2012 Atlantic Mackerel, Squid and Butterfish Specifications and Management Measures
Environmental Assessment
Regulatory Impact Review
Initial Regulatory Flexibility Analysis

October 2011

Prepared by the

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

National Marine Fisheries Service (NMFS)

1.0 EXECUTIVE SUMMARY

The Mid-Atlantic Fishery Management Council (Council) made recommendations for 2012 specifications and management measures for the Atlantic mackerel (referred to simply as "mackerel" hereafter), squid (*Illex* and longfin), and butterfish fisheries at its June 2011 meeting and herein submits them to the National Marine Fisheries Service (NMFS). This document examines the expected impacts to the environment from implementation of the recommended specifications and management measures.

Longfin squid have previously also been referenced as *Loligo pealeii* squid. There has been a scientific name change from *Loligo pealeii* to *Doryteuthis (Amerigo) pealeii*. To avoid confusion, this document will utilize the common name "longfin squid" wherever possible. Some historical documents will still refer to "*Loligo*."

Table 1 (next page) summarizes the preferred alternatives for each fishery. The quantities listed in ES1 are referred to as the "***specifications***." The longfin squid specifications are also divided up into trimesters, referred to as "***trimester quotas***" in this document. "***Management measures***" refer to other potential fishery controls such as closure thresholds, trips limits, gear restrictions, etc.

It is anticipated that the Omnibus Annual Catch Limit (ACL)/ Accountability Measure (AM) Amendment (Amendment 13 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan and referred to as "The Omnibus" hereafter) will be implemented by January 1, 2012 and this year's specifications recommendations for mackerel and butterfish were adopted accordingly. The Omnibus does not apply to the squids due to their short lifespan. This Environmental Assessment also includes fallback alternatives in case the Omnibus is not effective by January 1, 2012.

All of the preferred specifications are consistent with the Council's Scientific and Statistical Committee's (SSC) Acceptable Biological Catch (ABC) recommendation (see Appendix A). The SSC's ABC recommendations account for scientific uncertainty such that overfishing is unlikely to occur. The preferred specifications also address management uncertainties and optimum yield considerations raised by the MSB Monitoring Committee (NMFS and Council staff) or otherwise brought to the Council's attention.

The proposed actions are expected to maintain positive social and economic benefits by maintaining the sustainability of the resources and should have no significant impacts on valued ecological components compared to the fishery as it was prosecuted under the 2011 specifications. Because none of the preferred action alternatives are associated with significant impacts to the biological, social or economic, or physical environment, a "Finding of No Significant Impact" (FONSI) has been made.

Table 1. Summary of 2012 MSB Specifications, Preferred Alternatives

Proposed 2012 Specifications for Atlantic Mackerel, Squid, and Butterfish - all numbers are in metric tons				
Specification	Mackerel	*Illex* Squid	Butterfish	Longfin Squid
Overfishing Limit (OFL) [from SSC]	Unknown	Unknown	Unknown	Unknown
Acceptable Biological Catch (ABC) [from SSC]	80,000	24,000	3,622	23,400
Expected Canadian Catch (mackerel only)	36,219	NA	NA	NA
U.S ABC [= Total ABC - Canadian Catch]	43,781	NA	NA	NA
Annnual Catch Limit (ACL) [= ABC]	43,781	NA	3,622	NA
Recreational Allocation (6.2%) (mackerel only) [from Amendmennt 11]	2,714	NA	NA	NA
Commercial Allocation (93.8%) (mackerel only) [from Amendmennt 11]	41,067	NA	NA	NA
Recreational Annual Catch Target (ACT) Buffer	10%	NA	NA	NA
Recreational ACT = Recreational Harvest Limit (RHL) [= Rec Allocation - ACT buffer]	2,443	NA	NA	NA
Commercial ACT Buffer	15%	NA	10%	NA
Commercial ACT [= Com. Allocation(mack) or ABC (butter) - ACT buffer]	34,907	NA	3,260	NA
Commercial Discard Set-Aside	3.11%	4.52%	66.67%	4.08%
Initial Optimum Yield (IOY) - Squids only [= ABC - Discard Set Aside]	NA	22,915	NA	22,445
Domestic Annual Harvest (DAH) [= ACT - Discard Set Aside] or [= IOY for Squids]	33,821	22,915	1,087	22,445
Domestic Annual Processing (DAP) [= DAH]	33,821	22,915	1,087	22,445
Butterfish Cap [= 75% of butterfish ACT]	NA	NA	2,445	NA
Joint Venture Processing (JVP)	0	0	0	0
Total Allowable Level Foreign Fishing (TALFF)	0	0	0	0

A summary of the expected impacts related to the status quo and preferred ***specification*** alternatives is provided in Table 2. While there are a variety of changes proposed to the specifications compared to 2011, there are few changes proposed for other ***management measures***. Those changes are listed below and a summary of the expected impacts related to the status quo and preferred management alternatives is provided in Table 3.

-Increasing the mackerel DAH closure threshold from 90% of DAH to 95% of DAH (2b)

-Changing the variable (20,000 or 50,000 pounds pending on the time of year) post-closure trip limit to a simple 20,000 pound post-closure trip limit (2c)

-Increasing the threshold when 3-inch mesh is required for butterfish retention from 1,000 lbs to 2,000 lbs (5b)

-Allowing up to 3% of the longfin squid DAH to be used to fund research instead of 1.65%, related to the increased butterfish ABC (7b)

-Exempting jigging-only longfin squid fishing from the incidental longfin squid trip limits during any closures of the directed longfin squid fishery that are caused by the butterfish mortality cap (7c)

Table 2. Qualitative summary of expected impacts of status quo and preferred specifications considered for 2012.
("+" signifies a positive impact, "-" a negative impact, and "0" a similar impact to the year before. "0/" before "+" or "-" indicates a likely small impact; Impacts for non-preferred alternatives are discussed in Section 7)

	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 1a - Mackerel - Status Quo - ABC = 80,000mt; U.S. ABC = 47,395mt; DAH = 46,779mt	0	0	0	0	0
Alt 1b - Mackerel - Preferred - ABC = 80,000mt; U.S. ABC = 43,781mt; DAH = 33,821mt;	0/+	0/+	0/-	0/+	0/+
Alt 3a - Illex - Status Quo - ABC = 24,000mt; DAH = 23,328mt	0	0	0	0	0
Alt 3b - Illex - Preferred - ABC = 24,000mt; DAH = 22,915mt	0	0	0	0	0
Alt 4a - Butterfish - Status Quo - ABC = 1,811mt; DAH = 500mt	0	0	0	0	0
Alt 4b - Butterfish - Preferred - ABC = 3,622mt; DAH = 1087mt	0	0/-	+	0/-	0/-
Alt 6a - Longfin Squid - Status Quo - ABC = 24,000mt; DAH = 20,000mt	0	0	0	0	0
Alt 6b - Longfin Squid - Preferred - ABC = 23,400mt; DAH = 22,445mt	0	0/-	+	0/-	0/-

Table 3. Qualitative summary of expected impacts of status quo and preferred other management measures considered for 2012.
("+" signifies a positive impact, "-" a negative impact, and "0" a similar impact to the year before. "0/" before "+" or "-" indicates a likely small impact; Impacts for non-preferred alternatives are discussed in Section 7)

	Valued Ecosystem Components/Environmental Dimensions				
Management measures besides specifications.	Managed Resource	Non-target Species	Human Communi-ties	Protected Resources	Essential Fish Habitat
Alt 2a - mackerel - Status Quo - No addiitonal changes to mackerel management measures	0	0	0	0	0
Alt 2b - mackerel - Close the directed commerical fishery at 95% of DAH instead of 90% of DAH	0	0	0	0	0
Alt 2c - mackerel - Elliminate provision where the post-closure trip limit is 50,000 if a closure occurs on/after June 1 - Any closure would trigger a 20,000 pound trip limit.	0	0	0	0	0
Alt 5a - butterfish - status quo - No addiitonal changes to butterfish management measures	0	0	0	0	0
Alt 5b - butterfish - change threshold for 3" mesh from 1,000 pounds to 2,000 pounds	0	0	0/+	0	0
Alt 7a - Longfin Squid - status quo - No addiitonal changes to Longfin Squid management measures	0	0	0	0	0
Alt 7b - Longfin Squid - allow up to 3% of the Loligo IOY to be used for RSA	0	0	0	0	0
Alt 7c - Longfin Squid - allow jigging w/o trip limits for moratorium permit holders in the event of a closure related to the butterfish cap	0	0	0/+	0	0

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY ... 2
2.0 LIST OF ACRONYMS ... 7
3.0 LISTS OF TABLES AND FIGURES ... 11
4.0 **INTRODUCTION AND BACKGROUND** ... 15
4.1 Purpose of and Need for the Action ... 16
4.2 Management Objectives of the MSB FMP ... 16
5.0 WHAT ACTIONS ARE CONSIDERED IN THIS DOCUMENT? ... 18
5.1 Alternative Set 1: Mackerel Specifications ... 19
5.2 Alternative Set 2: Mackerel Management Measures ... 24
5.3 Alternative Set 3: *Illex* Specifications ... 25
5.4 Alternative Set 4: Butterfish Specifications ... 27
5.5 Alternative Set 5: Butterfish Management Measures ... 30
5.6 Alternative Set 6: Longfin Squid Specifications ... 31
5.7 Alternative Set 7: Longfin Squid Management Measures ... 34
6.0 DESCRIPTION OF THE ENVIRONMENT AND FISHERIES THAT MAY BE AFFECTED BY THE ACTIONS CONSIDERED IN THIS DOCUMENT ... 35
6.1 Physical Environment ... 35
6.2 Biology of the Managed Resources ... 37
6.2.1 Atlantic mackerel (mackerel) ... 37
6.2.3 Butterfish ... 42
6.2.4 Longfin Squid ... 44
6.3 Habitat (Including Essential Fish Habitat (EFH)) ... 50
6.4 Endangered and Protected Species ... 50
6.4.1 Description of species of concern which are protected under MMPA ... 54
6.4.2 Atlantic Trawl Gear Take Reduction Plan ... 60
6.4.3 Description of Turtle Species with Documented Interactions with the MSB Fisheries ... 62
6.4.4 Birds ... 63
6.4.5 Description of Species Proposed for Listing Under the ESA ... 64
6.5 Fishery, Port, and Community Description ... 72
6.6 Fishery and Socioeconomic Description (Human Communities) ... 72
6.6.1 Atlantic mackerel (mackerel) ... 72
6.6.2 *Illex illecebrosus* ... 84
6.6.3 Atlantic butterfish ... 91
6.6.4 Longfin Squid ... 98
7.0 WHAT ARE THE IMPACTS (Biological and Human Community) FROM THE ACTIONS CONSIDERED IN THIS DOCUMENT? ... 107
7.1 Impacts of Specification Alternatives for Mackerel ... 107
7.1.1 Biological Impacts on Managed Resource and Non-Target Species ... 108
7.1.2 Habitat Impacts ... 113
7.1.3 Impacts on Endangered and Other Protected Species ... 115
7.1.4 Impacts on Human Communities ... 116

7.2 Impacts of Other Management Measure Alternatives for Mackerel 119
7.3 Impacts of Specification Alternatives for *Illex* 120
7.3.1 Biological Impacts on Managed Resource and Non-Target Species .. 120
7.3.2 Impacts on Habitat 127
7.3.3 Impacts on Endangered and Other Protected Species 128
7.3.4 Impacts on Human Communities 129
7.4 Impacts of Specification Alternatives for Butterfish 130
7.4.1 Biological Impacts on Managed Resource and Non-Target Species .. 131
7.4.2 Impacts on Habitat 132
7.4.3 Impacts on Endangered and Other Protected Species 132
7.4.4 Impacts on Human Communities 132
7.5 Impacts of Other Management Measure Alternatives for Butterfish 134
7.6 Impacts of Specification Alternatives for Longfin Squid 135
7.6.1 Biological Impacts on Managed Resource and Non-Target Species .. 135
7.6.2 Impacts on Habitat 142
7.6.3 Impacts on Endangered and Other Protected Species 143
7.6.4 Impacts on Human Communities 144
7.7 Impacts of Other Management Measure Alternatives for Longfin Squid 145
7.8 Research Set-Asides (RSA) Recommendations 146
7.8.1 Impacts on Managed Resource and Non-Target Species 148
7.8.2 Impacts on Habitat 149
7.8.3 Impacts on Endangered and Other Protected Species 149
7.8.4 Impacts on Human Communities 150
7.9 Cumulative Impacts of Preferred Alternatives on Identified VECs 150
7.9.1 Cumulative Effects 150
7.9.2 Target Fisheries and Managed Resources 154
7.9.3 Non-target Species 155
7.9.4 Protected Species 156
7.9.5 Essential Fish Habitat 158
7.9.6 Human Communities 159
7.9.7 Summary of cumulative impacts 160
8.0 WHAT LAWS APPLY TO THE ACTIONS CONSIDERED IN THIS DOCUMENT? 161
8.1 Magnuson-Stevens Fishery Conservation and Management Act 161
8.1.1 Essential Fish Habitat Assessment 161
8.2 NEPA 162
8.2.1 Finding of No Significant Impact (FONSI) 162
8.3 Marine Mammal Protection Act 167
8.4 Endangered Species Act 167
8.5 Administrative Procedures Act (APA) 168
8.6 Paperwork Reduction Act (PRA) 169
8.7 Coastal Zone Management Act 169
8.8 Section 515 (Data Quality Act) 169
8.9 Regulatory Flexibility Analysis (RFA) 171
8.10 E.O. 12866 (Regulatory Planning and Review) 171
8.11 E.O. 13132 (Federalism) 172

9.0 LITERATURE CITED 173
10.0 LIST OF AGENCIES AND PERSONS CONSULTED 180
11.0 LIST OF PREPARERS AND POINT OF CONTACT 180
12.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS (IRFA) & REGULATORY IMPACT REVIEW FOR THE 2012 CATCH SPECIFICATIONS FOR ATLANTIC MACKEREL, SQUID, AND BUTTERFISH 181
12.1 INTRODUCTION 181
12.2 EVALUATION OF E.O.12866 SIGNIFICANCE 182
12.3 ANALYSIS OF IMPACTS 189
12.3.1 INTRODUCTION AND METHODS INCLUDING NUMBER OF REGULATED ENTITIES 189
12.3.2 ANALYSIS OF THE IMPACTS OF ALTERNATIVES 190
13.0 APPENDIX A - SSC 2012 ABC RECOMMENDATIONS 194
14.0 APPENDIX B - CANADIAN CATCH ESTIMATION DETAILS 204
15.0 APPENDIX C – RECREATIONAL DISCARD MORTALITY DETAILS 205
16.0 APPENDIX D – ECOSYSTEM CONSIDERATIONS THAT MAY PERTAIN TO ATLANTIC MACKEREL, SQUID, AND BUTTERFISH SPECIFICATIONS AND THAT WERE CONSIDERED BY THE COUNCIL 206

2.0 LIST OF ACRONYMS

AA	Assistant Administrator
ABC	Allowable Biological Catch or Acceptable Biological Catch
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
ACL	Annual Catch Limit
ACT	Annual Catch Target
AFS	American Fisheries Society
AM	Accountability Measure
APA	Administrative Procedures Act
AR	auto-regressive
ASMFC	Atlantic States Marine Fisheries Commission or Commission
ATGTRP	Atlantic Trawl Gear Take Reduction Plan
ATGTRT	Atlantic Trawl Gear Take Reduction Team
B	Biomass
BMSY	Biomass Associated with Maximum Sustainable Yield
BRP	Biological reference points
CAFSAC	Canadian Atlantic Fisheries Scientific Advisory Committee
CD	Confidential data
CDP	Census Designated Place
CEA	Cumulative Effects Assessment
CEQ	Council on Environmental Quality

CETAP	Cetacean and Turtle Assessment Program
CFR	Code of Federal Regulations
CI	Confidential Information
CPUE	Catch Per Unit Effort
CV	coefficient of variation
CZMA	Coastal Zone Management Act
DAH	Domestic Annual Harvest
DAP	Domestic Annual Processing
DMF	Department of Maine Fisheries
DOC	Department of Commerce
DOL	Department of Labor
DPS	Distinct Population Segment
DSEIS	Draft Supplementary Environmental Impact Statement
DWF	Department of Wildlife and Fisheries
EA	Environmental Assessment
EAP	Emergency Action Plan
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ELMR	Estuarine Living Marine Resources
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
F	Fishing Mortality Rate
FAO	U.N. Food and Agriculture Organization
FMAT	Fishery Management Action Team
FMAX	Threshold Fishing Mortality Rate
FMP	Fishery Management Plan
FMSY	Fishing Mortality Associated with MSY
FR	Federal Register
FSEIS	Final Supplementary Environmental Impact Statement
FTARGET	Target Fishing Mortality Rate
FWS	U.S. Fish and Wildlife Service
GAMS	general additive models
GB	George's Bank
GC	General Counsel or General Category (Scallop)
GOM	Gulf of Maine
GRA	Gear Restricted Area
HAPC	Habitat Area of Particular Concern
HPTRP	Harbor Porpoise Take Reduction Plan
ICES	International Council for the Exploration of the Sea
ICNAF	International Convention of the Northwest Atlantic Fisheries
IMPLAN	IMpact Analysis for PLANning
IRFA	Initial Regulatory Flexibility Analysis
IOY	Initial Optimum Yield
IQA	Information Quality Act

IRFA	Initial Regulatory Flexibility Analysis
ITQ	Individual Transferrable Quota
IUCN	International Union for Conservation of Nature
JV	Joint Venture
LNG	Liquefied Natural Gas
LOF	List of Fisheries
LTPC	Long-term Potential Catch
LWTRP	Large Whale Take Reduction Plan
M	Natural Mortality Rate
MMPA	Marine Mammal Protection Act
MRIP	Marine Recreational Information Program
MRFSS	Marine Recreational Fisheries Statistical Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSB	Atlantic Mackerel, Squid, Butterfish (Consistent with the relevant plan's name)
MSY	Maximum Sustainable Yield
MT (or mt)	metric tons
NAFO	Northwest Atlantic Fisheries Organization
NAO	National Oceanic and Atmospheric Administration Order
NASUS	National Academy of Sciences of the United States
NE	New England
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fishery Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NIOZ	Royal Netherlands Institute for Sea Research
NK	Not classified
NLDC	New London Development Corporation
NMFS	National Marine Fisheries Service (NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOS	National Ocean Service
NSF	National Science Foundation
OBSCON	Observer Contract
OSP	optimum sustainable population
OTA	Office of Technology Assessment
OY	Optimal Yield
PBR	Potential Biological Removal
PRA	Paperwork Reduction Act
PREE	Preliminary Regulatory Economic Evaluation
PSE	Proportional Standard Error
RFA	Regulatory Flexibility Act
RFF	reasonably foreseeable future
RFFA	Reasonably Foreseeable Future Actions
RIR	Regulatory Impact Review
RSA	Research Set-Aside
RV	Research Vessel

SA	South Atlantic
SAFE	Stock Assessment and Fishery Evaluation
SAFIS	Standard Atlantic Fisheries Information System
SAR	Stock Assessment Report
SARC	Stock Assessment Review Committee
SAV	Submerged Aquatic Vegetation
SAW	Stock Assessment Workshop
SBA	Small Business Administration
SBRM	Standardized Bycatch Reporting Methodology
SD	Standard Deviation
SEFSC	Southeast Fisheries Science Center
SEIS	Supplementary Environmental Impact Statement
SF	Sustainable Fisheries
SFA	Sustainable Fisheries Act
SMB	Squid, Mackerel, and Butterfish (Consistent with the relevant committee's name)
SP	Species
SSB	Spawning Stock Biomass
SSC	Scientific and Statistical Committee
STAT	Statistical
TAL	Total Allowable Landings
TALFF	Total allowable level of foreign fishing
TEWG	Turtle Expert Working Group
TL	Total Length
TRAC	Transboundary Resource Assessment Committee
TSR	TRAC Summary Report
TRP	Take Reduction Plan
TRT	Take Reduction Team
URI	University of Rhode Island
US	United States
USA	United States of America
USCG	United States Coast Guard
USDC	U.S. Department of Commerce
USDI	U.S. Department of the Interior
USGS	Untied Stated Geological Survey
USSR	Union of Soviet Socialist Republics
VEC	Valued Ecosystem Component
VMS	Vessel Monitoring System
VPA	Virtual Population Analysis
VTR	Vessel Trip Report
WNA	Western North Atlantic
WP	Working Paper
ZMRG	Zero Mortality Rate Goal

3.0 LISTS OF TABLES AND FIGURES

3.1 List of Tables

Table 1. Summary of 2012 MSB Specifications, Preferred Alternatives 3
Table 2. Qualitative summary of expected impacts of status quo and preferred specifications considered for 2012. 4
Table 3. Qualitative summary of expected impacts of status quo and preferred other management measures considered for 2012. 4
Table 4. History of the Atlantic Mackerel, Squid and Butterfish FMP 17
Table 5. Status Quo Mackerel Specifications 19
Table 6. Preferred Mackerel Specifications 20
Table 7. Summary Mackerel Specifications – ABC 25% Higher. 22
Table 8. Summary Mackerel Specifications – ABC 25% Lower. 22
Table 9. Mackerel Specifications – Fallback. 23
Table 10. Status Quo *Illex* Specifications. 25
Table 11. Summary of Preferred *Illex* Specifications. 26
Table 12. Summary *Illex* Specifications – ABC 25% Higher. 26
Table 13. Summary *Illex* Specifications – ABC 25% Lower. 26
Table 14. Status Quo Butterfish Specifications. 27
Table 15. Summary of Preferred Butterfish Specifications. 28
Table 16. Summary Butterfish Specifications – ABC 25% Higher. 29
Table 17. Summary Butterfish Specifications – ABC 25% Lower. 29
Table 18. Fallback Butterfish Alternative 30
Table 19. Status Quo Longfin Squid Specifications. 31
Table 20. Summary of Preferred Longfin Squid Specifications. 32
Table 21. Summary Longfin Squid Specifications – ABC 25% Higher. 33
Table 22. Summary Longfin Squid Specifications – ABC 25% Lower. 33
Table 23. Encounters of Atlantic Sturgeon and Unknown Sturgeon By Month, Area and Mesh Size In Otter Trawl Gear, 2006-2010 Combined. 67
Table 24. 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). 68
Table 25. Dead Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, Mesh Size, and Year for Otter Trawl (2006 Across Top Row to 2010 Across Bottom Row). 69
Table 26. 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. . 71
Table 27. Mackerel DAH Performance. (mt) 75
Table 28. 2010 Total Mackerel Landings, Value, Active Vessels, Trips, and Price. 75
Table 29. Mackerel Landings (mt) by State in 2010. 76
Table 30. Mackerel Landings (mt) by Month in 2010 76
Table 31. Mackerel Landings (mt) by Gear Category in 2010. 77
Table 32. Mackerel Vessel Permit Holders and Active Permit Holders in 2010 by Homeport State (HPST). 77
Table 33. Mackerel, Squid, and Butterfish Dealer Permit Holders and Those that Made

Mackerel Purchases in 2010 by State. 78
Table 34. Mackerel Landings by Permit Category for the Period 2001-2010. 79
Table 35. Statistical Areas from Which 1% or More of Mackerel Were Kept in 2010 According to VTR Reports. 79
Table 36. Recreational Harvest (rounded to nearest metric ton) of Mackerel by State, 2001-2010. 83
Table 37. Recreational Harvest (rounded to nearest metric ton) of Mackerel by Mode and Total, 2000-2010. 83
Table 38. *Illex* DAH Performance. (mt) 87
Table 39. Total Landings and Value of *Illex* During 2010. 88
Table 40. *Illex* Landings (mt) by State in 2010. 88
Table 41. *Illex* Squid Landings (mt) by Month in 2010. 88
Table 42. *Illex* Landings (mt) by Gear Category in 2010. 89
Table 43. *Illex* Moratorium Vessel Permit Holders and Active Vessels in 2010 by Homeport State (HPST). 89
Table 44. Mackerel, Squid, Butterfish Dealer Permit Holders and Permitted Dealers Who Bought *Illex* in 2010 by State. 89
Table 45. *Illex* Landings by Permit Category for the Period 2000-2010. 90
Table 46. Statistical Areas from Which 1% or More of *Illex* Were Kept in 2010 According to VTR Reports. 90
Table 47. Butterfish DAH Performance (mt) 93
Table 48. Total Landings and Value of Butterfish During 2010. 94
Table 49. Butterfish Landings (mt) by State in 2010. 94
Table 50. Butterfish Landings (mt) by Month in 2010. 94
Table 51. Butterfish Landings (mt) by Gear Category in 2010. 95
Table 52. Butterfish Landings by Port in 2010. 95
Table 53. Longfin Squid/Butterfish Moratorium Vessel Permit Holders in 2010 by Homeport State (HPST) and How Many of Those Vessels Were Active. 96
Table 54. Mackerel, Squid, Butterfish Dealer Permit Holders and How Many Were Active (bought butterfish) in 2010 by State. 96
Table 55. Butterfish Landings by Permit Category for the Period 2001-2010. 97
Table 56. Statistical Areas from Which 1% or More of Butterfish were Kept in 2010 According to VTR Reports. 97
Table 57. Longfin Squid DAH Performance (mt) 101
Table 58. Total Landings and Value Longfin Squid During 2010. 102
Table 59. Longfin Squid Landings (mt) by State in 2010. 102
Table 60. Longfin Squid Landings (mt) by Month in 2010. 103
Table 61. Longfin squid Landings (mt) by Gear Category in 2010. 103
Table 62. Longfin Squid Landings by Port in 2010. 103
Table 63. Longfin Squid-Butterfish Moratorium Vessel Permit Holders in 2010 by Homeport State (HPST) and How Many of Those Vessels Were Active (landed longfin squid) 104
Table 64. Mackerel, Squid, Butterfish Dealer Permit Holders by State and How Many Were Active (bought longfin squid) in 2010 by State. 104
Table 65. Longfin Squid Landings by Permit Category for the Period 2000-2010. 105
Table 66. Statistical Areas From Which 1% or More of Longfin Squid Were Kept in

2010 According to VTR Reports. 105
Table 67. Key Species Observed Taken and Discarded in Directed Trips for Mackerel, Based on Unpublished NMFS Northeast Fisheries Observer Program Data and Unpublished Dealer Weighout Data from 2006-2010. (see text for criteria). There Are 2204.6 Pounds in One Metric Ton. 111
Table 68. Pounds of Key Species Recorded as Caught but “Unobserved” by Observer on Mackerel Trips 2006-2010. 111
Table 69. Key Species Observed Taken and Discarded in Directed Trips for *Illex*, Based on Unpublished NMFS Northeast Fisheries Observer Program Data and Unpublished Dealer Weighout Data from 2006-2010. (see text for criteria). There Are 2204.6 Pounds in One Metric Ton. 124
Table 70. Pounds of all Species Recorded as Caught but “Unobserved” by Observer on *Illex* Trips 2006-2010. 125
Table 71. Sharks, Rays and Large Pelagic Finfish Species Discarded and Kept (numbers and weight, lbs) in the *Illex* Fishery Based on the NEFSC Observer Program Database, 1995-2008 (totals). 126
Table 72. Key Species Observed Taken and Discarded in Directed Trips for Longfin Squid, Based on Unpublished NMFS Northeast Fisheries Observer Program Data and Unpublished Dealer Weighout Data from 2006-2010. (see text for criteria). There Are 2204.6 Pounds in One Metric Ton. 138
Table 74. Sharks, Rays and Large Pelagic Finfish Species Discarded and Kept (numbers and weight, lbs) in the Longfin Squid Fishery Based on the NEFSC Observer Program Database, 1995-2008. 141
Table 75. Qualitative summary of expected impacts of status quo and preferred specifications considered for 2012. ("+" signifies a positive impact, "-" a negative impact, and "0" a null impact. "0/" before "+" or "-" indicates a likely small impact; Impacts for non-preferred alternatives are discussed in Section 7) 184
Table 76. Qualitative summary of expected impacts of status quo and preferred other management measures considered for 2012. ("+" signifies a positive impact, "-" a negative impact, and "0" a null impact. "0/" before "+" or "-" indicates a likely small impact; Impacts for non-preferred alternatives are discussed in Section 7) 184
Table 77. IRFA-1. Summary of specifications and landings for Mackerel (mt). 190
Table 78. IRFA-2. Summary of specifications and landings for *Illex* (mt). 191
Table 79. IRFA-3. Summary of specifications and landings for butterfish (mt). 191
Table 80. IRFA-4. Summary of Specifications and Landings for Longfin Squid (mt). 192

3.2 List of Figures

Figure 1. Geographic scope of the mackerel, squid and butterfish fisheries. 36
Figure 2. 2010 Mackerel TRAC SSB final model output.. 38
Figure 3. Spring NEFSC Survey Mackerel Indices 1968-2011. Geometric Mean, Numbers per Tow.. 39
Figure 5. Fall NEFSC Trawl Survey - *Illex* Mean #/tow. 41
Figure 6. Fall NEFSC Trawl Survey - *Illex* Mean kg/tow.. 41
Figure 7. Butterfish Recruitment and Biomass Through 2008. (SARC 2010).............. 43
Figure 8. NEFSC Fall Butterfish Indices.. 43
Figure 9. 2010 Assessment Figure B6 - Annual Biomass in Relation to the Proposed Biomass Threshold (which is ½ of the target) - Shown Here as a Relative Value......... 46
Figure 10. Fall NEFSC Trawl Survey – Longfin Squid Mean kg/tow All Sizes............. 46
Figure 11. Fall NEFSC Trawl Survey – Longfin Squid Mean #/tow Pre-recruits........... 47
Figure 12. Fall NEFSC Trawl Survey – Longfin Squid Mean #/tow Recruits. 47
Figure 13. Spring NEFSC Trawl Survey – Longfin Squid Mean kg/tow All Sizes. 48
Figure 14. Spring NEFSC Trawl Survey – Longfin Squid Mean #/tow Pre-recruits. 49
Figure 15. Spring NEFSC Trawl Survey – Longfin Squid mean #/tow Recruits. 49
Figure 16. Historical Alt. Mackerel Landings in the U.S. EEZ...................................... 73
Figure 17. U.S. Mackerel Landings. 73
Figure 18. U.S. Mackerel Ex-vessel Revenues. 74
Figure 19. U.S. Mackerel Ex-Vessel Prices... 74
Figure 20. Uncanceled Mackerel Permits Per Year 78
Figure 21. NMFS Statistical Areas 80
Figure 22. World production of Mackerel, 1950-2008 based on FAO (2010). 81
Figure 23. Historical *Illex* Landings in the U.S. EEZ. 84
Figure 24. U.S. *Illex* Landings. 85
Figure 25. U.S. *Illex* Ex-vessel Revenues. 85
Figure 26. U.S. *Illex* Ex-vessel Prices. 86
Figure 27. Historical Butterfish Landings in the U.S. EEZ. 91
Figure 28. U.S. Butterfish Landings... 92
Figure 29. U.S. Butterfish Ex-vessel Revenues. 92
Figure 30. U.S. Butterfish Ex-vessel Prices... 92
Figure 31. Historical Longfin Squid Landings in the U.S. EEZ. 98
Figure 32. U.S. Longfin Squid Landings.. 99
Figure 33. U.S. Longfin Squid Ex-vessel Revenues.. 100
Figure 34. U.S. Longfin Squid Ex-vessel Prices.. 100

4.0 INTRODUCTION AND BACKGROUND

The Council 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 Council to set annual specifications according to national standards specified in the MSA.

It is anticipated that the Omnibus Annual Catch Limit (ACL)/ Accountability Measure (AM) Amendment (Amendment 13 to the MSB FMP and referred to as "The Omnibus" hereafter) will be implemented by January 1, 2012 and this year's specifications recommendations for mackerel and butterfish were adopted accordingly (the Omnibus does not apply to the squids due to their short lifespan). This Environmental Assessment also includes fallback alternatives in case the Omnibus is not effective by January 1, 2012.

The Council recommended 2012 specifications for mackerel and butterfish consistent with the ACL/AM processes instituted by the Omnibus process for the first time. The implementation of the Omnibus is not expected to substantively change the mackerel and/or butterfish fisheries since they have generally been being managed with hard quotas provided by the Council's Scientific and Statistical Committee already. The primary change will be the required paybacks for overages (but overages are not expected) and the explicit consideration of management uncertainty which was already being addressed implicitly through adaptive management of measures like closure thresholds and buffers when quotas were approached. The process began with recommendations from the Council's Scientific and Statistical Committee (SSC) for an *acceptable biological catch* (ABC) for each species that accounts for scientific uncertainty regarding stock status and productivity. Because *annual catch limits* are set equal to the *acceptable biological catch*, if *annual catch limits* are exceeded paybacks will be required. To avoid such circumstances, the Council recommended *annual catch targets* (ACTs) to provide a buffer for management uncertainties and other considerations (e.g. optimum yield) not otherwise addressed. Up to 3% of all four species may be reserved to fund research projects.

The Council's SSC met May 25-26, 2011 in Baltimore MD and recommended all of the ABCs that are included in the preferred alternatives considered in this document. The Mackerel, Squid and Butterfish Monitoring Committee met on May 27, 2011 to review the SSC's ABC recommendations and consider additional measures to account for management uncertainty. The Council considered the SSC's and Monitoring Committee's recommendations as well as public comments and testimony for specifications for all four species at its June 2011 meeting in Port Jefferson, NY. Both the SSC and the Council also considered input from the Council's Squid-Mackerel-Butterfish Advisory Panel in the form of fishery-performance reports constructed by the Advisory Panel and available here: http://www.mafmc.org/meeting_materials/SSC/2011-05/SSC_2011-05.htm. This document serves as the submission to NMFS of the Council's recommendations for 2012 MSB specifications and related analyses supporting the recommendations. The analysis of the proposed measures' environmental impacts (and their significance) is discussed in accordance with the National Environmental Policy Act (NEPA) and National Oceanic and Atmospheric Administration Order (NAO) 216-6 formatting requirements for an Environmental Assessment (EA).

The status quo and/or proposed management measures also contain a variety of proactive measures to constrain catch such that ACTs in the case of mackerel and butterfish and ABCs in the case of the squids are unlikely to be exceeded. The Council also considered that the specifications can be additionally reduced to account for social, economic, and/or ecological needs (including forage needs) per the optimum yield provisions of the MSA and NMFS' national standard guidelines.

Wording conventions - All acronyms used in this document should be listed in Section 2.0, List of Acronyms. Several critical acronyms and/or abbreviations are noted below. The Magnuson-Stevens Fishery Conservation and Management Act is the primary law governing marine fisheries management in United States federal waters. The Act was first enacted in 1976 and amended in 1996 (via the Sustainable Fisheries Act - "SFA") and in 2007 (via the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 - "MSRA"). In this document, the abbreviation "MSA" refers to the Magnuson-Stevens Fishery Conservation and Management Act as currently amended. Also "mackerel" refers to "Atlantic mackerel" unless otherwise noted.

4.1 Purpose of and Need for the Action

The purpose of this action is to establish annual specifications and other measures that will meet the need to prevent overfishing and achieve optimum yield. Optimum yield is defined as the amount of fish which will provide the greatest overall benefit to the nation and is theoretically based on the maximum sustainable yield for each managed species as reduced by relevant economic, social, and/or ecological factors. Failure to implement the preferred measures described in this document could result in overfishing, stock depletion, and lower overall benefits to the Nation.

Current regulations allow for the adoption of MSB specifications and associated management measures for a period of up to three years (subject to annual review). The Council recommended the mackerel and butterfish specifications and associated management measures for one year and the squid specifications and associated management measures for 3 years subject to positive review by the Council and its SSC.

4.2 Management Objectives of the MSB FMP

The objectives of the FMP are:
1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.
2. Promote the growth of the US commercial fishery, including the fishery for export.
3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.
4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.
5. Increase understanding of the conditions of the stocks and fisheries.
6. Minimize harvesting conflicts among US commercial, US recreational, and foreign fishermen.

Related to these objectives, the Council has over time instituted a variety of management measures over the years, which are summarized in Table 4.

Table 4. History of the Atlantic Mackerel, Squid and Butterfish FMP

History of the Atlantic Mackerel, Squid and Butterfish FMP		
Year	**Document**	**Management Action**
1978 - 1980	Original FMPs (3) and individual amendments	Established and continued management of Atlantic mackerel, squid, and butterfish fisheries
1983	Merged FMP	Consolidated management of Atlantic mackerel, squid, and butterfish fisheries under a single FMP
1984	Amendment 1	Implemented squid OY adjustment mechanism
		Revised Atlantic mackerel mortality rate
1986	Amendment 2	Equated fishing year with calendar year
		Revised squid bycatch TALFF allowances
		Implemented framework adjustment process
		Converted expiration of fishing permits from indefinite to annual
1991	Amendment 3	Established overfishing definitions for all four species
1991	Amendment 4	Limited the activity of directed foreign fishing and joint venture transfers to foreign vessels
		Allowed for specification of OY for Atlantic mackerel for up to three years
1996	Amendment 5	Adjusted longfin squid MSY; established 1 7/8" minimum mesh size
		Eliminated directed foreign fisheries for longfin squid, *Illex*, and butterfish
		Instituted a dealer and vessel reporting system; Instituted operator permitting
		Implemented a limited access system for longfin squid, *Illex* and butterfish
		Expanded management unit to include all Atlantic mackerel, longfin squid, *Illex*, and butterfish under U.S. jurisdiction.
1997	Amendment 6	Established directed fishery closure at 95% of DAH for longfin squid, *Illex* and butterfish with post-closure trip limits for each species
		Established a mechanism for seasonal management of the *Illex* fishery to improve the yield-per recruit
		Revised the overfishing definitions for longfin squid, *Illex* and butterfish
1997	Amendment 7	Established consistency among FMPs in the NE region of the U.S. relative to vessel permitting, replacement and upgrade criteria
1998	Amendment 8	Brought the FMP into compliance with new and revised National Standards and other required provisions of the Sustainable Fisheries Act.
		Added a framework adjustment procedure.
2001	Framework 1	Established research set-asides (RSAs).

Year	Document	Management Action (Table 4 Continued)
2002	Framework 2	Established that previous year specifications apply when specifications for the management unit are not published prior to the start of the fishing year (excluding TALFF specifications)
		Extended the *Illex* moratorium for one year; Established *Illex* seasonal exemption from longfin squid minimum mesh;
		Specified the longfin squid control rule; Allowed longfin squid specs to be set for up to 3 years
2003	Framework 3	Extended the moratorium on entry to the *Illex* fishery for an additional year
2004	Framework 4	Extended the moratorium on entry to the *Illex* fishery for an additional 5 years
2009	Amendment 9	Extended the moratorium on entry into the *Illex* fishery, without a sunset provision
		Adopted biological reference points for longfin squid recommended by the stock assessment review committee (SARC).
		Designated EFH for longfin squid eggs based on available information
		Prohibited bottom trawling by MSB-permitted vessels in Lydonia and Oceanographer Canyons
		Authorized specifications to be set for all four MSB species for up to 3 years
2010	Amendment 10	Implemented a butterfish rebuilding program.
		Increased the longfin squid minimum mesh in Trimesters 1 and 3.
		Implemented a 72-hour trip notification requirement for the longfin squid fishery.
2011	Amendment 11	Being implemented in late 2011 – Mackerel Limited Access, EFH Revisions, Commercial-Recreational Allocation.
2007	Amendment 12	Implemented a Standardized Bycatch Reporting Methodology (currently being reviewed due to recent legal actions)_
2011	Amendment 13	Being implemented in late 2011 – Rick Policy, Annual Catch Limits, and Accountability Measures for mackerel and butterfish.

5.0 WHAT ACTIONS ARE CONSIDERED IN THIS DOCUMENT?

Introduction - The status quo alternative, what exists currently, is equivalent to the no action alternative because the current regulations contain 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 shall remain in effect. The preferred alternatives were recommended by the Council after considering the recommendations of its SSC (see Appendix A), recommendations from the MSB Monitoring Committee (Council and NMFS technical staff), and public testimony and comment given the requirements of the MSA and the regulations that exist (or are likely to be implemented soon) related to the MSB FMP. Several additional alternatives are also used to create a “reasonable range” around the preferred alternative, as required by NEPA. The alternatives are easiest to interpret in table form and are presented as tables followed by explanatory text. Specifications and other management measures are dealt with via separate “Alternative Sets.”

5.1 Alternative Set 1: Mackerel Specifications

5.1.a Alternative 1a – Status Quo and No Action Due to Roll-Over Provisions in FMP

Table 5. Status Quo Mackerel Specifications

Alternative 1a for Mackerel		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Allowable Biological Catch (ABC) (mt)	80,000
(c)	Expected Canadian Catch (mt)	32,605
(d)	U.S ABC (mt)	47,395
(e)	Commercial Discard Set-Aside	1.30%
(f)	Initial Optimum Yield (IOY)	46,779
(g)	Domestic Annual Harvest (DAH) (mt)	46,779
(h)	Domestic Annual Processing (DAP) (mt)	31,779
(i)	Joint Venture Processing (JVP)	0
(j)	Total Allowable Level Foreign Fishing (TALFF)	0

The above table summarizes the status quo mackerel specifications. The following list (a-j) corresponds to the table above to further explain how the specifications operated in 2011.

(a) The most recent assessment failed to produce accepted reference points

(b) ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) Expected Canadian Catch: See Appendix B from the 2011 EA for details

(d) U.S. ABC: The U.S. ABC = total ABC minus expected Canadian Catch per the MSB FMP.

(e) Discards: This was the presumed discard rate (see the 2011 Specifications Environmental Assessment for details).

(f/g) IOY and DAH equaled the ABC minus the presumed discard rate of 1.3%.

(h) DAP is 15,000 mt less than DAH because of an artifact of the regulations regarding how a potential 15,000 mt of recreational harvest is accounted for. The recreational allocation provisions in Amendment 11 and the Omnibus address this inconsistency.

(i/j) JVP/TALFF: Since the domestic fishery has landed more than the DAH in recent times it was believed that the domestic fishery would land the entire DAH if mackerel are available in U.S. waters so no JVP or TALFF is specified.

5.1.b Alternative 1b – Preferred

Table 6. Preferred Mackerel Specifications

	Alternative 1b for Mackerel	
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	80,000
(c)	Expected Canadian Catch (mt)	36,219
(d)	U.S ABC (mt)	43,781
(e)	Annnual Catch Limit (ACL) (Equals ABC)	43,781
(f)	Recreational Allocation (6.2%)	2,714
(g)	Commercial Allocation (93.8%)	41,067
(h)	Recreational Annual Catch Target (ACT) Buffer	10%
(i)	Recreational ACT = Recreational Harvest Limit (RHL) (mt)	2,443
(j)	Commercial ACT Buffer	15%
(k)	Commercial ACT (mt)	34,907
(l)	Commercial Discard Set-Aside	3.11%
(m)	Domestic Annual Harvest (DAH) (mt)	33,821
(n)	Domestic Annual Processing (DAP) (mt)	33,821
(o)	Joint Venture Processing (JVP)	0
(p)	Total Allowable Level Foreign Fishing (TALFF)	0

This alternative makes ABC/ACL/ACT/AM specifications assuming that the Omnibus will be in place by January 1, 2012.

The overall goal of the mackerel specifications under the Omnibus is to account for all mackerel catch such that the ABC provided by the SSC is not exceeded and optimum yield is achieved. The following list (a-p) corresponds to the letters in the table to the right to further explain how the specifications function to account for all catch.

(a) OFL: The most recent assessment failed to produce accepted reference points so the OFL is unknown.

(b) ABC: ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) Expected Canadian Catch: See Appendix B for details on how this was calculated. Since there is no resource sharing in order to stay below the ABC some portion of the ABC must be set-aside for Canadian catch.

(d) U.S. ABC: The U.S. ABC equals the ABC minus expected Canadian Catch.

(e) ACL: The ACL equals the ABC and if total U.S. catch exceeds the ACL in 2012 there will be a deduction from the 2013 commercial DAH and/or recreational harvest limit (RHL) depending on how each sector contributed to any overage.

(f/g) Recreational/Commercial Allocations: Amendment 11 (Am 11) to the MSB FMP created distinct allocations between the recreational and commercial fisheries. If Am11 is not final by Jan 1, 2012 the Omnibus provided for allocations to be made via the annual specifications process and the Council specified the same allocations as Am11 at its June 2011 specifications meeting for the MSB fisheries.

(h) Recreational ACT Buffer: This accounts for a variety of management uncertainties including the low precision and time lag of recreational estimates as well as the lack of recreational discard estimates (though these are thought to be low – see Appendix C).

(i) Recreational ACT/RHL: This equals the recreational allocation minus the 10% recreational buffer. It should be the effective cap on recreational catch.

(j) Commercial ACT Buffer: This accounts for a variety of management uncertainties including the variability in Canadian landings, poor discard estimate precision, general concern about the uncertainty of the mackerel stock, and potential impacts of ABC overages on the mackerel stock and/or ecosystem. Concern about the ability to accurately close the directed fishery if it nears the ACT is not included because the fishery is proposed to be closed when projected landings approach 95% of the ACT.

(k) The commercial ACT equals the commercial allocation minus the 15% commercial buffer. The ACT is the effective cap on commercial catch.

(l) Commercial Discard Set Aside: A value equal to the mean plus one standard deviation of the 10 most recently available (1999-2008) annual discard rates was used. In order to keep catch below the ABC, discards must be accounted for.

(m) DAH: The DAH equals the commercial ACT minus the discard set-aside and should be the functional cap on domestic commercial landings.

(n) DAP: This is the amount of the DAH expected to be processed by domestic dealers/processors.

(o/p) No JVP/TALFF is proposed: Since the domestic fishery has landed more than the DAH in recent times it is believed that the domestic fishery will land the entire DAH if mackerel are available in U.S. waters.

1b was selected as preferred primarily because:

a) It uses the SSC's recommendations for ABC to maintain sustainability.
b) It uses the best available scientific information for information on expected Canadian catch, recreational catch and discards, and commercial discards.
c) It uses ACT buffers to account for management uncertainty as deemed appropriate by the Council.
d) It conforms to previous management actions, primarily the Omnibus amendment that developed procedures for setting ACLs, ACTs, and accountability measures.

5.1.c Alternative 1c – ABC 25% higher than preferred

Table 7. Summary Mackerel Specifications – ABC 25% Higher.

Alternative 1c for Mackerel		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	100,000
(c)	Expected Canadian Catch (mt)	36,219
(d)	U.S ABC (mt)	63,781
(e)	Annnual Catch Limit (ACL) (Equals ABC)	63,781
(f)	Recreational Allocation (6.2%)	3,954
(g)	Commercial Allocation (93.8%)	59,827
(h)	Recreational Annual Catch Target (ACT) Buffer	10%
(i)	Recreational ACT = Recreational Harvest Limit (RHL) (mt)	3,559
(j)	Commercial ACT Buffer	15%
(k)	Commercial ACT (mt)	50,853
(l)	Commercial Discard Set-Aside	3.11%
(m)	Domestic Annual Harvest (DAH) (mt)	49,271
(n)	Domestic Annual Processing (DAP) (mt)	49,271
(o)	Joint Venture Processing (JVP)	0
(p)	Total Allowable Level Foreign Fishing (TALFF)	0

**See Alternative 1b for an explanation of the rows in the above table.

5.1.d Alternative 1d – ABC 25% lower than preferred

Table 8. Summary Mackerel Specifications – ABC 25% Lower.

Alternative 1d for Mackerel		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	60,000
(c)	Expected Canadian Catch (mt)	36,219
(d)	U.S ABC (mt)	23,781
(e)	Annnual Catch Limit (ACL) (Equals ABC)	23,781
(f)	Recreational Allocation (6.2%)	1,474
(g)	Commercial Allocation (93.8%)	22,307
(h)	Recreational Annual Catch Target (ACT) Buffer	10%
(i)	Recreational ACT = Recreational Harvest Limit (RHL) (mt)	1,327
(j)	Commercial ACT Buffer	15%
(k)	Commercial ACT (mt)	18,961
(l)	Commercial Discard Set-Aside	3.11%
(m)	Domestic Annual Harvest (DAH) (mt)	18,371
(n)	Domestic Annual Processing (DAP) (mt)	18,371
(o)	Joint Venture Processing (JVP)	0
(p)	Total Allowable Level Foreign Fishing (TALFF)	0

**See Alternative 1b for an explanation of the rows in the above table.

5.1.e Alternative 1e – Fall Back Mackerel Alternative

This alternative must be included in the event that neither the Omnibus nor Amendment 11 has been implemented by January 1, 2012. Under this alternative, the same basic set of specifications used in 2011 would be set in 2012 but using the values recommended in the preferred alternative above to the extent practicable.

Table 9. Mackerel Specifications – Fallback.

Alternative 1e for Mackerel		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Allowable Biological Catch (ABC) (mt)	80,000
(c)	Expected Canadian Catch (mt)	36,219
(d)	U.S ABC (mt)	43,781
(e)	Commercial Discard Set-Aside	3.11%
(f)	Initial Optimum Yield (IOY)	42,419
(g)	Domestic Annual Harvest (DAH) (mt)	42,419
(h)	Domestic Annual Processing (DAP) (mt)	27,419
(i)	Joint Venture Processing (JVP)	0
(j)	Total Allowable Level Foreign Fishing (TALFF)	0

(a) The most recent assessment failed to produce accepted reference points

(b) ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) Expected Canadian Catch: See Appendix B for details on how this was calculated.

(d) U.S. ABC: The U.S. ABC equals the ABC minus expected Canadian Catch per the FMP.

(e) Commercial Discard Set Aside: A value equal to the mean plus one standard deviation of the 10 most recently available (1999-2008) annual discard rates was used.

(f/g) IOY and DAH equaled the ABC minus the presumed discard rate of 3.11%.

(h) DAP is 15,000 mt less than DAH because of an artifact of the regulations regarding how a potential 15,000 mt of recreational harvest is accounted for. The recreational allocation provisions in Amendment 11 and the Omnibus address this inconsistency.

(i/j) No JVP/TALFF is proposed: Since the domestic fishery has landed more than the DAH in recent times it was believed that the domestic fishery would land the entire DAH if mackerel are available in U.S. waters.

5.2 Alternative Set 2: Mackerel Management Measures

The status-quo management measures that can be changed via annual actions for mackerel include:

- closing the directed commercial fishery at 90% of the DAH;
- imposing a 20,000 pound trip limit if that threshold is reached before June 1 or 50,000 pound trip limit if that threshold is reached on or after June 1.
- up to 3% of the IOY can be set-aside to fund research projects.

No changes were contemplated in the specifications process for the research set-aside (RSA) measures. However, the Omnibus modified the procedure so that any RSA will be taken proportionally out of the commercial and recreational Annual Catch Targets (up to 3%). Two issues with other management measures arose during development of the 2012 management measures and are detailed below.

First, with a separate recreational allocation being implemented, a 95% closure threshold for the commercial fishery should suffice. The 10% buffer associated with the 90% closure threshold was designed to accommodate 1) reporting issues as well as 2) the fact that because the commercial fishery closed based on the DAH with no distinct allocation to the recreational fishery, the 10% threshold also had to "cover" recreational catch. With recreational catch accounted for elsewhere, the closure buffer can increase to 95% without changing the overall accountability for catch.

Second, Amendment 11 states that the post-closure trip limit can only be up to 20,000 pounds. Thus there could be a tension between the current post-closure trip-limits in the annual management measures and Amendment 11, causing confusion about which applied since both are likely to be implemented near Jan 1, 2012. To address these issues, three alternatives are described below (more than one could be implemented).

5.2.a Alternative 2a – Status Quo

No management measures would be changed.

5.2.b Alternative 2b – Preferred

The directed fishery closes at 95% of the DAH.

5.2.c Alternative 2c – Preferred

A 20,000 pound trip limit will be implemented if the directed fishery closes.

<u>5.3 Alternative Set 3: *Illex* Specifications</u>

The Omnibus Amendment does not apply to *Illex* squid because of its short lifespan. Accordingly, the alternatives for *Illex* squid presented below do not include specifications for ACL and ACT.

5.3.a Alternative 3a – Status Quo and No Action Due to Roll-Over Provisions in FMP

Table 10. Status Quo *Illex* Specifications.

