Mackerel Rebuilding Framework
ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERY MANAGEMENT PLAN

Measures to Rebuild the Atlantic Mackerel Stock, Including 2019-2021 Specifications and the River Herring and Shad Cap

Includes Text for DRAFT Environmental Assessment

Atlantic Mackerel
Scomber scrombus

Prepared by the

Mid-Atlantic Fishery Management Council (Council) in collaboration with the

National Marine Fisheries Service (NMFS)

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1.0 EXECUTIVE SUMMARY AND TABLE OF CONTENTS

In this Framework Adjustment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (MSB FMP) the Mid-Atlantic Fishery Management Council (Council) considers measures to rebuild the Atlantic mackerel ("mackerel" hereafter) stock, including setting 2019-2021 mackerel specifications with the fishery's accompanying river herring and shad (RH/S) cap.

The purposes of this action are to rebuild the mackerel stock so that Optimum Yield (OY) can be achieved on an ongoing basis and implement associated specifications including the RH/S cap. The action is needed because the recent benchmark mackerel assessment found the mackerel stock to be overfished, with overfishing occurring based on 2016 data (which was the most recent data available for the assessment) (NEFSC 2018). Also, previously-set specifications were for 2016-2018 so new specifications are generally needed for 2019 and beyond regardless of the assessment findings.

After the results of the assessment, the Council deliberated on the issue at its April 2018 meeting and will take final action at its August 2018 meeting. The Council also received or will receive input from the MSB Advisory Panel (AP) on April 13, 2018, and input from the combined MSB and RH/S APs on July 17. The MSB and RH/S Committees will meet jointly on July 18, 2018 to develop recommendations for the Council. A Fishery Management Action Team has met several times to help develop possible alternatives and related analyses.

The Council accepted (or will accept) comments at both Council meetings and will select the preferred alternatives in August 2018 to recommend to NOAA Fisheries for approval and implementation. NOAA Fisheries will publish a proposed rule along with this Environmental Assessment for public comment. After considering public comments on the proposed rule, NOAA Fisheries will publish a final rule with implementation details, as long as the action is ultimately approved by NOAA Fisheries.

The purposes of this document, which will become an Environmental Assessment (EA) are to explain the potential actions and analyze their impacts on the human environment, including any impacts to Endangered Species Act (ESA) listed species and marine mammals. The proposed alternatives are expected to result in positive benefits to the nation by restoring the sustainability of the mackerel resource and achieving OY on an ongoing basis. This action should not result in significant impacts on any valued ecological components from the perspective of the National Environmental Policy Act (NEPA). Because none of the preferred alternatives are associated with significant impacts to the biological, social, economic, or physical environment, a "Finding of No Significant Impact" (FONSI) may be made and this document will constitute an EA to satisfy the impact analysis requirements of NEPA. Summaries of the preferred alternative and expected impacts will be added below once preferred alternatives are selected by the Council. Details of all alternatives and their impacts are in Sections 5 and 7, respectively.

Summary of Preferred Alternatives X, Y, and Z – To be completed once the Council selects preferred alternatives.

Target Species Impact Summary – To be completed once the Council selects preferred alternatives.

Non-Target Species Impact Summary – To be completed once the Council selects preferred alternatives.

Habitat Impact Summary - To be completed once the Council selects preferred alternatives.

Protected Resources Impact Summary – To be completed once the Council selects preferred alternatives.

Human Communities Impact Summary – To be completed once the Council selects preferred alternatives.

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2.0 LIST OF COMMON ACRONYMS AND ABBREVIATIONS

ABC	**Acceptable Biological Catch**
ACL	**Annual Catch Limit**
ACT	**Annual Catch Target**
ASMFC	**Atlantic States Marine Fisheries Commission or Commission**
B	**Biomass**
CFR	**Code of Federal Regulations**
CPH	**Confirmation of Permit History**
CV	**coefficient of variation**
DAH	**Domestic Annual Harvest**
DAP	**Domestic Annual Processing**
EA	**Environmental Assessment**
EEZ	**Exclusive Economic Zone**
EFH	**Essential Fish Habitat**
EIS	**Environmental Impact Statement**
ESA	**Endangered Species Act of 1973**
F	**Fishing Mortality Rate**
FMP	**Fishery Management Plan**
FR	**Federal Register**
GB	**Georges Bank**
GOM	**Gulf of Maine**
M	**Natural Mortality Rate**
MAFMC	**Mid-Atlantic Fishery Management Council**
MMPA	**Marine Mammal Protection Act**
MSA	**Magnuson-Stevens Fishery Conservation and Management Act (as currently amended)**
MSB	**Atlantic Mackerel, Squid, Butterfish**
MSY	**Maximum Sustainable Yield**
MT (or mt)	**Metric Tons (1 mt equals about 2,204.62 pounds)**
NE	**Northeast**
NEFMC	**New England Fishery Management Council**
NEFSC	**Northeast Fisheries Science Center**
NEPA	**National Environmental Policy Act**
NMFS	**National Marine Fisheries Service (NOAA Fisheries)**

NOAA	**National Oceanic and Atmospheric Administration**
OFL	**Overfishing Level**
OY	**Optimum Yield**
PBR	**Potential Biological Removal**
SARC	**Stock Assessment Review Committee**
SAW	**Stock Assessment Workshop**
SNE	**Southern New England**
SSC	**Scientific and Statistical Committee**
U.S.	**United States**
T1, T2, T3	**Trimesters 1, 2, and/or 3 of the Longfin Squid Fishery**
VTR	**Vessel Trip Report**

Notes: "Mackerel" refers to "Atlantic mackerel" unless otherwise noted. Likewise "herring" alone refers to Atlantic herring.

3.0 LISTS OF TABLES, AND FIGURES

3.1 List of Tables

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4.0 INTRODUCTION, BACKGROUND, AND PROCESS

4.1 Introduction and Background

The mackerel fishery is currently managed with an annual quota, in-season proactive accountability measures, and reactive accountability measures requiring paybacks of catches that exceed the Annual Catch Limit (ACL). The stock's Total Acceptable Biological Catch (ABC) in 2018 is 19,898 metric tons (MT), and after Canadian catch is deducted, the U.S. ABC is 11,009 MT. There is a 683 MT recreational allocation (6.2%) and a 10,327 MT commercial allocation (93.8%). There is a 10% management uncertainty buffer of 1,033 MT, resulting in a commercial annual catch target (ACT) of 9,294 MT. The management uncertainty buffer exists in case this high volume fishery overshoots its ACT before a closure. 1.26% is set aside for expected discards, leaving a commercial quota or Domestic Annual Harvest (DAH) of 9,177 MT (20,231,356 pounds). There are no recreational regulations other than angler registration through a state or federal registry/license.

When the fishery starts each year, the various commercial mackerel permit categories start with different trip limits. Tier 1 has an unlimited trip limit, Tier 2 has a 135,000 pound trip limit, and Tier 3 has a 100,000 pound trip limit. The open access incidental permit has a 20,000 pound trip limit. When the fishery reaches 95% of the DAH, all permits have 20,000 pound trip limits. When the fishery reaches 100% of the DAH, there is zero possession allowed by vessels with federal mackerel permits (which are required to fish for or possess mackerel in federal waters), though a separate action is likely to change that to 5,000 pounds in late 2018 before this current action is implemented.

The mackerel fishery also operates under a river herring and shad catch cap (RH/S), which closes the directed mackerel fishery and implements a 20,000 pound trip limit for all permits once 82 MT of RH/S has been projected to be caught in the directed mackerel fishery. In 2018, the RH/S cap closed the mackerel fishery effective February 27, 2018, at which point approximately 88% of the mackerel DAH had been harvested. The RH/S cap is currently 82 mt, which is a 0.89% ratio of RH/S to the mackerel DAH (9,177 MT X 0.0089 = 82 MT). Because other fish, primarily Atlantic herring (herring) are also retained on trips that catch mackerel, and because all kept fish on mackerel trips are counted against the cap, the approximate ratio (approximate because the amounts of other landed fish vary from year to year) that the fishery must stay below to catch the full mackerel quota is 0.64% of RH/S to all kept catch on mackerel trips (defined as trips that catch more than 20,000 pounds of mackerel).

Based on a recent benchmark assessment (NEFSC 2018), the mackerel stock has recently been declared overfished, with overfishing occurring in 2016. Related reports have been posted to the Northeast Regional Stock Assessment Workshop (SAW) report webpage: https://www.nefsc.noaa.gov/saw/reports.html. F40% was recommended as the proxy for FMSY (fishing mortality at "maximum sustainable yield") and was estimated to be 0.26. F40% was selected as a proxy for FMSY due to consistency with the Canadian reference point and ability to prevent stock collapse for stocks with similar life histories. F40% produces 40% of the "spawning stock biomass per recruit" (equivalent to lifetime egg production) relative to an unfished condition. Fishing mortality (F) in 2016 was estimated to be 0.47, so overfishing was occurring in 2016. The 2016 spawning stock biomass (SSB) was estimated to be 43,519 metric tons (MT), or 22% of the SSB target so mackerel is "overfished" (below 50% of the target). The biomass target is the SSB associated with the FMSY proxy or "SSBmsyproxy," and is estimated to be 196,894 MT. Once rebuilt, the MSYproxy is estimated to be 41,334 MT (combined U.S. and Canadian catch).

The alternatives in this document seek to rebuild mackerel to SSBmsyproxy as defined in the recent mackerel assessment (196,894 MT). The Council's Ecosystem Approach to Fisheries Management (EAFM) Guidance Document states "It shall be the policy of the Council to support the maintenance of an adequate forage base in the Mid-Atlantic to ensure ecosystem productivity, structure and function and to support sustainable fishing communities" and "the Council could adopt biological reference points (overfishing levels or OFL) for forage stocks that are more conservative than the required MSA standard of Fmsy." Acknowledging that the science to evaluate the biological and socioeconomic tradeoffs of more precautionary management is lacking, the Council adopted a policy that it would promote data collection and development of analyses to get to the point where the Council could evaluate the relevant tradeoffs and "establish an optimal forage fish harvest policy."

Views vary on the precaution inherent in using the recommended F40% as a proxy for FMSY (and for the resulting SSBmsyproxy target). Clark 1993, Mace 1994, Gabriel and Mace 1999, and Legault and Brooks 2013 generally recommended F40% for typical stocks. Clark 2002 notes that for typical stocks, fishing at F40% would be expected to result in a target biomass that is 20%-35% of an unfished biomass. Pikitch et al 2012 recommended more conservative approaches for forage species to support predators, and this has spawned ongoing debate (e.g. Hilborn et al 2017 to the contrary).

While the rebuilding target is based on F40%, the Council's risk policy produces catches less than fishing at this overfishing reference point. If the standard P* approach recommended by the SSC (i.e. 100% C.V. and typical life history) is used once the stock is rebuilt, due to the Council's risk policy and resulting lower-than-MSY catches (19% lower than MSY), the mackerel assessment and associated projections indicate the mackerel spawning stock should increase to approximately 150% of the target/rebuilt spawning biomass without any additional precaution other than the precaution from the Council's P* Risk Policy (MAFMC 2018).

The Council's current risk policy states that the Scientific and Statistical Committee (SSC) should provide Acceptable Biological Catches (ABCs) that are the lesser of rebuilding ABCs or standard risk policy (P*) ABCs. In some alternatives being considered by the Council, the rebuilding ABCs would be higher than the standard P* ABCs. In these cases, the alternatives (1c and 1d) also contain a modification of the Council's risk policy to indicate that the Council does want to use the rebuilding ABCs. Alternative 1b uses the current, unmodified risk policy. The risk policy change would only apply to this instance of initiating rebuilding for mackerel.

The alternatives also address other management measures needed to implement annual specifications, including the RH/S cap that restricts RH/S catch in the mackerel fishery.

4.2 Process

The Council accepted (or will accept) comments at both Council meetings and select the preferred alternative in August 2018 to recommend to NOAA Fisheries for approval and implementation. The Council also received or will receive input from the MSB AP on April 13, 2018, and input from the combined MSB and RH/S APs on July 17. The combined MSB and RH/S Committees meet on July 18 to provide recommendations to the Council.

Pending Council action, NOAA Fisheries will publish a proposed rule along with this Environmental Assessment for public comment. After considering public comments on the proposed rule, NOAA Fisheries will publish a final rule with implementation details, as long as the action is ultimately approved by NOAA Fisheries.

4.3 Purpose and Need

The purposes of this action are to rebuild the mackerel stock so that Optimum Yield (OY) can be achieved on an ongoing basis and implement associated specifications.

The action is needed because the recent benchmark mackerel assessment found the mackerel stock to be overfished, with overfishing occurring based on 2016 data (which was the most recent data available for the assessment) (NEFSC 2018). Also, previously-set specifications were for 2016-2018 so new specifications are generally needed for 2019 and beyond regardless of the assessment findings.

4.4 Regulatory Authority

The MSA states that Fishery Management Plans (FMPs) shall "contain the conservation and management measures… necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery." As discretionary provisions of Fishery Management Plans (FMPs), the MSA also allows restriction of fishing by gear/area/time/season. Seasonal management based on attainment of quotas has been previously incorporated into the MSB FMP and this action could modify the existing provisions regarding how the fishery closes due to attainment of the DAH or a portion of the DAH. The RH/S cap was implemented under the discretionary MSA provisions providing for conservation of non-target species.

4.5 FMP History and Management Objectives

Management of the MSB fisheries began through the implementation of three separate FMPs (one each for mackerel, squid, and butterfish) in 1978. The plans were merged in 1983. Over time a wide variety of management issues have been addressed including stock rebuilding, habitat conservation, bycatch minimization, and limiting participation in the fisheries. The history of the plan and its amendments can be found at http://www.mafmc.org/fisheries/fmp/msb.

The management goals and objectives, as described in the current FMP are listed below.

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.
2. Promote the growth of the U.S. commercial fishery, including the fishery for export.

3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.
4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.
5. Increase understanding of the conditions of the stocks and fisheries.
6. Minimize harvesting conflicts among U.S. commercial, U.S. recreational, and foreign fishermen.

4.6 Management Unit and Geographic Scope

The management unit (fish stock definition) for the MSB FMP is all Atlantic mackerel (*Scomber scombrus*), longfin inshore squid (*Doryteuthis (Amerigo) pealeii*),[1] Northern shortfin squid (*Illex illecebrosus*), and Atlantic butterfish (*Peprilus triacanthus*) under U.S. jurisdiction in the Northwest Atlantic, with a core fishery management area from Maine to North Carolina.

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[1] For longfin squid there was a scientific name change from *Loligo pealeii* to *Doryteuthis (Amerigo) pealeii*. To avoid confusion, this document will utilize the common name "longfin squid" wherever possible, but this squid is still often referred to as "*Loligo*" by interested parties.

5.0 WHAT ALTERNATIVES ARE CONSIDERED IN THIS DOCUMENT?

5.1 ALTERNATIVE SET 1: Rebuilding timelines, Risk policies, OFL, Total ABC, Canadian catch deduction, U.S. ABC, Recreational/Commercial allocation, ACT, and DAH.[2]

Alternative 1a. No action/Status Quo (current specifications roll over with no action)

With no action, no rebuilding plan would be implemented, no changes to the current risk policy would occur, and the current specifications would remain in place, as described in the table below. The fishery's operational details would stay as described in 4.1 1a's Total ABC, 19,898 MT, was 50% of the 1978-2014 median mackerel catch, which a data limited simulation exercise suggested came closest to meeting, while not exceeding, the acceptable probability of overfishing from the MAFMC risk policy. See https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=1e9802ffddb05d0243d9c657fade956c&rgn=div5&view=text&node=50:12.0.1.1.5&idno=50#se50.12.648_120 (§648.20 and §648.21) for additional details on the risk policy and ABC control rules).

8,889 MT (45%) is set aside to cover Canadian catches (this was set before Canada increased its quota to 10,000 MT). It was based on a Canadian quota of 8,000 MT plus 889 MT for uncertainty. This leaves 11,009 MT for the U.S. ABC/ACL, split 6.2% recreational (683 MT) and 93.8% commercial (10,327 MT) per the FMP. 10% of the commercial allocation is set aside as a management uncertainty buffer (in case this high-volume fishery is not closed at the exact right time) for an annual catch target (ACT) of 9,294 MT. 1.26% of the ACT is set aside for discards based on previous assessment discard estimates, leaving 9,177 MT for landings or "domestic annual harvest (DAH)."

Table 1. Current Mackerel Specifications (1a)

Current (all numbers are in metric tons)	
Specification	Mackerel 2019 (MT)
Overfishing Limit (OFL)	Unknown
Total Acceptable Biological Catch (ABC) from SSC	19,898
Canadian Deduction (Quota and 10% Management Uncertainty)	8,889
U.S. ABC = Annual Catch Limit (ACL) (Canadian catch deducted)	11,009
Recreational Allocation (6.2% of ACL)	683
Recreational Annual Catch Target (10% less than allocation to account for management uncertainty)	614
Commercial Allocation (93.8% of ACL)	10,327
Commercial Annual Catch Target (10% less than allocation to account for management uncertainty)	9,294
Landings or "Domestic Annual Harvest" (1.26% less than Annual Catch Target to account for expected discards)	9,177

[2] OFL = Overfishing level, ABC = Acceptable Biological Catch, ACT = Annual Catch Target, DAH = Domestic Annual Harvest, which is the commercial quota.

Alternative 1b. 3-Year Rebuilding based on P* with no risk policy change.

With Alternative 1b, the Council would begin a 3-year rebuilding program based on the Council's current "P*" risk policy, which coincidentally happens to be projected[3] to rebuild mackerel in 3 years. A table (Table 2) on the next page summarizes the various specifications, which are determined by a series of decisions described next.

For a species with a quantitative assessment, the Council has charged its SSC with providing catch advice (the Total ABC) that has a certain probability of overfishing based on stock size, the species life history, and the SSC's judgement of the uncertainty involved in calculating the overfishing level (OFL). Applying this to mackerel, the SSC noted the recent and predicted stock sizes, determined mackerel has a typical life history, and increased the measures of uncertainty to a 100% coefficient of variation (C.V.) on the overfishing level (the SSC determined the C.V. coming directly out of the model does not account for some sources of uncertainty).

The Council has a sliding scale of acceptable probability of overfishing for a species with a typical life history where lower stock sizes trigger a lower probability of overfishing. For a typical rebuilt stock, the Council uses a 40% probability of overfishing. For mackerel, with its low but projected increasing stock size, the required probabilities of overfishing are 24% for 2019, 29% for 2020, and 34% for 2021.[4]

To calculate the various specifications Canadian catch must be deducted. To date the Council has endorsed an option where 50% of the Total ABC would be set aside to cover Canadian catch. Canadian quotas have been increasing somewhat in recent years, and if the U.S. increases ABCs then Canada may follow suit and a 50% set-aside would allow for increases in Canadian quotas. Meghan Lapp, representing Seafreeze Ltd, requested that the FMAT consider whether deducting the current Canadian quota, 10,000 MT would be justifiable. The FMAT determined that doing so would be justifiable and is similar to the current approach, though it will usually deduct less for Canada than a 50%-50% split, theoretically increasing the chance of exceeding the total ABC (which could make overfishing more likely). However, given the current status of Canadian management (beginning to develop a rebuilding plan) a 10,000 MT deduction is justifiable because rapid increases in Canadian quotas seem unlikely. In the table below, sub-alternatives exists for either a 50% (Canada1) or 10,000 MT (Canada2) deduction (the 10,000 MT deduction option is a suggested addition by staff and can be added or removed if desired). This is handled similarly under all specification options. This is not modifying the FMP's requirements to account for Canadian catch, only operationalizing the requirement for this particular set of specifications (i.e. it can be changed in future specifications).

To calculate the specifications the Commercial/Recreational allocation must also be addressed. Currently the recreational fishery is allocated 6.2%. The total median recreational catch 2013-2017 has been 1,209 MT (range of 767 MT to 1,611 MT). However only 8%-26% comes from federal waters and could be impacted by federal regulations. There is also no long-term recreational total catch trend (see Figure 9). Closing federal waters could even just drive more recreational catch into state waters and not impact total catch. Given the lack of control over this fishery, this alternative also moves away

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[3] All projections in this document utilize the final assessment model that found mackerel to be overfished, and assume the ABC is caught for future years, that typical recruitment (i.e. similar to 1975-2016) occurs, and that natural mortality remains constant (same as the assessment model).

[4] The previous year's stock size determines the acceptable percentage of overfishing, which is why the 2021 percentage is only 34% and not 40% even though under this alternative mackerel is predicted to rebuild in 2021.

from a percentage allocation to a deduction of 1,209 MT for total recreational catch to avoid substantial ACL overages under all specification options.

Currently there is a 10% management uncertainty buffer set aside to create a reduced Annual Catch Target (ACT) in case the fishery can not be closed at the exact right time. Mackerel is a high volume fishery, which makes precise closures difficult. However, because the Council is considering moving to a system of phased trip limits (see Alternative Set 2) that incorporate their own buffering system, a 3% management uncertainty is proposed for this alternative. The phased trip limits should slow the fishery so a 10% buffer will not be needed. Finally, the last step in calculating the commercial quota is accounting for discards. 2012-2016 discards accounted for 0.37% of catch in the recent benchmark, and is set aside similarly under all specification options.

