2012 Atlantic Butterfish Specifications Adjustment
Environmental Assessment
Regulatory Impact Review
Initial Regulatory Flexibility Analysis

Last Updated: October 11, 2012

Prepared by the

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

National Marine Fisheries Service (NMFS)

1.0 EXECUTIVE SUMMARY & TABLE OF CONTENTS

The Mid-Atlantic Fishery Management Council (MAFMC) originally made recommendations for 2012 butterfish specifications at its June 2011 meeting and resulted in the specifications that are currently implemented by the National Marine Fisheries Service (NMFS). They are based on the MAFMC's Scientific and Statistical Committee (SSC) recommendation for an acceptable biological catch (ABC) of 3,622 metric tons (mt) originally provided in May of 2011 and reaffirmed in May of 2012.

In 2012 the SSC also recommended an increase for the 2013 butterfish ABC to 8,400 mt. Afterward, the MAFMC requested its SSC to revisit the 2012 butterfish ABC in light of the higher 2013 recommendation, which was made with data that likely reflects as much on 2012 as 2013. The primary motivation is to correctly specify a sustainable butterfish catch that effectively conserves butterfish but does not unnecessarily constrain the longfin squid fishery, which is shut down once it catches a specified amount of butterfish (the "butterfish cap") in order to control overall butterfish mortality. In September of 2012 the SSC did revise its butterfish ABC to 4,200 mt. The MAFMC subsequently adopted this recommendation and an increased butterfish cap, and additionally requested that NMFS transfer 200 mt of projected unused butterfish landings into the butterfish cap in order to minimize the probability of an unnecessary longfin squid closure.

This document examines the impacts expected from implementation of potential changes to the butterfish specifications. The recommendations are consistent with the recommendations of the MAFMC's SSC, which may be accessed at: http://www.mafmc.org/committees/science.htm. The SSC's ABC recommendations account for scientific uncertainty such that overfishing is unlikely to occur. The preferred specifications described in this document also address management uncertainties and optimum yield considerations raised by the MSB Monitoring Committee (NMFS and MAFMC staff) or otherwise brought to the MAFMC's attention.

The proposed alternatives are expected to maintain positive social and economic benefits by maintaining the sustainability of the resources and vitality of the associated fisheries. They should have no significant impacts on valued ecological components compared to the fishery as it was prosecuted under the earlier 2012 specifications. 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) has been made.

A summary of the proposed changes follows:

<u>Butterfish</u>

Based on undated advice from the MAFMC's SSC, the MAFMC recommended a butterfish ABC of 4,200 mt for 2012. This is a 16% increase from the current ABC. Following from the ABC increase, the MAFMC voted to keep the current 10% buffer for management uncertainty and set an Annual Catch Target (ACT) of 3,780 mt (520 mt more than the current ACT of 3,260 mt). The current butterfish cap on the longfin squid fishery is 2,445 mt. The Council voted to use the additional ACT to increase the butterfish cap. With the additional 520 mt of butterfish ACT and by reducing the landings quota by 200 mt, the MAFMC recommend that the butterfish cap be increased to 3,165 mt (2,445+520+200). A qualitative summary of the expected impacts related to the status quo and preferred specification alternatives is provided in Table 1.

Table 1. Expected impacts of status quo and preferred specifications.
("+" signifies a positive impact, "-" a negative impact, and "0" a similar impact to the year before. "0/" before "+" or "-" indicates a likely small impact)

	Valued Ecosystem Components/Environmental Dimensions				
Specification Alternatives - JVP and TALFF are not listed in the table because they are both zero throughout. DAHs may be reduced to provide RSA quota as described in this document.	Managed Resource	Non-target Species	Human Communi-ties	Protected Resources	Essential Fish Habitat
Alt A - Butterfish No Action/Status Quo - ABC = 3,622mt; ACT = 3,260 mt; DAH = 1087; Butterfish Cap = 2,445mt	0	0	0	0	0
Alt B - Butterfish Preferred - ABC = 4,200mt; ACT = 3,780mt; DAH = 872mt; butterfish cap = 3,165mt	0	0/-	+	0/-	0/-

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY & TABLE OF CONTENTS 2
2.0 LIST OF ACRONYMS 4
3.0 LISTS OF TABLES AND FIGURES 5
4.0 INTRODUCTION AND BACKGROUND OF SPECIFICATION PROCESS 6
4.1 PURPOSE AND NEED OF THE ACTION 6
5.0 WHAT ALTERNATIVES ARE CONSIDERED IN THIS DOCUMENT? 7
5.1 Alternatives: Butterfish Specifications 7
6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES 11
6.1 Description of the Managed Resources 11
6.2 Physical Environment 13
6.3 Habitat, Including Essential Fish Habitat (EFH) 14
6.3.1 Fishery Impact Considerations 16
6.4 ESA Listed Species and MMPA Protected Species 17
6.4.1 Commercial Fisheries Interactions 20
6.4.2 Atlantic Trawl Gear Take Reduction Plan 23
6.4.3 Description of Turtle Species with Documented Interactions with the MSB Fisheries 24
6.4.4 Atlantic sturgeon 24
6.4.5 Description of River Herring Candidate Species with Documented Interactions with the MSB Fisheries 29
6.5 Other Non-Target Species Interactions 29
6.6 Human Communities and Economic Environment 32
6.6.1.1 Longfin Squid 32
7.0 WHAT ARE THE IMPACTS (Biological and Human Community) FROM THE ALTERNATIVES CONSIDERED IN THIS DOCUMENT? 38
7.1 Biological Impacts on Managed Species 39
7.2 Habitat Impacts 39
7.3 Impacts on Protected Resources 40
7.4 Socioeconomic Impacts 40
7.5 Impacts on non-Target Fish Species 41
7.6 Cumulative Impacts of Preferred Alternatives on Identified Valued Ecosystem Components 41
7.7 Summary of cumulative impacts 49
8.0 WHAT LAWS APPLY TO THE ACTIONS CONSIDERED IN THIS DOCUMENT? 50
9.0 LITERATURE CITED 60
10.0 LIST OF AGENCIES AND PERSONS CONSULTED 63
11.0 LIST OF PREPARERS AND POINT OF CONTACT 63

2.0 LIST OF ACRONYMS

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ACT	Annual Catch Target
ASMFC	Atlantic States Marine Fisheries Commission or Commission
ATGTRT	Atlantic Trawl Gear Take Reduction Team
B	Biomass
CFR	Code of Federal Regulations
CPUE	Catch Per Unit of Effort
CV	coefficient of variation
DAH	Domestic Annual Harvest
DAP	Domestic Annual Processing
DPS	Distinct Population Segment
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
IOY	Initial Optimum Yield
M	Natural Mortality Rate
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 2,204.6 pounds)
NE	Northeast
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
PBR	Potential Biological Removal
RSA	Research Set-Aside
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SNE	Southern New England
SSC	Scientific and Statistical Committee
TALFF	Total allowable level of foreign fishing
TRAC	Transboundary Resource Assessment Committee
US	United States
VTR	Vessel Trip Report

Note: "Mackerel" refers to "Atlantic mackerel" unless otherwise noted.

3.0 LISTS OF TABLES AND FIGURES

3.1 List of Tables

Table 1. Expected impacts of status quo and preferred specifications. 3
Table 2. Status Quo/No Action Butterfish Specifications Alternative A Summary 9
Table 3. Summary of Preferred Butterfish Specifications – Alternative B 10
Table 4. EFH descriptions for federally-managed species/life stages in the U.S. Northeast Shelf Ecosystem that are vulnerable to bottom tending fishing gear. 14
Table 5. Encounters of Atlantic Sturgeon and Unknown Sturgeon By Month, Area In Small Mesh Otter Trawl Gear, 2006-2010 Combined. 26
Table 6. All Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, Mesh Size, and Year for Otter Trawls (2006 Across Top Row to 2010 Across Bottom Row). 26
Table 7. Dead Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, and Year for Small Mesh Otter Trawl (2006 Across Top Row to 2010 Across Bottom Row). 27
Table 8. Atlantic Sturgeon Encounters Expanded by VTR Landings for Southern (600 Series of Statistical Areas) for Small-Mesh Otter Trawls in Each Quarter of the Year. 28
Table 9. Discards and Incidental Catch in the Longfin Squid Fishery 2009-2011. 31
Table 10. Longfin DAH Performance. (mt) 34
Table 11. 2011 Data for Permitted and Active Vessels by State 34
Table 12. 2011 Vessel Dependence on Longfin (revenue-based) 35
Table 13. 2009-2011 Data (most recent 3) Landings by State (mt) 35
Table 14. 2009-2011 Data (most recent 3 years) for Landings by Month (mt) 35
Table 15. 2009-2011 Data (most recent 3 years) for Landings by Gear (mt) 35
Table 16. 2009-2011 Ex-Vessel Revenues by Port for All Ports with at Least $150,000 Ex-Vessel Sales Combined Over 2009-2011 35
Table 17. 2009-2011 Numbers of Active Dealers 36
Table 18. Kept Catch in Statistical areas with at least 250 mt of longfin caught in at least one year 2009-2011. 36
Table 19. 2012 Specifications Summary 38

3.2 List of Figures

Figure 1. Mean catch per tow of various species caught in NEFSC bottom trawl surveys 13
Figure 2. Historical Longfin Squid Landings in the U.S. EEZ. 32
Figure 3. Uncanceled Longfin/Butterfish Permits Per Year 34
Figure 4. NMFS Statistical Areas 36

4.0 INTRODUCTION AND BACKGROUND OF SPECIFICATION PROCESS

The MAFMC manages the mackerel, squid, and butterfish (MSB) fisheries with the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (MSB FMP), pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA) as currently amended. The MSB FMP requires the MAFMC to set annual specifications according to national standards specified in the MSA and has the following objectives: Enhance the probability of successful recruitment; promote the growth of the commercial fishery; provide freedom and flexibility to all harvesters; provide marine recreational fishing opportunities; increase understanding of the conditions of the stocks and fisheries; and minimize harvesting conflicts. Related to these objectives, the MAFMC has instituted a variety of management measures over the years in addition to annual specifications, which are summarized at http://www.mafmc.org/fmp/history/smb-hist.htm.

4.1 PURPOSE AND NEED OF THE ACTION

The purpose of this action is to provide optimal conservation and management of the MSB resource under the MSA by amending the 2012 butterfish ABC, ACT and longfin squid fishery cap specifications.. This action is needed to prevent overfishing and achieve optimum yield within the longfin squid fishery in response to updated recommendations from the SSC. Optimum yield is defined as the amount of fish which will provide the greatest overall benefit to the nation based on the maximum sustainable yield as reduced by relevant economic, social, and/or ecological factors. Action is needed because failure to implement the preferred measures described in this document could result in lower overall benefits to the Nation.

The Mid-Atlantic Fishery Management Council (MAFMC) originally made recommendations for 2012 butterfish specifications at its June 2011 meeting and resulted in the specifications that are currently implemented by the National Marine Fisheries Service (NMFS). They are based on the MAFMC's Scientific and Statistical Committee (SSC) recommendation for an acceptable biological catch (ABC) of 3,622 metric tons (mt) originally provided in May of 2011 and reaffirmed in May of 2012.

In 2012 the SSC also recommended an increase for the 2013 butterfish ABC to 8,400 mt. Afterward, the MAFMC requested its SSC to revisit the 2012 butterfish ABC in light of the higher 2013 recommendation, which was made with data that likely reflects as much on 2012 as 2013. The primary motivation is to correctly specify a sustainable butterfish catch that effectively conserves butterfish but does not unnecessarily constrain the longfin squid fishery, which is shut down once it catches a specified amount of butterfish (the "butterfish cap") in order to control overall butterfish mortality. In September of 2012 the SSC did revise its butterfish ABC to 4,200 mt. The MAFMC subsequently adopted this recommendation and an increased butterfish cap, and additionally requested that NMFS transfer 200 mt of projected unused butterfish landings into the butterfish cap in order to minimize the probability of an unnecessary longfin squid closure.

This document serves as the submission to NMFS of the MAFMC's recommendations for revised 2012 butterfish specifications and related analyses supporting the recommendations. The analysis of the proposed measures' environmental impacts (and their significance) is discussed in accordance with the Council on Environmental Quality regulations and National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6 - requirements for an Environmental Assessment.

5.0 WHAT ALTERNATIVES ARE CONSIDERED IN THIS DOCUMENT?

Introduction

The status quo alternative, what exists currently, is equivalent to the no action alternative because the current regulations will persist until new regulations are promulgated because the FMP contains a "roll-over" provision. This provision specifies that if the Regional Administrator fails to publish annual specifications before the start of the new fishing year, then the previous years' specifications remain in effect. The preferred alternatives were recommended by the MAFMC after considering the recommendations of its SSC, recommendations from MAFMC and NMFS technical staff, and public testimony and comment given the requirements of the MSA and the MSB FMP.

Based on advice from the MAFMC's SSC, the MAFMC recommended an updated butterfish ABC of 4,200 mt for 2012. This is a 16% increase from the current ABC. Following from the ABC increase, the MAFMC voted to keep the current 10% buffer for management uncertainty and set an Annual Catch Target (ACT) of 3,780 mt (520 mt more than the current ACT of 3,260 mt). The current butterfish cap on the longfin squid fishery is 2,445 mt and the Council voted to use the additional ACT to increase the butterfish cap on the longfin squid fishery. With the additional 520 mt of butterfish ACT and by reducing the landings quota by 200 mt, the MAFMC ultimately recommended that the butterfish cap be increased to 3,165 mt (2,445+520+200).

Because the MAFMC is limited to setting a butterfish ABC at or below the 4,200 mt recommended by its SSC and because the status quo ABC of 3,622 mt creates a range below the preferred specification, only two options are considered: the status quo (3,622 mt) and the preferred alternative (4,200 mt). This action only adjusts the butterfish specifications for the remainder of 2012 and a further range of alternatives is being considered in 2013 specifications.

5.1 Alternatives: Butterfish Specifications

The overall goal of the butterfish specifications is to account for all butterfish catch such that the ABC provided by the SSC is not exceeded and optimum yield is achieved. The ABC currently recommended by the SSC is 4,200 mt for 2012 (see http://www.mafmc.org/committees/science.htm for details). The SSC's initial recommendation for 2012 was 3,622 mt, making the updated 2012 recommendation of 4,200 mt a 16% increase from the initial 2012 ABC. The updated ABC of 4,200 mt is based on the observation that the SSC's 2013 ABC recommendation of 8,400 mt probably applies to 2012 as well, since the data considered for 2013 ranged primarily from 2005-2011, and most butterfish only live 1-3 years. The analysis for 2013 was not available when the current 2012 specifications were established, and is summarized next.

While the rationale for the SSC's 2013 ABC recommendation of 8,400 was documented in the SSC's May 2012 report (available at: http://www.mafmc.org/committees/science.htm) and described to the MAFMC, a further discussion of the SSC's decision-making may help the public more clearly

understand the context and rationale for the SSC's and MAFMC's recommendations.

Because of the relative uncertainty regarding the butterfish stock, in the spring of 2012 MAFMC staff requested that the NMFS Northeast Fishery Science Center (NEFSC) consider if additional investigation of the butterfish stock could take place prior to the SSC meeting that sets the butterfish ABCs. The NEFSC was able to complete such an analysis, which expanded survey data to a range of total swept area biomasses based on ranges of reasonable assumptions regarding catchability, and also investigated likely fishing mortality. Dr. Tim Miller and Dr. Paul Rago collaborated on the analysis summarized herein and further details are available at: http://www.mafmc.org/meeting_materials/SSC/2012-05/SSC_2012_05.htm.

The model results comported well with the 2010 assessment results and while insufficient to recommend particular catch advice for a directed fishery, strongly supported the contention that discard limits of 3,600 mt would have almost no chance of inducing overfishing. Even at the most conservative (smallest) biomasses (resulting from when the survey is assumed to encompass all butterfish habitat and catches every butterfish in the water column it samples, and when natural mortality (M) is assumed to be equal to 0.8) the fishing mortality over 2005-2011 would have been less than any of a suite of potential overfishing reference points whenever total catch is less than 9,400 mt. Actual catch was much lower, but the analysis takes a "what if" approach.

Miller and Rago conducted additional analysis via bootstrapping to further examine the range of probable fishing mortalities that would result from Miller and Rago's relatively conservative assumptions about butterfish biomass. Using Patterson 2002's guidance for small pelagic species of keeping to a target F:M ratio of 67% and an assumed M of 0.8 (which translates to a target of F = 0.536), the analysis suggested that catches of 16,800 mt would only lead to overfishing (F > = 0.536) under Miller and Rago's most extreme assumptions. The SSC therefore adopted 16,800 as a proxy OFL and recommended an ABC of half that amount, 8,400 mt. The relatively large 50% buffer was used because of the remaining uncertainty regarding the true status of the butterfish stock.

Since the SSC did see value in having 2012 be a precautionary stepping stone from 2011's 1,811 mt ABC to 2013's 8,400 mt ABC, upon reconsideration in September 2012 the SSC increased the 2012 ABC to 4,200 mt. The SSC observed that 8,400 mt equates to 700 mt per month (or 1,400 mt for November and December 2012 combined, when any change might be effective) and that the 2012 expected butterfish mortality on November 1, 2012 appears likely to be approximately 2,800 mt based on the available landings and discard information. 2,800 mt plus 1,400 mt equals 4,200 mt, the SSCs updated butterfish ABC recommendations. Most of 2012 would still serve as a stepping stone, as butterfish mortality will likely be limited to 2,800 mt through November 1, and only a maximum of 4,200 mt (which also equates to half of the 2013 ABC) would be permitted for the entire year. Note – all 2012 data in this document is preliminary unaudited data, but it is still the best available.