Alternative 5a for *Illex*		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	24,000
(c)	Commercial Discard Set-Aside	2.80%
(d)	Initial Optimum Yield (IOY)	23,328
(e)	Domestic Annual Harvest (DAH) (mt)	23,328
(f)	Domestic Annual Processing (DAP) (mt)	23,328

(a) The most recent assessment failed to produce accepted reference points.

(b) ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) A value of 2.8% of catch was used for discards in 2011.

(d/e/f) IOY, DAH, and DAP equaled the ABC minus the presumed discard rate of 2.8%

<u>3 Year Specifications – *Illex* Alternative 3b (preferred)</u>

For the first time the Council, consistent with the recommendations of its SSC, specified that the *Illex* squid specifications be set for 3 years subject to a positive annual review by the SSC. While on one hand setting specifications for 3 years for a species that lives less than a year may seem odd, the critical factor is that the primary information about the sustainability of the fishery comes from the SSC's finding that catches of 24,000 mt should be sustainable. Given it is unlikely that substantial new information on sustainable catch rates will be available next year, it is unlikely that any other specification will appear more appropriate. However, the SSC will review the fishery and if the SSC recommends a new ABC the Council would have to revisit these specifications because the SSC recommendation would constitute new "best available" scientific information. Setting 3 year specifications simply minimizes unnecessary paperwork if the SSC and Council decide not to propose any changes.

3b was also selected as preferred because:

a) It uses the SSC's recommendations for ABC to maintain sustainability.
b) It uses the best available scientific information for information on discards

5.3.b Alternative 3b – Preferred (for 3 years 2012-2014)

Table 11. Summary of Preferred *Illex* Specifications.

Alternative 5b for *Illex*		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	24,000
(c)	Commercial Discard Set-Aside	4.52%
(d)	Initial Optimum Yield (IOY)	22,915
(e)	Domestic Annual Harvest (DAH) (mt)	22,915
(f)	Domestic Annual Processing (DAP) (mt)	22,915

**See Alternative 5a for an explanation of the rows in the above table except for (c) – 4.52% is the mean plus one standard deviation of the most recent 10 years of observed discard rates.

5.3.c Alternative 3c – ABC 25% higher than preferred

Table 12. Summary *Illex* Specifications – ABC 25% Higher.

Alternative 5c for *Illex*		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	30,000
(c)	Commercial Discard Set-Aside	4.52%
(d)	Initial Optimum Yield (IOY)	28,644
(e)	Domestic Annual Harvest (DAH) (mt)	28,644
(f)	Domestic Annual Processing (DAP) (mt)	28,644

**See Alternative 5a/5b for an explanation of the rows in the above table.

5.3.d Alternative 3d – ABC 25% lower than preferred

Table 13. Summary *Illex* Specifications – ABC 25% Lower.

Alternative 5d for *Illex*		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	18,000
(c)	Commercial Discard Set-Aside	4.52%
(d)	Initial Optimum Yield (IOY)	17,186
(e)	Domestic Annual Harvest (DAH) (mt)	17,186
(f)	Domestic Annual Processing (DAP) (mt)	17,186

**See Alternative 5a/5b for an explanation of the rows in the above table.

***Illex* Management Measures**

Changes to measures other than Max OY/ABC/IOY/DAH/DAP were not considered because no issues with those other measures have been reported. Thus all alternatives maintain that the directed fishery for *Illex* closes when 95% of ABC is projected to be taken and a 10,000 pound trip limit implemented for the remainder of the fishing year. Vessels which possess *Illex* incidental catch permits may land up to 10,000 pounds per trip at all times. Also, up to 3% of the IOY for *Illex* may be set aside for scientific research.

5.4 Alternative Set 4: Butterfish Specifications

5.4.a Alternative 4a – Status Quo and No Action Due to Roll-Over Provisions in FMP

Table 14. Status Quo Butterfish Specifications.

Alternative 3a for Butterfish		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Allowable Biological Catch (ABC) (mt)	1,811
(c)	Commercial Discard Set-Aside	72.39%
(d)	Initial Optimum Yield (IOY)	500
(e)	Domestic Annual Harvest (DAH) (mt)	500
(f)	Domestic Annual Processing (DAP) (mt)	500

(a) The most recent assessment failed to produce accepted reference points so the OFL was unknown.

(b) ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) Discards: This was originally 2/3 of the ABC (approximately the mean of the 10 most recently available (1999-2008) annual discard rates) however subsequent emergency action by NMFS effectively increased it to 72.39%

(d/e/f) IOY, DAH, and DAP equaled the ABC minus the presumed discard rate of 72.39%.

Note: No bycatch TALFF was specified because no mackerel TALFF was specified.

5.4.b Alternative 4b – Preferred

Table 15. Summary of Preferred Butterfish Specifications.

Alternative 3b for Butterfish		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	3,622
(c)	Annnual Catch Limit (ACL) (Equals ABC)	3,622
(d)	Commercial ACT Buffer	10%
(e)	Commercial ACT (mt)	3,260
(f)	Commercial Discard Set-Aside	66.67%
(g)	Domestic Annual Harvest (DAH) (mt)	1,087
(h)	Domestic Annual Processing (DAP) (mt)	1,087
(i)	Butterfish Cap (mt)	2,445

This alternative makes ABC/ACL/ACT/AM specifications assuming that the Omnibus will be in place by January 1, 2012. 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 following list (a-i) corresponds to the letters in the table above to further explain how the specifications function to account for all catch.

(a) OFL: The most recent assessment failed to produce accepted reference points

(b) ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) ACL: The ACL equals the ABC and if total U.S. catch exceeds the ACL in 2012 there will be a deduction from the 2013 ACL.

(d) Commercial ACT Buffer: This accounts for a variety of management uncertainties including discard estimate uncertainty and uncertainty in the ability of NMFS to effectively close either the directed butterfish fishery or the butterfish mortality cap on the longfin squid fishery.

(e) The commercial ACT equals the ABC minus the 10% commercial buffer.

(f) Commercial Discard Set Aside: 2/3 of the ACT would be set aside for discards per analysis of 1999-2008 discard information from the most recent assessment.

(g/h) DAH/DAP: The DAH equals the commercial ACT minus the discard set-aside and should be the functional cap on domestic commercial landings. DAP is the amount of the DAH expected to be processed by domestic dealers/processors.

(i) 75% of the ACT (.75*3,260 = 2,445) would be specified as the butterfish mortality cap quota.

No bycatch TALFF was recommended because no mackerel TALFF was recommended.

4b was selected as preferred primarily because:

a) It uses the SSC's recommendations for ABC to maintain sustainability.
b) It uses the best available scientific information for discards
c) It uses an ACT buffer to account for management uncertainty as deemed appropriate by the Council
d) It conforms to previous management actions, primarily the Omnibus amendment that developed procedures for setting ACLs, ACTs, and accountability measures.

5.4.c Alternative 4c – ABC 25% higher than preferred

Table 16. Summary Butterfish Specifications – ABC 25% Higher.

Alternative 3c for Butterfish		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	4,528
(c)	Annnual Catch Limit (ACL) (Equals ABC)	4,528
(d)	Commercial ACT Buffer	10%
(e)	Commercial ACT (mt)	4,075
(f)	Commercial Discard Set-Aside	66.67%
(g)	Domestic Annual Harvest (DAH) (mt)	1,358
(h)	Domestic Annual Processing (DAP) (mt)	1,358
(i)	Butterfish Cap (mt)	3,056

**See Alternative 3b for an explanation of the rows in the above table.

5.4.d Alternative 4d – ABC 25% lower than preferred

Table 17. Summary Butterfish Specifications – ABC 25% Lower.

Alternative 3d for Butterfish		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	2,717
(c)	Annnual Catch Limit (ACL) (Equals ABC)	2,717
(d)	Commercial ACT Buffer	10%
(e)	Commercial ACT (mt)	2,445
(f)	Commercial Discard Set-Aside	66.67%
(g)	Domestic Annual Harvest (DAH) (mt)	815
(h)	Domestic Annual Processing (DAP) (mt)	815
(i)	Butterfish Cap (mt)	1,834

**See Alternative 3b for an explanation of the rows in the above table.

5.4.e Alternative 4e – Butterfish Fallback Alternative.

This alternative must be included in the event that the Omnibus has not been implemented by January 1, 2012. The same structure as 2011 would be used except the ABC would be 3,622 mt.

Table 18. Fallback Butterfish Alternative

Alternative 3e for Butterfish		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Allowable Biological Catch (ABC) (mt)	3,622
(c)	Commercial Discard Set-Aside	69.99%
(d)	Initial Optimum Yield (IOY)	1,087
(e)	Domestic Annual Harvest (DAH) (mt)	1,087
(f)	Domestic Annual Processing (DAP) (mt)	1,087
(g)	Butterfish Mortality Cap	2,717

**See Alternative 3a for an explanation of the rows in the above table.

5.5 Alternative Set 5: Butterfish Management Measures

Status-quo management measures that can be changed via annual actions for butterfish include:

-Incidental permits may retain 600 pounds of butterfish per trip unless the directed fishery closes before October 1, in which case the incidental trip is lowered to 250 pounds.

-The directed fishery closes when 80% of the DAH is landed. The 20% threshold buffer is designed to accommodate 1) reporting issues as well as 2) state landings that cannot be restricted after a closure and 3) post-closure incidental federal landings. If a closure occurs on or after October 1 the post-closure trip limit is 600 pounds. If a closure occurs before October 1 the post-closure trip limit is 250 pounds.

-There is a 5,000 pound trip limit for the directed fishery.

-A 3-inch mesh is required to possess 1,000 pounds or more of butterfish.

-Up to 3% of the IOY may be used to fund research projects (the Omnibus equivalent has the 3% coming out of the commercial Annual Catch Target)

The only change proposed for 2012 involves the threshold when 3-inch mesh is required. Related to the increased quota and hopefully to convert some discards to landings, the threshold is proposed to be 2,000 pounds instead to the current 1,000 pounds. To address this issue two alternatives are described below:

5.5.a Alternative 5a – Status Quo - No management measures would be changed.

5.5.b Alternative 5b – Preferred - A 3-inch mesh would be required to possess 2,000 pounds or more of butterfish.

<u>5.6 Alternative Set 6: Longfin Squid Specifications</u>

The Omnibus Amendment does not apply to longfin squid because of its short lifespan. Accordingly, the alternatives for longfin squid presented below do not include specifications for ACL and ACT.

5.6.a Alternative 6a – Status Quo and No Action Due to Roll-Over Provisions in FMP

Table 19. Status Quo Longfin Squid Specifications.

Alternative 6a for *Longfin Squid*		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	24,000
(c)	Management Uncertainty Set-Aside	16.67%
(d)	Initial Optimum Yield (IOY)	20,000
(e)	Domestic Annual Harvest (DAH) (mt)	20,000
(f)	Domestic Annual Processing (DAP) (mt)	20,000

(a) The most recent assessment failed to produce accepted reference points so the OFL was unknown.

(b) ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) In 2011 this set-aside was designed to deal with discards, uncertainty in discards, and uncertainty in the operation of the butterfish cap.

(d/e/f) IOY, DAH, and DAP equaled the ABC minus the management uncertainty set-aside.

<u>3 Year Specifications – Longfin Squid Alternative 6b (Preferred)</u>

For the first time the Council, consistent with the recommendations of its SSC, specified that the longfin squid specifications be set for 3 years subject to a positive annual review by the SSC. While on one hand setting specifications for 3 years for a species that lives less than a year may seem odd, the critical factor is that the primary information about the sustainability of the fishery comes from an assessment that strongly suggests catches of 23,400 mt should be sustainable and potentially exploitation rates could be increased, but it was impossible to determine by how much. Given it is unlikely that substantial new information on sustainable catch rates will be available next year, it is unlikely that any other specification will appear more appropriate. However, the SSC will review the fishery and if the SSC recommends a new ABC the Council would have to revisit the longfin squid specifications because the SSC recommendation would constitute new “best available” scientific information. Setting 3 year specifications just minimizes unnecessary paperwork if the SSC and Council decide not to propose any changes.

6b was also selected as preferred because it uses both the SSC’s recommendations for ABC to maintain sustainability and the best available scientific information for information on discards.

5.6.b Alternative 6b – Preferred (for 3 years 2012-2014)

Table 20. Summary of Preferred Longfin Squid Specifications.

Alternative 6b for *Longfin Squid*		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	23,400
(c)	Commercial Discard Set-Aside	4.08%
(d)	Initial Optimum Yield (IOY)	22,445
(e)	Domestic Annual Harvest (DAH) (mt)	22,445
(f)	Domestic Annual Processing (DAP) (mt)	22,445

(a) The most recent assessment failed to produce accepted reference points so the OFL was unknown.

(b) ABC is provided by the SSC and accounts for scientific uncertainty so as to achieve a relatively low probability of overfishing given the available scientific information – see Appendix A.

(c) In 2011 a set-aside was designed to deal with uncertainty in discards as well as uncertainty in the operation of the butterfish cap. The monitoring committee recommended any uncertainty with the butterfish cap be dealt with in the butterfish specifications so the only deduction is for discards. 4.08% is the mean plus one standard deviation of the most recent 10 years of observed discard rates.

(d/e/f) IOY, DAH, and DAP equal the ABC minus the commercial discard set-aside. The monitoring committee did not recommend any additional deductions from ABC to IOY.

5.6.c Alternative 6c – ABC 25% higher than preferred

Table 21. Summary Longfin Squid Specifications – ABC 25% Higher.

Alternative 6c for *Longfin Squid*		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	29,250
(c)	Commercial Discard Set-Aside	4.08%
(d)	Initial Optimum Yield (IOY)	28,057
(e)	Domestic Annual Harvest (DAH) (mt)	28,057
(f)	Domestic Annual Processing (DAP) (mt)	28,057

**See Alternative 5a/5b for an explanation of the rows in the above table.

5.6.d Alternative 6d – ABC 25% lower than preferred

Table 22. Summary Longfin Squid Specifications – ABC 25% Lower.

Alternative 6d for Longfin Squid		
(a)	Overfishing Limit (OFL) (metric tons - mt)	Unknown
(b)	Acceptable Biological Catch (ABC) (mt)	17,550
(c)	Commercial Discard Set-Aside	4.08%
(d)	Initial Optimum Yield (IOY)	16,834
(e)	Domestic Annual Harvest (DAH) (mt)	16,834
(f)	Domestic Annual Processing (DAP) (mt)	16,834

**See Alternative 5a/5b for an explanation of the rows in the above table.

5.7 Alternative Set 7: Longfin Squid Management Measures

Status-quo management measures that can be changed via annual actions include:

-The annual quota is divided up as follows: Trimester 1 - 43% (9,651 mt) Trimester 2 - 17% (3,816 mt), and Trimester 3 - 40% (8,978 mt). The numbers presented for the divisions are based on the preferred alternative.

- For Trimesters 1 and 2, the directed fishery will be closed when 90% of each Trimester allocation has been landed. In Trimester 3 the directed fishery closes when 95% of the total annual quota has been landed.

-Incidental permits may retain 2500 pounds of longfin squid per trip. All permits are limited to 2,500 pounds of longfin squid per trip after a closure.

-½ of Trimester 1 underages are transferred to Trimester 2 and ½ are transferred to Trimester 3. Overages in Trimester 1 are deducted from Trimester 3. Underages or overages in Trimester 2 are applied to Trimester 3. Trimester 1 underage transfers are only triggered if the Trimester 1 underage is greater than 25%. The Trimester 2 quota can be increased by a maximum of 50%.

- The butterfish cap will close the longfin squid fishery as described in Amendment 10.

-2 1/8” codends are required in Trimesters 1 and 3. 1 7/8” codends are required in Trimester 2. Strengtheners can be used subject to a minimum 5 inch mesh opening.

- Vessels intending to land more than 2,500 pounds of longfin squid must notify the observer program in all trimesters.

-Up to 1.65% of the IOY may be used to fund research projects.

Alternatives 7b and 7c propose two changes 2012 longfin squid management measures:

5.7.a Alternative 7a – Status Quo – No management measures would be changed.

5.7.b Alternative 7b – Preferred - Up to 3% of the longfin squid IOY would be available to fund research-set-aside (RSA) projects. Last year RSA was limited to 1.65% because that is the amount of longfin squid landings that could be covered by butterfish RSA in terms of accounting for butterfish discarding that may occur during RSA fishing. For 2012 the Council recommended that 3% be utilized if there is sufficient butterfish RSA to cover potential discarding during longfin squid RSA fishing. NMFS will use the best available scientific information to determine how much longfin squid landings the butterfish RSA can support.

5.7.c Alternative 7c – Preferred - Exempt jigging-only longfin squid fishing (no trawl nets on-board) by longfin squid-butterfish moratorium permit holders from the incidental longfin squid trip limits during any closures of the directed longfin squid fishery because of the butterfish mortality cap. The cap is designed to limit butterfish mortality. Substantial butterfish catch would not be expected to occur during jigging for longfin squid. While previous attempts at jigging for longfin squid have not shown jigging to be commercially feasible, there is no apparent reason to prohibit additional experimental fishing, which could be encouraged if a closure increases longfin squid prices.

6.0 DESCRIPTION OF THE ENVIRONMENT AND FISHERIES THAT MAY BE AFFECTED BY THE ACTIONS CONSIDERED IN THIS DOCUMENT

This section identifies and describes the *valued ecosystem components* (VECs) (Beanlands and Duinker 1984) likely to be affected by the actions proposed in this document. The VECs comprise the affected environment within which the proposed actions will take place. The VECs are identified and described here as a means of establishing a baseline for the impact analysis that will be presented in section 7's "Analysis of Impacts." The significance of the various impacts of the proposed actions on the VECs will also be assessed from a cumulative effects perspective. The range of VECs is described in this section is limited to those for which a reasonable likelihood of meaningful impacts could potentially be expected (CEQ 1997). These VECs are listed below.

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

The physical environment is described next, to establish the context for the VECs, and will be followed by the description of the actual VECs. It should be noted that impacts of this action on the physical environment are addressed through analysis of impacts on habitat, as most of the impacted physical environment comprises EFH for regional species. Appendix D also contains a variety of ecosystem factors considered by the Council.

6.1 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 probably 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 New England-Middle Atlantic area is fairly uniform physically and is influenced by many large coastal rivers and estuarine areas (Freeman and Walford 1974 a-d, 1976 a and b). In the New England-Middle Atlantic area, 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 in the New York Bight in February to over 80 ^{o}F off Cape Hatteras in August.

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 south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream (Figure 1). 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 a patchwork of 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.

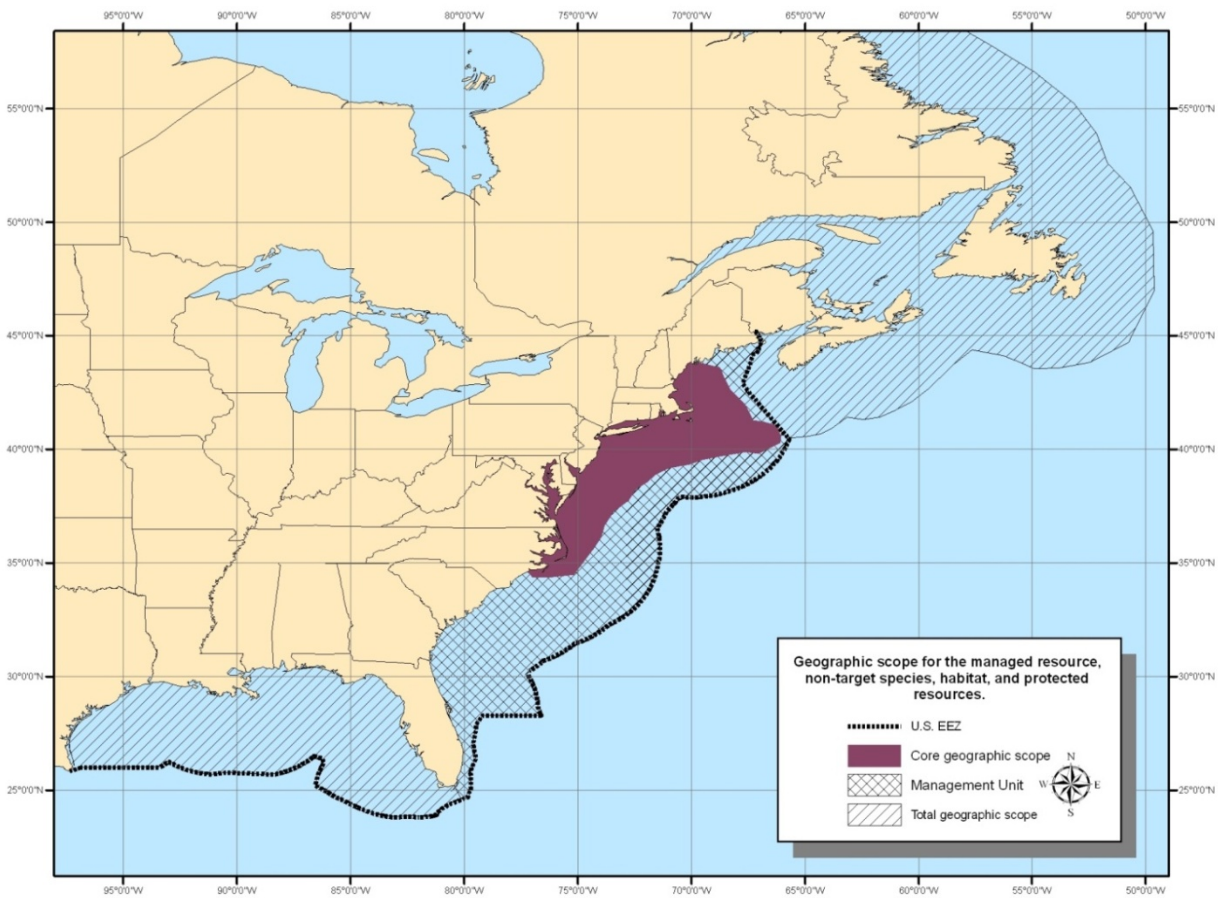

Figure 1. Geographic scope of the mackerel, squid and butterfish fisheries.

Figures 1 describes the geographic scope of the MSB fisheries. Almost all of the MSB catch and related effort occurs within the solid shaded "core geographic scope." Previous public comment has requested that the Council include mention that numerous old dump sites for municipal, industrial, and military waste exist in the management area, specifically the "106-Mile Dump Site" formerly utilized east of Delaware's ocean coastline, beyond the Continental Shelf. Detailed information on the 106-Mile Dump Site can be found in the 1995 EPA report to Congress on the 106-Mile Dump Site available by searching for "106 Mile Dump Site at http://www.epa.gov/history/. The available research generally concluded that sewage sludge did not reach important areas for commercial fisheries and that the 106-Mile Dump Site was not the prime source of the generally low chemical contamination in tilefish, the primary commercially important finfish species resident in the shelf/slope areas adjacent to the 106-Mile Dump Site (EPA 1995).

6.2 Biology of the Managed Resources

6.2.1 Atlantic mackerel (mackerel)

Atlantic mackerel is a pelagic, schooling species distributed between Labrador (Newfoundland, Canada) (Parsons 1970) and North Carolina (Anderson 1976a). Sette (1943; 1950) identified two distinct groups consisting of a northern contingent and a southern contingent. The two contingents overwinter primarily along the continental shelf between the Middle Atlantic and Nova Scotia, although it has been suggested that overwintering occurs as far north as Newfoundland. With the advent of warming shelf water in the spring, the two contingents begin migration, with the northern contingent moving along the coast of Newfoundland and historically into the Gulf of St. Lawrence for spawning from the end of May to Mid-August (Berrien 1982). The southern contingent spawns in the Mid-Atlantic and Gulf of Maine from mid-April to June (Berrien 1982) then moves north to the Gulf of Maine and Nova Scotia. In late fall, migration turns south and fish return to the over-wintering grounds. *Some of the Council's advisers who mackerel fish have questioned if the historical patterns described above are being maintained currently.* Biochemical studies (Mackay 1967) have not established that genetic differences exist between the two groups and precise estimates of the relative contributions of the two groups cannot be made (ICNAF 1975). Atlantic mackerel in the northwest Atlantic are assessed as a unit stock and are considered one stock for fishery management purposes.

Mackerel are 0.1" long at hatching, grow to about 2" in two months, and reach a length of 8" in December, near the end of their first year of growth (Anderson and Paciorkowski 1978). During their second year of growth they reach about 10" in December, and by the end of their fifth year they grow to an average length of 13" FL. Fish that are 10-13 years old reach a length of 15-16" (Grosslein and Azarovitz 1982). MacKay (1973) and Dery and Anderson (1983) have found an inverse relationship between growth and year class size. All Atlantic mackerel are sexually mature by age 3, while about 50% of the age 2 fish are mature. Average size at maturity is about 10.5-11" FL (Grosslein and Azarovitz 1982). The maximum age observed is 17 years (Pentilla and Anderson 1976).

Atlantic mackerel are opportunistic feeders that can ingest prey either by individual selection of organisms or by passive filter feeding (Pepin *et al.* 1988). Larvae feed primarily on zooplankton. Juveniles eat mostly small crustaceans such as copepods, amphipods, mysid shrimp and decapod larvae. They also feed on small pelagic molluscs (*Spiratella* and *Clione*) when available. Adults feed on the same food as juveniles but diets also include a wider assortment of organisms and larger prey items. For example, euphausiid, pandalid and crangonid shrimp are common prey; chaetognaths, larvaceans, pelagic polychaetes and larvae of many marine species have been identified in mackerel stomachs. Immature mackerel begin feeding in the spring; older fish feed until gonadal development begins, stop feeding until spent and then resume prey consumption (Berrien 1982).

Atlantic mackerel are an important prey species and are known to be preyed upon by many pelagic and demersal fish species, as well as by marine mammals and seabirds (Smith and Gaskin 1974; Payne and Selzer 1983; Overholtz and Waring 1991; Montevecchi and Myers 1995; Scott and Tibbo 1968; Maurer and Bowman 1975; Stillwell and Kohler 1982, 1985; Bowman and Michaels 1984). The recent TRAC estimated mortality for a subset of key finfish predators (www.mar.dfo-mpo.gc.ca/science/trac/tsr.html) but estimates for marine mammals and seabirds are not available.

Stock Status

The mackerel stock was most recently assessed via a Transboundary Resource Assessment Committee in 2010 (TRAC 2010), which analyzed data though 2008 (www.mar.dfo-mpo.gc.ca/science/trac/tsr.html). A number of different models and model formulations were evaluated. Given the uncertainty in the assessment results, the TRAC agreed that short term projections and characterization of stock status relative to estimated reference points would not be an appropriate basis for management advice at this time. Given current indications of reduced productivity and lack of older fish in the survey and catch, the TRAC recommended that annual total catches not exceed the average total landings (80,000 mt) over the last three years (2006-2008) until such time that new information suggests that a different amount is appropriate. SSB outputs from the final TRAC model are included below in Figure 2 but were considered useful only for the purposes of indicating likely trends. While NMFS' official "status of stocks" document technically list mackerel as "not overfished" and "not experiencing overfishing" the results of the 2010 TRAC suggest their true status is unknown with respect to being overfished or not and with respect to experiencing overfishing or not, especially since the 2010 TRAC identified technical issues with the preceding assessment. Efforts are ongoing to determine if a switch to "unknown status" would be more appropriate.

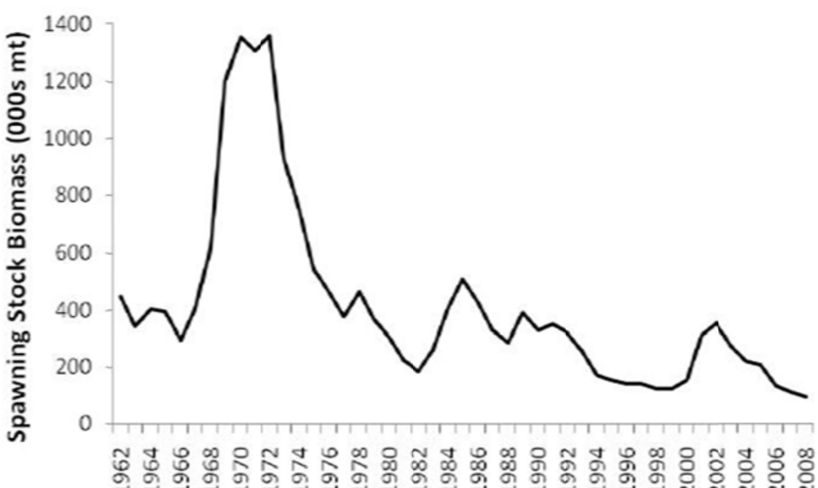

Figure 2. 2010 Mackerel TRAC SSB final model output.

NEFSC Spring Survey indices (Geometric Mean) through 2011 (a special request was made for Spring 2011 mackerel data due to concerns about low 2011 catch) for mackerel are included below. Taking the Geometric mean of a given year's values for individual hauls dampens the impact of individual large hauls and was the way the survey data was used in the 2010 TRAC assessment. It is important to note that the 2009-2011 values are adjusted from the raw data of the new Bigelow survey ship based on the calibration study between the Bigelow and its predecessor the Albatross. The calibration factor for this species is one factor for all sizes, and the next assessment may investigate whether size-specific calibration factors are more appropriate. Additional calibration information may be found at: http://www.nefsc.noaa.gov/publications/crd/crd1005/index.html (Miller et al 2010).

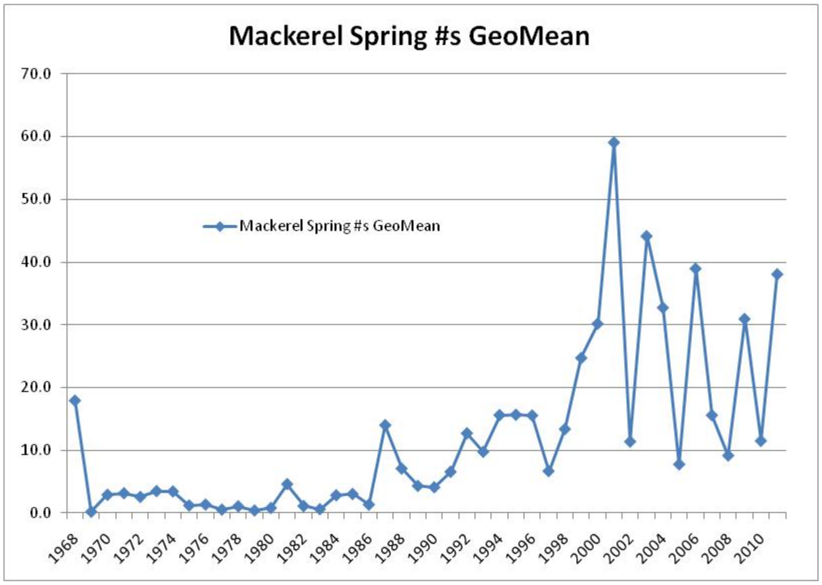

Figure 3. Spring NEFSC Survey Mackerel Indices 1968-2011. Geometric Mean, Numbers per Tow

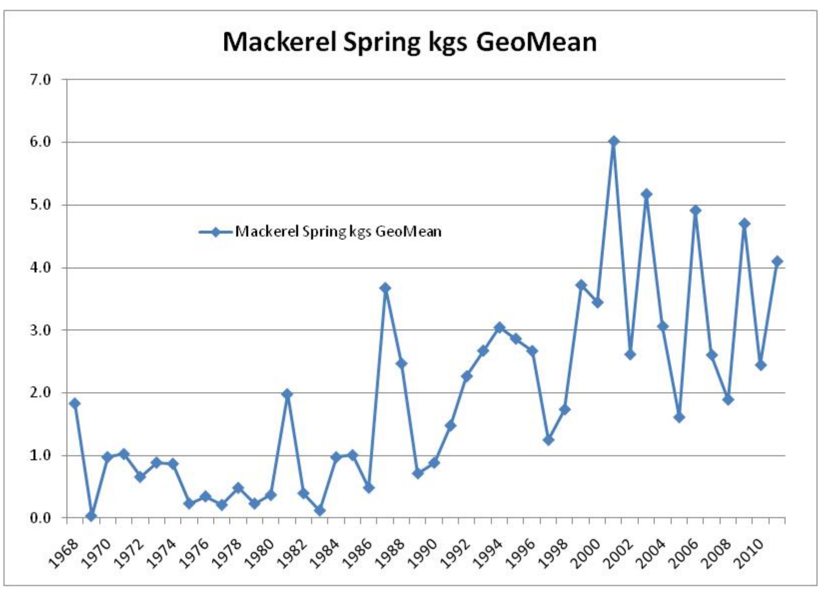

Figure 4. Spring Survey Mackerel Indices 1968-2011. Geometric Mean, kg per Tow

6.2.2 *Illex illecebrosus*

The age and growth of *Illex* has been well studied relative to other squid species, being one of the few for which the statolith ageing method has been validated (Dawe *et al.* 1985). Research on the age and growth of *Illex* based on counts of daily statolith growth increments indicates an annual life span (Dawe *et al.* 1985). *Illex* is a terminal spawner with a protracted spawning season. There have been no direct observations of spawning in nature. The winter spawning area is believed to be south of Cape Hatteras over the Blake Plateau (Black *et al.* 1987), but other spawning occurs between the Florida Peninsula and central New Jersey at depths down to 990 ft (300 m; Fedulov and Froerman 1980). Some spawning may also occur in the northern part of the Gulf Stream/Slope Water frontal zone (Dawe and Beck 1985, O'Dor and Balch 1985, Rowell et al 1985). However, the only confirmed spawning area is located in the Mid-Atlantic Bight where a large number of mated females have been collected during May in the vicinity of the US fishing grounds (Hendrickson, 2004, Hendrickson and Hart, 2006).

Illex feed primarily on fish, cephalopods (i.e. squid) and crustaceans. Prey include the early life history stages of various groundfish and pelagic fish as well as the adults of smaller prey such as capelin and smelt (Squires 1957, Dawe *et al.* 1997, O'Dor *et al.* 1980, Wigley 1982). Cannibalism is significant, and *Illex* also feed on longfin squid (Vinogradov 1984). When *Illex* are offshore in the spring, they primarily consume euphausiids, whereas they consume mostly fish and squid when they are inshore in the summer and fall (Maurer and Bowman 1985). Perez (1994) also demonstrated *Illex* consume less crustaceans and more fish as they grow larger.

Illex are an important prey species and are known to be preyed upon by many pelagic and demersal fish species, as well as by marine mammals, seabirds, and longfin squid (Butler 1971, Vinogradov 1972, Maurer 1975, Buckel 1997, Langton and Bowman 1977, Lilly and Osborne 1984, Templeman 1944, Stillwell and Kohler 1985, Scott and Scott 1988, Squires 1957, Wigley 1982, Major 1986, and Brown *et al.*1981).

<u>Stock Status</u>

The *Illex* stock was most recently assessed at SARC 42 (2006). SARC 42 was publically available in 2006 and included data through 2004. It was not possible to evaluate current stock status because there are no reliable current estimates of stock biomass or fishing mortality rate. The short lifespan of *Illex* greatly complicates assessing the stock with the available survey and assessment resources. In-season assessment and management would be the optimal way to manage any short-lived squid fishery but sufficient resources are not currently available. NEFSC indices for fall surveys (when *Illex* are available) are included below. It is important to note that the 2009 and 2010 values are adjusted from the raw data of the new Bigelow survey ship based on the calibration study between the Bigelow and its predecessor the Albatross. The calibration factor for this species is one factor for all sizes, and the next assessment may investigate whether size-specific calibration factors are more appropriate.

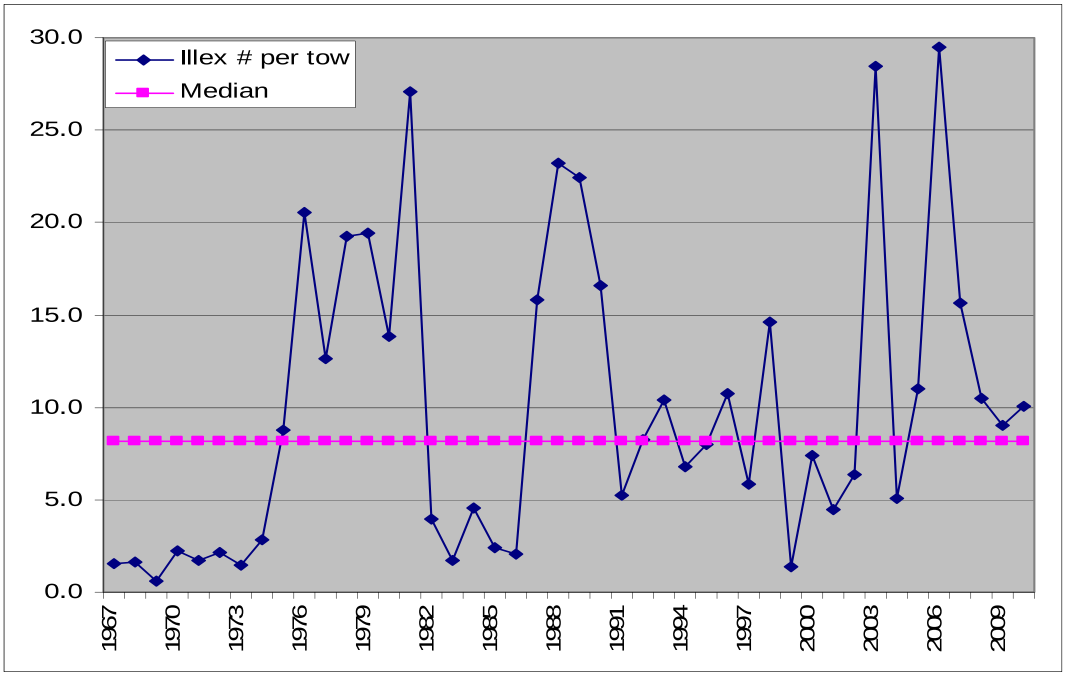

Figure 5. Fall NEFSC Trawl Survey - *Illex* Mean #/tow.

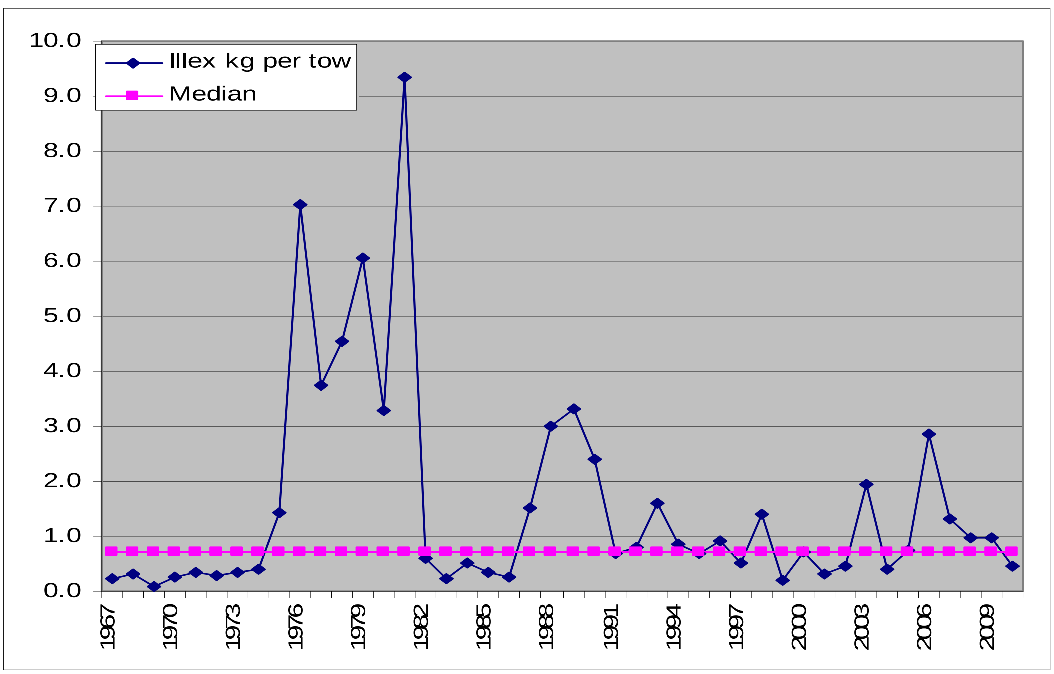

Figure 6. Fall NEFSC Trawl Survey - *Illex* Mean kg/tow.

6.2.3 Butterfish

Butterfish (*Peprilus triacanthus*) are distributed from Florida to Nova Scotia, occasionally straying as far north as the Gulf of St Lawrence (Bigelow and Schroeder 2002). Butterfish is a fast growing species that schools by size and makes seasonal inshore and offshore movements.

Maximum age is reported as six years though most fish seldom attain an age greater than 3 years. More recent studies showed that the population was composed of four age groups ranging from young of the year to over age three. Some butterfish are sexually mature at age one, but all are sexually mature by age two (Grosslein and Azarovitz 1982). Butterfish spawning takes place chiefly during summer (June- August) in inshore waters generally less than 100' deep and over 60 ^{o}F. The times and duration of spawning are closely associated with changes in surface water temperature (Grosslein and Azarovitz 1982). Butterfish eggs are found throughout the New York Bight and on Georges Bank, and they occur in the Gulf of Maine, but larvae appear to be relatively scarce east and north of Nantucket Shoals.

Butterfish exhibit a planktivorous diet, feeding mainly on zooplankton, ctenophores, chaetognaths, euphausiids and other organisms (Fritz 1965, Leim and Scott 1966, Haedrich 1967, Horn 1970a, Schreiber 1973, Mauer and Bowman 1975, Tibbets 1977, Bowman and Michaels 1984). Butterfish are an important prey species known to be preyed on by a variety of bony fish, sharks, longfin squid, marine mammals, and seabirds (Bigelow and Schroeder 1953, Scott and Tibbo 1968, Horn 1970a, Maurer and Bowman 1975, Tibbets 1977, Stillwell and Kohler 1985, Brodziak 1995a, SAW 38).

Stock Status

The butterfish stock was most recently assessed at SARC 49 (2010) using data through 2008. The SARC review panel did not accept the adequacy of the redefined BRPs or the BRPs used for stock status determination in the 2004 butterfish assessment. The review panel questioned the application of MSY theory to a short-lived recruitment-dominated population, particularly the use of equilibrium methods when trends in the data suggest the stock is declining even with low fishing mortality. It was agreed that overfishing was not likely occurring. The review panel concluded that the decline in the butterfish stock appears to be driven by environmental processes and low recruitment. Determination of an overfished versus not overfished condition was not resolved at the meeting, which left the overfished status of butterfish unknown. Final model outputs for biomass, recruitment, and fishing mortality are shown below in Figure 7, though again the SARC concluded that the final model results were only accepted in terms of reflecting the appropriate trend. Fall trawl survey indices are provided below – the last assessment concluded that the fall survey likely provides better coverage of butterfish distribution than the spring survey. It is important to note that the 2009 and 2010 values are adjusted from the raw data of the new Bigelow survey ship based on the calibration study between the Bigelow and its predecessor the Albatross. The calibration factor for this species is one factor for all sizes, and the next assessment will likely investigate whether size-specific calibration factors are more appropriate.

While NMFS' official "status of stocks" document technically lists butterfish as "overfished" and "not experiencing overfishing" the results of the 2010 assessment suggest their true status is unknown with respect to being overfished or not and unknown with respect to experiencing overfishing or not because of butterfish's short lifespan and because of the concerns raised by the review panel regarding the 2004 assessment's conclusions. Efforts are ongoing to determine if a switch to "unknown status" would be more appropriate.

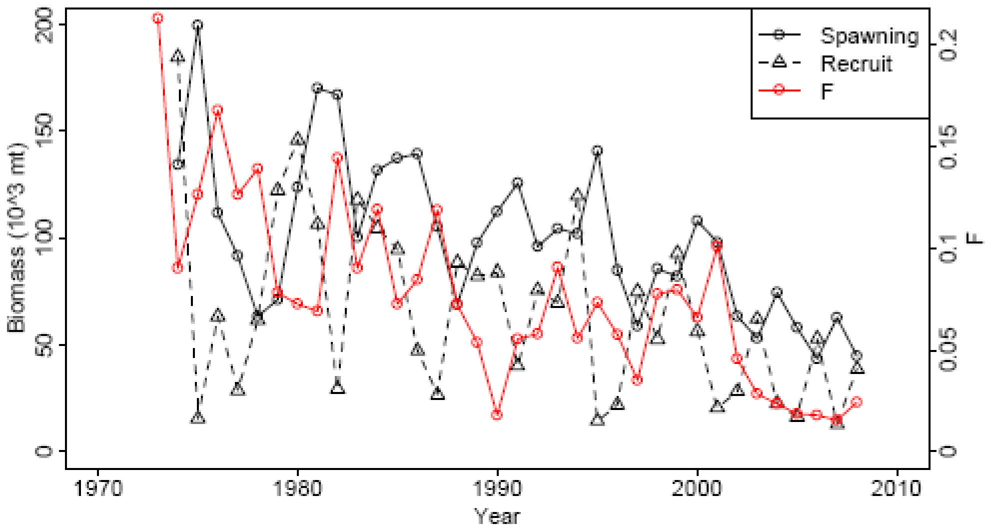

Figure 7. Butterfish Recruitment and Biomass Through 2008. (SARC 2010).

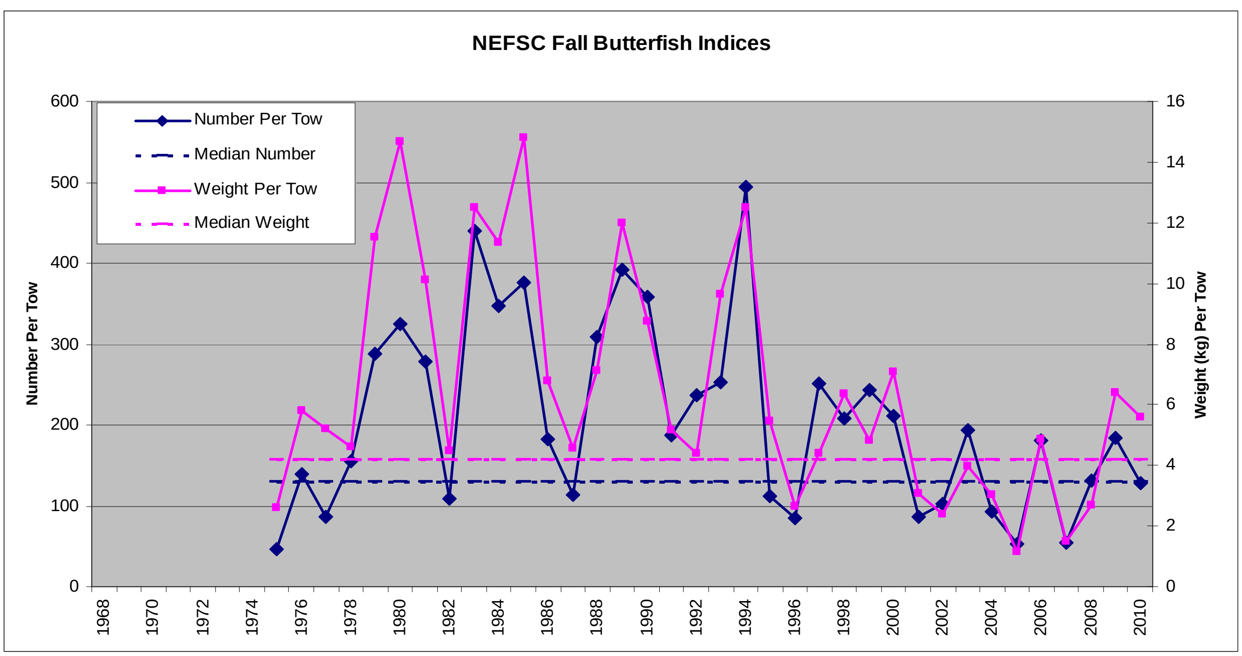

Figure 8. NEFSC Fall Butterfish Indices.

6.2.4 Longfin Squid

Longfin squid are distributed primarily in continental shelf waters located between Newfoundland and the Gulf of Venezuela (Cohen 1976; Dawe et al. 1990). In the northwest Atlantic Ocean, longfin squid are most abundant in the waters between Georges Bank and Cape Hatteras, NC where the species is commercially exploited. The stock area extends from the Gulf of Maine to southern Florida. However, the southern limit of the species' distribution in US waters is unknown due to an overlap in geographic distribution with the congener, *Loligo* pleii, which cannot be visually distinguished from longfin squid using gross morphology (Cohen 1976). A recent genetics study indicates that the population inhabiting the waters between Cape Cod Bay, MA and Cape Hatteras, NC is likely a single stock (Shaw et al. 2010). Distribution varies seasonally. North of Cape Hatteras, squid migrate offshore during late autumn to overwinter in warmer waters along the shelf edge and slope, and then return inshore during the spring where they remain until late autumn (Jacobson 2005).

Natural mortality rates are very high, especially after spawning. The species is migrates long distances during its short lifespan; inshore during spring and offshore during late fall. Recruitment occurs throughout the year with seasonal peaks in overlapping "micro-cohorts" which have rapid and different growth rates (Brodziak and Macy 1996; Macy and Brodziak 2001). As a result, seasonally stable biomass estimates may mask substantial population turnover (Guerra et al. 2010). Recruitment of longfin squid is largely driven by environmental factors (Dawe et al. 2007). For most squid species, temperature plays a large role in migrations and distribution, growth, and spawning (Boyle and Rodhouse 2005). For longfin squid, individuals hatched in warmer waters during the summer grow more rapidly than those hatched in winter and males grow faster and attain larger sizes than females (Brodziak and Macy 1996).

Statolith ageing studies of longfin squid have indicated a life span of less than one year (Macy 1992, Brodziak and Macy 1996). Consequently, all recent stock assessments for longfin squid have been conducted under the assumption that the species has a semelparous (i.e., annual) life-cycle and has the capacity to spawn throughout the year (NMFS 1994), as now appears typical of pelagic squid species studied throughout the world (Jereb *et a*l. 1991).

Longfin squid eggs are usually attached to a preexisting cluster of newly spawned eggs (clusters are initiated on rocks, sand, and seaweeds). The female lays between 20 and 30 of these capsules, each containing 150 to 200 large (about 0.05"), oval eggs, for a total of 3,000 to 6,000 eggs. These clusters of demersal eggs, with as many as 175 capsules per cluster, are found in shallow waters (10-100') and may often be found washed ashore on beaches (Jacobson 2005, Grosslein and Azarovitz 1982).

The diet of longfin squid changes with increasing size; small immature individuals feed on small invertebrates and planktonic organisms (Vovk 1972a, Tibbetts 1977) while larger individuals feed on crustaceans and small fish (Vinogradov and Noskov 1979). Cannibalism is observed in individuals larger than 2 in (5 cm) (Whitacker 1978). Maurer and Bowman (1985) demonstrated seasonal and inshore/offshore differences in diet: in the spring in offshore waters, the diet was composed of crustaceans (mainly euphausiids) and fish; in the fall in inshore waters, the diet was composed almost exclusively of fish; and in the fall in offshore waters, the diet was composed of fish and squid.

Longfin squid are an important prey species and are known to be preyed upon by many pelagic and demersal fish species, as well as by marine mammals, seabirds, and *Illex* squid (Lange and Sissenwine 1980, Vovk and Khvichiya 1980, Summers 1983, Waring *et al.* 1990, Overholtz and Waring 1991, Gannon *et al.* 1997, Maurer 1975, Langton and Bowman 1977, Gosner 1978, Lange 1980, Vinogradov 1984).

<u>Stock Status</u>

Based on a new proposed biomass reference point from the 2010 assessment (NEFSC 2011), the longfin inshore squid stock was not overfished in 2009, but overfishing status was not determined because no overfishing threshold was recommended. The 2010 longfin squid assessment (NEFSC 2010) essentially found that the longfin squid stock appears to have successfully supported the range of observed catches (9,600 mt - 26,100 mt) during 1976-2009, as well as relatively high levels of finfish predation during 1977-1984 and 1999-2009. Finfish predation appeared relatively low 1978-1998. Catch divided by biomass was used to evaluate exploitation and the highest exploitation index occurred related to a catch of 23,400mt which was the basis for this year's ABC. This was an important finding for management purposes given all of the squid in a squid as0sessment are dead before the assessment is completed, never-mind when management might actually seek to use the results. In-season assessment and management would be the optimal way to manage any short-lived squid fishery but sufficient resources are not currently available.