Table 2. Specifications for a 3-year rebuilding (1b)

Proposed Option 1b All numbers are in metric tons (MT)						
Specification	Mackerel 2019 (MT)		Mackerel 2020 (MT)		Mackerel 2021 (MT)	
	Canada1	Canada2	Canada1	Canada2	Canada1	Canada2
Overfishing Limit (OFL) (only available for 2019)	31,764	31,764	na	na	na	na
Total Acceptable Biological Catch (ABC) from	19,025	19,025	26,183	26,183	33,001	33,001
Canadian Deduction (1/2 of ABC or ABC-10,000)	9,513	10,000	13,092	10,000	16,501	10,000
U.S. ABC = ACL (Canadian catch deducted)	9,513	9,025	13,092	16,183	16,501	23,001
Recreational Allocation	1,209	1,209	1,209	1,209	1,209	1,209
Commercial Allocation (rest of ACL)	8,304	7,816	11,883	14,974	15,292	21,792
Management Uncertainty Buffer = 3%	249	234	356	449	459	654
Commercial ACT (97% of ACL)	8,054	7,582	11,526	14,525	14,833	21,138
DAH (0.37% discards)	8,025	7,553	11,483	14,471	14,778	21,060

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Alternative 1c. 5-Year Rebuilding based on projections from recent benchmark assessment.

With 1c, the Council would begin a 5-year rebuilding program based on the catches that are projected to rebuild the mackerel stock in 5 years. The first three years' specifications would be set as described below. Because these catches are higher than the P* catches described in 1b, the Council would also modify its risk policy. The Council's current risk policy states that the SSC should provide Acceptable Biological Catches (ABCs) that are the lesser of rebuilding ABCs or standard risk policy (P*) ABCs. Since the P* catches in 1b are higher than 1c, 1b would override 1c without a change in the risk policy. So for this alternative, the Council would amend its risk policy to indicate that in this case of mackerel rebuilding, the risk policy of the Council is changed to just use a 5-year rebuilding timeline. The SSC has provided Total ABCs to match this risk policy change for 2019-2021. Allowing a longer rebuilding timeline allows increased ABCs, and those increases affect many of the other specifications. Approaches for Canadian catch, the Commercial/Recreational allocation, the management uncertainty buffer/ACT, and discards are identical to Alternative 1b and are not repeated here, but the resulting specifications are detailed in the table below.

The SSC recommended an ABC of 35,195 MT for 2021. However, the FMAT noted that some SSC rebuilding ABCs like this one are higher/riskier than the ABCs that would result from applying the Council's standard risk policy to a fully rebuilt stock. The standard risk policy ABC for a 100% rebuilt mackerel stock assuming a 100% C.V. and typical life history is 33,474 metric tons (MT), or 81% of the Maximum Sustainable Yield for a rebuilt stock (MSY=41,334 MT). Accordingly, the FMAT recommends that no ABCs for 2019-2021 be initially set higher than 33,474 MT. Otherwise rebuilt ABCs might be lower than rebuilding ABCs. 33,474 MT is used in the table below for 2021's ABC, but could be modified back to 35,195 depending on the Council's preference and evaluation of the FMAT's recommendation.

Table 3. Specifications for a 5-year rebuilding (1c)

Proposed Option 1c All numbers are in metric tons (MT)						
Specification	Mackerel 2019 (MT)		Mackerel 2020 (MT)		Mackerel 2021 (MT)	
	Canada1	Canada2	Canada1	Canada2	Canada1	Canada2
Overfishing Limit (OFL) (only available for 2019)	31,764	31,764	na	na	na	na
Total Acceptable Biological Catch (ABC) from	29,184	29,184	32,480	32,480	33,474	33,474
Canadian Deduction (1/2 of ABC or ABC-10,000)	14,592	10,000	16,240	10,000	16,737	10,000
U.S. ABC = ACL (Canadian catch deducted)	14,592	19,184	16,240	22,480	16,737	23,474
Recreational Allocation	1,209	1,209	1,209	1,209	1,209	1,209
Commercial Allocation (rest of ACL)	13,383	17,975	15,031	21,271	15,528	22,265
Management Uncertainty Buffer = 3%	401	539	451	638	466	668
Commercial ACT (97% of ACL)	12,982	17,436	14,580	20,633	15,062	21,597
DAH (0.37% discards)	12,933	17,371	14,526	20,557	15,006	21,517

*****Council Staff recommends this (1c) alternative, as modified with the 10,000 MT deduction for Canadian catch ("Canada2") and the FMAT-recommended 33,474 ABC maximum in 2021 (highlighted in table above) on the basis it should both allow for mackerel to rebuild relatively quickly and for catches to increase moderately.*****

Alternative 1d. 7-Year Rebuilding based on projections from recent benchmark assessment.

With 1d, the Council would begin a 7-year rebuilding program based on the catches that are projected to rebuild the mackerel stock in 7 years. The first three years' specifications would be set as described below. Because these catches are higher than the P* catches described in 1b, the Council would also modify its risk policy. The Council's current risk policy states that the SSC should provide Acceptable Biological Catches (ABCs) that are the lesser of rebuilding ABCs or standard risk policy (P*) ABCs. Since the P* catches in 1b are higher than 1d, 1b would override 1d without a change in the risk policy. So for this alternative, the Council would amend its risk policy to indicate that in this case of mackerel rebuilding, the risk policy of the Council is changed to just use a 7-year rebuilding timeline. The SSC has provided Total ABCs to match this risk policy change for 2019-2021. Allowing a longer rebuilding timeline allows increased ABCs, and those increases affect many of the other specifications. Approaches for Canadian catch, the Commercial/Recreational allocation, the management uncertainty buffer/ACT, and discards are identical to Alternative 1b and are not repeated, but the resulting specifications are detailed in the table below.

The SSC recommended an ABC of 34,016 MT for 2020 and 36,551 MT for 2021. However, the FMAT noted that some SSC rebuilding ABCs like these are higher/riskier than the ABCs that would result from applying the Council's standard risk policy to a fully rebuilt stock. The standard risk policy ABC for a 100% rebuilt mackerel stock assuming a 100% C.V. and typical life history is 33,474 metric tons (MT), or 81% of the Maximum Sustainable Yield for a rebuilt stock (MSY=41,334 MT). Accordingly, the FMAT recommends that no ABCs for 2019-2021 be initially set higher than 33,474 MT. Otherwise rebuilt ABCs might be lower than rebuilding ABCs. 33,474 MT is used in the table below for 2020 and 2021 ABCs, but could be modified back to 34,016 MT for 2020 and 36,551 MT for 2021 depending on the Council's preference and evaluation of the FMAT's recommendation.

Table 4. Specifications for a 7-year rebuilding (1d)

Proposed Option 1d All numbers are in metric tons (MT)						
Specification	Mackerel 2019 (MT)		Mackerel 2020 (MT)		Mackerel 2021 (MT)	
	Canada1	Canada2	Canada1	Canada2	Canada1	Canada2
Overfishing Limit (OFL) (only available for 2019)	31,764	31,764	na	na	na	na
Total Acceptable Biological Catch (ABC) from	30,868	30,868	33,474	33,474	33,474	33,474
Canadian Deduction (1/2 of ABC or ABC-10,000)	15,434	10,000	16,737	10,000	16,737	10,000
U.S. ABC = ACL (Canadian catch deducted)	15,434	20,868	16,737	23,474	16,737	23,474
Recreational Allocation	1,209	1,209	1,209	1,209	1,209	1,209
Commercial Allocation (rest of ACL)	14,225	19,659	15,528	22,265	15,528	22,265
Management Uncertainty Buffer = 3%	427	590	466	668	466	668
Commercial ACT (97% of ACL)	13,798	19,069	15,062	21,597	15,062	21,597
DAH (0.37% discards)	13,747	18,999	15,006	21,517	15,006	21,517

5.2 ALTERNATIVE SET 2: In Season Management

Alternative 2a. No action/Status Quo (current closure measures roll over with no action)

The directed fishery closes at 95% of the DAH, and then a 20,000 pound trip limit is implemented for limited access permits. Incidental permits have a 20,000 pound trip limit regardless of fishery closure status. Limited access permits consist of 3 categories, Tier 1 with no initial trip limits, Tier 2 with 1 135,000-pound initial trip limit, and Tier 3 with a 100,000-pound initial trip limit. To restrict Tier 3 participants to their historical participation levels, they start a 20,000 pound trip limit if they land 7% of the DAH – this is a limit for them and not a set-aside. Additional details can be found at https://www.greateratlantic.fisheries.noaa.gov/sustainable/species/msb/index.html#el111022. At 100% of the DAH possession is prohibited in federal waters, though another action will change this to a 5,000 pound trip limit for all permits once 100% of the DAH is landed for the remainder of the 2018 fishing year. The RH/S cap can also close the directed fishery and implement a 20,000 pound trip limit for Tier 1-3 permits (see Alternative Set 3 for RH/S cap)

Alternative 2b. 80% of DAH Initial Trigger

When 80% of the DAH is projected to be landed, trip limits of 40,000 pounds would be implemented for Tier 1-3 directed permits and 5,000 pounds for incidental/open access permits. When 98% of the DAH is projected to be landed, a 5,000 pound trip limit would be implemented for all permits for the rest of the fishing year to cover remaining incidental catches. The initial Tier 2 and Tier 3 trip limits would remain the same, as would the Tier 3 7% limit. Recall from above there is also an additional 3% management uncertainty buffer than can accommodate any catches beyond 100% of the DAH. The RH/S cap could also still close the directed fishery and implement a 20,000 pound trip limit for Tier 1-3 permits. Once the RH/S cap has been triggered, additional changes to trip limits are only reductions, for example the trip limit would not increase to 40,000 pounds at 80% of the DAH if the RH/S cap has already been triggered. All possible combinations of triggers and DAHs will be provided in an Appendix in the EA. The Triggers for the preferred rebuilding option will be added in a table below once identified by the Committee/Council. An example based on the Council staff-recommended 5-year rebuilding option (1c) with a 10,000 MT deduction for Canada (Canada2) is provided below. Comparing the tables for 2b and 2c shows the key difference is in how quickly the fishery moves to the initial lower trip limit, which affects the amount of quota available for fishing under the initial lower trip limit.

Table 5. Example of 2b closures combined with 1c rebuilding

Proposed Option 1c + 2b In-Season Measures All numbers are in metric tons (MT)			
Specification	Mackerel 2019 (MT)	Mackerel 2020 (MT)	Mackerel 2021 (MT)
	Canada2	Canada2	Canada2
Total Acceptable Biological Catch (ABC) from	29,184	32,480	33,474
Canadian Deduction (1/2 of ABC or ABC-10,000)	10,000	10,000	10,000
DAH (Commercial Quota)	17,371	20,557	21,517
1st Close at 80% of DAH	13,897	16,445	17,214
Quota between 1st and 2nd close	3,127	3,700	3,873
2nd Close at 98% of DAH	17,024	20,145	21,087
Quota after 2nd close	347	411	430
Extra Management Uncertainty Buffer	539	638	668

The question of adaptive management came up at the last meeting, and the FMAT came up with the following provision that may or may not be added to this alternative: To facilitate adaptive management, if in November and December of each year NMFS determines that keeping the mackerel fishery open longer than the set percentage triggers (in any phase of the fishery) is unlikely to cause a DAH overage, then NMFS shall have the discretion, based on a projection to not close (or not further close) the fishery so that optimum yield can be harvested. Predicting catch can be difficult, but this provision allows for some flexibility and further development of optimizing the closure process. NMFS might end up going slightly over the DAH in an effort to optimize catch, but that is the purpose of the ACT management uncertainty buffer.

Alternative 2c. 85% of DAH Initial Trigger

As currently endorsed as an option by the Council, when 85% of the DAH is projected to be landed, trip limits of 20,000 pounds would be implemented for Tier 1-3 directed permits and 5,000 pounds for incidental/open access permits. When 98% of the DAH is projected to be landed, a 5,000 pound trip limit would be implemented for all permits for the rest of the fishing year to cover remaining incidental catches. Recall from above there is also an additional 3% management uncertainty buffer than can accommodate any catches beyond 100% of the DAH. The initial Tier 2 and Tier 3 trip limits would remain the same, as would the Tier 3 7% limit. The RH/S cap could also still close the directed fishery and implement a 20,000 pound trip limit for Tier 1-3 permits. Once the RH/S cap has been triggered, additional changes to trip limits would only be further reductions from 20,000 pounds. All possible combinations of triggers and DAHs will be provided in an Appendix in the EA. The Triggers for the preferred rebuilding option will be added in a table below once identified by the Committee/Council. An example based on the Council staff-recommended 5-year rebuilding option (1c) with a 10,000 MT deduction for Canada (Canada2) is provided below. Comparing the tables for 2b and 2c shows the key difference is in how quickly the fishery moves to the initial lower trip limit, which affects the amount of quota available for fishing under the initial lower trip limit.

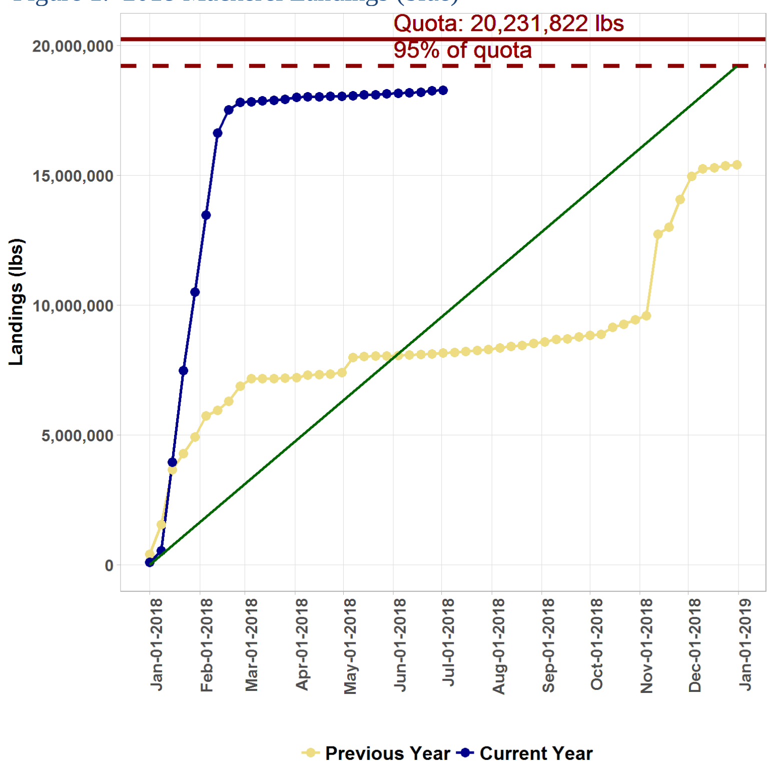
Table 6. Example of 2c closures combined with 1c rebuilding

Proposed Option 1c + 2c In-Season Measures All numbers are in metric tons (MT)			
Specification	Mackerel 2019 (MT)	Mackerel 2020 (MT)	Mackerel 2021 (MT)
	Canada2	Canada2	Canada2
Total Acceptable Biological Catch (ABC) from SSC	29,184	32,480	33,474
Canadian Deduction (1/2 of ABC or ABC-10,000)	10,000	10,000	10,000
DAH (Commercial Quota)	17,371	20,557	21,517
1st Close at 85% of DAH	14,766	17,473	18,290
Quota between 1st and 2nd close	2,258	2,672	2,797
2nd Close at 98% of DAH	17,024	20,145	21,087
Quota after 2nd close	347	411	430
Extra Management Uncertainty Buffer	539	638	668

The question of adaptive management came up at the last meeting, and the FMAT came up with the following provision that may or may not be added to this alternative: To facilitate adaptive management, if in November and December of each year NMFS determines that keeping the mackerel fishery open longer than the set percentage triggers (in any phase of the fishery) is unlikely to cause a DAH overage, then NMFS shall have the discretion, based on a projection to not close (or not further close) the fishery so that optimum yield can be harvested. Predicting catch can be difficult, but this provision allows for some flexibility and further development of optimizing the closure process. NMFS might end up going slightly over the DAH in an effort to optimize catch, but that is the purpose of the ACT management uncertainty buffer.

Since the April Council meeting when the Council endorsed this alternative, staff has been able to further examine mackerel landings under a 20,000 pound trip limit after the closure due to the RH/S cap. This is the first closure of the modern mackerel fishery. Landings under this trip limit after March 1, 2018 have averaged under 13 MT per week (Figure 1), or about 600 MT for a 10-month closure. Handgear auto-jig fishermen have been landing approximately 700-900 MT in the last three years, mostly in summer and later in the year so total post closure landings at a 20,000 pound trip limit might be expected to be around 1,300-1,500 MT.

Figure 1. 2018 Mackerel Landings (blue)



1,500 is less than the post 1st closure quota availability in this alternative of 2,258 MT – 2,797 MT under alternative 1c's DAH and 2c's closure provisions. However, the fishery landed about 4,000 MT per week for the first three months of 2006 so the approximately 2,500 MT quota available at a 20,000 pound trip limit is not that large relative to the potential scope of the directed mackerel fishery combined with possible post 1st closure landings. Our ability to accurately close the mackerel fishery due to directed mackerel landings has also never been tested. Accordingly, the 85% closure threshold seems reasonable to Council staff. Given the slow pace of landings after the implementation of the

20,000 pound trip limit in 2018 however, and the 5,000 pound trip limit for incidental permits proposed after the 1st closure, a higher trip limit for directed permits after the 1st closure also seems reasonable, and Council staff recommends modifying the 1st-closure trip limit to 30,000 pounds in this alternative. A 30,000 pound trip limit would further reduce incidental catch issues with the herring fishery and allow some additional opportunistic fishing by smaller vessels with directed permits (the trip limit would still be too small for primary directed fishing).

*****Council Staff recommends this (2c) alternative, but modified with a 30,000 pound trip limit for directed permits after the 1st closure on the basis that it should allow landings to get near DAH and cover most incidental catch during closures. *****

5.3 ALTERNATIVE SET 3: River Herring and Shad (RH/S) Cap

Before alternatives are considered, a history of the RH/S cap is presented. The caps are monitored based on observer data and landings data, and were set by looking at historical catch estimates based on observer and landings data. Since the caps are not based on the biology of RH/S, if RH/S abundance increases it will be harder for the fishery to operate within the cap, and if RH/S abundance decreases it will be easier for the fishery to operate within the cap.

2014 was the first year of the cap. The cap was set at **236 MT** and the mackerel DAH was 33,821 MT. 236 MT was the median of the values generated when the annual RH/S catch to all retained catch ratios on mackerel trips 2005-2012 (from observer data) were applied to the quota (33,821 MT). The critical ratio of cap to mackerel was 0.70% and the ratio of cap to all catch on mackerel trips (accounting for mostly Atlantic herring) was 0.50%. Above those ratios the fishery would have had an early shut down. The estimated cap catch was 6 MT.

In 2015 there was a slight adjustment to identifying cap trips made, but the same basic procedure was used to generate a cap of **155 MT** for a mackerel DAH of 20,872 MT. The Council included a provision that the cap starts out lower, at **89 MT** (the median of actual RH/S catches by the mackerel fishery 2005-2012) until 10,000 MT of mackerel landings, so that there was still a strong incentive to avoid RH/S catches even at the low levels of mackerel catch then occurring. Until landings got above 10,000 MT the critical ratio of cap to mackerel was 0.89% and the ratio of cap to all catch on mackerel trips (accounting for mostly Atlantic herring) was 0.64%. To catch the full mackerel quota the critical ratio of cap to mackerel was 0.74% and the ratio of cap to all catch on mackerel trips (accounting for mostly Atlantic herring) was 0.53%. The estimated cap catch was 13 MT.

For 2016-2018 the mackerel DAH dipped below 10,000 MT to 9,177 MT. The Council applied the 0.89% ratio to that quota to get a cap of **82 MT**. The estimated cap catch was 13 MT in 2016 and 39 MT in 2017. In 2018, the directed fishery caught 109 MT of RH/S when it was shut down and 8,072 MT of mackerel, for a ratio of 1.35%. In 2018 the cap operated as designed – the fishery was closed early due to the relatively high RH/S ratio. The overage was not large relative to the pace of mackerel landings and the precision of RH/S estimates.

Setting the RH/S Cap really depends on how much pressure the Council wants to put on the mackerel fishery and how the Council evaluates the potential impacts. The FMAT discussed several possible options for consideration, based primarily on past Council decisions, and they are listed below.

Alternative 3a. No action/Status Quo (current measures roll over with no action)

With no action, the current cap of 82 MT would roll over for whichever mackerel quotas are implemented.

Alternative 3b. Scale RH/S based on the 2015 ratio of 0.74% of mackerel DAH

Under 3b the RH/S cap would scale with the mackerel DAH based on the 0.74% ratio used in 2015. All possible combinations of caps and DAHs will be provided in an Appendix in the EA. The caps for the preferred rebuilding option will be added in a table below once identified by the Committee/Council, but can be calculated by multiplying any DAH by 0.0074. An example based on the Council staff-recommended 5-year rebuilding option (1c) with a 10,000 MT deduction for Canada (Canada2) is provided below.

Table 7. Example Scaled RH/S Cap 0.74% ratio and 1c

Proposed Option 1c + 3b RH/S Cap Option All numbers are in metric tons (MT)			
Specification	Mackerel 2019 (MT)	Mackerel 2020 (MT)	Mackerel 2021 (MT)
	Canada2	Canada2	Canada2
Total Acceptable Biological Catch (ABC) from	29,184	32,480	33,474
Canadian Deduction (1/2 of ABC or ABC-10,000)	10,000	10,000	10,000
DAH (Commercial Quota)	17,371	20,557	21,517
RH/S Cap	129	152	159

*****Council Staff recommends this (3b) alternative (combined with 3d), on the basis that it appears consistent with previous Council caps with DAH's over 10,000 MT. *****

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Alternative 3c. Scale RH/S based on current ratio of 0.89% of mackerel DAH

Under this alternative the RH/S cap would scale with the mackerel DAH based on the current 0.89% ratio. All possible combinations of caps and DAHs will be provided in an Appendix in the EA. The caps for the preferred rebuilding option will be added in a table below once identified by the Committee/Council, but can be calculated by multiplying any DAH by 0.0089. An example based on the Council staff-recommended 5-year rebuilding option (1c) with a 10,000 MT deduction for Canada (Canada2) is provided below.

