Framework Adjustment 50
To the Northeast Multispecies FMP

Prepared by the
New England Fishery Management Council
In consultation with the
Mid-Atlantic Fishery Management Council
National Marine Fisheries Service

Initial Framework Meeting:	December 20, 2012
Final Framework Meeting:	January 30, 2013
Date Submitted:	March 22, 2013
Date Resubmitted:	April 15, 2013

Intentionally Blank

1.0 Executive Summary

In New England, the New England Fishery Management Council (NEFMC) is charged with developing management plans that meet the requirements of the Magnuson-Stevens Act (M-S Act). The Northeast Multispecies Fishery Management Plan (FMP) specifies the management measures for thirteen groundfish species (cod, haddock, yellowtail flounder, pollock, plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, redfish, Atlantic wolffish, and ocean pout) off the New England and Mid-Atlantic coasts. The FMP has been updated through a series of amendments and framework adjustments. The most recent major amendment, published as Amendment 16, became effective on May 1, 2010. This amendment adopted a broad suite of management measures in order to achieve fishing mortality targets and meet other requirements of the M-S Act. Included in Amendment 16 was a process for setting specifications for the fishery and updating measures through framework actions. Framework 44 to the FMP set specifications for fishing years (FY) 2010-2012. It became effective concurrently with Amendment 16 on May 1, 2010. Framework 45 modified several management measures to improve administration of the fishery and revised several specifications; it was implemented May 1, 2011. Framework 46 was implemented September 14, 2011 and modified the provisions that restrict mid-water trawl catches of haddock. Framework Adjustment 47 was implemented May 1, 2012 and adjusted ACLs and other management measures. In 2011, the NEFMC also approved Amendment 17, which allowed for NOAA-sponsored state-operated permit banks to function within the structure of Amendment 16. Framework Adjustment 48 was approved by the Council on December 20, 2012, but has not yet been approved by NMFS. That action proposes revised status determination criteria for several stocks, modifies the sub-ACL system, adjusts monitoring measures for the groundfish fishery, and changes several accountability measures (AMs). Framework Adjustment 49 is a joint Northeast Multispecies/Atlantic Sea Scallop action that modifies the dates for scallop vessel access to the year-round groundfish closed areas; this action is in review and has not yet been approved.

Amendment 16 made major changes to the FMP. For several groundfish stocks, the mortality targets adopted by Amendment 16, and the resulting specifications in Framework 44, represented substantial reductions from existing levels. For other stocks, the mortality targets were at or higher than existing levels and mortality could remain the same or even increase. Because most fishing trips in this fishery catch a wide range of species, it is impossible to design effort control measures that will change mortality in a completely selective manner for individual species. The management measures adopted by Amendment 16 to reduce mortality where necessary were also expected to reduce fishing mortality unnecessarily on other, healthy stocks. As a result of these lower fishing mortality rates, yield from healthy stocks could be sacrificed and the management plan may not provide optimum yield - the amount of fish that will provide the greatest overall benefit to the nation. Amendment 16 created opportunities to target these healthy stocks. The FMP allows vessels with groundfish permits to either fish under the days-at-sea (DAS) effort control system or to join sectors, which are small groups of self-selected fishermen that receive an allocation of annual catch entitlement (ACE) based upon the catch history of each member. The Amendment also adopted a system of Annual Catch Limits (ACLs) and Accountability Measures (AMs) that are designed to ensure catches remain below desired targets.

This framework action would continue to improve management of the fishery. It incorporates the results of new stock assessments into the setting of specifications, including the catch limits for the U.S./Canada Resource Sharing Understanding and the distribution of ACLs to various components of the fishery. It also modifies the rebuilding strategy for SNE/MA winter flounder and changes the measures for that stock so that it can be landed, with appropriate AMs.

The measures that are considered in this action were first considered as part of Framework Adjustment 48. During the final decision for FW 48, the Council removed the specifications (OFLs/ABCs/ACLs) and decided to submit them as a separate action. The Council also decided to modify the SNE/MA winter flounder rebuilding strategy. This action would implement those decisions.

The *need* for this action is to set specifications for FY 2013 – 2015 that are consistent with the best available science and to modify the rebuilding program and associated management measures for SNE/MA winter flounder. There are several *purposes*: to adopt specifications, to adopt the U.S./Canada Total Allowable Catches (TACs), to modify the formal rebuilding program for SNE/MA winter flounder, and to modify the possession restrictions and AMs for that stock.

Proposed Action

Under the provision of the M-S Act, the Council submits proposed management actions to the Secretary of Commerce for review. The Secretary of Commerce can approve, disapprove, or partially approve the action proposed by the Council. In the following alternative descriptions, measures identified as Preferred Alternatives constitute the Council’s proposed management action.

If the Preferred Alternatives identified in this document are adopted, this action would implement a range of measures designed to achieve mortality targets and net benefits from the fishery. Details of the measures summarized below can be found in Section 4.0.

The Preferred Alternatives include:

- *Formal Rebuilding Programs and Annual Catch Limits:*
    - *Revised rebuilding strategy for SNE/MA winter flounder*. The preferred alternative would target a rebuilding date of 2023 with a median probability of success for this stock. Short-term catch advice might deviate from the rebuilding strategy in order to account for projection uncertainty.
    - *Revised Annual Catch Limit Specifications*. The preferred alternative would adopt new Overfishing Limits (OFLs), Acceptable Biological Catches (ABCs), and Annual Catch Limits (ACLs) for most multispecies stocks. This alternative would also distribute the ABCs to the various components of the fishery.

- *Commercial and Recreational Fishery Measures.* These measures, based on the Preferred Alternatives, would affect commercial and recreational fishing.
    - *SNE/MA winter flounder landings restrictions:* The preferred alternative would remove the prohibition on landing SNE/MA winter flounder. This change would apply to both commercial and recreational vessels.
    - *Commercial Fishery Accountability Measures: Revised AM for SNE/MA winter flounder*. The preferred alternative would allocate SNE/MA winter flounder to groundfish sectors, and sectors would be subject to the normal requirements for allocated stocks: catches must not exceed the allocation, fishing in a stock area is halted should this occur, and any overages are deducted from the following year's allocation. For common pool groundfish fishing vessels, the AM would be modified to require the use of selective gear in specific areas if the AM is exceeded.

Summary of Environmental Consequences

The environmental impacts of all of the alternatives under consideration are described in Section 7.0. Biological impacts are described in Section 7.1, impacts on essential fish habitat are described in Section 7.2, impacts on endangered and other protected species are described in Section 7.3, the economic impacts are described in Section 7.4, and social impacts are described in Section 7.5. Cumulative effects are described in Section 7.6. Summaries of the impacts of the Preferred Alternatives are provided in the following paragraphs. As required by NEPA, the Preferred Alternatives are compared to the No Action alternative. Throughout the document, more informative comparisons are also made between the Preferred Alternatives and 2012.

Biological Impacts

The extension of the SNE/MA winter flounder rebuilding plan will result in increased fishing mortality and slower stock rebuilding than would be the case under the No Action alternative. The revised specifications for multispecies stocks will increase the probability that mortality targets will be achieved, and stock rebuilding will continue, consistent with the adopted rebuilding plans, when compared to the No Action alternatives. Coupled with these changes are adjustments to measures that will facilitate the landing of SNE/MA winter flounder and make sure that catches of this stock are consistent with the revised rebuilding objectives.

Essential Fish Habitat (EFH) Impacts

The preferred alternatives are expected to result in a slight increase in habitat impacts when compared to the No Action alternative. This is due to two factors: the modification in the SNE/MA winter flounder rebuilding strategy and associated measures that will allow this stock to be landed, and the specifications that would be higher under the preferred alternative than under No Action. When compared to 2012 catch limits, however, the catch limits are much lower, which will lead to reduced groundfish fishing and a decrease in habitat impacts when compared to 2012.

Impacts on Endangered and Other Protected Species

When compared to recent fishing activity, the reduced specifications for most stocks that result from the preferred alternatives are likely to lead to reduced impacts on endangered and protected species. Impacts of the preferred alternative for specifications may be higher than under the No Action alternative, however, because there are many stocks that would not have any specifications under the No Action alternative, which could reduce fishing effort. The revised SNE/MA winter flounder rebuilding strategy and associated measures may result in a small increase in groundfish fishing activity in the stock area but this small increase is not expected to impact protected species.

Economic Impacts

The preferred alternative will likely result in an increase in groundfish fishing vessel revenues when compared to No Action. This is not informative, however, since the No Action alternative would not adopt specifications for many stocks and so most groundfish fishing activity would be curtailed. The preferred alternative would be expected to reduce groundfish fishing revenues by about $24.8 million from FY 2011 (about 28 percent) and by about $13.5 million from the predicted FY 2012 groundfish fishing revenues. Net revenues would be expected to show smaller declines, because more efficient trips are expected to be taken as fishermen target stocks with larger quotas. The modified SNE/MA winter flounder rebuilding plan and the associated measures may add about $5.4 million to groundfish fishing revenues if the entire ACL is caught. In sum, nominal groundfish fishing revenues in FY 2013 are likely to be lower than the groundfish fishing revenues in any year since at least 1994. The economic impacts will not be uniformly distributed, and are expected to fall more heavily on smaller vessels that target inshore stocks such as GOM cod, CC/GOM yellowtail flounder, and GOM haddock.

Social Impacts

In general, the preferred alternatives are likely to result in positive social benefits when compared to the No Action alternative, but when compared to previous fishing years the benefits are likely to be primarily negative. This is due to the reduced ACLs which are expected to lead to reduced groundfish fishing revenues. The revised SNE/MA winter flounder rebuilding strategy, and the changes to measures associated with that change would lead to some positive social benefits as it would reduce regulatory discarding. The benefits from this latter change, however, will not outweigh the effects of the other ACL reductions.

Alternatives to the Proposed Action

If the Proposed Action is based on the Preferred Alternatives there are a number of alternatives that would not be adopted. In all cases these alternatives are the No Action alternatives. These alternatives are briefly described below.

- *Formal Rebuilding Programs and Annual Catch Limits*
    - *Rebuilding strategy for SNE/MA winter flounder*: The No Action option would continue to target as low a fishing mortality as possible in order to rebuild this stock as soon after the original target date of 2014 as can be accomplished.

- *Annual Catch Limit Specifications*: The No Action alternative would not adopt new specifications for GOM cod, GOM haddock, GB cod, GB haddock, GB yellowtail flounder, witch flounder, white hake, plaice, CC/GOM yellowtail flounder. Without specification of an ACL, a catch would not be allocated to the groundfish fishery and targeted groundfish fishing activity would not occur for these stocks.

- *Commercial and Recreational Fishery Measures*
  - *SNE/MA Winter Flounder Landing Limit*. The No Action option would continue to prohibit landing of this stock by commercial and recreational fishermen.
  - *Commercial Fishery Accountability Measures: SNE/MA Winter Flounder AM*. The No Action option would retain either a prohibition on landing SNE/MA winter flounder as a proactive AM, or as recommended by Framework 48, would continue an area-based AM that is currently under review as part of that action.

Impacts of Alternatives to the Proposed Action

In many cases, the No Action alternatives would not have met current requirements of the M-S Act. Only the most substantial impacts are highlighted below.

Biological Impacts
Because the No Action alternatives would not adopt specifications for several stocks, and would not adjust the SNE/MA winter flounder rebuilding strategy, it would lead to a drastic reduction in groundfish fishing activity. This option would be expected to result in reduced fishing mortality rates and faster stock rebuilding than the preferred alternatives.

Essential Fish Habitat Impacts
Because the No Action alternatives would not adopt specifications for several stocks, and would not adjust the SNE/MA winter flounder rebuilding strategy, it would lead to a drastic reduction in groundfish fishing activity. This option would be expected to result in reduced habitat impacts when compared to the preferred alternatives.

Impacts on Endangered and Other Protected Species
Because the No Action alternatives would not adopt specifications for several stocks, and would not adjust the SNE/MA winter flounder rebuilding strategy, it would lead to a drastic reduction in groundfish fishing activity. This option would be expected to result in reduced fishing impacts on endangered and other protected species.

Economic Impacts
Because the No Action alternatives would not adopt specifications for several stocks, and would not adjust the SNE/MA winter flounder rebuilding strategy, it would lead to a drastic reduction in groundfish fishing activity. As a result, fishing vessel revenues on groundfish fishing trips would decline dramatically when compared to the preferred alternative or recent fishing years. Gross

fishing vessel revenues on groundfish fishing trips could be as low as $3-4 million, and in any case would probably be less than $10 million.

Social Impacts

Because the No Action alternatives would not adopt specifications for several stocks, and would not adjust the SNE/MA winter flounder rebuilding strategy, it would lead to a drastic reduction in groundfish fishing activity and reduced groundfish fishing revenues. Overall, this would likely lead to dramatic changes in the size and demographics of the groundfish fishery, dissatisfaction with the fishing industry and management, and a negative impact on fishermen’s attitudes and beliefs.

2.0 Contents

2.1 Table of Contents

2.2 List of Tables

2.3 List of Figures

2.4 List of Appendices

2.5 List of Acronyms

ABC	Acceptable Biological Catch
ACE	Annual Catch Entitlement
ACL	Annual Catch Limit
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
APA	Administrative Procedures Act
ASAP	Age-structured assessment program; assessment model
ASM	At-sea monitoring
ASMFC	Atlantic States Marine Fisheries Commission
B	Biomass
CAA	Catch at Age
CAI	Closed Area I
CAII	Closed Area II
CC	Cape Cod
CEQ	Council on Environmental Quality
CHOIR	Coalition for the Atlantic Herring Fishery's Orderly, Informed, and Responsible Long-Term Development
CPUE	Catch per unit of effort
CZMA	Coastal Zone Management Act
DAH	Domestic Annual Harvest
DAM	Dynamic Area Management
DAP	Domestic Annual Processing
DAS	Days-at-sea
DEA	Data Envelopment Analysis
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DSEIS	Draft Supplemental Environmental Impact Statement
DSM	Dockside monitoring
DWF	Distant-Water Fleets
E.O.	Executive Order
EA	Environmental Assessment
ECPA	East Coast Pelagic Association
ECTA	East Coast Tuna Association
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ETA	Elephant Trunk Area

F	Fishing mortality rate
FAAS	Flexible Area Action System
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
FSCS	Fisheries Scientific Computer System
FSEIS	Final Supplemental Environmental Impact Statement
FW	Framework
FY	Fishing year
GAMS	General Algebraic Modeling System
GB	Georges Bank
GEA	Gear Effects Evaluation
GIFA	Governing International Fisheries Agreement
GIS	Geographic Information System
GMRI	Gulf of Maine Research Institute
GOM	Gulf of Maine
GRT	Gross registered tons/tonnage
HAPC	Habitat area of particular concern
HCA	Habitat Closed Area
HPTRP	Harbor Porpoise Take Reduction Plan
I/O	Input/output
ICNAF	International Commission for the Northwest Atlantic Fisheries
IFQ	Individual fishing quota
IOY	Initial Optimal Yield
IRFA	Initial Regulatory Flexibility Analysis
ITQ	Individual transferable quota
IVR	Interactive voice response reporting system
IWC	International Whaling Commission
IWP	Internal Waters Processing
JVP	Joint Venture Processing
LISA	Local Indicator of Spatial Association
LOA	Letter of authorization
LPUE	Landings per unit of effort
LWTRP	Large Whale Take Reduction Plan
M	Natural Mortality Rate
MA	Mid-Atlantic
MA DMF	Massachusetts Division of Marine Fisheries
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MARFIN	Marine Fisheries Initiative
ME DMR	Maine Department of Marine Resources
MEY	Maximum economic yield

MMC	Multispecies Monitoring Committee
MMPA	Marine Mammal Protection Act
MPA	Marine protected area
MRFSS	Marine Recreational Fishery Statistics Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum sustainable yield
MWT	Midwater trawl; includes paired mid-water trawl when referring to fishing activity or vessels in this document
mt	Metric Tons
NAO	North Atlantic Oscillation
NAPA	National Academy of Public Administration
NAS	National Academy of Sciences
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fishery Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NLCA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS	National Standard
NSGs	National Standard Guidelines
NSTC	Northern Shrimp Technical Committee
NT	Net tonnage
NWA	Northwest Atlantic
OBDBS	Observer database system
OA2	Omnibus Essential Fish Habitat Amendment 2
OCS	Outer Continental Shelf
OFL	Overfishing Limit
OLE	Office for Law Enforcement (NMFS)
OY	Optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
PREE	Preliminary Regulatory Economic Evaluation
PS/FG	Purse Seine/Fixed Gear
PSC	Potential Sector Contribution
QCM	Quota change model
RFA	Regulatory Flexibility Act
RFFA	Reasonably Foreseeable Future Action

RIR	Regulatory Impact Review
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area
SAFE	Stock Assessment and Fishery Evaluation
SAP	Special Access Program
SARC	Stock Assessment Review Committee
SASI	Swept Area Seabed Impact
SAV	Submerged Aquatic Vegetation
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SCAA	Statistical catch-at-age assessment model
SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
SFMA	Southern Fishery Management Area (monkfish)
SIA	Social Impact Assessment
SNE	Southern New England
SNE/MA	Southern New England-Mid-Atlantic
SSB	Spawning stock biomass
SSC	Scientific and Statistical Committee
TAC	Total allowable catch
TALFF	Total Allowable Level of Foreign Fishing
TC	Technical Committee
TED	Turtle excluder device
TEWG	Turtle Expert Working Group
TMGC	Trans-boundary Management Guidance Committee
TMS	Ten minute square
TRAC	Trans-boundary Resources Assessment Committee
TRT	Take Reduction Team
TSB	Total stock biomass
USAP	U.S. At-Sea Processing
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VEC	Valued Ecosystem Component
VMS	Vessel monitoring system
VPA	Virtual population analysis
VTR	Vessel trip report
WGOM	Western Gulf of Maine
WO	Weighout
YPR	Yield per recruit

Intentionally Blank

Intentionally Blank

3.0 Introduction and Background

3.1 Background

The primary statute governing the management of fishery resources in the Exclusive Economic Zone (EEZ) of the United States is the Magnuson-Stevens Fishery Conservation and Management Act (M-S Act). In brief, the purposes of the M-S Act are:

> (1) to take immediate action to conserve and manage the fishery resources found off the coasts of the United States;
>
> (2) to support and encourage the implementation and enforcement of international fishery agreements for the conservation and management of highly migratory species;
>
> (3) to promote domestic and recreational fishing under sound conservation and management principles;
>
> (4) to provide for the preparation and implementation, in accordance with national standards, of fishery management plans which will achieve and maintain, on a continuing basis, the optimum yield from each fishery;
>
> (5) to establish Regional Fishery Management Councils to exercise sound judgment in the stewardship of fishery resources through the preparation, monitoring, and revisions of such plans under circumstances which enable public participation and which take into account the social and economic needs of the States.

In New England, the New England Fishery Management Council (NEFMC) is charged with developing management plans that meet the requirements of the M-S Act.

The Northeast Multispecies Fishery Management Plan (FMP) specifies the management measures for thirteen groundfish species (cod, haddock, yellowtail flounder, pollock, plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, yellowtail flounder, ocean pout, and Atlantic wolffish) off the New England and Mid-Atlantic coasts. Some of these species are sub-divided into individual stocks that are attributed to different geographic areas. Commercial and recreational fishermen harvest these species. The FMP has been updated through a series of amendments and framework adjustments.

Amendment 16, which became effective on May 1, 2010, adopted a broad suite of management measures in order to achieve the fishing mortality targets necessary to rebuild overfished stocks and meet other requirements of the M-S Act. In 2011, the NEFMC also approved Amendment 17, which allowed for NOAA-sponsored state-operated permit banks to function within the structure of Amendment 16. Amendment 16 greatly expanded the sector management program and adopted a process for setting Annual Catch Limits that requires catch levels to be set in biennial specifications packages. Several lawsuits challenged various provisions of Amendment 16, including the amendment's provisions related to sectors and some of the accountability measures.

Five framework adjustments have updated the measures in Amendment 16. The first, published as Framework 44, became effective on May 1, 2010 concurrently with Amendment 16. It adopted the required specifications for regulated northeast multispecies stocks for fishing years 2010-2012, as well as stocks managed by the U.S./Canada Resource Sharing Agreement. It was also used to incorporate the best available information in adjusting effort control measures adopted in Amendment 16. Framework 45 became effective on May 1, 2011. It built upon revisions made to the sector program in Amendment 16 and Framework 44, set specifications required under the U.S./Canada Resource Sharing Agreement, and incorporated an updated stock assessment for pollock. Framework 46 was implemented in September 14, 2011 and modified the provisions that restrict mid-water trawl catches of haddock. Framework Adjustment 47 was implemented May 1, 2012 and set specifications for some groundfish stocks for FY 2012-2014, modified AMs for the groundfish fishery and the administration of the scallop fishery AMs, revised common pool management measures. Framework Adjustment 48 was approved by the Council on December 20, 2012, but has not yet been approved by NMFS. That action proposes revised status determination criteria for several stocks, modifies the sub-ACL system, adjusts monitoring measures for the groundfish fishery, and changes several accountability measures (AMs). It is expected that Framework 48 will be implemented at the same time as FW 50. Framework Adjustment 49 is a joint Northeast Multispecies/Atlantic Sea Scallop action that modifies the dates for scallop vessel access to the year-round groundfish closed areas; this action is in review and has not yet been approved.

3.2 Purpose and Need for the Action

Under the Northeast Multispecies FMP the NMFS Regional Administrator, in consultation with the Council, is required to determine the specifications for the groundfish fishery. The best available science is reviewed to determine the status of the resource and fishery. These data, in conjunction with the ABC control rules adopted in Amendment 16, are used to set appropriate specifications for the stocks. Previous actions have established evaluation protocols and rebuilding plans for stocks; these are revised with the updated science. Periodic frameworks are used to adjust strategies in response to the evaluations that adjust rebuilding plans and overfishing.

This framework adds to elements of Amendment 16 to prevent overfishing. Similar modifications to Amendment 16 have been made in recent frameworks. This framework would also modify measures from Amendment 16 regarding the management measures for SNE/MA winter flounder. These specifications and adjustments to Amendment 16, listed in the following table, are intended to meet the goals and many of the objectives of the Northeast Multispecies FMP, as modified in Amendment 16.

The measures that are considered in this action were first considered as part of Framework Adjustment 48. During the final decision for FW 48, the Council removed the specifications (OFLs/ABCs/ACLs) and decided to submit them as a separate action. The Council also decided to modify the SNE/MA winter flounder rebuilding strategy. This action would implement those decisions.

To better demonstrate the link between the purpose and need for this action, the following table summarizes the need for the action and corresponding purposes.

Need for Framework 50	*Corresponding Purpose for Framework 50*
Set specifications for ACLs in Fishing Years 2013-2015 consistent with best available science, the ABC control rules adopted in Amendment 16 to the Northeast Multispecies FMP, the International Fisheries Agreement Clarification Act, and the most recent relevant law	• Measures to adopt ACLs, including relevant sub-ACLs and incidental catch TACs • Measures to adopt TACs for U.S./Canada area
Modify rebuilding program for SNE/MA winter flounder consistent with the status of stocks, the National Standard guidelines, and the requirements of the MSA	• Modification of the formal rebuilding program for SNE/MA winter flounder • Modification of accountability measures for SNE/MA winter flounder • Modification of measures that apply to SNE/MA winter flounder

3.3 Brief History of the Northeast Multispecies Management Plan

Groundfish stocks were managed under the M-S Act beginning with the adoption of a groundfish plan for cod, haddock, and yellowtail flounder in 1977. This plan relied on hard quotas (total allowable catches, or TACs), and proved unworkable. The quota system was rejected in 1982 with the adoption of the Interim Groundfish Plan, which relied on minimum fish sizes and codend mesh regulations for the Gulf of Maine and Georges Bank to control fishing mortality. The interim plan was replaced by the Northeast Multispecies FMP in 1986, which established biological targets in terms of maximum spawning potential and continued to rely on gear restrictions and minimum mesh size to control fishing mortality.

Amendment 5 was a major revision to the FMP. Adopted in 1994, it implemented reductions in time fished (days-at-sea, or DAS) for some fleet sectors and adopted year-round closures to control mortality. A more detailed discussion of the history of the management plan up to 1994 can be found in Amendment 5 (NEFMC 1994). Amendment 7 (NEFMC 1996), adopted in 1996, expanded the DAS program and accelerated the reduction in DAS first adopted in Amendment 5. After the implementation of Amendment 7, there were a series of amendments and smaller changes (framework adjustments) that are detailed in Amendment 13 (NEFMC 2003).

Amendment 13 was developed over a four-year period to meet the M-S Act requirement to adopt rebuilding programs for stocks that are overfished and to end overfishing. Amendment 13 also brought the FMP into compliance with other provisions of the M-S Act. Subsequent to the implementation of Amendment 13, FW 40A provided opportunities to target healthy stocks, FW 40B improved the effectiveness of the effort control program, and FW 41 expanded the vessels eligible to participate in a Special Access Program (SAP) that targets GB haddock. FW 42 included measures to implement the biennial adjustment to the FMP as well as a Georges Bank yellowtail rebuilding strategy, several changes to the Category B (regular) DAS Program and two Special Access Programs, an extension of the DAS leasing program, and introduced the differential DAS system. FW 43 adopted haddock catch caps for the herring fishery and was implemented August 15, 2006.