Alternative A – Status Quo and No Action Alternative Due to Roll-Over Provisions in FMP

Table 2. Status Quo/No Action Butterfish Specifications Alternative A Summary

Alternative A for Butterfish - No action and status quo (all numbers are in metric tons)	
Specification	Butterfish
Overfishing Limit (OFL)	Unknown
Total Acceptable Biological Catch (ABC) from SSC = ACL	3,622
Commercial Annual Catch Target (10% less than ACL to account/buffer for management uncertainty)	3,260
Landings or "Domestic Annual Harvest (DAH)" (66% less than Annual Catch Target to account for expected discards)	1,072
Butterfish Cap (set at 75% of ACT)	2,445

In the table above, the 3,622 mt ABC was the original recommendation for 2012 by the SSC and MAFMC and is the current implemented specification. The 10% deduction for management uncertainty was set by the MAFMC based on the best available scientific information available at the time of decision-making, including any history of overages as well as imprecision in catch estimates (including discards). Like the previous year, quota available to Joint Venture Processing is zero and quota available for foreign fishing, the total allowable level of foreign fishing (TALFF) is also zero since the U.S. fishery has the capacity to fully harvest the quota.

Butterfish landings and the butterfish mortality cap are tracked in parallel such that all butterfish landings count against the DAH for quota monitoring while all butterfish catch (landings and discards) by vessels that land over 2,500 lb of longfin squid counts against the butterfish mortality cap.

This document also notes that the ABC in effect for most of 2012 was 1,811 mt. NMFS initially rejected the increase from 1,811 mt in 2011 to 3,622 mt in 2012 due to an interpretation of the MAFMC's Risk Policy that forbade ABC increases when the status of a stock is as uncertain as butterfish (the Miller and Rago analysis has since reduced uncertainty). Via Framework 6 to the MSB FMP, the SSC is allowed to recommend increases in such cases if the SSC can certify that 1) best available science indicates that stock biomass is stable or increasing; and 2) the SSC provides a determination that, based on best available science, the recommended increase to the ABC is not expected to result in overfishing. After the MAFMC voted to recommend implementation of Framework 6, the SSC reaffirmed the 2012 ABC of 3,622 mt per the stipulations described above and NMFS implemented the 3,622 mt ABC in late August 2012.

Note: Should the 2013 specifications not go into effect on January 1, 2013, the status-quo alternative would roll over into the new fishing year, and apply until the 2013 specifications go into effect.

Alternative B – Preferred

Table 3. Summary of Preferred Butterfish Specifications – Alternative B

Alternative B for Butterfish - Preferred (all numbers are in metric tons)	
Specification	Butterfish
Overfishing Limit (OFL)	Unknown
Total Acceptable Biological Catch (ABC) from SSC = ACL	4,200
Commercial Annual Catch Target (ACT) (10% less than ACL to account/buffer for management uncertainty)	3,780
Landings or "Domestic Annual Harvest (DAH)" (66% less than Annual Catch Target to account for expected discards)	872
Butterfish Cap	3,165

Note: Should the 2013 specifications not go into effect on January 1, 2013, the preferred alternative, if implemented, would roll over into the new fishing year, and apply until the 2013 specifications go into effect.

In the table above, the 4,200 mt ABC is the updated the recommendation for 2012 by the SSC, which the SSC also found unlikely to cause overfishing. The 10% deduction from the ABC to determine the ACT for management uncertainty is set by the MAFMC based on the best available scientific information available at the time of decision-making, including any history of overages as well as imprecision in catch estimates (including discards). 10% of a larger ABC increases the amount of the ACT buffer from 360 mt to 420 mt but given the change to the ABC could allow some additional longfin squid effort and therefore butterfish discards, allowing the absolute buffer to increase likely maintains approximately the same risk posture relative to management uncertainty.

The cap would be set at 3,165 mt, or 83.73% of the ACT and landings would be set at 872 mt. Landings and the cap are tracked in parallel such that all landings count against the DAH for quota monitoring while all butterfish catch (landings and discards) by vessels that land over 2,500 lb of longfin squid count against the butterfish mortality cap. The MAFMC chose a cap of 3,165 mt to balance use of butterfish in the cap versus directed landings while restraining overall catch within the ABC. Analysis of 2012 landings to date suggests that landings in 2012 will not exceed 650 mt, which is less than what the butterfish fishery would close at with a DAH of 872 mt. Thus allocating most of the butterfish catch to the longfin squid fishery's butterfish cap (and thus to discards) should allow additional longfin squid landings while not additionally restricting butterfish landings.

Since the longfin squid fishery closes at 90% of the cap and the cap is not expected to close until late in the year under Alternative B, actual butterfish catches on trips that land more than 2,500 lb longfin squid will probably not exceed 95% of the cap, or 3007 mt. The performance of the butterfish cap (very slow increases) during the closure of longfin squid in Trimester 2 in 2012 supports the idea that the cap would be used up very slowly once the longfin squid fishery is closed. Of that predicted maximum cap catch of 3007 mt, if the fishery operates as it did in 2011, 13% or about 390 mt of the cap would be landings, and about 2,617 mt would be discards. This would mean that total landings plus cap discards are likely to be at most around 3,267 mt (650 + 2,617). This would leave about 500 mt of the ACT available (3,780 – 3,267 = 513) to cover discards in other fisheries which is slightly less than was estimated in 2011 (637mt) but preliminary analysis suggests that discarding in other fisheries in 2012 has been less than occurred in 2011 and may total about 400 mt, which would be covered by the remaining 500 mt of ACT. There are also 420 mt of separate additional buffering between the ACT and ABC.

6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES

This section identifies and describes the *valued ecosystem components* (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 will also be assessed from a cumulative effects perspective. The valued ecosystem components are:

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

Impacts of the alternatives considered in this document 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

Note: Atlantic mackerel and *Illex* squid are not expected to be impacted in any substantial way by the alternatives considered in this document and so are not discussed here but a description, which has not changed, may be found in last year's specifications environmental assessment at http://www.nero.noaa.gov/regs/.

Butterfish

The following documents are incorporated by reference for analytical purposes in this EA:

The basic biology of Atlantic butterfish, a semi-pelagic/semi-demersal schooling fish species primarily distributed between Nova Scotia and Florida, is detailed in the EFH document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

The status of butterfish is unknown with respect to being overfished or not and "unlikely" with respect to experiencing overfishing or not, based on the 2010 SAW-SARC assessment, available at: http://www.nefsc.noaa.gov/saw/archive.html. Recent trends in the NEFSC Fall Trawl survey (the NEFSC survey that catches the most butterfish) are upward and the most recent survey was above the long term median. Surveys trends are graphed in the annual "Fishery Information Documents" that is created as part of the SSC ABC-setting process. These are available at: http://www.mafmc.org/committees/science.htm ("Meeting Materials").

Longfin Squid

The basic biology of longfin squid, a semi-pelagic/semi-demersal schooling cephalopod species primarily distributed between Georges Bank and Cape Hatteras, NC, is detailed in the EFH document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

Based on a new proposed biomass reference point from a 2010 SAW-SARC assessment, the longfin inshore 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 assessment documents are available at: http://www.nefsc.noaa.gov/saw/reports.html. Recent trends in the NEFSC Trawl surveys (spring and fall) are variable and the most recent surveys were below the long term medians. Surveys trends are graphed in the annual "Fishery Information Documents" that are created as part of the SSC ABC-setting process. These are available at: http://www.mafmc.org/committees/science.htm ("Meeting Materials").

Ecosystems Considerations

The MAFMC has engaged its SSC to help the MAFMC:

-Develop ecosystem level goals, objectives, and policies;

-Incorporate ecosystem structure and function in FMPs to account for ecological sustainability;

-Anticipate and/or respond to shifts in ecological conditions and/or processes; and

-Consider evolving current FMPs into regional ecosystem-based plans.

Developing ecosystem policies will be a multi-year process. In the meantime, this section provides background on the broad ecosystem in which the Atlantic Mackerel, Squid, and Butterfish fisheries generally take place. This section is generally adapted from the "Ecosystem Status Report for the Northeast U.S. Continental Shelf Large Marine Ecosystem" (Ecosystem Assessment Program 2011 - http://www.nefsc.noaa.gov/publications/crd/crd1207/crd1207.pdf).

The Northeast U.S. Continental Shelf Large Marine Ecosystem is a dynamic, highly productive, and intensively studied system providing a broad spectrum of ecosystem goods and services. This region, encompassing the continental shelf area between Cape Hatteras and the Gulf of Maine, spans approximately 250,000 km^2 and supports some of the highest revenue fisheries in the U.S. The system historically underwent profound changes due to very heavy exploitation by distant-water and domestic fishing fleets. Further, the region is experiencing changes in climate and physical forcing that have contributed to large-scale alteration in ecosystem structure and function. Projections indicate continued future climate change related to both short and medium terms cyclic trends as well as non-cyclic climate change. The main findings of the 2011 Ecosystem Assessment Program update are:

-The Northeast Shelf Large Marine Ecosystem can be divided into four Ecological Production Units, which can in turn provide spatial domains for Ecosystem Based Fisheries Management.

-Atlantic basin scale climate indices, the North Atlantic Oscillation and the Atlantic Multidecadal Oscillation, are at extreme levels, which are reflected in local scale climate changes.

-The physical nature of the Northeast U.S. Continental Shelf Large Marine Ecosystem continues to change, notably there has been a decline in Labrador origin water, which influences salinity and food web processes in the ecosystem, and, there has been an increase in water column stratification, which affects the vertical transport of nutrients.

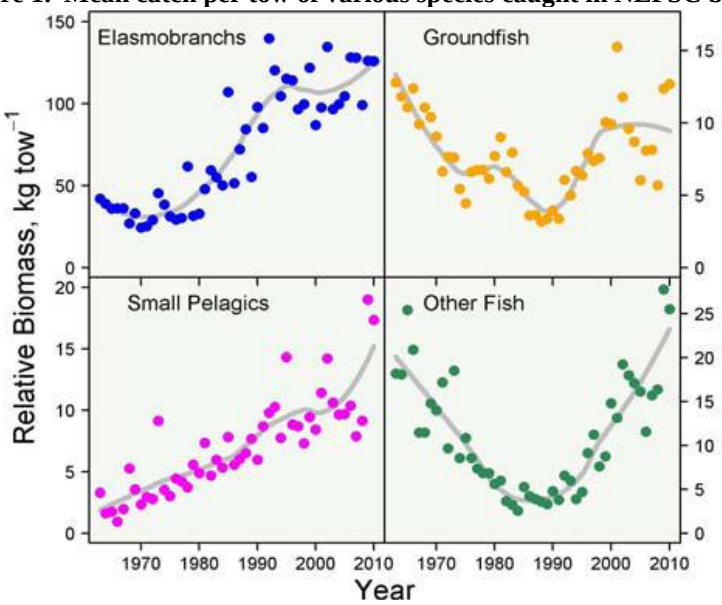
-Recent increases in primary phytoplankton production are not matched by increases in secondary zooplankton production raising the concern that the phytoplankton community structure is shifting to species that fail to effectively enter the food web.

-Many benthic resources have increased in recent years, which can be attributed to both fishery management strategies and environmental effects. The total biomass of fish species remains high.

-Though revenues have remained at high levels in the commercial fishing industry, employment in marine-related employment sectors has declined in recent years.

Since mackerel and the squids at least partially feed on small pelagics or their larvae at some life stage, and all MSB species are preyed upon by a wide variety of finfish at some life stage, mean catches of several fish groups in the NEFSC bottom trawl surveys are provided in the figure below. The 2009 Ecosystem Assessment Program (http://www.nefsc.noaa.gov/publications/crd/crd0911/crd0911.pdf) also noted that consumption of finfish by marine mammals has had a substantially increasing trend.

Figure 1. Mean catch per tow of various species caught in NEFSC bottom trawl surveys



6.2 Physical Environment

Climate, physiographic, and hydrographic differences separate the Atlantic Ocean from Maine to Florida into two distinct areas, the New England-Middle Atlantic Area and the South Atlantic Area, with the natural division occurring at Cape Hatteras, though the division is better thought of as a mixing zone rather than as a definitive boundary. The MSB fisheries are prosecuted in the New England-Middle Atlantic Area. The inshore New England-Middle Atlantic area is fairly 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).

6.3 Habitat, Including Essential Fish Habitat (EFH)

Pursuant to regulations stemming from the MSA's 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 managed resource is described using fundamental information on habitat requirements by life history stage that is summarized in a series of documents produced by NMFS and available at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. Matrices of habitat parameters (i.e. temperature, salinity, light, etc.) for eggs/larvae and juveniles/adults were developed and the updated EFH designations (text and maps) use this information and are available at http://www.nero.noaa.gov/regs/ in the Amendment 11 EIS (search for Amendment 11 in the July 2011 actions). In general, the EFH for the MSB species is the water column itself, and the species have temperature and prey preferences/needs that drive the 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. There are other life stages of federally-managed species that have designated EFH that may be susceptible to adverse impacts from bottom-tending mobile gear as described in the following multi-page table (see Stevenson et al 2004):

Table 4. EFH descriptions for federally-managed species/life stages in the U.S. Northeast Shelf Ecosystem that are vulnerable to bottom tending fishing gear.

Species	Life Stage	Geographic Area of EFH	Depth (meters)	Bottom Type
American plaice	juvenile	GOM, including estuaries from Passamaquoddy Bay to Saco Bay, ME and from Massachusetts Bay to Cape Cod Bay	45 - 150	Fine grained sediments, sand, or gravel
American plaice	adult	GOM, including estuaries from Passamaquoddy Bay to Saco Bay, ME and from Massachusetts Bay to Cape Cod Bay	45 - 175	Fine grained sediments, sand, or gravel
Atlantic cod	juvenile	GOM, GB, eastern portion of continental shelf off SNE, these estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	25 - 75	Cobble or gravel
Atlantic cod	adult	GOM, GB, eastern portion of continental shelf off SNE, these estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	10 - 150	Rocks, pebbles, or gravel
Atl halibut	juvenile	GOM and GB	20 - 60	Sand, gravel, or clay
Atl halibut	adult	GOM and GB	100 - 700	Sand, gravel, or clay
Barndoor skate	juvenile/ adult	Eastern GOM, GB, SNE, Mid-Atlantic Bight to Hudson Canyon	l0-750, most < 150	Mud, gravel, and sand

Species	Life Stage	Geographic Area of EFH	Depth (meters)	Bottom Type
Black sea bass	juvenile	GOM to Cape Hatteras, NC, including estuaries from Buzzards Bay to Long Island Sound, Gardiners Bay, Barnegat Bay to Chesapeake Bay, Tangier/ Pocomoke Sound, and James River	1 - 38	Rough bottom, shellfish/ eelgrass beds, manmade structures, offshore clam beds, and shell patches
Black sea bass	adult	GOM to Cape Hatteras, NC, including Buzzards Bay, Narragansett Bay, Gardiners Bay, Great South Bay, Barnegat Bay to Chesapeake Bay, and James River	20 - 50	Structured habitats (natural and manmade), sand and shell substrates preferred
Clearnose skate	juvenile/ adult	GOM, along continental shelf to Cape Hatteras, NC, including the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem	0 – 500, most < 111	Soft bottom and rocky or gravelly bottom
Haddock	juvenile	GB, GOM, and Mid-Atlantic south to Delaware Bay	35 - 100	Pebble and gravel
Haddock	adult	GB, eastern side of Nantucket Shoals, and throughout GOM	40 - 150	Broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches
Little skate	juvenile/ adult	GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes estuaries from Buzzards Bay south to mainstem Chesapeake Bay	0-137, most 73 - 91	Sandy or gravelly substrate or mud
Ocean pout	eggs	GOM, GB, SNE, and Mid-Atlantic south to Delaware Bay, including the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay and Cape Cod Bay	<50	Generally sheltered nests in hard bottom in holes or crevices
Ocean pout	juvenile	GOM, GB, SNE, Mid-Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts Bay, and Cape Cod Bay	< 50	Close proximity to hard bottom nesting areas
Ocean pout	adult	GOM, GB, SNE, Mid-Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay, MA Bay, Boston Harbor, and Cape Cod Bay	< 80	Smooth bottom near rocks or algae
Pollock	adult	GOME, GB, SNE, and Mid-Atlantic south to New Jersey and the following estuaries: Passamaquoddy Bay, Damariscotta R., MA Bay, Cape Cod Bay, Long Island Sound	15 – 365	Hard bottom habitats including artificial reefs
Red hake	juvenile	GOM, GB, continental shelf off SNE, and Mid-Atlantic south to Cape Hatteras, including the following estuaries: Passamaquoddy Bay to Saco Bay, Great Bay, MA Bay to Cape Cod Bay; Buzzards Bay to CT River, Hudson River, Raritan Bay, and Chesapeake Bay	< 100	Shell fragments, including areas with an abundance of live scallops
Red hake	adult	GOM, GB, continental shelf off SNE, Mid-Atlantic south to Cape Hatteras, these estuaries: Passamaquoddy Bay to Saco Bay, Great Bay, MA Bay to Cape Cod Bay; Buzzards Bay to CT River, Hudson River, Raritan Bay, Delaware Bay, and Chesapeake Bay	10 - 130	In sand and mud, in depressions
Redfish	juvenile	GOM, southern edge of GB	25 - 400	Silt, mud, or hard bottom
Redfish	adult	GOM, southern edge of GB	50 - 350	Silt, mud, or hard bottom
Rosette skate	juvenile/ adult	Nantucket shoals and southern edge of GB to Cape Hatteras, NC	33-530, most 74-274	Soft substrate, including sand/mud bottoms
Scup	juvenile/ adult	GOM to Cape Hatteras, NC, including the following estuaries: MA Bay, Cape Cod Bay to Long Island Sound, Gardiners Bay to Delaware inland bays, and Chesapeake Bay	0-38 for juv 2-185 for adult	Demersal waters north of Cape Hatteras and inshore estuaries (various substrate types)
Silver hake	juvenile	GOM, GB, continental shelf off SNE, Mid-Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Casco Bay, ME, MA Bay to Cape Cod Bay	20 – 270	All substrate types
Summer Flounder	juvenile/ adult	GOM to Florida – estuarine and over continental shelf to shelf break	0-250	Demersal/estuarine waters, varied substrates. Mostly inshore in summer and offshore in winter.
Smooth skate	juvenile/ adult	Offshore banks of GOM	31–874, most 110-457	Soft mud (silt and clay), sand, broken shells, gravel and pebbles