A new BMSY target of 50% of K (0.50*(76,329/0.90) = 42,405 mt) was recommended. The biomass (B) threshold is 50% of BMSY (= 21,203 mt). The biomass estimate, which is based on the two-year average of catchability-adjusted spring and fall survey biomass during 2008-2009, was 54,442 mt (80% CI = 38,452-71,783 mt). This is greater than the BTHRESHOLD and the BMSY target. The stock exhibits very large fluctuations in abundance from variation in reproductive success and recruitment, expressed as large inter-annual changes (2-3 fold) in survey biomass.

A new threshold reference point for fishing mortality was not recommended in the 2010 assessment because there was no clear statistical relationship between longfin squid catch and annual biomass estimates during 1975-2009. Furthermore, annual catches were low relative to annual estimates of minimum consumption by a subset of fish predators. The 2009 exploitation index of 0.176 (catch divided by the average 2008-2009 spring and fall survey biomasses) was slightly below the 1987-2008 median of 0.237 (80% CI = 0.124-0.232). Relevant NEFSC trawl indices are provided in figure 10 though figure 15. 2009 and 2010 values have been calibrated "back" to Albatross units to facilitate comparison with a length-specific calibration factor developed in the recent assessment.

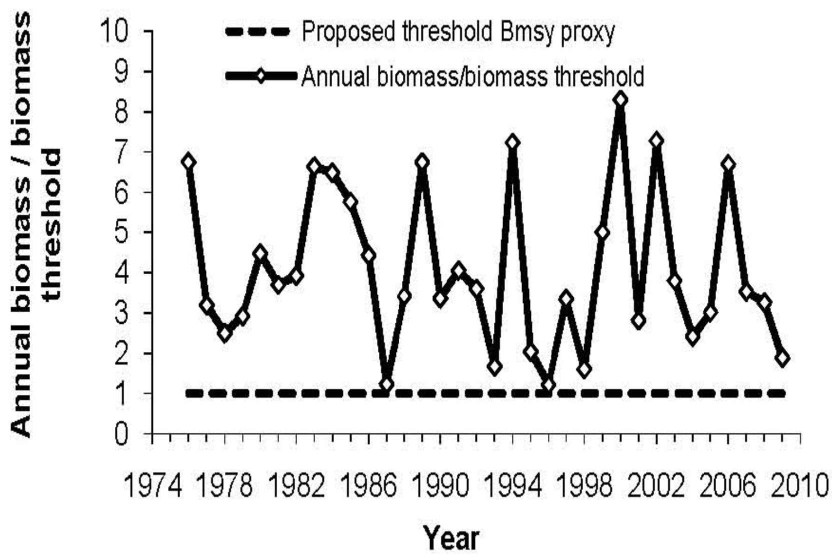

Figure 9. 2010 Assessment Figure B6 - Annual Biomass in Relation to the Proposed Biomass Threshold (which is ½ of the target) - Shown Here as a Relative Value

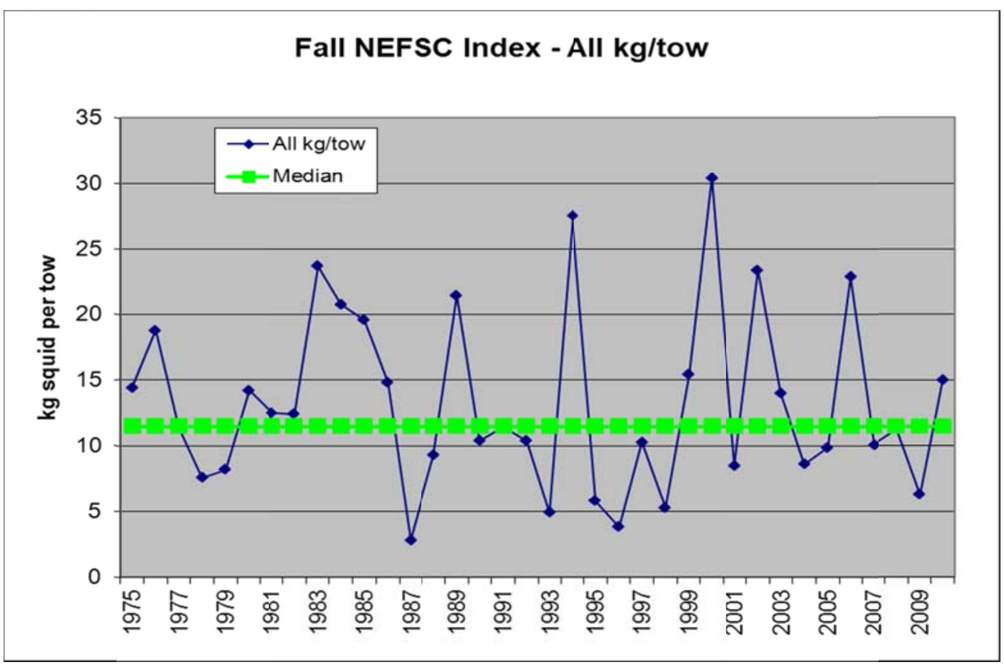

Figure 10. Fall NEFSC Trawl Survey – Longfin Squid Mean kg/tow All Sizes.

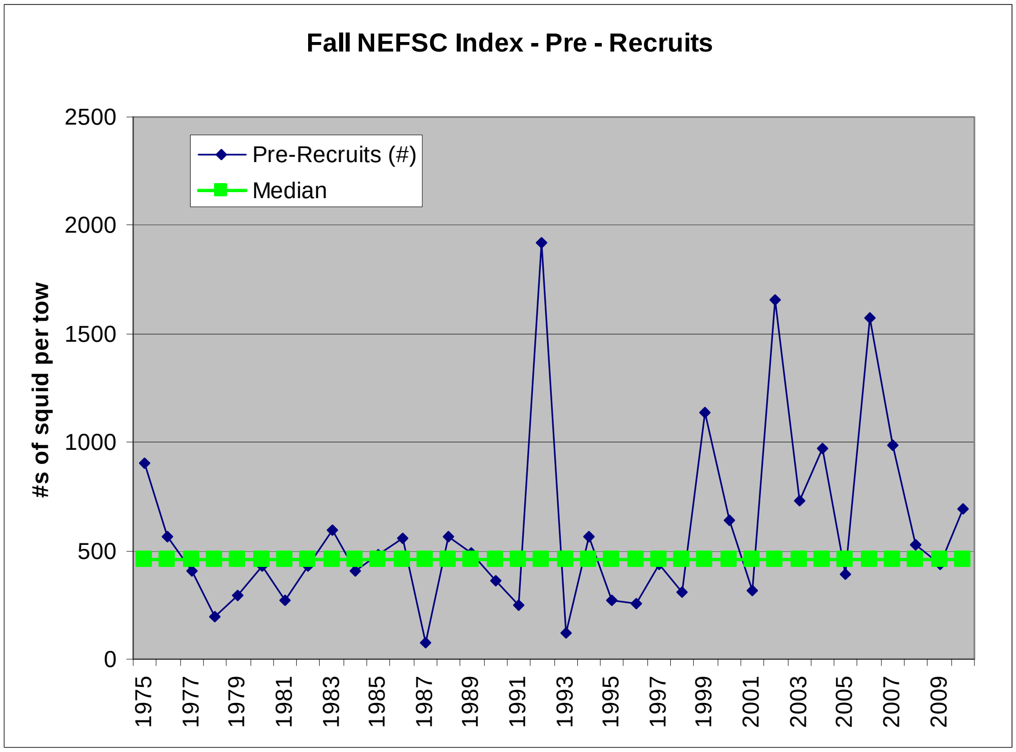

Figure 11. Fall NEFSC Trawl Survey – Longfin Squid Mean #/tow Pre-recruits.

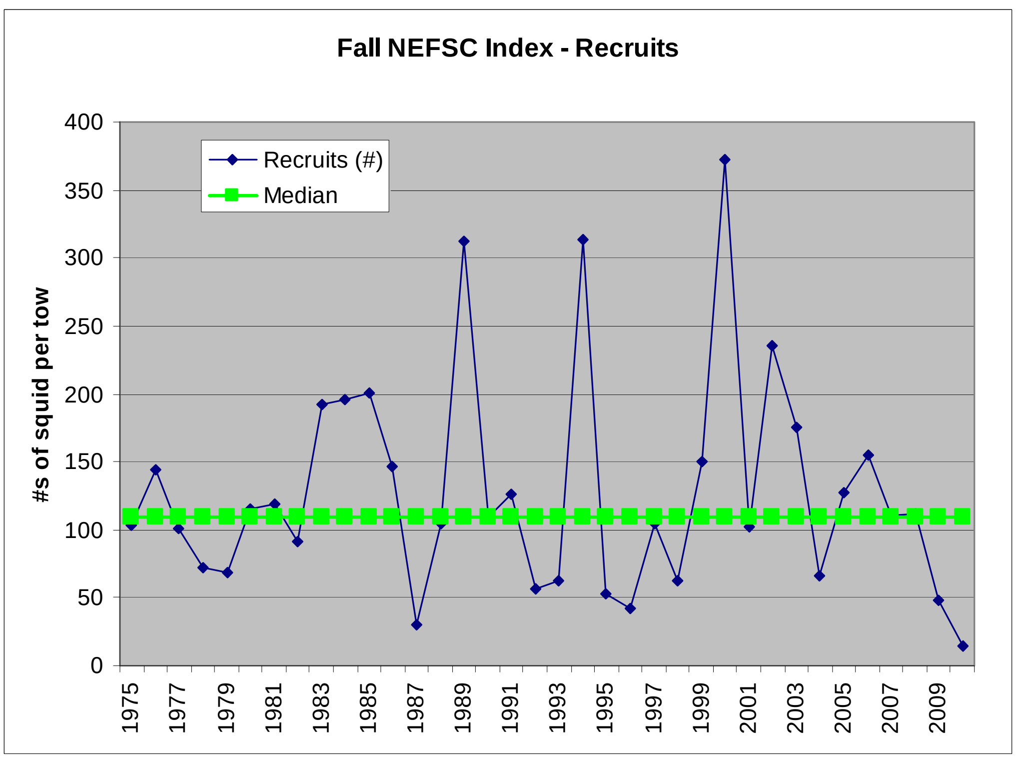

Figure 12. Fall NEFSC Trawl Survey – Longfin Squid Mean #/tow Recruits.

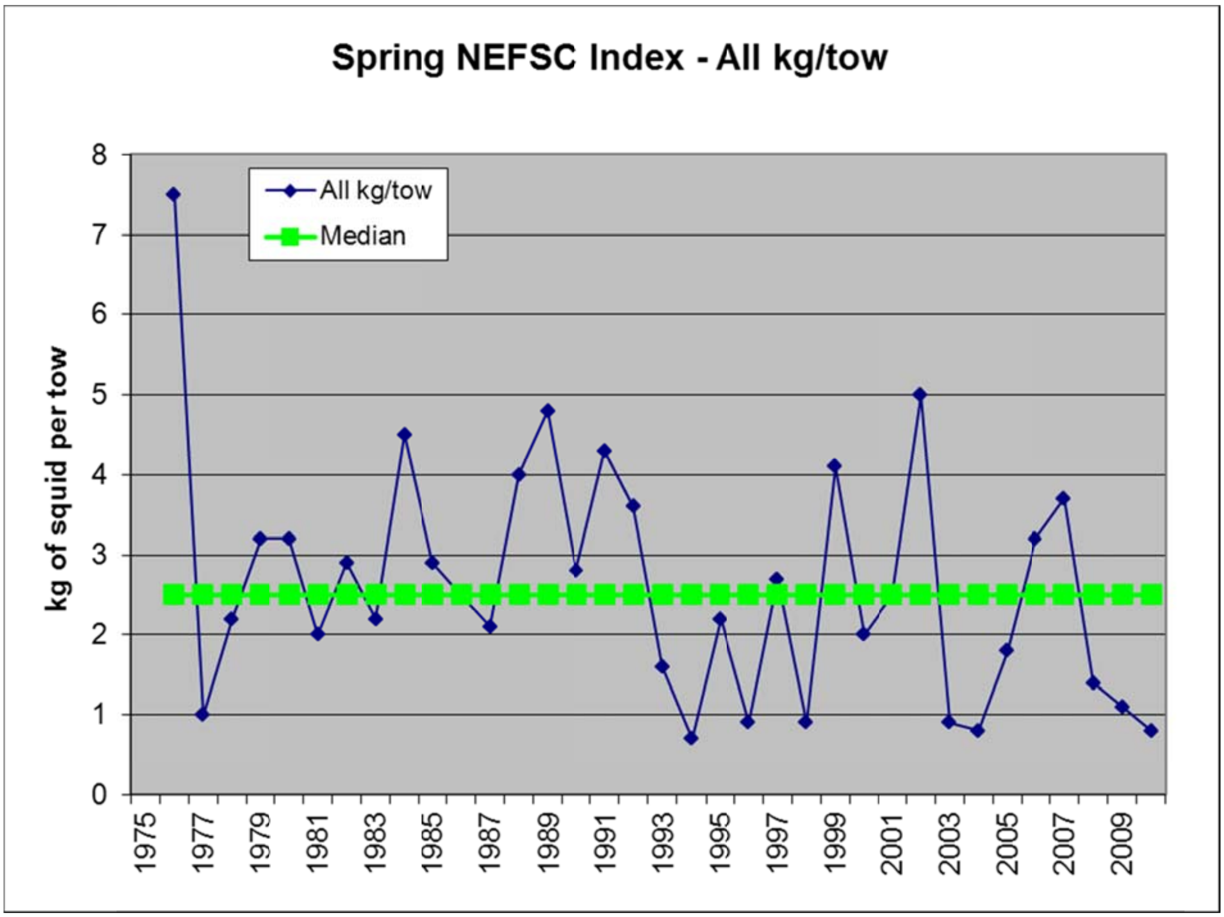

Figure 13. Spring NEFSC Trawl Survey – Longfin Squid Mean kg/tow All Sizes.

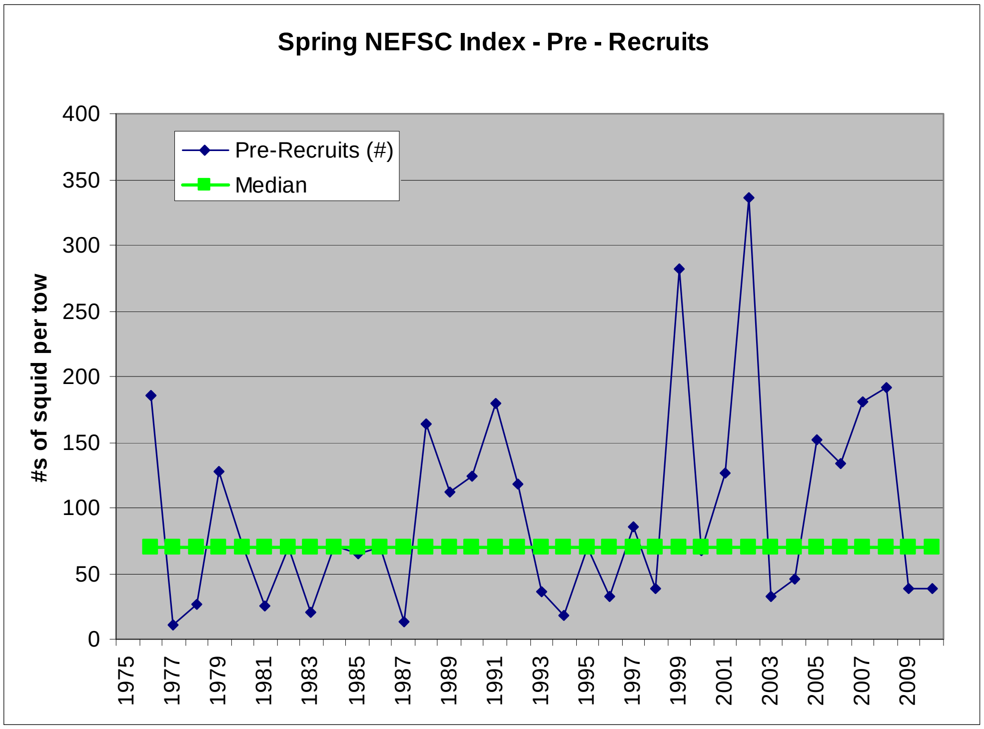

Figure 14. Spring NEFSC Trawl Survey – Longfin Squid Mean #/tow Pre-recruits.

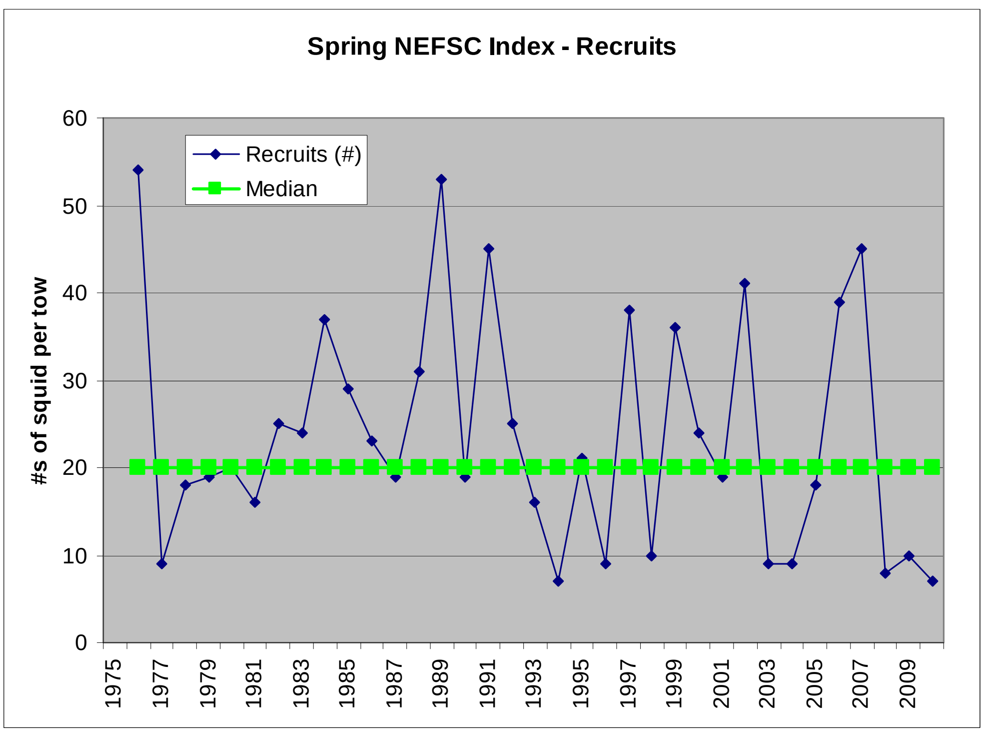

Figure 15. Spring NEFSC Trawl Survey – Longfin Squid mean #/tow Recruits.

6.3 Habitat (Including Physical Environment and Essential Fish Habitat (EFH))

Pursuant to the Magnuson Stevens Act / EFH Provisions (50 CFR Part 600.815 (a)(1)), an FMP must describe EFH by life history stage for each of the managed species in the plan. This information was previously described in Amendment 8 to the MSB FMP and is being 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/. This series of documents, as well as additional reports and publications, are used to provide the best available information on life history characteristics, habitat requirements, as well as ecological relationships. Matrices of habitat parameters (i.e. temperature, salinity, light, etc.) for eggs/larvae and juveniles/adults were developed in the mackerel, longfin squid and *Illex* squid and butterfish EFH background documents described above. Amendment 8 to the MSB FMP identified and described essential fish habitat for mackerel, longfin squid (except for eggs), *Illex*, and butterfish, summarized below. Amendment 9 to the MSB FMP identified and described essential fish habitat for longfin squid eggs. There are maps that show areas within which the text descriptions apply, and the maps for all four species are available in Amendment 8, except for longfin squid egg EFH, which is in Amendment 9. Amendment 11 (estimated implementation in late 2011) will update all of the EFH designations for MSB species. While not final, the new proposed EFH designations may be found here (search for Amendment 11 in the July 2011 actions): http://www.nero.noaa.gov/nero/regs/com.html. The current EFH textual descriptions are not repeated in this document as they are the exact same as were described in the 2011 specifications environmental assessment and can be accessed at http://www.nero.noaa.gov/nero/regs/com.html (February 2011 MSB EA/RIR/IRFA).

6.4 Endangered and 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). Eleven 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 provided in this document section. The Council has determined that the following list of species protected either by the Endangered Species Act of 1973 (ESA), the Marine Mammal Protection Act of 1972 (MMPA), or the Migratory Bird Treaty Act of 1918 may be found in the environment utilized by Atlantic mackerel, squid and butterfish fisheries:

This list also includes two candidate fish species and one proposed fish species (species being considered for listing as an endangered or threatened species), as identified under the ESA.

Candidate species are those petitioned species that are actively being considered for listing as endangered or threatened under the ESA, as well as those species for which NMFS has initiated an ESA status review that it has announced in the *Federal Register*. Atlantic sturgeon and cusk are known to occur within the action area of the MSB fisheries and have documented interactions with types of gear used in MSB fisheries.

Candidate species receive no substantive or procedural protection under the ESA; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed project. 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 both candidate species. The results of those efforts are needed to accurately characterize recent interactions between fisheries and the candidate species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information from these reviews. Please note that the conference provisions apply only if a candidate species is proposed for listing (and thus, becomes a proposed species) (see 50 CFR 402.10)."

* = Known to have interacted with MSB fisheries

Cetaceans

Species	Status
Northern 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*)	Threatened

Fish

Species	Status
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Smalltooth sawfish (*Pristis pectinata*)	Endangered
Cusk (*Brosme brosme*)	Candidate
*Atlantic sturgeon (*Acipenser oxyrinchus*)	Proposed

Birds

Species	Status
*Northern Gannet (*Morus bassanus*)	Protected

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*)	Threatened

Under section 118 of the MMPA, the 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, NEFOP 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 (2011) 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 (AA) 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 Description of species of concern which are protected under MMPA

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. This following species of cetaceans are known to interact with the Atlantic Mackerel Squid and Butterfish fisheries:

Common dolphin (PBR = 1000, all fisheries annual take 2004-2008 = 167)

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 (Hain et al. 1981; CETAP 1982; Payne et al. 1984). See Waring *et al*. 2010 (http://www.nefsc.noaa.gov/publications/tm/tm219/) for more life history information.

The following information was taken from the most recent Stock Assessment Report for the species (Waring *et al*. 2010) Total numbers of common dolphins off the USA or Canadian Atlantic coast are unknown, although several estimates from selected regions of the habitat do exist for selected time periods. However, the most recent SAR considers the best abundance estimate for common dolphins to be 120,743 animals (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. This joint estimate is considered best because together these two surveys have the most complete coverage of the species' habitat. The minimum population size is 99,975. The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because the CV of the average mortality estimate is less than 0.3 (Wade and Angliss 1997). PBR for the western North Atlantic common dolphin is 1000.

Fishery Interactions - The following information was taken from the latest stock assessment for common dolphin contained in Waring *et al.* (2010) which summarizes incidental mortality of this species through 2007. Annual averages are presented below – details on encounters may be reviewed in Waring *et al* (2010).

Illex Squid - No incidental takes of common dolphins have been observed in the *Illex* fishery.

Longfin squid - Historically, in the Southern New England/Mid-Atlantic fishery all incidental takes attributed to this fishery were observed during the first quarter of the year (Jan-Mar), exclusively in the offshore fishery. The estimated fishery-related mortality of common dolphins attributable to the fall/winter offshore fishery was 0 for 1997 and 1998 and 49 in 1999 (CV=0.97). Presently, since 1999, this fishery is included in both the Northeast and Mid-Atlantic bottom trawl fisheries. For the Mid-Atlantic bottom trawl fishery the mean estimated annual mortality of common dolphin was 121 (CV=0.13) during the five year period 2004-2008.

The portion of estimated common dolphin mortality attributable to the directed longfin squid fishery is unknown. For the Northeast bottom trawl fishery the mean estimated annual mortality of common dolphin was 25 (CV=0.13) during the five year period 2004-2008. The portion attributable to the directed longfin squid fishery is unknown.

Atlantic Mackerel - Historically, the estimated fishery-related mortality attributed to this fishery was 161 (CV=0.49) animals in 1997 and 0 in 1998 and 1999. After 1999, this fishery included as a component of the Mid-Atlantic bottom trawl and mid-water trawl fisheries. As noted above, the mean estimated annual mortality of common dolphin during the five year period 2004-2008 in the Mid-Atlantic bottom trawl fishery was 121 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 2004-2008. The portion of the estimated common dolphin mortality in the Mid-Atlantic bottom and mid-water trawl fisheries attributable to the directed Atlantic mackerel fishery is unknown.

A U.S. joint venture (JV) fishery was conducted in the Mid-Atlantic region from February-May 1998. NMFS maintained 100% observer coverage on the foreign JV vessels where 152 transfers from the U.S. vessels were observed. Seventeen incidental takes of common dolphin were observed in the 1998 JV mackerel fishery.

Atlantic white-sided dolphin (*Lagenorhynchus acutus*) (PBR = 509, all fisheries annual take 2004-2008 = 266)

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 species inhabits waters from central West Greenland to North Carolina (about 35° N) and perhaps as far east as 43° W (Evans 1987). Distribution of sightings, strandings and incidental takes suggest the possible existence of three stocks units: Gulf of Maine, Gulf of St. Lawrence and Labrador Sea stocks (Palka et al. 1997). Virginia and North Carolina observations appear to represent the southern extent of the species range. See Waring *et al*. 2010 (http://www.nefsc.noaa.gov/publications/tm/tm219/) for more life history information.

The total number of white-sided dolphins (*Lagenorhynchus acutus)* along the eastern USA and Canadian Atlantic coast is unknown, although the best available current abundance estimate for white-sided dolphins (*Lagenorhynchus acutus)* for the Gulf of Maine stock is 63,368 (CV=0.27) as estimated from 2002 – 2006 aerial and shipboard line-transect surveys. This is considered the best estimate of abundance because this survey is recent and provided the most complete coverage of the known habitat. The minimum population size is 50,883. The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because the CV of the average annual mortality estimate is less than 0.3. PBR for the western North Atlantic stock of white-sided dolphin (*Lagenorhynchus acutus)* is 509.

Fishery Interactions

The following information was taken from the latest stock assessment for white-sided dolphin (*Lagenorhynchus acutus)*contained in Waring *et al* (2010) which summarized incidental mortality of this species through 2008. Annual averages are presented below – details on encounters may be reviewed in Waring *et al* (2010).

Illex squid - Historically, no white-sided dolphin (*Lagenorhynchus acutus)* takes have been observed taken incidental to *Illex* squid fishing operations.

Longfin squid - According to Waring *et al*. (2010), no white-sided dolphin (*Lagenorhynchus acutus)* takes have been observed taken incidental to longfin squid fishing operations since 1996.

Atlantic mackerel - NMFS NEFOP observers in the Atlantic foreign mackerel fishery reported 44 takes of Atlantic white-sided dolphins (*Lagenorhynchus acutus)* incidental to fishing activities in the continental shelf and continental slope waters between March 1977 and December 1991. This total includes 9 documented takes by U.S. vessels involved in joint-venture fishing operations in which U.S. captains transfer their catches to foreign processing vessels. No incidental takes of white-sided dolphin (*Lagenorhynchus acutus)* were observed in the Atlantic mackerel JV fishery when it was observed in 1998.

Northeast Mid-water Trawl Fishery (Including Pair Trawl)

The two most commonly targeted fish in this fishery are herring (94% of vessel trip report (VTR) records) and mackerel (0.4%). The average annual estimated fishery-related mortality to white-sided dolphins (*Lagenorhynchus acutus)* during 2004-2008 was 2 (CV = 1.03).

Mid-Atlantic Mid-water Trawl Fishery (Including Pair Trawl)

The observer coverage in this fishery was highest after 2003, although a few trips in other years were observed. The average annual estimated fishery-related mortality to white-sided dolphins (*Lagenorhynchus acutus)* during 2004-2008 was 27 (CV = .50).

Mid-Atlantic Bottom Trawl Fishery

The average annual estimated fishery-related mortality to white-sided dolphins (*Lagenorhynchus acutus)* during 2004-2008 was 25 (0.10).

Long-finned (*Globicephala melas*) and short-finned (*Globicephala macrorhynchus*) pilot whales (PBR = 265, all fisheries annual take 2004-2008 = 166)

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; therefore, the descriptive material below refers to *Globicephala* sp., and is identified as such. The species boundary is considered to be in the New Jersey to Cape Hatteras area. Sightings north of this are likely *G. melas*.

Pilot whales (*Globicephala* sp.) are distributed principally along the continental shelf edge in the winter and early spring off the northeast USA coast, (CETAP 1982; Payne and Heinemann 1993). In late spring, pilot whales move onto Georges Bank and into the Gulf of Maine and more northern waters, and remain in these areas through late autumn (CETAP 1982; Payne and Heinemann 1993). In general, pilot whales occupy areas of high relief or submerged banks. They are also associated with the Gulf Stream north wall and thermal fronts along the continental shelf edge (Waring *et al.* 1992; Waring *et al.* 2002). Pilot whales have a propensity to mass strand throughout their range, but the role of human activity in these events is unknown. See Waring *et al*. 2010 (http://www.nefsc.noaa.gov/publications/tm/tm219/) for more life history information.

The total number of pilot whales off the eastern USA and Canadian Atlantic coast is unknown, although the minimum population size for *Globicephala sp*. is 26,523. The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because the CV of the average mortality estimate is less than 0.3 (Wade and Angliss 1997) and because this stock is of unknown status. PBR for the western North Atlantic *Globicephala sp*. is 265 (93 for long-finned and 172 for short-finned).

Fishery Interactions

The following information was taken from the latest stock assessment for pilot whales (*Globicephala* sp.) contained in Waring *et al.* (2010) which summarizes incidental mortality of these species through 2008. Mortality estimates within the Atlantic mackerel, squid and butterfish complex were made by sub-fishery prior to 2000. After that, each sub-fishery was re-categorized into bottom otter trawl or mid-water fishery categories. Annual averages are presented below – details on encounters may be reviewed in Waring *et al* (2010).

Illex Squid - The estimated fishery-related mortality of pilot whales (*Globicephala* sp.) attributable to this fishery was: 45 in 1996 (CV=1.27), 0 in 1997, 85 in 1998 (CV=0.65), and 0 in 1999. After 1999, this fishery has been included in the Mid-Atlantic bottom trawl fishery (see below).

Longfin squid - Only one pilot whale (*Globicephala* sp.) incidental take has been observed in longfin squid fishing operations 1996-1999. The one take was observed in 1999 in the offshore fishery. No pilot whale (*Globicephala* sp.) takes have been observed in the inshore fishery. The estimated fishery-related mortality of pilot whales (*Globicephala* sp.) attributable to the fall/winter offshore fishery was 0 between 1996 and 1998 and 49 in 1999 (CV=0.97). Since 1999, this fishery has been categorized in the Mid-Atlantic bottom trawl fishery (see below).

Atlantic Mackerel - No incidental takes of pilot whales (*Globicephala* sp.) have been observed in the mackerel fishery. The former distant water fleet fishery has been non-existent since 1977. There is also a mackerel trawl fishery in the Gulf of Maine that generally occurs during the summer and fall months (May-December). There have been no observed incidental takes of pilot whales (*Globicephala* sp.) reported for the Gulf of Maine fishery.

Mid-Atlantic Bottom Trawl

The average annual estimated fishery-related mortality of pilot whales (*Globicephala* sp.) during 2004-2008 was 34 (0.13).

Northeast Bottom Trawl

The average annual estimated fishery-related mortality of pilot whales (*Globicephala* sp.) during 2004-2008 was 15 animals (CV=0.13).

Mid-Atlantic Mid-Water Trawl – Including Pair Trawl

The average annual estimated fishery-related mortality of pilot (*Globicephala* sp.) whales during 2004-2008 was 2.4 (0.99).

Northeast Mid-Water Trawl – Including Pair Trawl

The average annual estimated fishery-related mortality of pilot whales (*Globicephala* sp.) during 2004-2008 was 4.3 (CV=0.51).

Risso's dolphin (*Grampus griseus*) (PBR = 124, all fisheries annual take 2004-2008 = 21)

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 Gulf of Mexico and Atlantic stocks are currently being treated as two separate stocks though in 2006 a rehabilitated adult male Risso’s dolphin stranded and released in the Gulf of Mexico off Florida was tracked via satellite to waters off Delaware. The minimum population estimate for the western North Atlantic Risso's dolphin is 12,920. See Waring *et al*. 2010 (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 2010 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 (Duffield et al. 1983; Duffield 1986) described as the coastal and offshore forms. Both inhabit waters in the western North Atlantic Ocean (Hersh and Duffield 1990; Mead and Potter 1995; Curry and Smith 1997) along the U.S. Atlantic coast. The two morphotypes are genetically distinct based upon both mitochondrial and nuclear markers (Hoelzel et al. 1998). The offshore form is distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic Ocean; however the offshore morphotype has been documented to occur relatively close to shore over the continental shelf south of Cape Hatteras, NC.

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. Detailed fishery information is reported in Appendix III.

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, the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (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.

Section 118 of the MMPA establishes a method for managing incidental interactions between marine mammals and commercial fisheries. Under section 118, Take Reduction Plans (TRPs) are developed to identify actions necessary to conserve and protect strategic marine mammal stocks1 that interact with Category I and II fisheries.[2] The immediate goal of a TRP 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 fishery management plans.

Take Reduction Teams (TRTs) consisting of representatives from the fishing industry, fishery management councils, state and federal resource management agencies, the scientific community and conservation organizations develops the TRP while NMFS is responsible for its implementation. After a TRP is finalized, the TRT and NMFS meet periodically to monitor implementation of the plan and update as necessary. Take reduction plans must recommend regulatory or voluntary measures for the reduction of incidental mortality and serious injury; and

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1 The MMPA defines the term "strategic stock" to mean a marine mammal stock (A) for which the level of direct human-caused mortality exceeds the potential biological removal level; (B) …..is declining and is likely to be listed as a threatened species under the Endangered Species Act (ESA) of 1973 within the foreseeable future; or (C) ….is listed as a threatened or endangered species under the ESA or is designated as a depleted stock under this Act. The term "potential biological removal level" means the maximum number of animals, not including natural mortalities that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

[2] NMFS must publish, at least annually, a List of Fisheries (LOF) that classifies U.S. commercial fisheries into one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals in each fishery.

- Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing;
- Category II designates fisheries with occasional serious injuries and mortalities;
- Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

recommend dates for achieving the specific objectives of the plan.

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.
At its first meeting the ATGTRT raised several issues critical to the take reduction planning process and the development of an ATGTRP. The ATGTRT requested clarification of the requirements under the MMPA for development of a take reduction plan for marine mammal stocks that are non-strategic and that do not interact with Category I fisheries. Specifically, the ATGTRT wanted to know if the 11 month timeline specified in the MMPA for the development of a TRP and the 5 year timeline for reaching ZMRG apply under the specific circumstances of the ATGTRT. The ATGTRT also requested that NMFS conduct a Tier Analysis for the 2007 annual List of Fisheries to verify whether the Squid, Mackerel Butterfish Fishery (Mid-Atlantic Midwater Trawl Fishery) should remain as a Category I fishery or be reclassified as a Category II fishery.

NOAA GC provided detailed legal guidance regarding the TRP timeline and requirements for development of a TRP for marine mammal stocks that are non-strategic in response to questions raised by the ATGTRT. In short, NOAA's GC legal guidance stated that neither the 11 month timeline for the development of a TRP nor the 5 year goal for reaching ZMRG apply to non-strategic stocks that do not interact with Category I fisheries.

The ATGTRT agreed that while a ATGTRP may not be required at this time[3], 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 ZMRG. This information is captured in the Atlantic Trawl Gear Take Reduction Strategy (ATGTRS).[4]

In addition, the ATGTRT recommended that certain voluntary measures be implemented immediately for the Atlantic trawl fisheries in defined areas. NMFS funded outreach placards highlighting these voluntary measures. The placards were designed in collaboration with Garden State Seafood Association, who is also a member of the ATGTRT.

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

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3 At the April 2007 meeting, the ATGTRT tabled the discussion of the NOAA GC's legal guidance without reaching consensus, with some members questioning the conclusions reached by NOAA GC. The ATGTRT agreed to focus on areas of consensus; specifically the need to identify and implement research and education and outreach initiatives to reduce serious injury and mortality of marine mammals in Atlantic trawl fisheries and ultimately to achieve the MMPA goal of reducing marine takes to Zero Mortality Rate Goal (ZMRG).
4 The Atlantic Trawl Gear Take Reduction Strategy (ATGTRS) identifies informational and research tasks as well as education and outreach needs the ATGTRT believes are necessary to provide the basis for achieving the ultimate MMPA goal of achieving ZMRG. The ATGTRS has identified several potential voluntary measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals. The tasks identified by this ATGTRS are necessary to make reasoned management decisions that could provide the basis for any future take reduction plan should it be determined that a TRP is needed.

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 ZMRG. 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 estimated loggerhead bycatch in the MSB trawl fishery between 2000-2004 (Murray 2008) was 62 animals annually. 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.

The loggerhead sea turtle is listed as threatened throughout its worldwide range. On July 12, 2007, NMFS and USFWS (Services) received a petition from Center for Biological Diversity and Turtle Island Restoration Network to list the ‘‘North Pacific populations of loggerhead sea turtle’’ as an endangered species under the ESA. In addition, on November 15, 2007, the

Services received a petition from Center for Biological Diversity and Oceana to list the ‘‘Western North Atlantic populations of loggerhead sea turtle’’ as an endangered species under the ESA. NMFS published notices in the *Federal Register*, concluding that the petitions presented substantial scientific information indicating that the petitioned actions may be warranted (72 FR 64585, November 16, 2007; 73 FR 11849; March 5, 2008). In 2008, a Biological Review Team (BRT) was established to assess the global population structure to determine whether DPSs exist and, if so, the status of each DPS. The BRT identified nine loggerhead DPSs, distributed globally (Conant et al. 2009). On March 16, 2010, the Services announced 12-month findings on the 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 Birds

Northern Gannet (*Morus bassanus*)

The Northern gannet is a migratory seabird federally protected in the U.S. and Canada. Gannets spend the boreal summer along coastal Canada and the winter along the U.S. East Coast continental shelf waters. North American breeding colonies exist at 6 main sites in the Gulf of St. Lawrence and along the Atlantic coast of Newfoundland. During the nesting season, March – November, birds forage throughout the North Atlantic from the Bay of Fundy, off the coasts of Newfoundland, Labrador and Greenland and throughout the Gulf of St. Lawrence. Dispersal from breeding sites begins in September, where gannets migrate south along the Northeast Atlantic coast and are considered common winter residents off most Northeast coastal states. Primary prey of the Northern gannet include herring, mackerel and squids. North American breeding population has been increasing since the early 1970’s and in 2000 the population was estimated at 144,596 individuals. Northern gannets were not listed as a species of conservation concern by the USFWS in 2008.

Northern gannet Fishery Interactions:

Illex squid: No interactions observed for 2004 – 2008.

Longfin squid: For 2004 to 2008, one Northern Gannet take was observed in March of 2004.

Atlantic mackerel: For 2004 to 2008 a total of 62 Northern Gannets have been observed (2004, n = 17; 2005, n = 1; 2006, n = 2; 2007, n = 30; 2008, n = 12).

Butterfish: Given recent restrictions on butterfish landings it is difficult to even define a directed butterfish fishery – landings are generally incidental to other fishing.

6.4.5 Description of Species Proposed for Listing Under the ESA

At this time, Atlantic sturgeon has been proposed for listing under the ESA. A status review for Atlantic sturgeon was completed in 2007. NMFS has concluded that the U.S. Atlantic sturgeon spawning populations comprise five Distinct Population Segments (DPSs) (ASSRT, 2007). The Gulf of Maine DPS of Atlantic sturgeon is proposed to be listed as threatened, and the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs of Atlantic sturgeon are proposed as endangered. On October 6, 2010, NMFS proposed listing five populations of Atlantic sturgeon along the U.S. East Coast as either threatened or endangered species (75 FR 61872 and 75 FR 61904). A final listing determination is expected shortly after October 6, 2011.

Comprehensive information on current abundance of Atlantic sturgeon is lacking for all of the spawning rivers (ASSRT, 2007). Based on data through 1998, an estimate of 870 spawning adults per year was developed for the Hudson River (Kahnle et al., 2007), and an estimate of 343 spawning adults per year is available for the Altamaha River, GA, based on data collected in 2004-2005 (Schueller and Peterson, 2006). Data collected from the Hudson River and Altamaha River studies cannot be used to estimate the total number of adults in either subpopulation, since mature Atlantic sturgeon may not spawn every year, and it is unclear to what extent mature fish in a non-spawning condition occur on the spawning grounds. Nevertheless, since the Hudson and Altamaha Rivers are presumed to have the healthiest Atlantic sturgeon subpopulations within the United States, other U.S. subpopulations are predicted to have fewer spawning adults than either the Hudson or the Altamaha (ASSRT, 2007). It is also important to note that the estimates above represent only a fraction of the total population size as spawning adults comprise only a portion of the total population (e.g., this estimate does not include subadults and early life stages).

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 proposed action to modify the MSB fisheries is expected to be completed before the anticipated date of a final listing determination for Atlantic sturgeon. However, the conference provisions of the ESA apply to actions proposed to be taken by Federal agencies once a species is proposed for listing (50 CFR 402.10). Therefore, this EA includes information on the anticipated effects of the action on Atlantic sturgeon.

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 (Holland and Yelverton 1973, Dovel and Berggen 1983, Waldman et al. 1996, Kynard and Horgan 2002, Dadswell 2006, ASSRT 2007).

Tracking and tagging studies have shown that subadult and adult Atlantic sturgeon that originate from different rivers mix within the marine environment, utilizing ocean and estuarine waters for life functions such as foraging and overwintering (Stein et al. 2004a, Dadswell 2006, ASSRT 2007, Laney et al. 2007, Dunton et al. 2010). Fishery-dependent data as well as fishery-independent data demonstrate that Atlantic sturgeon use relatively shallow inshore areas of the continental shelf; primarily waters less than 50 m (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010). The data also suggest regional differences in Atlantic sturgeon depth distribution with sturgeon observed in waters primarily less than 20 m in the Mid-Atlantic Bight and in deeper waters in the Gulf of Maine (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010). As noted above, information on population sizes for each Atlantic sturgeon DPS is very limited. Based on the best available information, NMFS has concluded that bycatch, vessel strikes, water quality and water availability, dams, lack of regulatory mechanisms for protecting the fish, and dredging are the most significant threats to Atlantic sturgeon.

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 were 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). In a review of the Northeast Fishery Observer Program (NEFOP) database for the years 2001-2006, observed bycatch of Atlantic sturgeon was used to calculate bycatch rates that were then applied to commercial fishing effort to estimate overall bycatch of Atlantic sturgeon in commercial fisheries. This review indicated sturgeon bycatch occurred in statistical areas abutting the coast from Massachusetts (statistical area 514) to North Carolina (statistical area 635) (ASMFC TC 2007). Based on the available data, participants in an ASMFC bycatch workshop concluded that sturgeon encounters tended to occur in waters less than 50 m throughout the year, although seasonal patterns exist (ASMFC TC 2007). The ASMFC analysis determined 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), based on a review of the NMFS Observer Database from 1989-2000, found clinal variation in the bycatch rate of sturgeon in sink gillnet gear with lowest rates occurring off of Maine and highest rates off of North Carolina for all months of the year.

Stein et al. (2004a) estimated Atlantic sturgeon bycatch in both the longfin squid and butterfish fisheries for 1989-2000. They 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 was able to use data from the NEFOP database to provide updated estimates for the 2006 to 2010 timeframe. Data were limited by observer coverage to waters outside the coastal boundary (fzone>0) and north of Cape Hatteras, NC. Sturgeon included in the data set were those identified by federal observers as Atlantic sturgeon, as well as those categorized as unknown sturgeon. At this time, data were limited to information collected by the NEFOP. Limited data collected in the At-Sea Monitoring Program were not included, although preliminary views suggest the incidence of sturgeon encounters was low. The frequency of encounters in the observer programs were expanded by total landings recorded in fishing vessel trip reports (VTR) rather than dealer data, since the dealer data does not include information on mesh sizes. Generally, the VTR data represent greater than 90 percent of total landings. Data were combined into division (identified as the first 2 digits in the statistical area codes), quarter, gear type (otter trawl (fish) and sink gillnet) and mesh categories. Mesh sizes were categorized for otter trawl as small (<5.5") or large (greater than or equal to 5.5") and small (<5.5"), large (between 5.5" and 8") and extra-large (>8") in sink gillnets.

For each cell (year, division, quarter, gear, mesh), the ratio of sturgeon count to total kept weight of all species was calculated. This ratio was then applied to total weight in the cell recorded in the VTR data. No imputation was done at this time to estimate sturgeon in missing cells. Totals are presented for encounters as well as encounters where the observer recorded the fish as dead (a subset of total encounters). The two categories represent bounds of possible sturgeon mortalities. The results should not be considered definitive estimates of Atlantic sturgeon losses until further work can be done to account for missing cells. The NEFSC is undertaking additional analyses to account for the missing cells, and this will be available this fall.

MSB species are primarily harvested using small-mesh otter trawl gear. Thus, the analysis in Amendment 11 focuses on the impacts to Atlantic sturgeon associated with small-mesh otter trawl gear. The data for encounter rates by month and statistical area for small-mesh otter trawl is presented in Table 23. The expanded estimates of all sturgeon encounters with small-mesh otter trawl by quarter, division and year are in Table 24. Total estimated dead sturgeons resulting from small-mesh otter trawl encounters are in Table 25. For reference, estimated total annual takes for all gear types (otter trawl and sink gillnet) ranged from 1536 to 3221 (average 2,215); estimated annual mortalities for all gear types ranged from 37 to 376 sturgeon. For small-mesh otter trawls, total annual takes from 2006 to 2010 ranged from 394 to 1546 (average 775).

Table 23. Encounters of Atlantic Sturgeon and Unknown Sturgeon By Month, Area and Mesh Size In Otter Trawl Gear, 2006-2010 Combined.

small mesh otter trawl

	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 24. **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).**

small mesh otter trawl
All sturgeon
Expanded by ratio to VTR landings

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

small mesh otter trawl
Expanded by ratio to VTR landings
dead sturgeon expanded

		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 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 24. However, because the NEFOP 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. Most fishing activity in the MSB fisheries occurs in the 600 series of statistical areas (i.e., waters directly south of Long Island, including waters off New York and New Jersey), which is also the same area where almost all of the 2006-2010 small-mesh otter trawl encounters with Atlantic sturgeon occurred (Table 24). The majority of *Illex*, mackerel, and winter and spring longfin squid landings occur along the continental shelf in waters greater than 100 m. Because these fisheries tend to occur in deeper waters, it is less likely that they would interact with Atlantic sturgeon DPSs. Conversely, the summer and fall longfin squid fishery occurs nearshore in waters less than 40 fathoms (Figures 18-20, Amendment 10 FSEIS). 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 26). However, the contribution of each quarter to total estimated encounters differs from year to year.

As noted above, 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., 870 spawning adults per year for the Hudson River, and 343 spawning adults per year for the Altamaha River). These estimates represent only a fraction of the total population size as Atlantic sturgeon do not appear to spawn every year and additionally, these estimates do not include subadults or early life stages.

Table 26. 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 (Table 25). Put another way, the contribution small-mesh otter trawl gear to total estimated Atlantic sturgeon mortalities is likely very low. 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 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.

Based on the available information, it is not possible at this time to attribute these mortalities to the DPS(s) from which these fish originated. However, given the migratory nature of subadult and adult Atlantic sturgeon, it is expected that these mortalities represent takes from multiple DPSs. This conclusion is supported by preliminary genetic mixed stock analyses undertaken by Dr. Isaac Wirgin from New York University and Dr. Tim King from the U.S. Geological Survey. These additional data support the conclusion from the earlier bycatch estimate that MSB fisheries may interact with Atlantic sturgeon from now until the time that a listing determination is made. However, the number of interactions that will occur between now and the time a final listing determination will be made is not likely to cause an appreciable reduction in survival and recovery.

6.5 Fishery, Port, and Community Description

The Council fully described the ports and communities that are associated with the mackerel, longfin squid and *Illex* squid and butterfish fisheries in Amendment 10's FSEIS, available at http://www.nero.noaa.gov/nero/regs/com.html (data through 2006). An update through 2010 of the importance of the mackerel, squid and butterfish to the ports and communities along the Atlantic Coast of the United States is provided immediately below, in section 6.6 of this EA. For each species, Section 6.6 describes the following: stock status; history of landings, specification performance (since mandatory reporting in 1997); 2010 data for: total landings, revenues, vessels, trips, landings by state, landings by month, landings by gear, landings by port, ports most dependent on each species, numbers of permitted vessels by state, numbers of permitted dealers by state, and landings by NMFS federal permit category; areas fished; market overview if applicable; and recreational landings if applicable. Some port level information has been omitted because of confidentiality issues.

The Council employed a new procedure for gathering information from its Squid-Mackerel-Butterfish Advisory Panel during the 2012 specifications setting process. The Advisory Panel created a "Fishery Performance Report" for each species based on the advisors' personal and professional industry experiences as well as reactions to an "informational document" for each species created by Council staff. The Fishery Performance Reports, while not reviewed by NMFS technical staff in the same fashion as this environmental assessment, may be of additional interest to the reader and may be found here: http://www.mafmc.org/meeting_materials/SSC/2011-05/SSC_2011-05.htm. The staff informational document, while also not reviewed and containing some preliminary information, was constructed using the same basic analytical techniques as this document and also may be of interest to readers looking for additional descriptive fishery information (available via same link as above).

6.6 Fishery and Socioeconomic Description (Human Communities)

6.6.1 Atlantic mackerel (mackerel)

Historical Commercial Fishery

The modern northwest mackerel fishery began with the arrival of the European distant-water fleets (DWF) in the early 1960's. Total international commercial landings (NAFO Subareas 2-6,) peaked at 437,000 mt in 1973 and then declined sharply to 77,000 by 1977 (Overholtz 1989). The MSA established control of the portion of the mackerel fishery occurring in US waters (NAFO Subareas 5-6) under the auspices of the Council. Reported foreign landings in US waters declined from an unregulated level of 385,000 mt in 1972 to less than 400 mt from 1978-1980 under the MSFCMA (the foreign mackerel fishery was restricted by NOAA Foreign Fishing regulations to certain areas or "windows." Under the MSB FMP foreign mackerel catches were permitted to increase gradually to 15,000 mt in 1984 and then to a peak of almost 43,000 mt in 1988 before being phased out again (Figure 16).

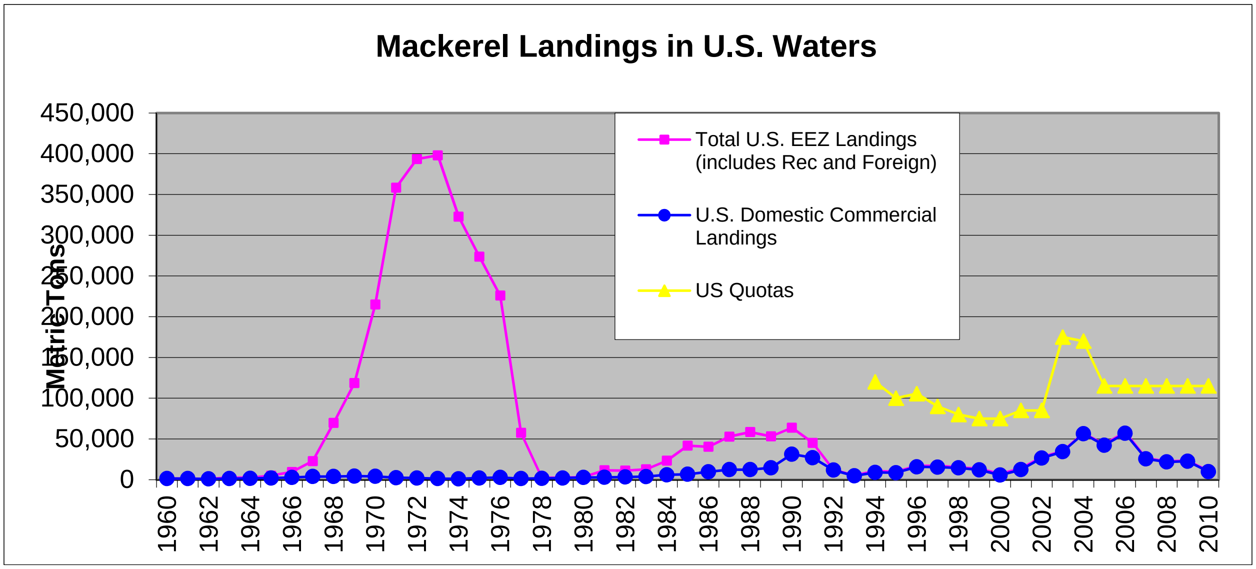


Figure 16. Historical Alt. Mackerel Landings in the U.S. EEZ.