Table 8. Example Scaled RH/S Cap 0.89% ratio and 1c

Proposed Option 1c + 3c RH/S Cap Option All numbers are in metric tons (MT)			
Specification	Mackerel 2019 (MT)	Mackerel 2020 (MT)	Mackerel 2021 (MT)
	Canada2	Canada2	Canada2
Total Acceptable Biological Catch (ABC) from	29,184	32,480	33,474
Canadian Deduction (1/2 of ABC or ABC-10,000)	10,000	10,000	10,000
DAH (Commercial Quota)	17,371	20,557	21,517
RH/S Cap	155	183	192

Alternative 3d (can be combined with 3b or 3c). Add a low-catch trigger to 3b or 3c as was done in 2015

Under this alternative, when mackerel quotas are above 10,000 MT and the associated RH/S cap is above 89 MT, the cap starts out lower, at 89 MT (the median of actual RH/S catches by the mackerel fishery 2005-2012) until 10,000 MT of mackerel landings so that there is still a strong incentive to avoid RH/S catches even at the low levels of mackerel catch. Once 10,000 MT of mackerel is landed, then the full cap becomes available. If the quota is at or above 10,000 MT, the cap will be at least 89 MT.

*****Council Staff recommends this (3d) alternative (combined with 3b), on the basis that it appears consistent with previous Council caps with DAH's over 10,000 MT. *****

5.4 Considered But Rejected Alternatives

1. 10-year Rebuilding Plan. The MSA typically allows up to a 10-year rebuilding timeline. In this case, a 10-year plan only provides slightly more ABC (2% more in 2019) than the 7-year timeline, so it would be hard to justify that 7 years wouldn’t be as short as possible after accounting for other considerations such as socioeconomic impacts, especially given the upward trend in possible catches. Accordingly, only timeframes up to 7 years were considered.

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6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES

This section identifies and describes the *valued ecosystem components* (VECs) (Beanlands and Duinker 1984) that comprise the affected environment and may be affected by the alternatives proposed in this document. The valued ecosystem components are identified and described here as a means of establishing the context for the impact analysis that will be presented in Section 7's "Analysis of Impacts." The significance of the various impacts of the proposed alternatives on the valued ecosystem components are also assessed from a cumulative effects perspective at the end of Section 7. The valued ecosystem components are:

1. Managed resources (Atlantic mackerel, longfin squid and *Illex* squid, and butterfish) and non-target species.
2. Habitat including EFH for the managed resources and non-target species
3. Endangered and other protected resources
4. Human communities

The affected environment consists of those physical, biological, and human components of the environment that are or will be meaningfully connected to mackerel fishing operations, and are described below. Overviews of the managed species in the FMP and of the physical environment are described first, to establish the context for the valued ecosystem components. While butterfish, longfin squid, and *Illex* squid should be negligibly affected by this action, summaries are provided since they are in the FMP. A summary for Atlantic herring is also included given the overlap with the mackerel and Atlantic herring fisheries. Impacts of the alternatives on the physical environment are addressed through analysis of impacts on habitat, as most of the impacted physical environment comprises EFH for various species.

6.1 Description of the Managed Resources and Non-target Fish Species

<u>Mackerel</u>

Atlantic mackerel is a semi-pelagic/semi-demersal (may be found near the bottom or higher in the water column) schooling fish species primarily distributed between Labrador (Newfoundland, Canada) and North Carolina. Based on the work of Sette (1943, 1950) and confirmed in the recent assessment, the stock is considered to comprise two spawning contingents: a northern contingent spawning primarily in the southern Gulf of St. Lawrence and a southern contingent spawning in the Mid-Atlantic Bight, Southern New England and the western Gulf of Maine. The two contingents mix during winter months on the Northeast U.S. shelf; however, the degree of mixing and natal homing is unknown. Mackerel in the northwest Atlantic were modeled as one stock for the recent assessment. The Canadian fishery catches largely the northern contingent while the U.S. fishery likely catches both contingents.

Mackerel Spawning occurs during spring and summer and progresses from south to north as the surface waters warm. Atlantic mackerel are serial, or batch spawners. Eggs and pelagic. Post-larvae gradually transform from planktonic to swimming and schooling behavior at about 30-50 mm. 50% of fish are mature at age 2 and about 98% are mature at age 3.

Atlantic mackerel are opportunistic feeders that can ingest prey either by individual selection of organisms or by passive filter feeding. A wide variety of fish and other animals are predators of mackerel.

Additional life history information is detailed in the Essential Fish Habitat (EFH) document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. The current status of Atlantic mackerel is overfished with overfishing occurring as of data through 2016 based on the results of SAW 64 (NEFSC 2018), and the Council has initiated a rebuilding action. However, because of a strong recruitment year-class (eggs spawned in 2015), the stock is projected to rebuild to target levels relatively quickly. Projections also indicate there was likely no overfishing in 2017 and that the stock should have climbed above the overfished threshold in 2018. Additional information on the mackerel fishery can be found in the EA for the 2016-2018 mackerel specifications, available at: https://www.greateratlantic.fisheries.noaa.gov/regs/2016/January/16msb2016specspr.html and in the recent assessment, available at https://www.nefsc.noaa.gov/saw/.

Butterfish

Atlantic butterfish is a semi-pelagic/semi-demersal schooling fish species primarily distributed between Nova Scotia, Canada and Florida. They are most abundant from the Gulf of Maine to Cape Hatteras and are fast-growing, short-lived, and form loose schools. Additional life history information is detailed in the EFH document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

The status of butterfish is not overfished (above target biomass) with no overfishing occurring according to a recent assessment update (NEFSC 2017a – available at http://www.mafmc.org/ssc-meetings/2017/may-17-18). The assessment update found that butterfish was at 141% of the target biomass in 2016. However, the update integrated recent trawl survey information that indicates recent recruitment has been poor, so biomass is expected to decline to below the SSBmsy target in 2017, but not below the overfished threshold. Fishing mortality appears to have been very low in recent years, so the decline is not a result of overfishing but rather poor recruitment. If recruitment returns to average levels, then the stock is predicted to build above the SSBmsy target by 2020 (http://www.mafmc.org/s/butterfish_projections_2018-2020.xlsx). Butterfish recruitment is variable, and the terminal year recruitment was underestimated the last time the assessment model was run (2014), so it is not unreasonable to expect recruitment to be closer to average levels over the course of the projection.

Longfin Squid

Longfin squid is a neritic (from the shore to the edge of the continental shelf), semi-pelagic schooling cephalopod species primarily distributed between Georges Bank and Cape Hatteras, NC. The squid, and the fishery, generally occur offshore in the winter and inshore during the summer, with mixing and migrations from one to the other in spring and fall. Additional life history information is detailed in the EFH document for the species (Jacobson 2005), located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. Information about the fishery, management and life history is presented in Arkhipkin et al. (2015). Based on a new biomass reference point from the 2010 stock assessment, the longfin squid stock was not overfished in 2009, but overfishing status was not determined because no overfishing threshold was recommended (though the assessment did describe the stock as "lightly exploited'). The most recent stock assessment document (NEFSC 2011) is available at: http://www.nefsc.noaa.gov/saw/reports.html. Longfin squid relative abundance and biomass indices from the NEFSC fall bottom trawl surveys are highly variable, and are graphed in the "NEFSC Biological Update" that is created as part of the annual quota setting process. These are available at: http://www.mafmc.org/ssc-meeting-documents/ (see May 2016 Meeting Materials). Longfin had a stock assessment update in 2017, which found the stock biomass to be at 174% of the target in 2016, even higher than the 128% of target biomass in 2009 in the 2011 benchmark assessment. The assessment update is available at http://www.mafmc.org/ssc-meetings/2017/may-17-18. ABCs are set by the Council's SSC to avoid overfishing given the best available science. See http://www.mafmc.org/ssc for details on how ABCs are set for this species.

Illex squid

Illex squid is an oceanic, semi-pelagic schooling cephalopod species distributed between Newfoundland and the Florida Straits. Additional life history information is detailed in the EFH document for the species (Hendrickson and Holmes 2004), located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. Information about the fishery, management and life history is presented in Arkhipkin et al. (2015). The status of *Illex* is unknown with respect to being overfished and is unknown with respect to overfishing. *Illex* squid relative abundance and biomass indices from the NEFSC fall bottom trawl surveys are highly variable and without trend, and are graphed in the "NEFSC Biological Update" that is created as part of the annual quota setting process. These are available at: http://www.mafmc.org/ssc-meeting-documents/ (see May 2016 Meeting Materials). According to the latest NEFSC "Illex Data Update" provided in April 2017 (available at http://www.mafmc.org/ssc-meetings/2017/may-17-18), relative abundance was near the long-term median during 2014-2016. ABCs are set by the Council's SSC to avoid overfishing given the best available science. See http://www.mafmc.org/ssc for details on how ABCs are set for this species. There has been a downward trend in *Illex* mean body weight in the survey since 1981, but squid size is likely highly influenced by environmental conditions.

Atlantic herring

Atlantic herring are migratory fish that live in large schools along the continental shelf from Labrador, Canada through Cape Hatteras, Virginia. Atlantic herring have supported an important commercial fishery since the late 19th century and play a very important role in the ecosystem as forage fish for many predators including marine mammals, larger fish, and seabirds, which support additional commercial, recreational, and ecotourism industries. Atlantic herring also provide effective and affordable bait to the lobster fishery, as well as other commercial and recreational fisheries. Finally, a smaller component of herring is landed and sold for human consumption, typically overseas. The status of herring is not overfished with overfishing not occurring, but an ongoing assessment is suggesting biomass declines due to low recruitment, which may affect future management. Additional life history information is detailed in the EFH document for the species (Reid et al 1999), located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. Additional management and population status information can be found in the last herring specifications EA (NEFMC 2016).

Non-Target Species

Non-target interactions in the longfin squid, *Illex* squid, and butterfish fisheries were recently described in the EA for the 2018-2020 specifications for those species (MAFMC 2017). Nothing in this action should affect the operation of those fisheries or their impact on non-target species.

Mackerel Non-Target Species

Various species are caught incidentally by the mackerel fishery. For non-target species that are managed under their own FMP, incidental catch/discards are also considered as part of the management of that fishery. These species will be impacted to some degree by the prosecution of the mackerel fishery. Mackerel non-target interactions were described in the EA for 2016-2018 mackerel specifications (MAFMC 2016). As described in that document, non-target interactions constitute a relatively small part of the catch in the mackerel fishery – discards are less than 1% of catch. The primary non-target species of current concern for mackerel are river herrings (alewife and blueback herring) and shads (American and hickory). Their populations are depleted in most river systems, and the RH/S cap limits catch of RH/S in the mackerel fishery. The text and table below update similar analysis on incidental catch and discards in the mackerel fishery from the 2016-2018 EA with more recent data (2015-2017 now vs 2011-2013 then).

The primary database used to assess discarding is the NMFS Observer Program database, which includes data from trips that had trained observers onboard to document discards. One critical aspect of using this database to describe discards is to correctly define the trips that constitute a given directed fishery. Presumably some criteria of what captains initially intend to target, how they may adjust targeting over the course of a trip, and what they actually catch would be ideal. Thus to begin this process, staff first reviewed 2015-2017 trips in the dealer weighout database to see if a certain trip definition could account for most mackerel landed. The result of this review resulted in the following definition for mackerel trips using landings: All trips that had at least 50% mackerel by weight and all trips over 100,000 pounds of mackerel regardless of the ratio of other species. This definition results in capturing 90% of all mackerel landings in the dealer weighout database 2015-2017. The other trips with lower mackerel landings landed a variety of species, mostly Atlantic herring, silver hake, longfin squid, and scup. The set of trips in the observer database with the same mackerel criteria included 9 on average for each year 2015-

2017. These trips made 124 hauls of which 89% were observed. Hauls may be unobserved for a variety of reasons, for example transfer to another vessel without an observer, observer not on station, haul slipped (dumped) in the water, etc.

Information on catch and discards is provided for observed hauls in the table below for species with at least 500 pounds of observed catch, with 500 pounds used as a proxy for catch that might be more than negligible. Since there were so few observed trips, extrapolations are not made but the total observed values are provided. Also, fishermen and processors on the Council's MSB Advisory Panel have also reported that mackerel caught in recent years are often caught incidental to Atl. herring fishing rather than during directed mackerel fishing because of the lack of fishable mackerel concentrations. This updated information is generally consistent with the previous analysis.

Table 9. Incidental catch in the mackerel fishery

NE Fisheries Science Center Common Name	Pounds Observed Caught	Pounds Observed Discarded	Of all discards observed, percent that comes from given species	Percent of given species that was discarded
MACKEREL, ATLANTIC	3,654,528	1,205	3%	0%
HERRING, ATLANTIC	1,294,838	1,577	4%	0%
BUTTERFISH	113,021	1,676	4%	1%
HAKE, SILVER (WHITING)	49,095	16,729	37%	34%
HERRING, NK	15,505	865	2%	6%
DOGFISH, SPINY	11,498	11,498	26%	100%
SQUID, ATL LONG-FIN	10,426	493	1%	5%
ALEWIFE	6,797	2,682	6%	39%
FISH, NK	3,567	3,567	8%	100%
HERRING, BLUEBACK	2,853	29	0%	1%
SHAD, AMERICAN	1,830	1,578	4%	86%
HADDOCK	899	323	1%	36%
HAKE, RED (LING)	575	324	1%	56%
SKATE, WINTER (BIG), WINGS	510	.	.	.
DORY, BUCKLER (JOHN)	506	481	1%	95%

An auto-jig fishery has developed in recent years. This fishery, while lightly observed 2015-2017 (13 trips targeting mackerel with handline or auto-jig handline), had minimal bycatch (primarily spiny dogfish).

Atlantic herring are not non-target species since the directed fishery targets mackerel and Atlantic herring. Non-negligible non-target species therefore include silver hake, spiny dogfish, alewife, blueback herring, American shad, haddock, red hake, winter skate, and John Buckler Dory. Of these red hake is experiencing overfishing and is overfished (https://www.nefsc.noaa.gov/publications/crd/crd1802/crd1802.pdf). There is no assessment for john dory buckler. Alewife, blueback herring, and American shad have been found to be depleted by the ASMFC, and assessment information is available at www.asmfc.org. Assessments for silver hake, spiny dogfish, haddock, and winter skate (not overfished, no overfishing) can be found at https://www.nefsc.noaa.gov/saw/.

6.2 Physical Environment and Habitat, Including EFH

Climate, physiographic, and hydrographic differences separate the Atlantic Ocean from Maine to Florida into the New England-Middle Atlantic Area and the South Atlantic Area (division/mixing at Cape Hatteras, NC). The MSB fisheries are prosecuted in the New England-Middle Atlantic Area. The inshore New England-Middle Atlantic area is relatively uniform physically, and is influenced by many large coastal rivers and estuarine areas. The continental shelf (characterized by water less than 650 ft. in depth) extends seaward approximately 120 miles off Cape Cod, narrows gradually to 70 miles off New Jersey, and is 20 miles wide at Cape Hatteras. Surface circulation is generally southwesterly on the continental shelf during all seasons of the year, although this may be interrupted by coastal indrafting and some reversal of flow at the northern and southern extremities of the area. Water temperatures range from less than 33 ^{o}F from the New York Bight north in the winter to over 80 ^{o}F off Cape Hatteras in summer.

Within the New England-Middle Atlantic Area, the principal area within which the MSB fisheries are prosecuted, is the Northeast Shelf Ecosystem which includes the area from the Gulf of Maine to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. A number of distinct subsystems comprise the region. The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and fast-moving currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. Detailed information on the affected physical and biological environments inhabited by the managed resources is available in Stevenson et al. (2006).

Ecosystem Considerations

The Council recently adopted an Ecosystem Approach to Fisheries Management (EAFM) Guidance Document, available at http://www.mafmc.org/eafm/. It is anticipated that the EAFM Guidance Document will serve through a transitional period where ecosystem considerations are introduced into Council management in an evolutionary fashion. Some highlights from the EAFM Guidance Document that could apply to MSB management include:

-It is the policy of the Council to support the maintenance of an adequate forage base in the Mid-Atlantic to ensure ecosystem productivity, structure and function and to support sustainable fishing communities.

-The Council could adopt biological reference points (overfishing levels or OFL) for forage stocks that are more conservative than the required MSA standard of F_{MSY}.

-The Council could modify the existing risk policy to accommodate ecosystem level concerns for forage species by reducing the maximum tolerance for risk of overfishing.

-The Council will promote the timely collection of data and development of analyses to support the biological, economic and social evaluation of ecosystem-level connections, tradeoffs, and risks, including those required to establish an optimal forage fish harvest policy.

-Habitat and climate change considerations will be more fully integrated into fishery management decisions.

The NEFSC also produces regular updates on conditions of the Northeast Shelf Ecosystem, which may be accessed via https://www.nefsc.noaa.gov/ecosys/. Highlights from the Spring 2017 Update include:

-Sea surface temperatures (SSTs) in the Northeast Shelf Large Marine Ecosystem during 2016 continue to be above average; in some season/area time series, 2016 was the second warmest year on record.

-The fall bloom on the Northeast Shelf was well developed in the Gulf of Maine, and, though chlorophyll concentrations on Georges Bank were elevated, a distinct bloom was not detected.

-Cool water habitats (5-15°C), which form the core thermal habitats of the Northeast Shelf, were at average levels in 2016, whereas warm habitats (16-27°C) were at high levels reflecting the trend of increasing warm habitat in recent years.

-The variability of daily sea surface temperature has increased over recent decades as indicated by the trends in standard deviation of daily temperature.

-The fall distribution of fish and invertebrate species sampled by the NEFSC shows that most species have moved to the Northeast and into deeper water.

-The strength of temperature fronts has increased over much of the Northeast Shelf; the 2016 frontal magnitudes for Northeast Shelf ecoregions moderated compared to recent years.

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Habitat, Including Essential Fish Habitat (EFH)

Pursuant to the Magnuson-Stevens Act / EFH Provisions (50 CFR Part 600.815 (a)(1)), an FMP must describe EFH by life history stage for each of the managed species in the plan. This information was updated via Amendment 11 to the MSB FMP. EFH for the four species managed under this FMP is described using fundamental information on habitat requirements by life history stage that is summarized in a series of EFH source documents produced by NMFS and available at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. The updated EFH designations (text and maps) are available at http://www.habitat.noaa.gov/protection/efh/efhmapper/. In general, EFH for the MSB species is the water column itself, and the species have temperature and prey preferences/needs that determine the habitat suitability of any particular area/depth, thus fishing activity has minimal impacts. Longfin squid also use hard bottom, submerged vegetation, other natural or artificial structure, and sand or mud to attach/anchor eggs, but there are no known preferences for different types of substrates or indications that fishing activity may negatively impact longfin squid egg EFH. Impacts to EFH are separate from impacts to longfin squid eggs themselves, which are considered in the alternative impact analysis in Section 7.