Species	Life Stage	Geographic Area of EFH	Depth (meters)	Bottom Type
Thorny skate	juvenile/ adult	GOM and GB	18-2000, most 111-366	Sand, gravel, broken shell, pebbles, and soft mud
Tilefish	juvenile/ adult	Outer continental shelf and slope from the U.S./Canadian boundary to the Virginia/North Carolina boundary	100 - 300	Burrows in clay (some may be semi-hardened into rock)
White hake	juvenile	GOM, southern edge of GB, SNE to Mid-Atlantic and the following estuaries: Passamaquoddy Bay, ME to Great Bay, NH, Massachusetts Bay to Cape Cod Bay	5 - 225	Seagrass beds, mud, or fine grained sand
Winter flounder	adult	GB, inshore areas of GOM, SNE, Mid- Atlantic south to Delaware Bay and the estuaries from Passamaquoddy Bay, ME to Chincoteague Bay, VA	1 - 100	Mud, sand, and gravel
Winter skate	juvenile/ adult	Cape Cod Bay, GB, SNE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 371, most < 111	Sand and gravel or mud
Witch flounder	juvenile	GOM, outer continental shelf from GB south to Cape Hatteras	50 - 450 to 1500	Fine grained substrate
Witch flounder	adult	GOME, outer continental shelf from GB south to Chesapeake Bay	25 - 300	Fine grained substrate
Yellowtail flounder	adult	GB, GOM, SNE and Mid-Atlantic south to Delaware Bay and these estuaries: Sheepscot River and Casco Bay, ME, MA Bay to Cape Cod Bay	20 - 50	Sand or sand and mud

6.3.1 Fishery Impact Considerations

Any alternatives implemented in the FMP 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). Mackerel are primarily caught by mid-water trawls (which should not impact the bottom) but longfin squid, *Illex* squid, and butterfish are primarily caught with bottom trawls (mobile bottom-tending gear) that can contact the bottom. Amendment 9 included an analysis of the adverse impacts of the MSB fisheries on EFH (as required pursuant to section 303(a)(7) of the MSA). In Amendment 9 the MAFMC 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 (Veaches and Norfolk) to protect tilefish EFH and prohibited all bottom trawling activity. Because there have be no significant changes proposed to the manner in which the MSB fisheries are prosecuted, and because none of the alternatives being considered in this document should adversely affect EFH (see section 7.0), no additional alternatives to minimize adverse effects on EFH are considered as part of this management action.

6.4 ESA Listed Species and MMPA Protected Species

There are numerous species which inhabit the environment within the management unit of this FMP that are afforded protection under the Endangered Species Act (ESA) of 1973 (i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act of 1972 (MMPA). Eighteen species are classified as endangered or threatened under the ESA, while the rest are protected by the provisions of the MMPA. The subset of these species that are known to have interacted with the MSB fisheries is starred in the list below, including several candidate species (species being considered for listing as an endangered or threatened species).

Candidate species receive no substantive or procedural protection under the ESA; however, NMFS recommends considering conservation alternatives to limit the potential for adverse effects on candidate species. The Protected Resources Division of the NMFS Northeast Regional Office has initiated review of recent stock assessments, bycatch information, and other information for these candidate species which will be incorporated in the status review reports for candidate species

* = Known to have interacted with MSB fisheries

Cetacean Species	**Status**
North Atlantic right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Beaked whales (*Ziphius and Mesoplodon spp*.)	Protected
*Risso's dolphin (*Grampus griseus*)	Protected
*Pilot whale (*Globicephala spp*.)	Protected
*White-sided dolphin (*Lagenorhynchus acutus*)	Protected
*Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella spp*.)	Protected
*Bottlenose dolphin (*Tursiops truncatus*)	Protected

Sea Turtles Species	**Status**
*Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
*Loggerhead sea turtle (*Caretta caretta*)	
-Northwest Atlantic DPS	Threatened

Fish Species	**Status**
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon – Gulf of Main DPS(*Salmo salar*)	Endangered
*Atlantic sturgeon (*Acipenser oxyrinchus*)	
Chesapeake Bay DPS	Endangered
New York Bight DPS	Endangered
Carolina DPS	Endangered
South Atlantic DPS	Endangered
Gulf of Maine DPS	Threatened
Cusk (*Brosme brosme*)	Candidate
*Blueback herring (*Alosa aestivalis*)	Candidate
*Alewife (*Alosa pseudoharengus*)	Candidate

Protected Species Interactions with the Managed Resources – Includes Fishery Classification under Section 118 of Marine Mammal Protection Act

Species	Status
Common dolphin (*Delphinus delphis*)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Pilot whale (*Globicephala spp*.)	Protected
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	
-Northwest Atlantic DPS	Threatened
Risso's dolphin (*Grampus griseus*)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected
Atlantic sturgeon	

Under section 118 of the MMPA, NMFS must publish and annually update the List of Fisheries (LOF), which places all U.S. commercial fisheries in one of three categories based on the level of incidental serious injury and mortality of marine mammals in each fishery (arranging them according to a two tiered classification system). The categorization of a fishery in the LOF determines whether participants in that fishery may be required to comply with certain provisions of the MMPA, such as registration, Northeast Fishery Observer Program observer coverage, and take reduction plan requirements. The classification criteria consists of a two tiered, stock-specific approach that first addresses the total impact of all fisheries on each marine mammal stock (Tier 1) and then addresses the impact of the individual fisheries on each stock (Tier 2). If the total annual mortality and serious injury of all fisheries that interact with a stock is less than 10% of the Potential Biological Removal (PBR) for the stock then the stock is designated as Tier 1 and all fisheries interacting with this stock would be placed in Category III. Otherwise, these fisheries are subject to categorization under Tier 2. PBR is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The current (2012) list of fisheries is available at: http://www.nmfs.noaa.gov/pr/interactions/lof/.

Under Tier 2, individual fisheries are subject to the following categorization:

Category I. Annual mortality and serious injury of a stock in a given fishery is greater than or equal to 50% of the PBR level;

Category II. Annual mortality and serious injury of a stock in a given fishery is greater than one percent and less than 50% of the PBR level; or

Category III. Annual mortality and serious injury of a stock in a given fishery is less than one percent of the PBR level.

In Category I, there is documented information indicating a "frequent" incidental mortality and injury of marine mammals in the fishery. In Category II, there is documented information indicating an "occasional" incidental mortality and injury of marine mammals in the fishery. In Category III, there is information indicating no more than a "remote likelihood" of an incidental taking of a marine mammal in the fishery or, in the absence of information indicating the frequency of incidental taking of marine mammals, other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, and species and distribution of marine mammals in the area suggest there is no more than a remote likelihood of an incidental take in the fishery. "Remote likelihood" means that annual mortality and serious injury of a stock in a given fishery is less than or equal to 10% of the PBR level or, that it is highly unlikely that any marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period or, in the absence of reliable information it is at the discretion of the Assistant Administrator for Fisheries to determine whether the incidental injury or mortality qualifies (or not) for a specific category.

Marine Mammal Stock Assessment Reports:

As required by the Marine Mammal Protection Act (MMPA), NMFS has incorporated earlier public comments into revisions of marine mammal stock assessment reports (SARs). These reports contain information regarding the distribution and abundance of the stock, population growth rates and trends, the stock's Potential Biological Removal level, estimates of annual human-caused mortality and serious injury from all sources, descriptions of the fisheries with which the stock interacts, and the status of the stock. The MMPA requires these assessments to be reviewed at least annually for strategic stocks and stocks for which significant new information is available, and at least once every 3 years for non-strategic stocks. The most recent SARs are available at: http://www.nmfs.noaa.gov/pr/sars/.

NMFS elevated the (mid-water) MSB fishery to Category I in the 2001 LOF but it was reduced to a Category II fishery in 2007 (see discussion below describing the Atlantic Trawl Gear Take Reduction Plan). The reduction in interactions documented between the MSB fisheries and several species/stocks of marine mammals compared to previous years led to the re-classification. No classification changes have occurred since 2007.

6.4.1 Commercial Fisheries Interactions

The following is a description of species of concern because they are protected under MMPA and, as discussed above, have had documented interactions with fishing gears used to harvest species managed under this FMP. Five year take averages are provided as found in Waring *et al* (2011).

Common dolphin (PBR = 1000, all fisheries annual take 2005-2009 = 164)

The common dolphin may be one of the most widely distributed species of cetaceans, as it is found worldwide in temperate, tropical, and subtropical seas. They are widespread from Cape Hatteras northeast to Georges Bank (35 to 42 North latitude) in outer continental shelf waters from mid-January to May. Exact total numbers of common dolphins off the US or Canadian Atlantic coast are unknown, although the most recent Stock Assessment Report considers the best abundance estimate for common dolphins to be 120,743 animals (Coefficient of Variation (CV) =0.23). This is the sum of the estimates from two 2004 U.S. Atlantic surveys, where the estimate for the northern U.S. Atlantic is 90,547 (CV=0.24) and 30,196 (CV=0.54) for the southern U.S. Atlantic. PBR for the western North Atlantic common dolphin is 1000. See Waring *et al*. 2011 (http://www.nefsc.noaa.gov/publications/tm/tm221/) for more life history information.

Fishery Interactions - The following fishery interaction information was taken from the latest stock assessment for common dolphin contained in Waring *et al.* (2011) which summarizes incidental mortality of this species. Annual averages are presented below – details on encounters may be reviewed in Waring *et al* (2011).

Illex/Longfin squid/butterfish - These fisheries are included in both the Northeast and Mid-Atlantic bottom trawl fisheries. The 2005-2009 average annual mortality attributed to the northeast bottom trawl was 23 animals (CV=0.13). The 2005-2009 average annual mortality attributed to the Mid-Atlantic bottom trawl was 110 animals (CV=0.13). The portion attributable to the directed *Illex*/longfin squid fisheries is unknown.

Atlantic Mackerel - This fishery is primarily prosecuted with mid-water trawl in the Mid-Atlantic but also with bottom trawl as well. As noted above, the mean estimated annual mortality of common dolphin during the five year period 2005-2009 in the Mid-Atlantic bottom trawl fishery was 110 animals (CV=0.13). For the Mid-Atlantic mid-water trawl fishery the mean estimated annual mortality of common dolphin was 1 (CV=0.7) during the five year period 2005-2009. The portion attributable to the directed Atlantic mackerel fishery is unknown.

Atlantic white-sided dolphin (*Lagenorhynchus acutus*) (PBR = 190, all fisheries annual take 2005-2009 = 245)

Atlantic white-sided dolphins (*Lagenorhynchus acutus)* are found in temperate and sub-polar waters of the North Atlantic, primarily in continental shelf waters to the 100m depth contour. The exact total number of white-sided dolphins (*Lagenorhynchus acutus)* along the eastern US and Canadian Atlantic coast is unknown, although the best available current abundance estimate for white-sided dolphins in the western North Atlantic stock is 23,390 (CV=0.23), the sum of the 2006 and 2007 surveys. PBR for the western North Atlantic stock of white-sided dolphin (*Lagenorhynchus acutus)* is 190. See Waring *et al*. 2011 (http://www.nefsc.noaa.gov/publications/tm/tm221/)for more life history information.

Fishery Interactions - The following information was taken from the latest stock assessment for white-sided dolphin (*Lagenorhynchus acutus)* contained in Waring *et al* (2011) which summarized incidental mortality of this species. Annual averages are presented below – details on encounters may be reviewed in Waring *et al* (2011).

Illex/Longfin squid/butterfish - These fisheries are included in both the Northeast and Mid-Atlantic bottom trawl fisheries. The 2005-2009 average annual mortality attributed to the northeast bottom trawl was 160 animals (CV=0.14). The 2005-2009 average annual mortality attributed to the Mid-Atlantic bottom trawl was 23 animals (CV=0.12). The portion attributable to the directed *Illex*/longfin squid fisheries is unknown.

Atlantic Mackerel - This fishery is primarily prosecuted with mid-water trawl in the Mid-Atlantic but also with bottom trawl as well. As noted above, the mean estimated annual mortality during the five year period 2005-2009 in the Mid-Atlantic bottom trawl fishery was 23 animals (CV=0.12). For the Mid-Atlantic mid-water trawl fishery the mean estimated annual mortality of common dolphin was 24 (CV=0.55) during the five year period 2005-2009. The portion attributable to the directed Atlantic mackerel fishery is unknown.

Long-finned (*Globicephala melas*) and short-finned (*Globicephala macrorhynchus*) pilot whales (PBR = 265, all fisheries annual take 2005-2009 = 162)

There are two species of pilot whales in the Western Atlantic - the Atlantic (or long-finned) pilot whale, *Globicephala melas*, and the short-finned pilot whale, *G. macrorhynchus*. These species (sp.) are difficult to identify to the species level at sea. Preliminary analysis suggests the following distribution of the two species: sightings south of the mouth of the Chesapeake Bay are likely short-finned pilot whales, as are offshore (near the 4,000m depth contour) sightings from off the mouth of the Chesapeake Bay through off New Jersey. Sightings from the mouth of the Chesapeake Bay to the Southern Edge of Georges Bank along the 100/1,000 m depth contours are likely mixed. Sightings in the Gulf of Maine and east and north of Cape Cod are likely long-finned pilot whales, as are sightings in shelf waters immediately southeast of Nantucket. The minimum population size for short-finned pilot whales is estimated to be 17,190 and the minimum population size for long-finned pilot whales is estimated to be 9,333. PBR for short-finned pilot whales is estimated to be 172 and PBR for long-finned pilot whales is estimated to be 93 (total is 265). See Waring *et al*. 2011 (http://www.nefsc.noaa.gov/publications/tm/tm221/) for more life history information.

Fishery Interactions - The following information was taken from the latest stock assessment for pilot whales (*Globicephala* sp.) contained in Waring *et al* (2011) which summarized incidental mortality of this species. Annual averages are presented below – details on encounters may be reviewed in Waring *et al* (2011).

Illex/Longfin squid/butterfish - These fisheries are included in both the Northeast and Mid-Atlantic bottom trawl fisheries. The 2005-2009 average annual mortality attributed to the northeast bottom trawl was 12 animals (CV=0.14). The 2005-2009 average annual mortality attributed to the Mid-Atlantic bottom trawl was 30 animals (CV=0.16). The portion attributable to the directed *Illex*/longfin squid fisheries is unknown.

Atlantic Mackerel - This fishery is primarily prosecuted with mid-water trawl in the Mid-Atlantic but also with bottom trawl as well. As noted above, the mean estimated annual mortality during the five year period 2005-2009 in the Mid-Atlantic bottom trawl fishery was 30 animals (CV=0.16). For the Mid-Atlantic mid-water trawl fishery the mean estimated annual mortality of common dolphin was 2.4 (CV=0.99) during the five year period 2005-2009. The portion attributable to the directed Atlantic mackerel fishery is unknown.

Risso's dolphin (*Grampus griseus*) (PBR = 124, all fisheries annual take 2005-2009 = 18)

Risso's dolphins are distributed worldwide in tropical and temperate seas, and in the Northwest Atlantic occur from Florida to eastern Newfoundland. Off the northeast U.S. coast, Risso's dolphins are distributed along the continental shelf edge from Cape Hatteras northward to Georges Bank during spring, summer, and autumn. In winter, the range is in the Mid-Atlantic Bight and extends outward into oceanic waters. The minimum population estimate for the western North Atlantic Risso's dolphin is 12,920. See Waring *et al*. 2011 (http://www.nefsc.noaa.gov/publications/tm/tm219/) for more life history information.

Fishery Interactions - NMFS foreign-fishery observers reported four deaths of Risso's dolphins incidental to squid and mackerel fishing activities in the continental shelf and continental slope waters between March 1977 and December 1991. In the pelagic pair trawl fishery, one mortality was observed in 1992.

Mid-Atlantic Mid-water Trawl

One Risso's dolphin mortality was observed in this fishery for the first time in 2008. No bycatch estimate has been generated.

Bottlenose dolphin (*Tursiops truncatus*) Offshore Form (not updated in 2011 so information below is from Waring et al 2008). (PBR = 566, all fisheries take is unknown)

There are two morphologically and genetically distinct bottlenose dolphin morphotypes described as the coastal and offshore forms. Both inhabit waters in the western North Atlantic Ocean along the U.S. Atlantic coast. See Waring *et al*. 2011 (http://www.nefsc.noaa.gov/publications/tm/tm221/) for more life history information.