US commercial landings of mackerel increased steadily from roughly 3000 mt in the early 1980s to greater than 31,000 mt by 1990. US mackerel landings declined to relatively low levels 1992-2000 before increasing in the early 2000's. The most recent years have seen a significant drop-off in harvest. Price (nominal) has fluctuated without trend since 1982 and averaged $323/mt in 2010.

Analysis of NMFS weighout data is used to chart annual estimates for U.S. mackerel landings (mt), ex-vessel value ($), and nominal (not inflation adjusted) prices 1982-2010 ($/mt) in the figures below.

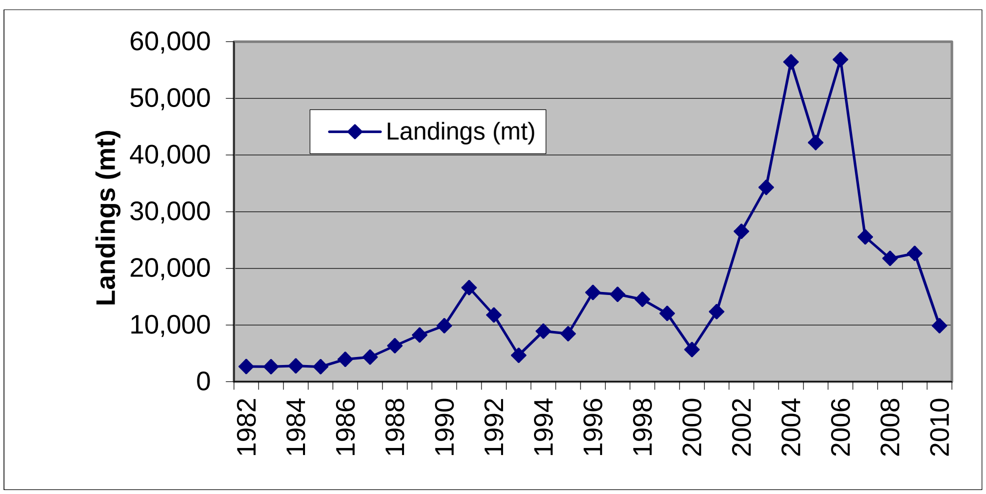


Figure 17. U.S. Mackerel Landings.
Source: Unpublished NMFS dealer reports

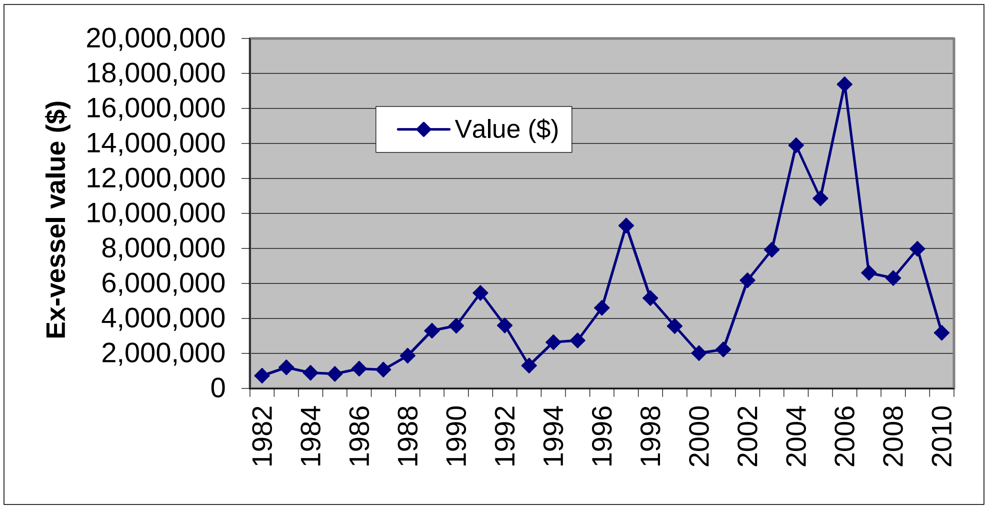


Figure 18. U.S. Mackerel Ex-vessel Revenues.
Source: Unpublished NMFS dealer reports

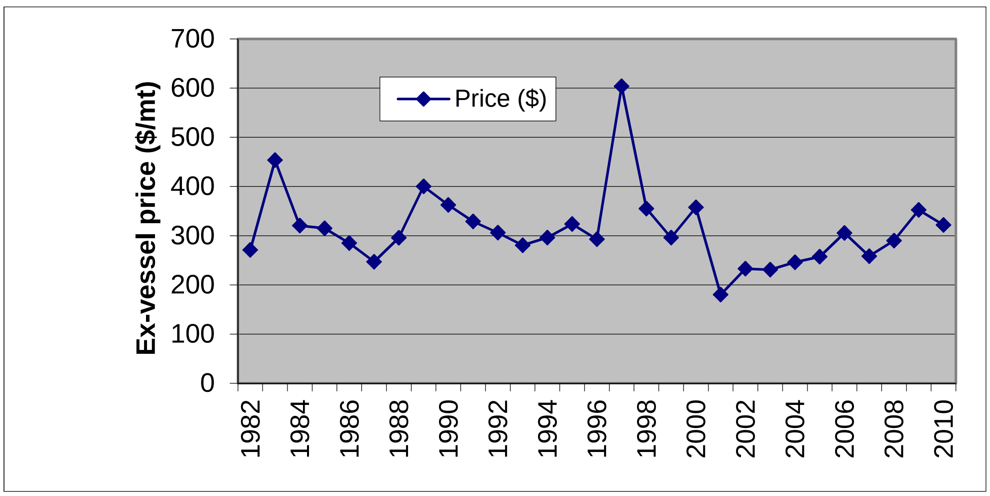


Figure 19. U.S. Mackerel Ex-Vessel Prices.
Source: Unpublished NMFS dealer reports

Specification Performance

The principle measure used to manage mackerel is monitoring via dealer weighout data that is submitted weekly. The dealer data triggers in-season management actions that institute relatively low trip limits when 90% of the DAH is landed. Mandatory reporting for mackerel was fully instituted in 1997 so specification performance since 1997 is most relevant. Table 27 lists the performance of the mackerel fishery (commercial and recreational together) compared to its DAH. There have been no quota overages.

Table 27. Mackerel DAH Performance. (mt)

Year	Harvest (mt) (Commercial and Recreational)	Quota (mt)	Percent of Quota Landed
1997	17,140	90,000	19%
1998	15,215	80,000	19%
1999	13,366	75,000	18%
2000	7,097	75,000	9%
2001	13,876	85,000	16%
2002	27,824	85,000	33%
2003	35,068	175,000	20%
2004	55,520	170,000	33%
2005	43,220	115,000	38%
2006	58,493	115,000	51%
2007	26,431	115,000	23%
2008	22,439	115,000	20%
2009	23,382	115,000	20%
2010	10,669	115,000	9%

Source: Unpublished NMFS dealer reports

Commercial Fishery and Community Analysis

The following tables describe, for mackerel in 2010, the total landings, value, numbers of vessels making landings, numbers of trips landing mackerel, price per metric ton (Table 28), landings by state (Table 29), landings by month (Table 30), landings by gear (Table 31), numbers of permitted and active vessels by state (Table 32), numbers of uncanceled permits over time (Figure 20), numbers of permitted and active dealers by state (Table 33), and landings by NMFS federal permit category (Table 34). Previous Specification EA's have included port information but because of confidentiality concerns such tables are not able to include much relevant information and have been deleted.

Table 28. 2010 Total Mackerel Landings, Value, Active Vessels, Trips, and Price.

(Based on unpublished NMFS dealer reports. For Vessels and Trips, only landing records with recorded NERO Permits or Hull Numbers landing over 1,000 pounds annually for “Vessels” and 100 pounds on a trip for “Trips” are considered. Since some state records do not include permit/hull information, the vessel and trip numbers are somewhat underestimated but account for the vast majority of landings.)

	Landings (mt)	Value ($)	Vessels	Trips	$/mt
Mackerel	9,891	3,195,962	74	588	$323

Source: Unpublished NMFS dealer reports

Table 29. Mackerel Landings (mt) by State in 2010.

State	Landings (mt)	Pct_of_Total
Massachusetts	5,514	56%
New Jersey	2,128	22%
Rhode Island	1,976	20%
Maine	161	2%
New York	51	1%
Connecticut	31	0%
North Carolina	21	0%
Virginia	9	0%
Maryland	0	0%
New Hampshire	0	0%
Total	9,891	100%

Source: Unpublished NMFS dealer reports

Table 30. Mackerel Landings (mt) by Month in 2010.

MONTH	Landings (mt)	Pct of Total
January	5,635	57%
February	2,655	27%
March	1,188	12%
April	165	2%
May	105	1%
June	57	1%
July	10	0%
August	4	0%
September	6	0%
October	54	1%
November	2	0%
December	10	0%
Total	9,891	100%

Source: Unpublished NMFS dealer reports

Table 31. Mackerel Landings (mt) by Gear Category in 2010.

GEAR_NAME	Landings (mt)	Pct of Total
TRAWL,OTTER,MIDWATER PAIRED	4,149	42%
TRAWL,OTTER,BOTTOM,FISH	2,744	28%
TRAWL,OTTER,MIDWATER	1,992	20%
Other	1,006	10%
Total	9,891	100%

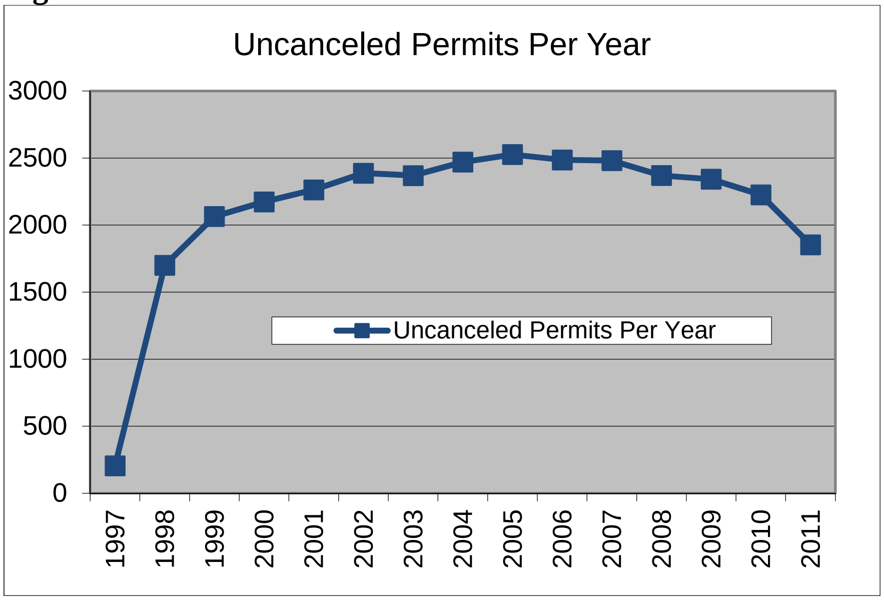
Source: Unpublished NMFS dealer reports

Table 32. Mackerel Vessel Permit Holders and Active Permit Holders in 2010 by Homeport State (HPST).

HPST	Permitted Vessels	Active Vessels
MA	891	52
NJ	294	37
ME	253	5
NY	230	34
RI	142	41
NH	95	11
VA	94	6
NC	91	10
CT	37	6
MD	30	2
Other	44	2
Total	2201	206

Source: unpublished NMFS permit and dealer data.

Figure 20. Uncanceled Mackerel Permits Per Year



Source: Unpublished NMFS dealer reports

Table 33. Mackerel, Squid, and Butterfish Dealer Permit Holders and Those that Made Mackerel Purchases in 2010 by State.

State	Permitted Dealers	Active Dealers
MA	109	27
NY	87	17
RI	39	12
NC	24	9
ME	19	7
VA	17	5
NJ	39	4
NH	8	3
CT	6	2
MD	8	2
Other	10	0
Total	366	88

Source: unpublished NMFS permit and dealer reports.

Table 34. Mackerel Landings by Permit Category for the Period 2001-2010.

Year	Atlantic Mackerel Permit		Party/Charter		No Permit/ Unknown		Total	
	mt	%	mt	%	mt	%	mt	Quota
2001	12,063	98%	0	0%	277	2%	12,340	85,000
2002	25,887	98%	0	0%	643	2%	26,530	85,000
2003	33,969	99%	0	0%	329	1%	34,298	175,000
2004	56,100	99%	0	0%	339	1%	56,439	170,000
2005	42,122	100%	0	0%	148	0%	42,270	115,000
2006	56,705	100%	0	0%	155	0%	56,860	115,000
2007	24,898	97%	0	0%	649	3%	25,546	115,000
2008	21,312	98%	0	0%	422	2%	21,734	115,000
2009	22,508	99%	0	0%	127	1%	22,635	115,000
2010	9,769	99%	0	0%	122	1%	9,891	115,000

Source: unpublished NMFS permit and dealer reports.

<u>Description of Areas Fished in VTR Reports</u>

Vessel Trip Reports (VTRs) represent captains' estimates of kept weight of fish/squid. VTR reports, which are a subset of the landings data, provide the approximate location of kept fish/squid. VTR reports for mackerel in 2010 by NMFS three digit statistical area (see Figure 21) are given in Table 35.

Table 35. Statistical Areas from Which 1% or More of Mackerel Were Kept in 2010 According to VTR Reports.

Stat Area	Landings (mt)	Percentage from Area
612	5759.73	59%
622	1260.21	13%
621	1130.75	12%
615	399.21	4%
616	383.22	4%
613	292.74	3%
625	118.25	1%

Source: Unpublished NMFS VTR reports.

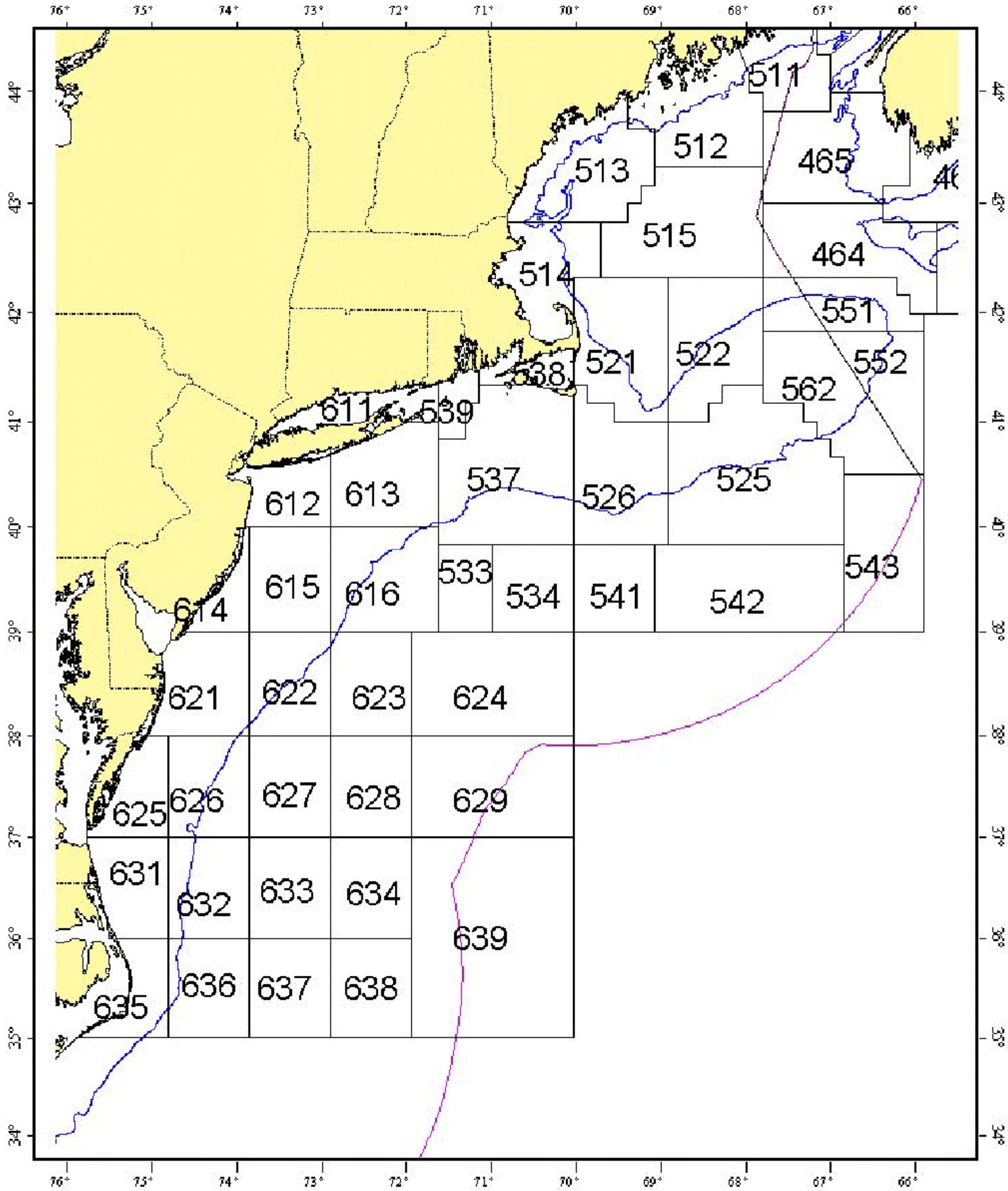


Figure 21. NMFS Statistical Areas

Current Market Overview for Mackerel

The Management Plan for mackerel, squid, and butterfish Fisheries requires that specific evaluations be made in the specification setting process before harvest rights are granted to foreign interests in the form of TALFF or joint venture allocations. The Council has concluded in recent years that conditions in the world market for mackerel have changed only slightly from year to year.

World Production and Prices

According to the FAO, world landings of mackerel dramatically increased in the 1960s, peaked at 1,092,759 mt in 1975, and have been between 550,000 mt and 850,000 mt since 1977. (Figure 22) (http://www.fao.org/fishery/statistics/). Prices for imported and exported U.S. mackerel, likely good indications of prices on the world market, averaged $1,118 per mt in 2010 for exports and 3,204 per mt in 2010 for imports (NMFS 2010; *http://www.st.nmfs.noaa.gov/st1/trade/documents/TRADE2010.pdf*).

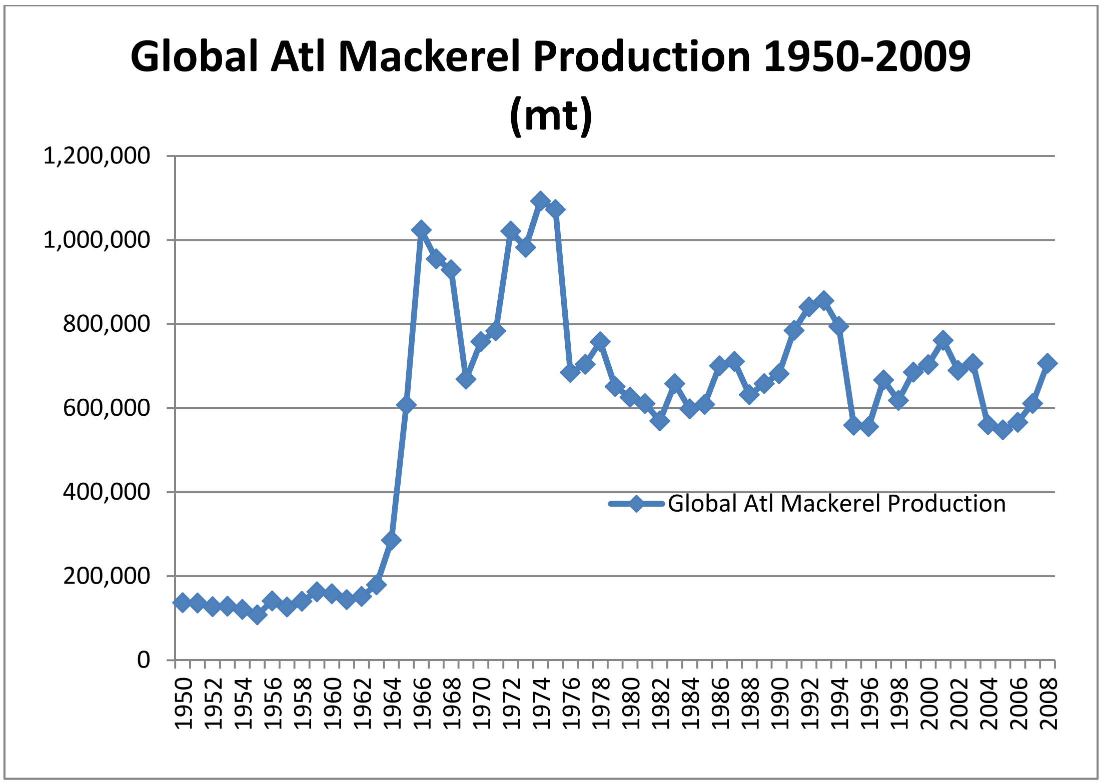


Figure 22. World production of Mackerel, 1950-2008 based on FAO (2010).

Future Supplies of and Demand for Mackerel

Mackerel produced in the US is a substitute for European produced mackerel. The quantity of European mackerel supplied to the market declined in 2006 and 2007 [Chetrick 2006: http://www.fas.usda.gov/info/fasworldwide/2006/10-2006/EUMackerel.pdf]. As a result, the quantity of US mackerel demanded increased. In addition to the price of European mackerel, there are many factors which affect the worldwide demand for mackerel, including income, tastes, and the price of substitute goods. There has also been controversy in 2011 regarding high levels of mackerel fishing by Iceland and the Faroe Islands in areas that have not recently produced mackerel.

US Exports of Mackerel

In 2010, US exports of all mackerel products (fresh, frozen, and prepared/preserved) totaled 10,340 mt, valued at $11.6 million.

Recreational Fishery

Mackerel are seasonally important to the recreational fisheries of the Mid-Atlantic and New England regions. They may be available to recreational anglers in the Mid-Atlantic primarily during the spring migration although this fishery has not been as robust in recent years. Historically, mackerel first appear off Virginia in March and gradually move northward. Christensen *et al.* 1979 found mackerel to be available to the recreational fishery from Delaware to New York for about three weeks (generally from early April to early May). As a result, the annual recreational catch of mackerel appears to be sensitive to changes in their migration and subsequent distribution pattern (Overholtz *et al.* 1989).

Recreational landings of mackerel for the last 10 years (since 2001), as estimated from the NMFS Marine Recreational Fishery Statistics Survey (MRFSS), are given in Table 36 and Table 37. In recent years, recreational mackerel harvest has varied from roughly 1,633 mt in 1997 to 530 in 2004. The highest landings occur from Massachusetts to Maine. Most mackerel are taken from boats. Also, over the same time period approximately 10% of all mackerel caught (by number) were released.

Estimates for mackerel recreational harvest are relatively uncertain due to low encounter rates. From 2001-2010 annual estimates had an average Proportional Standard Error (PSE) of 16%. Based on how PSEs are calculated, this means that on average we were approximately 95% sure that the real number for weight of mackerel harvest was within 32% (+ or -) of our estimate (best was ± 20%, worst was ± 47%). Breakouts by state or mode would have greater uncertainty. In addition, the uncertainty is even higher in reality because of sampling problems with MRFSS. The Marine Recreational Information Program (MRIP) is trying to figure out by just how much and to implement improved procedures – see countmyfish.noaa.gov. MRIP will be generating new less-biased estimates soon but they were not available at the time this document was developed.

Table 36. Recreational Harvest (rounded to nearest metric ton) of Mackerel by State, 2001-2010.

Year	ME	MD	MA	NH	NJ	NY	NC	RI	VA	DE	CT	Annual Total
2001	287	22	885	224	78	18	0	7	2	13	0	1,536
2002	387	2	728	65	60	0	0	47	0	3	1	1,294
2003	123	0	510	79	29	19	0	8	1	0	0	770
2004	207	0	291	27	2	0	0	0	0	3	0	530
2005	181	0	768	74	10	0	0	0	0	0	0	1,033
2006	109	0	1,488	31	0	0	0	1	0	0	3	1,633
2007	280	0	561	43	0	0	0	0	0	0	0	884
2008	148	0	413	129	0	0	0	0	0	0	0	691
2009	320	0	155	272	0	0	0	0	0	0	0	747
2010	250	0	465	62	0	0	0	0	0	0	0	778

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division.

Table 37. Recreational Harvest (rounded to nearest metric ton) of Mackerel by Mode and Total, 2000-2010.

Year	PARTY-CHARTER	PRIVATE or RENTAL	SHORE	Annual Total
2001	164	1,290	82	1,536
2002	23	1,172	98	1,294
2003	53	594	123	770
2004	21	395	115	530
2005	25	994	14	1,033
2006	11	1,560	62	1,633
2007	20	801	63	884
2008	9	646	35	691
2009	171	435	141	747
2010	26	610	142	778

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division.

6.6.2 *Illex illecebrosus*

<u>Historical Commercial Fishery</u>

Foreign fishing fleets became interested in exploitation of the neritic squid stocks of the Northwest Atlantic Ocean when the USSR first reported squid bycatches in the mid-1960's. By 1972, foreign fishing fleets reported landing 17,200 thousand mt of *Illex* from Cape Hatteras to the Gulf of Maine (Figure 23). During the period 1973-1982, foreign landings of *Illex* in US waters averaged about 18,000 mt, while US fisherman averaged only slightly more than 1,100 mt per year. Foreign landings from 1983-1986 were part of the US joint venture fishery which ended in 1987 (NMFS 1994a). The domestic fishery for *Illex* increased fitfully during the 1980's as foreign fishing was eliminated in the US EEZ. *Illex* landings are heavily influenced by year-to-year availability and world-market activity. Price (nominal) has increased fitfully since 1982 and averaged $525/mt in 2010.

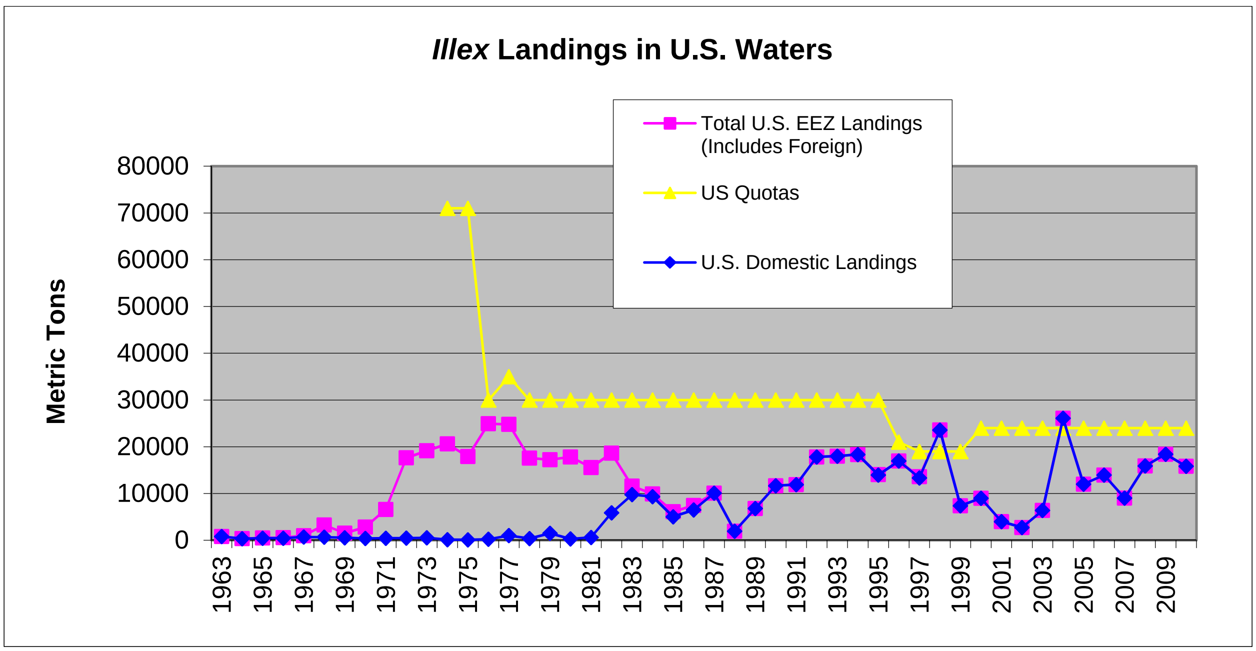


Figure 23. Historical *Illex* Landings in the U.S. EEZ.

Analysis of NMFS dealer weighout data 1982-2010 is used to chart annual averages for U.S. landings (mt), ex-vessel value ($), and nominal prices ($/mt) in the figures below.

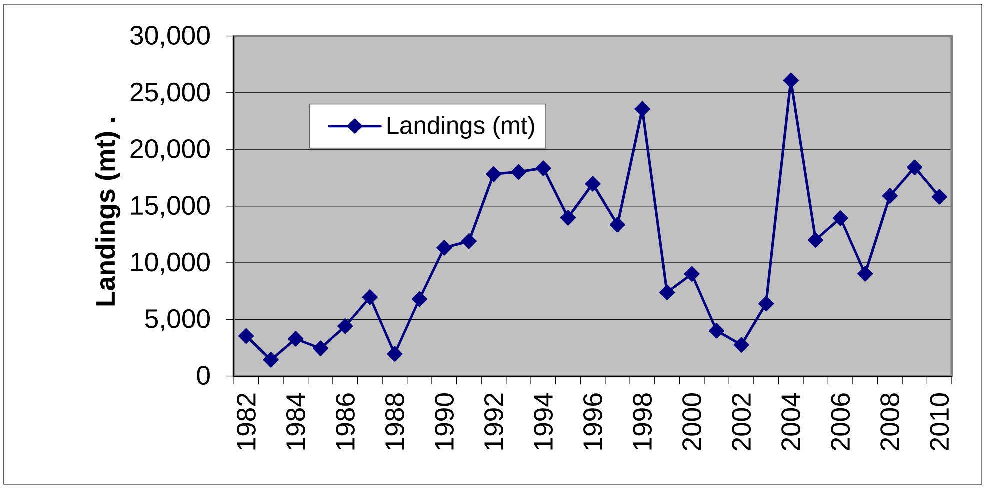


Figure 24. U.S. *Illex* Landings.
Source: Unpublished NMFS dealer reports

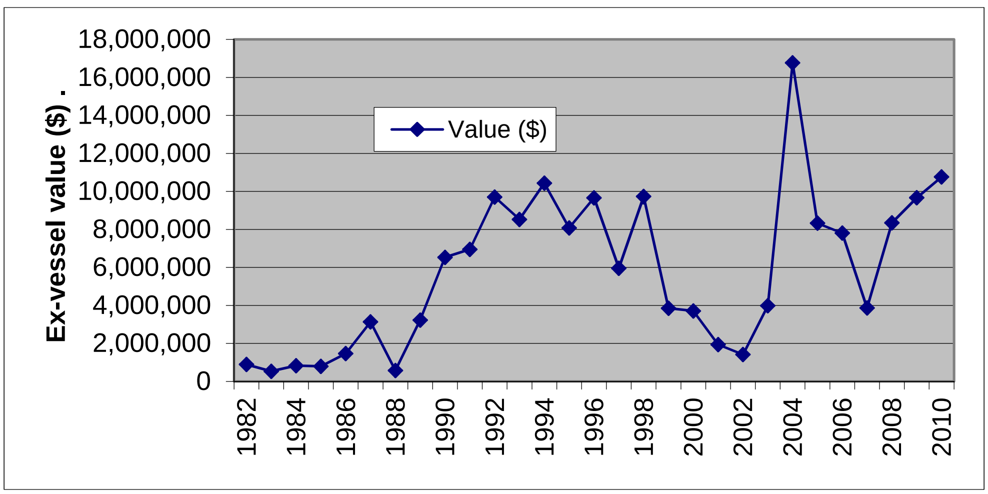


Figure 25. U.S. *Illex* Ex-vessel Revenues.
Source: Unpublished NMFS dealer reports

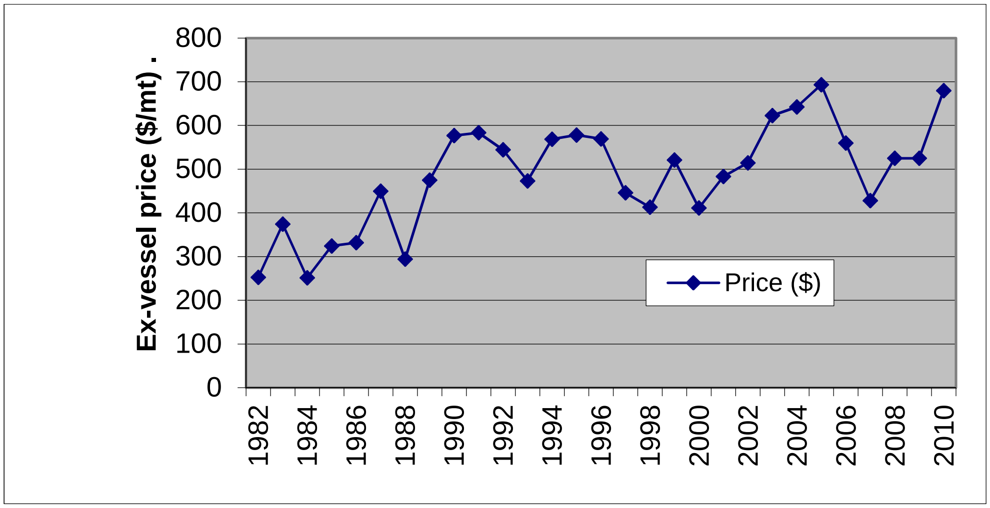


Figure 26. U.S. *Illex* Ex-vessel Prices.
Source: Unpublished NMFS dealer reports

<u>Specification Performance</u>

The principle measure used to manage *Illex* is monitoring via dealer weighout data that is submitted weekly. The dealer data triggers in-season management actions that institute relatively low trip limits when 95% of the DAH is landed. Mandatory reporting for *Illex* was fully instituted in 1997 so specification performance since 1997 is most relevant. Table 38 lists the performance of the *Illex* fishery compared to its DAH. There was an overage in 1 of the last 10 years (a 9% overage in 2004) and 2 of the last 12 years (the 9% overage and a 24% overage in 1998). NMFS is continually augmenting its projecting procedures so presumably future overages would be even less likely.

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Table 38. *Illex* DAH Performance. (mt)

Year	Landings	Quota	Percent of Quota Landed
1997	13,629	19,000	72%
1998	23,597	19,000	124%
1999	7,388	19,000	39%
2000	9,011	24,000	38%
2001	4,009	24,000	17%
2002	2,750	24,000	11%
2003	6,389	24,000	27%
2004	26,097	24,000	109%
2005	12,011	24,000	50%
2006	13,944	24,000	58%
2007	9,022	24,000	38%
2008	15,900	24,000	66%
2009	18,418	24,000	77%
2010	15,825	24,000	66%

Source: Unpublished NMFS dealer reports

<u>Commercial Fishery and Community Analysis</u>

The following tables describe, for *Illex* in 2010, the total landings, value, numbers of vessels making landings, numbers of trips landing *Illex* (Table 39), landings by state (Table 40), landings by month (Table 41), landings by gear (Table 42), numbers of permitted and active vessels by state (Table 43), numbers of permitted and active dealers by state (Table 44), and landings by NMFS federal permit category (Table 45). Previous Specification EA's have included port information but because of confidentiality concerns such tables are not able to include much relevant information and have been deleted.

Table 39. Total Landings and Value of *Illex* During 2010.
(Based on unpublished NMFS dealer reports. For Vessels and Trips, only landing records with recorded NERO Permits or Hull Numbers landing over 1,000 pounds annually for "Vessels" and 100 pounds on a trip for "Trips" are considered. Since some state records do not include permit/hull information, the vessel and trip numbers are somewhat underestimated but account for the vast majority of landings.)

	Landings (mt)	Value ($)	Vessels	Trips	$/mt
Illex	15,825	10,758,235	24	248	$680

Source: Unpublished NMFS dealer reports

Table 40. *Illex* Landings (mt) by State in 2010.

State	Landings_mt	Pct_of_Total
New Jersey	9,224	58%
Rhode Island	5,639	36%
North Carolina	521	3%
Virginia	435	3%
Other	5	0%
Total	15,825	100%

Source: Unpublished NMFS dealer reports

Table 41. *Illex* Squid Landings (mt) by Month in 2010.

MONTH	Landings (mt)	Pct of Total
January	1	0%
February	0	0%
March	0	0%
April	0	0%
May	264	2%
June	4,841	31%
July	6,164	39%
August	3,597	23%
September	620	4%
October	275	2%
November	22	0%
December	40	0%
Total	15,825	100%

Source: Unpublished NMFS dealer reports

Table 42. *Illex* Landings (mt) by Gear Category in 2010.

GEAR_NAME	Landings (mt)	Pct of Total
TRAWL,OTTER,BOTTOM,FISH	11,066	70%
TRAWL,OTTER,MIDWATER	4,232	27%
TRAWL,OTTER,BOTTOM,OTHER	520	3%
Other	7	0%
Total	15,825	100%

Source: Unpublished NMFS vessel trip reports

Table 43. *Illex* Moratorium Vessel Permit Holders and Active Vessels in 2010 by Homeport State (HPST).

HPST	Permitted Vessels	Active Vessels
NJ	28	11
MA	12	3
RI	11	6
NC	7	5
NY	6	1
Other	12	0
Total	76	26

Source: Unpublished NMFS dealer reports.

Table 44. Mackerel, Squid, Butterfish Dealer Permit Holders and Permitted Dealers Who Bought *Illex* in 2010 by State.

State	Permitted Dealers	Active Dealers
NC+VA	41	12
MA	109	6
RI	39	5
NY+NJ	126	6
Others	51	0

Source: Unpublished NMFS dealer reports

Table 45. *Illex* Landings by Permit Category for the Period 2000-2010.

Year	Illex Moratorium Permit		Party/ Charter		Incidental		No Permit/ Unknown		Total	
	mt	%	mt	%	mt	%	mt	%	mt	Quota
2001	3,922	98%	0	0%	0	0%	86	2%	4,009	24,000
2002	2,743	100%	0	0%	2	0%	5	0%	2,750	24,000
2003	6,389	100%	0	0%	0	0%	2	0%	6,391	24,000
2004	25,046	99%	0	0%	140	1%	237	1%	25,422	24,000
2005	11,146	95%	0	0%	23	0%	548	5%	11,717	24,000
2006	13,778	100%	0	0%	52	0%	7	0%	13,837	24,000
2007	9,019	100%	0	0%	1	0%	2	0%	9,022	24,000
2008	15,863	100%	0	0%	1	0%	36	0%	15,900	24,000
2009	18,409	100%	0	0%	9	0%	0	0%	18,419	24,000
2010	15,818	100%	0	0%	1	0%	6	0%	15,825	24,000

Source: Unpublished NMFS dealer reports

Description of the Areas Fished in VTR Reports

Vessel Trip Reports (VTRs) represent captains' estimates of kept weight of fish/squid. VTR reports, which are a subset of the landings data, provide the approximate location of kept fish/squid. VTR reports for *Illex* in 2010 by NMFS three digit statistical area (see Figure 21) are given in Table 46.

Table 46. Statistical Areas from Which 1% or More of *Illex* Were Kept in 2010 According to VTR Reports.

Stat Area	Landings (mt)	Percentage from Area
622	10444.06	68%
632	1748.89	11%
626	1187.52	8%
628	752.52	5%
537	393.77	3%
616	325.39	2%
615	171.91	1%

Source: Unpublished NMFS VTR reports.

6.6.3 Atlantic butterfish

<u>Historical Commercial Fishery</u>

Atlantic butterfish were landed exclusively by US fishermen from the late 1800's (when formal record keeping began) until 1962 (Murawski and Waring 1979). Reported landings averaged about 3,000 mt from 1920-1962 (Waring 1975). Beginning in 1963, vessels from Japan, Poland and the USSR began to exploit butterfish along the edge of the continental shelf during the late-autumn through early spring. Reported foreign catches of butterfish increased from 750 mt in 1965 to 15,000 mt in 1969, and then to about 32,000 mt in 1973. With the advent of extended jurisdiction in US waters, reported foreign catches declined sharply from 14,000 mt in 1976 to 2,000 mt in 1978 (Figure 27). Foreign landings were completely phased out by 1987.

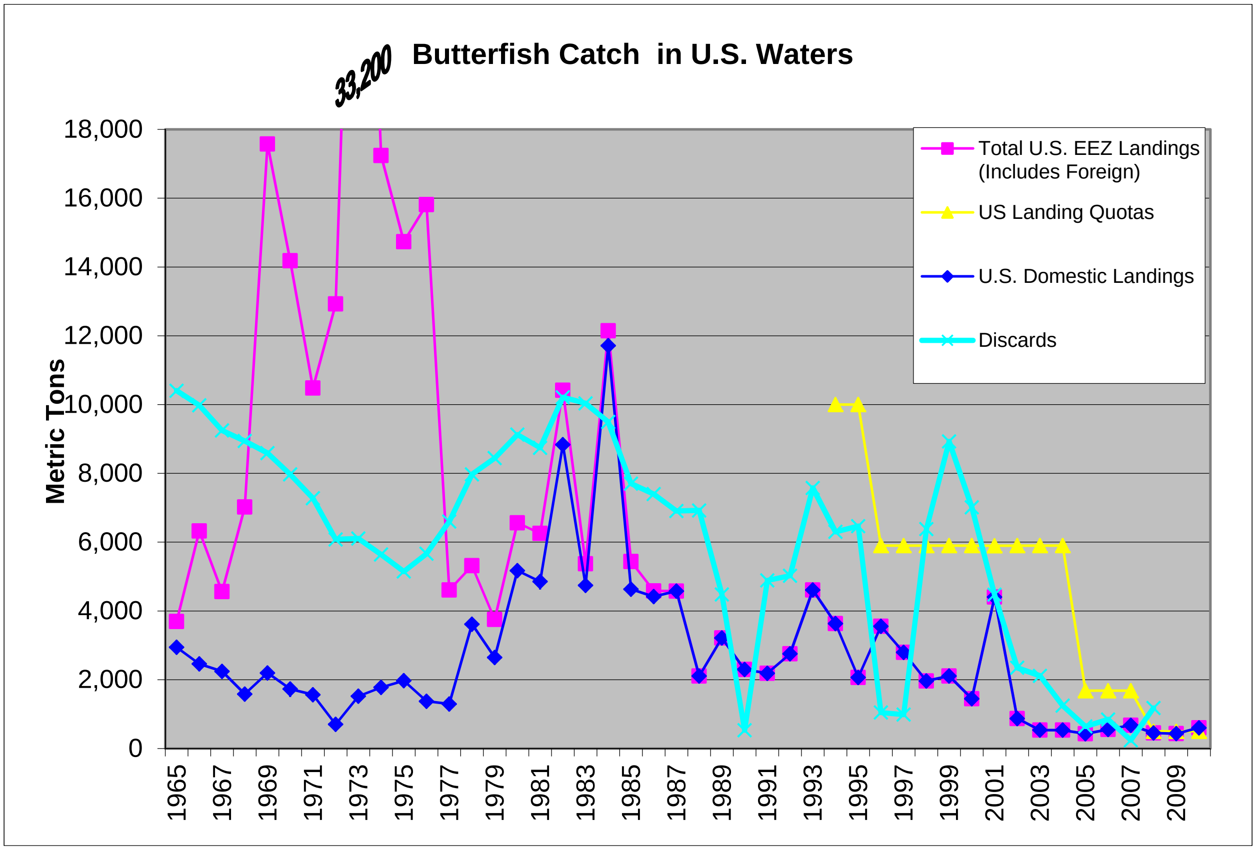

Figure 27. Historical Butterfish Landings in the U.S. EEZ.

During the period 1965-1976, US Atlantic butterfish landings averaged 2,051 mt. From 1977-1987, average US landings doubled to 5,252 mt, with a historical peak of slightly less than 12,000 mt landed in 1984. Since then US landings have declined sharply. Low abundance and reductions in Japanese demand for butterfish has probably had a negative effect on butterfish landings. Price (nominal) has increased fitfully since 1982 and averaged $1,404/mt in 2010. Analysis of NMFS weighout data 1982-2010 is used to chart annual averages for U.S. landings (mt), ex-vessel value ($), and prices ($/mt) in the figures below.

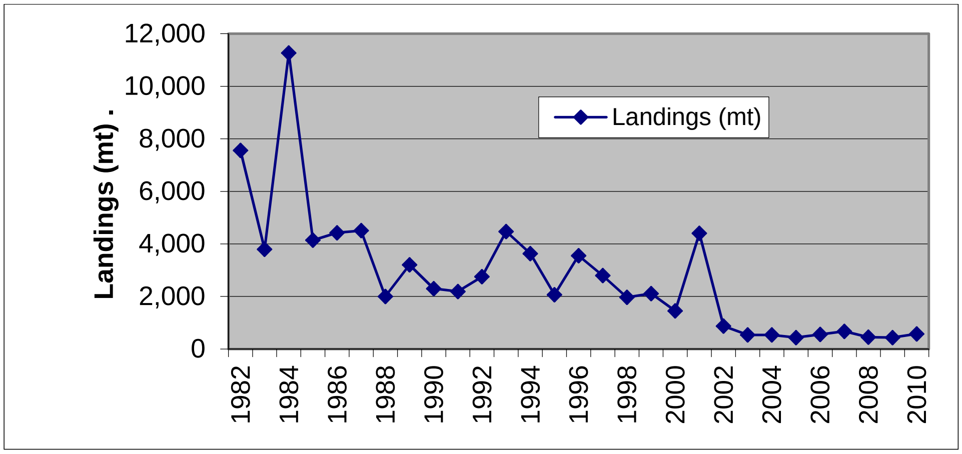

Figure 28. U.S. Butterfish Landings.
Source: Unpublished NMFS dealer reports

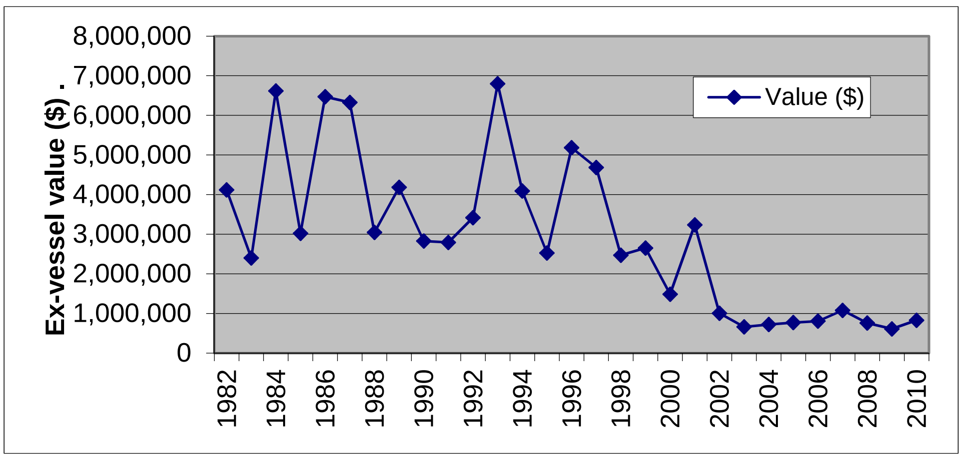

Figure 29. U.S. Butterfish Ex-vessel Revenues.
Source: Unpublished NMFS dealer reports

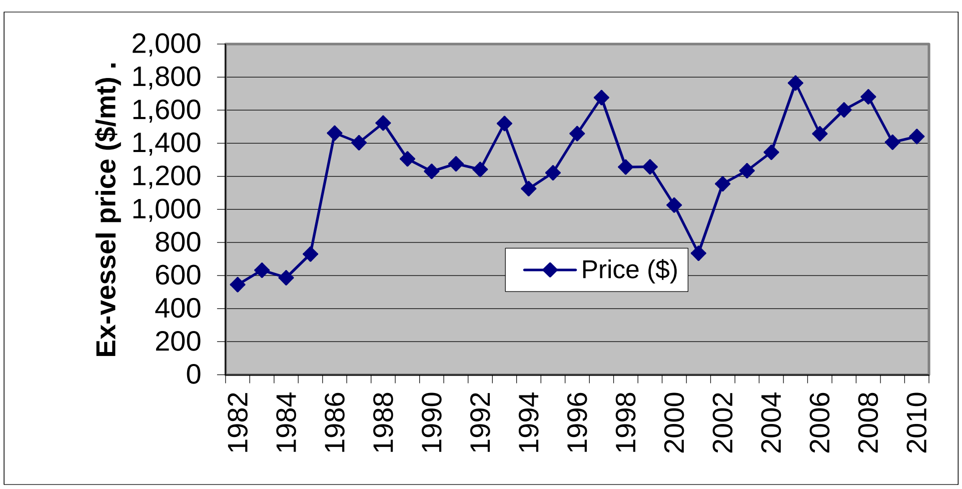

Figure 30. U.S. Butterfish Ex-vessel Prices.
Source: Unpublished NMFS dealer reports

Specification Performance

The principle measure used to manage butterfish landings is monitoring via dealer weighout data that is submitted weekly. The dealer data triggers in-season management actions that institute relatively low trip limits when 80% of the DAH is landed. Mandatory reporting for butterfish was fully instituted in 1997 so performance since 1997 is most relevant. Table 47 lists the performance of the butterfish fishery compared to its DAH. There had been no overages before 2010. There were closures in 2008 and 2009 but the closure threshold and the trip limits performed as designed and prevented an overage. It is unclear why there was an overage in 2010 but prospects for 2012 are discussed in the impacts section.

Table 47. Butterfish DAH Performance (mt)

Year	Harvest (only commercial)	Quota	Percent of Quota Landed
1997	2,795	5,900	47%
1998	1,966	5,900	33%
1999	2,110	5,900	36%
2000	1,449	5,900	25%
2001	4,404	5,897	75%
2002	872	5,900	15%
2003	536	5,900	9%
2004	537	5,900	9%
2005	428	1,681	25%
2006	554	1,681	33%
2007	678	1,681	40%
2008	451	500	90%
2009	435	500	87%
2010	603	500	121%

Source: Unpublished NMFS dealer reports

Commercial Fishery and Community Analysis

The following tables describe, for butterfish in 2010, the total landings, value, numbers of vessels making landings, numbers of trips landing butterfish (Table 48), landings by state (Table 49), landings by month (Table 50), landings by gear (Table 51), landings by port (Table 52), numbers of permitted vessels by state (Table 53), numbers of permitted dealers by state (Table 54), and landings by NMFS federal permit category (Table 55). Previous Specification EA's have included additional port information (dependence) but because of confidentiality concerns such tables are not able to include much relevant information and have been deleted.

Table 48. Total Landings and Value of Butterfish During 2010.
(Based on unpublished NMFS dealer reports. For Vessels and Trips, only landing records with recorded NERO Permits or Hull Numbers landing over 1,000 pounds annually for "Vessels" and 100 pounds on a trip for "Trips" are considered. Since some state records do not include permit/hull information, the vessel and trip numbers are somewhat underestimated but account for the vast majority of landings.)