Amendment 16 was adopted in 2009 and provided major changes in the realm of groundfish management. Notably, it greatly expanded the sector program and implemented Annual Catch Limits in compliance with 2006 revisions to the M-S Act. The amendment also included a host of mortality reduction measures for “common pool” (i.e. non-sector) vessels and the recreational component of the fishery. An appeal of the lawsuit filed by the Cities of Gloucester and New Bedford and several East Coast fishing industry members against Amendment 16 was heard by the U.S. Court of Appeals for the First Circuit in Boston in September, 2012. The court ruled against the plaintiffs and the provisions of Amendment 16 were upheld. Framework 44 was also adopted in 2009, and it set specifications for FY 2010 – 2012 and incorporated the best available information in adjusting effort control measures adopted in Amendment 16. Framework 45 was approved by the Council in 2010 and adopts further modifications to the sector program and fishery specifications; it was implemented May 1, 2011. Framework 46 revised the allocation of haddock to be caught by the herring fishery and was implemented in August 2011. Amendment 17, which authorizes the function of NOAA-sponsored state-operated permit bank, was implemented on April 23, 2012. Framework 47, implemented on May 1, 2012, set specifications for some groundfish stocks for FY 2012 – 2014, modified AMs for the groundfish fishery and the administration of the scallop fishery AMs, and revised common pool management measures; modification of the Ruhle trawl definition and clarification of regulations for charter/party and recreational groundfish vessels fishing in groundfish closed areas were proposed under the RA authority. Framework 48 is under review and may modify several ACLs and AMs, adjust monitoring measures, and provide opportunities to increase landings of some stocks.

A more detailed description of the history of the FMP is included in Amendment 16, and each of these actions can be found on the internet at http://www.nefmc.org.

3.4 National Environmental Policy Act (NEPA)

NEPA provides a structure for identifying and evaluating the full spectrum of environmental issues associated with Federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document includes the required NEPA analyses.

4.0 Alternatives Under Consideration

4.1 Formal Rebuilding Programs and Annual Catch Limits

4.1.1 SNE/MA Winter Flounder Rebuilding Strategy

4.1.1.1 Option 1: No Action

If this option would be adopted, the rebuilding strategy for SNE/MA winter flounder would continue to target an ending date of 2014 with a median probability of success. Since the stock is unlikely to rebuild by that date in the absence of all fishing mortality, the management objective would be to reduce fishing mortality to as close to 0 as possible until the stock is rebuilt.

Rationale: This option would attempt to rebuild the SNE/MA winter flounder stock as soon after the original rebuilding period ending date (2014) as possible. Management measures that prohibited retention of SNE/MA winter flounder resulted in fishing mortality of less than 0.10 in CY 2010 and 2011.

4.1.1.2 Option 2: Revised Rebuilding Strategy (Preferred Alternative)

This option would adopt a new strategy that would target rebuilding of SNE/MA winter flounder by 2023 with a median probability of success. Short-term catch advice during the rebuilding period may be reduced below the projected rebuilding catch in order to account for uncertainty in stock projections.

The current estimate of the rebuilding fishing mortality is F=0.175. This estimate would be revised during the course of the rebuilding program.

Rationale: This option would acknowledge that rebuilding cannot be achieved by 2014 and would restart the rebuilding period timeline as of 2013. Because the stock can rebuild in less than ten years in the absence of all fishing mortality (Tmin= 2019), the maximum period is ten years (Tmax). Adopting this period would rebuild as quickly as possible taking into account the needs of fishing communities. As analyzed in Section 7.4.1.1.2, this strategy would return greater net benefits than a strategy that targets an end date between 2019 and 2023. Because stock projections have demonstrated a tendency to predict more rapid stock growth than is realized, short term catch advice may reduce catches from the rebuilding fishing mortality rate in order to account for the uncertainty in projections. If the stock increases more rapidly than originally projected, the rebuilding fishing mortality rate will be recalculated and could lead to increases in catch.

4.1.2 Annual Catch Limit Specifications

4.1.2.1 Option 1: No Action

If the No Action option is selected, the specifications for FY 2013-FY 2014 would remain as adopted by FW 47. For many stocks there would not be any specifications for these years. The FY 2013 - FY 2014 ABCs would be as specified in Table 1.

If this option is selected, there would be no specific allocations made for the US/CA Resource Sharing Understanding quotas for FY 2013. These quotas are specified annually.

If this option is selected, there would be no specific allocations to the scallop fishery. While these allocations are typically made for a multi-year period, none have been specified beyond FY 2012.

Rationale: This No Action option is required by NEPA. While it would rebuild stocks quickly, it would not address M-S Act requirements to achieve OY and consider the needs of fishing communities.

Table 1 – No Action/Option 1 Northeast Multispecies OFLs, ABCs, ACLs, and other ACL sub-components for FY 2012 (metric tons, live weight). Values are rounded to the nearest metric ton.
(1) Grayed out values may be adjusted as a result of future recommendations of the TMGC. Values shown for GB haddock and cod are preliminary estimates subject to change.

Stock	Year	OFL	U.S. ABC	State Waters Sub-component	Other Sub-Components	Scallops	Groundfish Sub-ACL	Comm Groundfish Sub-ACL	Rec Groundfish Sub-ACL	Preliminary Sectors Sub-ACL	Preliminary Non_Sector Groundfish Sub-ACL	MWT Sub_ ACL	Total ACL
GB Cod[(1)]	2013												
	2014												
	2015												
GOM Cod	2013												
	2014												
	2015												
GB Haddock[(1)]	2013												
	2014												
	2015												
GOM Haddock	2013												
	2014												
	2015												
GB Yellowtail Flounder[(1)]	2013												
	2014												
	2015												
SNE/MA Yellowtail Flounder	2013												
	2014												
	2015												

Stock	Year	OFL	U.S. ABC	State Waters Sub-component	Other Sub-Components	Scallops	Groundfish Sub-ACL	Comm Groundfish Sub-ACL	Rec Groundfish Sub-ACL	Preliminary Sectors Sub-ACL	Preliminary Non_Sector Groundfish Sub-ACL	MWT Sub_ ACL	Total ACL
CC/GOM Yellowtail Flounder	2013												
	2014												
	2015												
Plaice	2013												
	2014												
	2015												
Witch Flounder	2013												
	2014												
	2015												
GB Winter Flounder	2013	4,819	3,750	0	188	0	3,384		0	3,361	23	0	3,572
	2014	4,626	3,598	0	180	0	3,247		0	3,225	22	0	3,427
	2015												
GOM Winter Flounder	2013	1,458	1,078	272	54	0	715		0	679	36	0	1,040
	2014	1,458	1,078	272	54	0	715		0	679	36	0	1,040
	2015												
SNE/MA Winter Flounder	2013	2,637	697	195	139	0	337		0	0	337	0	672
	2014	3,471	912	255	182	0	441		0	0	441	0	879
	2015												
Redfish	2013												
	2014												
	2015												

Stock	Year	OFL	U.S. ABC	State Waters Sub-component	Other Sub-Components	Scallops	Groundfish Sub-ACL	Comm Groundfish Sub-ACL	Rec Groundfish Sub-ACL	Preliminary Sectors Sub-ACL	Preliminary Non_Sector Groundfish Sub-ACL	MWT Sub_ ACL	Total ACL
White Hake	2013												
	2014												
	2015												
Pollock	2012	19,887	15,400	754	1,370	0	12,612		0	12,518	94	0	14,736
	2013	20,060	15,600	756	1,380	0	12,791		0	12,695	95	0	14,927
	2014	20,554	16,000	760	1,400	0	13,148		0	13,050	98	0	15,308
N. Window-pane Flounder	2013												
	2014												
	2015												
S. Window-pane Flounder	2013												
	2014												
	2015												
Ocean Pout	2013												
	2014												
	2015												
Atlantic Halibut	2013												
	2014												
	2015												
Atlantic Wolffish	2013												
	2014												
	2015												

Table 2 – Option 1 preliminary incidental catch TACs for Special Management Programs (metric tons, live weight). These values may change as a result of changes in sector membership.

	Cat B (regular) DAS Program			CAI Hook Gear Haddock SAP			EUS/CA Haddock SAP		
Stock	2013	2014	2015	2013	2014	2015	2013	2014	2015
GB cod									
GOM cod									
GB Yellowtail									
CC/GOM yellowtail									
SNE/MA Yellowtail									
Plaice									
Witch Flounder									
White Hake									
SNE/MA Winter Flounder									
GB Winter Flounder									
Pollock									

Table 3 – Proposed CAI Hook Gear Haddock SAP TACs, FY 2013-2014

Year	Exploitable Biomass (thousand mt)	WGB Exploitable Biomass	B(year)/B2004	TAC (mt, live weight)
2013- 2014				

4.1.2.2 Option 2: Revised Annual Catch Limit Specifications (Preferred Alternative)

If Option 2 is selected, the specifications for FY 2013 through FY 2015 would be as specified in Table 8.

The specifications in Table 8 reflect two other decisions that influence the values in the table. The first is the specification of quotas for EGB cod, EGB haddock, and GB yellowtail flounder for the U.S./Canada Resource Sharing area. The second is the identification of sub-ACLs for the scallop fishery for three stocks: GB yellowtail flounder, SNE/MA yellowtail flounder, and SNE/MAB windowpane flounder.

Benchmark assessments were completed for GB cod and GOM cod in December 2012. Because the results of these assessments were not available until January 2013, early drafts of this document indicated a broad range of possible ABCs for these two stocks. Once the assessments were completed, specific ABCs were recommended by the SSC and adopted by the Council, . so the preliminary ranges are not shown. Since the SSC forwarded two ABCs for GOM cod, both are included in Table 8.

U.S./Canada TACs

This alternative would specify TACs for the U.S./Canada Management Area for FY 2013 as indicated in Table 4 below. These TACs would be in effect for the entire fishing year, unless NMFS determines that FY 2012 catch of GB cod, haddock, or yellowtail flounder from the U.S./Canada Management Area exceeded the pertinent 2012 TAC. If the TAC in a particular fishing year is exceeded, the Understanding and the regulations require that the TAC for the subsequent fishing year is reduced by the amount of the overage. In order to minimize any disruption to the fishing industry, NMFS would attempt to make any necessary TAC adjustment in the first quarter of the fishing year.

Two alternatives were considered for GB yellowtail flounder. The TMGC recommended a 500 mt total quota for 2013. The second value is based on an SSC decision that 1,150 mt could be a backstop ABC if measures are adopted to allow only a bycatch fishery. The preferred alternative is the 1,150 mt value.

A comparison of the proposed FY 2013 U.S. TACs and the FY 2012 U.S. TACs is shown in Table 5. Changes to the U.S. TACs reflect changes to the percentage shares, stock status, and the TMGC recommendations.

Table 4 - Proposed FY 2013 U.S./Canada TACs (mt) and Country Shares

TAC	Eastern GB Cod	Eastern GB Haddock	GB Yellowtail Flounder
Total Shared TAC	600 mt	10,400 mt	500/ 1150 mt preferred
U.S. TAC	96 mt	3,952 mt	215 / 495 preferred
Canada TAC	504 mt	6,448 mt	285/ 656 preferred

Table 5 - Comparison of the Proposed FY 2013 U.S. TACs and the FY 2012 U.S. TACs (mt)

Stock	U.S. TAC		Percent Change
	FY 2013	FY 2012	
Eastern GB cod	96 mt	162 mt	-41%
Eastern GB haddock	3,952 mt	6,880	-43%
GB yellowtail	215 mt	564 mt	-62%
	495 mt		-12%

Scallop Fishery Sub-ACLs

This option would specify scallop fishery sub-ACLs for GB yellowtail flounder, SNE/MA yellowtail flounder, and possibly SNE/MAB windowpane flounder. Changes to the administration of those sub-ACLs are being considered in Framework 48, which has not yet been approved. For this reason, the tables below reflect all the options that may result from the Framework 48 decision, and identify the Preferred Alternatives.

Sub-ACLs for the two yellowtail flounder stocks were adopted in Amendment 16. FW 48 considers three alternatives for specifying how the sub-ACL for GB yellowtail flounder is calculated (see Section 4.1.3 of FW 48). The possible values based on the alternatives are shown below. The selected scallop fishery management alternative that will probably be implemented is Alternative 2. For those alternatives that are based on the expected scallop fishery catch of yellowtail flounder, the amount that would be allocated depends on both the scallop management alternative selected and the overall GB yellowtail flounder ABC. These values are shown in Table 6. The values shown are for the sub-ABC, which is then reduced for management uncertainty.

For SNE/MA yellowtail flounder, the Council selected an allocation for the scallop fishery. For reference, the expected catches for the various scallop management alternatives are shown in

Table 7. In FY 2010 – FY 2012, the sub-ACL for this stock was based on 90 percent of the estimated scallop fishery catch, but the Council is not bound by this decision. The preferred alternative would allocate the scallop fishery 90 percent of the high estimate in Table 7. In addition, this sub-ACL would be managed in a manner similar to the GB yellowtail flounder sub-ACL in order to prevent the loss of available yield of this stock. NMFS would evaluate catches of SNE/MA yellowtail flounder by the scallop fishery by January 15 of the fishing year. Should the estimate indicate that the scallop fishery will catch less than 90 percent of the entire sub-ACL, NMFS will reduce the scallop fishery sub-ACL to the amount expected to be caught and increase the groundfish sub-ACL by up to the difference between the original estimate and the revised estimate. The increase in the groundfish sub-ACL will be distributed to sectors and the common pool. If the amount of yellowtail flounder projected to be caught by the scallop fishery exceeds the scallop fishery sub-ACL, there will not be any changes to the sub-ACL.

For SNE/MA windowpane flounder FW 48 may establish a scallop fishery sub-ACL. If this sub-ACL is adopted, the scallop fishery would be allocated 36 percent of the ABC. These values are shown in Table 8.

Rationale: This measure would adopt new specifications for groundfish stocks that are consistent with the most recent assessment information. For most stocks, only one alternative to No Action is shown. This is because these catches represent the best scientific information, as determined by the Council's Science and Statistical Committee, and the M-S Act requires that catches not be set higher than these levels.

The U.S. and Canada coordinate management of three stocks that overlap the boundary between the two countries on Georges Bank. Agreement on the amount to be caught is reached each year by the Transboundary Management Guidance Committee (TMGC). This measure considers the recommendations of the TMGC that are consistent with the most recent assessments of those stocks.

The specification of sub-ACLs for the scallop fishery will help ensure that bycatches of GB and SNE/MA yellowtail flounder, and SNE/MA windowpane flounder, are controlled and do not lead to overfishing. These changes to the sub-ACLs were submitted in FW 48, and the tables reflect the values if those decisions are implemented.

Table 6 – Estimated scallop fishery catch of GB yellowtail flounder, 90 percent of that estimate, and 8 and 16 percent of the GB yellowtail flounder ABC. Italicized values exceed the U.S. share under an ABC of 500 mt; greyed out values exceed the U.S. share with an ABC of 1,150 mt. Note scallop sub-ABCs are reduced to account for management uncertainty. Fixed percentages shown for U.S. share of 215 mt and 495 mt. Scallop Alternative 2 is the Preferred Alternative submitted in Scallop Framework Adjustment 24.

	Scallop FW 24 Management Alternative									
	No Action		**Alt1**		**Alt2**		**Alt3**		**Alt4**	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Expected scallop fishery catch of GB yellowtail flounder										
LOW	62.4	96.5	46.9	42.6	40.7	65.9	43.4	56.2	26.4	38.1
MEDIUM	132.0	186.0	106.6	123.0	85.3	127.0	90.0	108.0	55.1	71.0
HIGH	*237.8*	*325.2*	194.3	*234.4*	152.8	*220.1*	161.4	186.7	97.4	121.5
Scallop Sub-ABC at 90 percent of expected scallop fishery catch of GB yellowtail flounder										
LOW	56.2	86.9	42.2	38.4	36.7	59.3	39.1	50.6	23.8	34.3
MEDIUM	118.8	167.4	95.9	110.7	76.8	114.3	81.0	97.2	49.6	63.9
HIGH	*214.1*	*292.7*	174.9	211.0	137.5	198.1	145.2	168.0	87.6	109.4
Scallop Sub-ABC at a Fixed Percentage Allocation of GB YTF ABC										
8 percent	17.2/39.6									
16 percent	34.4/79.2									

Table 7 – Estimated scallop fishery catch of SNE/MA yellowtail flounder and scallop fishery sub-ABC. Note these sub-ABCs are reduced to account for management uncertainty. Alternative 2 is the Preferred Alternative in Scallop Framework 24.

	Scallop FW 24 Management Alternative														
	No Action			Alt 1			Alt 2			Alt 3			Alt 4		
	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
	Estimated scallop fishery catches of SNE/MA yellowtail flounder														
Low	59.4	61.2	67.5	55.8	64.8	63	59.4	64.8	63	55.8	64.8	63.9	59.4	65.7	63
Medium	66	68	75	62	72	70	66	72	70	62	72	71	66	73	70
High	72.6	74.8	82.5	68.2	79.2	77	72.6	79.2	77	68.2	79.2	78.1	72.6	80.3	77
	Scallop Sub-ABC at 90 percent of estimated catches shown above														
Low	53.5	55.1	60.8	50.2	58.3	56.7	53.5	58.3	56.7	50.2	58.3	57.5	53.5	59.1	56.7
Medium	59.4	61.2	67.5	55.8	64.8	63.0	59.4	64.8	63.0	55.8	64.8	63.9	59.4	65.7	63.0
High	65.3	67.3	74.3	61.4	71.3	69.3	65.3	71.3	69.3	61.4	71.3	70.3	65.3	72.3	69.3

Table 8 – Option 2 Northeast Multispecies OFLs, ABCs, ACLs, and other ACL sub-components for FY 2013 – FY 2015 (metric tons, live weight). Values are rounded to the nearest metric ton. Sector shares based on 2012 PSCs. UPDATED 11/01/2012.

(1) Grayed out values will be adjusted as a result of future recommendations of the TMGC.

(2) Assumes scallop sub-ABC of 40 percent at both ABC values; small-mesh sub-ABC of 2 percent

(3) Assumes scallop sub-ABC is 40 pct for both ABC values; no small mesh sub-ACL.

(4) Other sub-components would be a sub-ACL for SNE/MA windowpane flounder if a FW 48 Preferred Alternative is adopted

Stock	Year	OFL	U.S. ABC	State Waters Sub-component	Other Sub-Components (4)	Scallops	Groundfish Sub-ACL	Comm Groundfish Sub-ACL	Rec Groundfish Sub-ACL	Preliminary Sectors Sub-ACL	Preliminary Non_Sector Groundfish Sub-ACL	Small Mesh/MWT Sub-_ACL	Total ACL
GB Cod()	2013	3,279	2,002	20	80	0	1,807		0	1,775	32	0	1,907
	2014	3,570	2,002	20	80	0	1,807		0	1,775	32	0	1,907
	2015	4,191	2,002	20	80	0	1,807		0	1,775	32	0	1,907
GOM Cod 2013-2015		1,634	1,249	83	41	0		669	391	656	13		
	Pref	1,635	**1,550**	103	51	0		830	486	814	16	0	1,470
GB Haddock(1)	2013	46,185	29,335	293	1,173	0	26,196		0	26,124	72	273	27,936
	2014	46,268	35,699	357	1,428	0	31,879		0	31,792	87	332	33,996
	2015	56,293	43,606	436	1,744	0	38,940		0	38,833	107	406	41,526
GOM Haddock	2013	371	290	4	6	0		187	74	186	1	3	274
	2014	440	341	5	7	0		220	87	218	2	3	323
	2015	561	435	6	9	0		280	111	279	2	4	412
GB Yellowtail Flounder(2)	2013 Pref.	Unk.	495	0	9.9	192.1	268.9		0	265.8	3.1	9.2	480.1
	2013	Unk.	215	0	4.3	83.4	116.8		0.0	115.4	1.3	4.0(4)	208.5
GB Yellowtail Flounder(3)	2013 Pref.	Unk.	495	0	9.9	192.1	278.5		0	275.3	3.2	0.0	480.4
	2013	Unk.	215	0	4.3	83.4	121.0		0.0	119.6	1.4	0.0	208.7

Stock	Year	OFL	U.S. ABC	State Waters Sub-component	Other Sub-Components	Scallops	Groundfish Sub-ACL	Comm Groundfish Sub-ACL	Rec Groundfish Sub-ACL	Prelim-inary Sectors Sub-ACL	Preliminary Non_Sector Groundfish Sub-ACL	MWT Sub_ ACL	Total ACL
SNE/MA Yellowtail Flounder	2013	1,021	700	7	28	61	570		0	455	115	0	665
	2014	1,042	700	7	28	66	564		0	450	114	0	665
	2015	1,056	700	7	28	64	566		0	452	114	0	665
CC/GOM Yellowtail Flounder	2013	713	548	33	11	0	479		0	467	12	0	523
	2014	936	548	33	11	0	479		0	467	12	0	523
	2015	1,194	548	33	11	0	479		0	467	12	0	523
Plaice	2013	2,035	1,557	31	31	0	1,420		0	1,396	24	0	1,482
	2014	1,981	1,515	30	30	0	1,382		0	1,359	23	0	1,442
	2015	2,021	1,544	31	31	0	1,408		0	1,385	24	0	1,470
Witch Flounder	2013	1,196	783	23	117	0	610		0	601	9	0	751
	2014	1,512	783	23	117	0	610		0	601	9	0	751
	2015	1,846	783	23	117	0	610		0	601	9	0	751
GB Winter Flounder	2013	4,819	3,750	0	113	0	3,528		0	3,508	21	0	3,641
	2014	4,626	3,598	0	108	0	3,385		0	3,366	20	0	3,493
	2015												
GOM Winter Flounder	2013	1,458	1,078	272	54	0	714.7		0	690.3	24.4	0	1,040
	2014	1,458	1,078	272	54	0	714.7		0	690.3	24.4	0	1,040
	2015												
SNE/MA Winter Flounder	2013	2,732	1,676	235	168	0	1,210		0	968	242	0	1,612
	2014	3,372	1,676	235	168	0	1,210		0	968	242	0	1,612
	2015	4,439	1,676	235	168	0	1,210		0	968	242	0	1,612
Redfish	2013	15,468	10,995	110	220	0	10,132		0	10,091	41	0	10,462
	2014	16,130	11,465	115	229	0	10,565		0	10,522	43	0	10,909
	2015	16,845	11,974	120	239	0	11,034		0	10,989	45	0	11,393

Stock	Year	OFL	U.S. ABC	State Waters Sub-component	Other Sub-Components	Scallops	Groundfish Sub-ACL	Comm Groundfish Sub-ACL	Rec Groundfish Sub-ACL	Prelim-inary Sectors Sub-ACL	Preliminary Non_Sector Groundfish Sub-ACL	MWT Sub_ ACL	Total ACL
White Hake	2013	5,306	3,638	36	73	0	3,352		0	3,326	27	0	3,462
	2014												
	2015												
Pollock	2013	20,060	15,600	936	1,092	0	12,893		0	12,810	84	0	14,921
	2014	20,554	16,000	960	1,120	0	13,224		0	13,138	86	0	15,304
	2015												
N. Window-pane Flounder	2013	202	151	2	44	0	98		0	0	98	0	144
	2014	202	151	2	44	0	98		0	0	98	0	144
	2015	202	151	2	44	0	98		0	0	98	0	144
S. Window-pane Flounder	2013	730	548	55	384	0	102		0	0	102	0	540
	2014	730	548	55	384	0	102		0	0	102	0	540
	2015	730	548	55	384	0	102		0	0	102	0	540
S. Window-pane Flounder Scallop Sub-ACL	2013	730	548	55	186	183	102		0	0	102	0	527
	2014	730	548	55	186	183	102		0	0	102	0	527
	2015	730	548	55	186	183	102		0	0	102	0	527
Ocean Pout	2013	313	235	2	21	0	197		0	0	197	0	220
	2014	313	235	2	21	0	197		0	0	197	0	220
	2015	313	235	2	21	0	197		0	0	197	0	220
Atlantic Halibut	2013	164	99	40	5	0	52		0	0	52	0	96
	2014	180	109	44	5	0	57		0	0	57	0	106
	2015	198	119	48	6	0	62		0	0	62	0	116
Atlantic Wolffish	2013	94	70	1	3	0	62		0	0	62	0	65
	2014	94	70	1	3	0	62		0	0	62	0	65
	2015	94	70	1	3	0	62		0	0	62	0	65

Table 9 – Option 2 preliminary incidental catch TACs for Special Management Programs (metric tons, live weight). These values may change as a result of changes in sector membership. GB winter flounder and SNE/MA yellowtail flounder are no longer a stock of concern and has been deleted.

	Cat B (regular) DAS Program			CAI Hook Gear Haddock SAP			EUS/CA Haddock SAP		
Stock	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
GB cod	0.0/0.6			0.0/0.2			0.0/0.4		
GOM cod	0.1/0.4								
GB Yellowtail	0.0						0.0		
CC/GOM yellowtail	0.1	0.1	0.1						
Plaice	1.2	1.2	1.2						
Witch Flounder	0.5	0.5	0.5						
White Hake	0.5								
SNE/MA Winter Flounder	3.4	4.4							

Table 10 – Proposed CAI Hook Gear Haddock SAP TACs, FY 2013 - 2015

Year	Exploitable Biomass (thousand mt)	WGB Exploitable Biomass	B(year)/B2004	TAC (mt, live weight)
2013	133,391	46,687	1.709	1,932
2014	136,753	47,864	1.752	1,980
2015	169,027	59,159	2.166	2,448

I***ntentionally Blank***

4.2 Commercial and Recreational Fishery Measures

4.2.1 SNE/MA Winter Flounder Landing Restrictions

4.2.1.1 Option 1: No Action

Landing of SNE/MA winter flounder would continue to be prohibited to commercial and recreational groundfish fishing vessels.