There are other lifestages of federally-managed species that have designated EFH that may be susceptible to adverse impacts from bottom trawls used in MSB fisheries, depending on the geographic distribution of their essential habitats in relation to the footprint of MSB bottom trawl fishing activity. Most directed fishing for mackerel fishing uses bottom trawl and mid-water trawl, though there are is a growing auto-jig fishery. Mid-water trawl and the auto-jig fishery should not affect the bottom, but bottom trawling does. EFH for all the federally-managed species in the region that could potentially be affected by mackerel bottom trawling activity is described in the following table (see Stevenson et al 2004):

Table 10. EFH descriptions for species vulnerable to trawl gear

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
Acadian redfish	Juveniles	Gulf of Maine and the continental slope north of 37°38'N	50-200 in Gulf of Maine, to 600 on slope	Sub-tidal coastal and offshore rocky reef substrates with associated structure-forming epifauna (e.g., sponges, corals) , and soft sediments with cerianthid anemones
Acadian redfish	Adults	Gulf of Maine and the continental slope north of 37°38'N	140-300 in Gulf of Maine, to 600 on slope	Offshore benthic habitats on finer grained sediments and on variable deposits of gravel, silt, clay, and boulders
American plaice	Juveniles	Gulf of Maine and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-180	Sub-tidal benthic habitats on mud and sand, also found on gravel and sandy substrates bordering bedrock
American plaice	Adults	Gulf of Maine, Georges Bank and bays and estuaries from Passamaquoddy Bay to Saco Bay, Maine and from Massachusetts Bay to Cape Cod Bay, Massachusetts Bay	40-300	Sub-tidal benthic habitats on mud and sand, also gravel and sandy substrates bordering bedrock
Atlantic cod	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including nearshore waters from eastern Maine to Rhode Island	Mean high water-120	Structurally-complex intertidal and sub-tidal habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements,

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
		and the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston Harbor, Cape Cod Bay, and Buzzards Bay		cobble, and boulder) with and without attached macroalgae and emergent epifauna
Atlantic cod	Adults	Gulf of Maine, Georges Bank, Southern New England, and the Mid-Atlantic to Delaware Bay, including the following estuaries: Passamaquoddy Bay to Saco Bay; Massachusetts Bay, Boston Harbor, Cape Cod Bay, and Buzzards Bay	30-160	Structurally complex sub-tidal hard bottom habitats with gravel, cobble, and boulder substrates with and without emergent epifauna and macroalgae, also sandy substrates and along deeper slopes of ledges
Atlantic halibut	Juveniles & Adults	Gulf of Maine, Georges Bank, and continental slope south of Georges Bank	60-140 and 400-700 on slope	Benthic habitats on sand, gravel, or clay substrates
Atlantic herring	Eggs	Coastal Gulf of Maine, Georges Bank, and Southern New England	5-90	Sub-tidal benthic habitats on coarse sand, pebbles, cobbles, and boulders and/or macroalgae
Atlantic sea scallop	Eggs	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Inshore and offshore benthic habitats (see adults)
Atlantic sea scallop	Larvae	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Massachusetts Bay, and Cape Cod Bay	No information	Inshore and offshore pelagic and benthic habitats: pelagic larvae (“spat”), settle on variety of hard surfaces, including shells, pebbles, and gravel and to macroalgae and other benthic organisms such as hydroids
Atlantic sea scallop	Juveniles	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats initially attached to shells, gravel, and small rocks (pebble, cobble), later free-swimming juveniles found in same habitats as adults
Atlantic sea scallop	Adults	Gulf of Maine coastal waters and offshore banks, Georges Bank, and the Mid-Atlantic, including the following estuaries: Passamaquoddy Bay to Sheepscot River; Casco Bay, Great Bay, Massachusetts Bay, and Cape Cod Bay	18-110	Benthic habitats with sand and gravel substrates
Atlantic surfclams	Juveniles and adults	Continental shelf from southwestern Gulf of Maine to Cape Hatteras, North Carolina	Surf zone to about 61, abundance low >38	In substrate to depth of 3 ft
Atlantic wolffish	Eggs	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<100	Sub-tidal benthic habitats under rocks and boulders in nests
Atlantic wolffish	Juveniles	U.S. waters north of 41˚N latitude and east of 71˚W longitude	70-184	Sub-tidal benthic habitats
Atlantic wolffish	Adults	U.S. waters north of 41˚N latitude and east of 71˚W longitude	<173	A wide variety of sub-tidal sand and gravel substrates once they leave

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
				rocky spawning habitats, but not on muddy bottom
Barndoor skate	Juveniles and adults	Primarily on Georges Bank and in Southern New England and on the continental slope	40-400 on shelf and to 750 on slope	Sub-tidal benthic habitats on mud, sand, and gravel substrates
Black sea bass	Juveniles and adults	Continental shelf and estuarine waters from the southwestern Gulf of Maine and Cape Hatteras, North Carolina	Inshore in summer and spring	Benthic habitats with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas, also offshore clam beds and shell patches in winter
Clearnose skate	Juveniles	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays, Chesapeake Bay, and Delaware Bays	0-30	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Clearnose skate	Adults	Inner continental shelf from New Jersey to the St. Johns River in Florida and certain bays and certain estuaries including Raritan Bay, inland New Jersey bays, Chesapeake Bay, and Delaware Bays	0-40	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Deep-sea red crab	Eggs	Outer continental shelf and slope throughout the region, including two seamounts	320-640	Benthic habitats attached to female crabs
Deep-sea red crab	Juveniles	Outer continental shelf and slope throughout the region, including two seamounts	320-1300 on slope and to 2000 on seamounts	Benthic habitats with unconsolidated and consolidated silt-clay sediments
Deep-sea red crab	Adults	Outer continental shelf and slope throughout the region, including two seamounts	320-900 on slope and up to 2000 on seamounts	Benthic habitats with unconsolidated and consolidated silt-clay sediments
Golden tilefish	Juveniles and adults	Outer continental shelf and slope from U.S.-Canada boundary to the Virginia-North Carolina boundary	100-300	Burrows in semi-lithified clay substrate, may also utilize rocks, boulders, scour depressions beneath boulders, and exposed rock ledges as shelter
Haddock	Juveniles	Inshore and offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in the Mid-Atlantic region	40-140 and as shallow as 20 in coastal Gulf of Maine	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel
Haddock	Adults	Offshore waters in the Gulf of Maine, on Georges Bank, and on the continental shelf in Southern New England	50-160	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel and adjacent to boulders and cobbles along the margins of rocky reefs
Little skate	Juveniles	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-80	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
Little skate	Adults	Coastal waters in the Gulf of Maine, Georges Bank, and the continental shelf in the Mid-Atlantic region as far south as Delaware Bay, including certain bays and estuaries in the Gulf of Maine	Mean high water-100	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Longfin inshore squid	Eggs	Inshore and offshore waters from Georges Bank southward to Cape Hatteras	Generally <50	Bottom habitats attached to variety of hard bottom types, macroalgae, sand, and mud
Monkfish	Juveniles	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on a variety of habitats, including hard sand, pebbles, gravel, broken shells, and soft mud, also seek shelter among rocks with attached algae
Monkfish	Adults	Gulf of Maine, outer continental shelf in the Mid-Atlantic, and the continental slope	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on hard sand, pebbles, gravel, broken shells, and soft mud, but seem to prefer soft sediments, and, like juveniles, utilize the edges of rocky areas for feeding
Ocean pout	Eggs	Georges Bank, Gulf of Maine, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	<100	Sub-tidal hard bottom habitats in sheltered nests, holes, or rocky crevices
Ocean pout	Juveniles	Gulf of Maine, on the continental shelf north of Cape May, New Jersey, on the southern portion of Georges Bank, and including certain bays and estuaries in the Gulf of Maine	Mean high water-120	Intertidal and sub-tidal benthic habitats on a wide variety of substrates, including shells, rocks, algae, soft sediments, sand, and gravel
Ocean pout	Adults	Gulf of Maine, Georges Bank, on the continental shelf north of Cape May, New Jersey, and including certain bays and estuaries in the Gulf of Maine	20-140	Sub-tidal benthic habitats on mud and sand, particularly in association with structure forming habitat types; i.e. shells, gravel, or boulders
Ocean quahogs	Juveniles and adults	Continental shelf from southern New England and Georges Bank to Virginia	9-244	In substrate to depth of 3 ft
Offshore hake	Juveniles	Outer continental shelf and slope from Georges Bank to 34° 40’N	160-750	Pelagic and benthic habitats
Offshore hake	Adults	Outer continental shelf and slope from Georges Bank to 34° 40’N	200-750	Pelagic and benthic habitats
Pollock	Juveniles	Inshore and offshore waters in the Gulf of Maine (including bays and estuaries in the Gulf of Maine), the Great South Channel, Long Island Sound, and Narragansett Bay, Rhode Island	Mean high water-180 in Gulf of Maine, Long Island Sound, and Narragansett Bay; 40-180 on Georges Bank	Intertidal and sub-tidal pelagic and benthic rocky bottom habitats with attached macroalgae, small juveniles in eelgrass beds, older juveniles move into deeper water habitats also occupied by adults
Pollock	Adults	Offshore Gulf of Maine waters, Massachusetts Bay and Cape Cod Bay, on the southern edge of Georges Bank, and in Long Island Sound	80-300 in Gulf of Maine and on Georges Bank; <80 in Long Island Sound, Cape Cod Bay, and Narragansett Bay	Pelagic and benthic habitats on the tops and edges of offshore banks and shoals with mixed rocky substrates, often with attached macro algae

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
Red hake	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including Passamaquoddy Bay to Cape Cod Bay in the Gulf of Maine, Buzzards Bay and Narragansett Bay, Long Island Sound, Raritan Bay and the Hudson River, and lower Chesapeake Bay	Mean high water-80	Intertidal and sub-tidal soft bottom habitats, esp those that that provide shelter, such as depressions in muddy substrates, eelgrass, macroalgae, shells, anemone and polychaete tubes, on artificial reefs, and in live bivalves (e.g., scallops)
Red hake	Adults	In the Gulf of Maine, the Great South Channel, and on the outer continental shelf and slope from Georges Bank to North Carolina , including inshore bays and estuaries as far south as Chesapeake Bay	50-750 on shelf and slope, as shallow as 20 inshore	Sub-tidal benthic habitats in shell beds, on soft sediments (usually in depressions), also found on gravel and hard bottom and artificial reefs
Rosette skate	Juveniles and adults	Outer continental shelf from approximately 40˚N to Cape Hatteras, North Carolina	80-400	Benthic habitats with mud and sand substrates
Scup	Juveniles	Continental shelf between southwestern Gulf of Maine and Cape Hatteras, North Carolina and in nearshore and estuarine waters between Massachusetts and Virginia	No information	Benthic habitats, in association with inshore sand and mud substrates, mussel and eelgrass beds
Scup	Adults	Continental shelf and nearshore and estuarine waters between southwestern Gulf of Maine and Cape Hatteras, North Carolina	No information, generally overwinter offshore	Benthic habitats
Silver hake	Juveniles	Gulf of Maine, including certain bays and estuaries, and on the continental shelf as far south as Cape May, New Jersey	40-400 in Gulf of Maine, >10 in Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats in association with sand-waves, flat sand with amphipod tubes, shells, and in biogenic depressions
Silver hake	Adults	Gulf of Maine, including certain bays and estuaries, the southern portion of Georges Bank, and the outer continental shelf and some shallower coastal locations in the Mid-Atlantic	>35 in Gulf of Maine, 70-400 on Georges Bank and in the Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats, often in bottom depressions or in association with sand waves and shell fragments, also in mud habitats bordering deep boulder reefs, on over deep boulder reefs in the southwest Gulf of Maine
Smooth skate	Juveniles	Offshore Gulf of Maine, some coastal bays in Maine and New Hampshire, and on the continental slope from Georges Bank to North Carolina	100-400 offshore Gulf of Maine, <100 inshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
Smooth skate	Adults	Offshore Gulf of Maine and the continental slope from Georges Bank to North Carolina	100-400 offshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
Summer flounder	Juveniles	Continental shelf and estuaries from Cape Cod, Massachusetts, to Cape Canaveral, Florida	To maximum 152	Benthic habitats, including inshore estuaries, salt marsh creeks, seagrass beds, mudflats, and open bay areas
Summer flounder	Adults	Continental shelf from Cape Cod, Massachusetts, to Cape Canaveral, Florida, including shallow coastal and estuarine waters during warmer months	To maximum 152 in colder months	Benthic habitats

Species	Life Stage	Geographic Area	Depth (meters)	Habitat Type and Description
Spiny dogfish	Juveniles	Primarily the outer continental shelf and slope between Cape Hatteras and Georges Bank and in the Gulf of Maine	Deep water	Pelagic and epibenthic habitats
Spiny dogfish	Female sub-adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male sub-adults	Primarily in the Gulf of Maine and on the outer continental shelf from Georges Bank to Cape Hatteras	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Female adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male adults	Throughout the region	Wide depth range	Pelagic and epibenthic habitats
Thorny skate	Juveniles	Offshore Gulf of Maine, some coastal bays in the Gulf of Maine, and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
Thorny skate	Adults	Offshore Gulf of Maine and on the continental slope from Georges Bank to North Carolina	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
White hake	Juveniles	Gulf of Maine, Georges Bank, and Southern New England, including bays and estuaries in the Gulf of Maine	Mean high water - 300	Intertidal and sub-tidal estuarine and marine habitats on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats
White hake	Adults	Gulf of Maine, including coastal bays and estuaries, and the outer continental shelf and slope	100-400 offshore Gulf of Maine, >25 inshore Gulf of Maine, to 900 on slope	Sub-tidal benthic habitats on fine-grained, muddy substrates and in mixed soft and rocky habitats
Windowpane flounder	Juveniles	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to northern Florida, including bays and estuaries from Maine to Maryland	Mean high water - 60	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Windowpane flounder	Adults	Estuarine, coastal, and continental shelf waters from the Gulf of Maine to Cape Hatteras, North Carolina, including bays and estuaries from Maine to Maryland	Mean high water - 70	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Winter flounder	Eggs	Eastern Maine to Absecon Inlet, New Jersey (39° 22´N) and Georges Bank	0-5 south of Cape Cod, 0-70 Gulf of Maine and Georges Bank	Sub-tidal estuarine and coastal benthic habitats on mud, muddy sand, sand, gravel, submerged aquatic vegetation, and macroalgae
Winter flounder	Juveniles	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 60	Intertidal and sub-tidal benthic habitats on a variety of bottom types, such as mud, sand, rocky substrates with attached macro algae, tidal wetlands, and eelgrass; young-of-the-year juveniles on muddy and sandy sediments in and adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks

Species	**Life Stage**	**Geographic Area**	**Depth (meters)**	**Habitat Type and Description**
Winter flounder	Adults	Coastal Gulf of Maine, Georges Bank, and continental shelf in Southern New England and Mid-Atlantic to Absecon Inlet, New Jersey, including bays and estuaries from eastern Maine to northern New Jersey	Mean high water - 70	Intertidal and sub-tidal benthic habitats on muddy and sandy substrates, and on hard bottom on offshore banks; for spawning adults, also see eggs
Winter skate	Juveniles	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries from eastern Maine to Chincoteague Bay, Virginia, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-90	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Winter skate	Adults	Coastal waters from eastern Maine to Delaware Bay, including certain bays and estuaries in Maine and New Hampshire, and on Georges Bank and the continental shelf in Southern New England and the Mid-Atlantic	0-80	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Witch flounder	Juveniles	Gulf of Maine and outer continental shelf and slope	50-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Witch flounder	Adults	Gulf of Maine and outer continental shelf and slope	35-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Yellowtail flounder	Juveniles	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	20-80	Sub-tidal benthic habitats on sand and muddy sand
Yellowtail flounder	Adults	Gulf of Maine, Georges Bank, and the Mid-Atlantic, including certain bays and estuaries in the Gulf of Maine	25-90	Sub-tidal benthic habitats on sand and sand with mud, shell hash, gravel, and rocks

Fishery Impact Considerations

Actions implemented that affect species with overlapping EFH were assessed in Amendment 9 to the MSB FMP in 2008 (http://www.mafmc.org/fmp/history/smb-hist.htm). Amendment 9 summarized Stevenson et al. 2004's findings on bottom-trawling's habitat impacts as:

"In studies examining the effect of bottom otter trawling on a variety of substrate types, it was demonstrated that the physical effects of trawl doors contacting the bottom produced furrows and some shifts in surface sediment composition, although there is a large variation in the duration of these impacts. Typically the more dynamic environment and less structured bottom composition, the shorter the duration of impact. This type of fishing was demonstrated to have some effects on composition and biomass of benthic species in the affected areas, but the directionality and duration of these effects varied by study and substrate types."

Some mackerel fishing does use bottom-tending trawl gear. Industry contacts report that MSB effort is generally over sand/mud bottoms that will not damage nets and that "hangs" or areas with structure have been mapped over the years and are avoided. Amendment 9 included an analysis of the adverse impacts of the MSB fisheries on EFH (per section 303(a)(7) of the MSA). In Amendment 9 the Council determined that bottom trawls used in MSB fisheries do have the potential to adversely affect EFH for some federally-managed fisheries in the region and closed portions of two offshore canyons (Lydonia and Oceanographer) to squid trawling. Subsequent closures were implemented in these and two other canyons (Veatch and Norfolk) to protect tilefish EFH by prohibiting all bottom trawling activity. The Council has also taken action for protections for deep-sea corals on the outer continental shelf and slope via Amendment 16 to the MSB FMP.

Because there have been no significant changes to the manner in which the MSB fisheries are prosecuted, and because none of the alternatives being considered in this document should have more than a minimal and/or temporary adverse impact (see section 7.0), no additional alternatives to minimize adverse effects on EFH are considered as part of this management action.

6.3 Human Communities and Economic Environment

This section describes the socio-economic importance of the mackerel fishery. The recent squid and butterfish specifications EA (MAFMC 2017) can be consulted for information on those species, but those fisheries are not expected to be impacted by this action. Recent Amendments to the MSB FMP contain additional information about the MSB fisheries, especially demographic information on ports that land MSB species. See Amendments 11 and 14 at http://www.mafmc.org/msb/ for more information or visit NMFS' communities page at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/. In general, the MSB fisheries saw high foreign landings in the 1970s followed by a domestication of the fishery, and domestic landings have been lower than the peak foreign landings and variable. The current regulations for the MSB fisheries are summarized by NMFS at https://www.greateratlantic.fisheries.noaa.gov/regs/info.html, and detailed in the Federal Register at http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=1e9802ffddb05d0243d9c657fade956c&rgn=div5&view=text&node=50:12.0.1.1.5&idno=50.

6.3.1 Atlantic Mackerel

As illustrated in the figure below (next page), Foreign catches were dominant in the early fishery, with total catch peaking at over 430,000 MT in 1973. Foreign catches declined and then were eliminated by the MSA, though there was also some joint venture activity from the mid-1980s through 1991. From 1992 through 2001, total catches averaged only 35,222 MT before increasing to peaks of just over 110,000 MT in 2004 and 2006. Total catch then declined and since 2011 has averaged 14,122 MT. Preliminary estimated 2017 total catch was the highest since 2010 and equaled 17,508 MT. U.S. commercial discards represented an average of 4.2% of U.S. commercial catch over the time series, and 1.7% of commercial catch since 2000. U.S. recreational catch represented an average of 26.4% of total U.S. catch in the 1980's, decreased to an average of 5.2% during the 1990's and 2000's, and has averaged 17.0% since 2010.

Most landings in recent years are from mid-water trawl gear, with lower levels from bottom trawl, handline (including auto-jig), and other (see figure next page). A substantial portion of mackerel landings in recent years have come incidental to herring fishing.

Figure 2. Total annual mackerel catch (mt) by the U.S., Canada and other countries for 1960-2017.

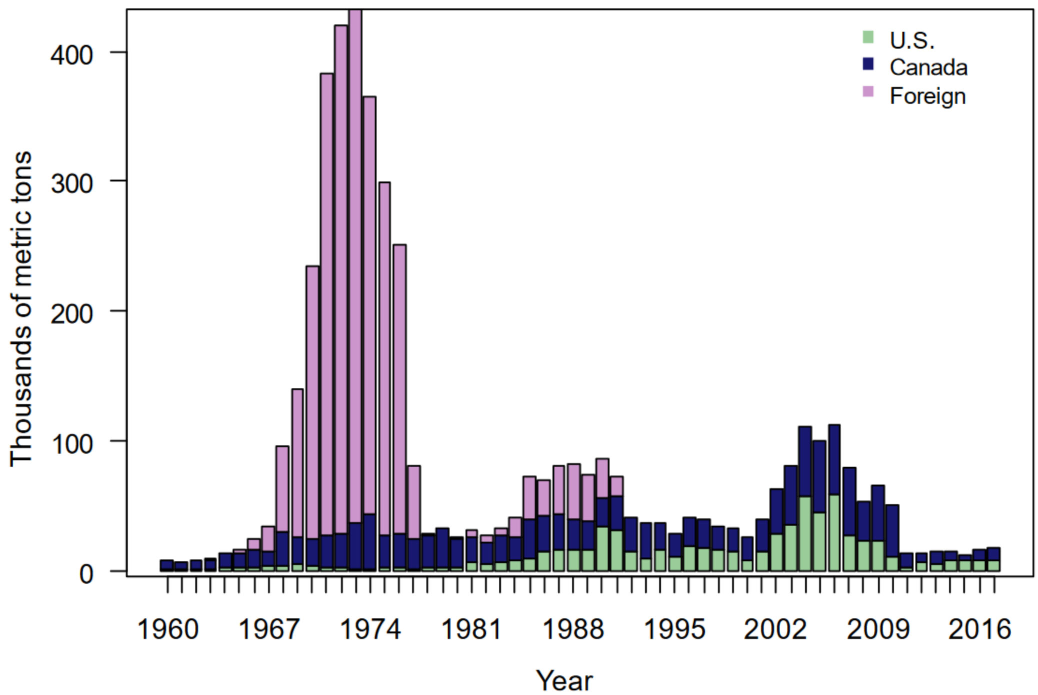
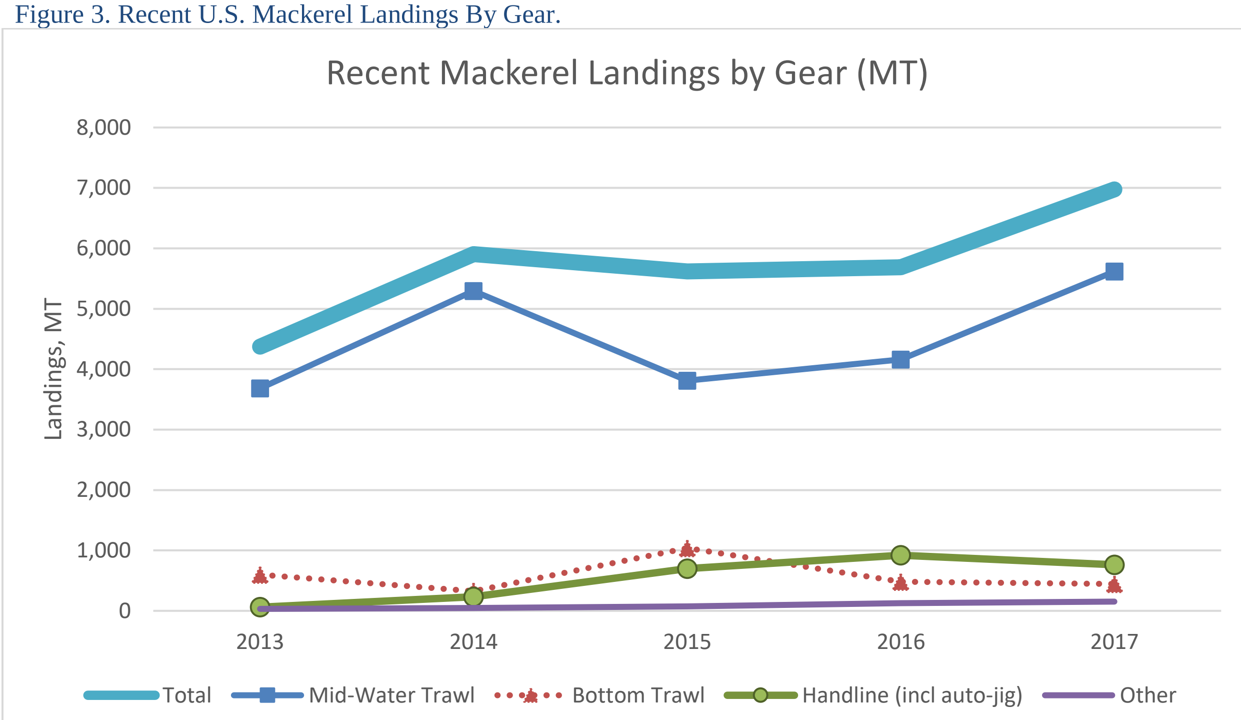


Figure 3. Recent U.S. Mackerel Landings By Gear.