	Landings (mt)	Value ($)	Vessels	Trips	$/mt
Butterfish	603	865,703	131	2,567	$1,435

Source: Unpublished NMFS dealer reports

Table 49. Butterfish Landings (mt) by State in 2010.

State	Landings_mt	Pct_of_Total
Rhode Island	254	42%
New York	184	30%
Massachusetts	79	13%
Connecticut	59	10%
New Jersey	20	3%
Virginia	5	1%
New Hampshire	2	0%
Maryland	1	0%
Delaware	0	0%
Maine	0	0%
Total	603	100%

Source: Unpublished NMFS dealer reports.

Table 50. Butterfish Landings (mt) by Month in 2010.

MONTH	Landings mt	Pct of Total
January	34	6%
February	19	3%
March	25	4%
April	49	8%
May	84	14%
June	94	16%
July	66	11%
August	74	12%
September	44	7%
October	58	10%
November	39	6%
December	19	3%
Total	603	100%

Source: Unpublished NMFS dealer reports

Table 51. Butterfish Landings (mt) by Gear Category in 2010.

GEAR_NAME	Landings (mt)	Pct of Total
TRAWL,OTTER,BOTTOM,FISH	408	68%
UNKNOWN	119	20%
Other	76	13%
Total	603	100%

Source: Unpublished NMFS dealer data.

Table 52. Butterfish Landings by Port in 2010.

name	ST_Name	Landings_mt	Pct_of_Total
POINT JUDITH	RHODE ISLAND	190	31%
MONTAUK	NEW YORK	131	22%
NEW BEDFORD	MASSACHUSETTS	54	9%
STONINGTON	CONNECTICUT	44	7%
NEWPORT	RHODE ISLAND	32	5%
LITTLE COMPTON	RHODE ISLAND	28	5%
HAMPTON BAYS	NEW YORK	24	4%
AMAGANSETT	NEW YORK	11	2%
Other	Various	90	15%
Total	Total	603	100%

Source: Unpublished NMFS dealer reports

Table 53. Longfin Squid/Butterfish Moratorium Vessel Permit Holders in 2010 by Homeport State (HPST) and How Many of Those Vessels Were Active.

HPST	Permitted Vessels	Active Vessels
MA	96	16
NJ	84	31
NY	54	39
RI	51	44
NC	22	4
ME	17	.
VA	13	.
CT	7	5
MD	2	2
NH	2	.
PA	2	.
WV	1	1
Total	351	142

Source: Unpublished NMFS dealer reports and NMFS permit database data

Table 54. Mackerel, Squid, Butterfish Dealer Permit Holders and How Many Were Active (bought butterfish) in 2010 by State.

State	Permitted Dealers	Active Dealers
NY	87	32
RI	39	17
MA	109	12
VA	17	7
NJ	39	6
Others	75	5

Source: Unpublished NMFS dealer reports and NMFS permit database data

Table 55. Butterfish Landings by Permit Category for the Period 2001-2010.

Year	Loligo/Butterfish Moratorium Permit		Party/Charter		Incidental		No Permit/ Unknown		Total	
	mt	%	mt	%	mt	%	mt	%	mt	Quota
2001	3,991	91%	0	0%	52	1%	360	8%	4,403	5,900
2002	653	75%	0	0%	39	4%	180	21%	872	5,897
2003	367	69%	0	0%	17	3%	151	28%	536	5,900
2004	329	61%	0	0%	22	4%	186	35%	537	5,900
2005	265	62%	0	0%	13	3%	150	35%	428	5,900
2006	386	70%	0	0%	36	7%	131	24%	554	1,681
2007	535	79%	0	0%	43	6%	99	15%	678	1,681
2008	350	78%	0	0%	32	7%	69	15%	451	500
2009	345	79%	0	0%	41	9%	49	11%	435	500
2010	454	75%	0	0%	67	11%	82	14%	602	500

Source: Unpublished NMFS dealer reports and NMFS permit database data

<u>Description of the Areas Fished in VTR Reports</u>

Vessel Trip Reports (VTRs) represent captains' estimates of kept weight of fish/squid. VTR reports, which are a subset of the landings data, provide the approximate location of kept fish/squid. VTR reports for butterfish in 2010 by NMFS three digit statistical area (see Figure 21 except as noted in table below) are given in Table 56.

Table 56. Statistical Areas from Which 1% or More of Butterfish were Kept in 2010 According to VTR Reports.

Stat Area	Landings (mt)	Percentage from Area
537	126.917	26%
539	65.393	13%
611	54.078	11%
616	36.06	7%
613	28.928	6%
562	27.249	6%
525	25.546	5%
522	20.464	4%
148	16.927	3%
612	12.249	2%
514	11.496	2%
538	10.073	2%
622	6.35	1%
166	5.659	1%
121	5.302	1%

Source: Unpublished NMFS VTR reports

6.6.4 Longfin Squid

Historical Commercial Fishery

United States fishermen have been landing squid along the Northeastern coast of the US since the 1880's (Kolator and Long 1978). The early domestic fishery utilized fish traps and otter trawls but was of relatively minor importance to the US fishery due to low market demand. The squid taken were used primarily for bait (Lux et al. 1974). However, squid have long been a popular food fish in various foreign markets and therefore a target of the foreign fishing fleets throughout the world, including both coasts of North America (Okutani 1977). USSR vessels first reported incidental catches of squid off the Northeastern coast of the United States in 1964. Fishing effort directed at the squids began in 1968 by USSR and Japanese vessels. By 1972, Spain, Portugal and Poland had also entered the fishery. 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 31).

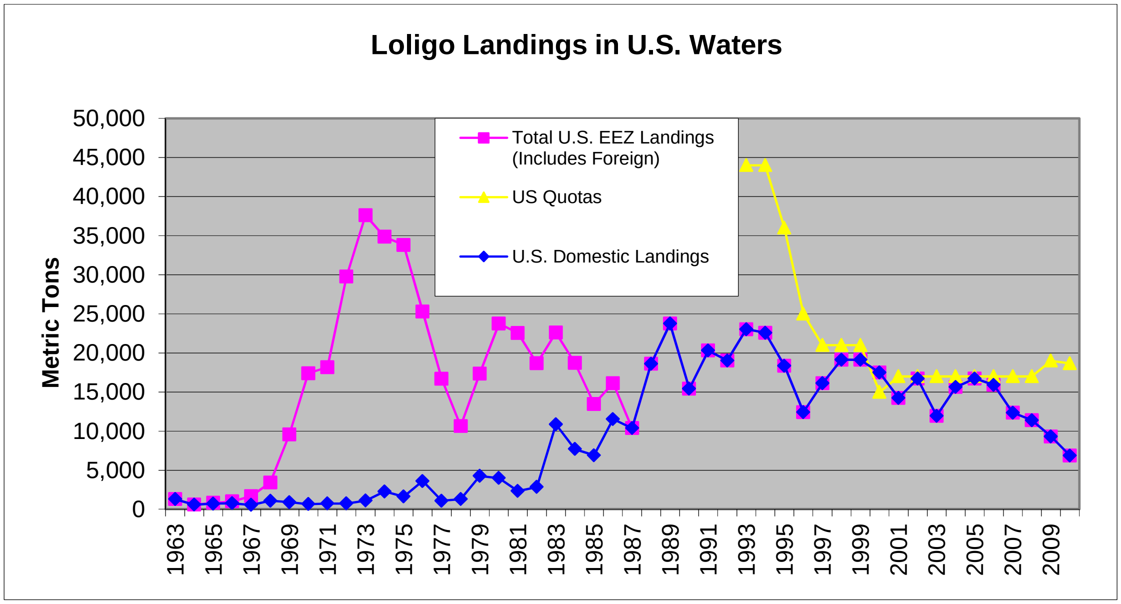

Figure 31. Historical Longfin Squid Landings in the U.S. EEZ.

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. The result of these restrictions was an immediate reduction in the foreign catch of longfin squid from 21,000 mt in 1976 to 9,355 mt in 1978.

By 1982, foreign longfin squid landings had again risen above 20,000 mt. At this time, US management of the squid resources focused on the Americanization of these fisheries. This process began with the development of joint ventures between US fishermen and foreign concerns. Domestic annual harvest (DAH) was increased from 7,000 mt in the 1982-83 fishing year to 22,000 mt for 1983-84. Foreign allocations were reduced from 20,350 mt during 1982-83 to 5,550 mt during 1983-84 (Lange 1985). The foreign catch of longfin squid fell below

5,000 mt by 1986, to 2 mt in 1987 and finally to zero in 1990. Price (nominal) has increased fitfully since 1982 and averaged $1,968/mt in 2010.

The development and expansion of the US squid fishery was slow to occur for several reasons. First, the domestic market demand for squid in the US had traditionally been limited to the bait market. Secondly, the US fishing industry lacked both the catching and processing technology necessary to exploit squid in offshore waters. In the late 19th and early 20th centuries, squid were taken primarily by pound nets. Even though bottom otter trawls eventually replaced pound nets as the primary gear used to capture squid during this century, the US industry did not develop the appropriate technology to catch and process squid in offshore waters until the 1980's. Analysis of NMFS weighout data 1982-2010 is used to chart annual averages for U.S. landings (mt), ex-vessel value ($), and prices ($/mt) in the figures below.

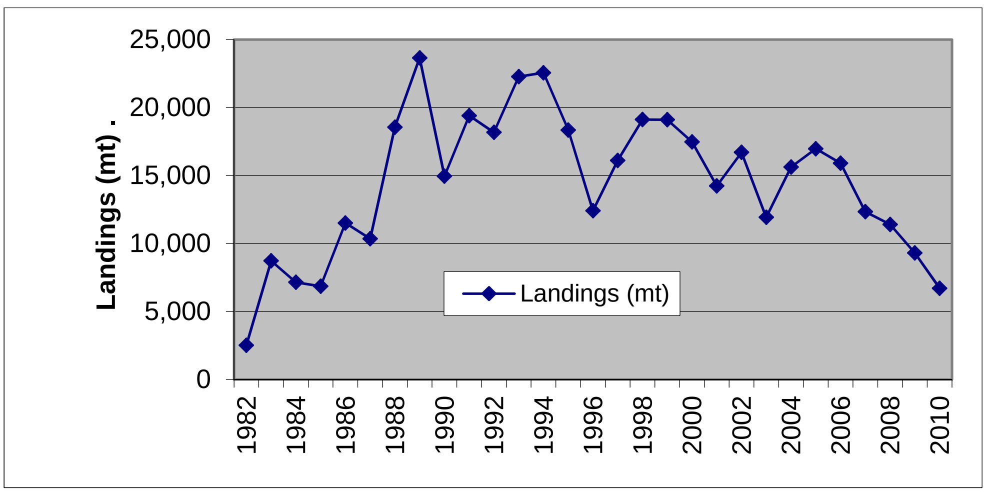

Figure 32. U.S. Longfin Squid Landings.
Source: Unpublished NMFS dealer reports

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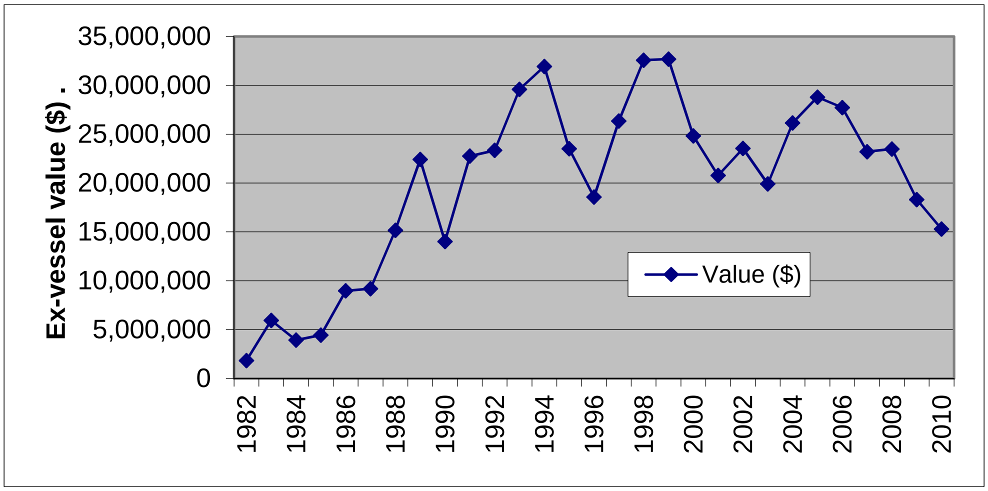

Figure 33. U.S. Longfin Squid Ex-vessel Revenues.
Source: Unpublished NMFS dealer reports

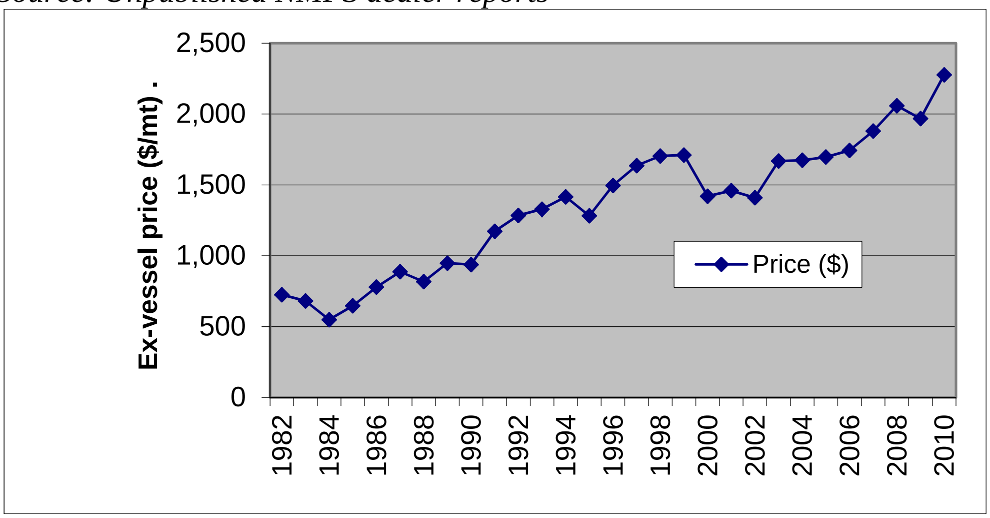

Figure 34. U.S. Longfin Squid Ex-vessel Prices.
Source: Unpublished NMFS dealer reports

<u>Specification Performance</u>

The principle measure used to manage longfin squid is Trimester quota monitoring via dealer weighout 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. Mandatory reporting for longfin squid was fully instituted in 1997 so performance since 1997 is most relevant. Table 57 lists the performance of the longfin squid fishery compared to its DAH. There has been one overage in the last 12 years, a 17% overage in 2000. NMFS is continually augmenting its quota projecting procedures so presumably future overages would be even less likely. There are occasional overages of the trimester quotas, but these are typically minor and should minimal effects since Trimester 1 and 2 overages are applied to Trimester 3.

As described in the alternatives, the longfin squid DAH is currently divided up into trimesters and has been since 2007. 2000 also had Trimester management 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 are **2000**: March 25-Apr 30; Jul 1-Aug 31; Sep 7-Dec 31; **2001**: May 29-Jun 30; **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.

Table 57. Longfin Squid DAH Performance (mt)

Year	Harvest (Commercial and Recreational)	Quota	Percent of Quota Landed
1997	16,113	21,000	77%
1998	19,123	21,000	91%
1999	19,109	21,000	91%
2000	17,475	15,000	117%
2001	14,238	17,000	84%
2002	16,703	17,000	98%
2003	11,935	17,000	70%
2004	15,628	17,000	92%
2005	16,716	17,000	98%
2006	15,907	17,000	94%
2007	12,343	17,000	73%
2008	11,385	17,000	67%
2009	9,307	19,000	49%
2010	6,855	18,667	37%

Source: Unpublished NMFS dealer reports

Commercial Fishery and Community Analysis

The following tables describe, for longfin squid in 2010, the total landings, value, numbers of vessels making landings, numbers of trips landing longfin squid (Table 58), landings by state (Table 59), landings by month (Table 60), landings by gear (Table 37), landings by port (Table 38), numbers of permitted and active vessels by state (Table 63), numbers of permitted and active dealers by state (Table 64), and landings by NMFS federal permit category (Table 65). Previous Specification EA's have included additional port information (dependence) but because of confidentiality concerns such tables are not able to include much relevant information and have been deleted.

Table 58. Total Landings and Value Longfin Squid During 2010.
(Based on unpublished NMFS dealer reports. For Vessels and Trips, only landing records with recorded NERO Permits or Hull Numbers landing over 1,000 pounds annually for "Vessels" and 100 pounds on a trip for "Trips" are considered. Since some state records do not include permit/hull information, the vessel and trip numbers are somewhat underestimated but account for the vast majority of landings.)

	Landings (mt)	Value ($)	Vessels	Trips	$/mt
Longfin squid	6,855	15,675,661	197	4,479	$2,287

Source: Unpublished NMFS dealer reports

Table 59. Longfin Squid Landings (mt) by State in 2010.

State	Landings_mt	Pct_of_Total
Rhode Island	3,342	49%
New York	1,769	26%
New Jersey	713	10%
Massachusetts	701	10%
Connecticut	303	4%
Virginia	25	0%
Maryland	1	0%
Maine	0	0%
Total	6,855	100%

Source: Unpublished NMFS dealer reports

Table 60. Longfin Squid Landings (mt) by Month in 2010.

MONTH	Landings_mt	Pct_of_Total
January	544	8%
February	345	5%
March	296	4%
April	278	4%
May	790	12%
June	543	8%
July	644	9%
August	280	4%
September	730	11%
October	1,075	16%
November	738	11%
December	590	9%
Totals	6,855	100%

Source: Unpublished NMFS dealer reports

Table 61. Longfin squid Landings (mt) by Gear Category in 2010.

GEAR_NAME	Landings (mt)	Pct of Total
TRAWL,OTTER,BOTTOM,FISH	5,359	78%
UNKNOWN	1,043	15%
TRAWL,OTTER,MIDWATER	215	3%
Other	237	3%
Totals	6,855	100%

Source: Unpublished NMFS dealer reports

Table 62. Longfin Squid Landings by Port in 2010.

Port	State	Landings mt	Pct of Total
POINT JUDITH	RHODE ISLAND	2,713	40%
MONTAUK	NEW YORK	1,109	16%
NORTH KINGSTOWN	RHODE ISLAND	591	9%
CAPE MAY	NEW JERSEY	530	8%
NEW BEDFORD	MASSACHUSETTS	373	5%
HAMPTON BAYS	NEW YORK	351	5%
OTHER BARNSTABLE	MASSACHUSETTS	200	3%
STONINGTON	CONNECTICUT	177	3%
POINT LOOKOUT	NEW YORK	174	3%
POINT PLEASANT	NEW JERSEY	109	2%
BELFORD	NEW JERSEY	74	1%
Others	NA	455	7%
Total	NA	6,855	100%

Source: Unpublished NMFS dealer reports

Table 63. Longfin Squid-Butterfish Moratorium Vessel Permit Holders in 2010 by Homeport State (HPST) and How Many of Those Vessels Were Active (landed longfin squid)

HPST	Permitted Vessels	Active Vessels
MA	96	22
NJ	84	46
NY	54	43
RI	51	44
NC	22	8
ME	17	0
VA	13	1
CT	7	6
MD	2	2
NH	2	0
PA	2	0
WV	1	1
Total	351	173

Source: Unpublished NMFS dealer reports

Table 64. Mackerel, Squid, Butterfish Dealer Permit Holders by State and How Many Were Active (bought longfin squid) in 2010 by State.

State	Permitted Dealers	Active Dealers
NY	87	36
RI	39	19
MA	109	15
NJ	39	9
VA	17	5
CT	6	2
MD	8	2
ME	19	2
NC	24	0
Others	18	0
Total	366	90

Source: Unpublished NMFS dealer reports

Table 65. Longfin Squid Landings by Permit Category for the Period 2000-2010.

Year	Loligo/Butterfish Moratorium Permit		Party/Charter		Incidental		No Permit/ Unknown		Total	
	mt	%	mt	%	mt	%	mt	%	mt	Quota
2001	13,423	94%	0	0%	170	1%	640	4%	14,232	17,000
2002	15,275	91%	4	0%	408	2%	1,016	6%	16,703	17,000
2003	10,988	92%	0	0%	98	1%	850	7%	11,935	17,000
2004	14,183	91%	1	0%	163	1%	1,281	8%	15,628	17,000
2005	15,068	90%	0	0%	73	0%	1,562	9%	16,703	17,000
2006	14,318	90%	0	0%	294	2%	1,295	8%	15,907	17,000
2007	11,360	92%	0	0%	230	2%	753	6%	12,343	17,000
2008	10,833	95%	0	0%	319	3%	233	2%	11,385	17,000
2009	8,719	94%	0	0%	266	3%	322	3%	9,307	19,000
2010	6,392	93%	1	0%	253	4%	207	3%	6,853	18,667

Source: Unpublished NMFS dealer reports and Permit database

Description of Areas Fished in VTR Reports

Vessel Trip Reports (VTRs) represent captains' estimates of kept weight of fish/squid. VTR reports, which are a subset of the landings data, provide the approximate location of kept fish/squid. VTR reports for Longfin squid in 2010 by NMFS three digit statistical area (see Figure 21 except as noted in table below) are given in Table 66.

Table 66. Statistical Areas From Which 1% or More of Longfin Squid Were Kept in 2010 According to VTR Reports.

Stat Area	Landings (mt)	Percentage from Area
616	2,470	33%
622	1,040	14%
537	595	8%
613	466	6%
612	465	6%
525	339	5%
539	333	4%
632	275	4%
611	226	3%
562	209	3%
538	197	3%
626	173	2%
121	86	1%

Source: Unpublished NMFS VTR reports

Butterfish Catch/Mortality Cap

Beginning in 2011 the longfin squid fishery was subject to closure if it caught too much butterfish (amounts are set annually - 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).

There was not a closure in Trimester 1 of 2011. As of September 12, 2011 the cap had not yet caused any closures of the longfin squid fishery and had utilized 45% of the total annual cap. The longfin squid fishery will close if 90% of the annual cap is utilized. Given the average 2011 rates of squid and butterfish catch, a cap closure may not occur in 2011 but the final result will depend on the observed catch rates in the final months of 2011. The cap operates in near real-time so operation in 2012 will depend on the total and relative amounts of longfin squid and butterfish caught in 2012. Additional details on the cap may be found here: http://www.nero.noaa.gov/nero/regs/frdoc/11/11SMB2011ButterfishSpecsRevisedCAP.pdf.

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

The alternatives considered for 2012 are fully described in section 5. Related to the specifications, the key determinant of biological impact on the managed resources is how much fish can be caught and the likely upper limit on catch is noted again below to facilitate comparison. For non-target species, habitat, and protected resource impacts the key determinant is not so much the catch itself but the amount and character of the related effort. Since limits on catch do cap effort, such limits are a factor related to effort but many other factors beyond the control of the Council (such as availability of other opportunities, weather, climate, fish movements, variable productivity, etc.) affect how much and what sort of effort is utilized to land a given quantity of fish in any given year.

In recent years the mackerel, longfin squid, and *Illex* fisheries have not caught their entire quota. Thus the status quo allows an expansion of catch. To the degree that extra effort is used to expand catch, impacts on non-target species, habitat, and protected resources could increase even under the status quo. Conversely, for the same reasons that catch has been lower than the quotas, catch and effort, and related impacts, could decrease under the status quo. Rather than repeat this concept for every resource, this document acknowledges that under any of the proposed alternatives effort and related impacts could increase or decrease for reasons other than the specifications. Recent catches are compared to the proposed specifications for each species so that the reader is aware of the relative difference between recent catches and the proposed specifications but the focus of analysis is on the relative upper limits imposed by the various specifications.

7.1 Impacts of Specification Alternatives for Mackerel

General

Implementation of the Omnibus in 2012 is not expected to have any impacts related to the 2012 mackerel specifications since the commercial mackerel fishery was managed under binding quotas enforced by in-season closures prior to the Omnibus. Theoretically if the recreational fishery caused an overall overage of an ACL the recreational fishery in the following year could be impacted, but given recent performance of the commercial fishery and the ACTs being utilized such an overage appears unlikely. Thus the key factor in comparing potential impacts is to identify the effective limit on catch/effort under any status quo or proposed alternative for biological impacts and the limit on landings for socio-economic impacts. This is why the overall catch limit is noted from section 5.1 for the biological impacts while some additional (DAH/RHL) specifications are noted from section 5.1 for the human community impacts. Again, the alternatives considered for 2012 are fully described in Section 5 above.

2010 catch (commercial plus recreational) was likely less than 12,000 mt in 2010. There is high uncertainty regarding exact mackerel discards but they are generally low. Given the performance of the mackerel fishery in 2011 up to August 1, 2011, and given the range of late season landings recorded in the dealer database since 1982, it appears unlikely that 2011 mackerel landings will surpass 3,500 mt. Landings as of August 1, 2011 were less than 500 mt and the highest August-December landings since 1982 totaled about 2,700 mt. 500mt + 2,700 mt = 3,200 mt. Accounting for a conservative discard estimate of 3.11% would bring total catch to about 3,300 mt. Thus it appears unlikely that total catch will be above 3,500 mt in 2011 and this is much lower than any of the proposed 2012 specifications. Given the recent performance, catch and likely effort (to the degree that catch is a proxy for effort) could expand relative to any of the analyzed specifications so the relative upper limit imposed by any specification is discussed below.

7.1.1 Biological Impacts on Managed Resource and Non-Target Species

Managed Resource

1a – status quo – The U.S. ABC of 47,395 would be the likely effective U.S. catch limit. The Canadian catch assumption would be 32,605 mt.

Due to the uncertainty regarding the mackerel stock and its productivity, it is difficult to quantify impacts but given the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year

1b – preferred – The combination of the commercial and recreational ACTs, 37,350 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.b.

Due to the uncertainty regarding the mackerel stock and its productivity, it is difficult to quantify impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1b as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. The measures contained in 1b use a reasonable accounting for discards and expected Canadian catch (see Appendix B) as well as proactive catch limiting measures such that total catch should remain less than the 80,000 mt recommended as management advice by both the most recent mackerel assessment (TRAC 2010) and the Council's SSC. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1c – high alternative – The combination of the commercial and recreational ACTs, 54,412 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.c.

Due to the uncertainty regarding the mackerel stock and its productivity, it is difficult to quantify impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 1c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status quo alternative's specifications, impacts may be similar to the prior fishing year. The measures contained in 1c could lead to catches higher than the 80,000 mt recommended as management advice by both the most recent mackerel assessment (TRAC 2010) and the Council's SSC. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

1d – low alternative – The combination of the commercial and recreational ACTs, 20,288 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.d.

Due to the uncertainty regarding the mackerel stock and its productivity, it is difficult to quantify impacts but since given the likely effective catch limit would be less than the status-quo, the impact of 1d as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year.   The measures contained in 1d use a reasonable accounting for discards and expected Canadian catch (see Appendix B) as well as proactive catch limiting measures such that total catch should remain less than the 80,000 mt recommended as management advice by both the most recent mackerel assessment (TRAC 2010) and the Council's SSC. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1e – fallback alternative – ABC = 43,781 would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.e.

Due to the uncertainty regarding the mackerel stock and its productivity, it is difficult to quantify impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1e as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. The measures contained in 1e use a reasonable accounting for discards and expected Canadian catch (see Appendix B) as well as proactive catch limiting measures such that total catches could be near the 80,000 mt recommended as management advice by both the most recent mackerel assessment (TRAC 2010) and the Council's SSC. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

<u>Relative Comparison Between Alternatives</u>

The lower the potential catch, the more protective of the managed resource any alternative should be. From this point of view, in terms of benefits to the managed resource, 1d > 1b > 1e > 1a > 1c. In other words 1d would most benefit the managed resource. However, since recent catch has been below all of these there may be no effective difference between them in reality.

Predator-Prey (Forage) Considerations

Given the current uncertainty regarding stock dynamics it is not really possible to quantify the impact of any particular catch on this species' availability for the various species and stocks of marine mammals, birds, and fish that prey on the managed resource. The Council did consider that specifications could be additionally reduced beyond other factors because of predator-prey considerations. The preferred alternative's ACT includes a 15% buffer to account for management uncertainty, which primarily addresses uncertainty surrounding potential Canadian landings but also addresses concern about the ecological role of mackerel.

Non-Target Species

Various species are caught incidentally by the mackerel fishery. For non-target species that are managed under their own fishery management plan, incidental catch/discards are also considered as part of the management of that fishery. These species will be impacted to some degree by the prosecution of the mackerel fishery.

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 2006-2010 trips in the dealer weighout database to see if a certain trip definition could account for most mackerel landed. The result of this review resulted in the following definition for mackerel trips using landings: All trips that had at least 50% mackerel by weight and all trips over 100,000 pounds of mackerel regardless of the ratio of other species. This definition results in capturing 97.4% of all mackerel landings in the dealer weighout database 2006-2010. The other trips with lower mackerel landings landed a variety of species, mostly Atlantic herring, silver hake, longfin squid, and scup. The set of trips in the observer database with the same mackerel criteria included 12 on average for each year 2006-2010 (61 total with 73 unobserved hauls and 204 observed hauls). The observed mackerel caught on these trips accounted for approximately 6.5% of the total mackerel caught.

Information on catch and discards is provided for observed hauls and information on catch is provided for the unobserved hauls. 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. Extrapolations of total catch are made using the ratios from observed hauls but given about ¼ of the hauls were unobserved such extrapolations are very uncertain and should be thought of more on an indication of potential relative scale rather than a specific quantity. The discards of large pelagics in the mackerel fishery are generally unknown due to the inability of the observers to view these discards because of the pumping of fish that occurs from the codend to an internal hold. Large-bodied species are prevented from entering the pump (the pump sends the catch directly from the codend into the hold) and are discarded while the codend is submerged.

Table 67. Key Species Observed Taken and Discarded in Directed Trips for Mackerel, Based on Unpublished NMFS Northeast Fisheries Observer Program Data and Unpublished Dealer Weighout Data from 2006-2010. (see text for criteria). There Are 2204.6 Pounds in One Metric Ton.

NE Fisheries Science Center Common Name	Pounds Observed Caught	Pounds Observed Discarded	For every metric ton of mackerel caught, pounds of given species caught.	For every metric ton of mackerel caught, pounds of given species discarded.	D:K Ratio (Ratio of species discarded to Mackerel Kept)	Of all discards observed, percent that comes from given species	Percent of given species that was discarded	Rough Annual Catch (pounds) based on 5-year (2006-2010) average of mackerel catch (29,200 mt)
Directed Mackerel Trip Bycatch and Discards								
DOGFISH SPINY	153,250	143,036	16.1	15.0	0.0068	47%	93%	468,934
HERRING, ATLANTIC	7,300,067	71,601	765.0	7.5	0.0034	23%	1%	22,337,625
SCUP	41,899	41,848	4.4	4.4	0.0020	14%	100%	128,206
FISH, NK	18,800	18,800	2.0	2.0	0.0009	6%	100%	57,527
MACKEREL, ATLANTIC	21,037,906	18,575	2,204.6	1.9	0.0009	6%	0%	NA
HERRING (NK)	2,859	2,859	0.3	0.3	0.0001	1%	100%	8,748
BUTTERFISH	13,151	2,821	1.4	0.3	0.0001	1%	21%	40,240
BASS, STRIPED	1,605	1,605	0.2	0.2	0.0001	1%	100%	4,911
SQUID (ILLEX)	2,709	1,148	0.3	0.1	0.0001	0%	42%	8,290
HAKE, SILVER	16,433	1,032	1.7	0.1	0.0000	0%	6%	50,284
SHAD, AMERICAN	3,502	702	0.4	0.1	0.0000	0%	20%	10,717
HERRING, BLUE BACK	97,416	644	10.2	0.1	0.0000	0%	1%	298,084
DOGFISH (NK)	500	500	0.1	0.1	0.0000	0%	100%	1,530
SEA BASS, BLACK	638	469	0.1	0.0	0.0000	0%	74%	1,952
SEA ROBIN, NORTHERN	330	312	0.0	0.0	0.0000	0%	95%	1,010
ALEWIFE	22,152	305	2.3	0.0	0.0000	0%	1%	67,783

Table 68. Pounds of Key Species Recorded as Caught but "Unobserved" by Observer on Mackerel Trips 2006-2010.

Common Name	Observed Weight
MACKEREL, ATLANTIC	7,911,525
HERRING, ATLANTIC	2,328,573
FISH, NK	913,197
DOGFISH SPINY	27,081
ALEWIFE	15,633
HERRING, BLUE BACK	6,367
SCUP	3,968
SHAD, AMERICAN	3,845

Impacts for each alternative are discussed below:

1a – status quo – The U.S. ABC of 47,395 would be the likely effective U.S. catch limit. The Canadian catch assumption would be 32,605 mt.

Due to the year-to-year variation in catch and effort in the mackerel fishery, there is some uncertainty in non-target impacts but since the likely effective catch limit would remain the same, impacts would be expected to be approximately similar to the prior fishing year.

1b – preferred – The combination of the commercial and recreational ACTs, 37,350 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.b.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1b as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1c – high alternative – The combination of the commercial and recreational ACTs, 54,412 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.c.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 1c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status quo alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

1d – low alternative – The combination of the commercial and recreational ACTs, 20,288 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.d.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1d as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1e – fallback alternative – ABC = 43,781 would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.e.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1e as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

Relative Comparison Between Alternatives

The lower the potential catch, the more protective of non-target resources any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to non-target resources, 1d > 1b > 1e > 1a > 1c. In other words 1d would most benefit non-target resources. However, since recent catch has been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.1.2 Habitat Impacts

This fishery is prosecuted primarily with mid-water trawls, which do not contact the seabed. About 28% of the mackerel harvested were caught with bottom trawl gear in 2010.

1a – status quo – The U.S. ABC of 47,395 would be the likely effective U.S. catch limit. The Canadian catch assumption would be 32,605 mt.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

1b – preferred – The combination of the commercial and recreational ACTs, 37,350 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.b.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1b as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1c – high alternative – The combination of the commercial and recreational ACTs, 54,412 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.c.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 1c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status-quo alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

1d – low alternative – The combination of the commercial and recreational ACTs, 20,288 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.d.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1d as an implemented specification should be more protective than the status quo.   However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1e – fallback alternative – ABC = 43,781 would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.e.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1e as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

<u>Relative Comparison Between Alternatives</u>

The lower the potential catch, the more protective of habitat any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to habitat, 1d > 1b > 1e > 1a > 1c. In other words 1d would most benefit habitat. However, since recent catch has been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.1.3 Impacts on Endangered and Other Protected Species

Section 6.4 describes the available information on interactions between the mackerel fishery and endangered and other protected species. Since the mackerel fishery overlaps with some marine mammal distributions, some marine mammal interactions are possible with the species highlighted in Section 6.4. The distribution of sea turtles also overlaps with the operation of the mackerel fishery. However, most of these species, including green, Kemp's ridley and loggerhead sea turtles, stay close to the coast feeding on bottom dwelling species (i.e., crabs) or vegetation where the mackerel fishery is less likely to occur and no interactions have been observed. Leatherbacks generally do not prey on fish (see Section 6.4 for references) and are unlikely to be attracted to operations of this fishery. While consumption of mackerel by Loggerheads has been documented, loggerheads do not generally target fast-moving fish such as mackerel (Dodd 1988). Thus, interactions between sea turtles and the mackerel fishery are not anticipated. Atlantic sturgeon occurs in the mackerel fishing area throughout the mackerel fishing season. The Stein et al. (2004a) review of sturgeon bycatch from 1989-2000 showed no observed sturgeon bycatch on vessels targeting Atlantic mackerel. Atlantic sturgeon interactions in small-mesh otter trawl fisheries from 2006-2010 have not been analyzed on a fishery-by-fishery basis (see Section 6.4.5), so it is not yet possible to determine if recent small-mesh otter trawl trips targeting Atlantic mackerel have contributed to sturgeon mortality. Impacts for each alternative are discussed below:

1a – status quo – The U.S. ABC of 47,395 would be the likely effective U.S. catch limit. The Canadian catch assumption would be 32,605 mt.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify protected species impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

1b – preferred – The combination of the commercial and recreational ACTs, 37,350 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.b.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify protected species impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1b as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1c – high alternative – The combination of the commercial and recreational ACTs, 54,412 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.c.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify protected species impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 1c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status-quo alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

1d – low alternative – The combination of the commercial and recreational ACTs, 20,288 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.d.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify protected species impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1d as an implemented specification should be more protective than the status quo.   However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

1e – fallback alternative – ABC = 43,781 would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. A full breakdown of all specifications is available in 5.1.e.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify protected species impacts but since the likely effective catch limit would be less than the status-quo, the impact of 1e as an implemented specification should be more protective than the status quo. However, since catch has recently been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

<u>Relative Comparison Between Alternatives</u>

The lower the potential catch, the more protective of protected resources any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to protected resources, 1d > 1b > 1e > 1a > 1c. In other words 1d would most benefit protected resources. However, since recent catch has been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.1.4 Impacts on Human Communities

Section 6 describes the importance of the mackerel fishery. The relative socio-economic impacts of the alternatives are described below. Socio-economic impacts are generally driven by landings quotas (DAH) but given the low level of discarding and small recreational catch this section will retain the practice of looking at ABCs/ACTs as above. Limitations on recreational harvest are not expected for any alternatives given recent recreational harvests. Comparisons of 1b-1e's catch limits are made to the status quo catch limit of 47,395mt. Impacts for each alternative are discussed below. Since the DAH (commercial landings limit) and RHL (recreational harvest limit) are important for human community impacts, those specifications are also listed below in addition to ABC where applicable (a full breakdown of all specifications is available in 5.1).

1a – status quo – The U.S. ABC of 47,395 would be the likely effective U.S. catch limit. The Canadian catch assumption would be 32,605 mt. DAH = 46,779 mt.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify human community impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year. This alternative would allow increased catch and revenues compared to how the fishery actually operated in either 2010 or 2011.

1b – preferred – The combination of the commercial and recreational ACTs, 37,350 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. DAH = 33,821 mt; RHL = 2,443 mt. A full breakdown of all specifications is available in 5.1.b.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify human community impacts. The preferred specifications for 2012 represent a reduction from the status quo but are still above recent (2008-2010) landings, so no change in landings would be expected as a result of the specifications in 2012 compared to how the fishery operated in 2011. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year but protection of the mackerel stock could lead to long term positive benefits.

1c – high alternative – The combination of the commercial and recreational ACTs, 54,412 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. DAH = 49,271 mt; RHL = 3,559 mt. A full breakdown of all specifications is available in 5.1.c.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify human community impacts. While 1c involves higher specifications, since recent (2008-2010) landings have been substantially below even the status quo specifications no change in landings would be expected. If the fishery did rebound, the 7,017 mt increase from 47,395 mt to 54,412 mt could theoretically represent $2.3 million in potential additional vessel revenues at 2012 ex-vessel prices, as well as additional opportunities related to support services. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year but insufficient protection of the mackerel stock could lead to long term negative benefits.

1d – low alternative – The combination of the commercial and recreational ACTs, 20,288 mt, would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. DAH = 18,371 mt; RHL = 1,327 mt. A full breakdown of all specifications is available in 5.1.d.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify human community impacts. 1d represents a reduction from the status quo but is still above recent (2008-2010) landings, so no change in landings would be expected as a result of the specifications in 2012 compared to how the fishery operated in 2011. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as “small negative” compared to the previous year but protection of the mackerel stock could lead to long term positive benefits.

1e – fallback alternative – ABC = 43,781 would be the likely effective U.S. catch limit with an assumed Canadian catch assumption of 36,219 mt. DAH = 42,419 mt. A full breakdown of all specifications is available in 5.1.e.

Due to the year-to-year variation in catch and effort in the mackerel fishery, it is difficult to quantify human community impacts. 1e represents a small reduction from the status quo but is still above recent (2008-2010) landings, so no change in landings would be expected as a result of the specifications in 2012 compared to how the fishery operated in 2011. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as “small negative” compared to the previous year but protection of the mackerel stock could lead to long term positive benefits.

Relative Comparison Between Alternatives

The higher the potential catch, the more revenue that can be produced, at least in the short term. From this point of view, in terms of benefits to human communities, 1d < 1b < 1e < 1a < 1c. In other words 1c would most benefit human communities in the short term. However, since recent catch has been below all of these there may be no effective difference between them in reality. Not enough is known about the long-term productivity of the managed resource to conclusively determine the long-term human community benefits of the various alternatives.

TALFF/JVP

The MSA provides that the specification of TALFF, if any, shall be that portion of the optimum yield of a fishery which will not be harvested by vessels of the United States. While a surplus existed between ABC and DAH for many years, that surplus has disappeared due to the downward adjustments of the specifications in recent years. Therefore, the Council concluded that no surplus exists between the US portion of the sustainable yield from this stock and the total U.S. ABC. As a result TALFF is specified as zero under all three alternatives considered by the Council. In addition, the term optimum yield under the Magnuson-Stevens Act means the amount of fish which will provide the provide the greatest overall benefit to the Nation with respect to food production, recreation, and the protection of marine ecosystems. The Council believes that the proposed level of IOY will provide the greatest overall benefit to the nation. Based on this analysis and a review of the state of the world mackerel market and possible increases in US production levels, the Council concluded that specifying an IOY resulting in zero TALFF will yield positive social and economic benefits to the mackerel fishery and to the Nation.

All alternatives include a JVP specification of zero. In years prior to 2005, the Council specified JVP greater than zero because it believed US processors lacked the capability to process the total amount of mackerel that US harvesters could land (i.e., this was a limiting factor). The Council systematically reduced JVP because it has concluded that the surplus between DAP and DAH has been declining as US shore side processing for mackerel has expanded over the last several years. This conclusion is reinforced by downward adjustments to the specifications. The Council received testimony from processors and harvesters that the shore side processing sector of this industry underwent substantial expansion in the early 2000s. US shore side processing capabilities for mackerel have expanded as a result of increased capacity at existing plants in Cape May, NJ as well as the addition of new processing facilities in New Bedford and Gloucester, MA. As a result of the expansion in shore side processing capacity in recent years and relatively low specifications, the Council concluded that shore side processing capacity was no longer a limiting factor relative to domestic production of mackerel.

7.2 Impacts of Other Management Measure Alternatives for Mackerel

Alternative 2a – Status Quo - No changes to the above management measures would be implemented.

No impacts to any resource would be expected by maintenance of the status quo.

Alternative 2b – Preferred - The directed fishery closes at 95% of the DAH.

No impacts to any resource would be expected by implementation of 2b. Given the separation of the commercial and recreational fishery contemplated in Amendment 11 or the Omnibus, 2b (closing at 95% instead of 90% of the DAH) would be expected to maintain an effective ability to close the commercial fishery and constrain catch to a particular target. The lack of a recreational allocation was part of the reason for the 10% buffer and having a 6.2% (the preferred allocation) allocation with a 5% buffer is almost the exact same as having a 0% allocation with a 10% buffer

Alternative 2c – Preferred - A 20,000 pound trip limit will be implemented if the directed fishery closes.

The current provision where post-closure trips limits are 50,000 pounds if the fishery closes on/after June 1 conflicts with Amendment 11. To avoid an in-season change this alternative would align the specifications with Amendment 11. No impacts to any resource would be expected by implementation of 2c. Currently if the fishery closes on/after June 1 a 50,000 pound post-closure trip limit is imposed. However, given the early-season operation of the mackerel fishery, if the fishery is going to close such a closure would most likely happen before June 1, not after June 1.

7.3 Impacts of Specification Alternatives for *Illex*

<u>General</u>

2010 catch (commercial only fishery) was likely (there is high uncertainty regarding exact *Illex* discards but they are generally low) less than 17,000 mt in 2010. Given the performance of the fishery in 2011 up to August 1, 2011, and given last years late season landings, it appears likely that catch in 2011 will be between 17,000 mt and 20,000 mt

The key factor in comparing potential impacts is to identify the effective limit on catch under any status quo or proposed alternative. To facilitate comparisons, the analysis below extracts the likely effective limit on catch. Again, the alternatives considered for 2012 are fully described in section 5.

7.3.1 Biological Impacts on Managed Resource and Non-Target Species

Managed Resource -Impacts for each alternative are discussed below:

3a – status quo – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the uncertainty regarding the *Illex* stock and its productivity, it is difficult to quantify impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

3b – preferred – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the uncertainty regarding the *Illex* stock and its productivity, it is difficult to quantify impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. The measures contained in 3b should constrain catches within the 24,000 mt recommended by the Council's SSC.

3c – high alternative – The ABC of 30,000 mt would be the likely effective catch limit.

Due to the uncertainty regarding the *Illex* stock and its productivity, it is difficult to quantify impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 3c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status quo alternative's specifications, impacts may be similar to the prior fishing year. The measures contained in 3c could lead to catches higher than the 24,000 mt recommended by the Council's SSC. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

3d – low alternative – The ABC of 18,000 mt would be the likely effective catch limit.

Due to the uncertainty regarding the *Illex* stock and its productivity, it is difficult to quantify impacts but since the likely effective catch limit would be less than the status-quo, the impact of 3d as an implemented specification should be more protective than the status quo. However, since usually recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. The measures contained in 3d should constrain catches within the 24,000 mt recommended by the Council's SSC. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

<u>3 Year Specifications – *Illex* Alternative 3b (preferred)</u>

For the first time the Council, consistent with the recommendations of its SSC, specified that the *Illex* squid specifications be set for 3 years subject to a positive annual review by the SSC. While on one hand setting specifications for 3 years for a species that lives less than a year may seem odd, the critical factor is that the primary information about the sustainability of the fishery comes from the SSC's finding that catches of 24,000 mt should be sustainable over time. Given it is unlikely that substantial new information on sustainable catch rates will be available next year, it is unlikely that any other specification will appear more appropriate. However, the SSC will review the fishery and if the SSC recommends a new ABC the Council would have to revisit these specifications given the SSC recommendation would constitute new "best available" scientific information. Setting 3 year specifications simply minimizes unnecessary paperwork if the SSC and Council decide not to propose any changes. Since the SSC must still review the fishery before the 2012 specifications are extended, there are no differential impacts from setting 3 year specifications versus 1 year specifications.

Relative Comparison Between Alternatives

The lower the potential catch, the more protective of the managed resource any alternative should be. From this point of view, in terms of benefits to the managed resource, 3d > 3b > 3a > 3c. In other words 3d would most benefit the managed resource. However, since recent catch has usually been below all of these there may be no effective difference between them in reality. Additionally, because of uncertainty regarding the productivity of the stock it is not possible to know whether any relative differences may be large or small.

Predator-Prey (Forage) Considerations

Given the current uncertainty regarding stock dynamics it is not really possible to quantify the impact of any particular catch on this species' availability for the various species and stocks of marine mammals, birds, and fish that prey on the managed resource. The Council did consider that specifications could be additionally reduced beyond other factors because of predator-prey considerations.

Non-Target Species

The primary species taken incidentally and discarded in the directed *Illex* fishery over the most recent five years of data (2006-2010) are listed in Table 69. Of the fisheries in this FMP *Illex* is generally considered to have the lowest catches of incidental species.

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 2006-2010 trips in the dealer weighout database to see if a certain trip definition could account for most *Illex* landed. The result of this review resulted in the following definition for *Illex* trips using landings: All trips that had at least 50% *Illex* by weight. This definition results in capturing 99.6% of all *Illex* landings in the dealer weighout database 2006-2010 and was applied to the observer database to examine discards in the *Illex* fishery. The resulting set of trips in the observer database included 18 on average for each year 2006-2010 (91 total – 2010 had a relatively high number of observed trips). These 91 trips made 962 hauls of which 94% 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. Estimates are made based on vessel captain/crew reports when a haul is unobserved. Data entries on unobserved hauls are included in **Table 70**.

Information for the species (99% of all discards) that make up most discards on these trips is presented in Table 69. For non-target species that are managed under their own fishery management plan, incidental catch/discards are also considered as part of the management of that fishery). Readers will note the high FISH, NK numbers. This was caused by one haul in 2009 that was too big to bring aboard a vessel and some had to be dumped (installed net sensors failed). While it had to be recorded as FISH, NK, the observer's log suggests that it was mostly squid ("Unknown as to how much was released, but observer saw a swordfish come out along with the squid."). Also, of the 75,042 pounds that did come aboard from this haul, the observer recorded only 42 pounds of *Illex* discarded and no other species observed.

The observed *Illex* caught on these trips accounted for approximately 11.0 % of the total *Illex* caught. 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 69 and the fact that about 15,314 mt of *Illex* were caught annually 2006-2010 to generally and very roughly estimate annual incidental catch for the species in the table. This is the last column in Table 69 and while the 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 estimates that can be calculated would only really be valid for the 99% of landings captured by the chosen directed *Illex* trip definition. It is even more difficult to assess the other 1% because to some degree the *Illex* itself is being caught incidental to other fisheries. Nonetheless, the *Illex*-to-other-species ratios were scaled up to the 100% of *Illex* caught to keep things relatively simple.

Impacts for each alternative are discussed below:

3a – status quo – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

3b – preferred – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

3c – high alternative – The ABC of 30,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 3c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status quo alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

3d – low alternative – The ABC of 18,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be less than the status-quo, the impact of 3d as an implemented specification should be more protective than the status quo. However, since usually recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

Table 69. Key Species Observed Taken and Discarded in Directed Trips for *Illex*, Based on Unpublished NMFS Northeast Fisheries Observer Program Data and Unpublished Dealer Weighout Data from 2006-2010. (see text for criteria). There Are 2204.6 Pounds in One Metric Ton.

NE Fisheries Science Center Common Name	Pounds Observed Caught	Pounds Observed Discarded	For every metric ton of Illex caught, pounds of given species caught.	For every metric ton of Illex caught, pounds of given species discarded.	D:K Ratio (Ratio of species discarded to Illex Kept)	Of all discards observed, percent that comes from given species	Percent of given species that was discarded	Rough Annual Catch (pounds) based on 5-year average of Illex landings (15,314 mt)
Directed Illex Trip Bycatch and Discards								
SQUID (ILLEX)	18,560,449	263,257	2,204.6	31	0.0144	64.1%	1%	NA
BUTTERFISH	51,629	37,497	6.1	4	0.0020	9.1%	73%	93,913
FISH, NK	25,994	25,994	3.1	3	0.0014	6.3%	100%	47,282
HAKE, SPOTTED	14,161	14,010	1.7	2	0.0008	3.4%	99%	25,759
DORY, BUCKLER (JOHN)	15,346	10,986	1.8	1	0.0006	2.7%	72%	27,915
HERRING (NK)	10,852	10,852	1.3	1	0.0006	2.6%	100%	19,739
DOGFISH SPINY	9,343	9,341	1.1	1	0.0005	2.3%	100%	16,994
MACKEREL, CHUB	10,226	8,243	1.2	1	0.0005	2.0%	81%	18,602
SQUID (LOLIGO)	75,449	6,648	9.0	1	0.0004	1.6%	9%	137,241
HAKE, SILVER	3,875	3,848	0.5	0	0.0002	0.9%	99%	7,049
SQUID, NK	3,612	3,612	0.4	0	0.0002	0.9%	100%	6,570
BEARDFISH	3,257	3,242	0.4	0	0.0002	0.8%	100%	5,924
HAKE, RED	2,825	2,825	0.3	0	0.0002	0.7%	100%	5,139
DOGFISH SMOOTH	1,257	1,257	0.1	0	0.0001	0.3%	100%	2,287
FLOUNDER, FOURSPOT	1,150	1,150	0.1	0	0.0001	0.3%	100%	2,092
WHITING, BLACK	1,036	1,036	0.1	0	0.0001	0.3%	100%	1,884
ANGLER	1,131	820	0.1	0	0.0000	0.2%	72%	2,057
SHAD, AMERICAN	779	636	0.1	0	0.0000	0.2%	82%	1,417
HADDOCK	582	582	0.1	0	0.0000	0.1%	100%	1,058
ROSEFISH,BLACK BELLY	504	490	0.1	0	0.0000	0.1%	97%	917
REDFISH	454	454	0.1	0	0.0000	0.1%	100%	826

Table 70. Pounds of all Species Recorded as Caught but "Unobserved" by Observer on *Illex* Trips 2006-2010.