Rationale: The prohibition on retention was adopted by Amendment 16 to discourage fishing on this stock so that fishing mortality could be reduced as close to 0 as possible. Fishing mortality has been reduced to below F_{MSY} as a result. This measure would continue the prohibition in order to rebuild this stock as quickly as possible.

4.2.1.2 Option 2: Landing of SNE/MA Winter Flounder Permitted (Preferred Alternative)

This option would allow the landing of SNE/MA winter flounder by commercial and recreational groundfish fishing vessels. Sectors would receive an allocation of this stock, and sector vessels would be required to land all legal-sized SNE/MA winter flounder. Common-pool vessels would be allowed to land legal-sized fish, subject to any trip limits or other in-season restrictions that may be adopted to ensure the ACL is not exceeded.

Rationale: This measure would allow landings of SNE/MA winter flounder in order to promote achieving OY, and would help mitigate the economic impacts of the low ACLs of other stocks. It would also allow collection of biological samples from landed fish.

4.2.2 Commercial Fishery Accountability Measures

4.2.2.1 Option 1: No Action

If this option is adopted, AMs for this fishery would remain as adopted by Amendment 16 and subsequent framework actions. The AM system that has been adopted is designed to reduce the probability of overfishing by adjusting management measures if a groundfish fishery ACL is exceeded. For sector vessels, the AM for most stocks is the requirement that sectors stop fishing in a stock area when an ACE is caught, and there is a pound-for-pound penalty in the following year if the sector's ACE is exceeded. Common pool vessels are subject to a TAC system that closes specific areas if a quota is exceeded. There are exceptions to these general statements that are described below.

The AMs for SNE/MA winter flounder would not be changed if this option is adopted. The current AM prohibits possession, but a change may result from FW 48 that would implement gear restrictions for groundfish fishing trips in certain areas if the total ACL is exceeded. Either of these measures would remain in place if this option is adopted.

4.2.2.2 Option 2: Revised AM for SNE/MA Winter Flounder (Preferred Alternative)

This option would modify the AMs for SNE/MA winter flounder for sector and common pool groundfish fishing vessels. This measure would replace the area-based AM for SNE/MA winter flounder that was proposed in FW 48 for sector vessels.

The stock would be allocated to sectors based on the PSC of each permit in the sector and all sector management provisions would apply. In general, the PSC for each permit would be determined as specified by Amendment 16. Sector vessels would be required to land legal-size SNE/MA winter flounder, and catches (landings and discards) would be charged against the sector's ACE. Sectors would be required to ensure that catches remain below the allocated ACE. If a sector exceeds its ACE, there are deductions in the ACE allocated to that sector in the following year.

For common pool vessels, the amount of this stock available to the common pool could be caught by common pool vessels. Common pool vessels would be subject to the area-based AM that was the Preferred Alternative in FW 48. Because this stock would be allocated and groundfish fishing vessels would be allowed to land it, the common pool AM would be triggered if the common pool exceeds the amount that is allocated to it by more than the management uncertainty buffer. Common pool vessels would also be subject to in-season adjustments in trip limits and/or DAS if necessary to control catches as a proactive AM.

Should an overage of the overall ACL result from fishing activity by other components of the fishery that do not have a specified sub-ACL and AMs, the overage will be distributed among the components of the fishery that do have a sub-ACL and the pertinent AMs would be triggered as necessary to account for the overage.

If the common pool AM is implemented trawl vessels fishing in the common pool would be required to use approved selective trawl gear that reduces the catch of demersal species. Approved gears include the separator trawl, Ruhle trawl, mini-Ruhle trawl, rope trawl, and other gear authorized by the Council in a management action or approved for use consistent with the process defined in 50 CFR 648.85 (b)(6). There would be no restrictions on longline or gillnet gear.

This measure differs from the groundfish fishery AM for SNE/MA winter flounder that would be implemented by FW 48. That AM would only be implemented if the total ACL (as opposed to the groundfish sub-ACL) is projected to be exceeded by an amount that exceeds the management uncertainty buffer. Should a sub-ACL be allocated to other fisheries and AMs developed for those fisheries, the AMs for either (or both) fisheries will be implemented only if the total ACL for the stock is exceeded. If only one fishery exceeds its sub-ACL the AM will be implemented only for that fishery.

Areas: The applicable areas where gear restrictions would apply are shown in Figure 1.The areas are designed to account for an AM overage of up to 20 percent. The areas would be implemented for common pool sub-ACL overages that exceed the management uncertainty buffer. Should an overage exceed 20 percent of the ACL, the AM will be implemented and then this measure will be reviewed in a future action.

Block 1:
41-10N 071-40W
East to Block Island Coastline at 41-10N
East along Block Island Coastline to 41-10N
41-10N 071-20W
41-00NI 071-20W
41-00N 071-40W

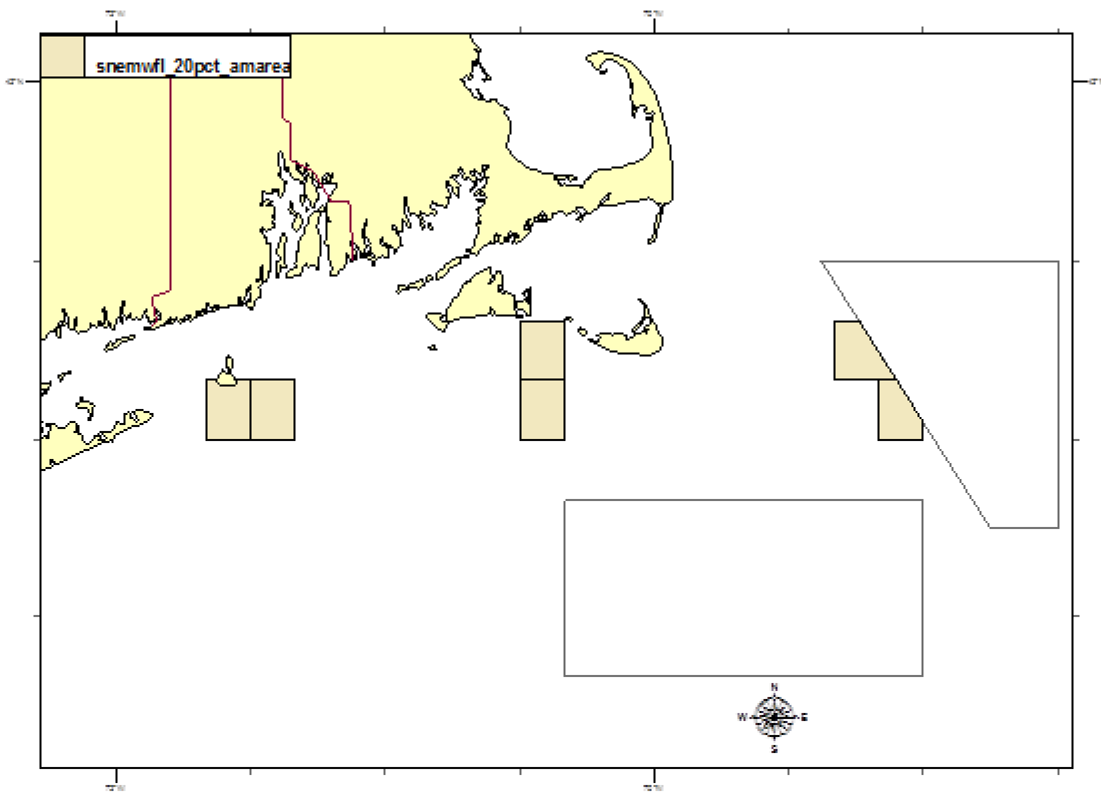
Block 2:
41-20N 070-30W
41-20N 070-20W
41-00N 070-20W
41-00N 070-30W

Block 3
41-20N 069-20W
41-20N 069-10W
41-10N 069-10W
41-10N 069-20W

Block 4:
41-20N 069-20W
Closed Area I Boundary at 41-20N
Closed Area I Boundary at 069-00W
41-00N 069-00W
41-00N 069-10W
41-10N 069-10W
41-10N 069-20W

Rationale: This measure adopts AMs that are more appropriate for a stock that can be landed by sectors and common pool vessels.

Figure 1 –SNE/MA winter flounder AM area preferred alternative for common pool vessels



5.0 Alternatives Considered and Rejected

No alternatives were considered and rejected for this action.

Intentionally Blank

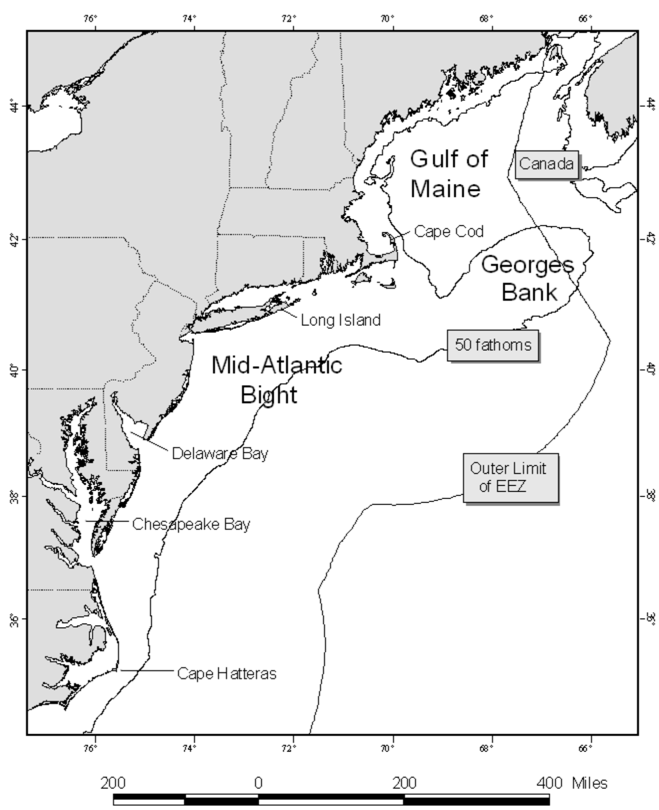
6.0 Affected Environment

The Valued Ecosystem Components (VECs) affected by the Preferred Alternatives include the physical environment, Essential Fish Habitat (EFH), target species, non-target species/bycatch, protected resources, and human communities, which are described below.

6.1 Physical Environment/Habitat/EFH

The Northeast U.S. Shelf Ecosystem (Figure 2) includes the area from the Gulf of Maine south to Cape Hatteras, North Carolina. It extends from the coast seaward to the edge of the continental shelf and offshore to the Gulf Stream (Sherman et al. 1996). The continental slope includes the area seaward of the shelf, out to a depth of 6,562 feet (ft) [2,000 meters (m)]. Four distinct sub-regions comprise the NMFS Northeast Region: the Gulf of Maine, Georges Bank, the southern New England/Mid-Atlantic region, and the continental slope. Sectors primarily fish in the inshore and offshore waters of the Gulf of Maine, Georges Bank, and the southern New England/Mid-Atlantic areas. Therefore, the description of the physical and biological environment focuses on these sub-regions. Information in this section was extracted from Stevenson et al. (2004).

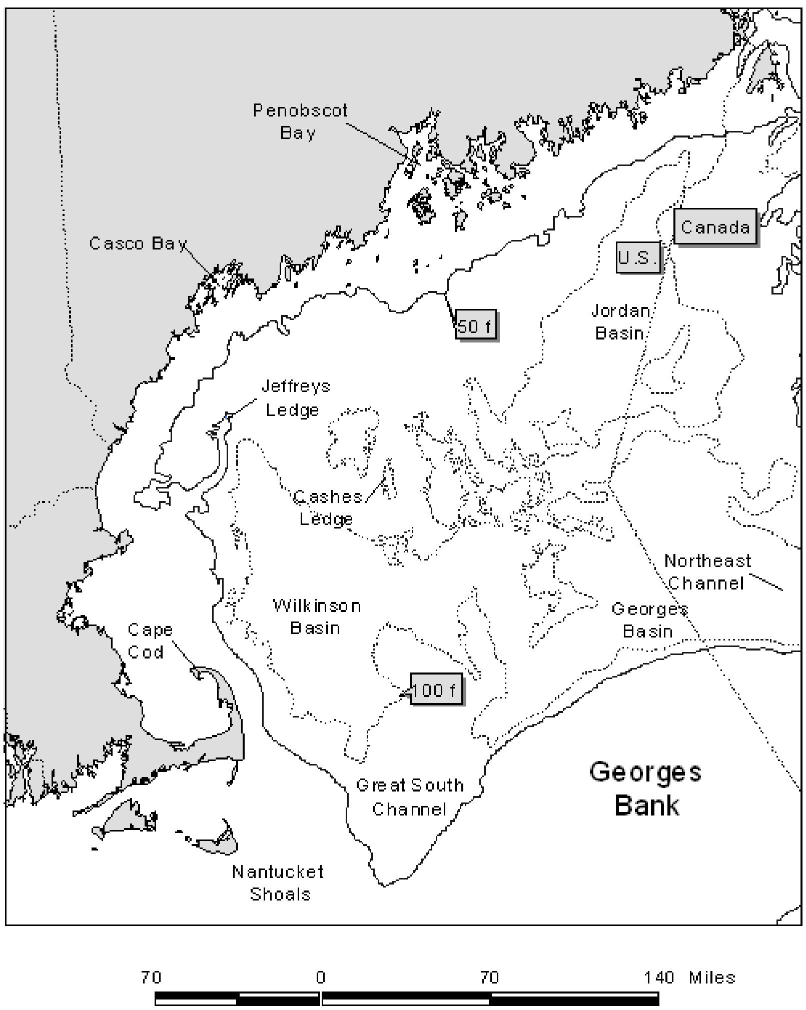
Figure 2 - Northeast U.S Shelf Ecosystem



6.1.1 Gulf of Maine

The Gulf of Maine is bounded on the east by Browns Bank, on the north by the Nova Scotia (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank (Figure 3). The Gulf of Maine is a boreal environment characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. There are 21 distinct basins separated by ridges, banks, and swells. Depths in the basins exceed 820 ft (250 m), with a maximum depth of 1,148 ft (350 m) in Georges Basin, just north of Georges Bank. High points within the Gulf of Maine include irregular ridges, such as Cashes Ledge, which peaks at 30 ft (9 m) below the surface.

Figure 3 - Gulf of Maine



The Gulf of Maine is an enclosed coastal sea that was glacially derived and is characterized by a system of deep basins, moraines, and rocky protrusions (Stevenson et al. 2004). The Gulf of Maine is topographically diverse from the rest of the continental border of the U.S. Atlantic coast (Stevenson et al. 2004). Very fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the seafloor of the Gulf of Maine, particularly in its deep basins. These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains. In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, sand predominates on some high areas, and gravel,[1] sometimes with boulders, predominates others. Bedrock is the predominant substrate along the western edge of the Gulf of Maine, north of Cape Cod in a narrow band out to a water depth of about 197 ft (60 m). Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Gravel, often mixed with shell, is common adjacent to bedrock outcrops and in fractures in the rock. Gravel is most abundant at depths of 66 to 131 ft (20 to 40 m), except off eastern Maine where a gravel-covered plain exists to depths of at least 328 ft (100 m). Sandy areas are relatively rare along the inner shelf of the western Gulf of Maine, but are more common south of Casco Bay, especially offshore of sandy beaches.

The geologic features of the Gulf of Maine coupled with the vertical variation in water properties (e.g., salinity, depth, temperature) combine to provide a great diversity of habitat types that support a rich biological community. To illustrate this, a brief description of benthic invertebrates and demersal (i.e., bottom-dwelling) fish that occupy the Gulf of Maine is provided below. Additional information is provided in Stevenson et al. (2004), which is incorporated by reference.

The most common groups of benthic invertebrates in the Gulf of Maine reported by Theroux and Wigley (1998) in terms of numbers collected were annelid worms, bivalve mollusks, and amphipod crustaceans. Bivalves, sea cucumbers, sand dollars, annelids, and sea anemones dominated biomass. Watling (1998) identified seven different bottom assemblages that occur on the following habitat types:

1) Sandy offshore banks: fauna are characteristically sand dwellers with an abundant interstitial component;
2) Rocky offshore ledges: fauna are predominantly sponges, tunicates, bryozoans, hydroids, and other hard bottom dwellers;
3) Shallow [< 197 ft (60 m)] temperate bottoms with mixed substrate: fauna population is rich and diverse, primarily comprised of polychaetes and crustaceans;
4) Primarily fine muds at depths of 197 to 459 ft (60 to 140 m) within cold Gulf of Maine Intermediate Water:[2] fauna are dominated by polychaetes, shrimp, and cerianthid anemones;
5) Cold deep water, muddy bottom: fauna include species with wide temperature tolerances which are sparsely distributed, diversity low, dominated by a few polychaetes, with brittle stars, sea pens, shrimp, and cerianthids also present;
6) Deep basin, muddy bottom, overlaying water usually 45 to 46 °F (7 to 8°C): fauna densities are not high, dominated by brittle stars and sea pens, and sporadically by tube-making amphipods; and

[1] The term "gravel," as used in this analysis, is a collective term that includes granules, pebbles, cobbles, and boulders in order of increasing size. Therefore, the term "gravel" refers to particles larger than sand and generally denotes a variety of "hard bottom" substrates.

[2] Maine Intermediate Water is described as a mid-depth layer of water that preserves winter salinity and temperatures, and is located between more saline Maine bottom water and the warmer, stratified Maine surface water. The stratified surface layer is most pronounced in the deep portions of the western Gulf of Maine.

7) Upper slope, mixed sediment of either fine muds or mixture of mud and gravel, water temperatures always greater than 46 °F (8°C): upper slope fauna extending into the Northeast Channel.

Two studies (Gabriel 1992, Overholtz and Tyler 1985) reported common[3] demersal fish species by assemblages in the Gulf of Maine and Georges Bank:

- Deepwater/Slope and Canyon: offshore hake, blackbelly rosefish, Gulf stream flounder;
- Intermediate/Combination of Deepwater Gulf of Maine-Georges Bank and Gulf of Maine-Georges Bank Transition: silver hake, red hake, goosefish (monkfish);
- Shallow/Gulf of Maine-Georges Bank Transition Zone: Atlantic cod, haddock, pollock;
- Shallow water Georges Bank-southern New England: yellowtail flounder, windowpane flounder, winter flounder, winter skate, little skate, longhorn sculpin;
- Deepwater Gulf of Maine-Georges Bank: white hake, American plaice, witch flounder, thorny skate; and
- Northeast Peak/Gulf of Maine-Georges Bank Transition: Atlantic cod, haddock, pollock.

6.1.2 Georges Bank

Georges Bank is a shallow (10 to 492 ft [3 to 150 m depth]), elongated ((100 miles [mi] (161 kilometer [km] wide) by 20 mi (322 km long)) extension of the continental shelf that was formed during the Wisconsinian glacial episode (Figure 2). It has a steep slope on its northern edge, a broad, flat, gently sloping southern flank, and steep submarine canyons on its eastern and southeastern edges. It has highly productive, well-mixed waters and strong currents. The Great South Channel lies to the west. Natural processes continue to erode and rework the sediments on Georges Bank. Erosion and reworking of sediments by the action of rising sea level as well as tidal and storm currents may reduce the amount of sand and cause an overall coarsening of the bottom sediments (Valentine and Lough 1991).

Bottom topography on eastern Georges Bank consists of linear ridges in the western shoal areas; a relatively smooth, gently dipping seafloor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 m high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin. The central region of Georges Bank is shallow, and the bottom has shoals and troughs, with sand dunes superimposed within. The area west of the Great South Channel, known as Nantucket Shoals, is similar in nature to the central region of Georges Bank. Currents in these areas are strongest where water depth is shallower than 164 ft (50 m). Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm-generated ripples, and scattered shell and mussel beds. Tidal and storm currents range from moderate to strong, depending upon location and storm activity.

Oceanographic frontal systems separate the water masses of the Gulf of Maine and Georges Bank from oceanic waters south of Georges Bank. These water masses differ in temperature, salinity, nutrient

[3] Other species were listed as found in these assemblages, but only the species common to both studies are listed.

concentration, and planktonic communities. These differences influence productivity and may influence fish abundance and distribution.

Georges Bank has historically had high levels of both primary productivity and fish production. The most common groups of benthic invertebrates on Georges Bank in terms of numbers collected were amphipod crustaceans and annelid worms, while sand dollars and bivalves dominated the overall biomass (Theroux and Wigley 1998). Using the same database, Theroux and Grosslein (1987) identified four macrobenthic invertebrate assemblages that occur on similar habitat type:

1) The Western Basin assemblage is found in comparatively deep water (492 to 656 ft [150 to 200 m]) with relatively slow currents and fine bottom sediments of silt, clay, and muddy sand. Fauna are comprised mainly of small burrowing detritivores and deposit feeders, and carnivorous scavengers.
2) The Northeast Peak assemblage is found in variable depths and current strength and includes coarse sediments, consisting mainly of gravel and coarse sand with interspersed boulders, cobbles, and pebbles. Fauna tend to be sessile (coelenterates, brachiopods, barnacles, and tubiferous annelids) or free-living (brittle stars, crustaceans, and polychaetes), with a characteristic absence of burrowing forms.
3) The Central Georges Bank assemblage occupies the greatest area, including the central and northern portions of Georges Bank in depths less than 328 ft (100 m). Medium-grained shifting sands predominate this dynamic area of strong currents. Organisms tend to be small to moderately large with burrowing or motile habits. Sand dollars are most characteristic of this assemblage.
4) The Southern Georges Bank assemblage is found on the southern and southwestern flanks at depths from 262 to 656 ft (80 to 200 m), where fine-grained sands and moderate currents predominate. Many southern species exist here at the northern limits of their range. Dominant fauna include amphipods, copepods, euphausiids, and starfish.

Common demersal fish species in Georges Bank are offshore hake, blackbelly rosefish, Gulf stream flounder, silver hake, red hake, goosefish (monkfish), Atlantic cod, haddock, pollock, yellowtail flounder, windowpane flounder, winter flounder, winter skate, little skate, longhorn sculpin, white hake, American plaice, witch flounder, and thorny skate.

6.1.3 Southern New England/Mid-Atlantic Bight

The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank south to Cape Hatteras, and east to the Gulf Stream (Figure 2). The northern portion of the Mid-Atlantic Bight is sometimes referred to as southern New England. It generally includes the area of the continental shelf south of Cape Cod from the Great South Channel to Hudson Canyon. The Mid-Atlantic Bight consists of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, North Carolina. The shelf slopes gently from shore out to between 62 to 124 ft (100 and 200 km) offshore where it transforms to the slope (328 to 656 ft [100 to 200 m water depth]) at the shelf break. In both the Mid-Atlantic Bight and on Georges Bank, numerous canyons incise the slope, and some cut up onto the shelf itself (Stevenson et al. 2004). Like the rest of the continental shelf, sea level fluctuations during past ice ages largely shaped the topography of the Mid-Atlantic Bight. Since that time, currents and waves have modified this basic structure.

The sediment type covering most of the shelf in the Mid-Atlantic Bight is sand, with some relatively small, localized areas of sand-shell and sand-gravel. Silty sand, silt, and clay predominate on the slope. Permanent sand ridges occur in groups with heights of about 33 ft (10 m), lengths of 6 to 31 mi (10 to 50 km), and spacing of 1 mi (2 km). The sand ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Sand waves are usually found in patches of 5 to 10 with heights of about 7 ft (2 m), lengths of 164 to 328 ft (50 to 100 m), and 0.6 to 1 mi (1 to 2 km) between patches. Sand waves are temporary features that form and re-form in different locations. They usually occur on the inner shelf, especially in areas like Nantucket Shoals where there are strong bottom currents. Because tidal currents southwest of Nantucket Shoals and southeast of Long Island and Rhode Island slow significantly, there is a large mud patch on the seafloor where silts and clays settle out.

Artificial reefs are another important Mid-Atlantic Bight habitat. Artificial reefs formed much more recently on the geologic time scale than other regional habitat types. These localized areas of hard structure have been formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle and Zetlin 2000). In general, reefs are important for attachment sites, shelter, and food for many species. In addition, fish predators, such as tunas, may be drawn by prey aggregations or may be behaviorally attracted to the reef structure. Estuarine reefs, such as blue mussel beds or oyster reefs, are dominated by epibenthic organisms, as well as crabs, lobsters, and sea stars. These reefs are hosts to a multitude of fish, including gobies, spot, bass (black sea and striped), perch, toadfish, and croaker. Coastal reefs consist of either exposed rock, wrecks, kelp, or other hard material. Boring mollusks, algae, sponges, anemones, hydroids, and coral generally dominate these coastal reefs. These reef types also host lobsters, crabs, sea stars, and urchins, as well as a multitude of fish, including; black sea bass, pinfish, scup, cunner, red hake, gray triggerfish, black grouper, smooth dogfish, and summer flounder. These epibenthic organisms and fish assemblages are similar to the reefs farther offshore, which generally consist of rocks and boulders, wrecks, and other types of artificial reefs. There is less information available for reefs on the outer shelf, but the fish species associated with these reefs include tilefish, white hake, and conger eel.