For almost the entire time series, catches have been well below the limits placed on the fishery, as summarized in the table below.

Table 11. Annual stock-wide ABCs (mt), total catch from all sources (mt) and the proportion of the annual ABC caught.

Year	Stock ABC	Total Catch	Proportion
1995	850,000	28,418	0.03
1996	1,175,500	40,322	0.03
1997	1,178,000	38,920	0.03
1998	382,000	34,376	0.09
1999	383,000	31,998	0.08
2000	369,000	25,338	0.07
2001	369,000	39,364	0.11
2002	369,000	62,962	0.17
2003	369,000	80,311	0.22
2004	369,000	111,377	0.30
2005	335,000	99,603	0.30
2006	335,000	112,425	0.34
2007	238,000	79,733	0.34
2008	211,000	53,008	0.25
2009	211,000	65,676	0.31
2010	211,000	49,648	0.24
2011	80,000	13,147	0.16
2012	80,000	12,601	0.16
2013	80,000	14,360	0.18
2014	80,000	13,971	0.18
2015	40,165	11,950	0.30
2016	19,898	15,316	0.77
2017	19,898	17,508	0.88

The figures below show ex-vessel revenues (nominal) and ex-vessel prices (inflation adjusted) for mackerel from 1982-2017 based on dealer data from the Northeast Commercial Fisheries Database.

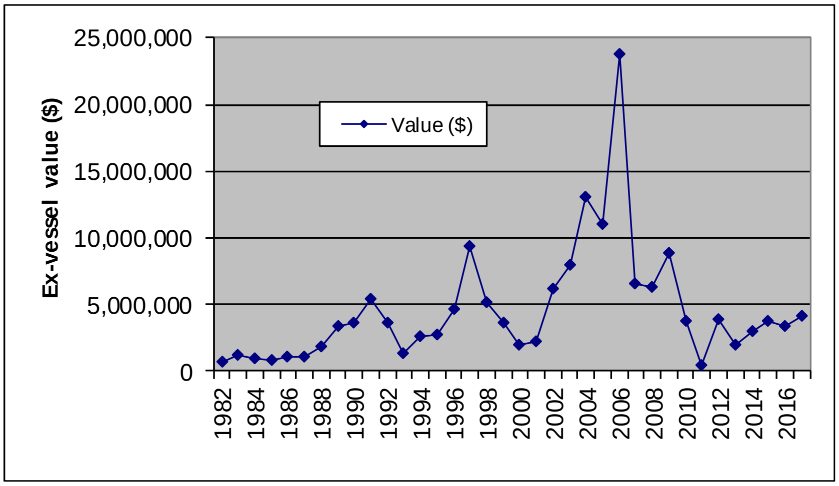


Figure 4. Nominal Ex-Vessel Revenues for mackerel landings during 1982-2017.

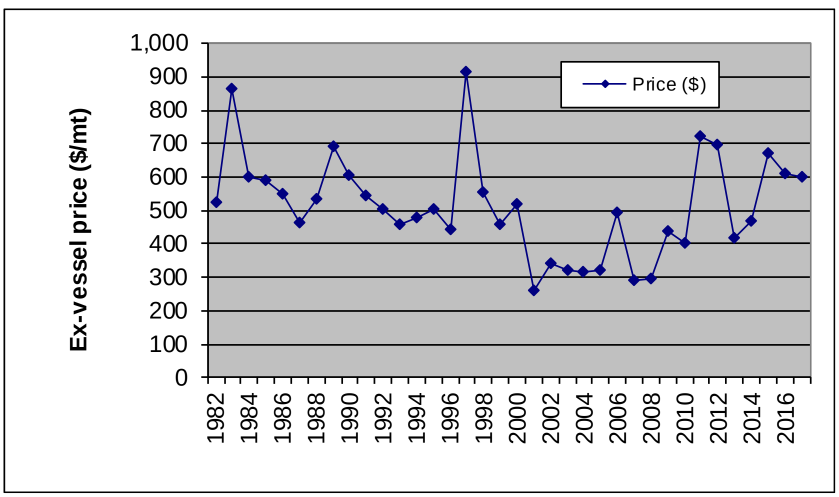


Figure 5. Inflation-adjusted ex-vessel Prices for mackerel landings during 1982-2017.

The mackerel fishery takes place in shelf waters as described in the figures below. Landings for all gears other than paired midwater trawl were reported via dealer reports matched to a vessel trip report (VTR) when possible (only VTR for 2017). Landings for paired midwater trawl vessels were reported via VTRs. From 2007-2011 80% of landings had location data, from 2012-2016 84% of landings had location information, and in 2017 99% of VTR reports had location information.

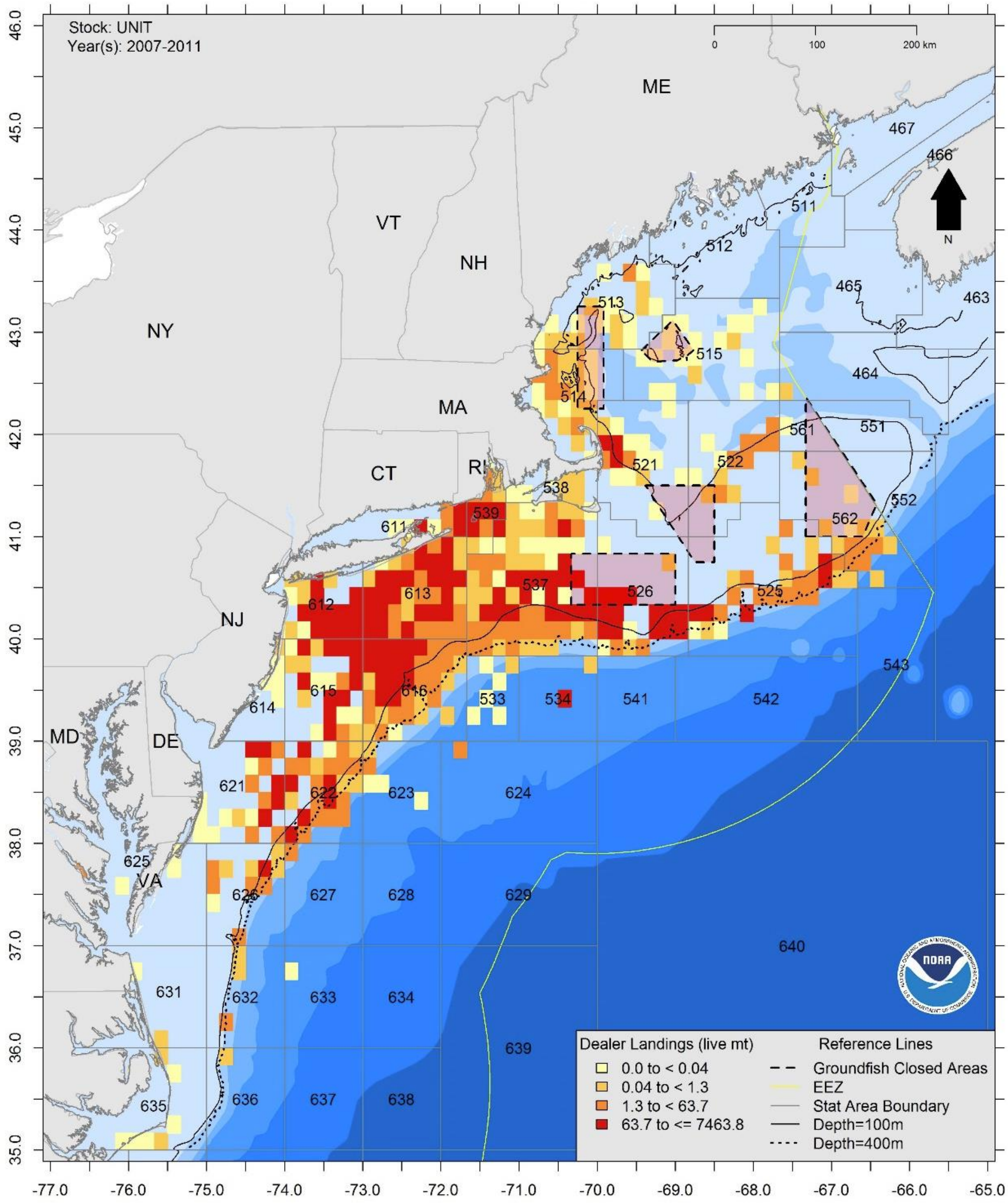


Figure 6. Spatial distribution of landings (mt) by ten-minute square, during 2007-2011.

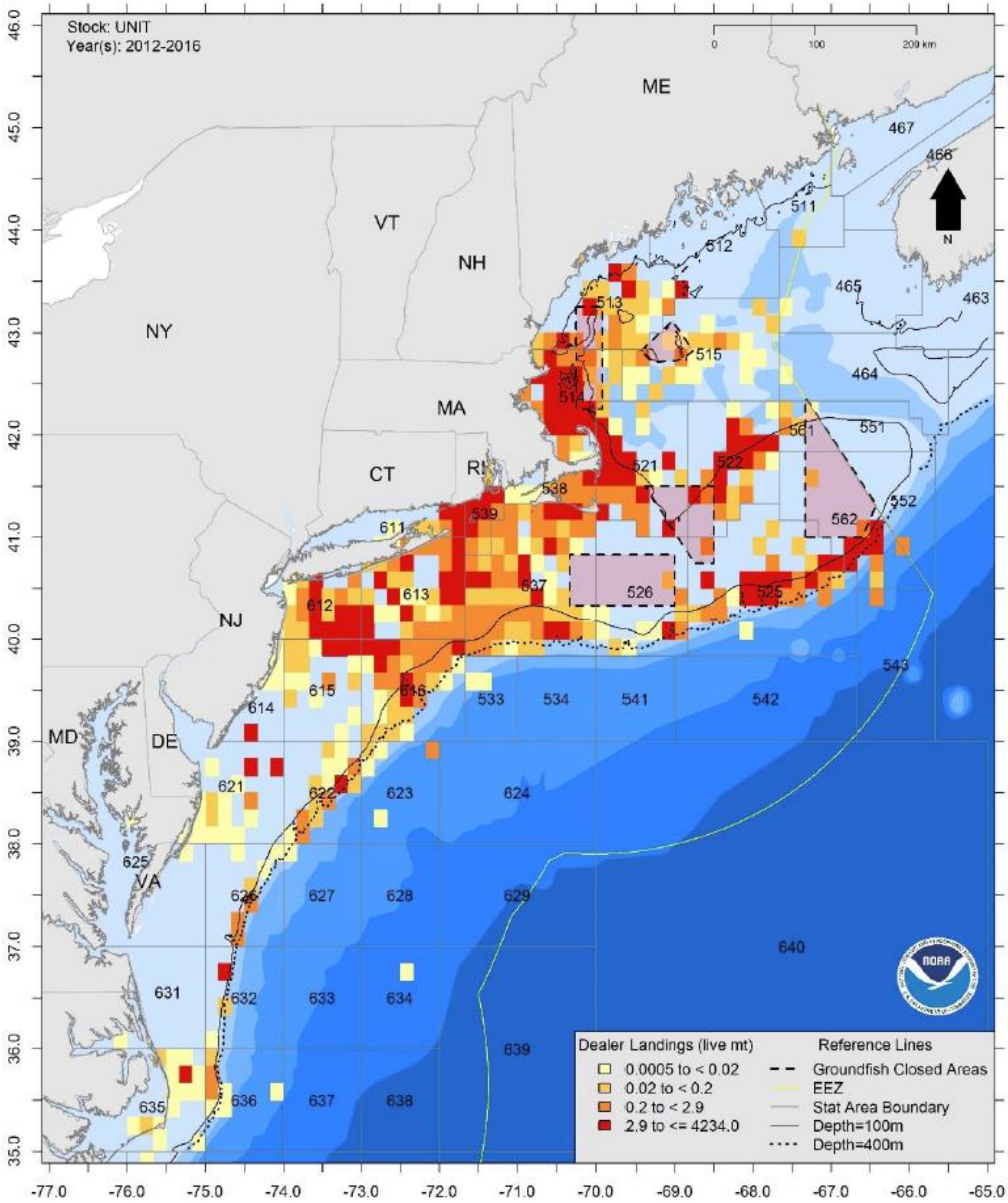


Figure 7. Spatial distribution of landings (mt) by ten-minute square, during 2012-2016.

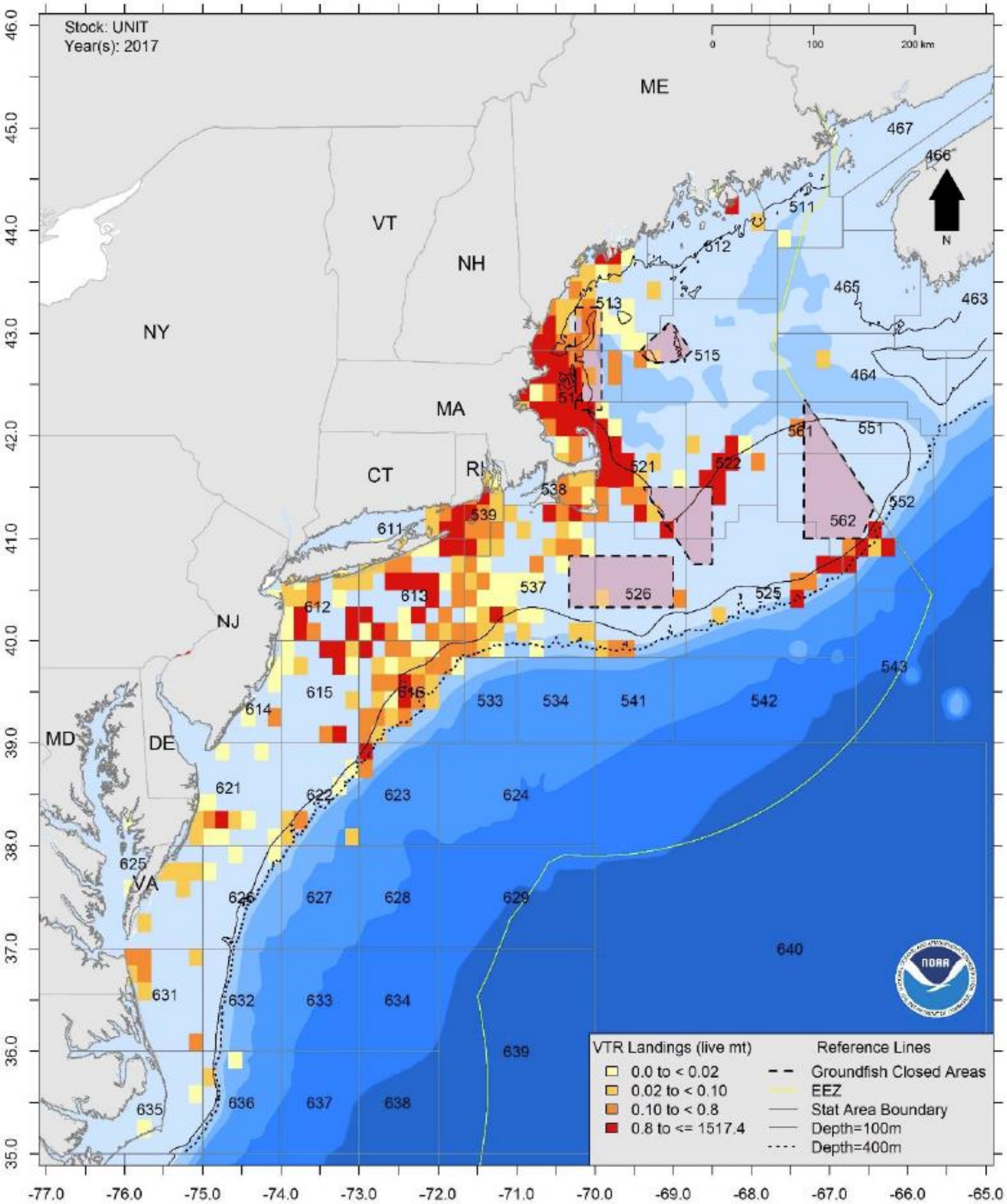


Figure 8. Spatial distribution of landings (mt) by ten-minute square, during 2017.

In recent years most mackerel landings have occurred in Massachusetts and New Jersey (see table below). Further breakdowns of landings by port may violate the spirit of data confidentiality rules. The subsequent table describes the numbers of vessels that have fished for mackerel over time.

Table 12. Recent Mackerel Landings by State (mt)

YEAR	MA	NJ	RI	ME	NY	Other	Total
2015	3,175	1,006	865	510	35	26	5,591
2016	4,833	139	519	169	21	7	5,681
2017	4,710	1,275	315	633	28	13	6,962

Table 13. Numbers of vessels that actively fished for mackerel, by landings (lbs) category, during 1982-2017.

YEAR	Vessels 1 mil +	Vessels 100,000 - 1mil	Vessels 50,000 - 100,000	Vessels 10,000 - 50,000	Total
1982	0	10	10	43	63
1983	0	10	5	26	41
1984	0	11	14	29	54
1985	0	12	10	28	50
1986	1	10	5	37	53
1987	1	15	8	31	55
1988	2	20	8	40	70
1989	6	17	8	27	58
1990	6	16	7	39	68
1991	13	18	1	38	70
1992	9	17	13	48	87
1993	0	16	11	55	82
1994	2	27	14	44	87
1995	4	24	11	50	89
1996	7	45	15	53	120
1997	6	30	20	46	102
1998	9	16	6	39	70
1999	6	15	9	36	66
2000	5	3	0	26	34
2001	5	3	2	20	30
2002	12	3	1	22	38
2003	14	6	5	23	48
2004	18	6	1	14	39
2005	16	12	4	15	47
2006	21	12	5	10	48
2007	16	12	2	20	50
2008	15	5	1	17	38
2009	15	6	6	18	45
2010	10	9	2	13	34
2011	0	3	3	17	23
2012	3	9	1	9	22
2013	4	3	3	13	23
2014	6	5	1	13	25
2015	5	9	10	12	36
2016	3	16	7	26	52
2017	6	7	14	28	55

Recreational harvest has been variable without much trend over the 1981-2017 Marine Recreational Information Program (MRIP) time series (see figure below). In recent years most fish have been caught in New England states' waters (primarily Massachusetts, Maine, and New Hampshire) in May-October. Pending revisions to this time series will likely be incorporated into the next assessment update. There are no recreational regulations except for license/registry requirements.

Figure 9. MRIP mackerel time series 1981-2017, total catch, numbers of fish.

6.3.2 Atlantic Herring

Detailed information on the herring fishery can be found in the most recent specifications Environmental Assessment (NEFMC 2016). Atlantic herring landings have been variable in the last decade, averaging about 90,000 mt, with the highest amount in 2009 (about 104,000 mt) and lowest in 2017 (about 50,000 mt). The herring fishery uses predominantly single and paired mid water trawl, bottom trawl, purse seine, and to a lesser extent, gillnet gear. Most landings are by midwater trawl gear (about 70%), followed by purse seine gear used exclusively in the Gulf of Maine (about 25%), and from bottom trawl gear (5-10%). The average dockside price of herring has increased over the last decade, from $238 per mt in 2007 to $552 per mt in 2017. Total revenues for the fishery have been above $20 million dollars per year for some time, peaking above $30 million in 2013. 40 vessels landed over 10,000 pounds of herring in 2017. Average Nov-Dec landings (of primary concern for this action) for 2015-2017 were worth $3.3 million.

6.4 Protected Species

Protected species are those afforded protections under the Endangered Species Act (ESA; species listed as threatened or endangered under the ESA) and/or the Marine Mammal Protection Act (MMPA). The table below provides a list of protected species that occur in the affected environment of the MSB fisheries and the potential for the fishery to impact the species, specifically via interactions with MSB fishing gear (i.e., mid-water trawl and bottom trawl gear). Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks. Shaded rows indicate species who prefer continental shelf edge/slope waters (i.e., >200 meters). The recently-developed bait-less auto jig fishery is not known to interact with any protected species, and interactions would not be predicted given the nature of that fishery and its gear type.

Table 14. Species Protected Under the ESA and/or MMPA that May Occur in the Affected Environment of the MSB FMP

Species	Status[2]	*Observed/documented interactions with bottom trawl and/or mid-water trawl gear?*
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***No***
Humpback whale, West Indies DPS, (*Megaptera novaeangliae*)	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter macrocephalus	***Endangered***	***No***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.)[3]	***Protected (MMPA)***	***Yes***
Pygmy sperm whale (*Kogia breviceps*)	Protected (MMPA)	No
Dwarf sperm whale (*Kogia sima*)	Protected (MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Atlantic Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Striped dolphin (*Stenella coeruleoalba*)	Protected (MMPA)	No
Beaked whales (*Ziphius and Mesoplodon spp*)[4]	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[5]	***Protected (MMPA)***	***Yes***
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes

Species	**Status**[2]	***Observed/documented interactions with bottom trawl and/or mid-water trawl gear?***
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	No
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Atlantic salmon	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk *(Brosme brosme)*	Candidate	Yes
Alewife *(Alosa pseudoharengus)*	Candidate	Yes
Blueback herring *(Alosa aestivalis)*	Candidate	Yes
Critical Habitat		
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA (Protected)	No
North Atlantic Right Whale Critical Habitat	ESA (Protected)	No

Notes:

[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3 of the MMPA of 1972).

[2] Status is defined by whether the species is listed under the ESA as endangered (i.e. at risk of extinction) or threatened (i.e. at risk of endangerment), or protected under the MMPA. Marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species for which ESA listing may be warranted.

[3] There are 2 species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often referred to as *Globicephala spp*.

[4] There are multiple species of beaked whales in the Northwest Atlantic. They include the cuvier's (*Ziphius cavirostris*), blainville's (*Mesoplodon densirostris*), gervais' (*Mesoplodon europaeus*), sowerbys' (*Mesoplodon bidens*), and trues' (*Mesoplodon mirus*) beaked whales. Species of *Mesoplodon* are difficult to identify at sea, therefore, much of the available characterization for beaked whales is to the genus level only.