Fisheries Information

Total estimated mean annual fishery-related mortality for this stock during 2001-2006 is unknown, however mortalities of offshore bottlenose dolphins were observed during this period in the Northeast Sink Gillnet and Mid-Atlantic Gillnet commercial fisheries.

Earlier Interactions

Thirty-two bottlenose dolphin mortalities were observed in the pelagic pair trawl fishery between 1991 and 1995. Estimated annual fishery-related mortality (CV in parentheses) was 13 dolphins in 1991 (0.52), 73 in 1992 (0.49), 85 in 1993 (0.41), 4 in 1994 (0.40) and 17 in 1995 (0.26).

Although there were reports of bottlenose dolphin mortalities in the foreign squid mackerel butterfish fishery during 1977-1988, there were no fishery-related mortalities of bottlenose dolphins reported in the self-reported fisheries information from the mackerel trawl fishery during 1990-1992.

One bottlenose dolphin mortality was documented in the North Atlantic bottom trawl in 1991 and the total estimated mortality in this fishery in 1991 was 91 (CV=0.97). Since 1992 there were no bottlenose dolphin mortalities observed in this fishery.

6.4.2 Atlantic Trawl Gear Take Reduction Plan

In September 2006, NMFS convened the Atlantic Trawl Gear Take Reduction Team (ATGTRT) under the Marine Mammal Protection Act (MMPA). The ATGTRT was convened to address incidental mortality and serious injury of long-finned pilot whales (*Globicephala melas*), short-finned pilot whales (*Globicephala macrorhynchus*), common dolphins (*Delphinus delphis*), and Atlantic white-sided dolphins (*Lagenorhynchus acutus*) in several trawl gear fisheries operating in the Atlantic Ocean. These marine mammal species are known to interact with the Mid-Atlantic Mid-Water Trawl, the Mid-Atlantic Bottom Trawl, Northeast Mid-Water Trawl and the Northeast Bottom Trawl fisheries.

The immediate goal of a Take Reduction Plan is to reduce, within six months of implementation, the incidental serious injury or mortality of marine mammals from commercial fishing to levels less than PBR. The long-term goal is to reduce, within five years of its implementation, the incidental serious injury and mortality of marine mammals from commercial fishing operations to insignificant levels approaching a zero serious injury and mortality rate, taking into account the economics of the fishery, the availability of existing technology, and existing state or regional FMPs.

Presently, none of these marine mammal stocks under consideration by the ATGTRT are classified as a strategic stock nor do they currently interact with a Category I fishery. NOAA's General Counsel legal guidance has stated that neither the 11 month timeline for the development of a Take Reduction Plan nor the 5 year goal for reaching the Zero Mortality Rate Goal apply to non-strategic stocks that do not interact with Category I fisheries. The ATGTRT agreed that while a take reduction plan may not be required at this time, efforts should be made to identify and conduct research necessary to identify measures to reduce serious injury and mortality of marine mammals in Atlantic trawl fisheries and, ultimately, to achieve the MMPA's Zero Mortality Rate Goal. This information is captured in the Atlantic Trawl Gear Take Reduction Strategy (ATGTRS).

The ATGTRT recommended that two plans be developed to achieve the overall goal of the Take Reduction Strategy to reduce the incidental take of marine mammals in Atlantic trawl fisheries. These include an Education and Outreach Plan and a Research Plan as part of an overall take reduction strategy. The ATGTRT established two sub-groups to develop the Education and Outreach and Research Plans. The Education and Outreach Plan identifies activities that promote the exchange of information necessary to reduce the bycatch of marine mammals in Atlantic trawl fisheries. The Research Plan identifies information and research needs necessary to improve our understanding of the factors resulting in the bycatch in Atlantic trawl fisheries. The results of the identified research will be used to direct additional research and/or identify measures to reduce the serious injury and mortality of short- and long-finned pilot whales, Atlantic white-sided dolphins, and common dolphins in trawl fisheries to levels approaching the Zero Mortality Rate Goal. The Atlantic Trawl Gear Take Reduction

Strategy is available at: http://www.nero.noaa.gov/prot_res/atgtrp/.

6.4.3 Description of Turtle Species with Documented Interactions with the MSB Fisheries

The October 2010 Biological Opinion for the MSB (http://www.nero.noaa.gov/prot_res/section7/NMFS-signedBOs/SMB%20BIOP%202010.pdf) fisheries contains detailed information on sea-turtle interactions. This document updates information on sea turtle interactions with trawl gear in the MSB fisheries. Summary information is provided below and the full document above may be consulted for details.

The primary species likely to be adversely affected by the MSB fishery would be loggerhead sea turtles, as they are the most abundant species occurring in U.S. Atlantic waters. Sea sampling and observer data indicate that fewer interactions occur between fisheries that capture MSB and leatherback, Kemp's ridley, and green sea turtles. The primary area of impact of the directed commercial fishery for MSB on sea turtles is likely bottom otter trawls in waters of the Mid-Atlantic from Virginia through New York, from late spring through fall (peak longfin squid abundance July-October). In New England, interactions with trawl gear may occur in summer through early fall (peak squid abundance August -September), although given the level of effort, the probability of interactions is much lower than in the Mid-Atlantic.

There have been 9 observed sea turtle takes in the MSB fishery during the past 11 years (using top species landed). All sea turtle takes have occurred in bottom otter trawl gear participating in the squid fishery. Loggerhead sea turtles are more likely to interact with MSB trawl gear but green, Kemps ridley and leatherback interaction may also occur. All sea turtles were released alive, except the 2002 take, when a gillnet was hauled up as part of the catch when the loggerhead turtle entangled was fresh dead.

Based on data collected by observers for the reported sea turtle captures in or retention in MSB trawl gear, the NEFSC has estimated loggerhead bycatch in the MSB trawl fishery 2005-2008 to be about 25 animals annually (Warden 2011). NMFS estimates 1 leatherback, 2 green, and 2 Kemp's ridley turtles are taken each year based on the very low encounter rates for these species and/or unidentified turtles (Murray 2008).

On March 16, 2010, the Services announced 12-month findings on petitions to list the North Pacific populations and the Northwest Atlantic populations of the loggerhead sea turtle as DPSs with endangered status and published a proposed rule to designate nine loggerhead DPSs worldwide, seven as endangered (North Pacific Ocean DPS, South Pacific Ocean DPS, Northwest Atlantic Ocean DPS, Northeast Atlantic Ocean DPS, Mediterranean Sea DPS, North Indian Ocean DPS, and Southeast Indo-Pacific Ocean DPS) and two as threatened (Southwest Indian Ocean DPS and South Atlantic Ocean DPS). On March 22, 2011, the timeline for the final determination was extended for six months until September 16, 2011 (76 FR 15932).

A final listing determination was published on September 22, 2011 (76 FR 58867). Unlike the proposed listing, the final listing designates four DPSs (Northwest Atlantic, South Atlantic, Southeast Indo-Pacific, Southwest Indian) as threatened, and five DPSs (Northeast Atlantic, Mediterranean, North Indian, North Pacific, South Pacific) as endangered.

6.4.4 Atlantic sturgeon

In 2012 NOAA's Fisheries Service announced a final decision to list five distinct population segments (DPS) of Atlantic sturgeon under the Endangered Species Act. The Chesapeake Bay, New York Bight, Carolina, and South Atlantic DPSs of Atlantic sturgeon were listed as endangered, while the Gulf of Maine DPS was listed as threatened. Atlantic sturgeon from any of the five DPSs could occur in areas where MSB fisheries operate, and the species has been captured in gear targeting longfin squid (Stein et al. 2004a, ASMFC 2007). Therefore, this Environmental Assessment includes background information on Atlantic sturgeon in this section and considers the anticipated effects of the action on Atlantic sturgeon in Section 7 of this Environmental Assessment.

Atlantic sturgeon is an anadromous species that spawns in relatively low salinity, river environments, but spends most of its life in the marine and estuarine environments from Labrador, Canada to the Saint Johns River, Florida. There are no total population size estimates for any of the 5 Atlantic sturgeon DPSs at this time. However, there are two estimates of spawning adults per year for two river systems (e.g., 863 spawning adults for the Hudson River, and 343 spawning adults per year for the Altamaha River). The Altamaha estimate represent only a fraction of the total population size of this subpopulation as Atlantic sturgeon do not spawn every year. Additionally, neither of these estimates include subadults or early life stages. Detailed life history information may be found in the 2007 Atlantic Sturgeon Status Review, available at:
http://sero.nmfs.noaa.gov/pr/esa/Sturgeon/Atl%20Sturgeon/atlanticsturgeon2007.pdf.

Atlantic sturgeon are known to be captured in sink gillnet, drift gillnet, and otter trawl gear (Stein et al. 2004a, ASMFC TC 2007). Of these gear types, sink gillnet gear poses the greatest known risk of mortality for bycaught sturgeon (ASMFC TC 2007). Sturgeon deaths are rarely reported in the otter trawl observer dataset (ASMFC TC 2007). However, the level of mortality after release from the gear is unknown (Stein et al. 2004a).

ASMFC analysis has estimated that an average of 650 Atlantic sturgeon mortalities occurred per year (during the 2001 to 2006 timeframe) in sink gillnet fisheries. Stein et al. (2004a) found the bycatch rate of Atlantic sturgeon (reported as pounds of sturgeon catch per pounds of targeted species landed) to be 0.000194 for longfin squid and 0.000800 for butterfish. There was no observed bycatch during this period for vessels targeting *Illex* squid or Atlantic mackerel. For the years 2006 through 2010, an average of 775 Atlantic sturgeon encounters with small mesh otter trawl gear occurred in all areas (759 in the 600 series of statistical areas).

In an updated analysis, NEFSC used data from the Northeast Fishery Observer Program to provide updated estimates for 2006-2010. The data for encounter rates by month and statistical area for small-mesh otter trawl is presented in Table 5. The expanded estimates of all sturgeon encounters with small-mesh otter trawl by quarter, division and year are in Table 6. Total estimated dead sturgeons resulting from small-mesh otter trawl encounters are in Table 7. For reference, estimated total annual takes for all gear types (otter trawl and sink gillnet) ranged from 1536 to 3221 (average 2,215). For small-mesh otter trawls, total annual takes from 2006 to 2010 ranged from 394 to 1546 (average 775). Estimated annual mortalities for all gear types ranged from 37 to 376 sturgeons.

Table 5. Encounters of Atlantic Sturgeon and Unknown Sturgeon By Month, Area In Small Mesh Otter Trawl Gear, 2006-2010 Combined.

	month											
area	1	2	3	4	5	6	7	8	9	10	11	12
465									0			
512							0		0		0	
513	0	0				0	0	0	0		0	
514	0	0	0				0	0	0	0	1	0
515	0		0			0	0		0		0	
521	0	0	0				0	0	0	0	0	0
522						0	0	0	0	0		
525	0	0	0	0	0	0	0	0	0	0	0	0
526	0	0	0				0	0	0	0	0	0
533				0								
534									0			
537	0	0	0	0	0	**1**	**1**	0	0	0	0	0
538				0	0	0	0	0	0	0		
539	0	0	0	0	0	1	0	0	0	0	0	0
562	0	0	0		0	0	0	0	0	0	0	0
611	0	0		0	1	0	0	0	0	0	0	0
612	0		0	**6**	**14**	**13**	0	0	**1**	0	0	0
613	0	0	0	0	0	0	**1**	0	0	**1**	**4**	0
614					**1**	**3**	0	0	0	0	0	
615	0	0	0	0	0	0	0	0	0	0	0	0
616	0	0	0	0	0	0	0	0	0	0	0	0
621	0	0	0	0	**3**	**1**	**1**	0	3	9	2	0
622	0	0	0	0	0	0	0	0	0	0	0	0
623	0	0	0	0				0	0	0	0	0
625	4		0			0				**1**	**12**	**2**
626	0	0	0	0		0	0	0	0	0	0	0
627	0	0		0			0	0	0	0		
631	**2**	**2**	**22**	**7**						**1**	**2**	**3**
632	0			0		0	0	0	0	0	0	0
633								0				
635	**10**	**4**	**8**	**1**						0	0	0
636	0	0		0		0	0	0	0	0	0	0

Table 6. All Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, Mesh Size, and Year for Otter Trawls (2006 Across Top Row to 2010 Across Bottom Row).

	1	**2**	**3**	**4**	
51	0		0	0	
52	0	0	0	0	
53	0	0	0	0	
56					
61	0	996	0	184	
62	29	0	8	309	
63	20	0	0	0	1546

51	0		0	0	
52	0	0	0	0	
53	0	0	0	0	
56					
61	0	0	0	0	
62	0	0	0	449	
63	47			40	536

51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
56					
61	0	279	80	0	
62	0	21	0	19	
63	19		0	36	454

51	0		0	22	
52	0	0	0	0	
53	0	0	17	0	
56					
61	0	336	9	0	
62	0	9	48	24	
63	435	0	0	6	907

51	0		0	0	
52	0	0	0	0	
53	0	39	0	0	
56					
61	0	317	0	0	
62	0	0	0	0	
63	41	36	0	0	433

Table 7. **Dead Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, and Year for Small Mesh Otter Trawl (2006 Across Top Row to 2010 Across Bottom Row).**

		1	2	3	4	
2006	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	61	
	62	29	0	0	0	
	63	0	0	0	0	90
2007	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	4			0	4
2008	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	0		0	0	0
2009	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	19	0	0	0	19
2010	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	7	0	0	0	7

It should be noted that other fisheries, such as the small-mesh multispecies (whiting) fishery, utilize the small-mesh otter trawl gear and fish in the same area where MSB species occur. Accordingly, it is likely that actual encounters with Atlantic sturgeon by the MSB fisheries are lower than what is presented in Table 6. However, because the Northeast Fishery Observer Program data available for this analysis did not identify the species targeted, a more precise evaluation of encounters in only the MSB fisheries cannot be specified at this time.

A comparison of the location of the MSB fisheries (see Section 6.1) and with the known-preferred habitat of Atlantic sturgeon (shallow inshore areas, primarily less than 50 m), suggests that the portion of 2006-2010 small-mesh otter trawl interactions attributable to MSB fisheries could likely have occurred in the summer/fall inshore longfin squid fishery, which occurs nearshore in waters less than 40 fathoms (Figures 18-20, Amendment 10 EIS). The longfin squid quota is allocated in trimesters (43% for Trimester 1; 17% for Trimester 2; 40% for Trimester 3), so roughly half of the quota is available during the summer and fall period. The nearshore effort in the summer and fall longfin squid fishery overlaps with the water depths in which most observed sturgeon encounters occur. This is supported by the Stein et al. (2004a) analysis, which showed sturgeon encounters with the longfin squid and butterfish fisheries during the period from 1989-2000, but showed no encounters with *Illex* squid and mackerel fisheries.

Atlantic sturgeon interactions with small-mesh otter trawl are distributed throughout the year. On average, the most estimated small-mesh otter trawl encounters with Atlantic sturgeon in the 600 series of statistical areas occur during Quarter 2 (April through June), and the fewest occur during Quarter 3 (July – September) (Table 8). However, the contribution of each quarter to total estimated encounters differs from year to year.

Table 8. **Atlantic Sturgeon Encounters Expanded by VTR Landings for Southern (600 Series of Statistical Areas) for Small-Mesh Otter Trawls in Each Quarter of the Year.**

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total Estimated Encounters
2006	49	996	8	493	1546
2007	47	0	0	489	536
2008	19	300	80	55	454
2009	435	345	57	30	867
2010	41	353	0	0	394
Average	114	399	29	213	759

Compared to gillnet gear, small-mesh otter trawl gear accounts for relatively few sturgeon mortalities. The number of small-mesh otter trawl takes resulting in mortality remained at less than 5% of total estimated encounters for the entire period, with estimated annual mortalities ranging from 4 to 90 (total mortalities for all gear types ranged from 37 to 376). Between 2006 and 2010, there were no estimated Atlantic sturgeon mortalities in small-mesh otter trawl gear during Quarters 2 and 3, and an average of 11 estimated mortalities in Quarters 1. Estimated Quarter 4 mortalities in small-mesh otter trawl gear only occurred in 2006 (61 total estimated mortalities). All mortalities in small-mesh otter trawl gear occurred in the 600 series of statistical areas. It is important to note that the information provided on mortality rates may be an underestimate as the rate of post-release mortality for those reportedly released alive is unknown. An analysis of observer data has suggested that the proportions of these mortalities by DPS are approximately: 11% Gulf of Maine, 49% New York Bight, 14% Chesapeake Bay, 4% Carolina, 20% South Atlantic, and 2% Canada (which are not listed). NMFS is undertaking a biological opinion to determine what fishery restrictions might be necessary for MAFMC fisheries.

The MAFMC has established a Sturgeon Advisory Panel to help guide its efforts and will consider appropriate measures once the biological opinion is finalized.

6.4.5 Description of River Herring Candidate Species with Documented Interactions with the MSB Fisheries

On August 5, 2011, the NMFS received a petition from the Natural Resources Defense Council (NRDC), requesting that alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) be listed each as threatened throughout all or a significant portion of their range under the Endangered Species Act (ESA). In the alternative, NRDC requested that NMFS designate distinct population segments of alewife and blueback herring as specified in the petition (Central New England, Long Island Sound, Chesapeake Bay, and Carolina for alewives, and Central New England, Long Island Sound, and Chesapeake Bay for blueback herring). NMFS reviewed the petition and published a positive 90-day finding on November 2, 2011, determining that the information in the petition, coupled with information otherwise available to the agency, indicated that the petitioned action may be warranted. As a result of the positive finding, the agency is required to review the status of the species to determine if listing under the ESA is warranted.