In terms of numbers, amphipod crustaceans and bivalve mollusks dominate the benthic inhabitants of this primarily sandy environment. Mollusks (70%) dominate the biomass (Theroux and Wigley 1998). Pratt (1973) identified three broad faunal zones related to water depth and sediment type:

1) The “sand fauna” zone is dominated by polycheates and was defined for sandy sediments (1 percent or less silt) that are at least occasionally disturbed by waves, from shore out to a depth of about 164 ft (50 m).
2) The “silty sand fauna” zone is dominated by amphipods and polychaetes and occurs immediately offshore from the sand fauna zone, in stable sands containing a small amount of silt and organic material.
3) Silts and clays become predominant at the shelf break and line the Hudson Shelf Valley supporting the “silt-clay fauna.”

While substrate is the primary factor influencing demersal species distribution in the Gulf of Maine and Georges Bank, latitude and water depth are the primary influence in the Mid-Atlantic Bight area.

Colvocoresses and Musick (1984) identified the following assemblages in the Mid-Atlantic subregion during spring and fall.[4]

- Northern (boreal) portions: hake (white, silver, red), goosefish (monkfish), longhorn sculpin, winter flounder, little skate, and spiny dogfish;
- Warm temperate portions: black sea bass, summer flounder, butterfish, scup, spotted hake, and northern searobin;
- Water of the inner shelf: windowpane flounder;
- Water of the outer shelf: fourspot flounder; and
- Water of the continental slope: shortnose greeneye, offshore hake, blackbelly rosefish, and white hake.

6.1.4 Habitat requirements of groundfish (focus on demersal lifestages)

Habitats provide living things with the basic life requirements of nourishment and shelter. This ultimately provides for both individual and population growth. The quantity and quality of available habitat influences the fishery resources of a region. Depth, temperature, substrate, circulation, salinity, light, dissolved oxygen, and nutrient supply are important parameters of a given habitat. These parameters determine the type and level of resource population that the habitat supports. Table 11 briefly summarizes the habitat requirements for each of the large-mesh groundfish species/stocks managed by the Northeast Multispecies FMP. Information for this table was extracted from the original Northeast Multispecies FMP and profiles available from NMFS (Clark 1998). EFH information for egg, juvenile, and adult life stages for these species was compiled from Stevenson et al. 2004 (Table 11). Note that EFH for the egg stage was included for species that have a demersal egg stage (winter flounder and ocean pout); all other species' eggs are found either in the surface waters, throughout the water column, or are retained inside the parent until larvae hatch. The egg habitats of these species are therefore not generally subject to interaction with gear and are not listed in Table 15.

[4] Other species were listed as found in these assemblages, but only the species common to both spring and fall seasons are listed.

Table 11 – Summary of Geographic Distribution, Food Sources, Essential Fish Habitat Features and Commercial Gear used to Catch each Species in the Northeast Multispecies Fishery Management Unit

Species	Geographic Region of the Northwest Atlantic	Food Source	Essential Fish Habitat		Commercial Fishing Gear Used
			Water Depth	Substrate	
Atlantic cod	Gulf of Maine, Georges Bank and southward	Omnivorous (invertebrates and fish)	(J): 82-245 ft (25-75 m)	(J): Cobble or gravel bottom substrates	Otter trawl, bottom longlines, gillnets
			(A): 33-492 ft (10-150 m)	(A): Rocks, pebbles, or gravel bottom substrate	
Haddock	southwestern Gulf of Maine and shallow waters of Georges Bank	Benthic feeders (amphipods, polychaetes, echinoderms), bivalves, and some fish	(J): 115-328 ft (35-100 m)	(J): Pebble and gravel bottom substrates	Otter trawl, bottom longlines, gillnets
			(A): 131-492 ft (40-150 m)	(A): Broken ground, pebbles, smooth hard sand, smooth areas between rocky patches	
Acadian redfish	Gulf of Maine, deep portions of Georges Bank and Great South Channel	Crustaceans	(J): 82-1,312 ft (25-400 m)	(J): Bottom habitats with a substrate of silt, mud, or hard bottom	Otter trawl
			(A): 164-1,148 ft (50-350 m)	(A): Same as for (J)	
Pollock	Gulf of Maine, extends to Georges Bank, and the northern part of Mid-Atlantic Bight	Juvenile feed on crustaceans, adults also feed on fish and mollusks	(J): 0-820 ft (0-250 m)	(J): Bottom habitats with aquatic vegetation or substrate of sand, mud, or rocks	Otter trawl, gillnets
			(A): 49-1,198 ft (5-365 m)	(A): Hard bottom habitats including artificial reefs	
Atlantic Halibut	Gulf of Maine, Georges Bank	Juveniles feed on annelid worms and crustaceans, adults mostly feed on fish	(J): 66-197 ft (20-60 m)	(J): Bottom habitat with a substrate of sand, gravel, or clay	Otter trawl, bottom longlines
			(A): 328-2,297 ft (100-700 m)	(A): Same as for (J)	
			(J): 262 ft (<80 m)	(J): Bottom habitat, often smooth areas near rocks or algae	

Species	Geographic Region of the Northwest Atlantic	Food Source	Essential Fish Habitat		Commercial Fishing Gear Used
			Water Depth	Substrate	
Ocean Pout	Gulf of Maine, Cape Cod Bay, Georges Bank, southern New England, middle Atlantic south to Delaware Bay	Juveniles feed on amphipods and polychaetes. Adults feed mostly on echinoderms as well as on mollusks and crustaceans	(E): <164 ft (<50 m)	(E): Bottom habitats, generally hard bottom sheltered nests, holes, or crevices where juveniles are guarded.	Otter trawl
			(L): <164 ft (<50 m)	(L): Hard bottom nesting areas	
			(J): 262 ft (<80 m)	(J): Bottom habitat, often smooth areas near rocks or algae	
			(A): 361 ft (<110 m)	(A): Bottom habitats; dig depressions in soft sediments	
White hake	Gulf of Maine, Georges Bank, southern New England	Juveniles feed mostly on polychaetes and crustaceans; adults feed mostly on crustaceans, squids, and fish	(J): 16-738 ft (5-225 m)	(J): Bottom habitat with seagrass beds or substrate of mud or fine-grained sand	Otter trawl, gillnets
			(A): 16-1,066 ft (5-325 m)	(A): Bottom habitats with substrate of mud or fine grained sand	
Yellowtail flounder	Gulf of Maine, southern New England, Georges Bank	Amphipods and polychaetes	(J): 66-164 ft (20-50 m)	(J): Bottom habitats with substrate of sand or sand and mud	Otter trawl
			(A): 66-164 ft (20-50 m)	(A): Same as for (J)	
American plaice	Gulf of Maine, Georges Bank	Polychaetes, crustaceans, mollusks, echinoderms	(J): 148-492 ft (45-150 m)	(J): Bottom habitats with fine grained sediments or a substrate of sand or gravel	Otter trawl
			(A): 148-574 ft (45–175 m)	(A): Same as for (J)	
Witch flounder	Gulf of Maine, Georges Bank, Mid-Atlantic Bight/southern New England	Mostly polychaetes (worms), echinoderms	(J): 164-1,476 ft (50-450 m)	(J): Bottom habitats with fine grained substrate	Otter trawl
			(A): 82-984 ft) (25-300 m)	(A): Same as for (J)	

Species	Geographic Region of the Northwest Atlantic	Food Source	Essential Fish Habitat		Commercial Fishing Gear Used
			Water Depth	Substrate	
Winter flounder	Gulf of Maine, Georges Bank, Mid-Atlantic Bight/southern New England	Polychaetes, crustaceans	(E): 16 ft (<5 m)	(E): Bottom habitats with a substrate of sand, muddy sand, mud, and gravel	Otter trawl, gillnets
			(J): 0.3-32 ft (0.1-10 m) (3-164 ft age 1+) (1-50 m)	(J): Bottom habitats with a substrate of mud or fine grained sand	
			(A): 3.2-328 ft (1-100 m)	(A): Bottom habitats including estuaries with substrates of mud, sand, gravel	
Atlantic wolffish	Gulf of Maine & Georges Bank	Mollusks, brittle stars, crabs, and sea urchins	(J): 131.2-787.4 ft (40-240 m)	(J): Rocky bottom and coarse sediments	Otter trawl, bottom longlines, and gillnets
			(A): 131.2-787.4 ft (40-240 m)	(A): Same as for (J)	
Windowpane flounder	Gulf of Maine, Georges Bank, Mid-Atlantic Bight/southern New England	Juveniles mostly crustaceans; adults feed on crustaceans and fish	(J): 3.2-328 ft (1-100 m)	(J): Bottom habitats with substrate of mud or fine grained sand	Otter trawl
			(A): 3.2-574 ft (1-75 m)	(A): Same as for (J)	

6.1.1 Essential Fish Habitat (EFH) designations

The Sustainable Fisheries Act defines EFH as “[t]hose waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The proposed action could potentially affect EFH for benthic life stages of species that are managed under the Northeast Multispecies FMP; Atlantic sea scallop; monkfish; deep-sea red crab; northeast skate complex; Atlantic herring; summer flounder, scup, and black sea bass; tilefish; squid, Atlantic mackerel, and butterfish; Atlantic surfclam and ocean quahog FMPs. EFH for the species managed under these FMPs includes a wide variety of benthic habitats in state and Federal waters throughout the Northeast U.S. Shelf Ecosystem. Table 15 summarizes the EFH descriptions of the general substrate or bottom types for all the benthic life stages of the species managed under these FMPs. Full descriptions and maps of EFH for each species and life stage are available on the NMFS Northeast Region website at http://www.nero.noaa.gov/hcd/index2a.htm. In general, EFH for species and life stages that rely on the seafloor for shelter (e.g., from predators), reproduction, or food is vulnerable to disturbance by bottom tending gear. The most vulnerable habitat is more likely to be hard or rough bottom with attached epifauna.

6.1.2 Gear Types and Interaction with Habitat

Groundfish vessels fish for target species with a number of gear types: trawl, gillnet, fish pots/traps, and hook and line gear (including jigs, handline, and non-automated demersal longlines) as part of the FY 2012 operations. This section discusses the characteristics of each of the proposed gear types as well as the typical impacts to the physical habitat associated with each of these gear types.

6.1.2.1 Gear Types

Table 12 - Description of the Gear Types Used by the Multispecies Fishery

	Gear Type			
	Trawl	**Sink/ Anchor Gillnets**	**Bottom Longlines**	**Hook and Line**
Total Length	Varies	295 ft (90 m) long per net	~1,476 ft (451 m)	Varies by target species
Lines	N/A	Leadline and floatline with webbing (mesh) connecting	Mainline is parachute cord. Gangions (lines from mainline to hooks) are 15 inches (38 cm) long, 3 to 6 inches (8 to 15 cm) apart, and made of shrimp twine	One to several with mechanical line fishing
Nets	Rope or large-mesh size, depends upon target species	Monofilament, mesh size depends on the target species (groundfish nets minimum mesh size of 6.5 inches [16.5 cm])	No nets, but 12/0 circle hooks are required	No nets, but single to multiple hooks, “umbrella rigs”
Anchoring	N/A	22 lbs (10 kg) Danforth-style anchors are required at each end of the net string	20-24 lbs (9-11 kg) anchors, anchored at each end, using pieces of railroad track, sash weights, or Danforth anchors, depending on currents	No anchoring, but sinkers used (stones, lead)
Frequency/ Duration of Use	Tows last for several hours	Frequency of trending changes from daily (when targeting groundfish) to semi-weekly (when targeting monkfish and skate)	Usually set for a few hours at a time	Depends upon cast/target species

6.1.2.1.1 Trawl Gear

Trawls are classified by their function, bag construction, or method of maintaining the mouth opening. Function may be defined by the part of the water column where the trawl operates (e.g., bottom) or by the species that it targets (Hayes 1983). Mid-water trawls are designed to catch pelagic species in the water column and do not normally contact the bottom; however, mid-water trawls are prohibited in the Northeast multispecies fishery. Bottom trawls are designed to be towed along the seafloor and to catch a variety of demersal fish and invertebrate species.

Fishermen use the mid-water trawl to capture pelagic species throughout the water column. The mouth of the net typically ranges from 361 to 558 ft (110 m to 170 m) and requires the use of large vessels (Sainsbury 1996). Successful mid-water trawling requires the effective use of various electronic aids to find the fish and maneuver the vessel while fishing (Sainsbury 1996). Tows typically last for several hours and catches are large. Fishermen usually remove the fish from the net while it remains in the water alongside the vessel by means of a suction pump. Some fishermen remove the fish in the net by repeatedly lifting the codend aboard the vessel until the entire catch is in the hold.

Bottom otter trawls account for nearly all commercial bottom trawling activity. There is a wide range of otter trawl types used in the Northeast due to the diversity of fisheries and bottom types encountered in the region (Northeast Region Essential Fish Habitat Steering Committee 2002). The specific gear design used is often a result of the target species (whether found on or off the bottom) as well as the composition of the bottom (smooth versus rough and soft versus hard). A number of different types of bottom otter trawl used in the Northeast are specifically designed to catch certain species of fish, on specific bottom types, and at particular times of year. Fishermen tow bottom trawls at a variety of speeds, but average about 5.6 km/hour (3 knots). Several federal FMPs manage the use of this gear. Bottom trawling is also subject to a variety of state regulations throughout the region.

A flatfish trawl is a type of bottom otter trawl designed with a low net opening between the headrope and the footrope and more ground rigging on the sweep. This type of trawl is designed so that the sweep follows the contours of the bottom, to get fish like flounders. Flounders lie in contact with the seafloor and flatfish trawls look to get flounder up off the bottom and into the net. It is used on smooth mud and sand bottoms. A high-rise or fly net with larger mesh has a wide net opening and is used to catch demersal fish that tend to rise higher off the bottom than flatfish (Northeast Region Essential Fish Habitat Steering Committee 2002).

Bottom otter trawls are rigged with rockhopper gear for use on "hard" bottom (i.e., gravel or rocky bottom), mud or sand bottom with occasional boulders. This type of gear seeks to sweep over irregularities in the bottom without damaging the net. The sweep in trawls rigged for fishing on smooth bottoms looks to herd fish into the path of the net (Mirarchi 1998).

The raised-footrope trawl was designed to provide vessels with a means of continuing to fish for small-mesh species without catching groundfish. Raised-footrope trawls fish about 1.6 to 2.0 ft (0.5 to 0.6 m) above the bottom (Carr and Milliken 1998). Although the doors of the trawl still ride on the bottom, underwater video and observations in flume tanks have confirmed that the sweep in the raised-footrope trawl has much less contact with the seafloor than the traditional cookie sweep (Carr and Milliken 1998).

The haddock separator trawl and Ruhle trawl (bottom trawls), are used to minimize the catch of cod. The design of these gears considers the behavior of fish in response to gear. A haddock separator trawl is a groundfish trawl modified to a vertically oriented trouser trawl configuration. It has two extensions arranged one over the other. A codend is attached to the upper extension, and the bottom extension is left open with no codend attached. A horizontal large mesh separating panel constructed with a minimum of 6-inch diamond mesh must be installed between the selvedges joining the upper and lower panels [648.85(a)(3)(iii)(A)]. Haddock generally swim to the upper part of a net and cod swim to the lower part of the net. By inserting a mesh panel in the net, and using two codends, the net effectively divides the catch. The cod can escape if the codend on the lower part of the net is left open (NEFMC 2003). Overall, the haddock separator trawl has had mixed results in commercial fishing operations. The expected ratios of haddock to cod have not been realized. Catches of other demersal species, such as flounders, skates, and monkfish, have also been higher than expected. However, the separator trawl has reduced catches of these species compared to normal fishing practices (NEFMC 2009a).

The Ruhle trawl (previously known as the haddock rope trawl or eliminator trawl) is a four-seam bottom groundfish trawl with a rockhopper. It is designed to reduce the bycatch of cod while retaining or increasing the catch of haddock and other healthy stocks [648.85(b)(6)(iv)(J)(*3*)]. NMFS approved the

Ruhle trawl for use in the DAS program and in the Eastern U.S./Canada Haddock SAP on July 14, 2008 (73 FR 40186) after nearly two years of testing to determine efficacy. Experiments comparing traditional and the new trawl gear showed that the Ruhle trawl reduced bycatch of cod and flounders, while simultaneously retaining the catch of healthier stocks, primarily haddock. The large, 8-foot mesh in the forward end (the wings) of the Ruhle trawl net allows cod and other fish to escape because of their body shapes and unique behavior around the netting (NOAA 2008).

6.1.2.1.2 Gillnet Gear

Sectors would also use individual sink/anchor gillnets which are about 295 ft (90 m) long. They are usually fished as a series of 5 to 15 nets attached end-to-end. A vast majority of “strings” consist of 10 gillnets. Gillnets typically have three components: the leadline, webbing, and floatline. In New England, leadlines are approximately 66 lbs/net (30 kilogram (kg)/net). Webs are monofilament, with the mesh size depending on the species of interest. Nets are anchored at each end using materials such as pieces of railroad track, sash weights, or Danforth anchors, depending on currents. Anchors and leadlines have the most contact with the bottom. For New England groundfish, frequency of tending gillnets ranges from daily to semiweekly (Northeast Region Essential Fish Habitat Steering Committee 2002).

A bottom gillnet is a large wall of netting equipped with floats at the top and lead weights along the bottom. Bottom gillnets are anchored or staked in position. Fish are caught while trying to pass through the net mesh. Gillnets are highly selective because the species and sizes of fish caught are dependent on the mesh size of the net. The meshes of individual gillnets are uniform in size and shape, hence highly selective for a particular size of fish (Jennings et al. 2001). Bottom gillnets are fished in two different ways, as "standup" and "tiedown" nets (Williamson 1998). Standup nets typically catch Atlantic cod, haddock, pollock, and hake and are soaked (duration of time the gear is set) for 12 to 24 hours. Tiedown nets are set with the floatline tied to the leadline at 6-ft (1.8 m) intervals, so that the floatline is close to the bottom and the net forms a limp bag between each tie. They are left in the water for 3-4 days, and are used to catch flounders and monkfish.

6.1.2.1.3 Fish Traps/Pots

Some sectors would use fish traps/pots. This EA assumes these traps/pots are similar to lobster pots. Lobster pots are typically rectangular and consist of two sections, the chamber and the parlor. The chamber has an entrance on both sides of the pot and usually contains the bait. Lobsters enter the parlor via a tunnel (Everhart and Youngs 1981). Escape vents in both areas of the pot minimize the retention of sub-legal sized lobsters (DeAlteris 1998).

Lobster pots are fished as either a single pot per buoy (although two pots per buoy are used in Cape Cod Bay, and three pots per buoy in Maine waters), or a “trawl” or line with up to one hundred pots. The Northeast Fishery Science Center (NEFSC 2002) provides the following important features of lobster pots and their use:

- About 95 percent of lobster pots are made of plastic-coated wire.
- Floating mainlines may be up to 25 ft (8 m) off bottom; sinking groundlines are used where entanglements with marine mammals are a concern.
- Soak time depends on season and location - usually 1 to 3 days in inshore waters in warm weather to weeks in colder waters.

- Offshore pots are larger [more than 4 ft (1 m) long] and heavier (~ 100 lbs or 45 kg), with an average of about 40 pots/trawl and 44 trawls/vessel. They have a floating mainline and are usually deployed for a week at a time.

6.1.2.1.4 Hook and Line Gear

Hand Lines/Rod and Reel

Sectors would also use handlines. The simplest form of hook and line fishing is the hand line. It may be fished using a rod and reel or simply "by hand." The gear consists of a line, sinker (weight), gangion, and at least one hook. The line is typically stored on a small spool and rack and varies in length. The sinkers vary from stones to cast lead. The hooks can vary from single to multiple arrangements in "umbrella" rigs. Fishermen use an attraction device such as natural bait or an artificial lure with the hook. Hand lines can be carried by currents until retrieved or fished in such a manner as to hit bottom and bounce (Stevenson et al. 2004). Fishermen use hand lines as well as rods and reels in the Northeast Region to catch a variety of demersal species.

Mechanized Line Fishing

Mechanized line-hauling systems use electrical or hydraulic power to work the lines on the spools. They allow smaller fishing crews to work more lines. Fishermen mount the reels, also called "bandits," on the vessel bulwarks with the mainline wound around a spool. They take the line from the spool over a block at the end of a flexible arm. Each line may have a number of branches and baited hooks.

Fishermen use jigging machines to jerk a line with several unbaited hooks up in the water to attract a fish. Fishermen generally use fish jigging machine lines in waters up to 1,970 ft (600 m) deep. Hooks and sinkers can contact the bottom. Depending upon the way the gear is used, it may catch a variety of demersal species.

Bottom Longlines

Sectors would also use bottom longlines. This gear consists of a long length of line to which short lengths of line ("gangions") carrying baited hooks are attached. Longlining is undertaken for a wide range of bottom species. Bottom longlines typically have up to six individual longlines strung together for a total length of more than 1,476 ft (450 m) and are deployed with 20 to 24 lbs (9 to 11 kg) anchors. The mainline is a parachute cord. Gangions are typically 16 in (40 cm) long and 3 to 6 in (1 to 1.8 m) apart and are made of shrimp twine. These bottom longlines are usually set for a few hours at a time (Northeast Region Essential Fish Habitat Steering Committee 2002).

All hooks must be 12/0 circle hooks. A "circle hook is a hook with the point turned back towards the shank. The barbed end of the hook is displaced (offset) relative to the parallel plane of the eyed-end or shank of the hook when laid on its side. Habitat impacts from bottom long lines are negligible.

6.1.2.2 Gear Interaction with Habitat

Commercial fishing in the region has historically used trawls, gillnets, and bottom longline gear. Fishermen have intensively used trawls throughout the region for decades and currently account for the majority of commercial fishing activity in the multispecies fishery off New England.

The most recent Multispecies FMP action to include a comprehensive evaluation of gear effects on habitat was Amendment 13 (NEFMC 2003). Amendment 13 described the general effects of bottom trawls on benthic marine habitats. This analysis primarily used an advisory report prepared for the International Council for the Exploration of the Seas. This report identified a number of possible effects of bottom otter trawls on benthic habitats (International Council for the Exploration of the Seas 2000). The International Council for the Exploration of the Seas report is based on scientific findings summarized in Lindeboom and de Groot (1998). The report focuses on the Irish Sea and North Sea, but assesses effects in other areas. The report generally concluded that: (1) low-energy environments are more affected by bottom trawling; and (2) bottom trawling affects the potential for habitat recovery (i.e., after trawling ceases, benthic communities and habitats may not always return to their original pre-impacted state). The report also concluded the following about direct habitat effects:

- Loss or dispersal of physical features such as peat banks or boulder reefs results in <u>changes that are always permanent</u> and lead to an overall change in habitat diversity. This in turn leads to the local loss of species and species assemblages dependent on such features;
- Loss of structure-forming organisms such as bryozoans, tube-dwelling polychaetes, hydroids, seapens, sponges, mussel beds, and oyster beds results in <u>changes that may be permanent</u> leading to an overall change in habitat diversity. This in turn leads to the local loss of species and species assemblages dependent on such biogenic features;
- <u>Changes are not likely to be permanent</u> due to a reduction in complexity caused by redistributing and mixing of surface sediments and the degradation of habitat and biogenic features, leading to a decrease in the physical patchiness of the seafloor; and
- <u>Changes are not likely to be permanent</u> due to alteration of the detailed physical features of the seafloor by reshaping seabed features such as sand ripples or damaging burrows and associated structures that provide important habitats for smaller animals and can be used by fish to reduce their energy requirements.

The Committee on Ecosystem Effects of Fishing for the National Research Council's Ocean Studies Board (National Research Council 2002) also prepared evaluation of the habitat effects of trawling and dredging that was evaluated during Amendment 13. Trawl gears evaluated included bottom otter trawls. This report identified four general conclusions regarding the types of habitat modifications caused by trawls:

- Trawling reduces habitat complexity;
- Repeated trawling results in discernible changes in benthic communities;
- Bottom trawling reduces the productivity of benthic habitats; and
- Fauna that live in low natural disturbance regimes are generally more vulnerable to fishing gear disturbance.

The report from a "Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern U.S." sponsored by the NEFMC and Mid-Atlantic Fishery Management Council (MAFMC) (NEFSC 2002) provides additional information for various Northeast region gear types. A panel of fishing industry members and experts in the fields of benthic ecology, fishery ecology, geology, and fishing gear technology convened for the purpose of assisting the NEFMC, MAFMC, and NMFS with:

- evaluating the existing scientific research on the effects of fishing gear on benthic habitats;
- determining the degree of impact from various gear types on benthic habitats in the Northeast;
- specifying the type of evidence that is available to support the conclusions made about the degree of impact;
- ranking the relative importance of gear impacts to various habitat types; and
- providing recommendations on measures to minimize those adverse impacts.

The panel was provided with a summary of available research studies that summarized information relating to the effects of bottom otter trawls, bottom gillnets, and bottom longlines. Relying on this information plus professional judgment, the panel identified the effects and the degree of impact of these gears on mud, sand, and gravel/rock habitats.