[5] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.

Cusk, alewife, and blueback herring are NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. If a species is proposed for listing the conference provisions under Section 7 of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, these species will not be discussed further in this and the following sections; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed action. Additional information on cusk, alewife, and blueback herring can be found at: http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm.

6.4.1. Protected Species and Critical Habitat Not Likely to be Affected (via interactions with gear or destruction of essential features of critical habitat) by the MSB fisheries

Based on available information, it has been determined that this action is not likely to affect (via interactions with gear or destruction of essential features of critical habitat) some ESA listed and/or marine mammal protected species or their designated critical habitat (see table above). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or there have never been documented interactions between the species and the primary gear type used to prosecute the MSB fisheries (i.e., bottom otter and mid-water trawls); Waring *et al*. 2014a, 2015, 2016; Hayes *et al*. 2017; NMFS NEFSC FSB 2015, 2016, 2017; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). In the case of critical habitat, this determination has been made because operation of the MSB fisheries will not affect the essential physical and biological features of North Atlantic right whale or loggerhead (NWA DPS) critical habitat and therefore, will not result in the destruction or adverse modification of any species critical habitat (NMFS 2014; NMFS 2015a,b).

6.4.2. Protected Species Potentially Affected by the Proposed Action

Table 17 also provides a list of protected species of sea turtle, marine mammal, and fish species present in the affected environment of the MSB fishery, and that may also be affected by the operation of this fishery; that is, have the potential to become entangled or bycaught in the fishing gear used to prosecute the fishery. To aid in the identification of MMPA protected species potentially affected by the action, the MMPA List of Fisheries and marine mammal stock assessment reports for the Atlantic Region were referenced (http://www.nmfs.noaa.gov/pr/sars/region.htm; http://www.nmfs.noaa.gov/pr/interactions/fisheries/lof.html). To aid in identifying ESA listed species potentially affected by the action, the 2013 Biological Opinion issued by NMFS on the operation of seven commercial fisheries, including the MSB FMP, and its impact on ESA listed species was referenced (NMFS 2013) was referenced. The 2013 Opinion, which considered the best available information on ESA listed species and observed or documented ESA listed species interactions with gear types used to prosecute the 7 FMPs (e.g., gillnet, bottom trawl, and pot/trap), concluded that the seven fisheries may adversely affect, but was not likely to jeopardize the continued existence of any ESA listed species. The Opinion included an incidental take statement (ITS) authorizing the take of specific numbers of ESA listed species of sea turtles, Atlantic salmon, and Atlantic sturgeon. Reasonable and prudent measures and terms and conditions were also issued with the ITS to minimize impacts of any incidental take.

Up until recently, the 2013 Opinion remained in effect; however, new information on North Atlantic right whales has been made available that may reveal effects of the fisheries analyzed in the 2013 Opinion that may not have been previously considered. As a result, per an October 17, 2017, ESA 7(a)(2)/7(d) memo issued by NMFS, the 2013 Opinion has been reinitiated. However, the October 17, 2017, memo concludes that allowing these fisheries to continue during the reinitiation period will not increase the likelihood of interactions with ESA listed species above the amount that would otherwise occur if consultation had not been reinitiated, and therefore, the continuation of these fisheries during the reinitiation period would not be likely to jeopardize the continued existence of any ESA listed species. Until replaced, the MSB FMP is currently covered by the incidental take statement authorized in NMFS 2013 Opinion.

As the primary concern for both MMPA protected and ESA listed species is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) data and observed records of protected species interaction with particular fishing gear types, in order to understand the potential risk of an interaction. Information on species occurrence in the affected environment of the MSB FMP is provided below, while information on protected species interactions with specific fishery gear is provided in section 6.4.3.

6.4.2.1. Sea Turtles

This section contains a brief summary of the occurrence and distribution of sea turtles in the affected environment of the MSB fisheries. Additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; TEWG 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant et al. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS et al. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Hard-shelled sea turtles: In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (Braun-McNeill et al. 2008; Braun

& Epperly 1996; Epperly et al. 1995a,b; Mitchell et al. 2003; Shoop & Kenney 1992; TEWG 2009; Blumenthal et al. 2006; Braun-McNeill & Epperly 2004; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 2009; McClellan & Read 2007; Mitchell et al. 2003; Morreale & Standora 2005). As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Braun-McNeill & Epperly 2004; Epperly et al. 1995a,b,c; Griffin et al. 2013; Morreale & Standora 2005), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the Gulf of Maine (GOM) in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The majority leave the Gulf of Maine by September, but some remain in Mid-Atlantic and Northeast areas until November. By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further south, although hard-shelled sea turtles can occur year-round in waters off Cape Hatteras and south (Epperly et al. 1995b; Griffin et al. 2013; Hawkes et al. 2011; Shoop & Kenney 1992).

Leatherback sea turtles: Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf and to have a greater tolerance for colder water than hard-shelled sea turtles (James *et al.* 2005; Eckert *et al.* 2006; Murphy *et al.* 2006; NMFS and USFWS 2013; Dodge *et al.* 2014). Leatherback sea turtles engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992; James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014). They are found in more northern waters (i.e., Gulf of Maine) later in the year (i.e., similar time frame as hard-shelled sea turtles), with most leaving the Northwest Atlantic shelves by mid-November (James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014).

6.4.2.2. Large Whales

Humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean. In general, these species follow an annual pattern of migration between low latitude (south of 35^{o}N) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41^{o}N; Waring *et al*. 2016; Hayes *et al*. 2017; NMFS 1991, 2010, 2011). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., humpback whales), some portion of the population remains in higher latitudes throughout the winter (Waring *et al*. 2016; Hayes *et al*. 2017; Clapham *et al*. 1993; Swingle *et al*. 1993; Vu *et al*. 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. As a result, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Payne *et al*.1986, 1990; Schilling *et al.* 1992; Waring *et al*. 2016; Hayes *et al*. 2017). For additional information on the biology, status, and range wide distribution of each whale species please refer to marine mammal stock assessment reports provided at: http://www.nmfs.noaa.gov/pr/sars/region.htm; and, NMFS (1991, 2010, 2011).

6.4.2.3. Small Cetaceans and Pinnipeds

Table 13 lists the small cetaceans and pinnipeds that may occur in the affected environment of the MSB fisheries. Small cetaceans can be found throughout the year in the Northwest Atlantic Ocean; however, within this range, there are seasonal shifts in species distribution and abundance. Pinnipeds are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35oN). For additional information on the biology and range wide distribution of each species of small cetacean and pinniped considered in this section, please refer to the marine mammal stock assessment reports provided at: http://www.nmfs.noaa.gov/pr/sars/region.htm.

6.4.2.4. Atlantic Sturgeon

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (ASSRT 2007; Dovel and Berggren 1983; Dadswell et al. 1984; Kynard et al. 2000; Stein et al. 2004a; Dadswell 2006; Laney et al. 2007; Dunton et al. 2010, 2015; Erickson et al. 2011; Wirgin et al. 2012; Waldman et al. 2013; O'Leary et al. 2014; Wirgin et al. 2015a,b). Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein et al. 2004 a,b; Erickson et al. 2011; Dunton et al. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein et al. 2004a,b; Dunton et al. 2010; Erickson et al. 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon may undertake seasonal movements along the coast (Dunton et al. 2010; Erickson et al. 2011; Wipplehauser 2012); however, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year. For additional information on the biology, status, and range wide distribution of each distinct population segment (DPS) of Atlantic sturgeon please refer to 77 FR 5880 and 77 FR 5914, as well as the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007).

6.4.2.5 Atlantic Salmon

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the Gulf of Maine DPS extends from the Gulf of Maine (primarily northern portion of the Gulf of Maine) to the coast of Greenland (NMFS and USFWS 2005, 2016; Fay *et al*. 2006). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the Gulf of Maine and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay *et al*. 2006; USASAC 2004; Hyvarinen *et al.* 2006; Lacroix and McCurdy 1996;

Lacroix *et al.* 2004, 2005; Reddin 1985; Reddin and Short 1991; Reddin and Friedland 1993, Sheehan *et al.* 2012; NMFS and USFWS 2005, 2016; Fay *et al*. 2006). For additional information on the on the biology, status, and range-wide distribution of the Gulf of Maine DPS of Atlantic salmon please refer to NMFS and USFWS 2005, 2016; Fay *et al*. 2006.

6.4.3. Gear Interactions with Protected Species

Several protected species are vulnerable to interactions with various types of fishing gear. Interaction risks vary by gear type, quantity, and soak or tow time. Available information on gear interactions with a given protected species (or species group) is provided in the sections below. These sections are not a comprehensive review of all fishing gear types known to interact with a given species; focus is placed on interaction risks associated with bottom trawls or midwater trawls, the primary gear types used in the MSB fisheries.

6.4.3.1. Gear Interactions with Sea Turtles

Bottom Otter Trawl

Sea turtle interactions with bottom trawl gear have been observed on Georges Bank, and in the Mid-Atlantic; however, most of the observed interactions have occurred in the Mid-Atlantic (Warden 2011a,b; Murray 2015). As no sea turtle interactions with bottom trawl gear have been observed in the Gulf of Maine, and few sea turtle interactions have been observed on Georges Bank, there is insufficient data available to conduct a robust model-based analysis on sea turtle interactions with bottom trawl gear in these regions or produce a bycatch estimate for these regions. As a result, the bycatch estimates and discussion below are for bottom trawl gear in the Mid-Atlantic.

Bottom trawl gear poses an injury and mortality risk to sea turtles, specifically due to forced submergence (Sasso and Epperly 2006). Green, Kemp's ridley, leatherback, loggerhead, and unidentified sea turtles have been documented interacting (e.g., bycaught) with bottom trawl gear. However, estimates are available only for loggerhead sea turtles. Warden (2011a,b) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic[5] was 292 (CV=0.13, 95% CI=221-369), with an additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but released through a Turtle Excluder Device (TED).[6] The 292 average annual observable loggerhead interactions equates to approximately 44 adult equivalents (Warden 2011a,b). Most recently, Murray (2015) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the

[5] Warden (2011a) defined the Mid-Atlantic as south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border.

[6] TEDs allow sea turtles to escape the trawl net, reducing injury and mortality resulting from capture in the net. Approved TEDs are required in the shrimp and summer trawl fishery. For further information on TEDs see 50 CFR 223.206 and 68 FR 8456 (February 21, 2003).

Mid-Atlantic[7] was 231 (CV=0.13, 95% CI=182-298); this equates to approximately 33 adult equivalents (Murray 2015). Bycatch estimates provided in Warden (2011a) and Murray (2015) are a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated at 616 sea turtles (CV=0.23, 95% CI over the nine-year period: 367-890). This decrease is likely due to decreased fishing effort in high-interaction areas (Warden 2011a, b).

Mid-Water Trawl

NEFOP and ASM observer data from 1989 to 2015 show five leatherback sea turtle interactions with mid-water trawl gear; the primary species landed during these interactions was tuna (NMFS NEFSC FSB 2015, 2016, 2017). These takes were in the early 1990s in an experimental HMS fishery that no longer operates. No takes have been documented in other mid-water trawl fisheries operating in the Greater Atlantic Region. Based on this and the best available information, sea turtle interactions in mid-water trawl gear in the Greater Atlantic Region are expected to be rare.

6.4.3.2. Gear Interactions with Atlantic Sturgeon

Bottom Otter Trawl

Atlantic sturgeon interactions (i.e., bycatch) with bottom trawl gear have been observed since 1989; these interactions have the potential to result in the injury or mortality of Atlantic sturgeon (NMFS NEFSC FSB 2015, 2016, 2017). Three documents, covering three time periods, that use data collected by the Northeast Fisheries Observer Program to describe bycatch of Atlantic sturgeon in bottom trawl gear: Stein et al. (2004b) for 1989-2000; ASMFC (2007b) for 2001-2006; and Miller and Shepard (2011) for 2006-2010; none of these documents provide estimates of Atlantic sturgeon bycatch by Distinct Population Segment. Miller and Shepard (2011), the most recent of the three documents, analyzed fishery observer data and VTR data in order to estimate the average annual number of Atlantic sturgeon interactions in otter trawl in the Northeast Atlantic that occurred from 2006 to 2010. This timeframe included the most recent, complete data and as a result, Miller and Shepard (2011) is considered to represent the most accurate predictor of annual Atlantic sturgeon interactions in the Northeast bottom trawl fisheries (NMFS 2013).

Based on the findings of Miller and Shepard (2011), NMFS (2013) estimated that the annual bycatch of Atlantic sturgeon in bottom trawl gear to be 1,342 sturgeon. Miller and Shepard (2011) reported observed Atlantic sturgeon interactions in trawl gear with small (< 5.5 inches) and large (≥ 5.5 inches) mesh sizes and concluded that, based on NEFOP observed sturgeon

[7] Murray 2015b defined the Mid-Atlantic as the boundaries of the Mid-Atlantic Ecological Production; roughly waters west of 71ºW to the North Carolina/South Carolina border)

mortalities, relative to gillnet gear, bottom trawl gear posed less risk of mortality to Atlantic sturgeon. Estimated mortality rates in gillnet gear were 20.0%, while those in otter trawl gear were 5.0% (Miller and Shepard 2011; NMFS 2013). Similar conclusions were reached in Stein *et al*. (2004b) and ASMFC (2007b) reports; after review of observer data from 1989-2000 and 2001-2006, both studies concluded that observed mortality is much higher in gillnet gear than in trawl gear. However, an important consideration to these findings is that observed mortality is considered a minimum of what actually occurs and therefore, the conclusions reached by Stein *et al*. (2004b), ASMFC (2007b), and Miller and Shepard (2011) are not reflective of the total mortality associated with either gear type. To date, total Atlantic sturgeon mortality associated with gillnet or trawl gear remains uncertain.

Mid-Water Trawl

To date, there have been no observed/documented interactions with Atlantic sturgeon in mid-water trawl gear (NMFS NEFSC FSB 2015, 2016, 2017). Based on this information, mid-water trawl gear is not expected to pose an interaction risk to any Atlantic sturgeon and therefore, is not expected to be source of injury or mortality to this species.

6.4.3.3. Gear Interaction with Atlantic Salmon

Bottom Otter Trawl

Atlantic salmon interactions (i.e., bycatch) with bottom trawl have been observed since 1989; in many instances, these interactions have resulted in the injury and mortality of Atlantic salmon (NMFS NEFSC FSB 2015, 2016, 2017). According to the Biological Opinion issued by NMFS Greater Atlantic Regional Fisheries Office on December 16, 2013, NMFS Northeast Fisheries Science Center's (NEFSC) Northeast Fisheries Observer and At-Sea Monitoring Programs documented a total of 15 individual salmon incidentally caught on more than 60,000 observed commercial fishing trips from 1989 through August 2013 (NMFS 2013; Kocik *et al*. 2014); of those 15 salmon, four were observed caught in bottom trawl gear (Kocik (NEFSC), pers. comm (February 11, 2013) in NMFS 2013).The genetic identity of these captured salmon is unknown; however, the NMFS 2013 Biological Opinion considers all 15 fish to be part of the Gulf of Maine Distinct Population Segment, although some may have originated from the Connecticut River restocking program (i.e., those caught south of Cape Cod, Massachusetts). Since 2013, no additional Atlantic salmon have been observed in bottom trawl gear (NMFS NEFSC FSB 2015, 2016, 2017). Based on the above information, bottom trawl interactions with Atlantic salmon are likely rare (NMFS 2013; Kocik *et al*. 2014).

Mid-Water Trawl

To date, there have been no observed/documented interactions with Atlantic salmon and mid-water trawl gear (NMFS NEFSC FSB 2015, 2016, 2017). Based on this information, mid-water trawls or purse seines are not expected to pose an interaction risk to any Atlantic salmon and therefore, are not expected to be source of injury or mortality to this species.

6.4.3.4. Gear Interactions with Marine Mammals

Depending on species, marine mammal interactions have been observed in bottom trawl, purse seine, and/or mid-water trawl gear. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, the 2018 LOF (83 FR 5349 (February 7, 2018)) categorizes the commercial MSB fisheries, which are primarily prosecuted with bottom and mid-water trawl gears, as a Category II bottom trawl (Northeast and Mid-Atlantic) or Category II mi-water (Northeast and Mid-Atlantic) fishery.

Large Whales

Bottom Otter and Mid-Water Trawls

With the exception of one species, there have been no observed interactions with large whales and trawl (bottom or mid-water) gear. The one exception is minke whales, which have been observed seriously injured and killed in both types of trawl gear. Over the past10 years, there have been two (2) observed minke whales incidentally taken in mid-water trawl gear. These occurred in 2009 and 2013, with the 2009 incident resulting from entanglement in NOAA research mid-water trawl gear (whale released alive, but seriously injured), and the 2013 incident resulting from entanglement in a Northeast mid-water trawl (including pair trawl) fishery (whale was dead, moderately decomposed) (see http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; Waring *et al*. 2016; Henry *et al*. 2015). Based on the latter incident, as provided in Waring *et al*. (2016), the estimated annual average minke whale mortality and serious injury from the Northeast mid-water trawl (including pair trawl) fishery from 2009 to 2013 is 0.2; Hayes *et al*. (2017) provided the same estimated annual average minke whale mortality and serious injury from the Northeast mid-water trawl (including pair trawl) fishery from 2010 to 2014.

In bottom trawl gear, to date, interactions have only been observed in the northeast bottom trawl fisheries. From the period of 2008-2012, the estimated annual mortality attributed to this fishery was 7.8 minke whales for 2008 and zero minke whales from 2009-2012; no serious injuries were reported during this time (Waring *et al*. 2015). Based on this information, from 2008-2012, the estimated annual average minke whale mortality and serious injury attributed to the northeast bottom trawl fishery was 1.6 (CV=0.69) whales (Waring *et al*. 2015). Lyssikatos (2015) estimated that from 2008-2013, mean annual serious injuries and mortalities from the northeast bottom trawl fishery were 1.40 (CV=0.58) minke whales. Serious injury and mortality records for minke whales in U.S. waters from 2010-2014 showed zero interactions with bottom trawl (northeast or Mid-Atlantic) gear (Henry *et al*. 2016; Hayes *et al*. 2017).

Based on above information, trawl gear is likely to pose a low interaction risk to any large whale species. Should an interaction occur, serious injury or mortality to any large whale is possible; however, relative to other gear types, such as fixed gear, trawl gear represents a low source serious injury or mortality to any large whale (Henry *et al*. 2016; Hayes *et al*. 2017).

Small Cetaceans and Pinnipeds

Bottom and Mid-Water Trawl Gear

Small cetaceans and pinnipeds are vulnerable to interactions with bottom and/or mid-water trawl gear (Read *et al*. 2006; Lyssikatos 2015; Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016; Hayes *et al*. 2017; 83 FR 5349 (February 7, 2018)).[8] Based on the most recent five years of observer data (2010-2014), Table 15 provides a list of species that have been observed (incidentally) seriously injured and/or killed by List of Fisheries Category II trawl fisheries that operate in the affected environment of the MSB fisheries (Hayes *et al*. 2017; 83 FR 5349 (February 7, 2018)).

Table 15. Small cetacean and pinniped species observed seriously injured and/or killed by Category II trawl fisheries in the affected environment of the MSB fisheries.

Fishery	Category	Species Observed or reported Injured/Killed
Mid-Atlantic Mid-Water trawl (including pair trawl)	II	Gray seal
		Harbor seal
Northeast Midwater Trawl-Including Pair Trawl	II	Short-beaked common dolphin
		Long-finned pilot whales
		Gray seal
		Harbor seal
Northeast Bottom Trawl	II	Harp seal
		Harbor seal
		Gray seal
		Long-finned pilot whales
		Short-beaked common dolphin
		White-sided dolphin
		Harbor porpoise
		Bottlenose dolphin (offshore)
		Risso's dolphin
Mid-Atlantic Bottom Trawl	II	White-sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Bottlenose dolphin (offshore)
		Gray seal
		Harbor seal
Sources: Hayes *et al.* (2017); MMPA LOF 83 FR 5349 (February 7, 2018).		

[8] For additional information on small cetacean and pinniped interactions prior to those provided in Waring et al. 2014a, see: http://www.nmfs.noaa.gov/pr/sars/region.htm

In 2006, based on observed mid-water trawl interactions with long-finned pilot whales, short - finned pilot whales, common dolphins, and white sided dolphins, the Atlantic Trawl Gear Take Reduction Team (ATGTRT) was convened to address the incidental mortality and serious injury of these species incidental to bottom and mid-water trawl fisheries operating in both the New England and Mid-Atlantic regions. Because none of the marine mammal stocks of concern to the ATGTRT are classified as a "strategic stock", nor do they currently interact with a Category I fishery,[9] it was determined that development of a take reduction plan was not necessary. In lieu of a take reduction plan, the ATGTRT agreed to develop an Atlantic Trawl Gear Take Reduction Strategy (ATGTRS). The ATGTRS identifies informational and research tasks, as well as education and outreach needs the ATGTRT believes are necessary to provide the basis for decreasing mortalities and serious injuries of marine mammals to insignificant levels approaching zero. The ATGTRS also identifies several voluntary measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals.[10]

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[9] Category I fisheries have frequent incidental mortality and serious injury of marine mammals.

[10] For additional details on the ATGTRS, visit: http://www.greateratlantic.fisheries.noaa.gov/Protected/mmp/atgtrp/

7.0 Biological and Human Community Impacts

The alternatives considered are fully described in section 5. A descriptive label is included for each alternative below when considering impacts.