The Atlantic States Marine Fisheries Commission (ASMFC) completed a stock assessment for river herring in May 2012, which they had been conducting since 2008, covering over 50 river specific stocks throughout the species U.S. range. This represented a significant effort on behalf of the ASMFC and the coastal states from Maine to Florida. NMFS recognized this extensive effort to compile the most current information on the status of these stocks throughout their range in the United States and, in order to not duplicate this effort, has been working cooperatively with ASMFC. NMFS will utilize the information from the stock assessment as a critical component in the ESA listing decision for these two species. Due to the nature of the stock assessment, it did not contain all elements necessary for making a listing determination under the ESA; therefore, NMFS identified the additional required elements and held workshops focused on addressing this information. The three workshops organized for this purpose addressed river herring stock structure, extinction risk analysis (ERA), and climate change. Reports from the stock structure and ERA workshop and working group meeting were compiled and are being independently peer reviewed by the Center for Independent Experts, and the report from the climate change workshop has been compiled and is also being reviewed. The peer review reports and additional climate change analysis and extinction risk modeling results will be available in September/October, 2012. NMFS will use these reports and the modeling results along with the ASMFC river herring stock assessment and all other best available information to develop a listing determination which will be published in the *Federal Register* as soon as possible.

6.5 Other Non-Target Species Interactions

The preferred alternative proposed in this document is only expected to impact fishing and fishing effort for longfin squid. Changes in non-target interactions from reducing the butterfish landings quota are not expected because butterfish landings are not expected to be affected by the proposed measures (even with the reduction the butterfish fishery should not close). Also, the butterfish fishery is small to begin with. Accordingly, non-target interactions in the longfin squid fishery are described. For non-target interactions in other MSB fisheries, the previous year's specifications' environmental assessment may be consulted, and it is available at: http://www.nero.noaa.gov/regs/.

Various species are caught incidentally by the longfin squid fishery and will be impacted to some degree by the prosecution of the 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.

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 2009-2011 trips in the dealer weighout database to see if a certain trip definition could account for most longfin squid landed. Since fisheries evolve over time, and expectation of and actual implementation of the butterfish cap (implemented January 1, 2011) has likely changed behavior recently, a relatively recent, three-year time period was examined (versus the five-year time period examined in prior specifications).

The result of this review resulted in the following definition for longfin squid trips using landings: All trips that had at least 50% longfin squid by weight and all trips that had at least 10,000 pounds of longfin squid regardless of the ratio to other species. This definition results in capturing over 89% of all longfin squid landings in the dealer weighout database 2009-2011. This definition was applied to the observer database to examine discards in the longfin squid fishery. The resulting set of trips in the observer database included 152 on average for each year 2009-2011. These trips made 5307 hauls of which 93% 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. Amendment 14 will address a variety of observation improvement issues and should minimize the occurrence of unobserved hauls.

The observed longfin squid caught on these trips accounted for approximately 8.8% of the total longfin squid caught. This is higher than historically occurred as NMFS has increased observer coverage in this fishery related to the implementation of the butterfish cap. While a very rough estimate, especially given the low observer coverage in small mesh fisheries and non-accounting for spatial and temporal trends, one can use the information in Table 9 and the fact that about 8,701 MT of longfin squid were caught annually 2009-2011 to generally and roughly estimate annual incidental catch for the species in the table. This is the last column in the table and while this information is provided, readers are strongly cautioned that while this is a reasonable approach for a general, rough, and relative estimate given the available data, it is highly imprecise. Note also that even the ratios that can be calculated would only really be valid for the 89% of landings captured by the chosen directed trip definition. It is even more difficult to assess the other 11% because to some degree the longfin squid is being caught incidental to other fisheries in those cases. Nonetheless, the longfin squid-to-other-species ratios were scaled up to the 100% of longfin squid catch to keep calculations relatively simple.

Table 9. Discards and Incidental Catch in the Longfin Squid Fishery 2009-2011.

NE Fisheries Science Center Common Name	Pounds Observed Caught	Pounds Observed Discarded	For every metric ton of longfin caught, pounds of given species caught.	For every metric ton of longfin caught, pounds of given species discarded.	D:K Ratio (Ratio of species discarded to longfin Kept)	Of all discards observed, percent that comes from given species	Percent of given species that was discarded	Rough Annual Catch (pounds) based on 3-year average of longfin catch (8,701 mt)
Directed LongfinTrip Bycatch and Discards								
BUTTERFISH	614,073	575,395	272.9	255.7	0.12	17.6%	93.7%	2,374,461
DOGFISH SPINY	417,734	412,649	185.6	183.4	0.08	12.6%	98.8%	1,615,268
HAKE, SILVER	609,489	364,962	270.9	162.2	0.07	11.2%	59.9%	2,356,735
HAKE, SPOTTED	293,294	286,218	130.3	127.2	0.06	8.8%	97.6%	1,134,092
SQUID (ILLEX)	1,101,544	236,393	489.5	105.1	0.05	7.2%	21.5%	4,259,384
SCUP	291,838	170,420	129.7	75.7	0.04	5.2%	58.4%	1,128,460
SKATE, LITTLE	165,023	164,687	73.3	73.2	0.03	5.0%	99.8%	638,101
HAKE, RED	136,495	129,085	60.7	57.4	0.03	4.0%	94.6%	527,792
SQUID (LOLIGO)	4,960,828	92,926	2204.6	41.3	0.02	2.8%	1.9%	NA
CRAB, LADY	81,086	81,086	36.0	36.0	0.02	2.5%	100.0%	313,536
FLOUNDER, FOURSPOT	68,055	67,900	30.2	30.2	0.01	2.1%	99.8%	263,151
FLOUNDER, SUMMER	96,220	46,789	42.8	20.8	0.01	1.4%	48.6%	372,058
DOGFISH SMOOTH	60,132	46,336	26.7	20.6	0.01	1.4%	77.1%	232,514
SKATE, BIG	46,876	43,806	20.8	19.5	0.01	1.3%	93.5%	181,256
SCALLOP, SEA	47,424	40,953	21.1	18.2	0.01	1.3%	86.4%	183,377
BASS, STRIPED	36,742	36,097	16.3	16.0	0.01	1.1%	98.2%	142,070
SEA ROBIN, NORTHERN	32,653	32,558	14.5	14.5	0.01	1.0%	99.7%	126,259
BLUEFISH	82,341	27,910	36.6	12.4	0.01	0.9%	33.9%	318,390
FLOUNDER, WINTER	27,338	27,032	12.1	12.0	0.01	0.8%	98.9%	105,708
SEA WEEDS	26,041	26,041	11.6	11.6	0.01	0.8%	100.0%	100,694
HADDOCK	24,727	24,727	11.0	11.0	0.01	0.8%	100.0%	95,612
SEA ROBIN, STRIPED	22,261	21,927	9.9	9.7	0.00	0.7%	98.5%	86,077
MACKEREL, ATLANTIC	46,229	21,537	20.5	9.6	0.00	0.7%	46.6%	178,757
HERRING, ATLANTIC	405,494	20,689	180.2	9.2	0.00	0.6%	5.1%	1,567,941
SEA BASS, BLACK	30,837	20,404	13.7	9.1	0.00	0.6%	66.2%	119,240
DORY, BUCKLER (JOHN)	50,134	18,824	22.3	8.4	0.00	0.6%	37.5%	193,855
ANGLER	29,592	12,792	13.2	5.7	0.00	0.4%	43.2%	114,426
LOBSTER	16,241	12,033	7.2	5.3	0.00	0.4%	74.1%	62,798
HAKE, NK	12,848	11,126	5.7	4.9	0.00	0.3%	86.6%	49,681
SKATE, BARNDOOR	6,497	6,450	2.9	2.9	0.00	0.2%	99.3%	25,121
SHAD, AMERICAN	7,081	6,199	3.1	2.8	0.00	0.2%	87.5%	27,378
WINDOWPANE	6,162	6,162	2.7	2.7	0.00	0.2%	100.0%	23,825
DOGFISH CHAIN	4,955	3,661	2.2	1.6	0.00	0.1%	73.9%	19,159
TAUTOG	2,373	2,373	1.1	1.1	0.00	0.1%	100.0%	9,176
HERRING (NK)	2,344	2,344	1.0	1.0	0.00	0.1%	100.0%	9,065
SKATE, ROSETTTE	2,139	2,139	1.0	1.0	0.00	0.1%	100.0%	8,271
FLOUNDER, WITCH	1,275	1,275	0.6	0.6	0.00	0.0%	100.0%	4,930
SKATE, CLEARNOSE	1,182	1,182	0.5	0.5	0.00	0.0%	100.0%	4,569
SKATE, NK	2,381	1,036	1.1	0.5	0.00	0.0%	43.5%	9,208
FISH, NK	1,208	806	0.5	0.4	0.00	0.0%	66.8%	4,670
ALEWIFE	775	761	0.3	0.3	0.00	0.0%	98.1%	2,997

6.6 Human Communities and Economic Environment

6.6.1 Fishery Descriptions

This section describes the socio-economic importance of the longfin squid fishery. Since butterfish landings are not expected to be impacted by the alternatives considered in this document (landings are low and the small fishery that exists should not close with either the current landings quota or the proposed reduced quota), butterfish information is not detailed. Readers may consult last year's specification's environmental assessment (available at http://www.nero.noaa.gov/regs/) for more detailed information on the directed butterfish fishery, which has been at a relatively low level of operation in recent years due to stringent regulations implemented in 2005-2008 when the status of butterfish was thought to be less robust than is currently believed. Recent amendments to the MSB FMP contain additional information, especially demographic information on ports that land MSB species. See Amendments 10 and 11 at http://www.mafmc.org/fmp/history/smb-hist.htm for more information or visit NMFS' community profiles page at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/.

6.6.1.1 Longfin Squid

Historical Commercial Fishery

US fishermen have been landing squid along east coast of the US since the 1880's (Kolator and Long 1978) but early fisheries were minor in scope. Focused effort began in 1968 by The Union of Soviet Socialist Republics and Japanese vessels. Reported foreign landings of longfin squid increased from 2000 mt in 1964 to a peak of 36,500 mt in 1973. Foreign longfin squid landings averaged 29,000 mt for the period 1972-1975 (Figure 2).

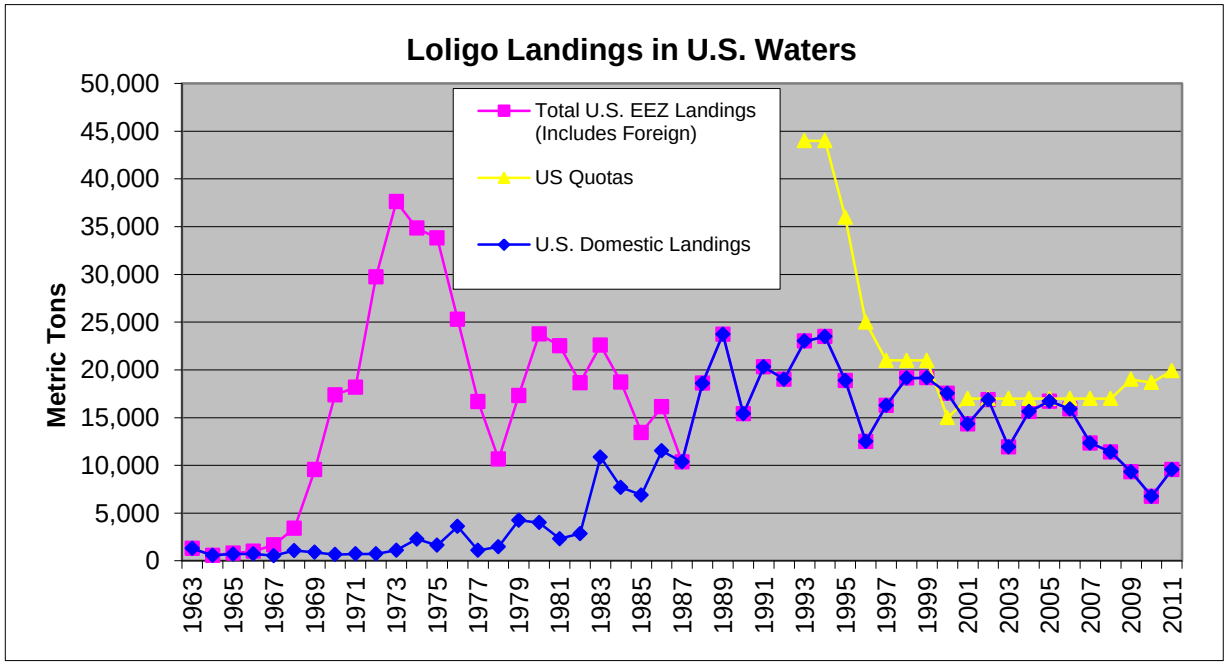


Figure 2. Historical Longfin Squid Landings in the U.S. EEZ.

Foreign fishing for longfin squid began to be regulated with the advent of extended fishery jurisdiction in the US in 1977. Initially, US regulations restricted foreign vessels fishing for squid (and other species) to certain areas and times (the so-called foreign fishing "windows"), primarily to reduce spatial conflicts with domestic fixed gear fishermen and minimize bycatch of non-target species. Later, foreign allocations were reduced and then eliminated as the domestic fishery became established. The development and expansion of the US squid fishery occurred relatively slowly as the US industry did not develop the appropriate technology to catch and process squid in offshore waters until the 1980's.

Price (nominal) has increased fairly steadily since 1982 to $2526/mt in 2011, even taking inflation into account (see Fishery Information Document at http://www.mafmc.org/meeting_materials/SSC/2012-05/SSC_2012_05.htm for details). 2011 landings totaled 9,554 mt and generated $24.1 million in ex-vessel revenues. While preliminary (all 2012 data cited in this document is preliminary, un-audited data), as of September 8 2012, 2012 landings totaled approximately 10,000 mt (more than all of 2011) with the majority of those landings occurring from May 1 to July 14 during what was described by some fishery participants as an "epic" summer longfin squid fishery. The longfin squid fishery was closed from early July until September 1 (when Trimester 3 began) because the Trimester 2 longfin squid quota was fully harvested.

Fishery Performance

The principle measure used to manage longfin squid is Trimester quota monitoring via dealer data that is submitted weekly. The dealer data triggers in-season management actions that institute relatively low trip limits when 90% of the Trimester quotas are reached in Trimesters 1 and 2 and when 95% of the annual DAH is reached in Trimester 3. The tables and figures on the subsequent three pages describe quota performance, vessel participation, vessel dependency, distribution of landings by state/month/gear/port, dealer participation, and the general at-sea location of most recent catches.

The longfin squid DAH is currently divided up into trimesters and has been since 2007 while 2001-2006 had quarterly management. Each seasonal time period closes at a threshold of the seasonal allocation, which can result in seasonal closures. The seasonal closures that have occurred since 2002 are: **2002**: May 28-Jun30, Aug 16-Sep 30, Nov 2 -Dec 11, Dec 24-Dec31; **2003**: Mar 25-Mar 31; **2004**: Mar 5- Mar 31; **2005**: Feb 20-Mar 31, April 25-Jun 30, Dec 18-Dec 31; **2006**: Feb 13-Mar 31, April 21-April 26, May 23-June 30, Sept 2-Sept 30; **2007**: April 13-April 30; **2008**: July 17 - Aug 31; **2009**: Aug 6 - Aug 31; **2010**: No closures; **2011**: Aug 6 – Aug 31; **2012**; April 17-April 30 (for butterfish cap); and July 10-August 31. There are occasional overages of the trimester quotas, but these are typically minor and should have minimal effects since any Trimester 1 and 2 overages are applied to Trimester 3.

Table 10. Longfin DAH Performance. (mt)

Year	Harvest (Commercial and Recreational)	Quota	Percent of Quota Landed
2002	16,868	17,000	99%
2003	11,941	17,000	70%
2004	15,629	17,000	92%
2005	16,720	17,000	98%
2006	15,920	17,000	94%
2007	12,343	17,000	73%
2008	11,394	17,000	67%
2009	9,307	19,000	49%
2010	6,750	18,667	36%
2011	9,556	19,906	48%

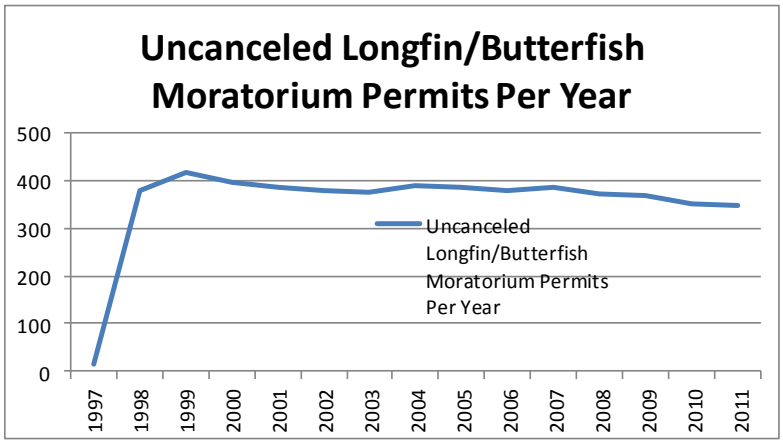
Source: Unpublished NMFS dealer reports

Table 11. 2011 Data for Permitted and Active Vessels by State

State of Principal Port	Permited Vessels	500,000 or more pounds	100,000-500,000 pounds	50,000-100,000 pounds	10,000-50,000 pounds
ME	16	0	0	1	0
NH	3	0	0	0	0
MA	103	0	1	3	3
RI	56	4	25	8	6
CT	9	0	2	3	0
NY	59	2	18	8	8
NJ	86	1	8	5	9
MD	2	0	0	0	0
VA	21	0	0	1	0
NC	18	0	1	0	2
OT	1	0	0	0	0

Source: Unpublished NMFS dealer reports and permit data.