The panel's report provides additional information on the recovery times for each type of impact for each gear type in mud, sand, and gravel habitats ("gravel" includes other hard-bottom habitats). This information made it possible for the panel to rank these three substrates in terms of their vulnerability to the effects of bottom trawling. The report also notes that other factors such as frequency of disturbance from fishing and from natural events are also important. In general, the panel determined that impacts from trawling are greater in gravel/rock habitats with attached epifauna. The panel ranked impacts to biological structure higher than impacts to physical structure. Effects of trawls on major physical features in mud (deep water clay-bottom habitats) and gravel bottom were described as permanent. Impacts to biological and physical structure were given recovery times of months to years in mud and gravel. Impacts of trawling on physical structure in sand were of shorter duration (days to months) given the exposure of most continental shelf sand habitats to strong bottom currents and/or frequent storms.

According to the panel, impacts of sink gillnets and bottom longlines on sand and gravel habitats would result in low degree impacts (NEFSC 2002). Duration of impacts to physical structures from these gear types would be expected to last days to months on soft mud, but could be permanent on hard bottom clay structures along the continental slope. Impacts to mud would be caused by gillnet lead lines and anchors. Physical habitat impacts from sink gillnets and bottom longlines on sand would not be expected.

Amendment 13 also summarized the contents of a second expert panel report, produced by the Pew Charitable Trusts and entitled "Shifting Gears: Addressing the Collateral Impacts of Fishing Methods in U.S. Waters" (Morgan and Chuenpagdee 2003). This group evaluated the habitat effects of 10 different commercial fishing gears used in U.S. waters. The report concluded that bottom trawls have relatively high habitat impacts; bottom gillnets and pots and traps have low to medium impacts; and bottom longlines have low impacts. As in the International Council for the Exploration of the Seas and National Research Council reports, the panel did not evaluate individual types of trawls and dredges. The impacts of bottom gillnets, traps, and bottom longlines were limited to warm or shallow water environments with rooted aquatic vegetation or "live bottom" environments (e.g., coral reefs).

Going beyond Amendment 13 analyses, one purpose of the ongoing Omnibus Essential Fish Habitat Amendment 2 (OA2) is to evaluate existing habitat management areas and develop new habitat management areas. To assist with this effort, the Habitat PDT developed an analytical approach to characterize and map habitats and to assess the extent to which different habitat types are vulnerable to different types of fishing activities. This body of work, termed the Swept Area Seabed Impact approach, includes a quantitative, spatially-referenced model that overlays fishing activities on habitat through time to estimate both potential and realized adverse effects to EFH. The approach is detailed in this document, available on the Council webpage: http://www.nefmc.org/habitat/sasi_info/110121_SASI_Document.pdf.

The spatial domain of the SASI model is US Federal waters (between 3-200 nm offshore) from Cape Hatteras to the US-Canada border. Within this region, habitats were defined based on natural disturbance regime and dominant substrate. Understanding natural disturbance regime is important because it may mask or interact with human-caused disturbance. Energy at the seabed was inferred from an oceanography model (flow) and a coastal relief model (depth) and was binned into areas of high or low energy. Substrate type is an important determinant of habitat because it influences the distribution of managed species, structure-forming epifauna, and prey species by providing spatially discrete resources such as media for burrowing organisms, attachment points for vertical epifauna, etc. The dominant substrate map was composed of thousands of visual and grab sample observations, with grid size based on the spacing of the observations. The underlying spatial resolution of the substrate grid is much higher on Georges Bank and on the tops of banks and ledges in the Gulf of Maine than it is in deeper waters. For this reason, additional data sources were used during habitat management area development.

One of the outputs of the model is habitat vulnerability, which is related in part to the characteristics of the habitat itself, and part to the quality of the impact. Because of a general need for attachment sites, epifauna that provided a sheltering function for managed species tend to be more diverse and abundant in habitats containing larger grain sized substrates. Structurally complex and/or long-lived epifaunal species are more susceptible to gear damage and slower to recover. Recovery rates were assumed to be retarded in low energy areas, such that overall vulnerability (susceptibility + recovery) of low energy areas is greater than high energy areas, other factors being equal. When combined with the underlying substrate and energy distribution, the susceptibility and recovery scores assigned to the inferred mix of epifaunal and geological features generated a highly patchy vulnerability map. Locations where high proportions by area map out as cobble-dominated or cobble- and boulder-dominated tended to show higher vulnerability scores. Although the literature on fixed gear impacts is relatively sparse, it was estimated that mobile gears have a greater per-unit area swept impact than fixed gears.

6.2 Groundfish Species

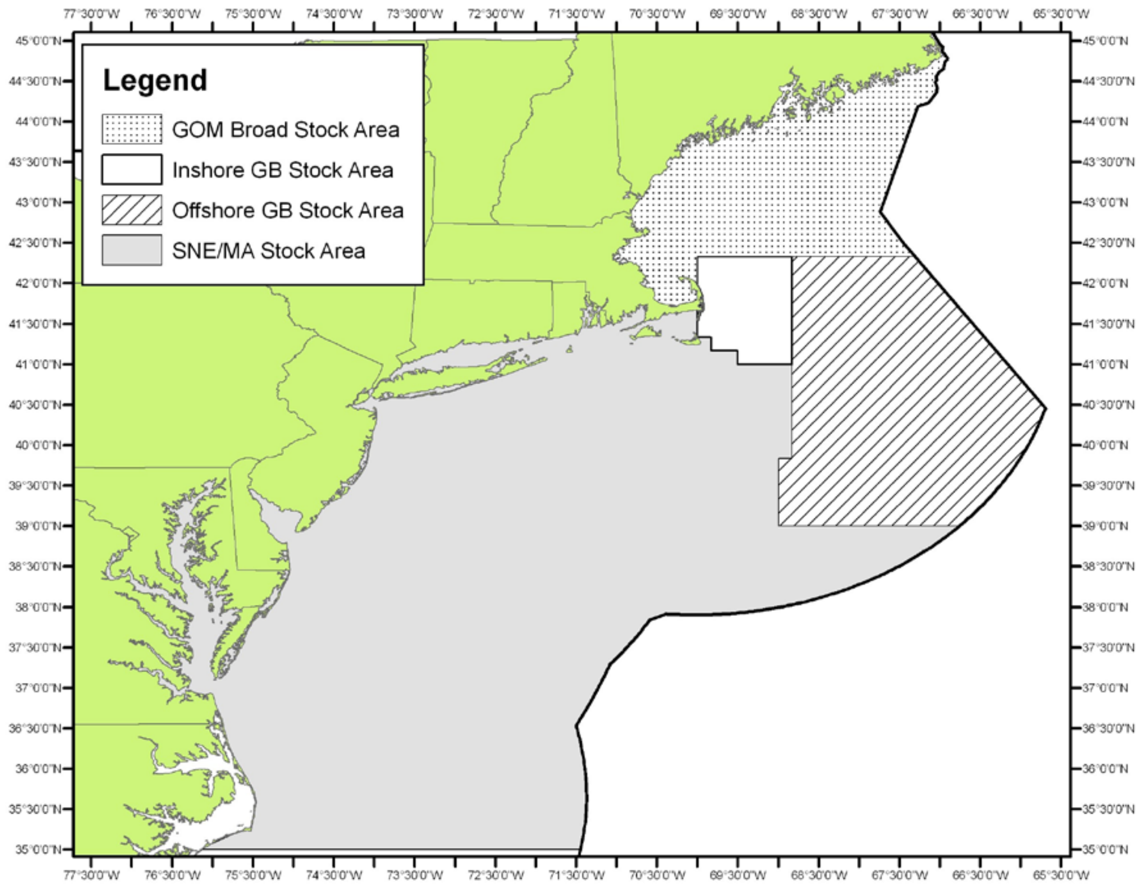
This section describes the life history and stock population status for each allocated fish stock the sectors harvest under the Northeast Multispecies FMP. Figure 4identifies the four broad stock areas used in the fishery. Please refer to the species habitat associations described in Section 4.2 for information on the interactions between gear and species. Section 6.1 also provides a comparison of depth-related demersal fish assemblages of Georges Bank and the Gulf of Maine. This section concludes with an analysis of the interaction between the gear types the sectors intend to use (as described in Section 6.1.2.1) and allocated target species. The following discussions have been adapted from the GARM III report (NEFSC 2008) and the EFH Source Documents: Life History and Habitat Characteristics are assessable via the NEFSC website at http://www.nefsc.org (NEFSC 2010).

6.2.1 Species and Stock Status Descriptions

The allocated target stocks for the sectors are GOM Cod, GB Cod, GOM Haddock, GB Haddock, American Plaice, Witch Flounder, GOM Winter Flounder, GB Winter Flounder, Cape Cod/GOM

Yellowtail Flounder, GB Yellowtail Flounder, SNE/MA Yellowtail Flounder, Redfish, Pollock and White Hake.

Figure 4 - Broad stock areas as defined in Amendment 16



Spiny dogfish, skates, and monkfish are considered in this EA as "non-allocated target species and bycatch" in Sections 4.4 and 5.1. Northeast Multispecies FMP does no allocate these species. They and are managed under their own FMPs.

The Northeast Multispecies FMP also manages Atlantic halibut, ocean pout, windowpane flounder, and SNE/MA winter flounder. However, sectors do not receive an allocation of these species. Sector and common pool vessels cannot land wolffish, ocean pout, windowpane flounder, and inshore GB and SNE/MA winter flounder, but can retain one halibut per trip. Wolffish are provisionally managed under the Northeast Multispecies FMP Amendment 16 to the Northeast Multispecies FMP (NEFMC 2009a) addresses these species. These species are discussed in Section 6.3.

6.2.1.1 Gulf of Maine Cod

Life History: The Atlantic cod, *Gadus morhua*, is a demersal gadoid species found on both sides of the North Atlantic. In the western North Atlantic, cod occur from Greenland to North Carolina. In U.S. waters, cod are assessed and managed as two stocks: Gulf of Maine and Georges Bank. GOM cod attain sexual maturity at a later age than GB cod due to differences in growth rates between the two stocks. The greatest concentrations of cod off the Northeast coast of the U.S. are on rough bottoms in waters between 33 and 492 ft (10 and 150 m) and at temperatures between 32 and 50°F (0 and 10°C). Spawning occurs year-round, near the ocean bottom, with a peak in winter and spring. Peak spawning corresponds to water temperatures between 41 and 45°F (5 and 7°C). It is delayed until spring when winters are severe and peaks in winter when mild. Eggs are pelagic, buoyant, spherical, and transparent. They drift for 2 to 3 weeks before hatching. The larvae are pelagic for about three months until reaching 1.6 to 2.3 in (4 to 6 cm), at which point they descend to the seafloor. Most remain on the bottom after this descent, and there is no evidence of a subsequent diel, vertical migration. Adults tend to move in schools, usually near the bottom, but also occur in the water column.

Population Status: The inshore GOM stock appears to be relatively distinct from the offshore cod stocks on the banks of the Scotian Shelf and Georges Bank based on tagging studies. GOM cod spawning stock biomass has increased since the late 1990’s from 12,236 ton (11,100 metric tons [mt]) in 1997 to 37,479 ton (34,000 mt) in 2007. However, the stock remains low relative to historic levels and is subject to a formal stock rebuilding plan. The 2010 biomass estimate, the most recent estimate available, was 8 percent of the biomass rebuilding target. The GOM cod stock is overfished and overfishing is occurring.

6.2.1.2 Georges Bank Cod

Life History: The GB cod stock, *Gadus morhua*, is the most southerly cod stock in the world. The greatest concentrations off the Northeast coast of the U.S. are on rough bottoms in waters between 33 and 492 ft (10 and 150 m) and at temperatures between 32 and 50° F (0 and 10°C). Spawning occurs year-round, near the ocean bottom, with a peak in winter and spring. Peak spawning corresponds to water temperatures between 41 and 45°F (5 and 7°C). It is delayed until spring when winters are severe and peaks in winter when mild. Eggs are pelagic, buoyant, spherical, and transparent. They drift for 2 to 3 weeks before hatching. The larvae are pelagic for about 3 months until reaching 1.6 to 2.3 in (4 to 6 cm), at which point they descend to the seafloor. Most remain on the bottom after this descent, and there is no evidence of a subsequent diel, vertical migration. Adults tend to move in schools, usually near the bottom, but also occur in the water column.

Population Status: GB cod are a transboundary stock harvested by both the U.S. and Canadian fishing fleets. The GB cod stock is overfished and overfishing is occurring.

6.2.1.3 Gulf of Maine Haddock

Life History: The GOM haddock, *Melanogrammus aeglefinus*, is a commercially-exploited groundfish found in the North Atlantic Ocean. This demersal gadoid species occurs from Cape May, New Jersey to the Strait of Belle Isle, Newfoundland in the western North Atlantic. A total of six distinct haddock stocks have been identified. Two of these haddock stocks occur in U.S. waters associated with Georges Bank and the Gulf of Maine.

Haddock are highly fecund broadcast spawners. They spawn over various substrates including rocks, gravel, smooth sand, and mud. Haddock release their eggs near the ocean bottom in batches where a courting male then fertilizes them. After fertilization, haddock eggs become buoyant and rise to the surface water layer. In the Gulf of Maine, spawning occurs from early February to May, usually peaking in February to April. Jeffreys Ledge and Stellwagen Bank are the two primary spawning sites in the Gulf of Maine. Fertilized eggs are buoyant and remain in the water column where subsequent development occurs. Larvae metamorphose into juveniles in roughly 30 to 42 days at lengths of 0.8 to 1.1 in (2 to 3 cm). Small juveniles initially live and feed in the epipelagic zone. Juveniles remain in the upper part of the water column for 3 to 5 months. Juveniles visit the ocean bottom in search of food. Juveniles settle into a demersal existence once they locate suitable bottom habitat. Haddock do not make extensive seasonal migrations. Haddock prefer deeper waters in the winter and tend to move shoreward in summer.

Population Status: The GOM haddock stock is not overfished but overfishing is occurring. The stock size has been decreasing and is approaching an overfished condition. Should the stock size drop below the minimum stock size threshold, a formal stock rebuilding program would need to be put in place.

6.2.1.4 Georges Bank Haddock

Life History: The general life history of GB haddock, *Melanogrammus aeglefinus*, is comparable to the GOM haddock as described above. On Georges Bank, spawning occurs from January to June, usually peaking from February to early-April. Georges Bank is the principal haddock spawning area in the Northeast U.S. Shelf Ecosystem. GB haddock spawning concentrates on the northeast peak of Georges Bank.

Median age and size of maturity differ slightly between the GB and GOM haddock stocks. GARM III found that the GOM fishery does not target haddock. The fleet targets mostly flatfish using large square (6.5 inch [16.5 cm]) mesh gear. This leads to reduced selectivity on haddock. The GOM haddock have lower weights at age than the GB stock and the age at 50 percent maturity was also lower for GOM haddock than GB haddock.

Population Status: The GB haddock stock is a transboundary resource co-managed with Canada. Substantial declines have recently occurred in the weights at age due to slower than average growth. This was particularly true of the 2003 year-class. This decline is affecting productivity in the short-term. The growth of subsequent year-classes is returning to the earlier rates. The stock is not overfished and overfishing is not occurring. The fishing mortality rate for this stock has been low in recent years.

6.2.1.5 American Plaice

Life History: The American plaice, *Hippoglossoides platessoides*, is an arctic-boreal to temperate-marine pleuronectid (righteye) flounder that inhabits both sides of the North Atlantic on the continental shelves of northeastern North America and northern Europe. Off the U.S. coast, American plaice are managed as a single stock in the Gulf of Maine-Georges Bank region. American plaice are batch spawners. They release eggs in batches every few days over the spawning period. Adults spawn and fertilize their eggs at or near the bottom. Buoyant eggs lack oil globules and will drift into the upper water column after release. Eggs hatch at the surface and the amount of time between fertilization and hatching varies with the water temperature. Transformation of the larvae and migration of the left eye begins when the larvae are approximately 0.8 in (20 millimeters (mm)). Dramatic physiological transformations occur during the juvenile stage. The body shape continues to change, flattening and increasing in depth from side to side. As the migration of the left eye across the top of the head to the right side reaches completion, descent towards the seafloor begins. In U.S. and Canadian waters, American plaice is a sedentary species migrating only for spawning and feeding.

Population Status: In the Gulf of Maine and Georges Bank area, the American plaice stock is not overfished and overfishing is not occurring. However, a stock assessment conducted in 2012 indicates that the stock will not rebuild by 2014, the currently specified rebuilding target date, even if no fishing is allowed on the stock in FY 2013. Because of this inadequate rebuilding progress, a revised rebuilding program is necessary and will be developed for use no later than May 1, 2014.

6.2.1.6 Witch Flounder

Life History: The witch flounder, *Glyptocephalus cynoglossus*, is a demersal flatfish distributed on both sides of the North Atlantic. In the western North Atlantic, the species ranges from Labrador southward, and closely associates with mud or sand-mud bottom. In U.S. waters, witch flounder are common throughout the Gulf of Maine, in deeper areas on and adjacent to Georges Bank, and along the shelf edge as far south as Cape Hatteras, North Carolina. NMFS manages witch flounder as a unit stock.

Spawning occurs at or near the bottom; however, the buoyant eggs rise into the water column where subsequent egg and larval development occurs. The pelagic stage of witch flounder is the longest among the species of the family *Pleuronectidae*. Descent to the bottom occurs when metamorphosis is complete, at 4 to 12 months of age. There has been a decrease in both the age and size of sexual maturity in recent years. Witch flounder spawn from March to November, with peak spawning occurring in summer. The general trend is for spawning to occur progressively later from south to north. In the Gulf of Maine-Georges Bank region, spawning occurs from April to November, and peaks from May to August. Spawning occurs in dense aggregations that are associated with areas of cold water. Witch flounder spawn at 32 and 50 °F (0 to 10^{o}C).

Population Status: Witch flounder are overfished and overfishing is occurring.

6.2.1.7 Gulf of Maine Winter Flounder

Life History: The winter flounder, *Psuedopleuronectes americanus*, is a demersal flatfish distributed in the western North Atlantic from Labrador to Georgia. Important U.S. commercial and recreational fisheries exist from the Gulf of Maine to the Mid-Atlantic Bight. NMFS manages and assesses winter flounder in U.S. waters as three stocks: Gulf of Maine, southern New England/Mid-Atlantic, and Georges Bank. Adult GOM winter flounder migrate inshore in the fall and early winter and spawn in late winter and early spring. Winter flounder spawn from winter through spring, with peak spawning occurring in Massachusetts Bay and south of Cape Cod during February and March, and somewhat later along the coast of Maine, continuing into May. After spawning, adults typically leave inshore areas when water temperatures exceed 59 °F (15^{o}C) although some remain inshore year-round. The eggs of winter flounder are demersal, adhesive, and stick together in clusters. Larvae are initially planktonic but become increasingly bottom-oriented as metamorphosis approaches. Metamorphosis is when the left eye migrates to the right side of the body and the larvae become “flounder-like”. It begins around 5 to 6 weeks after hatching, and finishes by the time the larvae are 0.3 to 0.4 in (8 to 9 mm) in length at about 8 weeks after hatching. Newly metamorphosed young-of-the-year winter flounder reside in shallow water where individuals may grow to about 4 in (100 mm) within the first year.

Population Status: The exact status determination for GOM winter flounder is unknown. Overfishing is not occurring.

6.2.1.8 Georges Bank Winter Flounder

Life History: The life history of the GB winter flounder**,** *Psuedopleuronectes americanus*, is comparable to the GOM winter flounder life history described above.

Population Status: The stock is not overfished and not undergoing overfishing.

6.2.1.9 Cape Cod/Gulf of Maine Yellowtail Flounder

Life History: The yellowtail flounder, *Limanda ferruginea*, is a demersal flatfish that occurs from Labrador to Chesapeake Bay. It generally inhabits depths between 131 to 230 ft (40 and 70 m). NMFS manages three stocks off the U.S. coast including the Cape Cod/GOM, GB, and SNE/MA stocks. Spawning occurs in the western North Atlantic from March through August at temperatures of 41 to 54 °F (5 to 12°C). Spawning takes place along continental shelf waters northwest of Cape Cod. Yellowtail flounder spawn buoyant, spherical, pelagic eggs that lack an oil globule. Pelagic larvae are brief residents in the water column with transformation to the juvenile stage occurring at 0.5 to 0.6 in (11.6 to 16 mm) standard length. There are high concentrations of adults around Cape Cod in both spring and autumn. The median age at maturity for females is 2.6 years off Cape Cod.

Population Status: The Cape Cod/GOM yellowtail flounder stock continues to be overfished and overfishing is continuing. However, fishing mortality has been declining since 2004 and was at the lowest level observed in the time series in 2009. Spawning stock biomass has increased the past few years.

6.2.1.10 Georges Bank Yellowtail Flounder

Life History: The general life history of the GB yellowtail flounder, *Limanda ferruginea*, is comparable to the Cape Cod/GOM yellowtail described above. The median age at maturity for females is 1.8 years on Georges Bank. Spawning takes place along continental shelf waters of Georges Bank.

Population Status: GB yellowtail flounder is overfished, and overfishing is occurring.

6.2.1.11 Southern New England/Mid-Atlantic Yellowtail Flounder

Life History: The general life history of the SNE/MA yellowtail flounder, *Limanda ferruginea*, is comparable to the Cape Cod/GOM yellowtail described above. The median age at maturity for females is 1.6 years off southern New England.

Population Status: Based on a 2012 assessment, the SNE/MA yellowtail flounder stock is not overfished, not subject to overfishing, and is rebuilt. The assessment concluded that the stock is less productive than previously believed and, as a result, the overall biomass at recently seen low levels represents the rebuilt state of nature for the stock.

6.2.1.12 Redfish

Life History: The Acadian redfish, *Sebastes fasciatus* Storer, and the deepwater redfish, *S. mentella* Travin, are virtually indistinguishable from each other based on external characteristics. Deepwater redfish are less prominent in the more southerly regions of the Scotian Shelf and appear to be virtually absent from the Gulf of Maine. Conversely, Acadian redfish appear to be the sole representative of the genus Sebastes. NMFS manages Acadian redfish inhabiting the U.S. waters of the Gulf of Maine and deeper portions of Georges Bank and the Great South Channel as a unit stock.

The redfish are a slow growing, long-lived, ovoviviparous species with an extremely low natural mortality rate. Redfish fertilize their eggs internally. The eggs develop into larvae within the oviduct, and are released near the end of the yolk sac phase. The release of larvae lasts for 3 to 4 months with a peak in late May to early June. Newly spawned larvae occur in the upper 10 m of the water column; at 0.4 to 1.0 in (10 to 25 mm). The post-larvae descend below the thermocline when about 1 in (25 mm) in length. Young-of-the-year are pelagic until reaching 1.6 to 2.0 in (40 to 50 mm) at 4 to 5 months old. Therefore, young-of-the-year typically move to the bottom by early fall of their first year. Redfish of 9 in (22 cm) or greater are considered adults. In general, the size of landed redfish positively correlates with depth. This may be due to a combination of differential growth rates of stocks, confused species identification (deepwater redfish are a larger species), size-specific migration, or gender-specific migration (females are larger). Redfish make diurnal vertical migrations linked to their primary euphausiid prey. Nothing is known about redfish breeding behavior. However, redfish fertilization is internal and fecundity is relatively low.

Population Status: The redfish stock is not overfished and overfishing is not occurring.

6.2.1.13 Pollock

Life History: Pollock, *Pollachius virens*, occur on both sides of the North Atlantic. In the western North Atlantic, the species is most abundant on the western Scotian Shelf and in the Gulf of Maine. There is considerable movement of pollock between the Scotian Shelf, Georges Bank, and the Gulf of Maine. Although some differences in meristic and morphometric characters exist, there are no significant genetic differences among areas. As a result, pollock are assessed as a single unit. The principal pollock spawning sites in the western North Atlantic are in the western Gulf of Maine, Great South Channel, Georges Bank, and on the Scotian Shelf. Spawning takes place from September to April. Spawning time is more variable in northern sites than in southern sites. Spawning occurs over hard, stony, or rocky bottom. Spawning activity begins when the water column cools to near 46 °F (8^oC) and peaks when temperatures are approximately 40 to 43 °F (4.5 to 6^oC). Thus, most spawning occurs within a comparatively narrow range of temperatures.

Pollock eggs are buoyant and rise into the water column after fertilization. The pelagic larval stage lasts for 3 to 4 months. At this time the small juveniles or “harbor pollock” migrate inshore to inhabit rocky subtidal and intertidal zones. Pollock then undergo a series of inshore-offshore movements linked to temperature until near the end of their second year. At this point, the juveniles move offshore where the pollock remain throughout the adult stage. Pollock are a schooling species and occur throughout the water column. With the exception of short migrations due to temperature changes and north-south movements for spawning, adult pollock are fairly stationary in the Gulf of Maine and along the Nova Scotian coast. Male pollock reach sexual maturity at a larger size and older age than females. Age and size at maturity of pollock have declined in recent years. This similar trend has also been reported in other marine fish species such as haddock and witch flounder.

Population Status: The pollock stock is not subject to overfishing, is not overfished, and was declared rebuilt in 2010.