For habitat, protected resource, and non-target species impacts, the key determinant is not so much the catch itself but the amount and character of the related effort. A decrease in effort may result in positive impacts (+) as a result of fewer encounters and/or fewer habitat impacts from fishing gear, while an increase in effort may result in a negative impact (-). Similar effort likely results in neutral impacts (0). The table immediately below illustrates that the availability of the target species can drive effort as much as any quota change, and as effort changes so would impacts on habitat, protected resources, and non-target species. This is noted for the habitat, protected resource, and non-target species sections since the MSB fisheries often experience large swings in availability and therefore effort, independent of any regulatory changes. Since limits on catch do cap effort, catch limits are a factor related to effort and impacts but many other factors are at least somewhat beyond the control of the Council (such as fish abundance, availability of other opportunities, weather, climate, fish movements/ availability, variable productivity, etc.).

The final EA will generally analyze impacts on each valued ecosystem component alternative by alternative, but this draft version provides general directional impact information.

National Oceanic and Atmospheric Administration Administrative Order 216-6A and the Companion Manual contains criteria for determining the significance of the impacts of a proposed action and it includes the possibility of introducing or spreading a nonindigenous species. This potential impact does not fit into the sections below so it is addressed in this introduction. There is no evidence or indication that these fisheries have ever resulted or would ever result in the introduction or spread of nonindigenous species.

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Table 16. Changes in effort as a result of adjustments to quota and/or fish availability.

Change in quota	**Fish abundance/availability**		
	Decrease in availability	**No change in availability**	**Increase in availability**
Decrease in quota	Fishing effort may decrease, increase, or stay the same depending on a combination of factors[11].	Effort likely to decrease or stay the same. If per trip catch stays the same, the fishery will be closed earlier with fewer trips taken (reducing effort). However managers may reduce trip limits or adjust regulations that extend the fishing season (keeping effort the same).	Effort likely to decrease or stay the same. A lower quota plus higher catch per unit of effort (CPUE) from higher availability should decrease effort. However, managers may reduce trip limits or adjust regulations that extend the fishing season which may keep effort relatively even.
No change in quota	Effort may increase or decrease. While the quota has not changed, fishermen may try to take more trips to catch the same amount of fish (increasing effort) or may stop targeting a stock of fish if availability is low enough to decrease profitability (decreasing effort).	Fishing effort may remain the same given the quota has not changed and availability is expected to be similar.	Effort should decrease. While the quota has not changed, fishermen should be able to take fewer trips to catch the same amount of fish (decreasing effort).
Increase in quota	Fishing effort likely to increase or stay the same. A higher quota plus lower catch per unit of effort from lower availability should increase effort. However, managers may increase trip limits or adjust regulations to allow more efficient fishing (keeping effort the same).	Effort likely to increase or stay the same. If per trip catch stays the same, the fishery will be closed later with more trips taken (increasing effort). However managers may increase trip limits or adjust regulations to allow more efficient fishing (keeping effort the same).	Fishing effort may decrease, increase, or stay the same depending on a combination of factors.

[11] Factors affecting fishing effort include other species abundance, availability of other opportunities, weather, climate, fish movements/availability, variable productivity, and market forces/price changes.

Environmental impacts are described both in terms of their direction (negative, positive, or no impact) and their magnitude (slight, moderate, or high). The table below summarizes the guidelines used for each VEC to determine the magnitude and direction of the impacts described in this section.

Table 17. General definitions for impacts and qualifiers relative to resource condition (i.e., baselines)

General Definitions				
VEC	Resource Condition	Impact of Action		
		Positive (+)	Negative (-)	No Impact (0)
Target and non-target Species	Overfished status defined by the MSA	Alternatives that maintain or are projected to result in a stock status above an overfished condition*	Alternatives that maintain or are projected to result in a stock status below an overfished condition*	Alternatives that do not impact stock / populations
ESA-listed protected species (endangered or threatened)	Populations at risk of extinction (endangered) or endangerment (threatened)	Alternatives that contain specific measures to ensure no interactions with protected species (i.e., no take)	Alternatives that result in interactions/take of listed species, including actions that reduce interactions	Alternatives that do not impact ESA listed species
MMPA protected species (not also ESA listed)	Stock health may vary but populations remain impacted	Alternatives that maintain takes below PBR and approaching the Zero Mortality Rate Goal	Alternatives that result in interactions with/take of marine mammals that could result in takes above PBR	Alternatives that do not impact MMPA protected species
Physical environment / habitat / EFH	Many habitats degraded from historical effort and slow recovery time (see condition of the resources table)	Alternatives that improve the quality or quantity of habitat or allow for recovery	Alternatives that degrade the quality/quantity or increase disturbance of habitat	Alternatives that do not impact habitat quality
Human communities (socioeconomic)	Highly variable but generally stable in recent years (see condition of the resources table for details)	Alternatives that increase revenue and social well-being of fishermen and/or communities	Alternatives that decrease revenue and social well-being of fishermen and/or communities	Alternatives that do not impact revenue and social well-being of fishermen and/or communities
	Impact Qualifiers			
A range of impact qualifiers is used to indicate any existing uncertainty	Negligible		To such a small degree to be indistinguishable from no impact	
	Slight (sl), as in slight positive or slight negative		To a lesser degree / minor	
	Moderate (M) positive or negative		To an average degree (i.e., more than "slight", but not "high")	
	High (H), as in high positive or high negative		To a substantial degree (not significant unless stated)	
	Significant (in the case of an EIS)		Affecting the resource condition to a great degree, see 40 CFR 1508.27.	
	Likely		Some degree of uncertainty associated with the impact	
*Actions that will substantially increase or decrease stock size, but do not change a stock status may have different impacts depending on the particular action and stock. Meaningful differences between alternatives may be illustrated by using another resource attribute aside from the MSA status, but this must be justified within the impact analysis.				

The table below summarizes the baseline conditions of the VECs considered in this action, as described in Section 6.

Table 18. Summary Baseline conditions of VECs considered in this action

VEC		**Baseline Condition**	
		Status/Trends, Overfishing?	**Status/Trends, Overfished?**
Target stocks (section 6.1)	**Atl. mackerel**	Yes through 2016, projected to be below overfishing threshold in 2017 and beyond.	Yes in 2016. Projected to be above overfished threshold in 2018 and beyond. A rebuilding program is being developed.
	Butterfish	No	No
	Longfin Squid	Unknown, believed lightly exploited.	No
	***Illex* Squid**	Unknown	Unknown, NEFSC fall bottom trawl surveys are highly variable and without trend
Non-target species (principal species listed in section 6.1)	silver hake	no	no
	spiny dogfish	no	no
	alewife	Unknown	depleted
	blueback herring	Unknown	depleted
	American shad	Unknown	depleted
	haddock	no	no
	red hake	yes	yes
	winter (big) skate	no	no
	john dory buckler	Unknown	Unknown
Habitat (section 6.2)		Commercial fishing impacts are complex and variable and typically adverse; Recreational fishing impacts are typically minimal. Non-fishing activities had historically negative but site-specific effects on habitat quality.	
Protected resources (section 6.4)	**Sea turtles**	Leatherback and Kemp's ridley sea turtles are classified as endangered under the ESA; loggerhead (NW Atlantic DPS) and green (North Atlantic DPS) sea turtles are classified as threatened.	
	Fish	Atlantic salmon, shortnose sturgeon, and the New York Bight, Chesapeake, Carolina, and South Atlantic DPSs of Atlantic sturgeon are classified as endangered under the ESA; the Atlantic sturgeon Gulf of Maine DPS is listed as threatened; cusk, alewife, and blueback herring are candidate species	
	Large whales	All large whales in the Northwest Atlantic are protected under the MMPA. North Atlantic right, fin, blue, sei, and sperm whales are also listed as endangered under the ESA. Pursuant to section 118 of the MMPA, the Large Whale Take Reduction Plan was implemented to reduce humpback, North Atlantic right, and fin	

		whale entanglement in vertical lines associated with fixed fishing gear (sink gillnet and trap/pot) and sinking groundlines.
	Small cetaceans	Pilot whales, dolphins, and harbor porpoise are all protected under the MMPA. Pursuant to section 118 of the MMPA, the HPTRP and BDTRP was implemented to reduce bycatch of harbor porpoise and bottlenose dolphin stocks, respectively, in gillnet gear.
	Pinnipeds	Gray, harbor, hooded, and harp seals are protected under the MMPA.
Human communities (section 6.3)		The MSB stocks support substantial fisheries and related support services.

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7.1 Managed Resources

7.1.1 Impacts on Mackerel

Current resource condition: mackerel are overfished with overfishing occurring in 2016. Any of the proposed alternatives or alternative combinations (including no action) are projected to rebuild mackerel in 7 years or less. As such, they should all have a positive impact on the mackerel stock. Alternatives that result in lower catches and therefore lower fishing mortality will have a faster positive impact.

7.1.2 Impacts on Butterfish

Current resource condition: butterfish are not overfished (141% of target biomass in 2016), overfishing is not occurring, and catches are limited to maintain a sustainable fishery. Recent projections suggest a short-term decline (but not to an overfished condition). Butterfish are relatively short-lived and recruitment is variable so substantial year to year populations changes are expected. In general, the Council will seek management that achieves OY, which should be sustainable and maintain the butterfish stock at a non-overfished level. None of the alternatives in this action should affect butterfish catches, which are separately and directly controlled. As such, existing management measures will ensure that catch stays at or below the ABC, maintaining stock size above an overfished condition. While there is some butterfish catch in mackerel fishing, the levels of catch are not substantial enough relative to the butterfish ABC to impact the butterfish stock.

7.1.3 Impacts on Longfin Squid

Current resource condition: longfin squid are not overfished (174% of target biomass in 2016). Overfishing status is unknown but likely low according to the most recent assessment, and catches are limited to maintain a sustainable fishery. In general, the Council will seek management that achieves OY, which should be sustainable and maintain the longfin squid stock at a non-overfished level. None of the alternatives in this action should affect longfin squid catches, which are separately and directly controlled. As such, existing management measures will ensure that catch stays at or below the ABC, maintaining stock size above an overfished condition. While there is some longfin squid catch in mackerel fishing, the levels of catch are not substantial enough relative to the longfin squid ABC to impact the longfin squid stock.

7.1.4 Impacts on *Illex* Squid

Current resource condition: while there is no assessment for *Illex* squid, catches have been limited to an amount deemed sustainable by the SSC based on the best available scientific information. In general, the Council will seek management that achieves OY, which should be sustainable and maintain the *Illex* squid stock at a non-overfished level. None of the alternatives in this action should affect *Illex* squid catches, which are separately and directly controlled. As such, existing management measures will ensure that catch stays at or below the ABC, maintaining stock size above an overfished condition.

7.2 Habitat

As discussed at the start of Section 7, the availability of the targeted species may drive effort (and habitat impacts) as much as quotas and other regulations. Impacts on the habitat for the managed species (7.2.1) and other species (7.2.2) are addressed separately. The word "habitat" encompasses essential fish habitat (EFH) for the purposes of this analysis. The Council has already minimized to the extent practicable impacts to habitat from the MSB fisheries through closure of several canyon areas in MSB Amendment 9 (http://www.mafmc.org/fmp/history/smb-hist.htm) and Tilefish Amendment 1 (http://www.mafmc.org/fmp/history/tilefish.htm), and protections for Deep Sea Corals via Amendment 16 (http://www.mafmc.org/fmp/history/smb-hist.htm). As an overall current resource condition, many habitats in the area of operation of the MSB fisheries are degraded from historical fishing effort (both MSB and other) and from non-fishing activities (Stevenson et al. 2004). Ongoing fishing, and ongoing and new non-fishing activities may also hinder recovery.

7.2.1 Impacts on Managed Species Habitat

As described in Section 6.2, most MSB fishing takes place with bottom otter trawling on sand/mud substrate or with mid-water trawl for mackerel. Potential impacts of the alternatives on MSB EFH are discussed below, followed by discussion of impacts on other federally managed species habitat.

Habitat for the managed species (MSB) generally consists of the water column, which is not significantly impacted by fishing activity. The exception to the habitat location being the water column is longfin squid eggs, which are attached to sand, mud, or bottom structure (manmade or natural). However, as determined in Amendment 9, there is no indication that squid eggs are preferentially attached to substrates that are vulnerable to disturbance from fishing/bottom trawling, so no impacts on habitat for longfin squid eggs are expected from any increase or decrease in fishing effort by bottom trawls. Bottom trawling or mid-water trawling won't impact the water column itself and there is no information to suggest that MSB bottom trawling impacts on substrate will degrade it for purposes of longfin squid egg laying or survival.

7.2.2 Impacts on Other Federally Managed Species Habitat

The in-season management alternatives and RH/S cap alternatives are unlikely to directly increase fishing effort or the nature of that effort. Most rebuilding plan/specifications alternatives allow an increase in mackerel landings/effort, though even the largest increase is moderate in the context of historical quotas that were much higher and overall fishing effort in the region.

Mid-water trawling and auto-jigging should not impact habitat. Expanded quota/opportunities for mackerel could lead to a moderate increase in bottom trawling activity for mackerel. However, existing restrictions on trawling in sensitive areas (e.g. New-England EFH restrictions, Tilefish and deep-water coral closures) would remain in place. All of the higher quotas are also substantially lower than historical quotas. Also, most MSB fishing with bottom-trawl gear takes place on sand/mud substrate with limited vulnerable hard bottom to avoid net damage. These areas are also subject to bottom trawl fishing already from other fisheries. Taking these factors into consideration, the limited increase in bottom trawling that could result from any options that increase quotas should not have adverse effects on habitat that are more than minimal and/or temporary in nature.

7.3 Protected Resources

7.3.1 Introduction

Current resource condition: Affected endangered species and marine mammals (MMPA protected) are described in Section 6.4. How the current MSB fisheries impact these species can be considered as if the no action alternatives were selected for all alternatives (because no action will continue the current regulations) and is further described below. The impacts on protected resources may vary between ESA-listed and MMPA-protected species. For ESA-listed species, any action that has the risk to result in take (including ongoing take) of ESA-listed species is expected to have negative impacts, including actions that reduce interactions (because some take is still occurring and the population is at a critical level). Under the MMPA, the impacts from an action vary based on the stock condition of each marine mammal species and the potential for an action to impact fishing effort. For marine mammal stocks/species that have their potential biological removal (PBR) level reached or exceeded, negative impacts would be expected from any action that has the potential to interact with these species or stocks. For marine mammal stocks/species that are at more sustainable levels (i.e., PBR levels have not been exceeded), any action not expected to change fishing behavior or effort such that interaction risks increase relative to what has been in the fishery previously, may have positive impacts by maintaining takes below the PBR level and approaching the Zero Mortality Rate Goal. Taking the latter into consideration, the overall impacts on the protected resources VEC account for impacts on ESA-listed species, impacts on marine mammal stocks in good condition (i.e., PBR level has not been exceeded), and marine mammal stocks that have reached or exceeded their PBR level.

For no-action and similar to Section 6.4, impacts reference both bottom and mid-water trawl gear since Atlantic mackerel are targeted with both bottom and mid-water trawl gear.

7.3.1 General No-Action Impacts

General No-action: MMPA (Non-ESA Listed) Species Impacts

The MSB FMP fisheries do overlap with the distribution of non-ESA listed species of marine mammals (cetaceans and pinnipeds). As a result, marine mammal (non-ESA listed species) interactions with bottom or mid-water trawl gear are possible (see section 6.4); however, ascertaining the risk of an interaction and the resultant potential impacts of the No Action on cetaceans and pinnipeds (marine mammals) are difficult and somewhat uncertain, as quantitative analysis has not been performed.

However, we have considered, to the best of our ability, the most recent (2010-2014) information on marine mammal interactions with commercial fisheries, of which, the MSB FMP is a component (Hayes *et al*. 2017). Aside from pilot whales and several stocks of bottlenose dolphin, there has been no indication that takes of non-ESA listed species of marine mammals in commercial fisheries has gone above and beyond levels which would result in the inability of each species population to sustain itself (Hayes *et al*. 2017). Specifically, aside from pilot whales and several stocks of bottlenose dolphin, potential biological removal (PBR) has not been exceeded for any of the non-ESA listed marine mammal species identified in section 6.4 (Hayes *et al*. 2017). Although pilot whales and several stocks of bottlenose dolphin have experienced levels of take that have resulted in the exceedance of each species PBR, take reduction strategies and/or plans have been implemented to reduce bycatch in the fisheries affecting these species (Atlantic Trawl Gear Take Reduction Strategy, Pelagic Longline Take Reduction Plan effective May 19, 2009 (74 FR 23349); Bottlenose Dolphin Take Reduction Plan (BDTRP), effective April 26, 2006 (71 FR 24776)). These efforts are still in place and are continuing to assist in decreasing bycatch levels for these species. Although the most recent five years of information presented in Hayes et al. (2017) is a collective representation of commercial fisheries interactions with non-ESA listed species of marine mammals, and does not address the effects of the MSB FMP specifically, the information does demonstrate that thus far, operation of the MSB FMP, or any other fishery, has not resulted in a collective level of take that threatens the continued existence of non-ESA listed marine mammal populations.

Taking into consideration the above information, and the fact that there are non-listed marine mammal stocks/species whose populations may or may not be at optimum sustainable levels, impacts of the No Action on non-ESA listed species of marine mammals are likely to range from low negative to slight positive. Impacts would be low negative for pilot whales and bottlenose dolphin because they are experiencing levels of interactions that have resulted in exceedance of their PBR levels. These stocks/populations are not at an optimum sustainable level and therefore, the continued existence of these stocks/species is at risk. As a result, any potential for an interaction is a detriment to the species/stocks ability to recover from this condition.

Alternatively, there are also many non-ESA listed marine mammals that, even with continued fishery interactions, are maintaining an optimum sustainable level (i.e., PBR levels have not been exceeded) over the last several years. For these stocks/species, it appears that the fishery management measures that have been in place over this timeframe have resulted in levels of effort that equate to interaction levels that are not expected to impair the stocks/species ability to remain at an optimum sustainable level. These fishery management measures, therefore, have resulted in indirect slight positive impacts to these non-ESA listed marine mammal species/stocks. Should future fishery management actions maintain similar operating condition as they have over the past several years, it is expected that these slight positive impacts would remain. Thus, given that the No Action will not substantially change fishing effort, the impacts of the No Action on these non-ESA listed species of marine mammals (all besides pilot whales and bottlenose dolphin) are expected to be slight positive (i.e., continuation of current operating conditions is not expected to result in exceedance of any of these stocks/species PBR level).

General No-action: ESA Listed Species Impacts

The MSB fishery is prosecuted with bottom and mid-water trawl gear. As provided in section 6.4, these gear types are known to interact with ESA listed species of sea turtles, whales, Atlantic sturgeon, and Atlantic salmon, with interactions often resulting in the serious injury or mortality to the species. The risk of an interaction; however, is strongly associated with the amount of gear in the water, the time the gear is in the water (e.g., soak time, tow time), and the presence of listed species in the same area and time as the gear, with risk of an interaction increasing with increases in of any or all of these factors. Based on this, the MSB fishery is likely to result in some level some level of negative impacts to ESA listed species. Taking into consideration fishing behavior/effort under the No Action, as well as the factors that affect the risk of an interaction with a listed species, we determined the level of negative impacts to ESA listed species to be low. Below, we provide support for this determination.

Under the No Action, fishing behavior and effort in the MSB fishery is expected to remain similar to what has been observed in the fishery over the last 5 or more years. Specifically, the amount of trawl gear, tow times, and area fished are not expected change significantly from current operating conditions. As provided above, interactions risks with ESA listed species are strongly associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and listed species, with vulnerability of an interaction increasing with increases in any of these factors. Continuation of "status quo" fishing behavior/effort is not expected to change any of these operating conditions and therefore, relative to current conditions, new or elevated (e.g., more gear, longer tow times) interaction risks to listed species are not expected. Based on this, impacts of the No Action on ESA listed species is expected to be low negative.

General Action Alternative Impact Considerations:

Impacts to protected resources (ESA and MMPA species) should generally follow impacts to effort. Interactions with and therefore risks to protected species are strongly associated with amount, time, and location of gear in the water (components of effort), with vulnerability of an interaction increasing with increases in any or all of these factors. These are the components of effort that are considered in making impact determinations for protected species. If there are potential increases in any of these factors, then the potential for interactions will also increase. If none of these factors will be met, then interactions with protected species are not expected to be no greater than status quo. If there are potential decreases in any of these factors, then the potential for interactions will decrease.

Since ESA listed species have negative impacts from any potential interactions, impacts from any alternatives will be negative to some degree because there is risk of some interactions with the MSB fisheries. If interactions are likely to increase then impacts will be even more negative than no action, and if interactions are likely to decrease then impacts will be less negative than no action but still somewhat overall negative.

Since pilot whales and bottlenose dolphins are above PBR and it's not possible to conclusively know whether any measure in this action could reduce them below PBR, the same is true for them as with ESA listed species. If interactions are likely to increase then impacts will be even more negative than no action, and if interactions are likely to decrease then impacts will be less negative than no action but still somewhat overall negative.

For other MMPA species, they are starting out with slight positive impacts from no action, so if interactions are likely to increase then impacts will be negative compared to no action, and if interactions are likely to decrease then impacts will be more positive. The overall impact will depend on the degree of expected change to interactions. However, since no alternatives are expected to drastically reduce effort, overall impacts when interactions are expected to decrease are still likely to be only slightly positive for these other MMPA species.

7.3.2 Impacts from Specific Alternatives

The in-season management alternatives and RH/S cap alternatives are unlikely to directly increase fishing effort or protected species impacts. Most rebuilding plan/specifications alternatives allow an increase in mackerel landings/effort, though even the largest increase is moderate in the context of both historical quotas that were much higher and overall fishing effort in the region. The measures should also not appreciably change the spatial-temporal distribution of effort. As such, a moderate increase in mackerel effort is unlikely to appreciably change the total type, amount, or time that fishing gear is in the water, especially since additional mackerel effort may mean that somewhat less effort will be expended in some other fishery. Existing take reduction plans will also remain in place. Taking these factors into consideration, the limited increase in mackerel fishing effort that could result from any options that increase quotas should only have a slight-negative impact on protected species that maintains the impacts described above and would not be likely to change or jeopardize the status of any protected species.