Figure 3. Uncanceled Longfin/Butterfish Permits Per Year



Source: Unpublished NMFS permit data.

Table 12. 2011 Vessel Dependence on Longfin (revenue-based)

Dependence on Longfin	Number of Vessels in Each Dependency Category
1%-5%	55
5%-25%	73
25%-50%	46
More than 50%	28

Source: Unpublished NMFS dealer reports Not at State Level to Avoid Confidentiality Issues

Table 13. 2009-2011 Data (most recent 3) Landings by State (mt)

YEAR	CT	MA	MD	ME	NA	NC	NH	NJ	NY	RI
2009	166	585	1	0	63	13	0	1,565	1,859	5,054
2010	166	701	1	0	25	0	0	713	1,769	3,342
2011	226	639	1	0	34	11	0	1,591	2,553	4,498

Source: Unpublished NMFS dealer reports

Table 14. 2009-2011 Data (most recent 3 years) for Landings by Month (mt)

YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	880	968	1,216	288	414	778	1,613	438	387	1,568	560	195
2010	524	336	289	271	781	533	632	274	720	1,056	723	578
2011	1,245	913	975	447	345	1,011	2,135	949	344	552	288	350

Source: Unpublished NMFS dealer reports

Table 15. 2009-2011 Data (most recent 3 years) for Landings by Gear (mt)

YEAR	Bottom Trawl	Unknown	Midwater Trawl	Dredge	Trap/Pots/Pound/Weir	Other
2009	7,971	981	90	192	12	61
2010	5,339	991	215	61	30	81
2011	8,039	1,326	91	54	8	35

Source: Unpublished NMFS dealer reports

Table 16. 2009-2011 Ex-Vessel Revenues by Port for All Ports with at Least $150,000 Ex-Vessel Sales Combined Over 2009-2011

YEAR	POINT JUDITH, RI	MONTAUK, NY	CAPE MAY, NJ	NORTH KINGSTOWN, RI	HAMPTON BAYS, NY	NEW BEDFORD, MA	BARNSTABLE, MA
2009	$8,215,747	$2,763,207	$2,492,213	$1,583,757	$1,100,908	$451,649	$486,620
2010	$6,079,897	$2,862,926	$1,181,245	$1,249,178	$818,683	$930,328	$482,247
2011	$8,206,277	$3,792,852	$2,932,800	$2,321,291	$2,643,944	$1,128,010	$331,584
	POINT LOOKOUT, NY	POINT PLEASANT, NJ	STONINGTON, CT	BELFORD, NJ	NEWPORT, RI	NEW LONDON, CT	FALMOUTH, MA
2009	$109,240	$167,916	$118,455	NA - Confidential	$223,694	$76,976	$44,082
2010	$475,173	$216,999	$249,568	NA - Confidential	$34,464	$62,170	$43,027
2011	$488,106	$390,524	$360,612	NA - Confidential	$89,768	$141,030	$159,765
	EAST HAVEN, CT	GREENPORT, NY	WOODS HOLE, MA	FREEPORT, NY	NIANTIC, CT	SHINNECOCK, NY	
2009	$30,833	$40,041	NA - Confidential	$39,588	$29,095	$55,536	
2010	$104,191	$134,586	NA - Confidential	$61,328	$56,581	$75,334	
2011	$104,035	$59,818	NA - Confidential	$96,889	$85,330	$28,201	

Source: Unpublished NMFS dealer reports

Table 17. 2009-2011 Numbers of Active Dealers

	Number of dealers buying at least $50,000 longfin	Number of dealers buying at least $100,000 longfin	Number of dealers buying at least $1,000,000 longfin
2009	29	22	6
2010	29	26	4
2011	39	28	6

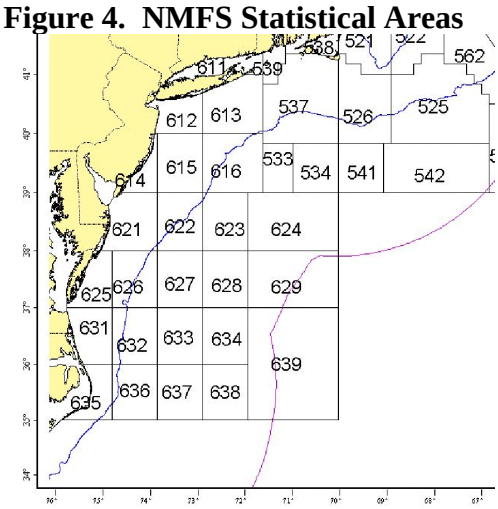
Source: Unpublished NMFS dealer reports

Table 18. Kept Catch in Statistical areas with at least 250 mt of longfin caught in at least one year 2009-2011.

YEAR	_616	_622	_537	_612	_613	_626	_539	_525	_632	_611	_526
2009	1,904	1,613	2,416	486	905	624	331	42	313	186	54
2010	2,470	1,040	595	465	466	173	333	339	275	226	43
2011	1,262	1,601	1,227	1,593	623	412	320	427	136	305	324

Source: Unpublished VTR reports

Figure 4. NMFS Statistical Areas



Butterfish Catch/Mortality Cap

Beginning on January 1, 2011 the longfin squid fishery was subject to closure if it caught too much butterfish (amounts are set annually – it was 1,436 mt in 2011), with the cap divided up such that closures could occur in Trimesters 1 (Jan-Apr) and 3 (Sept-Dec). The cap is important for the longfin squid fishery because changes in the butterfish specifications, and the resulting cap amount, can have effects related to the "shadow value" of butterfish for the longfin squid fishery (longfin squid and butterfish are often caught together). Because of the butterfish cap, a constraint on total butterfish catch may limit production in the squid fishery, so butterfish takes on a "shadow value" in terms of the indirect impact on the longfin squid fishery. While the exact relationship between butterfish and longfin squid catches is unknown ahead of time for any given year, the "shadow value" of butterfish could be quite large; that is, the longfin squid fishery may recognize large increases in landings/revenues/profits from relatively small increases in the butterfish specifications (and vice-versa with decreases).

The cap also is important for butterfish management. While the cap was instituted due to a now invalid assessment and overfished finding, the regulations still require that ACL overages of butterfish be paid back in following years, and the cap serves to limit annual butterfish mortality to a given amount established by the SSC. This limitation on total annual butterfish mortality should both protect the butterfish stock and avoid negative socio-economic impacts related to large paybacks if discarding was not monitored and not controlled in each year in near real-time.

Additional details on the cap estimation may be found here: http://www.nero.noaa.gov/nero/regs/frdoc/11/11SMB2011ButterfishSpecsRevisedCAP.pdf and a report on the 2011 operation of the cap may be found here: http://www.mafmc.org/meeting_materials/SSC/2012-05/SSC_2012_05.htm. Review of the cap's 2011 operation by the SSC in May 2012 found that the cap appears to be operating as designed, i.e. tracking and limiting butterfish mortality in the longfin squid fishery. It also found that non-cap mortality needs to be sufficiently accounted for to avoid ABC overages. Non-cap mortality has been addressed by buffering for management uncertainty and ensuring that there is some extra quota not used by either the cap or landings (see discussion in 5.1 above where Alternative B is discussed). Recently some questions regarding the estimation of the cap have resulted in an additional review by NMFS but results of that review are still pending.

Longfin Squid Recreational Fishery

While there is definitely a recreational fishery for longfin squid, catch amounts have not been estimated – MRIP does not collect information on invertebrates. Based on qualitative research by MAFMC staff, recreational fishing primarily occurs in the following modes: fishing from shore on manmade structures with artificial lighting at night; private boat fishing, charter boat fishing, and party/head boat fishing. Once the new MRIP methodology is fully in place the MAFMC may request that additional information on squid catches be collected by MRIP interviewers. If individuals are looking for qualitative information on recreational squid fishing, the following site contains a variety of anecdotal information on recreational longfin squid fishing: http://www.squidfish.net/forums/index.php?/forum/18-east-coast/.

7.0 WHAT ARE THE IMPACTS (Biological and Human Community) FROM THE ALTERNATIVES CONSIDERED IN THIS DOCUMENT?

The alternatives considered herein are fully described in section 5 and summarized in a table below. Related to the specifications, the key determinant of biological impact on the managed resources is how much fish can be caught and the specifications considered may restrict catch. 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 results in neutral impacts (0).

Table 19. 2012 Specifications Summary

Specification	Butterfish A (mt)	Butterfish B (mt)
Overfishing Limit (OFL)	Unknown	Unknown
Total Acceptable Biological Catch (ABC) from SSC = ACL	3,622	4,200
Commercial Annual Catch Target (10% less than ACL to account/buffer for management uncertainty)	3,260	3,780
Landings or "Domestic Annual Harvest (DAH)" (66% less than Annual Catch Target to account for expected discards)	1,072	872
Butterfish Cap (set at 75% of ACT)	2,445	3,165

Since limits on catch do cap effort, catch limits are a factor related to effort but many other factors at least somewhat beyond the control of the MAFMC (such as fish abundance, availability of other opportunities, weather, climate, fish movements/availability, variable productivity, etc.) also affect how much and what sort of effort is utilized to land a given quantity of a given species of fish in any given year. This is especially true for the MSB species as they are subject to sometimes rapid fluctuations in abundance (how many fish are out there) and/or availability (how many fish are out there in places where the fishery can find and target them profitably enough to stimulate effort).

Under the status quo, the longfin squid fishery may close sometime in December, if it closes at all in 2012, based on the first month of data from Trimester 3 in 2012 and the estimated amount of the cap that had been attained at that time (54% of the total as of September 29th 2012, and closing at 90% of the total). If squid trip landing rates are higher or more butterfish are incidentally encountered, then the squid fishery could close earlier. If squid trip landing rates are lower or less butterfish are incidentally encountered, then the squid fishery may not close at all. Increasing the butterfish cap on the longfin squid fishery by 720 mt in the preferred Alternative B is thus likely to add a month or less of longfin squid fishing effort compared to the status quo. This is the only change to regulations that impact fishermen contemplated under the preferred alternative. So far in 2012 the longfin squid fishery has been averaging about 1,200 mt per month so the general impact of the preferred specification is probably to increase longfin squid landings by around 1,200 mt or less and to add one month or less of fishing activity. As described in the alternative description section, lowering the butterfish landings quota is not expected to impact butterfish fishing at all given 2012 butterfish landings to date have been relatively low (and steadily low).

Note: It is anticipated that specifications for butterfish will change in 2013 so the timeframe for this impact analysis is through December 31, 2012 and a separate environmental assessment will evaluate

any changes that are proposed for 2013. Should the 2013 specifications not go into effect on January 1, 2013, the preferred alternative would roll over into the new fishing year, and apply until the 2013 specifications go into effect. It is likely that any delay in implementation of 2013 specifications would only be for 1-2 months, and since a closure of either the longfin squid fishery due to the butterfish cap or a closure of directed butterfish fishing would be unlikely at the beginning of the year under either the status quo or the preferred alternative, there should be no impacts of rolling over the preferred alternative compared to rolling over the status quo.

7.1 Biological Impacts on Managed Species

Under the status quo, the longfin squid fishery will contribute to catches of all of the managed species (longfin squid, butterfish, *Illex* squid, and mackerel) because the longfin squid fishery catches all four of these species when it is targeting longfin squid. As described above, this would probably continue through November 2012. However, catch of all of these species is anticipated to be below the acceptable biological catch for each due to existing management measures (landings limits, the butterfish cap, precautionary buffers, trip limits, and discard set-asides), which should maintain the protective nature of controls on these fisheries and thus maintain the sustainability of the stocks (i.e. neutral impacts).

Under the preferred alternative that increases the butterfish ABC and the butterfish cap on the longfin squid fishery, there would likely be around 1,200 mt or less of additional longfin squid landings, and some degree of additional butterfish, *Illex* squid, and mackerel mortality. However, the same existing management measures would be in place to still limit mortality below the acceptable biological catch, which should maintain the protective nature of controls on these fisheries and thus maintain the sustainability of the stocks (i.e. neutral impacts). The maximum additional butterfish mortality would be the 720 mt that is added to the butterfish cap, and as described in the alternatives section, that amount of an increase to the cap wound not be expected to result in an ABC overage. Note: while only 520 mt is being added to the ACT, since the 200 mt being transferred from landings is not expected to be used and the cap is more likely to be used, the maximum expected additional butterfish mortality is 520 mt + 200 mt = 720 mt.

7.2 Habitat Impacts

7.2.1 Impacts on Managed Species Habitat

EFH for the managed species generally consists of the water column which is not significantly impacted by fishing activity. The exception to the EFH 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, so no impacts on EFH for longfin squid eggs are expected from any increase in fishing effort by bottom trawls.

7.2.2 Impacts on Other Federally Managed Species Habitat

Under the status quo, the longfin squid fishery will continue to negatively impact habitats for demersal species (see table 4) because the longfin squid fishery uses bottom otter trawls. As described above,

this would probably continue through November 2012, but may continue to the end of the 2012 fishing year on December 31, 2012, depending on squid landing and butterfish encounter rates. However, previous MAFMC actions have minimized impacts to habitat to the extent practicable, for example through closures in areas of important tilefish habitat.

Under the preferred alternative that increases the butterfish ABC and the butterfish cap on the longfin squid fishery, there would likely be around one month or less of additional habitat impacts compared to the status quo. In that month it is probable that 1,200 mt or less squid would be landed. According to the most recent assessment, the June-January fishery averaged about 5mt per vessel-day fished over 2007-2009. Thus an additional 1,200 mt or less of squid landings would translate into approximately 240 additional vessel fishing days or less. Compared to the overall habitat impacts from all bottom trawling across all fisheries such a change would not be likely to have more than minimal impacts.

7.3 Impacts on Protected Resources

Formal consultation on the MSB fishery was last completed on October 29, 2010. The October 29, 2010, Biological Opinion concluded that the operation of the MSB fishery is not likely to jeopardize the continued existence of listed species. An ESA Section 7 consultation for 2012 MSB Specifications was completed on September 9, 2011. The consultation concluded that the proposed specification measures do not constitute a modification to the operations of the MSB fisheries under the FMP that would cause an effect to ESA-listed species or critical habitat not considered in the October 29, 2010 Biological Opinion.

Under the status quo, the longfin squid fishery will continue to negatively impact protected resources occasionally because bottom otter trawl does occasionally encounter protected species such as marine mammals, turtles, and sturgeon. As described above, this would probably continue through November 2012, but may continue to the end of the 2012 fishing year on December 31, 2012, based on squid landing and butterfish encounter rates. However, there are no available analyses that have concluded that additional mitigations are necessary at this time for the longfin squid fishery. Based on ongoing or future analyses, mitigations may be necessary and will be addressed as appropriate (e.g. sturgeon as described earlier in this document).

Under the preferred alternative that increases the butterfish ABC and the butterfish cap on the longfin squid fishery, there would likely be around one month or less of additional protected species impacts (in December) compared to the status quo. In that month it is probable that 1,200 mt or less squid would be landed. According to the most recent assessment, the June-January fishery averaged about 5mt per vessel-day fished over 2007-2009. Thus an additional 1,200 mt or less of squid landings would translate into approximately 240 additional vessel fishing days or less. Compared to the overall protected resource impacts from all gears across all fisheries such a change would not be likely to have more than minimal impacts. In addition, interactions with turtles and sturgeon in December in the offshore squid fishery areas would be unlikely.

7.4 Socioeconomic Impacts

Under the status quo, the longfin squid fishery will continue to generate revenues for vessels, processors, and associated industries. As described above, this would probably continue through

November 2012, but may continue to the end of the 2012 fishing year on December 31, 2012, based on squid landing and butterfish encounter rates. Monthly ex-vessel revenues in 2012 through September 15th have averaged about $3 million per month. Monthly ex-vessel revenues for butterfish have averaged about $80,000 per month in 2012 but the ability to land butterfish is not expected to be at all affected by the transfer of 200 mt from landings to the cap as the butterfish fishery appears unlikely to close even under the proposed reduced butterfish landings quota.

Under the preferred alternative that increases the butterfish ABC and the butterfish cap on the longfin squid fishery, there would potentially be around 1,200 mt or less additional squid landed, resulting in about $3million or less in additional ex-vessel revenues. Previous analyses (Am10) have suggested that an impact multiplier of four is appropriate for longfin squid such that $3 million in ex-vessel longfin squid revenues translates into approximately $9 million in additional revenues for supporting industries (ice, fuel, boat repair, insurance, processors, etc) for a total of around $12 million or less in potential total additional revenues.