6.2.1.14 White Hake

Life History: The white hake, *Urophycis tenuis*, occurs from Newfoundland to southern New England and is common on muddy bottom throughout the Gulf of Maine. The depth distribution of white hake varies by age and season. Juvenile white hake typically occupy shallower areas than adults, but individuals of all ages tend to move inshore or shoalward in summer and disperse to deeper areas in winter. The northern spawning group of white hake spawns in late summer (August-September) in the southern Gulf of St. Lawrence and on the Scotian Shelf. The timing and extent of spawning in the Georges Bank - Middle Atlantic spawning group has not been clearly determined. The eggs, larvae, and early juveniles are pelagic. Older juvenile and adult white hake are demersal. The eggs are buoyant. Pelagic juveniles become demersal at 2.0 to 2.4 in (50 to 60 mm) total length. The pelagic juvenile stage lasts about two months. White hake attain a maximum length of 53 in (135 cm) and weigh up to 49 lbs (22 kg). Female white hake are larger than males.

Population Status: The 2008 assessment for white hake concluded the stock was overfished and overfishing was occurring. A new comprehensive stock assessment is planned for early 2013.

6.2.1.15 SNE/MA Winter Flounder

Life History: The winter flounder, blackback, or lemon sole, *Psuedopleuronectes americanus*, is a demersal flatfish distributed in the western North Atlantic from Labrador to Georgia. Winter flounder prefer mud, sand, clay, and even gravel habitat, but offshore populations may occur on hard bottom (Collette and Klein-MacPhee 2002). They migrate inshore in the fall and early winter and spawn in late winter and early spring (Pereira et al. 1999), with peak spawning occurring in Massachusetts Bay and south of Cape Cod during February and March, continuing into May. After spawning, adults typically leave inshore areas when water temperatures exceed 59 °F (15^{o}C) although some remain inshore year-round. The eggs of winter flounder are demersal, adhesive, and stick together in clusters. Larvae are initially planktonic but become increasingly bottom-oriented as metamorphosis approaches. Metamorphosis is when the left eye migrates to the right side of the body and the larvae become “flounder-like”. It begins around 5 to 6 weeks after hatching, and finishes by the time the larvae are 0.3 to 0.4 in (8 to 9 mm) in length at about 8 weeks after hatching. Newly metamorphosed young-of-the-year winter flounder reside in shallow water where individuals may grow to about 4 in (100 mm) within the first year (Collette and Klein-MacPhee 2002). In U.S. waters, the resource is assessed and managed as three stocks: Gulf of Maine, Southern New England/Mid-Atlantic (SNE/MA), and Georges Bank.

Population Status: A benchmark assessment completed for SNE/MA winter flounder in 2011 concluded that this stock was overfished but overfishing was not occurring in 2010 (NEFSC 2011).

6.2.1 Gulf of Maine-Georges Bank Windowpane Flounder

Life History: Windowpane flounder or sand flounder, *Scophthalmus aquosus*, is a left-eyed, flatfish species that occurs in the northwest Atlantic from the Gulf of St. Lawrence to Florida (Collette and Klein-MacPhee 2002). Windowpane prefer sandy bottom habitats. They occur at depths from the high water mark to 656 ft (200 m), with the greatest abundance at depths < 180 ft (55 m), and at temperatures between 32º-80ºF (0º-26.8ºC) (Moore 1947). On Georges Bank, the species is most abundant at depths < 60 m during late spring through autumn but overwintering occurs in deeper waters out to 366 m (Chang et al. 1999). Windowpane flounders are assessed and managed as two stocks: Gulf of Maine-Georges Bank (GOM/GB) and Southern New England-Mid-Atlantic Bight (SNE/MA) due to differences in growth rates, size at maturity, and relative abundance trends. Windowpane generally reach sexual maturity between ages 3 and 4 (Moore 1947), though males can mature at age 2 (Grosslein and Azarovitz 1982). On Georges Bank, median length at maturity is nearly the same for males (8.7 in, 22.2 cm) and females (8.9 in, 22.5 cm) (O'Brien et al. 1993). Spawning occurs on Georges bank during July and August and peaks again between October and November at temperatures of 55º- 61ºF (13º-16ºC) (Morse and Able 1995). Eggs incubate for 8 days at 50º-55ºF (10º-13ºC) and eye migration occurs approximately 17- 26 days after hatching (G. Klein-MacPhee, unpubl. data, as cited in Collette and Klein-MacPhee 2002). During the first year of life, spring-spawned fish have significantly faster growth rates than autumn-spawned fish, which may result in differential natural mortality rates between the two cohorts (Neuman et al. 2001). Young windowpane settle inshore and then move offshore to deeper waters as they grow. Trawl survey data suggest that windowpane on Georges Bank aggregate in shallow water during summer and early fall and move offshore in the winter and early spring (Grosslein and Azarovitz 1982).

Population Status: Indices from NEFSC fall surveys are used as an indicator of stock abundance and biomass. These biomass indices have fluctuated above and below the time series median as fishing mortality rates have fluctuated below and above the point where the stock could replenish itself. Biomass indices increased to levels at or slightly above the median during 1998-2003, but then fell below the median from 2004-2010 and was 29% of B_{MSY} in 2010 (NEFSC 2012). According to a 2012 assessment update, the stock was overfished and overfishing was occurring in 2010.

6.2.1 Southern New England-Mid-Atlantic Bight Windowpane Flounder

Life History: Windowpane flounder, *Scophthalmus aquosus*, is a left-eyed, flatfish species that occurs in the northwest Atlantic from the Gulf of St. Lawrence to Florida, with the greatest abundance on Georges Bank and in the New York Bight (Collette and Klein-MacPhee 2002). Windowpane prefer sandy bottom habitats at depths < 180 ft (55 m), but they occur at depths from the high water mark to 656 ft (200 m) and at temperatures between 32º-80ºF (0º-26.8ºC) (Moore 1947). Windowpane flounders are assessed and managed as two stocks: Gulf of Maine-Georges Bank (GOM/GB) and Southern New England-Mid-Atlantic Bight (SNE/MA) due to differences in growth rates, size at maturity, and relative abundance trends. Windowpane generally reach sexual maturity between ages 3 and 4 (Moore 1947), though males can mature at age 2 (Grosslein and Azarovitz 1982). In Southern New England, median length at maturity is nearly the same for males (8.5 in, 21.5 cm) and females (8.3 in, 21.2 cm) (O'Brien et al. 1993). A split spawning season occurs between Virginia and Long Island with peaks in spring and fall (Chang et al. 1999). Spawning occurs in the southern Mid-Atlantic during April and May and then peaks again in October or November (Morse and Able 1995). Eggs incubate for 8 days at 50º-55ºF (10º-13ºC) and eye migration occurs approximately 17- 26 days after hatching (G. Klein-MacPhee, unpubl. data, as cited in Collette and Klein-MacPhee 2002). During the first year, spring-spawned fish have significantly faster growth rates than autumn-spawned fish, which may lead to different natural mortality rates (Neuman et al. 2001).

Population Status: A 2012 assessment update indicated that in 2010 biomass was well above the B_{MSY} proxy (146%) and overfishing was not occurring (NEFSC 2012). As a result this stock has been declared rebuilt.

6.2.1 Atlantic Wolffish

Life History: Atlantic wolffish, *Anarhichas lupus*, is a benthic fish distributed on both sides of the North Atlantic Ocean. In the northwest Atlantic the species occurs from Davis Straits off of Greenland to Cape Cod and sometimes in southern New England and New Jersey waters (Collette and Klein-MacPhee 2002). In the Georges Bank-Gulf of Maine region, abundance is highest in the southwestern portion at depths of 263-394 ft (80 - 120 m), but wolffish are also found in waters from 131-787 ft (40 to 240 m) (Nelson and Ross 1992) and at temperatures of 29.7º-50.4º F (-1.3º-10.2º C) (Collette and Klein-MacPhee 2002). They prefer complex benthic habitats with large stones and rocks (Pavlov and Novikov 1993). Atlantic wolffish are mostly sedentary and solitary, except during mating season. There is some evidence of a weak seasonal shift in depth between shallow water in spring and deeper water in fall (Nelson and Ross 1992). Most individuals mature by age 5-6 when they reach approximately 18.5 in (47 cm) total length (Nelson and Ross 1992, Templeman 1986). However, size at first maturity varies regionally; northern fish mature at smaller sizes than faster growing southern fish. There is conflicting information about the spawning season for Atlantic wolffish in the Gulf of Maine-Georges Bank region. Peak spawning period is believed to occur from September to October (Collette and Klein-MacPhee 2002), though laboratory studies have shown that wolffish can spawn most of the year (Pavlov and Moksness 1994). Eggs are laid in masses and that the males are thought to brood for several months. Incubation time is dependent on water temperature and may be 3 to 9 months. Larvae and early juveniles are pelagic between 20 and 40 mm TL, with settlement beginning by 50 mm TL (Falk-Petersen and Hansen 1990).

Population Status: NEFSC spring and fall bottom trawl survey indices show abundance and biomass of Atlantic wolffish generally has declined over the last two to three decades. However, Atlantic wolffish are encountered infrequently on NEFSC bottom trawl surveys and there is uncertainty as to whether the NEFSC surveys adequately sample this species (NDPSWG, 2009). Atlantic wolffish continues to be considered a data poor species. An assessment update in 2012 determined that the stock is overfished, but overfishing is not occurring.

6.2.1 Atlantic Halibut

Life History: Atlantic halibut, *Hippoglossus hippoglossus*, is the largest species of flatfish found in the northwest Atlantic Ocean. This long-lived, late-maturing flatfish is distributed from Labrador to southern New England (Collette and Klein-MacPhee 2002). They prefer sand, gravel, or clay substrates at depths up to 1000 m (Scott and Scott 1988; Miller et al. 1991). Along the coastal Gulf of Maine, halibut move to deeper water in winter and shallower water in summer (Collette and Klein-MacPhee 2002). Atlantic halibut reach sexual maturity between 5 to 15 years and the median female age of maturity in the Gulf of Maine-Georges Bank region is 7 years (Sigourney et al. 2006). In general, Atlantic halibut spawn once per year in synchronous groups during late winter through early spring (Neilson et al. 1993) and females can produce up to 7 million eggs per year depending on size (Haug and Gulliksen 1988). Spawning is believed to occur in waters of the upper continental slope at depths of 200 m or greater (Scott and Scott

1988). Halibut eggs are buoyant but drift suspended in the water at depths of 54-90 m (Tåning 1936). Incubation times are 13-20 days depending on temperature (Blaxter et al. 1983), how long halibut live in the plankton after hatching is not known.

Population Status: Survey indices are highly variable because the NEFSC trawl surveys catch low numbers of halibut. The spring survey abundance index suggested a relative increase during the late 1970s to the early 1980s, a decline during the 1990s, and an increase since the late 1990s. Based on the results of a 2012 assessment update, Atlantic halibut is overfished and overfishing is not occurring (NEFSC 2012).

6.2.1.1.1 Ocean Pout

Life History: Ocean pout, *Zoarces americanus*, is a demersal eel-like species found in the northwest Atlantic from Labrador to Delaware. Ocean pout are most common sand and gravel bottom (Orach-Meza 1975) at an average depth of 49-262 ft (15-80 m) (Clark and Livingstone 1982) and temperatures of 43º-48º F (6º-9º C) (Scott 1982). In U.S. waters, ocean pout are assessed and managed as a unit stock from the Gulf of Maine to Delaware. In the Gulf of Maine, median length at maturity for males and females was 11.9 in (30.3 cm) and 10.3in (26.2 cm), respectively. Median length at maturity for males and females from Southern New England was 12.6 in (31.9 cm) and 12.3in (31.3 cm), respectively (O'Brien et al. 1993). According to tagging studies conducted in Southern New England, ocean pout appear not to migrate, but do move between different substrates seasonally. In Southern New England-Georges Bank they occupy cooler rocky areas in summer, returning in late fall (Orach-Meza 1975). In the Gulf of Maine, they move out of inshore areas in the late summer and then return in the spring. Spawning occurs between September and October in Southern New England (Olsen and Merriman 1946) and in August and September in Newfoundland (Keats et al. 1985). Adults aggregate in rocky areas prior to spawning. Eggs are internally fertilized (Mercer et al. 1993; Yao and Crim 1995a) and females lay egg masses in encased in a gelatinous matrix that they then guard during the incubation period of 2.5-3 months (Keats et al. 1985). Ocean pout hatch as juveniles on the bottom and are believed to remain there throughout their lives (Methven and Brown 1991; Yao and Crim 1995a).

Population Status: Between 1975 and 1985, NEFSC spring trawl survey biomass indices increased to record high levels, peaking in 1981and 1985. Since 1985, survey catch per tow indices have generally declined, and the 2010 index was the lowest value in the time series. Catch and exploitation rates have also been low, but stock size has not increased. A 2012 assessment update determined that in 2010 ocean pout was overfished, but overfishing was not occurring (NEFSC 2012).

6.2.2 Assemblages of Fish Species

Georges Bank and the Gulf of Maine have historically had high levels of fish production. Several studies have identified demersal fish assemblages over large spatial scales. Overholtz and Tyler (1985) found five depth-related groundfish assemblages for Georges Bank and the Gulf of Maine that were persistent temporally and spatially. The study identified depth and salinity as major physical influences explaining assemblage structure. Table 13 (adapted from Amendment 16) compares the six assemblages identified in Gabriel (1992) with the five assemblages from Overholtz and Tyler (1985). This EA considers these assemblages and relationships to be relatively consistent. Therefore, these descriptions generally describe the affected area. The assemblages include allocated target species, as well as non-allocated target species and bycatch. The terminology and definitions of habitat types in Table 13 vary slightly between the two studies. For further information on fish habitat relationships, see Table 11.

Table 13 -Comparison of Demersal Fish Assemblages of Georges Bank and the Gulf of Maine

Overholtz and Tyler (1985)		Gabriel (1992)	
Assemblage	**Species**	**Species**	**Assemblage**
Slope and Canyon	offshore hake, blackbelly rosefish, Gulf stream flounder, fourspot flounder, goosefish, silver hake, white hake, red hake	offshore hake, blackbelly rosefish, Gulf stream flounder, fawn cusk-eel, longfin hake, armored sea robin	Deepwater
Intermediate	silver hake, red hake, goosefish, Atlantic cod, haddock, ocean pout, yellowtail flounder, winter skate, little skate, sea raven, longhorn sculpin	silver hake, red hake, goosefish, northern shortfin squid, spiny dogfish, cusk	Combination of Deepwater Gulf of Maine/Georges Bank and Gulf of Maine-Georges Bank Transition
Shallow	Atlantic cod, haddock, pollock, silver hake, white hake, red hake, goosefish, ocean pout	Atlantic cod, haddock, pollock	Gulf of Maine-Georges Bank Transition Zone
	yellowtail flounder, windowpane winter flounder, winter skate, little skate, longhorn sculpin, summer flounder, sea raven, sand lance	yellowtail flounder, windowpane winter flounder, winter skate, little skate, longhorn sculpin	Shallow Water Georges Bank-southern New England
Gulf of Maine-Deep	white hake, American plaice, witch flounder, thorny skate, silver hake, Atlantic cod, haddock, cusk, Atlantic wolffish	white hake, American plaice, witch flounder, thorny skate, redfish	Deepwater Gulf of Maine-Georges Bank
Northeast Peak	Atlantic cod, haddock, pollock, ocean pout, winter flounder, white hake, thorny skate, longhorn sculpin	Atlantic cod, haddock, pollock	Gulf of Maine-Georges Bank Transition Zone

6.2.3 Stock Status Trends

The most recent stock assessments for the groundfish stocks can be found via the NEFSC website at http://www.nefsc.noaa.gov/saw/. The information in this section is adapted from the most recent stock assessment report for the groundfish stocks. The information in this section is adapted from the most recent stock assessment report for the groundfish stocks. Table 14 summarizes the status of the northeast groundfish stocks.

Table 14 - Status of the Northeast Groundfish Stocks for fishing year 2013

Stock Status	Stock (assessment source)
Overfished and Overfishing Biomass < ½ B_{MSY} and F > F_{MSY}	GB Cod (GARM III) GOM Cod (SARC 54) Cape Cod/GOM Yellowtail Flounder (assessment update) White Hake (GARM III,) Witch Flounder (assessment update) Northern Windowpane (operational assessment) GB Yellowtail Flounder (2012 TRAC)
Overfished but not Overfishing Biomass < ½ B_{MSY} and F $\leq$ F_{MSY}	Ocean Pout (assessment update) Atlantic Halibut (assessment update) GOM Winter Flounder (SARC 52)[b] Atlantic wolffish (assessment update) SNE/MA Winter Flounder
Not Overfished but Overfishing Biomass $\geq$ ½ B_{MSY} and F > F_{MSY}	GOM Haddock (assessment update)
Not Overfished and not Overfishing Biomass $\geq$ ½ B_{MSY} and F $\leq$ F_{MSY}	Pollock (SARC 50) Acadian Redfish (assessment update) SNE/MA yellowtail flounder (SARC 54) American Plaice (assessment update) GB Haddock (assessment update) GB Winter Flounder(SARC 52) Southern Windowpane (assessment update)

Notes:

B_{MSY} = biomass necessary to produce maximum sustainable yield (MSY)

F_{MSY} = fishing mortality rate that produces the MSY

[b] Rebuilding, but no defined rebuilding program due to a lack of data. Unknown whether the stock is overfished.

Assessment references (available at http://www.nefsc.noaa.gov/saw/)

Northeast Fisheries Science Center. 2008. Assessment of 19 Northeast Groundfish Stocks through 2007: Report of the 3rd Groundfish Assessment Review Meeting (GARM III), Northeast Fisheries Science Center, Woods Hole, Massachusetts, August 4-8, 2008. US Dep Commer, NOAA Fisheries, Northeast Fish Sci Cent Ref Doc. 08-15; 884 p + xvii.

Northeast Fisheries Science Center. 2010. 50th Northeast Regional Stock Assessment Workshop (50th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 10-17; 844 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026

Northeast Fisheries Science Center. 2011. 52nd Northeast Regional Stock Assessment Workshop (52nd SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 11-17; 962 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026

Northeast Fisheries Science Center. 2012. 53rd Northeast Regional Stock Assessment Workshop (53rd SAW) Assessment Summary Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-03; 33 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026

Northeast Fisheries Science Center. 2012. 54th Northeast Regional Stock Assessment Workshop (54th SAW) Assessment Summary Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-14; 40 p. Available from:

National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026,

Northeast Fisheries Science Center. 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06; 789 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026

6.2.4 Interaction between Gear and Allocated Target Species

FY 2010 through FY 2011 data show that the majority of fish of all species caught on groundfish trips are caught with trawls. GARM III indicated that only cod and white hake are caught in significant numbers by gillnets. Only haddock are caught in significant numbers by hook and line.

6.3 Non-Allocated Target Species and Bycatch

Non-allocated target species are species which sector vessels are not assigned an ACE but can target and land. Bycatch refers to fish which are harvested in a fishery, but are discarded and not sold or kept for personal use. Non-allocated target species and bycatch may include a broad range of species. For purposes of this assessment the non-allocated target species and bycatch most likely to be affected by the sector operations plans include spiny dogfish, skates, and monkfish. This approach follows the convention established in Amendment 16. Spiny dogfish, skates, and monkfish were the top three non-groundfish species landed by multispecies vessels in FY 2006 and FY 2007 under the Category B (regular) DAS program (Amendment 16, Table 87). American lobster is also included as a non-target bycatch species for FY 2012 because many sector vessels also fish in the lobster fishery. These species have no allocation under the Northeast Multispecies FMP and are managed under separate FMPs. Fishermen commonly land monkfish and skates. Spiny dogfish tend to be relatively abundant in catches. Fishermen may land some spiny dogfish, but dogfish are often the predominant component of the discarded bycatch. Fishermen may discard monkfish when regulations or market conditions constrain the amount of the catch that they can land.

Scallops, whiting, fluke and fluke squid are included in this section because fishing activity for these species will be affected by measures in this action that are designed to reduce or control catches of groundfish species by these fisheries. This is primarily due to the groundfish sub-ACLs allocated to fisheries for these species.

6.3.1 Spiny Dogfish

Life History: The spiny dogfish, *Squalus acanthias*, occurs in the western North Atlantic from Labrador to Florida. Regulators consider spiny dogfish to be a unit stock off the coast of New England. In summer, dogfish migrate northward to the Gulf of Maine-Georges Bank region and into Canadian waters. They return southward in autumn and winter. Spiny dogfish tend to school by size and, when mature, by sex. The species bears live young, with a gestation period of about 18 to 22 months, and produce between 2 to 15 pups with an average of 6. Size at maturity for females is around 31 in (80 cm), but can vary from 31 to 33 in (78 cm to 85 cm) depending on the abundance of females.

Population Management and Status: The NEFMC and MAFMC jointly develop the spiny dogfish FMP for federal waters. The Atlantic States Marine Fisheries Commission (ASMFC) concurrently develops a plan for state waters. Spawning stock biomass of spiny dogfish declined rapidly in response to a directed fishery during the 1990's. NFMS initially implemented management measures for spiny dogfish in 2001. These measures have been effective in reducing landings and fishing mortality. Based upon the 2009 updated stock assessment performed by the Northeast Fisheries Science Center, the spiny dogfish stock is not presently overfished and overfishing is not occurring. NMFS declared the spiny dogfish stock rebuilt for the purposes of U.S. management in May 2010.

6.3.2 Skates

Life History: The seven species in the Northeast Region skate complex are: little skate (*Leucoraja erinacea*), winter skate (*L. ocellata*), barndoor skate (*Dipturus laevis)*, thorny skate (*Amblyraja radiata*), smooth skate (*Malacoraja senta*), clearnose skate (*Raja eglanteria*), and rosette skate (*L. garmani*). The barndoor skate is the most common skate in the Gulf of Maine, on Georges Bank, and in southern New England. Georges Bank and southern New England is the center of distribution for the little and winter skates in the Northeast Region. . The thorny and smooth skates typically occur in the Gulf of Maine. The clearnose and rosette skates have a more southern distribution, and occur primarily in southern New England and the Chesapeake Bight.

Skates are not known to undertake large-scale migrations. Skates tend to move seasonally in response to changes in water temperature. Therefore, they move offshore in summer and early autumn and then return inshore during winter and spring. Skates lay eggs enclosed in a hard, leathery case commonly called a mermaid's purse. Incubation time is 6 to 12 months, with the young having the adult form at the time of hatching.

Population Management and Status: NMFS implemented the Northeast Skate Complex Fishery Management Plan (Skate FMP) in September 2003. The FMP required by both dealers and vessels to report skate landings by species (http://www.nefmc.org/skates/fmp/fmp.htm). Possession prohibitions of barndoor, thorny, and smooth skates in the Gulf of Maine were also provisions of the FMP. The FMP implemented a trip limit of 10,000 lbs (4,536 kg) for winter skate, and required fishermen to obtain a Letter of Authorization to exceed trip limits for the little skate bait fishery.

In 2010 Amendment 3 to the Skate FMP implemented a rebuilding plan for smooth skate and established an ACL and annual catch target for the skate complex, total allowable landings for the skate wing and bait fisheries, and seasonal quotas for the bait fishery. Amendment 3 also reduced possession limits, in-season possession limit triggers, and other measures to improve management of the skate fisheries. Due to insufficient information about the population dynamics of skates, there remains considerable uncertainty about the status of skate stocks. Based on NEFSC bottom trawl survey data through autumn 2011/spring 2012 one skate species was overfished (thorny) and overfishing was not occurring in any of the seven skate species.

Skate landings have generally increased since 2000. The landings and catch limits proposed by Amendment 3 have an acceptable probability of promoting biomass growth and achieving the rebuilding (biomass) targets for thorny skates. Modest reductions in landings and a stabilization of total catch below the median relative exploitation ratio should cause skate biomass and future yield to increase.

6.3.3 Monkfish

Life History: Monkfish, *Lophius americanus*, also called goosefish, occur in the western North Atlantic from the Grand Banks and northern Gulf of St. Lawrence south to Cape Hatteras, North Carolina. Monkfish occur from inshore areas to depths of at least 2,953 ft (900 m). Monkfish undergo seasonal onshore-offshore migrations. These migrations may relate to spawning or possibly to food availability.

Female monkfish begin to mature at age 4 with 50 percent of females maturing by age 5 (about 17 in [43 cm]). Males generally mature at slightly younger ages and smaller sizes (50 percent maturity at age 4.2 or 14 in [36 cm]). Spawning takes place from spring through early autumn. It progresses from south to north, with most spawning occurring during the spring and early summer. Females lay a buoyant egg raft or veil that can be as large as 39 ft (12 m) long and 5 ft (1.5 m) wide, and only a few mm thick. The larvae hatch after about 1 to 3 weeks, depending on water temperature. The larvae and juveniles spend several months in a pelagic phase before settling to a benthic existence at a size of about 3 in (8 cm).

Population Management and Status: NMFS implemented the Monkfish FMP in 1999 (NEFMC and MAFMC 1998). The FMP included measures to stop overfishing and rebuild the stocks through a number of measures. These measures included:

- limiting the number of vessels with access to the fishery and allocating DAS to those vessels
- setting trip limits for vessels fishing for monkfish; minimum fish size limits
- gear restrictions
- mandatory time out of the fishery during the spawning season and
- a framework adjustment process.

The Monkfish FMP defines two management areas for monkfish (northern and southern), divided roughly by an east-west line bisecting Georges Bank. Monkfish in both management regions are not overfished and overfishing is not occurring.