COMNAME	HAILWTLB
SQUID (ILLEX)	1,083,940
SQUID (LOLIGO)	6,399
DORY, BUCKLER (JOHN)	166
TILEFISH, GOLDEN	105
ANGLER	80
HAKE, SILVER	4
TILEFISH	2

Relative Comparison Between Alternatives

The lower the potential catch, the more protective of non-target resources any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to non-target resources, 3d > 3b > 3a > 3c. In other words 3d would most benefit non-target resources. However, since recent catch has usually been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

Table 71. Sharks, Rays and Large Pelagic Finfish Species Discarded and Kept (numbers and weight, lbs) in the *Illex* Fishery Based on the NEFSC Observer Program Database, 1995-2008 (totals).

Given the relatively low numbers per year that the totals below translate into, this table was not updated for the 2012 specifications.

***Illex* Fishery**				
Common Name	Number Discarded	Weight (lbs) Discarded	Number Kept	Weight (lbs) Kept
CUTLASSFISH, ATL	418	245	0	0
GROUPER, NK	1	11	5	219
MACKEREL, FRIGATE	12	806	0	0
MOLA, OCEAN SUNFISH	28	6,279	0	0
RAY, NK	3	1,000	0	0
RAY, TORPEDO	11	129	0	0
RAY,MANTA, ATLANTIC	4	1,400	0	0
SHARK, ATL ANGEL	3	49	0	0
SHARK, BASKING	6	21,900	0	0
SHARK, BIGEYE SAND TIGER	1	150	0	0
SHARK, BIGNOSE	16	186	0	0
SHARK, BLACK TIP	2	24	0	0
SHARK, BLUE (BLUE DOG)	1	300	0	0
SHARK, CARCHARHIN,NK	5	118	0	0
SHARK, DUSKY	19	806	0	0
SHARK, FINETOOTH	1	19	0	0
SHARK, HAMMERHEAD, GREAT	7	2,000	0	0
SHARK, HAMMERHEAD, SCALL(	35	8,045	0	0
SHARK, HAMMERHEAD,NK	7	1,035	0	0
SHARK, MAKO, NK	0	0	1	300
SHARK, NIGHT	1	23	0	0
SHARK, NK	4	293	0	0
SHARK, PORBEAGLE	1	7	0	0
SHARK, SILKY	2	91	0	0
SHARK, THRESHER	2	425	0	0
SHARK, THRESHER, BIGEYE	1	300	0	0
SHARK, TIGER	2	800	0	0
SKATE, LITTLE	1	250	0	0
STINGRAY, ROUGHTAIL	2	500	0	0
SWORDFISH	216	9,199	165	14,241
TUNA, BIG EYE	3	470	2	400
TUNA, BLUEFIN	1	57	1	100
TUNA, YELLOWFIN	6	355	8	490

7.3.2 Impacts on Habitat

Illex are taken almost exclusively by bottom otter trawls. Impacts for each alternative are discussed below:

3a – status quo – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

3b – preferred – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

3c – high alternative – The ABC of 30,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 3c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status quo alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

3d – low alternative – The ABC of 18,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be less than the status-quo, the impact of 3d as an implemented specification should be more protective than the status quo. However, since usually recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

<u>Relative Comparison Between Alternatives</u>

The lower the potential catch, the more protective of habitat any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to habitat, 3d > 3b > 3a > 3c. In other words 3d would most benefit habitat. However, since recent catch has usually been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.3.3 Impacts on Endangered and Other Protected Species

Section 6.4 describes available information relative to fishery interactions with protected resources and the mackerel, squid and butterfish fisheries. There are no known interactions between the *Illex* fishery and any ESA listed species including sea turtles. Based on an analysis of available observer data, the cetaceans of primary concern relative to the prosecution of the *Illex* fishery are pilot whales. NMFS has convened a take reduction team to develop measures to reduce the take of common dolphins and pilot whales in offshore Atlantic trawl fisheries, including the *Illex* fishery. See section 6.4.2 for details on this take reduction team. Atlantic sturgeon occurs in the *Illex* fishing area throughout the *Illex* fishing season. The Stein et al. (2004a) review of sturgeon bycatch from 1989-2000 showed no observed sturgeon bycatch on vessels targeting *Illex*. Atlantic sturgeon interactions in small-mesh otter trawl fisheries from 2006-2010 have not been analyzed on a fishery-by-fishery basis (see Section 6.4.5), so it is not yet possible to determine if recent small-mesh otter trawl trips targeting *Illex* have contributed to sturgeon mortality. Impacts for each alternative are discussed below:

3a – status quo – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify protected resource impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

3b – preferred – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify protected resource impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year

3c – high alternative – The ABC of 30,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify protected resource impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 3c as an implemented specification should be less protective than the status quo. However, since catch has recently been below even the status quo alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

3d – low alternative – The ABC of 18,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify protected resource impacts but since the likely effective catch limit would be less than the status-quo, the impact of 3d as an implemented specification should be more protective than the status quo. However, since usually recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

Relative Comparison Between Alternatives

The lower the potential catch, the more protective of protected resources any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to protected resources, 3d > 3b > 3a > 3c. In other words 3d would most benefit protected resources. However, since recent catch has usually been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.3.4 Impacts on Human Communities

Section 6 describes the importance of the *Illex* fishery. The relative socio-economic impacts of the alternatives are described below.

3a – status quo – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify human community impacts. Given the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year. This alternative would however allow increased catch and revenues compared to how the fishery actually operated in 2010 (the outcome of the 2011 fishery is unknown).

3b – preferred – The ABC of 24,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify human community impacts. Given the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year. This alternative would however allow increased catch and revenues compared to how the fishery actually operated in 2010. 2011 catches could be near the status-quo alternative for 2012. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit.

3c – high alternative – The ABC of 30,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify human community impacts. Given the likely effective catch limit would be higher than the status-quo, the impact of 3c as an implemented specification could increase revenues in the short term but could decrease sustainability in the long term. However, since catch has recently been below even the status quo alternative's specifications, impacts may be similar to the prior fishing year. At 2010 ex-vessel prices, the 6,000 mt increase could represent $4.1 million in potential additional vessel revenues and additional opportunities related to support services compared to the status quo. This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "unknown" compared to the previous year.

3d – low alternative – The ABC of 18,000 mt would be the likely effective catch limit.

Due to the year to year variation in catch and effort in the *Illex* fishery, it is difficult to quantify human community impacts. Given the likely effective catch limit would be less than the status-quo, the impact of 3d as an implemented specification could lower revenues in the short term but could increase sustainability in the long term. However, since usually recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. At 2010 ex-vessel prices, the 6,000 mt decrease could represent $4.1 million in forgone vessel revenues and additional forgone opportunities related to support services compared to the status quo. This alternative would however allow increased catch and revenues compared to how the fishery actually operated in 2010 (the outcome of the 2011 fishery is unknown). This alternative also utilizes a somewhat larger (i.e. more conservative) assumption for discards compared to the status quo but impacts would be minimal relative to potential changes to the catch limit. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

<u>Relative Comparison Between Alternatives</u>

The higher the potential catch, the more revenue that can be produced, at least in the short term. From this point of view, in terms of benefits to human communities, 3d < 3b < 3a < 3c. In other words 3c would most benefit human communities in the short term. However, since recent catch has usually been below all of these there may be no effective difference between them in reality. Not enough is known about the long-term productivity of the managed resource to determine the long-term human community benefits of the various alternatives.

7.4 Impacts of Specification Alternatives for Butterfish

<u>General</u>

Implementation of the Omnibus in 2012 is not expected to have any impacts related to the 2012 butterfish specifications since the fishery was managed under binding quotas enforced by in-season closures prior to the Omnibus for both landings and discards via the butterfish cap on the longfin squid fishery. While there have been some DAH overages in recent years, the proposed increase in butterfish DAH combined with generally maintaining other constraints (e.g. trip limits) should avoid any overages that would have to be repaid the following year.

Thus the key factor in comparing potential impacts is to identify the effective limit on catch and/or effort under any status quo or proposed alternative. Where appropriate, the analysis below extracts the likely effective limits on catch regardless of the name given to various specification designations pre or post-Omnibus. Again, the alternatives considered for 2012 are fully described in section 5. 2010 landings were 603 mt and it is likely that 2011 landings will be in the same range given 2011 fishery performance to date and given the directed fishery had already closed in July 2011.

7.4.1 Biological Impacts on Managed Resource and Non-Target Species

The alternatives considered for 2012 are fully described in section 5 and are summarized in the Managed Resource Impact section below. Changes to measures other than specifications are evaluated in the next section. Also, up to 3% of the IOY may be set aside for scientific research.

Managed Resource

The 2010 butterfish assessment suggested that catch throughout the range being considered in the alternatives (1,500 mt to 4,528mt) would be unlikely to have any substantial impact on the butterfish stock for better or for worse. Alternative 4c could result in catch higher than the ABC provided by the Council's SSC however.

Predator-Prey (Forage) Considerations

Given the current uncertainty regarding stock dynamics it is not really possible to quantify the impact of any particular catch on this species availability for the various species and stocks of marine mammals, birds, and fish that prey on the managed resource. The Council did consider that specifications could be additionally reduced beyond other factors because of predator-prey considerations.

Non-Target Species

For non-target species that are managed under their own fishery management plan, incidental catch/discards are also considered as part of the management of that fishery. The list of species taken incidentally and discarded in the butterfish fishery is not calculated because currently there is very limited directed fishing for butterfish because of both regulations and market demand. It is also very difficult to identify a directed butterfish trip in the observer database and double counting with other fisheries would likely occur due to the incidental nature of the fishery. Prior specifications identified butterfish, red hake, silver hake, spiny dogfish, scup, unclassified skates, fourspot flounder, longfin squid, mackerel, and little skate as primary bycatch and/or discard species in the butterfish fishery. All of these species would be expected to be negatively impacted to some degree by the re-establishment of the butterfish fishery. While the butterfish landings quota (DAH) is proposed to increase in 2012, the proposed trip limits and mesh limits are still expected to prevent re-establishment of a directed fishery so impacts are likely to be similar to the previous fishing year (i.e. butterfish will still primarily be an incidental fishery).

Since the butterfish ABC/ACT is tied to the longfin squid's butterfish mortality cap, the higher the butterfish ABC/ACT is, the less likely a related closure would be (i.e. more longfin squid effort). This could impact non-target species in the longfin squid fishery as discussed in the longfin squid alternatives section but since there has not yet been a closure related to the butterfish cap the impact may be nil compared to how the fishery operated in 2011. Given the above, overall impacts for the status quo should be similar to the previous year and any of the other alternatives (increasing the butterfish ABC) are likely best characterized as "small negative" compared to the previous year.

7.4.2 Impacts on Habitat

Butterfish are taken with a number of gears. The gear of concern relative to habitat is bottom otter trawls which account for most of the landings in any given year. However, because as described above, none of the alternatives are expected to change directed effort, impacts on habitat are likely to be similar to the previous fishing year. Since the butterfish ABC/ACT is tied to the longfin squid's butterfish mortality cap, the higher the butterfish ABC/ACT is, the less likely a related closure would be (i.e. more longfin squid effort). This could impact habitat affected by the longfin squid fishery as discussed in the longfin squid alternatives section but since there has not yet been a closure related to the butterfish cap the impact may be nil compared to how the fishery operated in 2011. Given the above, overall impacts for the status quo should be similar to the previous year and any of the other alternatives (increasing the butterfish ABC) are likely best characterized as "small negative" compared to the previous year.

7.4.3 Impacts on Endangered and Other Protected Species

The basic interactions between fisheries and protected resources are discussed in section 6.4 (see Affected Environment). As discussed in that section, these fisheries were listed as Category 1 fisheries but have recently been changed to Category 2 fisheries under MMPA. However, within the overall classification, no interactions between marine mammals and the butterfish fishery have been observed. Therefore, the impacts expected from the alternatives considered should be minimal based on available data. Also, as described above none of the alternatives are expected to change directed effort, so impacts on protected species are likely to be similar to the previous fishing year regardless of magnitude. While the butterfish landings quota (DAH) is proposed to increase in 2012, the proposed trip limits and mesh limits are still expected to prevent re-establishment of a directed fishery so butterfish will still primarily be an incidental fishery. Since the butterfish ABC/ACT is tied to the longfin squid's butterfish mortality cap, the higher the butterfish ABC/ACT is, the less likely a related closure would be (i.e. more longfin squid effort). This could affect protected resource impacts from the longfin squid fishery as discussed in the longfin squid alternatives section but since there has not yet been a closure related to the butterfish cap, the impact may be nil compared to how the fishery operated in 2011. Given the above, overall impacts for the status quo should be similar to the previous year and any of the other alternatives (increasing the butterfish ABC) are likely best characterized as "small negative" compared to the previous year.

7.4.4 Impacts on Human Communities

Section 6 describes the importance of the butterfish fishery. While the trip limits for butterfish should prevent reestablishment of a directed fishery, the higher DAH proposed could translate to additional revenue by avoiding the very low trips limits imposed when butterfish nears the DAH, thereby converting some butterfish that would be discarded into landings.

Changes in the butterfish ABC, ACT, and ACL have two possible economic effects. The first potential effects are the direct changes in revenues as described below. The second set of potential effects are 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.

4a – status quo – The ABC of 1,811 mt would be the likely effective catch limit.

This ABC would translate into a DAH of 500 mt, the status quo, so impacts would be expected to be similar to the prior fishing year. However, at this level a DAH overage may be likely, which would cause deductions in following years, which could impact revenues from both butterfish and longfin squid as discussed above.

4b – preferred – The ACT of 3,260 mt would be the likely effective catch limit.

This ACT would translate into a DAH of 1,087mt. Given the likely effective catch limit and landings would be greater than the status-quo, the impact of 4b as an implemented specification could increase revenues in the short term and should not affect sustainability in the long term. At 2010 ex-vessel prices, 587 mt of additional butterfish landings could represent $0.8 million in potential additional vessel revenues and additional opportunities related to support services compared to the status quo, as well as increasing the shadow value of butterfish as described above. Given the above, overall impacts are likely best characterized as "positive" compared to the previous year.

4c – high alternative – The ACT of 4,528 mt would be the likely effective catch limit.

This ACT would translate into a DAH of 1,358mt. Given the likely effective catch limit and landings would be greater than the status-quo, the impact of 4c as an implemented specification could increase revenues in the short term and should not affect sustainability in the long term. At 2010 ex-vessel prices, 587 mt of additional butterfish landings could represent $1.2 million in potential additional vessel revenues and additional opportunities related to support services compared to the status quo, as well as increasing the shadow value of butterfish as described above. Given the above, overall impacts are likely best characterized as "positive" compared to the previous year.

4d – low alternative – The ACT of 2,445 mt would be the likely effective catch limit.

This ACT would translate into a DAH of 815mt. Given the likely effective catch limit and landings would be greater than the status-quo, the impact of 4d as an implemented specification could increase revenues in the short term and should not affect sustainability in the long term. At 2010 ex-vessel prices, 315 mt of additional butterfish landings could represent $0.5 million in potential additional vessel revenues and additional opportunities related to support services compared to the status quo, as well as increasing the shadow value of butterfish as described above. Given the above, overall impacts are likely best characterized as "positive" compared to the previous year.

4e – fallback alternative – ABC = 3,622 would be the likely effective catch limit.

This ACT would translate into a DAH of 1087mt. Given the likely effective catch limit and landings would be greater than the status-quo, the impact of 4e as an implemented specification could increase revenues in the short term and should not affect sustainability in the long term. At 2010 ex-vessel prices, 587 mt of additional butterfish landings could represent $0.8 million in potential additional vessel revenues and additional opportunities related to support services compared to the status quo, as well as increasing the shadow value of butterfish as described above. Given the above, overall impacts are likely best characterized as "positive" compared to the previous year.

Relative Comparison Between Alternatives

The higher the potential catch, the more revenue that can be produced, at least in the short term. From this point of view, in terms of benefits to human communities, 4a< 4d < 4b < 4c. In other words 4c would most benefit human communities in the short term. Not enough is known about the long-term productivity of the managed resource to determine the long-term human community benefits of the various alternatives.

7.5 Impacts of Other Management Measure Alternatives for Butterfish

The status-quo management measures that can be changed via annual actions for butterfish are described in Section 5.5.

The only change proposed for 2012 involves the threshold when 3-inch mesh is required. Related to the increased quota and hopefully to convert some discards to landings, the threshold is proposed to be 2,000 pounds instead to the current 1,000 pounds. To address this issue two alternatives are described below:

Alternative 5a – Status Quo

No changes to the above management measures would be implemented. No impacts of any sort would be expected.

Alternative 5b – Preferred - A 3-inch mesh would be required to possess 2,000 pounds or more of butterfish.

This would enable some additional retention of butterfish by small-mesh fishing gear. Given there is still a 5000 pound trip limit regardless of mesh, additional directing is not anticipated, so there would be no changes to managed resources, non-target species, habitat, or protected species. The only impact would be to reduce regulatory discarding of incidentally-caught butterfish, which may have some socio-economic benefits in terms of a modest increase to per-trip revenues. At 2010 prices an extra 1000 pounds of butterfish could result in an extra $651 dollars in ex-vessel revenues per trip.

7.6 Impacts of Specification Alternatives for Longfin Squid

General

2010 catch (commercial only fishery) was likely less than 7,500 mt in 2010. There is high uncertainty regarding exact longfin squid discards but they are generally low. Given the performance of the fishery in 2011 up to August 1, 2011, and given the historical operation of the fishery, it appears likely that catch in 2011 will be between 10,000 mt and 20,000 mt.

The key factor in comparing potential impacts is to identify the effective limit on catch under any status quo or proposed alternative. To facilitate comparisons, the analysis below extracts the likely effective limit on catch. Again, the alternatives considered for 2012 are fully described in section 5

7.6.1 Biological Impacts on Managed Resource and Non-Target Species

Managed Resource Impacts

6a – status quo – The likely effective landings limit would be the status-quo IOY of 20,000mt adjusted up per the discard estimates used for the 2012 specifications to ensure and apples to apples comparison. Accounting for 4.08% discards results in a catch limit of 20,851mt.

Given the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year. Due to the uncertainty regarding the longfin squid stock and its productivity, it is difficult to quantify impacts but the 2010 longfin squid assessment found that catches at or below 23,400 are likely to be sustainable.

6b – preferred – The likely effective catch limit would be the ABC of 23,400.

Given the likely effective catch limit would be higher than the status-quo, the impact of 6b as an implemented specification might be less protective than the status quo. However, since recent catch has been below this alternative’s specifications, impacts may be similar to the prior fishing year. Due to the uncertainty regarding the longfin squid stock and its productivity, it is difficult to quantify impacts but the 2010 longfin squid assessment found that catches at or below 23,400 are likely to be sustainable. Given the above, overall impacts are likely best characterized as similar to the previous year.

6c – high alternative – The likely effective catch limit would be an ABC of 29,250mt.

Given the likely effective catch limit would be higher than the status-quo, the impact of 6c as an implemented specification should be less protective than the status quo. However, since recent catch has been below even the status quo alternative’s specifications, impacts may be similar to the prior fishing year. Due to the uncertainty regarding the longfin squid stock and its productivity, it is difficult to quantify impacts, however the measures contained in 6c could lead to catches higher than the 23,400 mt recommended by the Council's SSC and supported by the 2010 longfin squid assessment. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

6d – low alternative – The likely effective catch limit would be an ABC of 17,550mt.

Given the likely effective catch limit would be less than the status-quo, the impact of 6d as an implemented specification should be more protective than the status quo. However, since recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. Due to the uncertainty regarding the longfin squid stock and its productivity, it is difficult to quantify impacts but the 2010 longfin squid assessment found that catches at or below 23,400 are likely to be sustainable. The measures contained in 6d should also constrain catches within the 23,400 mt recommended by the Council's SSC. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

<u>3 Year Specifications – Longfin Squid Alternative 6b (Preferred)</u>

For the first time the Council, consistent with the recommendations of its SSC, specified that the Longfin squid specifications be set for 3 years subject to a positive annual review by the SSC. While on one hand setting specifications for 3 years for a species that lives less than a year may seem odd, the critical factor is that the primary information about the sustainability of the fishery comes from an assessment that concluded catches of 23,400 mt should be sustainable and potentially exploitation rates could be increased, but it was impossible to determine how much. Given it is unlikely that substantial new information on sustainable catch rates will be available next year, it is unlikely that any other specification will appear more appropriate. However, the SSC will review the fishery and if the SSC recommends a new ABC the Council would have to revisit the longfin squid specifications given the SSC recommendation would constitute new "best available" scientific information. Setting 3 year specifications just minimizes unnecessary paperwork if the SSC and Council decide not to propose any changes. Since the SSC must still review the fishery before the 2012 specifications are extended, there are no differential impacts from setting 3 year specifications versus 1 year specifications.

<u>Relative Comparison Between Alternatives</u>

The lower the potential catch, the more protective of the managed resource any alternative should be. From this point of view, in terms of benefits to the managed resource, 6d > 6a > 6b > 6c. In other words 6d would most benefit the managed resource. However, since recent catch has been below all of these there may be no effective difference between them in reality. Additionally, because of uncertainty regarding the productivity of the stock it is not possible to know whether any relative differences may be large or small.

Predator-Prey (Forage) Considerations

Given the current uncertainty regarding stock dynamics it is not really possible to quantify the impact of any particular catch on this species availability for the various species and stocks of marine mammals, birds, and fish that prey on the managed resource. The Council did consider that specifications could be additionally reduced beyond other factors because of predator-prey considerations.

Non-Target Species

For non-target species that are managed under their own fishery management plan, incidental catch/discards are also considered as part of the management of that fishery. The primary species taken incidentally and discarded in the directed longfin squid fishery over the most recent five years of data (2006-2010) are listed in Table 72 and include the species that account for 94% of all observed discards on the identified longfin squid trips. Of the fisheries in this FMP longfin squid is generally considered to have the highest catches of incidental species.

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 2006-2010 trips in the dealer weighout database to see if a certain trip definition could account for most longfin squid landed. 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 almost 91% of all longfin squid landings in the dealer weighout database. 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 83 on average for each year 2006-2010 (413 total – 2009 and 2010 had relatively high numbers of observed trips). These 413 trips made 4186 hauls of which 91% 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. Data entries on unobserved hauls are included in Table 73.

The observed longfin squid caught on these trips accounted for approximately 3.5% of the total longfin squid caught. 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 72 and the fact that about 11,634 MT of longfin squid were caught annually 2006-2010 to generally and very 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 estimates that can be calculated would only really be valid for the 91% of landings captured by the chosen directed trip definition. It is even more difficult to assess the other 9% because to some degree the longfin squid is being caught incidental to other fisheries. Nonetheless, the longfin squid-to-other-species ratios were scaled up to the 100% of longfin squid catch to keep things relatively simple. The slightly more-inclusive definition of a longfin squid trip used this year may be the cause of some sizable changes in the incidental catch estimates compared to last year, reinforcing the caveat that those estimates should be treated as relative indicators rather than actionable point estimates.

Table 72. Key Species Observed Taken and Discarded in Directed Trips for Longfin Squid, Based on Unpublished NMFS Northeast Fisheries Observer Program Data and Unpublished Dealer Weighout Data from 2006-2010. (see text for criteria). There Are 2204.6 Pounds in One Metric Ton.

NE Fisheries Science Center Common Name	Pounds Observed Caught	Pounds Observed Discarded	For every metric ton of Loligo caught, pounds of given species caught.	For every metric ton of Loligo caught, pounds of given species discarded.	D:K Ratio (Ratio of species discarded to Loligo Kept)	Of all discards observed, percent that comes from given species	Percent of given species that was discarded	Rough Annual Catch (pounds) based on 5-year average of Loligo catch (11634 mt)
Directed Loligo Trip Bycatch and Discards								
BUTTERFISH	524,478	490,523	260.3	243.4	0.11	0.17	0.94	3,027,814
DOGFISH SPINY	327,240	326,342	162.4	161.9	0.07	0.11	1.00	1,889,160
SQUID (ILLEX)	651,634	254,007	323.4	126.0	0.06	0.09	0.39	3,761,885
HAKE, SILVER	310,387	240,680	154.0	119.4	0.06	0.08	0.78	1,791,865
HAKE, SPOTTED	227,516	221,705	112.9	110.0	0.05	0.08	0.97	1,313,452
SCUP	225,359	147,507	111.8	73.2	0.03	0.05	0.65	1,301,001
HAKE, RED	151,091	141,791	75.0	70.4	0.03	0.05	0.94	872,248
SKATE, LITTLE	129,078	128,741	64.1	63.9	0.03	0.04	1.00	745,167
FLOUNDER, FOURSPOT	90,270	90,101	44.8	44.7	0.02	0.03	1.00	521,128
SQUID (LOLIGO)	4,442,800	86,808	2204.6	43.1	0.02	0.03	0.02	NA
MACKEREL, ATLANTIC	301,008	75,364	149.4	37.4	0.02	0.03	0.25	1,737,723
FLOUNDER, SUMMER	99,681	50,938	49.5	25.3	0.01	0.02	0.51	575,461
SCALLOP, SEA	55,802	47,427	27.7	23.5	0.01	0.02	0.85	322,145
DOGFISH SMOOTH	48,695	44,503	24.2	22.1	0.01	0.02	0.91	281,118
SEA WEEDS	37,692	37,692	18.7	18.7	0.01	0.01	1.00	217,594
CRAB, LADY	36,931	36,931	18.3	18.3	0.01	0.01	1.00	213,200
BASS, STRIPED	32,826	31,097	16.3	15.4	0.01	0.01	0.95	189,504
HERRING, ATLANTIC	30,188	30,188	15.0	15.0	0.01	0.01	1.00	174,274
SKATE, BIG	27,459	27,057	13.6	13.4	0.01	0.01	0.99	158,519
SKATE, NK	25,968	25,873	12.9	12.8	0.01	0.01	1.00	149,915
FLOUNDER, WINTER	23,383	23,059	11.6	11.4	0.01	0.01	0.99	134,993
HERRING (NK)	20,892	20,882	10.4	10.4	0.00	0.01	1.00	120,610
ANGLER	44,126	18,540	21.9	9.2	0.00	0.01	0.42	254,740
BLUEFISH	43,050	18,402	21.4	9.1	0.00	0.01	0.43	248,530
DORY, BUCKLER (JOHN)	33,895	14,465	16.8	7.2	0.00	0.01	0.43	195,678
SKATE, BARNDOOR	12,720	12,660	6.3	6.3	0.00	0.00	1.00	73,434
SEA BASS, BLACK	18,185	12,433	9.0	6.2	0.00	0.00	0.68	104,984
HAKE, WHITE	13,360	12,255	6.6	6.1	0.00	0.00	0.92	77,125
LOBSTER	15,560	12,093	7.7	6.0	0.00	0.00	0.78	89,830
FISH, NK	6,076	6,033	3.0	3.0	0.00	0.00	0.99	35,078
TAUTOG	6,047	5,617	3.0	2.8	0.00	0.00	0.93	34,910
SHAD, AMERICAN	5,501	5,431	2.7	2.7	0.00	0.00	0.99	31,758
HADDOCK	3,897	3,883	1.9	1.9	0.00	0.00	1.00	22,495
HERRING, BLUE BACK	2,911	2,911	1.4	1.4	0.00	0.00	1.00	16,806
FLOUNDER, YELLOWTAIL	2,244	1,506	1.1	0.7	0.00	0.00	0.67	12,952
ALEWIFE	2,356	1,276	1.2	0.6	0.00	0.00	0.54	13,600
SHAD, HICKORY	1,007	915	0.5	0.5	0.00	0.00	0.91	5,811

Table 73. Pounds of All Species Recorded as Caught but "Unobserved" by Observer on Longfin Squid Trips 2006-2010 With at least 1,000 Pounds of Entered Catch.

COMNAME	HAILWTLB
SQUID (LOLIGO)	391,495
SQUID (ILLEX)	63,932
HAKE, SILVER	18,687
SCUP	7,878
FLOUNDER, SUMMER	5,873
DOGFISH SPINY	4,900
BUTTERFISH	3,429
FISH, NK	3,023
HAKE, RED	2,624
WHITING, BLACK	1,307
ANGLER	1,262
SCALLOP, SEA	1,222

6a – status quo – The likely effective landings limit would be the status-quo IOY of 20,000mt adjusted up per the discard estimates used for the 2012 specifications to ensure and apples to apples comparison. Accounting for 4.08% discards results in a catch limit of 20,851mt.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would remain the same, impacts would be expected to be approximately similar to the prior fishing year.

6b – preferred – The likely effective catch limit would be the ABC of 23,400.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 6b as an implemented specification should be less protective than the status quo. However, since recent catch has been below even the status-quo specifications, impacts may be similar to the prior fishing year. Also, continued operation of the butterfish mortality cap and the recent increase in mesh should continue to minimize bycatch to the extent practicable. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

6c – high alternative – The likely effective catch limit would be an ABC of 29,250mt.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 6c as an implemented specification should be less protective than the status quo. However, since recent catch has been below even the status-quo specifications, impacts may be similar to the prior fishing year. Also, continued operation of the butterfish mortality cap and the recent increase in mesh should continue to minimize bycatch to the extent practicable. Given the above, overall impacts are likely best characterized as “small negative” compared to the previous year.

6d – low alternative – The likely effective catch limit would be an ABC of 17,550mt.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify non-target impacts but since the likely effective catch limit would be less than the status-quo, the impact of 6d as an implemented specification should be more protective than the status quo.   However, since recent catch has been below this alternative’s specifications, impacts may be similar to the prior fishing year. Also, the continued operation of the butterfish mortality cap and the recent increase in mesh should continue to minimize bycatch to the extent practicable. Given the above, overall impacts are likely best characterized as “small positive” compared to the previous year.

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Table 74. Sharks, Rays and Large Pelagic Finfish Species Discarded and Kept (numbers and weight, lbs) in the Longfin Squid Fishery Based on the NEFSC Observer Program Database, 1995-2008.

Given the relatively low numbers per year that the totals below translate into, this table was not updated for the 2012 specifications.

Loligo Fishery				
Common Name	Number Discarded	Weight (lbs) Discarded	Number Kept	Weight (lbs) Kept
AMBERJACK, NK	1	1	1	3
BARRACUDA, NK	4	7	0	0
BONITO, ATLANTIC	3	6	5	37
COBIA	0	0	1	15
GROUPER, NK	2	17	13	335
MOLA, OCEAN SUNFISH	9	2,750	0	0
NEEDLEFISH, ATLANTIC	4	1	0	0
OILFISH	1	23	0	0
RAY, BUTTERFLY, SPINY	3	153	0	0
RAY, NK	3	134	0	0
RAY, TORPEDO	162	5,716	0	0
SHARK, ATL ANGEL	5	60	0	0
SHARK, BASKING	23	86,050	0	0
SHARK, BLUE (BLUE DOG)	3	240	0	0
SHARK, BULL	0	0	4	34
SHARK, DUSKY	11	564	1	42
SHARK, HAMMERHEAD, SCALLOPED	6	1,825	0	0
SHARK, HAMMERHEAD, SMOOTH	2	270	0	0
SHARK, HAMMERHEAD,NK	11	2,640	0	0
SHARK, MAKO, NK	1	3	1	65
SHARK, NIGHT	1	10	0	0
SHARK, NK	7	355	0	0
SHARK, PORBEAGLE	5	540	0	0
SHARK, SAND TIGER	2	79	1	50
SHARK, SANDBAR	45	1,844	0	0
SHARK, SEVENGILL SHARPNOSE	1	8	0	0
SHARK, THRESHER	3	115	1	11
SHARK, THRESHER, BIGEYE	1	80	0	0
SHARK, TIGER	3	155	0	0
STINGRAY, ATLANTIC	2	40	0	0
STINGRAY, NK	1	9	0	0
STINGRAY, PELAGIC	1	10	0	0
STINGRAY, ROUGHTAIL	11	1,765	0	0
STURGEON, ATLANTIC	13	627	0	0
SWORDFISH	43	1,396	32	1,253
TUNA, BIG EYE	1	1	0	0
TUNA, BLUEFIN	3	113	0	0
TUNA, LITTLE (FALSE ALBACORE)	17	139	5	47
TUNA, NK	1	1	0	0
TUNA, SKIPJACK	1	3	0	0
TUNA, YELLOWFIN	2	3	1	28
WRECKFISH	0	0	4	41

Relative Comparison Between Alternatives

The lower the potential catch, the more protective of non-target resources any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to non-target resources, 6d > 6a > 6b > 6c. In other words 6d would most benefit non-target resources. However, since recent catch has been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.6.2 Impacts on Habitat

Longfin squid are taken with a number of gears, but the gears of concern relative to habitat are bottom otter trawls which account for most of the longfin squid landings in any given year. Since catch is limited by the availability of the resource, it is difficult to predict how changes in the specifications would affect effort and therefore habitat.

6a – status quo – The likely effective landings limit would be the status-quo IOY of 20,000mt adjusted up per the discard estimates used for the 2012 specifications to ensure and apples to apples comparison. Accounting for 4.08% discards results in a catch limit of 20,851mt.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year.

6b – preferred – The likely effective catch limit would be the ABC of 23,400.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 6b as an implemented specification should be less protective than the status quo. However, since recent catch has been below even the status-quo alternative's specifications, impacts may be similar to the prior fishing year. The relatively small increase from the status quo would not be expected to create substantial additional habitat impacts. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

6c – high alternative – The likely effective catch limit would be an ABC of 29,250mt.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be higher than the status-quo, the impact of 6c as an implemented specification should be less protective than the status quo. However, since recent catch has been below even the status-quo alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

6d – low alternative – The likely effective catch limit would be an ABC of 17,550mt.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify habitat impacts but since the likely effective catch limit would be less than the status-quo, the impact of 6d as an implemented specification should be more protective than the status quo. However, since recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. Given the above, overall impacts are likely best characterized as "small positive" compared to the previous year.

Relative Comparison Between Alternatives

The lower the potential catch, the more protective of habitat any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to habitat, 6d > 6a > 6b > 6c. In other words 6d would most benefit habitat. However, since recent catch has been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.6.3 Impacts on Endangered and Other Protected Species

The basic interactions between the longfin squid fishery and protected resources are discussed in section 6.4. For 6a, the status quo, effort is likely to be approximately equivalent to last year which means 2012 fishing year protected resource impacts would be expected to be similar to the previous fishing year (related to both the total quota and rollover provisions). 6b could result in a modest increase and thus “small negative” additional protected species impacts. However, in recent years the DAH has not been reached so environmental and/or market conditions rather than the specifications appear to be limiting longfin squid catch, so increasing the specifications may not increase effort and impacts would be similar to the previous year. Since longfin squid landings have not achieved the specifications in recent years, it is difficult to predict what effect a change in the specifications might have on actual (vs. potential) fishing effort if any. 6c would constitute a substantial increase in available quota and while the fishery may not harvest much in a given year or expand, additional protected species analysis would likely be warranted before implementing such a specification. 6d would cap catch lower than the status quo and therefore cap effort lower than recent years, but again in recent years the fishery has not produced as much as even 6d so there may be “small positive” or no differences in impacts. Atlantic sturgeon occurs in the longfin squid fishing area throughout the longfin fishing season. Longfin squid is the only MSB fishery for which the Stein et al. (2004a) review of sturgeon bycatch from 1989-2000 identified observed bycatch events. Atlantic sturgeon interactions in small-mesh otter trawl fisheries from 2006-2010 have not been analyzed on a fishery-by-fishery basis (see Section 6.4.5), so it is not yet possible to determine if recent small-mesh otter trawl trips targeting longfin squid have contributed to sturgeon mortality.

Relative Comparison Between Alternatives

The lower the potential catch, the more protective of protected resources any alternative should be since effort is capped by catch limits. From this point of view, in terms of benefits to protected resources, 6d > 6a > 6b > 6c. In other words 6d would most benefit protected resources. However, since recent catch has been below all of these there may be no effective difference between them in reality. In addition, effort is not directly related to catch and there are many other factors that may increase or decrease effort independent of catch limits (weather, availability, other opportunities, etc.).

7.6.4 Impacts on Human Communities

Section 6 describes the importance of the longfin squid fishery.

6a – status quo – The likely effective landings limit would be the status-quo IOY of 20,000mt adjusted up per the discard estimates used for the 2012 specifications to ensure and apples to apples comparison. Accounting for 4.08% discards results in a catch limit of 20,851mt.

Due to the year-to-year variation in catch and effort in the longfin squid fishery, it is difficult to quantify human community impacts but since the likely effective catch limit would remain the same, impacts would be expected to be similar to the prior fishing year. This alternative would however allow increased catch and revenues compared to how the fishery actually operated in 2010 (the outcome of the 2011 fishery is unknown).

6b – preferred – The likely effective catch limit would be the ABC of 23,400.

This ABC would translate into a DAH of 22,445mt. Given the likely effective catch limit and landings would be greater than the status-quo, the impact of 6b as an implemented specification could increase revenues in the short term and should not affect sustainability in the long term. However, since recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. At 2010 ex-vessel prices, 2,445 mt of additional longfin squid landings could represent $5.6 million in potential additional vessel revenues and additional opportunities related to support services compared to the status quo. Given the above, overall impacts are likely best characterized as "positive" compared to the previous year.

6c – high alternative – The likely effective catch limit would be an ABC of 29,250mt.

This ABC would translate into a DAH of 28,057mt. Given the likely effective catch limit would be higher than the status-quo, the impact of 6c as an implemented specification could increase revenues in the short term but could decrease sustainability in the long term given the current scientific advice. However, since recent catch has been below even the status-quo alternative's specifications, impacts may be similar to the prior fishing year. At 2010 ex-vessel prices, the 8,057 mt increase could represent $18.4 million in potential additional vessel revenues and additional opportunities related to support services compared to the status quo. Given the above, overall impacts are likely best characterized as "unknown" compared to the previous year.

6d – low alternative – The likely effective catch limit would be an ABC of 17,550mt.

This ABC would translate into a DAH of 16,834mt. Given the likely effective catch limit would be less than the status-quo, the impact of 6d as an implemented specification could decrease revenues in the short term and should not affect sustainability in the long term given the current scientific advice. However, since recent catch has been below this alternative's specifications, impacts may be similar to the prior fishing year. At 2010 ex-vessel prices, the 3,166 mt increase could represent $7.2 million in potentially forgone vessel revenues and additional lost opportunities related to support services compared to the status quo. Given the above, overall impacts are likely best characterized as "small negative" compared to the previous year.

Relative Comparison Between Alternatives

The higher the potential catch, the more revenue that can be produced, at least in the short term. From this point of view, in terms of benefits to human communities, 6d < 6a < 6b < 6c. In other words 6c would most benefit human communities in the short term. However, since recent catch has been below all of these there may be no effective difference between them in reality. Not enough is known about the long-term productivity of the managed resource to determine the long-term human community benefits of the various alternatives but the effects of any of these alternatives on the human environment is not expected to be significant.

7.7 Impacts of Other Management Measure Alternatives for Longfin Squid

The status-quo management measures that can be changed via annual actions for longfin squid are described in Section 5.7.

There are two changes proposed for 2012: The first involves allowing up to 3% of the longfin squid IOY to be available to fund research-set-aside (RSA) projects. Last year RSA was limited to 1.65% because that is the amount of longfin squid landings that could be covered by butterfish RSA in terms of accounting for butterfish discarding that could occur during RSA fishing. NMFS would use the best available scientific information to determine at the time of RSA awards how much longfin squid RSA (and associated butterfish discarding) can be supported by the available butterfish RSA. Since the RSA is accounted for as part of IOY no impacts would be expected because of this action, though there is additional discussion of RSA impacts in Section 7.8.

The second would exempt jigging-only longfin squid fishing (no trawl nets on-board) by longfin squid-Butterfish moratorium permit holders from the incidental longfin squid trip limits during any closures of the directed longfin squid fishery because of the butterfish mortality cap. The cap is designed to limit butterfish mortality. Substantial butterfish catch would not be expected to occur during jigging for longfin squid. While previous attempts at jigging for longfin squid have not shown jigging to be commercially feasible, there is no apparent reason to prohibit additional experimental fishing, which could be encouraged if a closure increases longfin squid prices. It is expected that at most only a few vessels might experiment with this gear.

Jigging for longfin squid would not be expected to cause any impacts for the managed resource since the fishery would still operate under a hard longfin squid quota. Non-target species should not be affected (squid jigging is generally considered a “clean” gear type). Habitat impacts should be minimal since jigging involves minimal bottom contact. Jigging is not expected to affect protected resource interactions. If the longfin squid fishery closed due to the butterfish bycatch cap, jigging could help mitigate any socio-economic impacts related to the closure if it proved to be a viable fishing method.

7.8 Research Set-Asides (RSA) Recommendations

Per Framework Adjustment 1 to the Mackerel, Squid and Butterfish (MSB) FMP, the annual RSA amount may vary between 0 and 3% of each species' total allowable landing level, which is the IOY value for MSB species. The Council has recommended that up to 3% of the 2012 preferred mackerel (1120mt), Illex (687mt), butterfish (98mt), and longfin squid (673mt) ACT's and/or IOY's be available as set-asides to fund projects selected under the 2012 Mid-Atlantic RSA Program. If any portion of the research quota is not awarded, NMFS will return any un-awarded set-aside amount to the fishery either through the 2012 MSB specification rulemaking process or through the publication of a separate notice in the Federal Register notifying the public of a quota adjustment.

In order to expedite the implementation of the 2012 Mid-Atlantic RSA Program, the environmental impact of this program and the selected projects are analyzed in this document. With the exception of the research activities of Project #3, for which the NEPA and Endangered Species Act analysis occurred through a separate EA completed April 20, 2010, and a Section 7 Consultation completed April 13, 2010, this document analyzes all research activities, compensation fishing activities, and regulatory exemptions with respect to the MSB FMP. Potential environmental impacts of this program on summer flounder, scup, black sea bass, and Atlantic bluefish are addressed in those respective specification documents. Additional consultation and analysis with respect to NEPA, ESA, MSA, and other applicable law may be necessary if the statement of work changes or additional exemptions are requested.

Vessels harvesting research quota in support of approved research projects would be issued exempted fishing permits (EFP) authorizing them to exceed Federal possession limits and to fish during Federal quota closures. MSA requires that interested parties are provided an opportunity to comment on all proposed EFPs. Comments on EFPs issued under the 2012 Mid-Atlantic RSA program will be received through the 2012 MSB specification rulemaking process. These exemptions are necessary to facilitate compensation fishing and allow project investigators to recover research expenses as well as adequately compensate fishing industry participants harvesting research quota. Vessels harvesting research quota would operate within all other regulations that govern the fishery, unless otherwise exempted through a separate EFP. Because RSA is deducted from the available DAH, exemption from closures will have no additional environmental impact. Exemption from possession limits could result in compensation fishing vessels altering their normal fishing behavior; altering tow duration or fishing longer or shorter than they otherwise would for example. However, these slight alterations in fishing behavior will not likely impact the environment beyond that of the fishery otherwise operating within the full suite of regulations.

Following is a description of the three preliminarily selected projects and associated exemptions that would likely be required to conduct the research.

Project #1: The proposed project is a scup survey of hard-bottom sites in Southern New England that are not sampled by current state and federal finfish trawl surveys. Unvented fish pots will be fished on each site from June through October. The length frequency distribution of the catch will be compared statistically to each of the other collection sites, and to finfish trawl data collected by the National Marine Fisheries Service (NMFS) and state agencies.

Scup and black sea bass will be collected from each site utilizing standard fish pots made with coated wire mesh. Pots will be unvented and therefore have the capability to retain all size classes of scup. The sampling protocol will require that the commercial vessels take 30 pots to each sampling site once during each fouw-week sampling cycle. Pots will be left to fish for one to two days at each site. All scup and black sea bass will be measured utilizing the standard NMFS sea sampling protocols. At the conclusion of each sampling cycle, pots will be removed from the water. This same sampling format will be followed every four weeks from June 15 through October 15 for five complete cycles. The survey area includes waters around Martha's Vineyard, Buzzard's Bay, and Rhode Island Sound.

Research vessels for Project #1 would require an EFP for exemption from minimum scup and black sea bass pot vent size requirements to ensure that scup length frequency data is representative and not biased. If a participating vessel holds a Federal lobster permit it would need exemption from lobster pot vent size requirements. Exemption from scup and black sea bass closures and time restrictions would be needed to ensure the survey is not disrupted by such regulations. Exemption from scup and black sea bass minimum fish sizes and possession limits would also be needed for data collection purposes only. All undersized fish would be discarded as soon as practicable to minimize mortality, and fish in excess of possession limits would either be discarded as soon as practicable or landed as RSA quota.

Project #2: The proposed project is a fishery independent black sea bass survey of four separate hard bottom sites in Southern New England (SNE) and Mid-Atlantic waters. Unvented black sea bass pots will be fished on each site for five months running from June through October in SNE, and April through August in the Mid-Atlantic. The project is designed to collect black sea bass from four separate hard bottom sites, which are un-sampled by current state and federal finfish bottom trawl surveys. The length frequency distribution of the catch will be compared statistically to each of the other collection sites, and to finfish trawl data collected by the National Marine Fisheries Service (NMFS) and state agencies.

Black sea bass will be collected from four general zones along the coast utilizing black sea bass pots (43½" long, 23" wide, and 16" high) made with 1½ x 1½ inch coated wire mesh, single mesh entry head, and single mesh inverted parlor nozzle. The four general zones will include one in Massachusetts, one south of Rhode Island, one south of New Jersey, and one south of Virginia. This particular configuration is being proposed as it generally corresponds to the northern and southern core range of the species, and each is an area in which a major black sea bass fishery takes place. In each of these general zones four individual sampling sites will be selected, each of which will be one square mile in size.

Each of the individual sampling sites will be separated by at least four miles in order to provide adequate spatial coverage. Specific sampling sites within each square mile sampling site will be randomly selected from the sub-blocks each month. The traps will be set at the center of each sampling site once per month. The sampling protocol will require that a commercial vessel take 30 pots (3 ten pot trawls) to each of the randomly selected hard bottom sampling sites. This procedure will continue each month during the sampling season for five months. Thus, 16 locations will be sampled monthly. Pots will be un-baited and allowed to remain in place for a minimum of four days. The date, area, depth, set over days, and catch will be recorded and fish measured utilizing the standard NMFS sea sampling protocols. Fish will be measured excluding tendril, which is the NMFS/ASMFC standard. At the conclusion of each sampling cycle, pots will be placed on the vessel for transport back to port.

Research vessels for Project #2 would require an EFP for exemption from minimum scup and black sea bass pot vent size requirements to ensure that black sea bass length frequency data is representative and not biased. If a participating vessel holds a Federal lobster permit it would need exemption from lobster pot vent size requirements. Exemption from scup and black sea bass closures and time restrictions would also be needed to ensure the survey is not disrupted by such regulations. Exemption from scup and black sea bass minimum fish sizes and possession limits would also be needed for data collection purposes only. All undersized fish would be discarded as soon as practicable to minimize mortality, and fish in excess of possession limits would either be discarded as soon as practicable or landed as RSA quota.

Project #3: Because the research activities of Project #3, for which the NEPA and Endangered Species Act analysis occurred through a separate EA completed April 20, 2010, and a Section 7 Consultation completed April 13, 2010, additional environmental review under this EA is not necessary.

For informational purposes, project #3 would conduct a spring and fall monitoring (trawl) survey in shallow waters between Martha's Vineyard, MA and Cape Hatteras, NC. The project investigators plan to provide stock assessment data for Mid-Atlantic RSA species, including summer flounder, scup, black sea bass, *Loligo* squid, butterfish, and Atlantic bluefish, and assessment-quality data for weakfish, Atlantic croaker, spot, several skate and ray species, smooth dogfish, horseshoe crab, and several unmanaged but important forage species.

7.8.1 Impacts on Managed Resource and Non-Target Species

The RSA quota is part of the overall quota. If any portion of the 3-percent RSA quota is not awarded to an RSA project, the remainder will be returned to the commercial and recreational quotas. With the exception of exemptions from possession limits and quota closures, the RSA quota will be harvested in the same manner as the commercial and recreational quotas. Therefore, it is unlikely that the retention of MSB species under RSA projects would have negative biological impacts on the managed resource and non-target species compared to if the quota had been utilized by the directed fishery, especially since differences in how an RSA project used the quota compared to directed fishery are minor.

Research activities for project #1 and #2, as described in Section 7.5, would only occur in concert with commercial fishing trips and/or compensation fishing trips. Research activities would not result in additional fishing effort. To conduct this research, research vessels would require an EFP, as described in Section 7.5, but these changes to standard fishing practice are not expected to result in a substantive increase in mortality of target and non-target fish.

7.8.2 Impacts on Habitat

Because all MSB landings count against the overall quota regardless of whether the RSA program is implemented, the RSA program is not expected to change the level of fishing effort for these species. In addition, it is not expected that the possession limit and quota closure exemptions will redistribute effort or gear type or change the manner in which these fisheries are prosecuted.

Although exemptions would be issued for compensation fishing that would exempt vessels from possession limits and quota closures, there would be no additional impacts on habitat because RSA quota is part of, and not in addition to, the overall quota. Because research activities for projects #1 and #2, as described in Section 7.5, would only occur in concert with commercial and/or compensation fishing trips, it is unlikely that additional habitat impacts would result from funding these projects. The exemptions for research purposes, as described in Section 7.5, would not alter the impact on EFH that occurs during standard commercial and recreational fishing activities. Therefore, each of these alternatives will likely minimize the adverse effects of fishing on EFH to the extent practicable, pursuant to section 305 (a)(7) of the MSFCMA.

7.8.3 Impacts on Endangered and Other Protected Species

Because all MSB landings count against the overall quota regardless of whether the RSA program is implemented, the RSA program is not expected to change the level of fishing effort for these species. In addition, it is not expected that the possession limit and quota closure exemptions will redistribute effort or gear type or change the manner in which these fisheries are prosecuted.

Vessels harvesting research quota in support of approved research projects would be issued EFPs authorizing them to exceed Federal possession limits and to fish during Federal quota closures. These exemptions are necessary to facilitate compensation fishing and allow project investigators to recover research expenses as well as adequately compensate fishing industry participants harvesting research quota. Vessels harvesting research quota would operate within all other regulations that govern the fishery, unless otherwise exempted through a separate EFP. Because quota closures may or may not occur during a given fishing year, exemption from these closures will have no additional environmental impact. Exemption from possession limits could result in compensation fishing vessels altering their normal fishing behavior; extending tow duration or fishing longer than they otherwise would for example.

Because research activities for projects #1 and #2, as described in Section 7.5, would only occur in concert with commercial fishing trips and/or compensation fishing trips, it is unlikely that research activities would have any impact on protected species. The exemptions for research purposes, as described in Section 7.5, would not alter the potential effects beyond that of standard commercial and recreational fishing activities.

7.8.4 Impacts on Human Communities

Under this program, successful applicants receive a share of the annual IOY for the purpose of conducting scientific research. The Nation receives a benefit in that data or other information about that fishery is obtained for management or stock assessment purposes that would not be obtained otherwise. In fisheries where the entire DAH is taken and the fishery closes earlier than would have occurred if the RSA program was not allocated a portion of the IOY, the economic and social costs of the program are shared among the non-RSA participants in the fishery. That is, each participant in a fishery that utilizes a resource that is limited by the annual DAH relinquishes a share of the amount of quota retained by the RSA program. Given the impacts of using a minimal amount of the IOY are spread among the fishery, impacts to vessels are not expected to be substantial. Also, even these losses should be recouped in the long term because the scientific benefits derived from RSA projects should lead to more efficient and effective management of the fisheries.

7.9 Cumulative Impacts of Preferred Alternatives on Identified VECs

The biological, economic and social impacts of the proposed specifications (preferred alternatives) for 2012 action for longfin squid, *Illex*, mackerel, and butterfish are expected to be minimal since they are unlikely to cause catches to change substantially from what they were in 2011. The proposed specifications are considered the most reasonable to achieve the fishery conservation objectives while minimizing the impacts on fishing communities as per the objectives of the FMP. A summary of the environmental consequences for each of the alternatives considered is given in Table 2 and table 3 (see Executive Summary).