7.4 Non-Target Resources

Current Resource Condition:

Bycatch in the mackerel fishery is described in Section 6.1 and is relatively low, less than 1%. Atlantic herring are not non-target species since the directed fishery targets mackerel and Atlantic herring. Non-negligible non-target species therefore include silver hake, spiny dogfish, alewife, blueback herring, American shad, haddock, red hake, winter skate, and John Buckler Dory. Of these red hake is experiencing overfishing and is overfished (https://www.nefsc.noaa.gov/publications/crd/crd1802/crd1802.pdf). There is no assessment for john dory buckler. Alewife, blueback herring, and American shad have been found to be depleted by the ASMFC, and assessment information is available at www.asmfc.org. Assessments for silver hake, spiny dogfish, haddock, and winter skate (not overfished, no overfishing) can be found at https://www.nefsc.noaa.gov/saw/. Mortality from bycatch is accounted for with species that are managed under a fishery management plan. For unmanaged species, we have no data to indicate the impact that these measures would have on them.

The in-season management alternatives and RH/S cap alternatives are unlikely to directly increase fishing effort or non-target impacts. Most rebuilding plan/specifications alternatives allow an increase in mackerel landings/effort, though even the largest increase is moderate in the context of historical quotas that were much higher and overall fishing effort in the region. The measures should also not appreciably change the spatial-temporal distribution of effort. As such, a moderate increase in mackerel effort is unlikely to appreciably change the total type, amount, or time that fishing gear is in the water, especially since additional mackerel effort may mean that somewhat less effort will be expended in some other fishery. The mackerel fishery also has relatively low bycatch and the primary bycatch of concern is controlled through the RH/S cap. Taking these factors into consideration, the limited increase in mackerel fishing effort that could result from any options that increase quotas should only have at most a low negative impact on non-target species that maintains the impacts described above, and would not be likely to change the status of any non-target species.

The Council can also control RH/S impacts by its choice of not scaling or how it scales the RH/S cap to the mackerel quota. Lower caps will lessen negative impacts on RH/S.

7.5 Socioeconomic Impacts

Current Condition: This action could affect the mackerel and herring fisheries, and separate summary is provided for each fishery. The performance of each fishery is further described above in Section 6.3. As discussed above, the availability of the targeted species may drive effort (and catch and revenues) as much as any regulations.

Mackerel fishery Current Condition: Due to the year to year variation in catch and effort in the fishery, it is difficult to fully quantify human community impacts but the current fishery supports a number of vessels, as described in Section 6.3, and provides a variety of jobs related directly to fishing and also in associated support services. 55 vessels landed over 10,000 pounds of mackerel in 2017, with total mackerel landings valued at $4.1 million. The current conditions of the fishery should generally be maintained in the short and long run since the ABCs and catch should be sustainable given the Council's risk policy and implementation of that risk policy in specifications. While a rebuilding plan is being developed, it is not expected to result in substantial negative economic impacts relative to recent fleet operations.

Mackerel Fishery-Related Impacts

1. Rebuilding Alternatives: Almost all of the action rebuilding alternatives allow immediate increases in landings and so should have positive socioeconomic benefits compared to no action depending on the amount of increase. 2019 for 1b is the only alternative/year that involves a quota reduction and then even in 1b quotas are higher than current in 2020 and 2021. 1d has the highest quotas (and potential revenues) and 1c is in between. 1b does rebuild the stock fastest so there is some gain in the future from higher quotas after getting rebuilt faster, and 1c has a similar advantage over 1d. Assuming a lower catch for Canada has a positive impact for potential U.S. fisheries, and a 10,000 MT deduction versus a 50%-50% split leads to a higher U.S. quota in all cases except for 2019 for 1b.
2. Closure Alternatives: The action closure alternatives should provide for efficient operation of the fishery. The closure thresholds and post-closure trip limits would likely benefit from additional input from the Advisory Panel to confirm which closure methods are optimal.
3. RH/S Cap: Lower caps can lead to less landings and mackerel revenues (and vice versa for higher caps). Consistent with previous evaluations, if the caps assist recovery of RH/S, then lower caps might result in additional long term benefits related to commercial revenues, recreational opportunities, ecosystem services, cultural values for RH/S, and/or other non-market existence values (i.e. value gained by the public related to the knowledge that these species are being conserved successfully). Since it is not possible to determine the effects of the caps on RH/S populations, such potential benefits can only be described qualitatively.

Atlantic Herring fishery Current Condition: Due to the year to year variation in catch and effort in the fishery, it is difficult to fully quantify human community impacts but the current fishery supports a number of vessels, as described in Section 6.3, and provides a variety of jobs related directly to fishing and also in associated support services. 40 vessels landed over 10,000 pounds of herring in 2017, with total herring landings valued at $27.4 million. The current conditions of the fishery should generally be maintained in the short and long run since the ABCs and catch should be sustainable given the New England Fishery Management Council's risk policy and implementation of that risk policy in specifications. Preliminary indications from a recent assessment do suggest that quotas may be lowered substantially in the near future due to low recruitment.

Herring Fishery-Related Impacts

The mackerel closure provisions are the primary measures that impact the herring fishery, and all of the proposed closure provisions allow for some incidental catch of mackerel in the herring fishery and therefore should not cause substantial operational problems for the herring fishery.

7.6 Cumulative Impacts

To be added upon selection of preferred alternatives, but not expected to be significant from a NEPA perspective (i.e. an EA should be appropriate)

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8.0 WHAT LAWS APPLY TO THE ACTIONS CONSIDERED IN THIS DOCUMENT?

8.1 Magnuson-Stevens Fishery Conservation and Management Act

8.1.1 National Standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act requires that fishery management plans contain conservation and management measures that are consistent with the ten National Standards:

In General. – Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the…national standards for fishery conservation and management.

(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The proposed measures would increase yield while preventing overfishing, thus helping to achieve optimum yield.

(2) Conservation and management measures shall be based upon the best scientific information available.

The data sources considered and evaluated during the development of this action include, but are not limited to: permit data, landings data from vessel trip reports, information from resource trawl surveys, sea sampling (observer) data, data from the dealer weighout purchase reports, peer-reviewed assessments and original literature, and descriptive information provided by fishery participants and the public. To the best of the Council's knowledge these data sources constitute the best scientific information available. All analyses based on these data have been reviewed by National Marine Fisheries Service and the public.

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The fishery management plan addresses management of the mackerel, squid, and butterfish stocks throughout the range of the species in U.S. waters, in accordance with the jurisdiction of U.S. law.

(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

There is nothing in the proposed measures that would be expected to discriminate between residents of different States.

(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

There is no allocation proposed. The proposed actions are efficient in that they should facilitate full utilization of the mackerel and herring quotas.

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Changes in fisheries occur continuously, both as the result of human activity (for example, new technologies or shifting market demand) and natural variation (for example, oceanographic perturbations). In order to provide the greatest flexibility possible for future management decisions, the fishery management plan includes a framework adjustment mechanism with an extensive list of possible framework adjustment measures that can be used to quickly adjust the plan as conditions in the fishery change.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

As always, the Council considered the costs and benefits associated with the management measures proposed in the action when developing this action. This action should not create any duplications related to managing the MSB resources.

(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The human community impacts of the action are described above in Section 7.5. The proposed measures would likely increase yield and revenues to human communities.

(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

The Magnuson-Stevens Act defines “bycatch” as fish that are harvested in a fishery, but are not retained (sold, transferred, or kept for personal use), including economic discards and regulatory discards. Incidentally landed catch are fish, other than the target species, that are harvested while fishing for a target species and retained and/or sold. Previous actions have reduced bycatch to the extent practicable, as described elsewhere in this document. The RH/S cap should continue to control catch of those species in the mackerel fishery.

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Fishing is a dangerous occupation; participants must constantly balance the risks imposed by weather against the economic benefits. According to the National Standard guidelines, the safety of the fishing vessel and the protection from injury of persons aboard the vessel are considered the same as “safety of human life at sea.” The safety of a vessel and the people aboard is ultimately the responsibility of the master of that vessel. Each master makes many decisions about vessel maintenance and loading and about the capabilities of the vessel and crew to operate safely in a variety of weather and sea conditions. This national standard does not replace the judgment or relieve the responsibility of the vessel master related to vessel safety. No measures in this action are expected to negatively impact safety at sea.

8.1.2 Other Required Provisions of the Magnuson-Stevens Act

Section 303 of the MSA contains 15 additional required provisions for FMPs, which are listed and discussed below. Nothing in this action is expected to contravene any of these required provisions.

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States, which are-- (A) necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery; (B) described in this subsection or subsection (b), or both; and (C) consistent with the National Standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including but not limited to closed areas, quotas, and size limits), and any other applicable law

The MSB FMP has evolved over time through 20 Amendments and currently uses Acceptable Biological Catch recommendations from the Council's Scientific and Statistical Committee to sustainably manage the Mackerel, Squid, and Butterfish fisheries. Under the umbrella of limiting catch to the Acceptable Biological Catch, a variety of other management and conservation measures have been developed to meet the goals of the fishery management plan and remain consistent with the National Standards. The current measures are codified in the Code of Federal Regulations (50 C.F.R. § 648 Subpart B - http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=1e9802ffddb05d0243d9c657fade956c&rgn=div5&view=text&node=50:12.0.1.1.5&idno=50) and summarized at http://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/msbinfosheet.pdf. This action proposes measures that should continue to promote the long-term health and stability of the fisheries, consistent with the MSA.

(2) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any

Every Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan provides this information. This document updates this information as appropriate in Section 6.

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification

This provision is addressed via assessments that are conducted through a peer-reviewed process at the NMFS Northeast Fisheries Science Center. The available information is summarized in every

Amendment and Specifications document – see Section 6. Full assessment reports are available at: http://www.nefsc.noaa.gov/saw/.

(4) assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3); (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing; and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States

Based on past performance and capacity analyses (e.g. Amendment 11 and the pending Squid Amendment), if Atlantic mackerel, squid, and butterfish are sufficiently abundant and available, the domestic fishery has the desire and ability to fully harvest the available quotas, and domestic processors can process the fish/squid.

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors

Previous Amendments have specified the data that must be submitted to NMFS in the form of vessel trip reports, vessel monitoring system trip declarations and catch reports, and dealer reports.

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery; except that the adjustment shall not adversely affect conservation efforts in other fisheries or discriminate among participants in the affected fishery

There are no such requests pending, but the plan contains provisions for framework actions to make modifications regarding access/permitting if necessary.

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat

Section 6.3 of this document summarizes essential fish habitat (EFH). Amendments 9 and 11 evaluated habitat impacts, updated essential fish habitat designations, and implemented measures to reduce habitat impacts (primarily related to tilefish essential fish habitat). Amendment 16 implemented measures to protect deep-sea corals. An upcoming review of EFH will review EFH designations and potential adverse impacts to EFH from Council-managed fisheries.

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan

The preparation of this action included a review of the scientific data available to assess the impacts of all alternatives considered. No additional data was deemed needed for effective implementation of the plan at this time.

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on-- (A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

Section 7.5 of this document provides an assessment of the likely effects on fishery participants and communities from the considered actions.

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery

Amendments 8 and 9 to the fishery management plan established biological reference points for the species in the plan, and Amendment 10 contained measures for butterfish rebuilding. Mackerel was recently declared overfished and a rebuilding action is under development through this action. If a fishery is declared overfished or if overfishing is occurring, another Amendment or appropriate action would be undertaken to implement effective corrective measures. A recent omnibus framework also streamlined incorporation of new overfished/overfishing reference points.

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority-- (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided

NMFS has implemented an omnibus amendment to implement a revised standardized reporting methodology since the previous methodology was invalidated by court order. See http://www.greateratlantic.fisheries.noaa.gov/mediacenter/2013/09/draftsbrmamendment.html for details.

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish

The Atlantic mackerel, squid, and butterfish fisheries are primarily commercial. There are some discards in the recreational mackerel fishery, but these are minimal related to the overall scale of the mackerel fishery. There are no size limits that would lead to regulatory recreational discarding of mackerel. There are no specific catch and release fishery management programs. There is some recreational longfin squid fishing, but it is thought to be relatively minor and the Council can consider if a survey is appropriate to further investigate longfin squid recreational fishing.

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors

This document updates this information as appropriate in Section 6. There is minimal recreational and charter fishing for squid, and no measures in this action would restrict such activity.

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery.

Substantial harvest reductions are not anticipated as part of this rebuilding plan for mackerel.

(15) establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.

The annual specifications process addresses this requirement. Acceptable Biological Catch recommendations from the Council's Scientific and Statistical Committee are designed to avoid overfishing and form the upper bounds on catches. There are a variety of proactive and reactive accountability measures for these fisheries, fully described at: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=1e9802ffddb05d0243d9c657fade956c&rgn=div5&view=text&node=50:12.0.1.1.5&idno=50#50:12.0.1.1.5.2.

8.1.3 Discretionary Provisions of the Magnuson-Stevens Act

Section 303b of the Magnuson-Stevens Act contains 14 additional discretionary provisions for Fishery Management Plans. They may be read on pages 59 and 60 of the National Marine Fisheries Service's redline version of the Magnuson-Stevens Act at: http://www.nmfs.noaa.gov/msa2007/MSA_Amended%20by%20Magnuson-Stevens%20Reauthorization%20Act%20%281-31-07%20draft%29.pdf.

8.1.4 Essential Fish Habitat Assessment

The measures under the preferred alternatives proposed in this action are not expected to result in substantial changes in effort that impacts habitat, as described in Section 7. Therefore, the Council concluded in section 7 of this document that the proposed measures will have no additional adverse impacts on EFH that are more than minimal or temporary. Thus no mitigation is necessary. The adverse impacts of bottom trawls used in MSB fisheries on other managed species (not MSB), which were determined to be more than minimal and not temporary in Amendment 9, were minimized to the extent practicable by the Lydonia and Oceanographer canyon closures to squid fishing. In addition, Amendment 1 to the Tilefish FMP closed those canyons plus Veatch's and Norfolk Canyons to all bottom trawling. Deepwater corals were also protected in Amendment 16. Therefore, the adverse habitat impacts of MSB fisheries "continue to be minimized." Amendment 11 revised the MSB EFH designations and EFH impacts will continue to be monitored and addressed as appropriate.

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8.2 NEPA

To be added upon selection of preferred alternatives, but not expected to be significant from a NEPA perspective (i.e. an EA should be appropriate)

8.3 Marine Mammal Protection Act

To be added upon selection of preferred alternatives, but expected to be consistent with the provisions of the MMPA and would not alter existing measures to protect the species likely to inhabit the management units of the subject fisheries. For further information on the potential marine mammal impacts of the fishery and the proposed management action, see Sections 6 and 7 of this Environmental Assessment.

8.4 Endangered Species Act

To be added upon selection of preferred alternatives, but do not expect the proposed action, in conjunction with other activities, to result in jeopardy to any ESA listed species.

8.5 Administrative Procedures Act

To be added upon selection of preferred alternatives, but at this time, the Council is not requesting any abridgement of the rulemaking process for this action.

8.6 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to control and, to the extent possible, minimize the paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. This action would not modify existing collections or require new collections.

8.7 Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 requires that all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. Pursuant to the Coastal Zone Management Act regulations at 15 CFR 930.35, a negative determination may be made if there are no coastal effects and the subject action: (1) Is identified by a state agency on its list, as described in ' 930.34(b), or through case-by-case monitoring of unlisted activities; or (2) which is the same as or is similar to activities for which consistency determinations have been prepared in the past; or (3) for which the Federal agency undertook a thorough consistency assessment and developed initial findings on the coastal effects of the activity. NMFS is reviewing applicable coastal policies of affected states and will make an appropriate determination as part of the rulemaking process.

8.8 Section 515 (Data Quality Act)

Pursuant to NOAA guidelines implementing section 515 of Public Law 106-554 (the Data Quality Act), all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of the information (including statistical information) disseminated by or for Federal agencies. The following section addresses these requirements.

Utility

The information presented in this document should be helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the measures proposed, and the impacts of those measures. A discussion of the reasons for selecting the proposed action is included so that intended users may have a full understanding of the proposed action and its implications, as well as the Council's rationale.

Until a proposed rule is prepared and published, this document is the principal means by which the information contained herein is available to the public. The information provided in this document is based on the most recent available information from the relevant data sources. The development of this document and the decisions made by the Council to propose this action are the result of a multi-stage public process. Thus, the information pertaining to management measures contained in this document has been improved based on comments from the public, the fishing industry, members of the Council, and NMFS.

The Federal Register notice that announces the proposed rule and the final rule and implementing regulations will be made available in printed publication, on the website for the Greater Atlantic Regional Fisheries Office, and through the Regulations.gov website. The Federal Register documents will provide metric conversions for all measurements.

Integrity

Prior to dissemination, information associated with this action, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information. All electronic information disseminated by NOAA Fisheries adheres to the standards set out in Appendix III, Security of Automated Information Resources,@ of OMB Circular A-130; the Computer Security Act; and the Government Information Security Act. All confidential information (e.g., dealer purchase reports) is safeguarded pursuant to the Privacy Act; Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business, and financial information); the Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity

For purposes of the Pre-Dissemination Review, this document is considered to be a Natural Resource Plan. Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, FMP Process; the EFH Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6A, Compliance with the National Environmental Policy Act and its Companion Manual.

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Stock status (including estimates of biomass and fishing mortality) reported in this product are based on either assessments subject to peer-review through the Stock Assessment Review Committee or on updates of those assessments prepared by scientists of the Northeast Fisheries Science Center. Landing and revenue information is based on information collected through the Vessel Trip Report and Commercial Dealer databases. Information on catch composition, by tow, is based on reports collected by the NOAA Fisheries observer program and incorporated into the sea sampling or observer database systems. These reports are developed using an approved, scientifically valid sampling process. In addition to these sources, additional information is presented that has been accepted and published in peer-reviewed journals or by scientific organizations. Original analyses in this document were prepared using data from accepted sources, and the analyses have been reviewed by members of the Mackerel, Squid and Butterfish Monitoring Committee or other NMFS staff with expertise on the subject matter.

Despite current data limitations, the conservation and management measures proposed for this action were selected based upon the best scientific information available. The analyses conducted in support of the proposed action were conducted using information from the most recent complete calendar years, generally through 2017 except as noted. The data used in the analyses provide the best available information on the number of seafood dealers operating in the northeast, the number, amount, and value of fish purchases made by these dealers. Specialists (including professional members of plan development teams, technical teams, committees, and Council staff) who worked with these data are familiar with the most current analytical techniques and with the available data and information relevant to these fisheries.

The policy choices are clearly articulated in Section 5 of this document as well as the management alternatives considered in this action. The supporting science and impact analyses, upon which the policy choices are based, are described in Sections 6 and 7 of this document. All supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency.

The review process used in preparation of this document will involve the responsible Council, the Northeast Fisheries Science Center, the Greater Atlantic Regional Fisheries Office, and NOAA Fisheries Headquarters. The Center's technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment methods, demersal resources, population biology, and the social sciences. The Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the document. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the action proposed in this document and clearance of any rules prepared to implement resulting regulations is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

8.9 Regulatory Flexibility Analysis

The purpose of the Regulatory Flexibility Act is to reduce the impacts of burdensome regulations and recordkeeping requirements on small businesses. To achieve this goal, the Regulatory Flexibility Act requires Federal agencies to describe and analyze the effects of proposed regulations, and possible alternatives, on small business entities. Section 12.0 at the end of this document will include the Regulatory Flexibility Act Analysis.

8.10 Executive Order (E.O.) 12866 (Regulatory Planning and Review)

To be added upon selection of preferred alternatives.

8.11 Executive Order (E.O.) 13132 (Federalism)

This Executive Order established nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. The Executive Order also lists a series of policy making criteria to which Federal agencies must adhere when formulating and implementing policies that have federalism implications. However, no federalism issues or implications have been identified relative to the measures proposed measures. This action does not contain policies with federalism implications sufficient to warrant preparation of an assessment under Executive Order 13132. The affected states have been closely involved in the development of the proposed management measures through their representation on the Council (all affected states are represented as voting members of at least one Regional Fishery Management Council). No comments were received from any state officials relative to any federalism implications that may be associated with this action

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10.0 LIST OF AGENCIES AND PERSONS CONSULTED

In preparing this document the Council consulted with the NMFS, New England and South Atlantic Fishery Management Councils, Fish and Wildlife Service, Department of State, and the states of Maine through Florida through their membership on or participation with the Mid-Atlantic, New England and/or South Atlantic Fishery Management Councils. In addition, states that are members within the management unit were consulted through the Coastal Zone Management Program consistency process.

11.0 LIST OF PREPARERS AND POINT OF CONTACT

This environmental assessment was prepared by the following member of the Council staff: Jason Didden. Review and document improvement was conducted by NMFS staff at the Greater Atlantic Regional Office in Gloucester, MA and the Northeast Fisheries Science Center in Woods Hold, MA. Questions about this environmental assessment or additional copies may be obtained by contacting Jason Didden, Mid-Atlantic Fishery Management Council, 800 N. State Street, Dover, DE 19901 (302-674-2331). This Environmental Assessment may also be accessed by visiting the NMFS Greater Atlantic Region website at http://www.greateratlantic.fisheries.noaa.gov/regs/.

12.0 REGULATORY FLEXIBILITY ANALYSIS AND IMPACT REVIEW

To be added once preferred alternatives are selected.

13.0 APPENDIX 1: MATRIX OF CLOSURE TRIGGER THRESHOLDS FOR ALL DAHS

To be added once preferred alternatives are selected.

14.0 APPENDIX 2: MATRIX OF RH/S CAPS FOR ALL DAHS

To be added once preferred alternatives are selected.

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