6.3.4 Summer Flounder

Life History: Summer flounder, *Paralichthys dentatus*, occur in the western North Atlantic from the southern Gulf of Maine to South Carolina. Summer flounder are concentrated in bays and estuaries from late spring though early autumn, when an offshore migration to the outer continental shelf is undertaken.

Spawning occurs during autumn and early winter, and the larvae are transported toward coastal areas by prevailing water currents. Development of post larvae and juveniles occurs primarily within bays and estuarine areas. Most fish are sexually mature by age 2. Female summer flounder may live up to 20 years, but males rarely live for more than 10 years. Growth rates differ appreciably between the sexes with females attaining weights up to 11.8 kg (26 lbs.).

Population Management and Status: The FMP was developed by the Mid-Atlantic Fishery Management Council in 1988. Scup and black sea bass were later incorporated into the FMP. Amendment 2, implemented in 1993, established a commercial quota allocated to the states, a recreational harvest limit, minimum size limits, gear restrictions, permit and reporting requirements, and an annual review process to establish specifications for the coming fishing year. In 1999, Amendment 12 revised the overfishing definitions for all three species, established rebuilding programs, addressed bycatch and habitat issues and established a framework adjustment procedure for the FMP to allow for a streamlined process for relatively minor changes to management measures.

The stock is not overfished and overfishing is not occurring, although the stock is still rebuilding (NEFSC 2008).

6.3.5 American lobster

Life History: The American lobster, *Homarus americanus*, occurs in continental shelf waters from Maine to North Carolina. The American lobster is long-lived and known to reach more than 40 pounds in body weight (Wolff, 1978). Lobsters are encased in a hard external skeleton that is periodically cast off (molted) to allow growth and mating to take place. Eggs are carried under the female’s abdomen during the 9 to 12 month incubation period. Larger lobsters produce eggs with greater energy content and thus, may produce larvae with higher survival rates (Attard and Hudon, 1987). Seasonal timing of egg extrusion and larval hatching is somewhat variable among areas and may also vary due to seasonal weather patterns. Overall, hatching tends to occur over a four month period from May – September, occurring earlier and over a longer period in the southern part of the range. The pelagic larvae molt four times before they resemble adults and settle to the bottom. They will molt more than 20 times over a period of 5 to 8 years before they reach the minimum legal size to be harvested. Cooper and Uzmann, (1971) and Uzmann, et al., (1977) observed that tagged lobster were observed to move to relatively cool deep canyon areas in late fall and winter, and then migrate back to shallower and relatively warm water in spring and summer.

Population Management and Status: The states and NMFS cooperatively manage the American lobster resource and fishery under the framework of the Atlantic States Marine Fisheries Commission (ASMFC). States have jurisdiction for implementing measures in state waters, while NMFS implements complementary regulations in federal waters. Inshore landings have increased steadily since the early 1970s. Fishing effort is intense and increasing throughout much of the range of the species. The majority of the landings are reportedly harvested from state waters (within 3 miles of shore). The most recent peer-reviewed stock assessment for American lobster, published by the ASMFC in 2009, identifies the status of the three biological stock units, delineated primarily on the basis of regional differences in life history parameters, such as lobster distribution and abundance, patterns of migration, location of spawners, and the dispersal and transport of larvae. These stock units are the Gulf of Maine, Georges Bank, and Southern New England. While each area has an inshore and offshore component, Gulf of Maine and Southern New England areas support predominantly inshore fisheries and the Georges Bank supports a predominantly offshore fishery. The most recent 2009 Stock Assessment Report concluded that “(t)he American lobster fishery resource presents a mixed picture, with stable abundance for much of the Gulf of Maine stock, increasing abundance for the Georges Bank stock, and decreased abundance and recruitment yet continued high fishing mortality for the Southern New England stock (ASMFC 2009).

6.3.6 Whiting (Silver Hake)

This description is quoted from the NEFSC Status of Fishery Resources (http://www.nefsc.noaa.gov/sos/spsyn/pg/silverhake/).

Life History: Silver hake, also known as whiting, *Merluccius bilinearis*, range primarily from Newfoundland to South Carolina. Silver hake are fast swimmers with sharp teeth, and are important fish predators that also feed heavily on crustaceans and squid (Lock and Packer 2004). In U.S. waters, two stocks have been identified based on differences of head and fin lengths (Almeida 1987), otolith morphometrics (Bolles and Begg 2000), otolith growth differences, and seasonal distribution patterns (Lock and Packer 2004). The northern silver hake stock inhabits Gulf of Maine - Northern Georges Bank waters, and the southern silver hake stock inhabits Southern Georges Bank - Middle Atlantic Bight waters. Silver hake migrate in response to seasonal changes in water temperatures, moving toward shallow, warmer waters in the spring. They spawn in these shallow waters during late spring and early summer and then return to deeper waters in the autumn (Brodziak et al. 2001). The older, larger silver hake especially prefer deeper waters. During the summer, portions of both stocks can be found on Georges Bank, whereas during the winter fish in the northern stock move to deep basins in the Gulf of Maine, while fish in the southern stock move to outer continental shelf and slope waters. Silver hake are widely distributed, and have been observed at temperature ranges of 2-17° C (36-63° F) and depth ranges of 11-500 m (36-1,640 ft). However, they are most commonly found between 7-10º C (45-50º F) (Lock and Packer 2004).

Population Management and Status: Due to their abundance and availability, silver hake have supported important U.S. and Canadian fisheries as well as distant-water fleets. Landings increased to 137,000 mt in 1973 and then declined sharply with increased restrictions on distant-water fleet effort and implementation of the Magnuson Fishery Conservation and Management Act (MFCMA) in 1977. U.S. landings during 1987-1996 were relatively stable, averaging 16,000 mt per year, but have gradually declined to a historic low of 6,800 mt in 2005.

The otter trawl remains the principal gear used in the U.S. fishery, and recreational catches have been low since 1985. Silver hake are managed under the New England Fishery Management Council's Northeast Multispecies Fishery Management Plan ("nonregulated multispecies" category). In 2000, the New England Fishery Management Council implemented Amendment 12 to this FMP, and placed silver hake into the “small mesh multispecies” management unit, along with red hake and offshore hake. This amendment established retention limits based on net mesh size, adopted overfishing definitions for northern and southern stocks, identified essential fish habitat for all life stages, and set requirements for fishing gear (NEFMC 2000). In 2005, the 3-year average exploitation index for 2003-2005 was below the FMSY proxy and the 3-year average biomass index remained above the ½ BMSY proxy, indicating that the stock is not overfished and overfishing is not occurring.

6.3.7 Loligo Squid

This description is quoted from the NEFSC Status of Fishery Resources (http://www.nefsc.noaa.gov/sos/spsyn/iv/lfsquid/).

Life History: Longfin inshore squid (*Loligo pealeii*) are distributed primarily in continental shelf waters located between Newfoundland and the Gulf of Venezuela (Cohen 1976; Roper et al. 1984). In the northwest Atlantic Ocean, longfin squid are most abundant in the waters between Georges Bank and Cape Hatteras where the species is commercially exploited. The stock area extends from the Gulf of Maine to Cape Hatteras. 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). The species lives for about nine months, grows rapidly, and spawns year-round (Brodziak and Macy 1996) with peaks during late spring and autumn. Individuals hatched in summer grow more rapidly than those hatched in winter and males grow faster and attain larger sizes than females (Brodziak and Macy 1996).

Population Management and Status: The domestic fishery occurs primarily in Southern New England and Mid-Atlantic waters, but some fishing also occurs along the edge of Georges Bank. Fishing patterns reflect seasonal Loligo distribution patterns and effort is generally directed offshore during October through April and inshore during May through September. The fishery is dominated by small-mesh otter trawlers, but near-shore pound net and fish trap fisheries occur during spring and summer. Since 1984, annual offshore landings have generally been three-fold greater than inshore landings. The stock is managed by the Mid-Atlantic Fishery Management Council under the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (FMP). Management measures for the L. pealeii stock include annual total allowable catches (TACs) which have been partitioned into seasonal quotas since 2000 (trimesters in 2000 and quarterly thereafter), a moratorium on fishery permits, and a minimum codend mesh size of 1 7/8 inches.

6.3.8 Atlantic Sea Scallops

Life History: This description is quoted from the NEFSC Status of Fishery Resources (http://www.nefsc.noaa.gov/sos/spsyn/iv/lfsquid/). Sea scallops *Placopecten magellanicus* are distributed in the northwest Atlantic Ocean from Newfoundland to North Carolina, mainly on sand and gravel sediments where bottom temperatures remain below 20°C (68°F). North of Cape Cod, concentrations generally occur in shallow water less than 40 m (22 fathoms) deep. South of Cape Cod and on Georges Bank, sea scallops typically occur at depths between 25 and 200 m (14 to 110 fathoms), with commercial concentrations generally between 35 and 100 m (19 to 55 fathoms). Sea scallops are filter feeders, feeding primarily on phytoplankton, but also on microzooplankton and detritus (Hart and Chute 2004). Sea scallops grow rapidly during the first several years of life. Between ages 3 and 5, they commonly increase 50 to 80% in shell height and quadruple their meat weight. Sea scallops have been known to live more than 20 years. They usually become sexually mature at age 2, but individuals younger than age 4 probably contribute little to total egg production. Sexes are separate and fertilization is external. Spawning usually occurs in late summer and early autumn; spring spawning may also occur, especially in the Mid-Atlantic Bight. Sea scallops are highly fecund; a single large female can release hundreds of millions of eggs annually. Larvae remain in the water column for four to seven weeks before settling to the bottom. Sea scallops attain commercial size at about four to five years old, though historically, three year olds were often exploited.

Population and Management Status: The commercial fishery for sea scallops is conducted year round, primarily using offshore New Bedford style scallop dredges. A small percentage of the fishery employs otter trawls, mostly in the Mid-Atlantic. The principal U.S. commercial fisheries are in the Mid-Atlantic (from Virginia to Long Island, New York) and on Georges Bank and neighboring areas, such as the Great South Channel and Nantucket Shoals. There is also a small, primarily inshore fishery for sea scallops in the Gulf of Maine. Recreational fishing is insignificant. Sea scallops have a somewhat uncommon combination of life-history attributes: low mobility, rapid growth, and low natural mortality. The Council established the Scallop FMP in 1982. A number of Amendments and Framework Adjustments have been implemented since that time to adjust the original plan. The scallop resource was last assessed in 2010 (SARC 50) and it was not overfished, and overfishing was not occurring. The Scallop PDT has evaluated biomass and fishing mortality since and based on 2012 estimates, biomass is 119,000 mt, well above the threshold for an overfished stock (1/2 Bmsy = 62,000 mt), and almost at Bmsy (125,000 mt). The estimate of fishing mortality overall is 0.34, above the target F of 0.32 but below the overfishing limit threshold of 0.38. Total catch has been stable at about 20-30,000 mt since 2001, up from about 5,000 mt harvests of the late 1990s.

6.3.9 Interaction between Gear and Non-allocated Target Species and Bycatch

The majority of the proposed sectors have minimal operational history; therefore, the analysis of interactions between gear and non-allocated target species and bycatch is based in part on catch information for the Northeast Multispecies FMP common pool fishery from FY 1996 to FY 2006. It is also based on sector data from FY 2009 to FY 2011, as presented in Section 6.5.8.

The Final Supplemental Environmental Impact Statement to Amendment 2 to the Monkfish FMP (NEFMC and MAFMC 2003) evaluated the potential adverse effects of gears used in the directed monkfish fishery. It evaluated impacts for monkfish and other federally-managed species, as well as the effects of fishing activities regulated under other federal FMPs on monkfish. Bottom trawls and bottom gillnets and the two gears used in the monkfish fishery. Amendment 2 to the Monkfish FMP (NEFMC and MAFMC 2003) describes these gears in detail. Sectors would use these same gears in FY 2012.

Fishermen in the Northeast Region harvest skates in two very different ways. Fishermen harvest whole skates for lobster bait. They also harvest skate wings for food. Vessels tend to catch skates when targeting other species like groundfish, monkfish, and scallops. The vessels will land skate if the price is high enough. The recent NEFMC Amendment to the Skate FMP and accompanying Final Supplemental Environmental Impact Statement (NEFMC 2009b) contain detailed information about skate fisheries.

Dogfish have the potential to interact with all gear types used by sectors. A status review for Atlantic sturgeon was completed in 2007 which indicated that five distinct population segments (DPS) of Atlantic sturgeon exist in the United States (ASSRT 2007). On October 6, 2010, NMFS proposed listing these five DPSs 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 was published on February 6th, 2012 (77 FR 5880 and 75 FR 5914). The GOM DPS of Atlantic sturgeon has been listed as threatened, and the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs of Atlantic sturgeon have been listed as endangered. Atlantic sturgeon from any of the five DPSs could occur in areas where the multispecies fishery operates 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, as well as sink gillnet and drift gillnet gear (ASMFC TC 2007).

Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA. Candidate species also include those species for which NMFS has initiated an ESA status review through an announcement in the *Federal Register*.

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. NMFS has initiated review of recent stock assessments, bycatch information, and other information for these candidate and proposed species. The results of those efforts are needed to accurately characterize recent interactions between fisheries and the candidate/proposed species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information reviews. Please note that once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10).

Table 15 shows that otter trawl gear caught the majority of non-allocated target species and bycatch between FY 1996 to FY 2006.

Table 15 - Landings (mt) for Non-allocated Target Species and Bycatch by Gear Type[a]

	Gear Type									
	Trawl		Gillnet		Dredge		Other Gear		Total[b]	
Species	Landings	Discard	Landings	Discard	Landings	Discard	Landings	Discard	Landings	Discard
Monkfish	NA	16,516	NA	6,526	NA	16,136	NA	4 [c]	228,000	39,182
Skates	117,381	315,308	29,711	26,601	--	146,725	4,413	2646 [d]	151,505	491,280
Dogfish	24,368	61,914	72,712	39,852	--	--	946	--	98,026	101,766

Notes:

NA = landings or discard data not available for individual fishery gear type for this species.

-- = None reported

[a] monkfish 1996-2006, skates 1996-2006, dogfish 1996-2005

[b.] Total landings or discards may differ slightly from the sum of the individual fishery entries due to differences in rounding.

[c] Shrimp Trawl

[d] Line and shrimp trawl

Source: Northeast Data Poor Stocks Working Group 2007a; Northeast Data Poor Stocks Working Group 2007b ; Sosebee et al. 2008; NEFSC 2006a.

6.4 Protected Resources

Numerous protected species inhabit the environment within the Northeast Multispecies FMP management unit. Therefore, many protected species potentially occur in the operations area of the fishery. These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act of 1973 (ESA) and/or the Marine Mammal Protection Act of 1972 (MMPA). As listed in Table 16, 17 marine mammal, sea turtle, and fish species are classified as endangered or threatened under the ESA, three others are candidate species under the ESA. The remaining species in Table 16 are protected by the MMPA and are known to interact with the Northeast multispecies fishery. Non ESA-listed species protected by the MMPA that utilize this environment and have no documented interaction with the Northeast multispecies fishery will not be discussed in this statement.

6.4.1 Species Present in the Area

Table 16 lists the species, protected either by the ESA, the MMPA, or both, that may be found in the environment utilized by sectors. Table 16 also includes three candidate fish species, as identified under the ESA.

A status review for Atlantic sturgeon was completed in 2007 which indicated that five distinct population segments (DPS) of Atlantic sturgeon exist in the United States (ASSRT 2007). On October 6, 2010, NMFS proposed listing these five DPSs 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 was published on February 6th, 2012 (77 FR 5880 and 75 FR 5914). The GOM DPS of Atlantic sturgeon has been listed as threatened, and the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs of Atlantic sturgeon have been listed as endangered. Atlantic sturgeon from any of the five DPSs could occur in areas where the multispecies fishery operates 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 , as well as sink gillnet and drift gillnet gear (ASMFC TC 2007).

Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA. Candidate species also include those species for which NMFS has initiated an ESA status review through an announcement in the *Federal Register*.

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. NMFS has initiated review of recent stock assessments, bycatch information, and other information for these candidate and proposed species. The results of those efforts are needed to accurately characterize recent interactions between fisheries and the candidate/proposed species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information reviews. Please note that once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10).

Table 16 - Species Protected Under the Endangered Species Act and/or Marine Mammal Protection Act that May Occur in the Operations Area for the FY 2013 Sectors[a]

Species	Status
Cetaceans	
North Atlantic right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sperm whale (*Physeter macrocephalus*	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Pilot whale (*Globicephala spp*.)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted dolphin (*Stenella frontalis*)	Protected
Bottlenose dolphin (*Tursiops truncatus*)[b]	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected
Sea Turtles	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered[c]
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic DPS	Threatened
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Fish	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Atlantic sturgeon *(Acipenser oxyrinchus)*	
Gulf of Maine DPS	Threatened
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered
Cusk (*Brosme brosme*)	Candidate
Alewife (*Alosa pseudo harengus*)	Candidate
Blueback herring (*Alosa aestivalis*)	Candidate
Pinnipeds	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Phoca groenlandicus*)	Protected

Species	Status
Hooded seal (*Cystophora cristata*)	Protected

Notes:

[a] MMPA-listed species occurring on this list are only those species that have a history of interaction with similar gear types within the action area of the Northeast Multispecies Fishery, as defined in the 2012 List of Fisheries.

[b] Bottlenose dolphin (*Tursiops truncatus*), Western North Atlantic coastal stock is listed as depleted.

[c] Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.

Notes:

[a] MMPA-listed species occurring on this list are only those species that have a history of interaction with similar gear types within the action area of the Northeast Multispecies Fishery, as defined in the 2012 List of Fisheries.

[b] Bottlenose dolphin (*Tursiops truncatus*), Western North Atlantic coastal stock is listed as depleted.

[c] Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.

6.4.2 Species Potentially Affected

The multispecies fishery has the potential to affect the fish, sea turtle, cetacean, and pinniped species discussed below. A number of documents contain background information on the range-wide status of the protected species that occur in the area and are known or suspected of interacting with fishing gear (demersal gear including trawls, gillnets, and bottom longlines). These documents include sea turtle status reviews and biological reports (NMFS and USFWS 1995; Turtle Expert Working Group 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b, recovery plans for ESA-listed cetaceans and sea turtles (NMFS 1991, 2005; NMFS and USFWS 1991a, 1991b; NMFS and USFWS 1992), the marine mammal stock assessment reports (e.g., Waring et al. 1995; 2011), and other publications (e.g., Clapham et al. 1999, Perry et al. 1999, Best et al. 2001, Perrin et al. 2002, ASSRT 2007).

6.4.2.1 Sea Turtles

Loggerhead, leatherback, Kemp's ridley, and green sea turtles occur seasonally in southern New England and Mid-Atlantic continental shelf waters north of Cape Hatteras, North Carolina. Turtles generally move up the coast from southern wintering areas as water temperatures warm in the spring (James et al. 2005, Morreale and Standora 2005, Braun-McNeill and Epperly 2004, Morreale and Standora 1998, Musick and Limpus 1997, Shoop and Kenney 1992, Keinath et al. 1987). A reversal of this trend occurs in the fall when water temperatures cool. Turtles pass Cape Hatteras by December and return to more southern waters for the winter (James et al. 2005, Morreale and Standora 2005, Braun-McNeill and Epperly 2004, Morreale and Standora 1998, Musick and Limpus 1997, Shoop and Kenney 1992, Keinath et al. 1987). Hard-shelled species typically occur as far north as Cape Cod whereas the more cold-tolerant leatherbacks occur in more northern Gulf of Maine waters in the summer and fall (Shoop and Kenney 1992, STSSN database http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp).

On March 16, 2010, NMFS and USFWS published a proposed rule (75 FR 12598) to divide the worldwide population of loggerhead sea turtles into nine DPSs, as described in the 2009 Status Review. Two of the DPSs were proposed to be listed as threatened and seven of the DPSs, including the Northwest Atlantic Ocean DPS, were proposed to be listed as endangered. NMFS and the USFWS accepted comments on the proposed rule through September 13, 2010 (75 FR 30769, June 2, 2010). On March 22, 2011 (76 FR 15932), NMFS and USFWS extended the date by which a final determination on the listing action will be made to no later than September 16, 2011. This action was taken to address the interpretation of the existing data on status and trends and its relevance to the assessment of risk of extinction for the Northwest Atlantic Ocean DPS, as well as the magnitude and immediacy of the fisheries bycatch threat and measures to reduce this threat. New information or analyses to help clarify these issues were requested by April 11, 2011.

On September 22, 2011, NMFS and USFWS issued a final rule (76 FR 58868), determining that the loggerhead sea turtle is composed of nine DPSs (as defined in Conant *et al.*, 2009) that constitute species that may be listed as threatened or endangered under the ESA. Five DPSs were listed as endangered (North Pacific Ocean, South Pacific Ocean, North Indian Ocean, Northeast Atlantic Ocean, and Mediterranean Sea), and four DPSs were listed as threatened (Northwest Atlantic Ocean, South Atlantic Ocean, Southeast Indo-Pacific Ocean, and Southwest Indian Ocean). Note that the Northwest Atlantic Ocean (NWA) DPS and the Southeast Indo-Pacific Ocean DPS were original proposed as endangered. The NWA DPS was determined to be threatened based on review of nesting data available after the proposed rule was published, information provided in public comments on the proposed rule, and further discussions within the agencies. The two primary factors considered were population abundance and population trend. NMFS and USFWS found that an endangered status for the NWA DPS was not warranted given the large size of the nesting population, the overall nesting population remains widespread, the trend for the nesting population appears to be stabilizing, and substantial conservation efforts are underway to address threats.

The September 2011 final rule also noted that critical habitat for the two DPSs occurring within the U.S. (NWA DPS and North Pacific DPS) will be designated in a future rulemaking. Information from the public related to the identification of critical habitat, essential physical or biological features for this species, and other relevant impacts of a critical habitat designation was solicited.

This proposed action only occurs in the Atlantic Ocean. As noted in Conant *et al*. (2009), the range of the four DPSs occurring in the Atlantic Ocean are as follows: NWA DPS – north of the equator, south of 60° N latitude, and west of 40° W longitude; Northeast Atlantic Ocean (NEA) DPS – north of the equator, south of 60° N latitude, east of 40° W longitude, and west of 5° 36’ W longitude; South Atlantic DPS – south of the equator, north of 60° S latitude, west of 20° E longitude, and east of 60° W longitude; Mediterranean DPS – the Mediterranean Sea east of 5° 36’ W longitude. These boundaries were determined based on oceanographic features, loggerhead sightings, thermal tolerance, fishery bycatch data, and information on loggerhead distribution from satellite telemetry and flipper tagging studies. Sea turtles from the NEA DPS are not expected to be present over the North American continental shelf in U.S. coastal waters, where the proposed action occurs (P. Dutton, NMFS, personal communication, 2011). Previous literature (Bowen *et al*. 2004) has suggested that there is the potential, albeit small, for some juveniles from the Mediterranean DPS to be present in U.S. Atlantic coastal foraging grounds. These data should be interpreted with caution however, as they may be representing a shared common haplotype and lack of representative sampling at Eastern Atlantic rookeries. Given that updated, more refined analyses are ongoing and the occurrence of Mediterranean DPS juveniles in U.S. coastal waters is rare and uncertain, if even occurring at all, for the purposes of this assessment we are making the determination that the Mediterranean DPS is not likely to be present in the action area. Sea turtles of the South Atlantic DPS do not inhabit the action area of this subject fishery (Conant *et al*. 2009). As such, the remainder of this assessment will only focus on the NWA DPS of loggerhead sea turtles, listed as threatened.

In general, sea turtles are a long-lived species and reach sexual maturity relatively late (NMFS SEFSC 2001; NMFS and USFWS 2007a, 2007b, 2007c, 2007d). Sea turtles are injured and killed by numerous human activities (NRC 1990; NMFS and USFWS 2007a, 2007b, 2007c, 2007d). Nest count data are a valuable source of information for each turtle species since the number of nests laid reflects the reproductive output of the nesting group each year. A decline in the annual nest counts has been measured or suggested for four of five western Atlantic loggerhead nesting groups through 2004 (NMFS and USFWS 2007a), however, data collected since 2004 suggests nest counts have stabilized or increased (TEWG 2009). Nest counts for Kemp’s ridley sea turtles as well as leatherback and green sea turtles in the Atlantic demonstrate increased nesting by these species (NMFS and USFWS 2007b, 2007c, 2007d).

6.4.2.2 Large Cetaceans

The most recent Marine Mammal Stock Assessment Report (SAR) (Waring et al. 2012), covering the time period between 2005 and 2009, reviewed the current population trend for each of these cetacean species within U.S. Economic Exclusion Zone (EEZ) waters. The SAR also estimated annual human-caused mortality and serious injury. Finally, it described the commercial fisheries that interact with each stock in the U.S. Atlantic. The following paragraphs summarize information from the SAR.

The western North Atlantic baleen whale species (North Atlantic right, humpback, fin, sei, and minke whales) follow a general annual pattern of migration. They migrate from high latitude summer foraging grounds, including the Gulf of Maine and Georges Bank, to low latitude winter calving grounds (Perry et al. 1999, Kenney 2002). However, this is a simplification of species movements as the complete winter distribution of most species is unclear (Perry et al. 1999, Waring et al. 2012). Studies of some of the large baleen whales (right, humpback, and fin) have demonstrated the presence of each species in higher latitude waters even in the winter (Swingle et al. 1993, Wiley et al. 1995, Perry et al. 1999, Brown et al. 2002). Blue whales are most often sighted along the east coast of Canada, particularly in the Gulf of St. Lawrence. They occur only infrequently within the U.S. EEZ (Waring et al. 2002).