7.5 Impacts on non-Target Fish Species

Under the status quo, the longfin squid fishery will continue to impact non-target species because of historically relatively high incidental catch rates (see Table 9). As described above, this would probably continue through November 2012, , but may continue to the end of the 2012 fishing year on December 31, 2012, based on squid landing and butterfish encounter rates. However, discards in the longfin squid fishery have been minimized to the extent practicable in previous actions, principally closed areas implemented for scup, a higher minimum mesh size implemented in Amendment 9, and the butterfish cap. Industry has also been active in recent years in cooperative management research to try and discover both gear and temporal-spatial solutions to bycatch, especially butterfish, river herrings, and winter flounder.

Under the preferred alternative that increases the butterfish ABC and the butterfish cap on the longfin squid fishery, there would likely be around one month or less of additional non-target species impacts compared to the status quo. In that month it is probable that 1,200 mt or less squid would be landed. According to the most recent assessment, the June-January fishery averaged about 5mt per vessel-day fished over 2007-2009. Thus an additional 1,200 mt or less squid landings would translate into approximately 240 additional vessel fishing days or less. Compared to the overall impacts on these species from all gears across all fisheries (both directed and incidental), such a change would not be likely to have more than minimal impacts.

7.6 Cumulative Impacts of Preferred Alternatives on Identified Valued Ecosystem Components

The impacts of the proposed amended specifications (preferred alternative) for 2012 considered herein are expected to be positive since they are likely to provide positive socioeconomic benefits without inducing substantial negative impacts to the managed species, habitat, protected resources, or other non-target species. The proposed specifications are considered the most reasonable alternatives to achieve the FMP's conservation objectives while optimizing the outcomes for fishing communities given the conservation objectives, as per the objectives of the FMP, which are summarized in Section

4. The expected impacts of each alternative have been analyzed earlier in this section and are summarized in Table 1 in the Executive Summary for the status quo and preferred alternatives.

Definition of Cumulative Effects

A cumulative impact analysis is required by the Council on Environmental Quality's regulation for implementation of the National Environmental Policy Act (NEPA). Cumulative effects are defined under NEPA as "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other action (40 CFR section 1508.7)."

The cumulative impacts of past, present, and future Federal fishery management actions (including the specification recommendations in this document) should generally be positive. The mandates of the MSA as currently amended and of NEPA require that potential management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Therefore, it is expected that under the current and proposed management regime, the long term cumulative impacts will contribute toward improving the human environment.

Temporal Scope

The temporal scope of this analysis is primarily focused on actions that have taken place since 1976, when these fisheries began to be managed under the MSA. For endangered and other protected species, the context is largely focused on the 1980s and 1990s, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ. In terms of future actions, the analysis considers the period between the expected effective date of these specifications (November 1, 2012) and Dec 31, 2015, the year when pending multi-year specifications for mackerel would expire if implemented. The temporal scope of this analysis does not extend beyond 2015 because the FMP and the issues facing these fisheries may change in ways that can't be effectively predicted.

Geographic Scope

The geographic scope of the analysis of impacts to fish species and habitat for this potential action is the range of the fisheries in the Western Atlantic Ocean, as described in the Affected Environment and Environmental Consequences sections of the document. For endangered and protected species the geographic range is the total range of each species. The geographic range for socioeconomic impacts is defined as those fishing communities bordering the range of the fisheries for mackerel, longfin squid and *Illex* squid and butterfish which occur primarily from the U.S.- Canada border to Cape Hatteras, although the management unit includes all the coastal states from Maine to Florida.

Summary of the Past, Present and Reasonably Foreseeable Future Actions

The earliest management actions implemented under this FMP involved the phasing out of foreign fishing for these species in US waters and the gradual development of domestic fishing fleet. All MSB species are considered to be fully utilized by the US domestic fishery to the extent that sufficient availability would allow full harvest of the DAH. More recent actions have focused on reducing bycatch and habitat impacts.

Past actions which had a major impact on the fishery included: the implementation of a limited access program in Amendment 5 to control capacity in the squid and butterfish fisheries; revision of overfishing definitions in Amendment 6; modification of vessel upgrade rules in Amendment 7; and implementation of overfishing and rebuilding control rules and other measures in Amendment 8. Amendment 9 allowed multi-year specifications, extended the moratorium on entry into the *Illex* fishery without a sunset provision; adopted biological reference points recommended by the SARC 34 (2002) for longfin squid; designated EFH for longfin squid eggs, and prohibited bottom trawling by MSB-permitted vessels in Lydonia and Oceanographer Canyons. Amendment 10's measures included increasing the longfin squid minimum mesh to 2 1/8 inches in Trimesters 1 and 3 and implementing a butterfish mortality cap in the longfin squid fishery. Amendment 11 implemented mackerel limited access, a recreational-commercial mackerel allocation, and EFH updates. Amendment 12 implemented a Standardized Bycatch Reporting Methodology that has since been vacated by court order and will be revisited in a new amendment soon. Amendment 13 to the MSB FMP addressed Annual Catch Limit and Accountability Measures. Future actions include Amendments 14 and 15 to addresses river herring and shad catch and management and also the MSB specifications for 2013-2015. Amendment 14 will improve and increase monitoring of river herring and shad in the mackerel and longfin squid fisheries. It is also scheduled to implement a catch cap on river herring and shad for the mackerel fishery beginning in 2014. Amendment 15 is currently likely to consider adding river herrings and shads as MAFMC-managed species, subject to all of the requirements of the MSA including EFH designation, ACLs, AMs, etc. as appropriate. The MAFMC has also begun an Amendment (as yet unnumbered) to consider additional trawling limitations to protect deep water corals, which should further reduce habitat impacts.

Regarding protected resources, a take reduction strategy for long-finned pilot whales (*Globicephala melas*), short-finned pilot whales (*Globicephala macrorhynchus*), white-sided dolphins (*Lagenorhynchus acutus*), and common dolphins (*Delphinus delphis*) has been developed and is described in Section 6.

In addition to the direct effects on the environment from fishing, the cumulative effects to the physical and biological dimensions of the environment may also come from non-fishing activities. Non-fishing activities, in this sense, relate to habitat loss from human interaction and alteration or natural disturbances. These activities are widespread and can have localized impacts to habitat such as accretion of sediments from at-sea disposal areas, oil and mineral resource exploration, aquaculture, construction of at-sea wind farms, bulk transportation of petrochemicals and significant storm events. In addition to guidelines mandated by the MSA, NMFS reviews some of these types of effects during the review process required by Section 404 of the Clean water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by Federal, state, and local authority. The jurisdiction of these activities is in "waters of the United States" and includes both riverine and marine habitats. A database which could facilitate documentation regarding cumulative impacts of non-fishing activities on the physical and biological habitat in the management unit covered by this FMP is not available at this time. The development of a habitat and effect database would expedite the review process and outline areas of increased disturbance. Additional inter-agency coordination would also prove beneficial.

Cumulative Effects Analysis

The cumulative impacts of this FMP were last fully addressed in final form by the EIS for Amendment 11 (http://www.nero.noaa.gov/nero/regs/com.html). All four species in the management unit are managed primarily via annual specifications to control fishing mortality so the operation of the fishery is also reviewed annually. As noted above, the cumulative impact of this FMP and annual specification process has been positive since its implementation after passage of the MSA for both the resources and communities that depend on them. Limited access and control of fishing effort through implementation of the annual specifications have had a positive impact on target and non-target species since the current domestic fishery is being prosecuted at lower levels of fishing effort compared to the historical foreign fishery. The foreign fishery was also known to take significant numbers of marine mammals including common dolphin, white sided dolphin, and pilot whales.
The MAFMC continues to manage these resources in accordance with the National Standards required under the MSA. First and foremost the MAFMC has strived to meet the obligations of National Standard 1 by adopting and implementing conservation and management measures that prevent overfishing, while achieving, on a continuing basis, the optimum yield for the four species and the United States fishing industry. The MAFMC uses the best scientific information available (National Standard 2) and manages these resources throughout their range (National Standard 3). The management measures do not discriminate between residents of different states (National Standard 4), and they do not have economic allocation as its sole purpose (National Standard 5). The measures account for variations in fisheries (National Standard 6), avoid unnecessary duplication (National Standard 7), they take into account fishing communities (National Standard 8), address bycatch in these fisheries (National Standard 9) and promote safety at sea (National Standard 10). By continuing to meet the National Standards requirements of the MSA through future FMP amendments and actions, the MAFMC will insure that cumulative impacts of these actions will remain positive. The cumulative effects of the proposed specifications will be examined for the following five valued economic components: target/managed species, habitat, protected species, communities, and non-target species.

7.6.1. Target Fisheries and Managed Resources

First and foremost, the MAFMC has met the obligations of National Standard 1 by adopting and implementing conservation and management measures that have prevented overfishing, while achieving, on a continuing basis, the optimum yield for the four species and the United States fishing industry. Mackerel were overfished prior to US management under the MSA and then were subsequently rebuilt under the FMP and subsequent Amendments. While the current status based on a 2010 TRAC assessment is unknown, the stock is likely in better shape compared to if no management had taken place. Longfin squid were considered overfished in 2000 but remedial action by the MAFMC in subsequent years (i.e., reduced specifications) resulted in stock rebuilding to the point that the species in no longer considered overfished. *Illex* has never been designated as overfished since passage of the Sustainable Fisheries Act. In the case of butterfish, the current status is unknown and the MAFMC is maintaining the butterfish mortality cap for the longfin squid fishery to help limit butterfish mortality at SSC-approved levels that should avoid overfishing.

The most obvious and immediate impact on the stocks managed under this FMP occurs as a result of fishing mortality. The MAFMC manages federally permitted vessels which fish for these four species throughout their range in both Federal and state waters. Fishing mortality from all fishing activities that catch these species is controlled and accounted for by the specifications and incorporated into stock assessments. In addition to mortality on these stocks due to fishing, there are other indirect effects from non-fishing anthropogenic activities, but these are generally not quantifiable at present. Nonetheless, since these species occur over wide areas of the mid and north Atlantic Ocean and inhabit

both inshore and offshore pelagic waters, it is unlikely that any indirect anthropogenic activity currently substantially impacts these populations, especially in comparison to the direct effects on these populations as a result of fishing.

The adjusted butterfish specifications under the preferred alternative for 2012 should serve to continue to achieve the objectives of the FMP as the ABC of butterfish should not be exceeded. The impacts on the environment for each of the alternatives are described in greater detail in section 7.0. The specifications proposed under the preferred alternative were developed to achieve the primary goal of the FMP and MSA which is to prevent overfishing. They are also intended to provide for the greatest overall benefit to the nation (i.e., achieve optimum yield). These measures in conjunction with previous actions and any future actions should continue to allow the MAFMC to continue to manage the targeted resources such that the objectives of the MSA continue to be met and therefore no significant cumulative effects to the target fisheries are expected.

7.6.2 Essential Fish Habitat (EFH)

The 2002 final rule for EFH requires that FMPs minimize to the extent practicable adverse effects on EFH caused by fishing (section 600.815 (a) (2)). Pursuant to the final EFH regulations (50 CFR 600.815(a)(2)), FMPs must contain an evaluation of the potential adverse effects of fishing on EFH designated under the FMP, including effects of each fishing activity regulated under the FMP or other Federal FMPs. The evaluation should consider the effects of each fishing activity on each type of habitat found within EFH. FMPs must describe each fishing activity, review and discuss all available relevant information (such as information regarding the intensity, extent, and frequency of any adverse effect on EFH: the type of habitat within EFH that may be affected adversely; and the habitat functions that may be disturbed), and provide conclusions regarding whether and how each fishing activity adversely affects EFH. The evaluation should also consider the cumulative effects of multiple fishing activities on EFH

The mackerel fishery primarily uses mid-water trawls. Bottom otter trawls are the principal gear used in the squid and butterfish fisheries. In general, bottom tending mobile gears have the potential to reduce habitat complexity and change benthic communities. Available research indicates that the effects of mobile gear are cumulative and are a function of the frequency and intensity with which an area is fished, the complexity of the benthic habitat (structure), energy of the environment (high energy and variable or low energy and stable), and ecology of the community (long-lived versus short lived). The extent of an adverse impact on habitat requires high resolution data on the location of fishing effort by gear and the location of specific seafloor habitats.

Stevenson *et al.* (2004) performed an evaluation of the potential impacts of otter trawls and susceptible species and life stages are described in Section 6.3 The MAFMC analyzed MSB gear impacts on EFH in Amendment 9, which also included measures which address gear impacts on EFH. To reduce MSB gear impacts on EFH, Amendment 9 prohibited bottom trawling by MSB-permitted vessels in Lydonia and Oceanographer Canyons. Subsequent actions in the Tilefish FMP prohibited bottom trawling in these areas as well as Veaches and Norfolk Canyons. All EFH designations were updated in Amendment 11 and the new designations will be used in future evaluations. However since the EFH for most MSB species is the water column, MSB species are generally not susceptible to impacts from the MSB fisheries. Other species may be, as described in table 4. Given the small changes in effort (if any) likely to result from the preferred alternative, no change in cumulative effects are anticipated and

EFH impacts should continue to be minimized to the extent practicable. The MAFMC has also begun an Amendment to consider additional trawling limitations to protect deep water corals, which should further reduce habitat impacts.

Johnson et al 2008 (available at http://www.nefsc.noaa.gov/publications/tm/tm209/index.html) suggest that for non-fishing impacts, given the wide distribution of the MSB species and their use of EFH (the water column), minor overall negative effects to their habitat are anticipated since the affected areas are localized to specific project sites, which involve a small percentage of the fish populations and their habitat.

7.6.3 Protected Species

There are numerous species which inhabit the environment within the management unit of this FMP that are afforded protection under the ESA of 1973 and/or the Marine Mammal Protection MMPA. Eleven are classified as endangered or threatened under the ESA, while others are protected by the provisions of the MMPA. The species protected either by the ESA, the MMPA, or the Migratory Bird Act of 1918, that be found in the environment utilized by mackerel, squid and butterfish fisheries are listed in section 6.4.

As noted above, none of the amended management measures for 2012 under the preferred alternatives are expected to result in substantial changes to levels of effort relative to the status quo. Prior to the passage of the MSA and development of this FMP, the foreign prosecution of these fisheries occurred at much higher levels of fishing effort and were likely a major source of mortality for a number of marine mammal stocks. The elimination of these fisheries and subsequent controlled development of the domestic fisheries have resulted in lower fishing effort levels. The cumulative effect of the proposed measures for 2012 in conjunction with past and future management actions under the FMP and take reduction measures developed under the MMPA should continue to reduce the impact of these fisheries on the protected species listed in section 6.

Although the negative effects associated with non-fishing activities may have increased negative effects on protected species, it is likely that those actions were minor due to the limited scale of impact compared with the populations at large and their geographical range.

As discussed in section 6.4.5, compared to gillnet gear, small-mesh otter trawl gear accounts for relatively few sturgeon mortalities. The number of small-mesh otter trawl takes resulting in mortality remained at less than 5% of total estimated encounters for the entire period, with estimated annual mortalities ranging from 4 to 90 (total mortalities for all gear types ranged from 37 to 376). Between 2006 and 2010, there were no estimated Atlantic sturgeon mortalities in small-mesh otter trawl gear during Quarters 2 and 3, and an average of 11 estimated mortalities in Quarters 1. Estimated Quarter 4 mortalities in small-mesh otter trawl gear only occurred in 2006 (61 total estimated mortalities). All mortalities in small-mesh otter trawl gear occurred in the 600 series of statistical areas. It is important to note that the information provided on mortality rates may be an underestimate as the rate of post-release mortality for those reportedly released alive is unknown. An analysis of observer data has suggested that the proportions of these mortalities by DPS are approximately: 11% Gulf of Maine, 49% New York Bight, 14% Chesapeake Bay, 4% Carolina, 20% South Atlantic, and 2% Canada (which are not listed). NMFS is undertaking a biological opinion to determine what fishery restrictions might be necessary for MAFMC fisheries. The MAFMC has established a Sturgeon Advisory Panel to help guide its efforts and will consider appropriate measures once the biological opinion is finalized.

It is unlikely that the implementation of adjusted 2012 specifications for butterfish considered in this document would result in significant impacts under NEPA to any DPS of Atlantic sturgeon because of the limited interactions with small mesh gear and the relatively small change in effort that could result.

7.6.4 Human Communities

National Standard 8 requires that management measures take into account fishing communities. Communities from Maine to North Carolina are involved in the harvesting of mackerel, squid and butterfish. Through implementation of the FMP for these species the MAFMC seeks to achieve the primary objective of the MSA which is to achieve optimum yield from these fisheries.

The first cumulative effect of the FMP has been to end foreign exploitation of these resources and to guide the development of the domestic harvest and processing fishery infrastructure. Part of this fishery rationalization process included the development of limited access programs to control capitalization while maintaining harvests at levels that are sustainable. In addition, by meeting the National Standards prescribed in the MSA, the MAFMC has strived to meet one of the primary objectives of the act - to achieve optimum yield in each fishery. The proposed amended specifications for 2012 (which should have positive economic benefits), in conjunction with the past and future actions described above, should have positive cumulative impacts for the communities which depend on these resources by maintaining stock sizes that provide for optimal sustainable harvests.

7.6.5 Non-target Species

National Standard 9 requires the MAFMC to consider the bycatch effects of existing and planned conservation and management measures. The term "bycatch" means fish that are harvested in a fishery, but that are not sold or kept for personal use. Bycatch includes the discard of whole fish at sea or elsewhere, including economic discards and regulatory discards, and fishing mortality due to an encounter with fishing gear that does not result in capture of fish (i.e., unobserved fishing mortality). Bycatch does not include any fish that legally are retained in a fishery and kept for personal, tribal, or cultural use, or that enter commerce through sale, barter, or trade. Bycatch can increase the uncertainty concerning total fishing-related mortality, which makes it more difficult to assess the status of stocks, to set the appropriate Optimal Yield and define overfishing levels, and to ensure that OYs are attained and overfishing levels are not exceeded. Bycatch may also preclude other more productive uses of fishery resources.