7.9.1 Cumulative Effects

Definition on Cumulative Effects

A cumulative impact analysis is required by the Council on Environmental Quality's (CEQ) regulation for implementation of 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)." A formal cumulative impact assessment is not necessarily required as part of an Environmental Assessment under NEPA as long as the significance of cumulative impacts has been considered (U.S. EPA 1999). The following remarks address the expected cumulative impacts as they relate to the federally managed mackerel, squid and butterfish fisheries.

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 the NEPA require that 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 management regime, the long term cumulative impacts of federal fishery management actions under this FMP and annual specifications process 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 MSFCMA. 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 effective date of these specifications (January 1, 2012) and Dec 31, 2014, the years where the multi-year specifications for *Illex* and longfin squid would be effective if implemented. The temporal scope of this analysis does not extend beyond 2014 because the FMP and the issues facing these fisheries may change in ways that can't be predicted or assessed at this time within the framework of an Environmental Assessment.

Geographic Scope

The geographic scope of the analysis of impacts to fish species and habitat for this 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 were designed to control the extensive foreign fisheries that existed in US waters prior to the passage of the MSFCMA. These management actions involved the sequential phasing out of foreign fishing for these species in US waters and the gradual transfer of offshore fishing methods and technology to the domestic fishing fleet. Foreign landings of butterfish were slowly phased out by 1987.

Other 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 longfin squid, butterfish, and *Illex* fisheries; revision of overfishing definitions in Amendment 6; modification of vessel upgrade rules in Amendment 7; and implementation of overfishing control rules and other measures (including a framework adjustment procedure) to bring the FMP into compliance with the SFA in Amendment 8. Amendment 9 established multi-year specifications for all four species managed under the FMP (mackerel, butterfish, *Illex* squid (*Illex*), and longfin squid for up to 3 years; 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 essential fish habitat (EFH) for longfin squid eggs based on best available scientific information; 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 a butterfish mortality cap.

Future Actions - Other major actions likely to be considered and/or implemented before Dec 31, 2014 include:

-Amendment 11 to the MSB FMP: Addresses mackerel limited access, EFH Updates, recreational-commercial mackerel allocation, at-sea mackerel processing cap; and

-Amendment 13 to the MSB FMP (Omnibus): Addresses Annual Catch Limit and Accountability Measures; and

-Amendment 14 to the MSB FMP: Addresses river herring and shad catch and management; and

-Butterfish and mackerel specifications for 2013 and 2014.

In addition, NMFS convened the Atlantic Trawl Gear (ATG) Take Reduction Team (TRT) in 2006 as a result of a 2003 settlement agreement with the Center for Biological Diversity, with the goal of reducing serious injury and mortality (bycatch) of long-finned pilot whales (*Globicephala melas*), short-finned pilot whales (*Globicephala macrorhynchus*), white-sided dolphins (*Lagenorhynchus acutus*), and common dolphins (*Delphinus delphis*) in the Mid-Atlantic Mid-water Trawl fishery, which is part of the MSB fishery. There is no timeline within the MMPA requiring the ATGTRT to submit a draft TRP because all the fisheries affected by the ATGTRT are Category II fisheries and none of the stocks under the ATGTRP are strategic at this time. However, NMFS requested that the TRT make the best effort possible to meet the original 11 month obligation to develop a TRP. While unable to agree on whether to develop a TRP within the 11 month timeframe, TRT members did agree that developing a research plan would maintain progress towards reducing the serious injury and mortality of marine mammals in Atlantic trawl fisheries. The finalized consensus strategy, which is not a TRP, was described in previous specifications EAs and can be found, along with other ATGTRT documentation at : http://www.nero.noaa.gov/prot_res/atgtrp/.

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 MSFMCA, 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.

Generally effective federal fishery management of mackerel, longfin squid and *Illex* squid, and butterfish has occurred for the past two decades. The management strategy during the first phase of the Mackerel, Squid, and Butterfish FMP was to provide for the orderly development of the domestic fisheries for these resources under the purview of the MSFMCA. This process involved the sequential phasing out of foreign fishing for these species in US waters and the gradual transfer of offshore fishing methods and technology to the 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.

Cumulative Effects Analysis

The cumulative impacts of this FMP were last fully addressed in final form by the FSEIS 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. This FMP requires a specifications process which allows for the review and modifications to management measures specified in the FMP on an annual basis which allows for review. In addition, the Council added a framework adjustment procedure in Amendment 8 which allows the Council to add or modify management measures through a streamlined regulatory process. As noted above, the cumulative impact of this FMP and annual specification process has been positive since its implementation after passage of the Magnuson Act for both the resources and communities that depend on them. Limited access and control of fishing effort through implementation of the annual specifications has had a positive impact on target and non-target species since the current domestic fishery is being prosecuted at much 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.

Through development of the FMP and its amendments and the subsequent annual specification process, the Council continues to manage these resources in accordance with the National Standards required under the Magnuson-Stevens Act. First and foremost the Council has strived to meet 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. The Council uses the best scientific information available (National Standard 2) and manages these two resources throughout their range (National Standard 3). The management measures do not discriminate between residents of different states (National Standard 4), 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 The 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 Magnuson-Stevens Act through future FMP amendments and actions, the Council will insure that cumulative impacts of these actions will remain overwhelmingly positive for the ports and communities that depend on these fisheries, as well as the Nation as a whole.

The cumulative effects of the proposed specifications will be examined for the following five valued economic components (VECs): targeted species, non-targeted species, protected species, habitat, and communities.

7.9.2 Target Fisheries and Managed Resources

First and foremost, the Council 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 Magnuson Act 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 Council 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 SFA. In the case of butterfish, the species was designated as overfished in 2005 though a 2010 assessment concluded that the current status is unknown, and that the 2005 determination probably should have been unknown as well. The 2010 assessment found that butterfish appears to be in a depleted state because of environmental conditions, and the Council is maintaining the butterfish mortality cap for the longfin squid fishery to help limit butterfish mortality to SSC-approved levels.

The most obvious and immediate impact on the stocks managed under this FMP occurs as a result of fishing mortality. The Council 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. However, there is a high degree of uncertainty regarding the overall impact of non-fishing activities.

A major goal of this FMP has been the Americanization of these fisheries. Prior to the passage of the Magnuson Act and development of this FMP, the foreign prosecution of these fisheries occurred at much higher levels of fishing effort, which in many cases, resulted in overfishing . The first phase of the domestic fishery development was the elimination of these foreign fisheries and the transfer of the offshore fishing technology to the US fishing fleet. Thus, the immediate and cumulative impact was to end overfishing of these stocks, most notably in the case of mackerel. In addition, the foreign fishery landings for the other three species in the management unit also reached unsustainable levels prior to FMP development and implementation. The second phase of FMP implementation was the controlled development of these fisheries which allowed stock rebuilding, especially in the case of mackerel. The final phase of FMP implementation has been to adopt and implement new overfishing definitions which are consistent with the SFA, and remedial measures as appropriate. Additional actions will implemented via Amendment 13 in terms of annual catch limits and additional accountability measures to ensure sustainability moving forward.

The specifications and other measures under the preferred alternatives for 2012 serve to achieve the objectives of the FMP. The impacts on the environment for each of these alternatives are described in section 7.0. The specifications proposed under the preferred alternative for each species were developed to achieve the primary goal of the FMP and SFA 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[5] should continue to avoid overfishing and achieve optimum yield. The future actions noted above should continue to allow the Council to continue to manage these resources such that the objectives of the MSA continue to be met and therefore no significant cumulative effects to the target fisheries are expected.

7.9.3 Non-target Species

National Standard 9 addresses bycatch in fisheries. This National Standard requires Councils to consider the bycatch effects of existing and planned conservation and management measures. Bycatch can, in two ways, impede efforts to protect marine ecosystems and achieve sustainable fisheries and the full benefits they can provide to the Nation. First, bycatch can substantially increase the uncertainty concerning total fishing-related mortality, which makes it more difficult to assess the status of stocks, to set the appropriate OY and define overfishing levels, and to ensure that OYs are attained and overfishing levels are not exceeded. Second, bycatch may also preclude other more productive uses of fishery resources.

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.

None of the management measures recommended by the Council for 2012 under the preferred alternatives is expected to substantially promote or result in increased overall levels of bycatch relative to the status quo because none are expected to substantially increase effort. Past

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5 Includes establishment of limited access for the squids and butterfish in Amendment 5, overfishing definitions in Amendment 8, the extension of the *Illex* moratorium in Amendment 9, and butterfish bycatch reduction in the longfin squid fishery via Amendment 10

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 for non-moratorium vessels and all vessels during directed fishery closures and 3) minimum mesh requirements. The measures proposed under the preferred alternative for each species, in conjunction with these past actions, should maintain or reduce historical levels of bycatch and discards in these fisheries. The Council considered a number of additional measures to address discards in these fisheries in Amendment 10, including modification of the *Illex* exemption from the longfin squid minimum mesh requirement, establishment of small mesh gear restricted areas, increase in the minimum mesh size for longfin squid, and creation of an incidental catch allowance for the longfin squid fishery. Related to the modest increase in the longfin squid quota for 2012, the 2010 implementation of increased longfin squid minimum mesh size and the 2011 implementation of the butterfish mortality cap for the longfin squid fishery should continue to minimize bycatch to the extent practicable.

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. However, there is a high degree of uncertainty regarding the overall impact of non-fishing activities.

In the near future the Council will be considering the impact of the MSB fisheries on river herrings and shads through Amendment 14 and will consider if any additional mitigation of non-target catch is necessary and/or appropriate.

7.9.4 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 management measures for 2012 under the preferred alternatives are expected to promote or result in substantial changes to levels of effort relative to the status quo. As noted above, a major goal of this FMP has been the Americanization of these fisheries. Prior to the passage of the Magnuson Act and development of this FMP, the foreign prosecution of these fisheries occurred at much higher levels of fishing effort. As described in section 6.4, the foreign fisheries for mackerel, squid and butterfish were 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 for mackerel, squid and butterfish have resulted in fishing effort levels lower than those which occurred in the foreign fisheries prior to FMP development and implementation. Other proposed future actions by the Council which should have positive benefits relative to marine mammal stocks are the controlled access plan for mackerel being developed in Amendment 11 and ACLs/AMs in Amendment 13. These actions will control entry of new fishing effort into or reduce current effort in these fisheries. 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 reduce the impact of these fisheries on the protected species listed in section 6.4.

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. However, there is a high degree of uncertainty regarding the overall impact of non-fishing activities.

As discussed in section 6.4.5, estimated encounters with Atlantic sturgeon and small-mesh otter trawl gear in the 600 series of statistical areas average 759 sturgeon annually. Of these small-mesh otter trawl encounters, less than 5 percent are expected to result in serious injury or mortality. For reference, estimated total annual takes for all gear types (otter trawl and sink gillnet) from 2006-2010 ranged from 1536 to 3221 (average 2,215); estimated annual mortalities for all gear types ranged from 37 to 376 sturgeon. Overall, the contribution of small-mesh otter trawl gear to sturgeon mortalities is low compared to the contribution of gillnet gear to sturgeon mortalities.

Current estimates indicate that the Hudson River DPS likely consists of approximately 870 spawning individuals in any one year. However, adult Atlantic sturgeon are not believed to spawn annually, but rather every other year for males and every two to five years for females. Although NMFS does not have information necessary to determine the sex or spawning condition of Atlantic sturgeon encountered by the MSB fisheries, these encounters may include both males and females and fish that may or may not spawn during that year. Therefore, encounters of Atlantic sturgeon by the MSB fisheries may be a subset of the entire population, as opposed to being comprised exclusively of the smaller annual spawning population.

Despite limited information that can be used to accurately estimate the number of Atlantic sturgeon in each DPS and because estimated encounters and expected mortalities are lower in recent years than has been estimated in the past, it is unlikely that the implementation of 2012 Specifications for the MSB fisheries would result in significant impacts under NEPA to any DPS of Atlantic sturgeon prior to the issuance of a final listing decision for Atlantic sturgeon shortly after October 6, 2011.

7.9.5 Essential Fish Habitat

The 2002 final rule for EFH requires that fishery management plans minimize to the extent practicable adverse effects on essential fish habitat 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.* (2003) performed an evaluation of the potential impacts of otter trawls using the following information: 1) the EFH designations adopted by the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils; 2) the results of a Fishing Gear Effects Workshop convened in October 2001; 3) the information provided in this report, including the results of existing scientific studies, and the geographic distribution of bottom otter trawl use in the Northeast region; and 4) the habitats utilized by each species and life stage as indicated in their EFH designations and supplemented by other references. First, the habitat's value to each species and life stage was characterized to the extent possible, based on its function in providing shelter, food and/or the right conditions for reproduction. For example, if the habitat provided shelter from predators for juvenile or other life stages, gear impacts that could reduce shelter were of greater concern. In cases where a food source was closely associated with the benthos (*e.g.* infauna), the ability of a species to use alternative food sources was evaluated. Additionally, since benthic prey populations may also be adversely affected by fishing, gear impacts that could affect the availability of prey for bottom-feeding species or life stages were of greater concern than if the species or life stages were piscivorous. In most cases habitat usage was determined from the information provided in the EFH Source Documents (NOAA Technical Memorandum NMFS-NE issues 123-153) with additional information from Collette and Klein-MacPhee (2002).

Based upon this qualitative draft assessment approach, Stevenson *et al.* (2003) indicated that otter trawls potentially have a high adverse impact on 18 life stages for 8 species, predominantly juveniles and adults; moderate impacts on 40 life stages of 21 species, predominantly juveniles, adults, and spawning adults; low impacts on about 30 life stages for 14 species, predominantly juveniles, adults, and spawning adults; no impacts on one life stage of one species, halibut eggs; and are not applicable to 67 life stages of 28 species, predominantly eggs and larvae.

The Council analyzed MSB gear impacts on EFH in Amendment 9, which also included measures which address gear impacts on essential fish habitat. To reduce MSB gear impacts on EFH, Amendment 9 prohibited bottom trawling by MSB-permitted vessels in Lydonia and Oceanographer Canyons. All EFH designations are being updated in Amendment 11. These updated designations should improve fishery-effect mitigation and non-fishing impact consultations in the near future.

In addition to impacts on habitat due to fishing, there are other habitat effects from non-fishing anthropogenic activities in and near the Atlantic Ocean, but these are generally not quantifiable at present. Based on the MSB species EFH descriptions (see Section 6.3), only those non-fishing activities that occur in nearshore/estuarine and marine/offshore pelagic habitats have the potential to adversely impact EFH for the four species managed under the MSB FMP. Relevant high, medium, and low potential effects for these habitats from a variety of activity types are evaluated in Johnson et al. (2008). The general conclusion from Johnson et al 2008 would be that nearshore and estuarine habitats are more affected by non-fishing activities than offshore and that impacts on habitat from non-fishing habitats are many and varied. Johnson et al 2008, available at http://www.nefsc.noaa.gov/publications/tm/tm209/index.html details the expected level of habitat impact by activity type, potential impacts, and ecosystem type. Though largely unquantifiable, it is likely that non-fishing activities would have negative impacts on habitat quality from disturbance and/or construction activities in the area immediately around the affected area. Given the wide distribution of the affected species, minor overall negative effects to habitat are anticipated since the affected areas are localized to the project sites, which involve a small percentage of the fish populations and their habitat. However, there is a high degree of uncertainty regarding the overall impact of non-fishing activities.

7.9.6 Human Communities

National Standard 8 requires that management measures take into account the fishing communities. Communities from Maine to North Carolina are involved in the harvesting of mackerel, squid and butterfish. The Amendment 9 FSEIS and the Amendment 10 FSEIS contain descriptions of the communities most dependent on the MSB fisheries. Through implementation of the FMP for these species the Council seeks to achieve the primary objective of the Magnuson-Stevens Act which is to achieve optimum yield from these fisheries.

As noted above, a major goal of this FMP has been to develop the domestic fisheries for these species in a controlled manner. Prior to FMP development, the foreign prosecution of these fisheries occurred at much higher levels of fishing effort, which in many cases, resulted in overfishing. Thus, 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 SFA, the Council has strived to meet one of the primary objectives of the act - to achieve optimum yield in each fishery. The proposed specifications for 2012, 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. However, there is a high degree of uncertainty regarding the overall impact of non-fishing activities.

7.9.7 Summary of cumulative impacts

The impacts of the preferred alternatives on the biological, physical, and human environment are described in section 7. The overall interactions of improvements in the efficiency of the fisheries are expected to generate positive impacts. These impacts will be felt most strongly in the social and economic dimension of the environment. These benefits are addressed in the RIR and IRFA which are appended to this document. Indirect benefits of the preferred alternatives are likely to affect consumers and in areas of the economic and social environment that interact in various ways with these fisheries. The proposed actions, 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 and rebuild overfished stocks, 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 Council has concluded that no significant impacts will result from the specifications proposed for 2012.

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

8.1 Magnuson-Stevens Fishery Conservation and Management Act

This action is being taken in conformance with the Mackerel, Squid and Butterfish FMP, which requires that specifications be set for this fishery (annual or for a period of up to 3 years). Amendment 8 to the FMP established the overfishing definitions which form the basis for the specifications. Although Amendment 8 was partially approved in 1999, NOAA Fisheries Service noted that the amendment inadequately addressed some Magnuson-Stevens Act requirements for Federal FMPs. Specifically, Amendment 8 was considered deficient with respect to: Consideration of fishing gear impacts on EFH as they relate to MSB fisheries; designation of EFH for longfin squid eggs; and the reduction of bycatch and discarding of target and non-target species in the MSB fisheries. Amendment 9 evaluated fishing gear impacts on EFH and designated EFH for longfin squid eggs. Amendment 10 brought the MSB into compliance with Magnuson-Stevens Act rebuilding and bycatch requirements. The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 will require annual catch limits and accountability measures for mackerel and butterfish, and these requirements are addressed in a pending Omnibus Amendment. In Amendment 11, the Council considered limited access in the mackerel fishery, EFH designation updates for all species, a recreational/ commercial mackerel allocation, and at-sea mackerel processing caps (in rulemaking). The Council is also considering river herring and shad bycatch issues via Amendment 14.

8.1.1 Essential Fish Habitat Assessment

The specifications under the preferred alternatives proposed in this action are not expected to result in substantial changes in effort. Therefore, the Council concluded in section 7.1-7.6 of this document that the 2012 quota specifications proposed for mackerel, squid, and butterfish will have no adverse impacts on EFH other than those that may currently exist. Thus no mitigation of adverse effects 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 GRAs. Therefore, the adverse habitat impacts of MSB fisheries “continue to be minimized” by the canyon GRAs. Amendment 11 (in rulemaking) is revising 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 NAO 216-6 criteria and CEQ'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 for 2012 are expected to jeopardize the sustainability of any target species affected by the action (see section 7 of this document). The proposed quota specifications under the preferred alternatives for each species are consistent with the FMP overfishing definitions and best available scientific information. As such, the proposed action will ensure the long-term sustainability of harvests from the mackerel, *Illex* and longfin squid, and butterfish 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). The proposed measures maintain or reduce the specifications of IOY for the upcoming fishing year for mackerel, *Illex*, butterfish, and provide for a modest increase in the longfin squid specifications. Therefore, none of these specifications are 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 for 2012 are expected to jeopardize the sustainability of non-target species relative to the 2011 specifications. The butterfish mortality cap, which began in 2011, should continue to reduce 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 essential fish habitat as defined under the Magnuson-Stevens Act 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 Magnuson-Stevens Act and identified in the FMP (see sections 7.1.2, 7.2.2, 7.3.2, and 7.4.2 of this document). 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 for 2012 would 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 2011 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 mackerel, longfin squid, *Illex* and butterfish 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 of IOY. In addition, none of the proposed specifications of IOY are expected to substantially alter fishing methods, activities or the spatial and/or temporal distribution of fishing effort (see sections 7.1.3, 7.2.3, 7.3.3, and 7.4.3 of this document). Therefore, this action is not expected to have increased negative effects on common and white sided dolphin and pilot whales. The mackerel, *Illex* and butterfish fisheries are not known to interact with any endangered or threatened species or their critical habitat. 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.

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 specification of IOY 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 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 action. 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 EA, the proposed action 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 peer reviewed and is the most recent information available. As a result of these facts, the specifications in 2012 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 some 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 for 2012 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 (see sections 8.3 - 8.11 below).

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 2012 mackerel, Squid and Butterfish fisheries, it is hereby determined that the proposed specifications for 2012 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.

Northeast Regional Administrator, NOAA   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. Four species of marine mammals are known to interact with the mackerel, squid and butterfish fisheries - long and short finned pilot whales, common dolphin and white sided dolphin. This action proposes to continue the commercial quotas and other management measures in 2012 which are already in place for 2011 for mackerel, *Illex* squid and butterfish. The longfin squid specifications involve a small increase. None of the specifications are expected to significantly alter fishing methods or activities or result in substantially increased effort. The Council has reviewed the impacts of the proposed specifications for the 2012 mackerel, squid and butterfish fisheries 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 the EA.

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 Council has concluded that the proposed 2012 specifications for mackerel, *Illex* and butterfish and the prosecution of the associated fisheries are not likely to result in jeopardy to any ESA-listed species under NOAA Fisheries Service 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 Section 6.4 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.

Final listing determinations for the Atlantic sturgeon distinct population segments (DPSs) are expected shortly after October 6, 2011. If final listing rules are published, they will likely become effective 30 to 60 days after publication. With the publication of a final listing rule, a section 7 consultation would be required to estimate and analyzed the impacts of the MSB fisheries on Atlantic sturgeon. NMFS has considered whether the proposed MSB specifications and has determined that they are not likely to jeopardize the proposed Atlantic sturgeon DPSs. While it is possible that there may be interactions between Atlantic sturgeon and gear used in the MSB fisheries, the number of interactions that will occur between now and the time a final listing determination will be made 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 (APA)

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 Council is not requesting any abridgement of the rulemaking process for this action.

8.6 Paperwork Reduction Act (PRA)

The purpose of the PRA 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 PRA is necessary.

8.7 Coastal Zone Management Act

Section 307(c)(1) of the Federal CZMA 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 CZMA 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 Council to propose this action are the result of a multi-stage public process. Thus, the information pertaining to management measures contained in this document has been improved based on comments from the public, the fishing industry, members of the Council, and 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, "Security of Automated Information Resources," of OMB Circular A-130; the Computer Security Act; and the Government Information Security Act. All confidential information (e.g., dealer purchase reports) is safeguarded pursuant to the Privacy Act; Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business, and financial information); the Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity

For purposes of the Pre-Dissemination Review, this document is considered to be a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat 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 members of the mackerel, Squid and Butterfish Monitoring Committee or other NMFS staff with expertise on the subject matter.

Despite current data limitations, the conservation and management measures proposed for this action were selected based upon the best scientific information available. The analyses conducted in support of the proposed action were conducted using information from the most recent complete calendar years, generally through 2009 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 Council staff) who worked with these data are familiar with the most current analytical techniques and with the available data and information relevant to these fisheries.

The policy choices are clearly articulated in section 5.0 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 summarized and described in section 6.0 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 responsible Council, 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 Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the document. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the action proposed in this document and clearance of any rules prepared to implement resulting regulations is conducted by staff at NOAA Fisheries Service Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

8.9 Regulatory Flexibility Analysis (RFA)

The purpose of the RFA is to reduce the impacts of burdensome regulations and recordkeeping requirements on small businesses. To achieve this goal, the RFA requires Federal agencies to describe and analyze the effects of proposed regulations, and possible alternatives, on small business entities. To this end, this document contains an IRFA, found at section 12.0 at the end of this document, which includes an assessment of the effects that the proposed action and other alternatives are expected to have on small entities.

8.10 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 2.0 at the end of this document represents the RIR, 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 RIR 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

8.11 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 Council (all affected states are represented as voting members of at least one Regional Fishery Management Council). No comments were received from any state officials relative to any federalism implications that may be associated with this action

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9.0 LITERATURE CITED

Anderson, E. D. 1973. Assessment of Atlantic mackerel in ICNAF subarea 5 and statistical area 6. Int. Comm. Northwest Atl. Fish. Res. Doc., 73/14 Ser. No. 2916.

Anderson, E. D. 1976. Measures of abundance of Atlantic mackerel off the northeastern coast of the United States. ICNAF Res. Bull. 12: 5-21.

Anderson, E. D. 1982. Status of the northwest Atlantic mackerel stock - 1982. NMFS, NEFC, Woods Hole Lab Ref. No. 85-03. 46 p.

Anderson, E. D. 1995. Atlantic mackerel. *In:* Status of the fishery resources of the northeastern United States for 1994, (Conservation and Utilization Division, Northeast Fisheries Science Center, eds.), p. 100-101. NOAA Tech. Memo. NMFS-NE-108.

Anderson, E.D. and A.J. Paciorkowski. 1978. A review of the Northwest Atlantic mackerel fishery. ICES Symposium on the Biological Basis of Pelagic Fish Stock Management. No. 11, 63p.

Anderson, E. D., and A.J. Paciorkowski. 1980. A review of the northwest Atlantic mackerel fishery. Rapp. P-V. Reun. Cons. Int. Explor. Mer 177:175-211.

Applegate, A.J., S. Cadrin, J. Hoenig, C. Moore, S. Murawski, and E. Pikitch. 1998. Evaluation of existing overfishing definitions and recommendations for new overfishing definitions to comply with the Sustainable Fisheries Act. Overfishing Definition Review Panel. 179 p.

Berrien, P.L. 1982. Atlantic mackerel, *Scomber scombrus*. *In*: M. D. Grosslein and T. R. Azarovitz, eds., Fish Distribution, MESA New York Bight Atlas Monogr. 15: 99-102.

Bigelow, H.B., and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. Fishery Bulletin, U.S. 53:417-423

Black, G.A.P., T.W. Rowell, and E.G. Dawe. 1987. Atlas of biology and distribution of the squids *Illex* illecebrosus and *Loligo* pealei in the Northwest Atlantic. Can. Spec. Publ. Fish. Aquat. Sci. 100. 62 p.

Bowman, R. E. and W. L. Michaels. 1984. Food of seventeen species of northwest Atlantic fish. NOAA Tech. Memo. NMFS-F/NEC-28, Northeast Fish. Sci. Ctr., Natl. Mar. Fish. Serv., NOAA, Woods Hole, MA. 193 p.

Brodziak, J.K.T. and W.K. Macy. 1994. Revised estimates of growth of long-finned squid, *Loligo pealei*, in the Northwest Atlantic based on statolith ageing: implications for stock assessment and fishery management. ICES C.M. 1994/K:13. 46 p.

Christensen, D.J., W.J. Clifford, P.G. Scarlett, R.W. Smith, and D. Zachea. 1979. A survey of the 1978 spring recreational fishery for the Atlantic mackerel, *Scomber scombrus*, in the Middle

Atlantic region. NMFS Sandy Hook Lab Report No. 78-43. 22 p.

Chetrick, Joel. 2006. Record Six-Month Exports of U.S. Frozen Mackerel to EU Eclipse 2005 Sales. FAS Worldwide. United States Department of Agriculture, Foreign Agricultural Service. Available online at: http://www.fas.usda.gov/info/fasworldwide/2006/10-2006/EUMackerel.pdf.
Cross, J.N., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and C. McBride. 1999. Essential fish habitat source document: Butterfish, Peprilus triacanthus, life history and habitat characteristics, NOAA Tech. Memo. NMFS NE-145. 50 p.

Dawe, E.G., P.C. Beck, H.J. Drew, and G.H. Winters. 1981. Long-distance migration of a short-finned squid, *Illex* illecebrosus. J. Northw. Atl. Fish. Sci. 2: 75-76.

Dawe, E.G., R.K. O'Dor, P.H. Odense, and G.V. Hurley. 1985. Validation and application of an ageing technique for short-finned squid (*Illex* illecebrosus). J. Northw. Atl. Fish. Sci. 6:107-116.

Dawe, E.G. and P.C. Beck. 1992. Population structure, growth, and sexual maturation of short-finned squid (*Illex* illecebrosus). ICES CM 1993/K:33.

Dery, L.M. and E.D. Anderson. 1983. Recent problems with the aging of northwest Atlantic mackerel, concerning the 1977 and 1978 year classes. NMFS, NEFC, Woods Hole Lab. Ref. No. 83-02.30 p.

Dodd, C.K., Jr. 1988. Synopsis of the biological data on the loggerhead sea turtle *Caretta caretta* (Linnaeus 1758). Fish and Wildlife Service Biological Report 88(14). 110pp. Available at: http://www.seaturtle.org/documents/Dodd_1988_Loggerhead.pdf.

Fedulov, P.P. and Yu M. Froerman. 1980. Effect of abiotic factors on distribution of young shortfin squid, *Illex illecebrosus*. Northwest Atl. Fish. Org. (NAFO) Sci. Counc. Res. Doc. 80/VI/98.22p.

Fortier, L. and A. Villeneuve. 1996. Cannibalism and predation on fish larvae by larvae of Atlantic mackerel, *Scomber scombrus*: trophodynamics, and potential impact on recruitment. Fish. Bull. 94: 268-281.

Gregoire, F. 1996. Mackerel in the Northwest Atlantic. Stock Status Report 96/24. Dept. of Fisheries and Oceans, Quebec Canada. 15p.

Grosslein, M.D. and T.R. Azarovitz. 1982. Fish distribution. MESA New York Bight Atlas Monograph 15. 182 p.

Hatfield, E. M. C. and S. X. Cadrin. 2002. Geographic and temporal patterns in size and maturity of the longfin inshore squid (*Loligo*) off the northeastern United States. Fish. Bull. 100 (2): 200-213.

Hendrickson, L. 2004. Population biology of northern shortfin squid (*Illex illecebrosus*) in the Northwest Atlantic Ocean and initial documentation of a spawning area. ICES J Mar Sci 61:

252-266.

Hendrickson, L. C. and D. Hart. 2006. An age-based cohort model for estimating the spawning mortality of semelparous cephalopods with an application to per-recruit calculations for the northern shortfin squid, *Illex* illecebrosus. Fish. Res. 78: 4-13.

Hendrickson L. C. and E. M. Holmes. 2004. Essential fish habitat source document: northern shortfin squid, *Illex illecebrosus*, life history and habitat characteristics (2nd edition) NOAA Tech. Memo. NMFS NE-191. 36 p.

ICNAF (International Commission for the Northwest Atlantic Fisheries). 1975. Report of Standing Committee on Research and Statistics, May-June, 1975. App. 1. Report of Assessments Subcommittee. ICNAF, Redbook 1975: 23-63

Jackson G.D. and J.H. Choat. 1992. Growth in tropical cephalopods: an analysis based on statolith microstructure. Can. J. Fish. Aquat. Sci. 49:218-228.

Jacobson, L.D. 2005. Essential fish habitat source document: Longfin inshore squid, *Loligo Pealei* , life history and habitat characteristics (2nd edition) NOAA Tech. Memo. NMFS NE-193. 52 p.

Jereb, P., S. Ragonese, S. von Boletzky [*Eds.*]. 1991. Squid age determination using statoliths. Proceedings of the International Workshop held at the Institutio di Technilogica della Pesce e del Pescato (ITPP-CNR), Mazara del Vallo, Italy, 9-14 October 1989. N.T.R.-I.T.P.P. Special Publication,, Vol. 1, 127 p.

Johnson, M.R., C. Boelke, L.A. Chiarella, P.D. Colosi, K. Greene, K. Lellis-Dibble, H. Ludemann, M. Ludwig, S. McDermott, J. Ortiz, D. Rusanowsky, M. Scott, J. Smith 2008. Impacts to marine fisheries habitat from nonfishing activities in the Northeastern United States. NOAA Tech. Memo. NMFS-NE-209, 328 p.

Lange, A.M.T. 1984. An assessment of the long-finned squid resource off the northeastern United States - Autumn 1984. NMFS, NEFC, Woods Hole Lab. Ref. Doc.84-37. 24 p.

Lange, A.M.T. and M.P. Sissenwine. 1980. Biological considerations relevant to the management of Squid, *Loligo pealei* and *Illex illecebrosus* of the Northwest Atlantic. Mar. Fish. Rev. 42(7-8): 23-38.

Langton, R. W. and R. E. Bowman. 1977. An abridged account of predator-prey interactions for some Northwest Atlantic species of fish and squid. NEFSC Lab. Ref. Doc. No 77-17.

Lux, F.E. and W.D. Handwork and W.J. Rathjen. 1974. the potential for an offshore squid fishery in New England. Mar. Fish. Rev. 36(12): 24-27.

MacKay, K.T. 1967. An ecological study of mackerel *Scomber scombrus* (Linnaeus) in the coastal waters of Canada. Fish. Res. Bd. Can., Tech. Rep. 31. 127p.

Macy, W.K. III. 1992. Preliminary age determination of the squid, *Loligo pealei*, using digital imaging. ICES CM 1992/K:, 9 p.

Maurer, R. 1975. A preliminary description of some important feeding relationships. ICNAF, Res. Doc. No. 76/IX/130. Ser. No. 3681.

Maurer, R. O., Jr. and R. E. Bowman. 1975. Food habits of marine fishes of the northwest Atlantic - Data Report. NEFSC, NOAA, Woods Hole Lab., Ref. Doc. 75-3. 90 p.

McCay, Bonnie J., Bryan Oles, Brent Stoffle, Eleanor Bochenek, Kevin St.Martin, Giovani Graziosi, Teresa Johnson, and Johnelle Lamarque. 2002. Port and Community Profiles, Amendment 9, Squid, Atlantic Mackerel, and Butterfish FMP. A Report to the Mid-Atlantic Fishery Management Council. The Fisheries Project, Rutgers the State University, New Brunswick, New Jersey, June 27, 2002.

Mesnil, B. 1977. Growth and life cycle of squid, *Loligo pealei* and *Illex illecebrosus,* from the Northwest Atlantic. NAFO Research Document 76/VI/65.

Miller TJ, Das C, Politis PJ, Miller AS, Lucey SM, Legault CM, Brown RW, Rago PJ. 2010. Estimation of Albatross IV to Henry B. Bigelow calibration factors. Northeast Fish Sci Cent Ref Doc. 10-05; 233 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at: http://www.nefsc.noaa.gov/nefsc/publications/.

Montevecchi, W.A. and R.A. Myers. 1995. Prey harvests of seabirds reflect pelagic fish and squid abundance on multiple spatial and temporal scales. Mar. Ecol. Prog. Ser. 117: 1-9.

Moores, J.A., G.H. Winters, and L.S. Parsons. 1975. Migrations and biological characteristics of Atlantic mackerel (*Scomber scombrus*) occurring in Newfoundland waters. J. Fish. Res. Bd. Can. 32: 1347-1357.

Morse, W.W. 1978. The fecundity of Atlantic mackerel, *Scomber scombrus*, in the Middle Atlantic Bight. Fish. Bull., 78: 103-108.

Murison, L.D., and D.E. Gaskin. 1989. The distribution of right whales and zooplankton in the Bay of Fundy, Canada. Can. J. Zool. 67:1411-1420.

Murawski S.A. and G.T. Waring. 1979. A population assessment of butterfish, *Peprilus triacanthus*, in the Northwest Atlantic Ocean. Tran. Am. Fish. Soc. 108(5): 427-439.

Murray, K.T. 2006. Estimated average annual bycatch of loggerhead sea turtles in the U.S. Mid-Atlantic bottom other trawl gear, 1996-2004. U.S. Commerce Northeast Fish. Sci. Cent. Ref. Doc. 06-19, 26 pp.

NEFSC 2010. Northeast Fisheries Science Center. 2010. 49th Northeast Regional Stock Assessment Workshop (49th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 10-01; 383 p. Available from: National Marine Fisheries Service, 166 Water

NEFSC 2011. Northeast Fisheries Science Center. 2011. 51st Northeast Regional Stock Assessment Workshop (51st SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 11-01; 70 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at: http://www.nefsc.noaa.gov/nefsc/publications/

Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

NMFS. 1994. Report of 17th NEFSC Stock Assessment Workshop. NEFSC, Woods Hole Lab. Ref. Doc. 94-03.

NMFS. 1996. Draft Report of the 20th Northeast Regional Stock Assessment Workshop, Northeast Fishery Science Center. Woods Hole, MA.

NMFS. 1996. Report of the 21th Northeast Regional Stock Assessment Workshop, Northeast Fishery Science Center. Woods Hole, MA. June 1996.

NMFS. 1998. Guidelines for Regulatory Analysis of Fishery Management Actions. Office of Sustainable Fisheries, National Marine Fisheries Service, Silver Spring, Maryland 20910. Revised April 15, 1998.

NMFS. 1999. Report of the 29th Northeast Regional Stock Assessment Workshop, Northeast Fishery Science Center. Woods Hole, MA. June 1999.

NMFS. 2001. Report of the 34th Northeast Regional Stock Assessment Workshop, Northeast Fishery Science Center. Woods Hole, MA. June 1999.

NMFS 2010. NMFS Marine Mammal List of Fisheries. 2010. Available at: http://www.nmfs.noaa.gov/pr/interactions/lof/#lof.

NMFS 2010. IMPORTS AND EXPORTS OF FISHERY PRODUCTS ANNUAL SUMMARY, 2010. Available at: http://www.st.nmfs.noaa.gov/st1/trade/documents/TRADE2010.pdf.

O'Dor, R.K. and E.G. Dawe. 1998. *Illex illecebrosus*. *In:* P.G. Rodhouse, E.G. Dawe, and R.K. O'Dor (eds.). Squid recruitment dynamics: the genus *Illex* as a model, the commercial *Illex* species and influences on variability, p. 77-104. FAO Fish. Tech. Pap. No. 376. 273 p.

O'Dor, R.K. and N. Balch. 1985. Properties of *Illex illecebrosus* egg masses potentially influencing larval oceanographic distribution. Northwest Atl. Fish. Org. (NAFO) Sci. Counc. Stud. 9:69-76.

Okutani, T. 1977. Stock assessment of cephalopod resources fished by Japan. FAO Fish. Tech. paper No. 173. 62 p.

Overholtz, W.J. 1989. Density-dependent growth in the Northwest Atlantic stock of Atlantic mackerel (*Scomber scombrus*). J. Northw. Atl. Fish. Sci. (9):115-121.

Overholtz, W.J. and G.T. Waring. 1991. Diet composition of pilot whales *Globicephala* sp. and common dolphins *Delphinus delphis* in the Mid-Atlantic Bight during Spring 1989. Fish. Bull. 89: 723-728.

Overholtz, W.J., R.S. Armstrong, D.G. Mountain, and M. Terceiro. 1991. Factors influencing spring distribution, availability, and recreational catch of Atlantic mackerel (*Scomber scombrus*) in the Middle Atlantic and southern New England regions. NOAA Tech. Memo. NMFS-FNEC-85. 13 p.

Parsons, L.S. 1970. Northern range extension of the Atlantic mackerel, *Scomber scombrus*, to Black Island, Labrador. J. Fish. Res. Bd. Can. 27: 610-613.

Parsons, L.S. and J.A. Moores. 1974. Long-distance migration of an Atlantic mackerel (*Scomber scombrus*). J. Fish. Res. Bd. Can. 31: 1521-1522.

Payne, P. M. and L. A. Selzer. 1983. Population distribution, abundance and prey requirements of the harbor seal in southern new England. NMFS contract Rep. NA-82-FA 00007 by Manomet Bird Observatory, Manomet, MA. Northeast Fish. Ctr., Nat. Mar. Fish. Sev., NOAA, Woods Hole, MA. 51 p.

Pentilla, J.A. and E.D. Anderson. 1976. Mackerel age-length keys from the 1973-76 bottom trawl surveys in SA 5-6. Int. Comm. Northw. Atlantic Fish., Res. Doc. 76/XII/148, Ser. No. 4044.

Pepin, P., S. Pearre, Jr., and J.A. Koslow. 1987. Predation on larval fish by Atlantic mackerel, *Scomber scombrus*, with a comparison of predation by zooplankton. Can. J. Fish. Aquat. Sci. 44: 2012-2018.

Peterson, W.T. and S.J. Ausubel. 1984. Diets and selective feeding by larvae of Atlantic mackerel *Scomber scombrus* on zooplankton. Mar. Ecol. Prog. Ser. 17: 65-75.

Rowell, T.W. and J.H. Young, J.C. Poulard and J.P. Robin. 1985. Changes in distribution and biological characteristics of *Illex illecebrosus* on the Scotian shelf. Northwest Atl. Fish. Org. (NAFO) Sci. Counc. Stud. 9:11-26.

SARC 34. 2002. Stock Assessment Review Committee Report. Available at: http://www.nefsc.noaa.gov/saw/.

SARC 38. 2004. Stock Assessment Review Committee Report. Available at: http://www.nefsc.noaa.gov/saw/.

SARC 42. 2006. Stock Assessment Review Committee Report. Available at: http://www.nefsc.noaa.gov/saw/.

SARC 49. 2010. Stock Assessment Review Committee Report. Available at: http://www.nefsc.noaa.gov/saw/.

Scott, W.B., and S.N. Tibbo. 1968. Food and feeding habits of swordfish, *Xiphias gladius*, in the western North Atlantic. J. Fish. Res. Bd. Canada, 25:174-179.

Serchuck F.M. and W.J. Rathjen. 1974. Aspects of the distribution and abundance of the long-finned squid, Loligo *pealei*, between Cape Hatteras and Georges Bank. Mar. Fish. Rev., 36(1): 10-17.

Sette, O.E. 1950. Biology of the Atlantic mackerel *Scomber scombrus* of North America. Part 2. Migrations and habits. U.S. Fish. Bull. 50(38): 251-358.

Smith, G. J. D. and D. E. Gaskin. 1974. The diet of harbor porpoises (*Phocoena phocoena* (L.)) in coastal waters of Eastern Canada, with special reference to the Bay of Fundy. Can. J. Zool. 52: 777-782.

Squires, H.J. 1967. Growth and hypothetical ages of Newfoundland bait squid, *Illex illecebrosus*. J. Fish. Res. Board of Can. 24:1209-1217.

Stillwell, C. E. and N. E. Kohler. 1982. Food, feeding habits, and estimates of daily ration of the shortfin mako (*Isurus oxyrinchus*) in the northwest Atlantic. Can. J. Fish. Aquat. Sci. 39: 407-414.

Studholme, A.L., D.B. Parker, P.L. Berrrien, D.L. Johnson, C.A. Zettein, and W.w. Morse. 1999. Essential fish habitat source document: Atlantic mackerel, Scomber, scombrus, life history and habitat characteristics. NOAA Tech. Memo. NMFS NE-141. 44 p.

Summers, W.C. 1968. The growth and size distribution of the current year class *Loligo pealei*. Biol. Bull. 137(1): 366-377.

Summers, W.C. 1983. *Loligo pealei*, pp 115-142. In: Cephalopod Life Cycles, Vol. I. Academic Press, London.
United States Department of Commerce (USDC). 1990. Fisheries of the United States, 1989. Current Fishery Statistics No. 8900. NOAA. NMFS. 111 p.

Tibbetts, A.M. 1977. Squid fisheries (*Loligo pealei* and *Illex illecebrosus*) off the northeastern coast of the United States of America, 1963-1974. Int. Comm. Northwest Atl .Fish., Sel. Pap., 2:85-109.

TRAC 2010. Transboundary Resources Assessment Committee (TRAC). TRAC Summary Report (TSR). Available online at: http://www.mar.dfo-mpo.gc.ca/science/trac/tsr.html.

USDC. 1994. Fisheries of the United States, 1993. Current Fishery Statistics No. 9300. NOAA. NMFS. 121 p.

USDC. 1994a. Imports and exports of fishery products annual summery, 1994. Current Fishery Statistics No. 9402. NOAA. NMFS. 23 p.

Vovk, A.N. 1972. Method of determining maturing stages in gonads of the squid *Loligo pealei*. Zool. ZH 51: 127-132. Can. Fish. Res. Transl. Ser. 2337.

Vovk, A.N. 1985. Feeding spectrum of *Loligo* (*Loligo pealei*) in the Northwest Atlantic and its position in the ecosystem. Northwest Atl. Fish. Org. Sci. Counc. Stud. 8: 33-38.

Vovk, A.N. and L.A. Khvichiya. 1980. On feeding of long-finned squid (*Loligo pealei*) juveniles in Subareas 5 and 6. Northwest Atl. Fish. Org. Sci. Counc. Sci. Counc. Res. Doc. 80/VI/50.

Ware, D.M. and T.C. Lambert. 1985. Early life history of Atlantic mackerel (*Scomber scombrus*) in the Southern Gulf of St. Lawrence. Can. J. Fish. Aquat. Sci. 42: 577-592.

Waring, G. 1975. A preliminary analysis of the status of the butterfish in ICNAF subarea 5 and statistical area 6. International Commission for the Northwest Atlantic Fisheries. Res. Doc. 74/74, Dartmouth, Canada.

Waring, G.T., E. Josephson, C. P. Fairfield, K Maze-Foley (eds). 2007. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2006. NOAA Technical Memorandum NMFS-NE-201.

Whitaker, J.D. 1978. A contribution to the biology of *Loligo pealei* and *Loligo plei* (Cephalopoda, Myopsida) off the southeastern coast of the United States. M.Sc. Thesis, College of Charleston, 164 p.

10.0 LIST OF AGENCIES AND PERSONS CONSULTED

In preparing this annual specifications analysis the Council consulted with the NMFS, New England and South Atlantic Fishery Management Councils, Fish and Wildlife Service, Department of State, and the states of Maine through Florida through their membership on 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 each state's Coastal Zone Management Program: 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 Council 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 EA may also be accessed by visiting the NMFS Northeast Region website at http://www.nero.noaa.gov/nero/regs/com.html.

12.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS (IRFA) & REGULATORY IMPACT REVIEW FOR THE 2012 CATCH SPECIFICATIONS FOR ATLANTIC MACKEREL, SQUID, AND BUTTERFISH

12.1 INTRODUCTION

The applicable laws pertaining to this action are summarized above in Section 8. E.O. 12866 requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions that either implement a new Fishery Management Plan (FMP) or significantly amend an existing plan or regulation. The RIR is part of the process of preparing and reviewing FMPs and provides a comprehensive review of the changes in net economic benefits to society associated with regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way.

Purpose of and Need for the Action

The purposes (objectives) of this action are to establish annual quotas and other measures, where necessary, that will meet the need to prevent overfishing and achieve optimum yield. Optimum yield is defined as the amount of fish which will provide the greatest overall benefit to the Nation in terms of food production and recreational opportunities and is based on the maximum sustainable yield for each managed species. Failure to implement the preferred measures described in this document could result in overfishing and stock depletion. In the case of butterfish, failure to restrict fishing mortality would impede efforts to rebuild this overfished stock.

Regulations at 50 CFR Part 648 stipulate that the Secretary will publish a notice specifying the initial annual amounts of the initial optimum yield (IOY) as well as the amounts for allowable biological catch (ABC) domestic annual harvest (DAH), domestic annual processing (DAP), joint venture processing (JVP), and total allowable levels of foreign fishing (TALFF) for the species managed under the MSB FMP. The term IOY is used in these fisheries to reinforce the fact that the Regional Administrator may alter this specification up to the ABC if economic and social conditions warrant an increase. Therefore, this specification is no different than OY or optimum yield. No reserves are permitted under the FMP for any of these species. The new Omnibus-related specification described in Section 5 will apply for mackerel and butterfish in the near future

Current regulations allow for the specification of measures for a period of up to three years (subject to annual review). However, the Council has chosen to specify the mackerel and butterfish measures for one year and the squid measures for 3 years.

Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

This action does not contain new collection-of-information, reporting, recordkeeping, or other compliance requirements. It does not duplicate, overlap, or conflict with any other Federal rules.

12.2 EVALUATION OF E.O.12866 SIGNIFICANCE

The proposed action does not constitute a significant regulatory action under Executive Order 12866 for the following reasons. (1) It will not have an annual effect on the economy of more than $100 million. Based on unpublished NMFS preliminary data (Maine-North Carolina) the total commercial value for the Atlantic mackerel, squid and butterfish fisheries combined was estimated at $30.5 million in 2010 so the measures considered in this regulatory action should not affect total revenues generated by the commercial industry to the extent that a $100 million annual economic impact will occur (especially since the proposed specifications could allow the 2009 landings to occur again or increase). The proposed actions are necessary to maintain the harvest of Atlantic mackerel, squid and butterfish at sustainable levels. The proposed action benefits in a material way the economy, productivity, competition and jobs. The proposed action will not adversely affect, in the long-term, competition, jobs, the environment, public health or safety, or state, local, or tribal government communities. (2) The proposed actions will not create a serious inconsistency or otherwise interfere with an action taken or planned by another agency. No other agency has indicated that it plans an action that will affect the Atlantic mackerel, squid and butterfish fisheries in the EEZ. (3) The proposed actions will not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of their participants. (4) the proposed actions do not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

The economic benefits of the Atlantic Mackerel, Squid and Butterfish FMP have been evaluated periodically as amendments to the FMP have been implemented. These analyses have been conducted at the time a major amendment is developed and interim actions (framework adjustments or quota specifications) may be presumed to leave the conclusions reached in the initial benefit-cost analyses unchanged provided the original conservation and economic objectives of the plan are being met. Amendment 11 is the most recent Amendment for which an FSEIS is available. The economic analysis presented with Amendment 11 was largely qualitative in nature but used quantitative measures whenever possible to describe the MSB fisheries and the impacts of the alternatives being considered.

A more detailed description of the economic concepts involved can be found in "Guidelines for Economic Analysis of Fishery Management Actions" (USDC 2000), as only a brief summary of key concepts will be presented here.

The law of demand states that price and quantity demanded are inversely related. Given a demand curve for a commodity (good or service), the elasticity of demand is a measure of the responsiveness of the quantity that will be taken by consumers giving changes in the price of that commodity (while holding other variables constant). There are several major factors that influence the elasticity for a specific commodity. These factors largely determine whether demand for a commodity is price elastic or inelastic[6]: 1) the number and closeness of substitutes for the commodity under consideration, 2) the number of uses to which the commodity can be put; and 3) the price of the commodity relative to the consumer's purchasing power (income). There are other factors that may also determine the elasticity of demand but are not mentioned here because they are beyond the scope of this discussion. As the number and closeness of substitutes and/or the number of uses for a specific commodity increase, the demand for the specific commodity will tend to be more elastic. Demand for commodities that take a large amount of the consumer's income is likely to be elastic compared to services with low prices relative to the consumer's income. It is argued that the availability of substitutes is the most important of the factors listed in determining the elasticity of demand for a specific commodity (Leftwich 1973; Awk 1988). Seafood demand in general appears to be elastic. In fact, for most species, product groups, and product forms, demand is elastic (Asche and Bjørndal 2003).

Benefit-cost analysis is conducted to evaluate the net social benefit arising from changes in consumer and producer surpluses that are expected to occur upon implementation of a regulatory action. Total Consumer Surplus (CS) is the difference between the amounts consumers are willing to pay for products or services and the amounts they actually pay. Thus CS represents net benefits to consumers. When the information necessary to plot the supply and demand curves for a particular commodity is available, consumer surplus is represented by the area that is below the demand curve and above the market clearing price where the two curves intersect. Since an empirical model describing the elasticities of supply and demand for these species is not available, it was assumed that the price for these species was determined by the market clearance price market or the interaction of the supply and demand curves. These prices were the base prices used to determine potential changes in prices due to changes in landings.

Net benefit to producers is producer surplus (PS). Total PS is the difference between the amounts producers actually receive for providing goods and services and the economic cost producers bear to do so. Graphically, it is the area above the supply curve and below the market clearing price where supply and demand intersect. Economic costs are measured by the opportunity cost of all resources including the raw materials, physical and human capital used in the process of supplying these goods and services to consumers.

One of the more visible costs to society of fisheries regulation is that of enforcement. From a budgetary perspective, the cost of enforcement is equivalent to the total public expenditure devoted to enforcement. However, the economic cost of enforcement is measured by the opportunity cost of devoting resources to enforcement vis à vis some other public or private use and/or by the opportunity cost of diverting enforcement resources from one fishery to another.

[6]Price elasticity of demand is elastic when a change in quantity demanded is large relative to the change in price. Price elasticity of demand is inelastic when a change in quantity demanded is small relative to the change in price. Price elasticity of demand is unitary when a change in quantity demanded and price are the same.