None of the amended specifications recommended by the MAFMC under the preferred alternative is expected to substantially promote or result in increased overall levels of bycatch relative to the status quo because they are not expected to substantially increase effort. Past measures implemented under this FMP which help to control or reduce discards of non-target species in these fisheries include 1) limited entry and specifications which are intended to control or reduce fishing effort, 2) incidental catch allowances, and 3) minimum mesh requirements. Other FMPs have also regulated MSB fishing to minimize bycatch (such as the Scup Gear Restricted Areas implemented through its FMP). The measures proposed under the preferred, in conjunction with these past actions, should maintain historical reductions of bycatch and discards in these fisheries. Related to the proposed increase in the butterfish cap for the remainder of 2012, the related potential additional longfin squid effort is not expected to be substantial.

In addition to mortality on these stocks due to fishing, there are other indirect effects from non-fishing anthropogenic activities in the Atlantic Ocean, but these are generally not quantifiable at present. Nonetheless, since these species occur over wide areas of the mid and north Atlantic Ocean and inhabit both inshore and offshore pelagic waters, it is unlikely that any indirect anthropogenic activity

currently substantially impacts these populations, especially in comparison to the direct effects on these populations as a result of fishing.
In the near future Amendments 14 and 15 are likely to result in additional mitigation of non-target catch of river herring and shads. Amendment 14 will increase and improve monitoring of the mackerel and longfin squid fisheries and implement a cap catch of river herrings and shads in the mackerel fishery. Amendment 15 will consider adding river herrings and shads as directly managed species by the MAFMC, which could require the MAFMC and NMFS to implement a variety of management and conservation measures ranging from EFH designation to implementation of annual catch limits and accountability measures to ensure catch limits are adhered to.

7.7 Summary of cumulative impacts

The preferred alternative, together with past and future actions are not expected to result in significant cumulative impacts on the biological, physical, and human components of the environment. As long as management continues to prevent overfishing, the fisheries and their associated communities should continue to benefit. As noted above, the historical development of the FMP resulted in a number of actions which have impacted these fisheries. The cumulative effects of past actions in conjunction with the proposed measures for 2012 and possible future actions are discussed above. Within the construct of that analysis, the MAFMC has concluded that no significant impacts will result from the adjusted specifications proposed for the remainder of 2012, primarily because any related change in effort allowed should be relatively minor.

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

8.1 Magnuson-Stevens Fishery Conservation and Management Act (MSA)

The MAFMC manages these resources in accordance with the National Standards required under the MSA. First and foremost the MAFMC strives to meet the obligations of National Standard 1 by adopting and implementing management measures that prevent overfishing, while achieving, on a continuing basis, the optimum yield for the four species and the United States fishing industry. The MAFMC uses the best scientific information available (National Standard 2) and manages these resources throughout their range (National Standard 3). The management measures do not discriminate between residents of different states (National Standard 4), and they do not have economic allocation as its sole purpose (National Standard 5). The measures account for variations in fisheries (National Standard 6), avoid unnecessary duplication (National Standard 7), they take into account fishing communities (National Standard 8), address bycatch in these fisheries (National Standard 9) and promote safety at sea (National Standard 10). By continuing to meet the National Standards requirements of the MSA through future FMP amendments and actions, the MAFMC will insure that impacts of its actions remain positive for the benefit of the Nation.

8.1.1 Essential Fish Habitat (EFH) Assessment

The specifications under the preferred alternatives proposed in this action are not expected to result in substantial changes in effort. Therefore, the MAFMC concluded in section 7 of this document that the proposed MSB specifications will have no adverse impacts on EFH other than those that may currently exist. 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. Therefore, the adverse habitat impacts of MSB fisheries "continue to be minimized" by the canyon closures. Amendment 11 revised all of the MSB EFH designations and EFH impacts will continue to be monitored and addressed as appropriate.

8.2 NEPA

8.2.1 Finding of No Significant Impact (FONSI)

National Oceanic and Atmospheric Administration Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. '1508.27 state that the significance of an action should be analyzed both in terms of context and intensity. Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the Administrative Order 216-6 criteria and Council on Environmental Quality's context and intensity criteria.
These include:

1) *Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action*?

None of the proposed specifications are expected to jeopardize the sustainability of any target species affected by the action (see section 7 of this document). The proposed specifications under the preferred alternative are consistent with the FMP overfishing definitions and best available scientific information. As such, the proposed action is expected to ensure the long-term sustainability of harvests from the MSB stocks.

2) *Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species*?

The proposed action is not expected to jeopardize the sustainability of any non-target species (see section 7 of this document) because the proposed specifications are not expected to result in substantial increases in fishing effort. In addition, none of the measures are expected to substantially alter fishing methods or the temporal and/or spatial distribution of fishing activities. Therefore, none of the proposed actions are expected to jeopardize the sustainability of non-target species relative to the existing 2012 specifications. The butterfish mortality cap, which began in 2011, should continue to control bycatch of butterfish and may reduce bycatch of other species if the cap closes the longfin squid fishery earlier than would have otherwise occurred or the fishery proactively avoids bycatch.

3) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or EFH as defined under the MSA and identified in FMPs?

The proposed action is not expected to cause damage to the ocean, coastal habitats, and/or EFH as defined under the MSA and identified in the FMP (see Section 7). In general, bottom-tending mobile gear, primarily otter trawls, which are used to harvest mackerel, squid, and butterfish, have the potential to adversely affect EFH for the benthic lifestages of a number of species in the Northeast region that are managed by other FMPs. However, because none of the management measures proposed in this action should cause any substantial increase in fishing effort relative to status quo, they are not expected to have any substantial negative impact on EFH or on coastal and ocean habitats relative to the existing 2012 specifications.

4) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

None of the measures substantially alter the manner in which the industry conducts fishing activities for the target species. Therefore, the proposed actions in these fisheries are not expected to adversely impact public health or safety.

5) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

The MSB fisheries are known to interact with common and white sided dolphins and pilot whales. Fishing effort is not expected to substantially increase in magnitude under the proposed specifications. In addition, none of the proposed specifications are expected to substantially alter fishing methods, activities, or the spatial and/or temporal distribution of fishing effort. Therefore, this action is not

expected to have increased negative effects on common and white sided dolphin and pilot whales. The longfin squid fishery has been known to have interactions with loggerhead, green, and leatherback sea turtles as discussed in section 6.4. The proposed action is not expected to substantially increase fishing effort or substantially alter fishing patterns in a manner that would adversely affect either of these endangered species of sea turtles. While the longfin squid fishery may have some interactions with sturgeon (endangered) and river herrings (candidate species), the interactions are at a relatively low level compared to other gear types and fisheries, and the relative longfin squid fishery effort change that could be allowed by the preferred alternative is relatively small. NMFS is also undertaking a biological opinion to determine what fishery restrictions might be necessary for MAFMC fisheries relative to sturgeon. The MAFMC has also established a Sturgeon Advisory Panel to help guide its efforts and will consider appropriate measures once the biological opinion is finalized. If river herrings are declared endangered species, the same procedure would be followed.

6) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

These fisheries are prosecuted using bottom otter trawls, which have the potential to impact bottom habitats. In addition, a number of non-target species are taken incidentally to the prosecution of these fisheries. However, fishing effort is not expected to substantially increase in magnitude under the proposed specifications (see section 7.0 of this document). In addition, none of the proposed specifications are expected to substantially alter fishing methods, activities or the spatial and/or temporal distribution of fishing effort. Therefore, the proposed action is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area.

7) Are significant social or economic impacts interrelated with natural or physical environmental effects?

These fisheries are primarily prosecuted using mid-water and bottom otter trawls. Bottom otter trawls have the potential to impact bottom habitats. In addition, a number of non-target species are taken incidentally to the prosecution of these fisheries. However, fishing effort is not expected to substantially increase in magnitude under the proposed alternative. In addition, none of the proposed specifications are expected to substantially alter fishing methods, activities or the spatial and/or temporal distribution of fishing effort. As noted in Section 7 of this Environmental Assessment, the proposed alternative is not expected to have any substantial natural or physical effects within the affected area. Therefore, there are no social or economic impacts interrelated with significant natural or physical environmental impacts that are expected.

8) Are the effects on the quality of the human environment likely to be highly controversial?

The proposed action is based on measures contained in the FMP which have been in place for many years. In addition, the scientific information upon which the annual quotas are based has been reviewed by the MAFMC's SSC and is the most recent information available. As a result of these facts, the proposed specifications are not expected to be controversial.

9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

The mackerel, longfin squid and *Illex* squid and butterfish fisheries are prosecuted primarily using bottom otter trawls in the open ocean throughout the Mid-Atlantic Bight and New England. Most of the fishing effort in these fisheries occurs over featureless sand and sand/mud bottoms along the Atlantic Coast. These fisheries are not known to be prosecuted in any unique areas such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. Therefore, the proposed action is not expected to have a substantial impact on any of these areas (see section 7.0 of this document).

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

While there is always a degree of uncertainty in the year to year performance of the relevant fisheries, the proposed actions are not expected to substantially increase effort or to substantially alter fishing methods and activities. As a result, the effects on the human environment of the proposed specifications are not highly uncertain nor do they involve unique or uncertain risks (see section 7.0 of this document).

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

The impacts of the preferred alternatives on the biological, physical, and human environment are described in section 7.0. The overall interaction of the proposed action with other actions are expected to generate positive impacts, but are not expected to result in significant cumulative impacts on the biological, physical, and human components of the environment.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

The mackerel, longfin squid, *Illex*, and butterfish fisheries are prosecuted primarily using bottom otter trawls in the open ocean throughout the Mid-Atlantic Bight and New England. Most of the fishing effort in these fisheries occurs over featureless sand and sand/mud bottoms along the Atlantic Coast. These fisheries are not known to be prosecuted in any areas that might affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause the loss or destruction of significant scientific, cultural or historical resources (sections 6.0 and 7.0 of this document). Therefore, the proposed action is not expected to affect any of these areas.

13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

There is no evidence or indication that these fisheries have ever resulted or would ever result in the introduction or spread of nonindigenous species.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

The proposed action has been proposed and evaluated consistent with prior year's specification setting processes and therefore is neither likely to establish a precedent for future actions with significant effects nor to represent a decision in principle about a future consideration.

15) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Fishing effort is not expected to substantially increase in magnitude under the proposed action (see section 7.0 of this document). In addition, none of the proposed specifications are expected to substantially alter fishing methods, activities, or the spatial and/or temporal distribution of fishing effort. Thus, it is not expected that they would threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. The proposed measures have been found to be consistent with other applicable laws as described in this Section.

16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Fishing effort is not expected to substantially increase in magnitude under the proposed action (see section 7.0 of this document). In addition, none of the proposed specifications are expected to substantially alter fishing methods, activities or the spatial and/or temporal distribution of fishing effort. Therefore the proposed action is unlikely to result in cumulative adverse effects (including any that could have a substantial effect on the target species or non-target species).

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for updating the 2012 Butterfish specifications, it is hereby determined that the proposed specifications will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

Harold C Mears

For Northeast Regional Administrator, NOAA

10/22/12

Date

8.3 Marine Mammal Protection Act

The various species which inhabit the management unit of this FMP that are afforded protection under the Marine Mammal Protection Act of 1972 (MMPA) are described in Section 6.4. None of the specifications are expected to significantly alter fishing methods or activities or result in substantially increased effort. The MAFMC has reviewed the impacts of the proposed specifications on marine mammals and concluded that the management actions proposed are 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 impacts of the fishery and the proposed management action, see Sections 6 and 7 of this Environmental Assessment.

8.4 Endangered Species Act

Section 7 of the ESA requires Federal agencies conducting, authorizing, or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The MAFMC has concluded that the proposed specifications and the prosecution of the associated fisheries are not likely to result in jeopardy to any ESA-listed species under NMFS jurisdiction, or alter or modify any critical habitat, based on the analysis in this document. For further information on the potential impacts of the fisheries and the proposed management action, see Sections 6 and 7 of this document.

Formal consultation on the MSB fishery was last completed on October 29, 2010. The October 29, 2010, Biological Opinion concluded that the operation of the MSB fishery is not likely to jeopardize the continued existence of listed species. An ESA Section 7 consultation for 2012 MSB Specifications was completed on September 9, 2011. The consultation concluded that the proposed specification measures do not constitute a modification to the operations of the MSB fisheries under the FMP that would cause an effect to ESA-listed species or critical habitat not considered in the October 29, 2010 Biological Opinion.

In 2012 NOAA's Fisheries Service announced a final decision to list five distinct population segments of Atlantic sturgeon under the Endangered Species Act. The Chesapeake Bay, New York Bight, Carolina, and South Atlantic populations of Atlantic sturgeon were listed as endangered, while the Gulf of Maine population was listed as threatened. Atlantic sturgeon from any of the five DPSs could occur in areas where MSB fisheries operate, and the species has been captured in gear targeting longfin squid (Stein et al. 2004a, ASMFC 2007). The MAFMC and NMFS have begun an evaluation of the MAFMC's fisheries to determine if specific changes to specific fisheries are needed related to the listing of Atlantic sturgeon under the Endangered Species Act. While it is possible that there may be interactions between Atlantic sturgeon and gear used in the MSB fisheries before this evaluation is complete, the number of interactions in MSB fisheries is not likely to cause an appreciable reduction in survival and recovery.

The effects of the MSB fishery on loggerhead sea turtles were assessed in the October 2010 Biological Opinion on the Atlantic Mackerel, Squid and Butterfish FMP. A revised listing for loggerhead sea turtles, published on September 16, 2011, establishes nine DPSs, four of which are listed as threatened and five of which are listed as endangered. The October 2010 Opinion concluded that the fishery may affect, but was not likely to jeopardize, loggerhead sea turtles. In reaching that conclusion, the Opinion considered the effect of the estimated take on nesting beach aggregations and ultimately to the

global species as listed. The analysis contained in the 2010 Opinion was conducted at the level of the global species, and was conducted for a species listed as threatened. Only the Northwest Atlantic DPS is likely to be affected by the MSB fishery and is listed as threatened. The effects analysis was conducted by examining the estimated number of takes against what is known about the biological status of loggerhead sea turtles and did not explicitly include any specific variable that would be affected by the listing status *(e.g.*, threatened or endangered). Since the 2010 Opinion considered effects at the nesting beach aggregation level first and then worked up to consider effects at the species level, an analysis considering effects at the DPS rather than species level and on an endangered rather than threatened species would not change the jeopardy conclusion of the Opinion.

8.5 Administrative Procedures Act

Section 553 of the Administrative Procedure Act establishes procedural requirements applicable to informal rulemaking by Federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process, and to give the public adequate notice and opportunity for comment. At this time, the MAFMC 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 does not propose to modify any existing collections, or to add any new collections; therefore, no review under the Paperwork Reduction Act is necessary.

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. Accordingly, NMFS has determined that this action would have no effect on any coastal use or resources of any state. Letters documenting the NMFS negative determination, along with this document, were sent to the coastal zone management program offices of the states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. A list of the specific state contacts and a copy of the letters are available upon request.

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.

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 MAFMC 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 MAFMC, and NOAA Fisheries Service.

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 Northeast Regional 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 Service adheres to the standards set out in Appendix III, ASecurity 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 MSA; 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 MSA; the Operational Guidelines, FMP Process; the EFH Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act.

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 Service 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 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 2011 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, the number of reports made annually by these dealers, and the types of permits held by these dealers. Specialists (including professional members of plan development teams, technical teams, committees, and MAFMC 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 analyses, upon which the policy choices are based, are described in section 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 involves the MAFMC, the Northeast Fisheries Science Center, the Northeast Regional Office, and NOAA Fisheries Service 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 MAFMC review process involves internal staff review and public meetings at which affected stakeholders have opportunity to provide comments on the proposed alternatives. 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 Service Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

8.9 E.O. 12866 (Regulatory Planning and Review)

The purpose of E.O 12866 is to enhance planning and coordination with respect to new and existing regulations. This E.O. requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be significant. Section 12.0 at the end of this document represents the Regulatory Impact Review, which includes an assessment of the costs and benefits of the proposed action, in accordance with the guidelines established by E.O. 12866. The analysis included in the Regulatory Impact Review shows that this action is not a significant regulatory action because it will not affect in a material way the economy or a sector of the economy

8.10 E.O. 13132 (Federalism)

This E.O. established nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. The E.O. 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 E.O. 13132. The affected states have been closely involved in the development of the proposed management measures through their representation on the MAFMC (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

9.0 LITERATURE CITED

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10.0 LIST OF AGENCIES AND PERSONS CONSULTED

In preparing this annual specifications analysis the MAFMC 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 the Mid-Atlantic, New England and /or South Atlantic Fishery Management Councils. In addition, states that are members within the management unit were be consulted through the Coastal Zone Management Program consistency process. Letters were sent to each of the following states within the management unit reviewing the consistency of the proposed action relative to states' Coastal Zone Management Programs: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia and Florida.

11.0 LIST OF PREPARERS AND POINT OF CONTACT

This environmental assessment was prepared by the following members of the MAFMC staff: Jason Didden. 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 Northeast Region website at http://www.nero.noaa.gov/nero/regs/com.html.