Alternatives - Tables 2 and 3 above are reproduced below to provide a review of the status quo and preferred alternatives considered in the proposed action. Additional details and the non-preferred alternatives can be found in Section 5.

Table 75. Qualitative summary of expected impacts of status quo and preferred specifications considered for 2012. ("+" signifies a positive impact, "-" a negative impact, and "0" a similar impact to the year before. "0/" before "+" or "-" indicates a likely small impact; Impacts for non-preferred alternatives are discussed in Section 7)

	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 1a - Mackerel - Status Quo - ABC = 80,000mt; U.S. ABC = 47,395mt; DAH = 46,779mt	0	0	0	0	0
Alt 1b - Mackerel - Preferred - ABC = 80,000mt; U.S. ABC = 43,781mt; DAH = 33,821mt;	0/+	0/+	0/-	0/+	0/+
Alt 3a - Illex - Status Quo - ABC = 24,000mt; DAH = 23,328mt	0	0	0	0	0
Alt 3b - Illex - Preferred - ABC = 24,000mt; DAH = 22,915mt	0	0	0	0	0
Alt 4a - Butterfish - Status Quo - ABC = 1,811mt; DAH = 500mt	0	0	0	0	0
Alt 4b - Butterfish - Preferred - ABC = 3,622mt; DAH = 1087mt	0	0/-	+	0/-	0/-
Alt 6a - Longfin Squid - Status Quo - ABC = 24,000mt; DAH = 20,000mt	0	0	0	0	0
Alt 6b - Longfin Squid - Preferred - ABC = 23,400mt; DAH = 22,445mt	0	0/-	+	0/-	0/-

Table 76. Qualitative summary of expected impacts of status quo and preferred other management measures considered for 2012. ("+" signifies a positive impact, "-" a negative impact, and "0" a similar impact to the year before. "0/" before "+" or "-" indicates a likely small impact; Impacts for non-preferred alternatives are discussed in Section 7)

	Valued Ecosystem Components/Environmental Dimensions				
Management measures besides specifications.	Managed Resource	Non-target Species	Human Communi-ties	Protected Resources	Essential Fish Habitat
Alt 2a - mackerel - Status Quo - No addiitonal changes to mackerel management measures	0	0	0	0	0
Alt 2b - mackerel - Close the directed commerical fishery at 95% of DAH instead of 90% of DAH	0	0	0	0	0
Alt 2c - mackerel - Elliminate provision where the post-closure trip limit is 50,000 if a closure occurs on/after June 1 - Any closure would trigger a 20,000 pound trip limit.	0	0	0	0	0
Alt 5a - butterfish - status quo - No addiitonal changes to butterfish management measures	0	0	0	0	0
Alt 5b - butterfish - change threshold for 3" mesh from 1,000 pounds to 2,000 pounds	0	0	0/+	0	0
Alt 7a - Longfin Squid - status quo - No addiitonal changes to Longfin Squid management measures	0	0	0	0	0
Alt 7b - Longfin Squid - allow up to 3% of the Loligo IOY to be used for RSA	0	0	0	0	0
Alt 7c - Longfin Squid - allow jigging w/o trip limits for moratorium permit holders in the event of a closure related to the butterfish cap	0	0	0/+	0	0

Atlantic mackerel

The alternatives considered for Atlantic mackerel specifications for 2012 are fully described in section 5. Two measures other than specifications are proposed. These minor changes to closure thresholds and post-closure trip limits are not expected to have any substantial impacts but are related to remaining consistent with other management actions. Up to 3% of the IOY may be set aside for scientific research. Due to a lack of an empirical model for these fisheries and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was used. Nevertheless, quantitative measures are provided whenever possible.

Landings

The preferred specifications for 2012 represent a reduction from the status quo but are still above recent (2008-2010) landings, so no change in landings would be expected as a result of the specifications in 2012 compared to how the fishery operated in 2011.

Prices

Given the likelihood that the alternatives for Atlantic mackerel will result in no change in mackerel landings and that mackerel prices are a function of numerous factors including world supply and demand, it is assumed that there will not be a change in the price for this species as a result of the 2012 proposed specifications. Since the majority of US caught Atlantic mackerel are exported to foreign markets, prices will depend principally on the state of world demand for mackerel and the world supply of mackerel in 2012. Since US supply of mackerel is small compared to world supply and demand, it appears unlikely that potential changes in US production will result in a change in price on the world market (and hence the amount received by US producers in the world export market).

Consumer Surplus

Assuming Atlantic mackerel prices will not be affected under the scenario for landings constructed above, there should be no corresponding change in consumer surplus associated with these fisheries.

Harvest Costs

No changes to harvest costs relative to the status quo for the MSB fisheries are expected as a result of the considered measures.

Producer surplus

Assuming Atlantic mackerel prices will not be affected as described above, there should be no corresponding change in producer surplus directly associated with these actions.

Enforcement Costs

Properly defined, enforcement costs are not equivalent to the budgetary expense of dockside or at-sea inspection of vessels. Rather, enforcement costs from an economic perspective, are measured by opportunity cost in terms of foregone opportunities related to enforcing regulations. None of the measures are expected to increase enforcement costs.

Distributive Effects

The 2012 specifications operationalize a division of quota between the commercial and recreational fisheries as implemented via Amendment 11 and the Omnibus Amendment. The division was implemented via those amendments however based on recent operation of the fishery none of the allocations are expected to create a constraint given the preferred specifications.

Alternatives for *Illex*

Because the preferred *Illex* specifications (see section 5) for 2012 are nearly identical to the 2011 alternatives and because they are above recent landings, no direct impacts are expected related to *Landings, Prices, Consumer Surplus, Harvest Costs, Producer surplus, Enforcement Costs, or Distributive Effects.*

Alternatives for butterfish

One measure other than specifications in proposed. This minor change to the threshold when 3" mesh is required from 1,000 pounds to 2,000 pounds should have minimal effects and if anything should allow fishermen to convert potential discards into landings. Up to 3% of the IOY may be set aside for scientific research. Due to a lack of an empirical model for these fisheries and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was used. Nevertheless, quantitative measures are provided whenever possible.

Landings

The preferred specifications for 2012 would allow a doubling of landings but other existing measures (trip limits) will likely prohibit re-establishment of a directed fishery and the primary impact may just be additional retention of fish that would have otherwise been discarded.

Prices

Given that existing measures will temper any additional input of butterfish and given that butterfish prices are a function of numerous factors including both supply and demand, it is assumed that there will not be a change in the price for this species as a result of the preferred alternatives.

Consumer Surplus

Assuming butterfish prices will not be affected under the alternatives considered there should be no corresponding change in consumer surplus associated with these alternatives.

Harvest Costs

No changes to harvest costs are expected as a result of the alternatives considered. If anything harvest costs may be reduced because of the higher threshold when 3" mesh is required.

Producer surplus

Assuming prices will not be affected under the alternatives considered there should be no corresponding change in producer surplus associated with these alternatives.

Enforcement Costs

The alternatives considered are not expected to change enforcement costs.

Distributive Effects

There are no changes to the quota allocation process for butterfish under the alternatives considered. As such, no distributional effects are expected for these fisheries.

<u>Alternatives for Longfin Squid</u>

The alternatives considered for longfin squid specifications for 2012 are fully described in section 5. The only substantial change other than the specifications is that if the butterfish cap closes the longfin squid fishery in 2012, fishermen would still be allowed to fish for longfin squid with jigging gear. While this gear is not currently employed butterfish bycatch would be minimal so there was no reason to discourage mitigating behavior/experimentation. Due to a lack of an empirical model for these fisheries and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was used. Nevertheless, quantitative measures are provided whenever possible.

Landings

The preferred specifications for 2012 represent a slight increase from the status quo but since the fishery was not reaching the status quo specifications there may be no increase in landings despite the increase in specifications.

Prices

Given the overall likelihood that the alternatives considered for longfin squid would not significantly affect landings in 2012, it is assumed that there will not be a change in the price for this species as a result of the alternatives considered.

Consumer Surplus

Assuming longfin squid prices will not be affected under the alternatives considered there should be no corresponding change in consumer surplus associated with these alternatives.

Harvest Costs

No changes to harvest costs are expected as a result of the alternatives considered.

Producer surplus

Assuming prices will not be affected under the alternatives considered there should be no corresponding change in producer surplus as a result of the alternatives considered.

Enforcement Costs

The alternatives considered for longfin squid are not expected to change enforcement costs. Since any vessel looking to fish with jigging gear during a closure would still have to declare to the observer program it should be pretty easy to track behavior in response to this provision.

Distributive Effects

There are no changes to the quota allocation process for butterfish under the alternatives considered. As such, no distributional effects are expected for these fisheries.

<u>Summary of Impacts</u>

The overall impacts of Atlantic mackerel, longfin squid, *Illex* and butterfish landings on prices, consumer surplus, and consumer surplus are difficult to determine without detailed knowledge of the relationship between supply and demand factors for these fisheries. In the absence of detailed empirical models for these fisheries and knowledge of elasticities of supply and demand, a qualitative approach was employed to assess potential impacts of the management measures, which appear to be minimal.

The Council has concluded that no change in the competitive nature of these fisheries should result from implementation of the quota specifications under the preferred alternatives. No changes in enforcement costs or harvest costs have been identified for any of the alternatives considered for each species.

It is important to note that although the measures that are evaluated in this specification package are for the 2012 fisheries, the annual specification process for these fisheries could have potential cumulative impacts. The extent of any cumulative impacts from measures established in previous years is largely dependent on how effective those measures were in meeting the intended objectives and the extent to which mitigating measures compensated for any quota overages. Section 7 of this EA has a description of the cumulative impacts of the measures established under the FMP since it was implemented.

12.3 ANALYSIS OF IMPACTS

12.3.1 INTRODUCTION AND METHODS INCLUDING NUMBER OF REGULATED ENTITIES

The Regulatory Flexibility Act (RFA) requires the Federal rulemaker to examine the impacts of proposed and existing rules on small businesses, small organizations, and small governmental jurisdictions. In reviewing the potential impacts of proposed regulations, the agency must either certify that the rule "will not, if promulgated, have a significant economic impact on a substantial number of small entities or prepare a final regulatory flexibility analysis. The Small Business Administration (SBA) defines a small business in the commercial fishing sector as a firm with receipts (gross revenues) of up to $4.0 million. Party/charter small businesses are included in NAICS code 487210 and are defined as a firm with gross receipts of up to $7 million.

The measures regarding the 2012 quotas could affect any vessel holding an active Federal permit for Atlantic mackerel, longfin squid, *Illex* or butterfish, as well as vessels that fish for any one of these species in state waters. According to NMFS permit file data, in 2010, 2,201 commercial vessels possessed Atlantic mackerel permits, 351 vessels possessed longfin squid/butterfish moratorium permits, 76 vessels possessed *Illex* permits, 1904 vessels possessed incidental catch permits and 831 vessels possessed squid/mackerel/butterfish party/charter permits. In 2010 all but 3 of the relevant commercial vessels were within the definition of a small business. Only a very few commercial vessels may be above the gross revenue cut-off in a given year. While gross revenue data is not available for the party/charter sector, it is a reasonably safe presumption that almost all if not all of the party/charter vessels would qualify as a small business. Many vessels participate in more than one of these fisheries; therefore, permit numbers are not additive. The distribution of permitted and active vessels by state may be found in Section 6.

Since all permit holders may not actually land any of the four species, the more immediate impact of the specifications may be felt by the commercial vessels that are actively participating in these fisheries (see active vessel tables in Section 6 above). An active participant was defined as being any vessel that reported having landed one or more pounds of any one of the four species in the Northeast dealer data during calendar year 2010. NMFS weighout databases cover activity by unique vessels that hold a Federal permit of any kind and provides summary data for vessels that fish exclusively in state waters. This means that an active vessel may be a vessel that holds a valid Federal Atlantic mackerel, squid, or butterfish permit, a vessel that holds a valid Federal permit but no Atlantic mackerel, squid, or butterfish permit; a vessel that holds a Federal permit other than Atlantic mackerel, squid, or butterfish permit and fishes for those species exclusively in state waters; or may be a vessel that holds no Federal permit of any kind. Of the four possibilities the number of vessels in the latter two categories cannot be estimated because the dealer data provides only summary information for state waters vessels and because the vessels in the last category do not have to report landings.

Not all landings and revenues reported through the Federal dealer data can be attributed to a specific vessel. Vessels with no Federal permits are not subject to any Federal reporting requirements with which to corroborate the dealer reports. Thus, it is possible that some vessel activity cannot be tracked with the landings and revenue data that are available. Thus, these vessels cannot be included in the threshold analysis, unless each state were to report individual vessel activity through some additional reporting system - which currently does not exist. This problem has two consequences for performing threshold analyses. First, the stated number of entities subject to the regulation is a lower bound estimate, since vessels that operate strictly within state waters and sell exclusively to non-Federally permitted dealers cannot be counted. Second, the portion of activity by these uncounted vessels may cause the estimated economic impacts to be over- or underestimated.

The effects of actions were analyzed by employing quantitative approaches to the extent possible. In the current analysis, effects on profitability associated with the management measures should be evaluated by looking at the impact the measures on individual vessel costs and revenues. However, in the absence of cost data for individual vessels engaged in these fisheries, changes in gross revenues are used a proxy for profitability.

12.3.2 ANALYSIS OF THE IMPACTS OF ALTERNATIVES

For the purpose of ease of comparison, the specifications in recent years compared to actual fishery performance are given by species in Tables 48-51 below.

Table 77. IRFA-1. Summary of specifications and landings for Mackerel (mt).

	2006	2007	2008	2009	2010	2011
ABC[1]	335,000	186,000	156,000	156,000	156,000	47,395
IOY	115,000	115,000	115,000	115,000	115,000	46,779
DAH[2]	115,000	115,000	115,000	115,000	115,000	46,779
DAP	100,000	100,000	100,000	100,000	100,000	31,779
JVP	0	0	0	0	0	0
TALFF	0	0	0	0	0	0
US Commercial	56,860	25,547	21,748	22,634	9,891	-
US Value (m $)	23.7	6.6	6.2	8.0	3.2	-
US Recreational	1,633	884	691	747	778	-
Total US	58,493	26,431	22,439	23,381	10,669	-
Canadian	54,279	53,649	50,578	28,288	36,219	-

[1] ABC = F_{target} - estimated Canadian landings.
[2] Includes recreational assumption of 15,000 mt.

Table 78. IRFA-2. Summary of specifications and landings for *Illex* (mt).

	2006	2007	2008	2009	2010	2011
Max OY	24,000	24,000	24,000	24,000	24,000	Unkn
ABC	24,000	24,000	24,000	24,000	24,000	24,000
IOY	24,000	24,000	24,000	24,000	24,000	23,328
DAH	24,000	24,000	24,000	24,000	24,000	23,328
DAP	24,000	24,000	24,000	24,000	24,000	23,328
JVP	0	0	0	0	0	0
TALFF	0	0	0	0	0	0
Landings (mt)	13,944	9,022	15,900	18,418	15,825	-
Value (millions $)	7.9	3.9	8.3	9.7	10.8	-

Table 79. IRFA-3. Summary of specifications and landings for butterfish (mt).

	2006	2007	2008	2009	2010	2011
Max OY	12,175	12,175	12,175	12,175	12,175	Unkn
ABC	4,545	4,545	4,545	1,500	1,500	1,811
IOY	1,681	1,681	1,681	500	500	500
DAH	1,681	1,681	1,681	500	500	500
DAP	1,681	1,681	1,681	500	500	500
JVP	0	0	0	0	0	0
TALFF[2]	0	0	0	0	0	0
Landings (mt)	554	674	451	435	603	-
Value (millions $)	0.8	1.1	0.8	0.6	.9	-

Table 80. IRFA-4. Summary of Specifications and Landings for Longfin Squid (mt).

	2006	2007	2008	2009	2010	2011
Max OY	26,000	26,000	26,000	26,000	26,000	32,000
ABC	17,000	17,000	17,000	19,000	19,000	24,000
IOY	17,000	17,000	17,000	19,000	19,000	19,906
DAH	17,000	17,000	17,000	19,000	19,000	19,906
DAP	17,000	17,000	17,000	19,000	19,000	19,906
JVP	0	0	0	0	0	0
TALFF	0	0	0	0	0	0
Landings (mt)	15,907	12,342	11,409	9.306	6,855	-
Value (millions $)	27.8	23.2	23.3	18.3	15.7	-

12.3.2.1 Impacts of Alternatives for Atlantic mackerel

The alternatives considered for this species are fully described in section 5 of the EA. All alternatives exceed recent landings of mackerel (2008-2010) and would therefore likely be unconstraining for 2012 (there were no closures related to achieving the DAH in those years). In the absence of any expected constraints on vessels in the fishery in aggregate or individually, there is no expected impact on revenues under the Regulatory Flexibility Act and the proposed 2012 specifications could actually allow for an increase in ex-vessel revenues in 2012 compared to 2008-2010.

12.3.2.2 Impacts of Alternatives for *Illex*

The alternatives considered for this species are fully described in section 5. All alternatives exceed recent landings of *Illex* (2008-2010) and would therefore likely be unconstraining for 2012 (there were no closures related to achieving the DAH in those years). In the absence of any expected constraints on vessels in the fishery in aggregate or individually, there is no expected impact on revenues under the Regulatory Flexibility Act and the proposed 2012 specifications could actually allow for an increase in ex-vessel revenues in 2012 compared to 2008-2010.

12.3.2.3 Impacts of Alternatives for butterfish

The alternatives considered for this species are fully described in section 5. Changes in the butterfish ABC, ACT, and ACL have two possible economic effects. The first potential effects are the direct changes in revenues as described below. The second set of potential effects are 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.

Since the proposed specifications are not likely to cause a reduction in revenues from the status quo, the 2012 specifications are not expected to have substantial negative impacts on businesses involved in the commercial harvest of this species compared to how the fishery operated in 2010.

12.3.2.4 Impacts of Alternatives for Longfin squid

The alternatives considered for this species are fully described in section 5. All alternatives exceed recent landings of longfin squid (2008-2010) and would therefore likely be unconstraining for 2012 (there were no closures related to achieving the DAH in those years). In the absence of any expected constraints on vessels in the fishery in aggregate or individually, there is no expected impact on revenues under the Regulatory Flexibility Act and the proposed 2012 specifications could actually allow for an increase in ex-vessel revenues in 2012 compared to 2008-2010.

While the preferred longfin squid specifications could allow for an increase in landing/revenue, the butterfish mortality cap could still close the longfin squid fishery before the longfin squid specifications close the longfin squid fishery. As discussed above, the higher butterfish ABC in 2012 makes this less likely but if high rates of butterfish catch occur, Amendment 10 found that potentially 64% of 2006 longfin squid revenue levels could be lost. While 2008-2010 landings have been lower, so a closure would likely cause a smaller impact, the fact still remains that a closure related to the butterfish mortality cap could substantially restrict longfin squid landings. The economic impacts of the cap are further detailed in Amendment 10.

13.0 APPENDIX A - SSC 2012 ABC RECOMMENDATIONS

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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M E M O R A N D U M

DATE: May 27, 2011

TO: Richard B. Robins, Jr., Chairman, Mid-Atlantic Fishery Management Council

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

Subject: Report of May 2011 Meeting of the MAFMC Scientific and Statistical Committee

The Scientific and Statistical Committee (SSC) of the Mid-Atlantic Fishery Management Council (MAFMC) met on 25-26 May 2011 to review stock assessment information and develop acceptable biological catch (ABC) recommendations for four species under the management purview of the MAFMC: *Loligo* squid, *Illex* squid, butterfish, and Atlantic mackerel. A total of 12 SSC members were in attendance on May 25th and 11 on May 26th, which represented a quorum each day as defined by the SSC standard operating procedures. Also in attendance were representatives of the MAFMC, MAFMC staff, and the public. Stock assessment scientists from the Northeast Fisheries Science Center participated by phone during the ABC discussions (see attached attendance list).

For each species, MAFMC staff described the assessment history, the most recent survey and landings information, and comments from the Advisory Panel and Monitoring Committee. Scientists from the NEFSC were then asked to comment, followed by the SSC species lead on socioeconomics then the SSC species lead on biology. The public was then invited to comment. The SSC species lead for biology led the SSC discussion on selection of an ABC for the 2012 fishing year (and beyond in some cases). Once the discussion was completed, the SSC provided consensus statements in response to the terms of reference provided by the MAFMC. The terms of reference were the same for each of the six species. The SSC also developed research recommendations for investigations that would likely lead to reduction in scientific uncertainty associated with the ABC recommendation.

The following represents the consensus responses by the SSC to the ABC terms of reference and research recommendations for each of the four species covered in the 25-26 May 2011 meeting.

Loligo Squid

1) The materials considered in reaching its recommendations:

- MAFMC Staff Memorandum from Jason Didden to Chris Moore: “2012 Atlantic Mackerel, *Illex*, *Loligo*, and Butterfish OFL/ABC Recommendations,” dated 3 May 2011

- Letter from Lars Axelson, Jeff Reichle, Dave Ellenton, Geir Monson, Peter Moore, Jeff Kaelin, and Hank Lackner to John Boreman, dated 13 May 2011.
- Letter from the National Coalition for Marine Conservation to Rick Robins, dated 6 April 2011
- MAFMC Staff Report: Loligo AP Informational Document, dated April 2011. 30pp.
- SARC 51 panelist reports
- SARC 51 panelist summary report. 51pp.
- *Loligo pealeii* Stock assessment for 2010. 51st SAW stock assessment report. 158pp.
- Squid-Mackerel-Butterfish (SMB) Advisory Panel (AP) Fishery Performance Report (FPR) – *Loligo* (undated). 1pp.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

The SSC deemed the assessment to be Level 4 because of the lack of an OFL reference point.

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

Not possible as no OFL was provided.

4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the Act and the National Standard 1 Guidelines to the Act:

The SSC recommends an ABC of **23,400 mt**, based on the catch in the year with the highest observed exploitation fraction (catch divided by the estimated biomass) during a period of apparent light exploitation (1976-2009). Based on the results of the accepted SAW 51 assessment, the SSC interpreted this level of exploitation to be sustainable over the long term.

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations (if not possible, provide a qualitative evaluation):

Not possible, given available information.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Surveys cover unknown portion of entire range (variable availability). Range may extend beyond survey coverage;
- Poor precision of U.S. discard estimates;
- Using a bottom trawl survey gear for a semi-pelagic species may induce variation in the indices of abundance and obscure the true signal;
- Highly variable survey trends;
- Highly variable natural mortality;
- Extremely short life-span (less than 1 year), and unknown, but likely high, impact of environmental factors on recruitment;
- Because of its short life span, its high rate of natural mortality and the delay in collating survey and catch information, there is an inherent lag in information pertaining to the current state of the

stock; and

- Inability to distinguish between inter-seasonal differences in productivity and inter-seasonal differences in catchability.

7) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Research Recommendation

Explore alternative weightings of semi-annual surveys other than simple averaging.

Illex Squid

1) The materials considered in reaching its recommendations:

- MAFMC Staff Memorandum from Jason Didden to Chris Moore: "2012 Atlantic Mackerel, *Illex*, *Loligo*, and Butterfish OFL/ABC Recommendations," dated 3 May 2011
- Letter from Lars Axelson, Jeff Reichle, Dave Ellenton, Geir Monson, Peter Moore, Jeff Kaelin, and Hank Lackner to John Boreman, dated 13 May 2011.
- Letter from the National Coalition for Marine Conservation to Rick Robins, dated 6 April 2011
- MAFMC Staff Report: Illex AP Informational Document, dated April 2011. 19pp.
- Squid-Mackerel-Butterfish (SMB) Advisory Panel (AP) Fishery Performance Report (FPR) – *Illex* (undated). 1pp.
- Northeast Fisheries Science Center. 1996. Report of the 21st Northeast Regional Stock Assessment Workshop (21st SAW): Stock assessment review committee consensus summary of assessments. Northeast Fisheries Science Center Reference Document 96-05d. 200pp.
- Northeast Fisheries Science Center. 1996. Report of the 21st Northeast Regional Stock Assessment Workshop (21st SAW): Public review workshop. Northeast Fisheries Science Center Reference Document 96-05h. 50pp.
- SARC 42 Assessment Working Group. 2006. C. Assessment of northern shortfin squid on the eastern USA shelf during 2003 and 2004. 83pp.
- 42nd Northeast Regional Stock Assessment Workshop (42nd SAW): 42nd SAW assessment summary report. Northeast Fisheries Science Center Reference Document 06-01. 61pp.
- SARC 42 review panelist reports

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

The SSC deemed the assessment to be Level 4 because of the lack of an OFL reference point.

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

The SSC determined it was not possible to provide an OFL given currently available scientific information.

4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the Act and the National Standard 1 Guidelines to the Act:

The SSC recommends an ABC of **24,000 mt.** The 24,000 mt for *Illex* is not an assessment-based ABC. Even though trawl survey CPUE and landings have varied, there do not appear to be any long-term trends; changes in landings could be the result of changes in abundance, availability, and/or market conditions. Additionally, there is no available evidence that landings of 24,000-26,000 MT have caused harm to the *Illex* stock. The SSC recommends this ABC for a three-year period (2012-2014), subject to SSC annual review.

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations (if not possible, provide a qualitative evaluation):

Not possible, given available information.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Surveys cover an unknown portion of the entire range (leading to variable availability);
- Poor precision of U.S. discard estimates (but of low magnitude);
- Using a bottom trawl survey gear for a semi-pelagic species may induce variation in the indices of abundance and obscure the true signal;
- LPUE values are sensitive to availability;
- Highly variable natural mortality;
- Extremely short life-span (less than 1 year), and unknown, but likely high, impact of environmental factors on recruitment; and
- No available estimates of biological reference points (F & B), and no estimates of recent biomass and/or fishing mortality.

7) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Research Recommendations

- Demographic information on growth, mortality, reproduction by sex, season, and cohort.
- Consider a length-based assessment with a sub-annual time step, undertaking cooperative research with the fishing industry.
- Expand investigations into oceanographic correlates with trends in recruitment and abundance.
- Investigate range and range dynamics at depths >185 m.
- Refine between-vessel survey calibration estimate for *Ilex*, and consider a size-based calibration.
- Analyze the change in availability of *Ilex* to the survey and fishery, resulting from long-term changes in climate or other oceanographic factors.
- Consider an *Ilex* index standardization for the NEFSC trawl survey.

Butterfish

1) The materials considered in reaching its recommendations:

- Northeast Fisheries Science Center. 2010. 49th Northeast Regional Stock Assessment Workshop (49th SAW) Assessment Summary Report. NEFSC Ref. Doc. 10-01; 41 p.
- Northeast Fisheries Science Center. 2010. 49th Northeast Regional Stock Assessment Workshop (49th SAW) Assessment Report. NEFSC Ref. Doc. 10-03; 383 p.
- SARC 49 review panelist reports
- Open letter from Joel Sohn, dated 15 May 2011
- Squid-Mackerel-Butterfish (SMB) Advisory Panel (AP) Fishery Performance Report (FPR) - Butterfish (undated). 1p.
- MAFMC Staff Memorandum from Jason Didden to Chris Moore: "2012 Atlantic Mackerel, *Illex*, *Loligo*, and Butterfish OFL/ABC Recommendations," dated 3 May 2011
- Letter from Lars Axelson, Jeff Reichle, Dave Ellenton, Geir Monson, Peter Moore, Jeff Kaelin, and Hank Lackner to John Boreman, dated 13 May 2011.
- Letter from the National Coalition for Marine Conservation to Rick Robins, dated 6 April 2011
- MAFMC Staff Report: Butterfish AP Informational Document, dated April 2011. 21pp.
- Berkson, J., L. Barbieri, S. Cadrin, S. L. Cass-Calay, P. Crone, M. Dorn, C. Friess, D. Kobayashi, T. J. Miller, W. S. Patrick, S. Pautzke, S. Ralston, M. Trianni. 2011. Calculating Acceptable Biological Catch for Stocks That Have Reliable Catch Data Only (Only Reliable Catch Stocks – ORCS). NOAA Technical Memorandum NMFS-SEFSC-616. 56pp.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted to the Secretary of Commerce:

The SSC deemed the assessment to be Level 4 because of the lack of an OFL reference point.

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

An estimate of OFL was not available from the most recent stock assessment (49th SAW).

4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the Act and the National Standard 1 Guidelines to the Act:

The SSC recommends an ABC of **3,622 mt**, which represents a doubling of the 2011 ABC.

- Survey indices appear to be stable or increasing.
- Anecdotal observations of increased butterfish abundance, as described in the AP Fishery Performance Report.
- Fishing mortality appears to be very low, particularly when compared to natural mortality.
- The above 3 bullets suggest an increase in ABC from the 2011 level is warranted.
- Analysis of the existing relationship among fishing mortality and yield for lightly exploited stocks contained in the OCRS report (Berkson, et al., cited above) suggests that OFLs could be

doubled (ORCS Report); the same rationale was applied to 2011 butterfish ABC.

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations (if not possible, provide a qualitative evaluation):

Not possible, given available information.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Discards imprecisely estimated;
- Survey indices, except for the NEFSC fall survey;
- Model-based estimates of biomass and F are generally imprecise;
- Survey efficiency and stock area coverage;
- High natural mortality;
- Possible low survey catchability (pelagic fish);
- Conflicting trends among surveys;
- No accepted reference points; and
- Probable large role of environmental drivers (including predation).

7) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Atlantic Mackerel

1) The materials considered in reaching its recommendations:

- Letter from Lars Axelson, Jeff Reichle, Dave Ellenton, Geir Monson, Peter Moore, Jeff Kaelin, and Hank Lackner to John Boreman, dated 13 May 2011.
- Letter from Cape Cod Commercial Hook Fishermen's Association to Rick Robins, dated 7 April 2011.
- Letter from the National Coalition for Marine Conservation to Rick Robins, dated 6 April 2011
- Letter from James Dow, Janet Messineo, Capt. Patrick Paquette, and Stephen Medeiros to Rick Robins, dated 8 April 2011
- MAFMC Staff Report: Mackerel AP Informational Document, dated April 2011
- MAFMC Staff Memorandum from Jason Didden to Chris Moore: "2012 Atlantic Mackerel, *Illex*, *Loligo*, and Butterfish OFL/ABC Recommendations," dated 3 May 2011
- Squid-Mackerel-Butterfish (SMB) Advisory Panel (AP) Fishery Performance Report (FPR) – Atlantic Mackerel (undated)
- Transboundary Resources Assessment Committee. 2010. Atlantic mackerel in the Northwest Atlantic - 2009 (NAFO Subareas 2 – 6). Summary of Status Report 2010/01. 12pp.
- Deroba, J. J., G. Shepherd, F. Gregoire, J. Nieland, and J. Link. 2010. Stock assessment of Atlantic mackerel in the Northwest Atlantic – 2009. Transboundary Resource Assessment Committee. Reference Document 2010/01. 64pp.

2) The level (1-4) that the SSC deems most appropriate for the information content of the most recent stock assessment, based on criteria listed in the version of the proposed Omnibus Amendment submitted *to the Secretary of Commerce:*

Level 4: an OFL was not provided in the most recent stock assessment (2010 TRAC).

3) If possible, the level of catch (in weight) associated with the overfishing limit (OFL) based on the maximum fishing mortality rate threshold:

An estimate of OFL was not provided in the most recent stock assessment (2010 TRAC), and thus the SSC cannot provide a catch in weight associated with OFL.

4) The level of catch (in weight) associated with the acceptable biological catch (ABC) for the stock. The ABC will be selected based on the overfishing definition contained in the FMP and to reflect the level of scientific uncertainty inherent in the stock assessment such that the recommended ABC is less than or equal to the overfishing limit in line with the Act and the National Standard 1 Guidelines to the Act:

The SSC recommended an ABC of **80,000 mt**, based on the results of the most recent TRAC (2010). No information was presented to the SSC to cause the SSC to deviate from the TRAC recommendation.

Recent survey data are inconclusive because of:

- Potential changes in catchability in the change from RV Albatross to R/V Bigelow have yet to adequately specified. In particular, the SSC currently lacks estimates of length-specific catchability.
- Concerns remain over the extent to which the survey provides a reliable index of abundance given changes in availability.

Catch data may be inconclusive because:

- Catch may not be a reliable index of abundance owing to concerns related to availability and the short duration of the fishing season.
- Increases in fuel prices may have limited the flexibility of the fishery to search for mackerel.

5) If possible, the probability of overfishing associated with the OFL and ABC catch level recommendations (if not possible, provide a qualitative evaluation):

No OFL is available for this stock, and thus it is not possible to provide a quantitative estimate of the probability of overfishing. Also, the SSC is unable to specify in a qualitative sense of the level of risk assumed by the adoption of the recommended ABC.

6) The most significant sources of scientific uncertainty associated with determination of OFL and ABC:

- Disparate trend between NEFSC trawl survey and both the commercial CPUE trend and landings;
- Apparent, but not fully explainable changes in survey catchability, which may alias a number of unidentified factors;
- Lack of quantification of the linkage between US and Canadian catches;
- Surveys cover an unknown portion of entire range (variable availability);
- No Canadian discard information and poor precision of U.S. discard and recreational estimates (though likely low);
- Using a bottom trawl survey gear for a semi-pelagic species may induce variation in the indices of abundance and obscure the signal;

- Conflicting catch-at-age and survey information; and
- No satisfactory explanation of model retrospectives.

7) A certification that the recommendations provided by the SSC represent the best scientific information available:

To the best of the SSC's knowledge, these recommendations are based on the best available scientific information.

Research Recommendations

- Explore patterns in consumption as an additional index of abundance.
- Collaborate with industry to explore the spatial and temporal pattern and variability in catch to evaluate issues of abundance and availability.
- Re-evaluate existing data.

The SSC also endorse the following research recommendations developed during the 2010 TRAC:

- Explore opportunities for the development of alternative indices of abundance.
- Attempt to develop total stock abundance.
- Initiate broad scale international egg surveys covering potential spawning habitat that is consistently representative of the total stock area, including the shelf break. Investigate potential to conduct work in cooperation with commercial fishing industry (priority: high, long term).
- Explore spatial distribution of stock relative to the mixing of the northern and southern 'contingents' of mackerel i.e. tagging, genetics, chemical assay, microchemistry of otoliths (priority: high, medium-long term).
- Explore influence of environmental factors on spatial distribution of the stock e.g. rate of mixing and distribution of stock relative to the survey area (high priority, short term)
- Extend predation estimates to include DFO data and entire predator spectrum (marine mammals, highly migratory species).
- Examine methodology for incorporating consumptions estimates in the assessment.
- Quantify the magnitude of additional sources of mortality in Canada including the bait fishery, recreational catch and discards (high priority; short term)
- Exploration of bottom trawl characteristics for catchability of mackerel.
- Participate with industry in investigating the contemporary overlap of survey stock area, commercial fishery, and mackerel distribution and explore historical databases for the same purpose to better understand interpretation of abundance indices (survey, cpue) (medium term)
- Collaborate with industry to investigate alternative sampling gear (i.e. jigging) to survey adult abundance (long term)
- Explore MARMAP database relative to spatial distribution of survey indices.
- Investigate alternative assessment models that incorporate spatial structure (i.e. northern and southern contingents, different age groups).
- Explore alternative assessment models that incorporate covariates.
- Initiate a technical TRAC WG in order to advance and monitor progress of research recommendations.

Attachment

cc: Members, MAFMC SSC, R. Seagraves, L. Anderson, J. Didden, J. Saunders

MAFMC Scientific and Statistical Committee Meeting
Baltimore, MD

May 25, 2011

SSC Members in Attendance

Name	Affiliation
John Boreman (SSC Chairman)	North Carolina State University
Tom Miller (SSC Vice-Chair)	University of Maryland - CBL
Mike Wilberg	University of Maryland - CBL
Robert Latour	Virginia Institute of Marine Science
David Tomberlin	NMFS/S&T
Dave Secor	University of Maryland - CBL
Doug Lipton	University of Maryland - College Park
Cynthia Jones	Old Dominion University
Wendy Gabriel	NMFS/NEFSC
Yan Jiao	Virginia Tech
Bonnie McCay	Rutgers University
Mike Frisk	SUNY Stony Brook

Others in attendance

Rich Seagraves	MAFMC staff
Jason Didden	MAFMC staff
Rick Robins	MAFMC Chair
Lee Anderson	MAFMC Vice-Chair/University of Delaware
Fred Serchuk	NMFS/NEFSC
Pam Lyons Gromen	NCMC
Jud Crawford	Pew Environmental Group
Joel Sohn	Seafreeze/Harvard University
Jeff Kaelin	Lunds Fisheries
Greg DiDomenico	Garden State Seafood Association
Jeff Reichle	Lunds Fisheries
Josh Kohut	Rutgers University
Laura Palmara	Rutgers University

By phone

Lisa Hendrickson	NMFS/NEFSC
Kiersten Curti	NMFS/NEFSC
Tim Miller	NMFS/NEFSC
Jon Deroba	NMFS/NEFSC
Aja Peters-Mason	NMFS/NERO

May 26, 2011

SSC Members in Attendance

Name	Affiliation
John Boreman (SSC Chairman)	North Carolina State University
Tom Miller (SSC-Vice-Chair)	University of Maryland - CBL
Mike Wilberg	University of Maryland - CBL
Robert Latour	Virginia Institute of Marine Science
David Tomberlin	NMFS/S&T
Dave Secor	University of Maryland - CBL
Doug Lipton	University of Maryland - College Park
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Yan Jiao	Virginia Tech
Bonnie McCay	Rutgers University
Mike Frisk	SUNY Stony Brook

Others in attendance

Rich Seagraves	MAFMC staff
Jason Didden	MAFMC staff
Rick Robins	MAFMC Chair
Lee Anderson	MAFMC Vice-Chair/University of Delaware
Fred Serchuk	NMFS/NEFSC
Jud Crawford	Pew Environmental Group
Jeff Kaelin	Lunds Fisheries
Greg DiDomenico	Garden State Seafood Association
Jeff Reichle	Lunds Fisheries
Tom Alspach	Surf Clam/Ocean Quahog Industry Advisory Panel

By phone

Lisa Hendrickson	NMFS/NEFSC
Aja Peters-Mason	NMFS/NERO

14.0 APPENDIX B - CANADIAN CATCH ESTIMATION DETAILS

Due to the low catch of mackerel by the U.S. fleet in the early part of 2011, the method employed in last year's specifications was not viable (see 2011 Specifications Environmental Assessment for details). The Squid-Mackerel-Butterfish Monitoring Committee (MC) investigated several other methods and correlations with the most recent available year's landings (2010 in this case) proved to perform better than a recent three year average when considering what catch might be two years from the most recently available data. Thus the MC recommended that a recent update for 2010 Canadian catch be used as a proxy estimate for 2012 Canadian catch and be deducted accordingly. The most recent information from Francois Gregoire, the Canadian DFO mackerel assessment lead suggested that 2010 Canadian landings were 35,093 mt. The monitoring committee scaled this number up to catch based on the 3.11% discarding assumed for the U.S. fleet since no other information on Canadian discarding is available for a 2012 catch estimate of 36,219 mt. When the performance of this method is examined retroactively sometimes Canadian catch is underestimated (by as much as 21,000 mt) and sometimes Canadian catch is overestimated (by as much as 25,000 mt). Given the variability of Canadian landings, estimating landings in one year from landings two years prior is by nature uncertain, but the MC deemed that this method constituted a good-faith estimate based on the strength of the correlation. If ABC overages occur in the future related to underestimating Canadian catch the MC will revisit the procedure.

15.0 APPENDIX C – RECREATIONAL DISCARD MORTALITY DETAILS

2004-2010 MRFSS data was used in this analysis because these are the years for which improved MRIP (www.countmyfish.noaa.gov) re-estimates will eventually be available.

From 2004-2010 the mean “released alive” percentage of mackerel was 9.2% (range of 5-14%). If one makes a conservative assumption that discarded mackerel weigh the same as retained mackerel (anglers generally release smaller fish) and an assumption that 30% of the released fish die (there is no release mortality estimates for mackerel but it is estimated that 10%, 15%, 25%, and 39% of the summer flounder, scup, black sea bass, and bluefish respectively, that are caught and released by anglers die after release – see those species’ annual specifications environmental assessments for details), then one can roughly estimate the potential weight of dead recreational discards.

The recreational ACT is proposed to be 2,443 mt. If landings were actually 2,443 mt and given the assumptions above, this would mean 247 mt of mackerel were released and 74 mt of that 247 mt died. The 10% recreational buffer of 271 mt (2,714-2,443) is more than 3½ times the estimated potential dead discard amount, leaving substantial additional buffer for other management uncertainties. In addition, recreational harvest 2004-2010 has actually averaged less than 900 mt annually, further suggesting that discards should not be substantial related to the recreational allocation (and especially not substantial related to the total ABC/ACL).

Note: While dead discards appear relatively low compared to the buffer, there are also other sources of management uncertainty such as: catch estimate imprecision, time-lags in catch estimate generation and directed fishery closure, and the fact that most mackerel are caught in state waters (within three miles of the beach) while NMFS can only close Federal Waters (beyond three miles).

16.0 APPENDIX D – ECOSYSTEM CONSIDERATIONS THAT MAY PERTAIN TO ATLANTIC MACKEREL, SQUID, AND BUTTERFISH SPECIFICATIONS AND THAT WERE CONSIDERED BY THE COUNCIL

1. Introduction

The Mid-Atlantic Fishery Management Council (Council) has engaged its Scientific and Statistical Committee (SSC) to help the Council:

-Develop ecosystem level goals, objectives, and policies;
-Incorporate ecosystem structure and function in fishery management plans and annual specifications to ensure effective accounting for ecological sustainability;
-Anticipate and/or respond to shifts in ecological conditions and/or processes; and
-Consider evolving current fishery management plans into regional ecosystem-based plans.

Developing policies based on the above considerations will be a multi-year process. In the meantime, this section provides background on the primary broad ecosystem in which the Atlantic Mackerel, Squid, and Butterfish fisheries take place. This section is generally adapted from the "Ecosystem Status Report for the Northeast U.S. Continental Shelf Large Marine Ecosystem" (EAP 2009 - http://www.nefsc.noaa.gov/publications/crd/crd0911/crd0911.pdf). It is expected that an update of NMFS' Ecosystem Status Report for the Northeast U.S. Continental Shelf Large Marine Ecosystem will be available in late 2011 utilizing data through 2010.

2. Description of the Northeast U.S. Continental Shelf Large Marine Ecosystem

In 2009 the Northeast Fisheries Science Center (NEFSC) of the National Marine Fisheries Service (NMFS) produced an "Ecosystem Status Report for the Northeast U.S. Continental Shelf Large Marine Ecosystem" (EAP 2009) utilizing data through 2008. This report noted that the Northeast U.S. Continental Shelf Large Marine Ecosystem (NES LME) 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 (Figure 1), 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 has experienced changes in climate and physical forcing that have contributed to large-scale alteration in ecosystem structure and function. Projections indicate continued future climate change (EAP 2009).

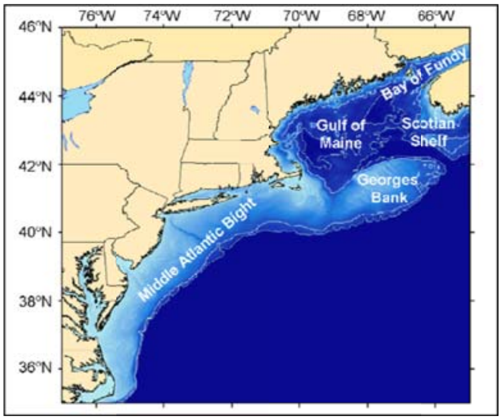

Figure 1. Map of Northeast U.S. Continental Shelf Large Marine Ecosystem (NES LME).

In the 2009 Ecosystem Status Report for the NES LME, NMFS tracked changes in key indicators of climate, physical forcing, ecosystem dynamics, and the role of humans in this system. These indicators can be broadly classified into natural and anthropogenic drivers, resulting pressures, and ecosystem states. Drivers are identified as forcing factors such as climate and human population size underlying a constellation of pressures exerted on the system. Pressures include human-related impacts such as removal or degradation of living marine resources through harvesting, shipping, pollution, and impacts on the coastal zone such as habitat loss. Climate-related pressures include changes in atmospheric and oceanographic processes directly or indirectly affecting marine life. The primary findings as of 2009 included:

- The Northeast U.S. Continental Shelf Large Marine Ecosystem (NES LME) has undergone sustained perturbations due to environmental and anthropogenic impacts over the last four decades, resulting in fundamental changes in system structure.

- Thermal conditions in the NES LME are changing due to warming of coastal and shelf waters and cooling in the northern end of the range. As a consequence, there has been a constriction of thermal habitats in the ecosystem, a northward shift in the distributions of some fish species and a shift to a warmer-water fish community.

- Zooplankton community structure has also changed in concert with climate and physical processes acting over the North Atlantic Basin indicating the importance of remote forcing to the function and structure of this ecosystem.

- Important changes in some components of benthic communities, notably increased abundance of sea scallops and lobster are evident, reflecting changes in fishery management and/or ecological conditions.

- The direct and indirect effects of species-selective harvesting patterns have also contributed to shifts fish community composition which is now dominated by small pelagic fishes and elasmobranch species (skates and small sharks) of low relative economic value.

- The trajectory of regional human population size suggests that anthropogenic pressure in the ecosystem will continue to increase.

- The Northeast U.S. Continental Shelf is classified as experiencing ecosystem overfishing according to published criteria for this designation, although improvement in the condition of several resource species has occurred and exploitation effects have been reduced for some system components over the last decade (EAP 2009)

3. Current Climate and Oceanographic Conditions.
Pages 2-11 of the Ecosystem Status Report for the NES LME describe current climate and oceanographic conditions including the North Atlantic Oscillation, Atlantic Multidecadal Oscillation, carbon dioxide Levels, The Gulf Stream, Labrador Slope Water, river flow, winds, temperature, salinity, and stratification. Pages 11-17 of the Ecosystem Status Report for the NES LME describe trends in primary and secondary production including chlorophyll and phytoplankton concentrations, a "color index," and zooplankton abundance (EAP 2009).
4. Prey Abundance
Since mackerel, butterfish, and squid feed at least partially on zooplankton at some life stage, Figure 2 provides a time series of annual zooplankton biovolume from the northeast U.S. continental shelf ecosystem from 1976-2008 (EAP 2009). Since mackerel and the squids at least partially feed on small pelagics or their larvae at some life stage, the mean small pelagic catch (kg) per tow caught in NEFSC bottom trawl surveys is provided in Figure 3. Additional similar figures for other communities are described in pages 18-21 of the Ecosystem Status Report for the NES LME (EAP 2009).

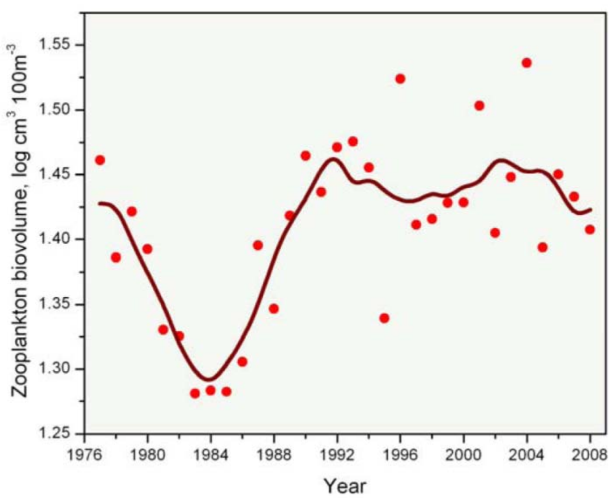

Figure 2. Time series of annual zooplankton biovolume from the northeast U.S. continental shelf ecosystem. Approximately 600-800 samples are included annually. Biovolume is log-transformed and then averaged across all samples.

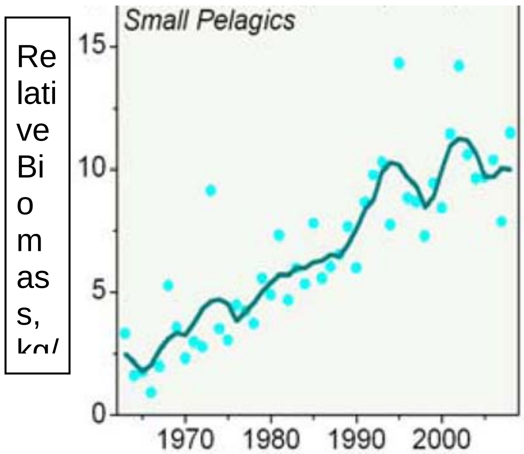

Figure 3. Mean small pelagic catch per tow caught in NEFSC bottom trawl surveys

5. Predator Abundance

Atlantic Mackerel, Squid, and butterfish are preyed upon by a wide variety of finfish, seabirds, and marine mammals. While overall seabird population estimates are not currently available (see http://www.fws.gov/birds/waterbirds/MANEM/Species%20Profiles.htm for species profiles of Mid-Atlantic/New England water and sea birds), finfish populations in the NES LME have been generally increasing recently (figure 4) as has total consumption by marine mammals (Figure 5) (EAP 2009).

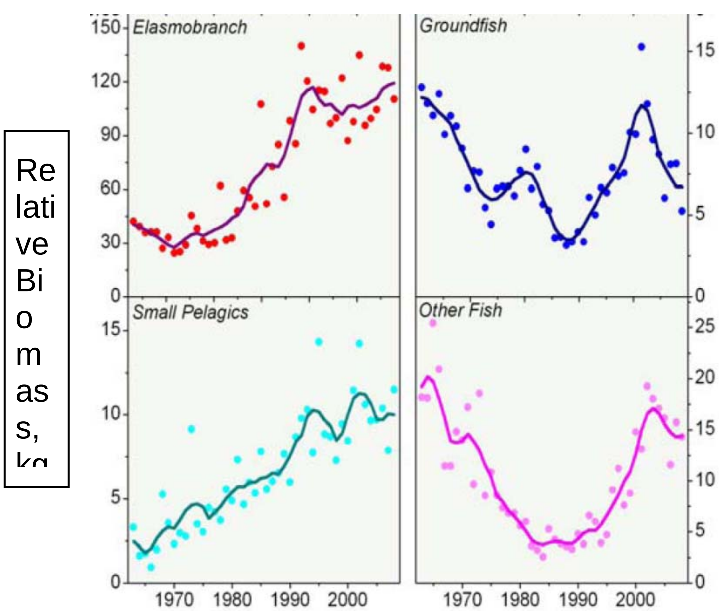

Figure 4. Mean catch (kg) per tow caught in NEFSC bottom trawl surveys by species group.

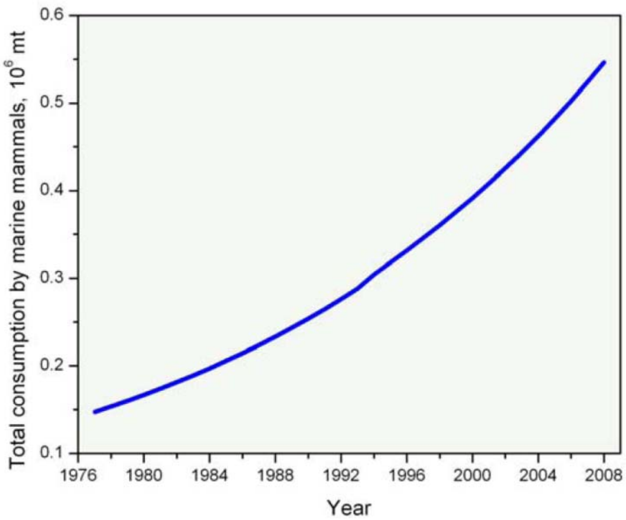

Figure 5. Estimated total consumption by selected marine mammal species (in millions of mt).

Appendix D References

Ecosystem Assessment Program (EAP). 2009. Ecosystem Assessment Report for the Northeast U.S. Continental Shelf Large Marine Ecosystem. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 09-11; 61 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/publications/crd/crd0911/crd0911.pdf.

Individual Profiles: Mid-Atlantic/New England/Maritimes Waterbird Conservation Plan. U.S. Fish and Wildlife Service. Available at: http://www.fws.gov/birds/waterbirds/MANEM/Species%20Profiles.htm.