North Atlantic right whales are federally listed as endangered under the ESA and a revised recovery plan was published in June 2005. Available information suggests that the North Atlantic right whale population increased at a rate of 2.4 percent per year between 1990 and 2007. The total number of North Atlantic right whales is estimated to be at least 396 animals in 2006 (Waring et al. 2012). The minimum rate of annual human-caused mortality and serious injury to right whales averaged 2.4 mortality or serious injury incidents per year during 2005 to 2009 (Waring et al. 2012). Of these, fishery interactions resulted in an average of 0.8 mortality or serious injury incidents per year, all in U.S. waters. The potential biological removal (PBR) level for this stock is 0.8 animals per year (Waring et al. 2012).

Humpback whales are also listed as endangered under the ESA, and a recovery plan was published for this species in 1991. The North Atlantic population of humpback whales is conservatively estimated to be 7,698 (Waring et al. 2012). The best estimate for the GOM stock of humpback whale population is 847 whales and current data suggest that the Gulf of Maine humpback whale stock is steadily increasing in size (Waring et al. 2012). The minimum rate of annual human-caused mortality and serious injury to humpback whales averaged 5.2 mortality or serious injury incidents per year during 2005 to 2009 (Waring et al. 2012). Of these, fishery interactions resulted in an average of 3.8 mortality or serious injury incidents per year (3.4 from U.S. waters and 0.4 from Canadian waters). The PBR for this stock is 1.1 animals per year (Waring et al. 2012).

Fin, sei, and sperm whales are all federally listed as endangered under the ESA, with recovery plans currently in place. Based on data available for selected areas and time periods, the minimum population estimates for these western North Atlantic whale stocks are 3,269 fin whales, 208 sei whales (Nova Scotia stock) (Waring et al. 2012), and 3,539 sperm whales (Waring et al. 2007). Insufficient information exists to determine population trends for these large whale species.

The minimum rate of annual human-caused mortality and serious injury to fin whales averaged 2.6 mortality or serious injury incidents per year during 2005 to 2009 (Waring et al. 2012). Of these, fishery interactions resulted in an average of 0.8 mortality or serious injury incidents per year (0.6 from U.S. waters and 0.2 from Canadian waters). The PBR for this stock is 6.5 animals per year (Waring et al. 2012). For sei whales, the minimum rate of annual human-cause mortality and serious injury averaged 1.2 per year, of which 0.6 were a result of fishery interactions. PBR for the Nova Scotia sei whale stock is 0.4 (Waring et al. 2012). For both fin and sei whales, these estimates are likely biased low due to the low detection rate for these species. The most recent SAR for the North Atlantic sperm whale stock is from 2007 (covering the years 2001-2005) and during that time period, there were no recorded mortality or serious injury incidents due to entanglements (Waring et al. 2007). PBR for this stock is 7.1 animals per year.

Minke whales are not ESA-listed but are protected under the MMPA, with a minimum population estimate of 6,909 animals for the Canadian east coast stock; however, a population trend analysis has not been conducted for this stock (Waring et al. 2012). The minimum rate of annual human-caused mortality and serious injury averaged 5.9 per year during 2005 to 2009, and of these, 3.5 animals per year were recorded through observed fisheries and 0.8 per year were attributed to U.S. fisheries using strandings and entanglement data (Waring et al. 2012). PBR for this stock is 69 animals per year.

More details on fisheries interactions with these species, as well as management actions in place to reduce entanglement risk, can be found in Section 6.4.4.

6.4.2.3 Small Cetaceans

There is fishing related mortality of numerous small cetacean species (dolphins, pilot whales, and harbor porpoises) associated with Northeast Multispecies fishing gear. Seasonal abundance and distribution of each species off the coast of the Northeast U.S. varies with respect to life history characteristics. Some species such as white-sided dolphins and harbor porpoises primarily occupy continental shelf waters. Other species such as the Risso's dolphin occur primarily in continental shelf edge and slope waters. Still other species like the common dolphin and the spotted dolphin occupy all three habitats. Waring et al. (2012) summarizes information on the distribution and geographic range of western North Atlantic stocks of each species.

The most commonly observed small cetaceans recorded as bycatch in multispecies fishing gear (e.g., gillnets and trawls) are harbor porpoises, white-sided dolphins, common dolphins, and pilot whales. These species are described in a bit more detail here. Harbor porpoises are found seasonally within New England and Mid-Atlantic waters. In the Mid-Atlantic, porpoises are present in the winter/spring (typically January through April) and in southern New England waters from December through May. In the Gulf of Maine, porpoises occur largely from the fall through the spring (September through May) and in the summer are found in northern Maine and through the Bay of Fundy and Nova Scotia area. White-sided dolphin distribution shifts seasonally, with a large presence from Georges Bank through the Gulf of Maine from June through September, with intermediate presence from Georges Bank through the lower Gulf of Maine from October through December. Low numbers are present from Georges Bank to Jeffrey's Ledge from January through May (Waring et al. 2012). Common dolphins are widely distributed over the continental shelf from Maine through Cape Hatteras, North Carolina. From mid-January to May they are dispersed from North Carolina through Georges Bank, and then move onto Georges Bank and the Scotia shelf from the summer to fall. They are occasionally found in the Gulf of Maine (Waring et al. 2012). Pilot whales are generally distributed along the continental shelf edge off the northeastern U.S. coast in the winter and early spring. In late spring, the move onto Georges Bank and into the Gulf of Maine and remain until late fall. They do occur along the Mid-Atlantic shelf break between Cape Hatteras, North Carolina and New Jersey (Waring et al. 2012). Since pilot whales are difficult to differentiate at sea, they are generally considered *Globicephala* sp. when they are recorded at sea (Waring et al. 2012).

6.4.2.4 Pinnipeds

Harbor seals have the most extensive distribution of the four species of seal expected to occur in the area. Harbor seals sighting have occurred far south as 30° N (Katona et al. 1993, Waring et al. 2012). Their approximate year-round range extends from Nova Scotia, through the Bay of Fundy, and south through Maine to northern Massachusetts (Waring et al. 2012). Their more seasonal range (September through May) extends from northern Massachusetts south through southern New Jersey, and stranding records indicate occasional presence of harbor seals from southern New Jersey through northern North Carolina (Waring et al. 2012). Gray seals are the second most common seal species in U.S. EEZ waters. They occur from Nova Scotia through the Bay of Fundy and into waters off of New England (Katona et al. 1993; Waring et al. 2011) year-round from Maine through southern Massachusetts (Waring et al. 2012). A more seasonal distribution of gray seals occurs from southern Massachusetts through southern New Jersey from September through May. Similar to harbor seals, occasional presence from southern New Jersey through northern North Carolina indicate occasional presence of gray seals in this region (Waring et al. 2012). Pupping for both species occurs in both U.S. and Canadian waters of the western North Atlantic. The majority of harbor seal pupping is thought to occur in U.S. waters. While there are at least three gray seal pupping colonies in U.S., the majority of gray seal pupping likely occurs in Canadian waters. Observations of harp and hooded seals are less common in U.S. EEZ waters. Both species form aggregations for pupping and breeding off eastern Canada in the late winter/early spring. They then travel to more northern latitudes for molting and summer feeding (Waring et al. 2006). Both species have a seasonal presence in U.S. waters from Maine to New Jersey, based on sightings, stranding, and fishery bycatch information (Waring et al. 2012).

6.4.2.5 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 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 2007, Dunton et al. 2010). 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.

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 863 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).

6.4.3 Species and Habitats Not Likely to be Affected

NMFS has determined that the action being considered in this EA is not likely to adversely affect shortnose sturgeon, the Gulf of Maine distinct population segment (DPS) of Atlantic salmon, hawksbill sea turtles, blue whales, or sperm whales, all of which are listed as endangered species under the ESA. Further, the action considered in this EA is not likely to adversely affect North Atlantic right whale (discussed in Section 6.4.2.2) critical habitat. The following discussion provides the rationale for these determinations.

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They occupy rivers along the western Atlantic coast from St. Johns River in Florida, to the Saint John River in New Brunswick, Canada. Although, the species is possibly extirpated from the Saint Johns River system. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while some northern populations are amphidromous (NMFS 1998). Since groundfish fishermen would not operate in or near the rivers where concentrations of shortnose sturgeon are most likely found, it is highly unlikely that sectors would affect shortnose sturgeon.

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River. Juvenile salmon in New England rivers typically migrate to sea in spring after a one- to three-year period of development in freshwater streams. They remain at sea for two winters before returning to their U.S. natal rivers to spawn (Kocik and Sheehan 2006). Results from a 2001-2003 post-smolt trawl survey in the nearshore waters of the Gulf of Maine indicate that Atlantic salmon post-smolts are prevalent in the upper water column throughout this area in mid to late May (Lacroix, Knox, and Stokesbury 2005). Therefore, commercial fisheries deploying small-mesh active gear (pelagic trawls and purse seines within 10 m of the surface) in nearshore waters of the Gulf of Maine may have the potential to incidentally take smolts. However, it is highly unlikely that the action being considered will affect the Gulf of Maine DPS of Atlantic salmon given that operation of the multispecies fishery does not occur in or near the rivers where concentrations of Atlantic salmon are likely to be found. Additionally, multispecies gear operates in the ocean at or near the bottom rather than near the surface where Atlantic salmon are likely to occur. Thus, this species will not be considered further in this EA.

North Atlantic right whales occur in coastal and shelf waters in the western North Atlantic (NMFS 2005). Section 6.4.4 discusses potential fishery entanglement and mortality interactions with North Atlantic right whale individuals. The western North Atlantic population in the U.S. primarily ranges from winter calving and nursery areas in coastal waters off the southeastern U.S. to summer feeding grounds in New England waters (NMFS 2005). North Atlantic Right Whales use five well-known habitats annually, including multiple in northern waters. These northern areas include the Great South Channel (east of Cape Cod); Cape Cod and Massachusetts Bays; the Bay of Fundy; and Browns and Baccaro Banks, south of Nova Scotia. NMFS designated the Great South Channel and Cape Cod and Massachusetts Bays as Northern Atlantic right whale critical habitat in June 1994 (59 FR 28793). NMFS has designated additional critical habitat in the southeastern U.S. Multispecies gear operates in the ocean at or near the bottom rather than near the surface. It is not known whether the bottom-trawl, or any other type of fishing gear, has an impact on the habitat of the Northern right whale (59 FR 28793). As discussed in the FY 2010 and FY 2011 sector EAs and further in Section 5.1, sectors would result in a negligible effect on physical habitat. Therefore, FY 2013 sector operations would not result in a significant impact on Northern right whale critical habitat. Further, mesh sizes used in the multispecies fishery do not significantly impact the Northern right whale's planktonic food supply (59 FR 28793). Therefore, Northern right whale food sources in areas designated as critical habitat would not be adversely affected by sectors. For these reasons, Northern right whale critical habitat will not be considered further in this EA.

The hawksbill turtle is uncommon in the waters of the continental U.S. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America. Hawksbills feed primarily on a wide variety of sponges, but also consume bryozoans, coelenterates, and mollusks. The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands. There are accounts of hawksbills in south Florida and individuals have been sighted along the east coast as far north as Massachusetts; however, east coast sightings north of Florida are rare (NMFS 2009a). Sector operations would not occur in waters that are typically used by hawksbill sea turtles. Therefore, it is highly unlikely that sector operations would affect this turtle species.

Blue whales do not regularly occur in waters of the U.S. EEZ (Waring et al. 2002). In the North Atlantic region, blue whales are most frequently sighted from April to January (Sears 2002). No blue whales were observed during the Cetacean and Turtle Assessment Program surveys of the mid- and North Atlantic areas of the outer continental shelf (Cetacean and Turtle Assessment Program 1982). Calving for the species occurs in low latitude waters outside of the area where the sectors would operate. Blue whales feed on euphausiids (krill) that are too small to be captured in fishing gear. There were no observed fishery-related mortalities or serious injuries to blue whales between 1996 and 2000 (Waring et al. 2002). The species is unlikely to occur in areas where the sectors would operate, and sector operations would not affect the availability of blue whale prey or areas where calving and nursing of young occurs. Therefore, the Proposed Action would not be likely to adversely affect blue whales.

Unlike blue whales, sperm whales do regularly occur in waters of the U.S. EEZ. However, the distribution of the sperm whales in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring et al. 2007). Sperm whale distribution is typically concentrated east-northeast of Cape Hatteras in winter and shifts northward in spring when whales are found throughout the Mid-Atlantic Bight (Waring et al. 2006). Distribution extends further northward to areas north of Georges Bank and the Northeast Channel region in summer and then south of New England in fall, back to the Mid-Atlantic Bight (Waring et al. 1999). In contrast, the sectors would operate in continental shelf waters. The average depth over which sperm whale sightings occurred during the Cetacean and Turtle Assessment Program surveys was 5,879 ft (1,792 m) (Cetacean and Turtle Assessment Program 1982). Female sperm whales and young males almost always inhabit open ocean, deep water habitat with bottom depths greater than 3,280 ft (1,000 m) and at latitudes less than 40° N (Whitehead 2002). Sperm whales feed on large squid and fish that inhabit the deeper ocean regions (Perrin et al. 2002). There were no observed fishery-related mortalities or serious injuries to sperm whales between 2001 and 2005 (Waring et al. 2007). Sperm whales are unlikely to occur in water depths where the sectors would operate, sector operations would not affect the availability of sperm whale prey or areas where calving and nursing of young occurs. Therefore, the Proposed Action would not be likely to adversely affect sperm whales.

Although marine turtles and large whales could be potentially affected through interactions with fishing gear, NMFS has determined that the continued authorization of the multispecies fishery, and therefore the FY 2011 sectors, would not have any adverse effects on the availability of prey for these species. Sea turtles feed on a variety of plants and animals, depending on the species. However, none of the turtle species are known to feed upon groundfish. Right whales and sei whales feed on copepods (Horwood 2002, Kenney 2002). The multispecies fishery will not affect the availability of copepods for foraging right and sei whales because copepods are very small organisms that will pass through multispecies fishing gear rather than being captured in it. Humpback whales and fin whales also feed on krill as well as small schooling fish such as sand lance, herring and mackerel (Aguilar 2002, Clapham 2002). Multispecies fishing gear operates on or very near the bottom. Fish species caught in multispecies gear are species that live in benthic habitat (on or very near the bottom) such as flounders. As a result, this gear does not typically catch schooling fish such as herring and mackerel that occur within the water column. Therefore, the continued authorization of the multispecies fishery or the approval of the FY 2013 sector operations plans will not affect the availability of prey for foraging humpback or fin whales.

6.4.4 Interactions Between Gear and Protected Resources

Marine Mammals

NMFS categorizes commercial fisheries based on a two-tiered, stock-specific fishery classification system that addresses both the total impact of all fisheries on each marine mammal stock as well as the impact of individual fisheries on each marine mammal stock. NMFS bases the system on the numbers of animals per year that incur incidental mortality or serious injury due to commercial fishing operations relative to a marine mammal stock's PBR level. Tier 1 takes into account the cumulative mortality and serious injury to marine mammals caused by commercial fisheries. Tier 2 considers marine mammal mortality and serious injury caused by the individual fisheries. This EA uses Tier 2 classifications to indicate how each type of gear proposed for use in the Proposed Action may affect marine mammals (NMFS 2009b). Table 17 identifies the classifications used in the final List of Fisheries for FY 2012 (76 FR 73912; November 29, 2011; NMFS 2011), which are broken down into Tier 2 Categories I, II, and III.

Interactions between gear and a given species occur when fishing gear overlaps both spatially and trophically with the species' niche. Spatial interactions are more "passive" and involve inadvertent interactions with fishing gear when the fishermen deploy gear in areas used by protected resources. Trophic interactions are more "active" and occur when protected species attempt to consume prey caught in fishing gear and become entangled in the process. Spatial and trophic interactions can occur with various types of fishing gear used by the multispecies fishery through the year. Many large and small cetaceans and sea turtles are more prevalent within the operations area during the spring and summer. However they are also relatively abundant during the fall and would have a higher potential for interaction with sector activities that occur during these seasons. Although harbor seals may be more likely to occur in the operations area between fall and spring, harbor and gray seals are year-round residents. Therefore, interactions could occur year-round. The uncommon occurrences of hooded and harp seals in the operations area are more likely to occur during the winter and spring, allowing for an increased potential for interactions during these seasons.

Table 17 - Descriptions of the Tier 2 Fishery Classification Categories (50 CFR 229.2)

Category	Category Description
Category I	A commercial fishery that has frequent incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is, by itself, responsible for the annual removal of 50 percent or more of any stock's PBR level.
Category II	A commercial fishery that has occasional incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is one that, collectively with other fisheries, is responsible for the annual removal of more than 10 percent of any marine mammal stock's PBR level and that is by itself responsible for the annual removal of between 1 percent and 50 percent, exclusive of any stock's PBR.
Category III	A commercial fishery that has a remote likelihood of, or no known incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is one that collectively with other fisheries is responsible for the annual removal of: a. Less than 50 percent of any marine mammal stock's PBR level, or b. More than 1 percent of any marine mammal stock's PBR level, yet that fishery by itself is responsible for the annual removal of 1 percent or less of that stock's PBR level. In the absence of reliable information indicating the frequency of incidental mortality and serious injury of marine mammals by a commercial fishery, the Assistant Administrator would determine whether the incidental serious injury or mortality is "remote" by evaluating other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, qualitative data from logbooks or fisher reports, stranding data, and the species and distribution of marine mammals in the area or at the discretion of the Assistant Administrator.

Although interactions between protected species and gear deployed by the Northeast Multispecies fishery would vary, interactions generally include:

- becoming caught on hooks (bottom longlines)
- entanglement in mesh (gillnets and trawls)
- entanglement in the float line (gillnets and trawls)
- entanglement in the groundline (traps/pots, gillnets, trawls, and bottom longlines)
- entanglement in anchor lines (gillnets and bottom longlines), or
- entanglement in the vertical lines that connect gear to the surface and surface systems (gillnets, traps/pots, and bottom longlines).

NMFS assumes the potential for entanglements to occur is higher in areas where more gear is set and in areas with higher concentrations of protected species.

Table 18 lists the marine mammals known to have had interactions with gear used by the Northeast Multispecies fishery. This gear includes sink gillnets, traps/pots, bottom trawls, and bottom longlines within the Northeast Multispecies region, as excerpted from the List of Fisheries for FY 2012 ([76 FR 73912; November 29, 2011], also see Waring et al. 2012). Sink gillnets have the greatest potential for interaction with protected resources, followed by bottom trawls. There are no observed reports of interactions between bottom longline gear used in the Multispecies fishery and marine mammals in FY 2009 through FY 2011. However, interactions between the pelagic longline fishery and both pilot whales and Risso's dolphins led to the development of the Pelagic Longline Take Reduction Plan.

Table 19 shows trends in marine mammal and ESA listed species takes from FY 2009 to FY 2011 (fishing years as opposed to calendar years) as recorded in the ASM and observer program data. This data comes from trips that were potentially using sector ACE.

Table 18 - Marine Mammal Species and Stocks Incidentally Killed or Injured Based on Northeast Multispecies Fishing Areas and Gear Types (based on 2012 List of Fisheries)

Fishery: Category	Fishery: Type	Estimated Number of Vessels/Persons	Marine Mammal Species and Stocks Incidentally Killed or Injured
Category I	Mid-Atlantic gillnet	6,402	Bottlenose dolphin, Northern Migratory coastal [a] Bottlenose dolphin, Southern Migratory coastal [a] Bottlenose dolphin, Northern NC estuarine system [a] Bottlenose dolphin, Southern NC estuarine system [a] Bottlenose dolphin, WNA offshore Common dolphin, WNA Gray seal, WNA Harbor porpoise, GOM/Bay of Fundy Harbor seal, WNA Harp seal, WNA Humpback whale, Gulf of Maine Long-finned pilot whale, WNA Minke whale, Canadian east coast Short-finned pilot whale, WNA White-sided dolphin, WNA
	Northeast sink gillnet	3,828	Bottlenose dolphin, WNA, offshore Common dolphin, WNA Fin whale, WNA Gray seal, WNA Harbor porpoise, GOM/Bay of Fundy Harbor seal, WNA Harp seal, WNA Hooded seal, WNA Humpback whale, GOM Minke whale, Canadian east coast North Atlantic right whale, WNA Risso's dolphin, WNA White-sided dolphin, WNA

Fishery		Estimated Number of Vessels/Persons	Marine Mammal Species and Stocks Incidentally Killed or Injured
Category	**Type**		
Category II	Mid-Atlantic bottom trawl	1,388	Bottlenose dolphin, WNA offshore Common dolphin, WNA [a] Long-finned pilot whale, WNA [a] Risso's dolphin, WNA Short-finned pilot whale, WNA [a] White-sided dolphin, WNA
	Northeast bottom trawl	2,584	Common dolphin, WNA Harbor porpoise, GOM/ Bay of Fundy Harbor seal, WNA Harp seal, WNA Long-finned pilot whale, WNA Short-finned pilot whale, WNA White-sided dolphin, WNA [a]
	Atlantic mixed species trap/pot [c]	3,526	Fin whale, WNA Humpback whale, GOM
Category III	Northeast/Mid-Atlantic bottom longline/hook-and-line	>1,281	None documented in recent years

Notes:

[a] Fishery classified based on serious injuries and mortalities of this stock, which are greater than 50 percent (Category I) or greater than 1 percent and less than 50 percent (Category II) of the stock's PBR.

Table 19 - Marine Mammal and ESA listed Species Takes By Gear as Recorded in ASM and Observer Program Universe: Trips Potentially Using Sector ACE in FY 2009-FY2011 Data as of: October 18, 2012

Gear Name	Species Category	Common Name	Scientific Name	2009 Takes	2010 Takes	2011 Takes
GILL NET, DRIFT-SINK, FISH	pinniped	SEAL, HARBOR	PHOCA VITULINA CONCOLOR	2	0	0
GILL NET, FIXED OR ANCHORED,SINK, OTHER	cetacean	PORPOISE, HARBOR	PHOCOENA PHOCOENA	18	31	10
GILL NET, FIXED OR ANCHORED,SINK, OTHER	cetacean	PORPOISE/DOLPHIN, NK	PHOCOENIDAE/DELPHINIDAE	0	0	2
GILL NET, FIXED OR ANCHORED,SINK, OTHER	cetacean	DOLPHIN, NK (MAMMAL)	DELPHINIDAE	0	0	1
GILL NET, FIXED OR ANCHORED,SINK, OTHER	cetacean	DOLPHIN, WHITESIDED	LAGENORHYNCHUS ACUTUS	1	1	0
GILL NET, FIXED OR ANCHORED,SINK, OTHER	cetacean	DOLPHIN,COMMON (OLD SADDLEBACK)	DELPHINUS DELPHIS (COMMON)	1	1	2
GILL NET, FIXED OR ANCHORED,SINK, OTHER	cetacean	MARINE MAMMAL, NK	CETACEA/PINNIPEDIA	0	1	0
GILL NET, FIXED OR ANCHORED,SINK, OTHER	cetacean	WHALE, PILOT, NK	GLOBICEPHALA SP	0	1	0
GILL NET, FIXED OR ANCHORED,SINK, OTHER	pinniped	SEAL, HARBOR	PHOCA VITULINA CONCOLOR	27	4	30
GILL NET, FIXED OR ANCHORED,SINK, OTHER	pinniped	SEAL, NK	PHOCIDAE	9	9	0
GILL NET, FIXED OR ANCHORED,SINK, OTHER	pinniped	SEAL, GRAY	HALICHOERUS GRYPUS	52	41	53
GILL NET, FIXED OR ANCHORED,SINK, OTHER	pinniped	SEAL, HARP	PHOCA GROENLANDICA	2	1	0
GILL NET, FIXED OR ANCHORED,SINK, OTHER	turtle	TURTLE, NK HARD-SHELL	CHELONIIDAE	1	0	1
TRAWL,OTTER,BOTTOM,FISH	cetacean	DOLPHIN, WHITESIDED	LAGENORHYNCHUS ACUTUS	9	35	9
TRAWL,OTTER,BOTTOM,FISH	cetacean	DOLPHIN, NK (MAMMAL)	DELPHINIDAE	0	0	5
TRAWL,OTTER,BOTTOM,FISH	cetacean	PORPOISE, HARBOR	PHOCOENA PHOCOENA	0	1	4
TRAWL,OTTER,BOTTOM,FISH	cetacean	WHALE, PILOT, NK	GLOBICEPHALA SP	3	6	2
TRAWL,OTTER,BOTTOM,FISH	cetacean	DOLPHIN,COMMON (OLD SADDLEBACK)	DELPHINUS DELPHIS (COMMON)	3	6	4
TRAWL,OTTER,BOTTOM,FISH	cetacean	DOLPHIN, RISSOS	GRAMPUS GRISEUS	1	0	0
TRAWL,OTTER,BOTTOM,FISH	cetacean	WHALE, NK	CETACEA, WHALE	0	0	1
TRAWL,OTTER,BOTTOM,FISH	pinniped	SEAL, HARBOR	PHOCA VITULINA CONCOLOR	0	3	0
TRAWL,OTTER,BOTTOM,FISH	pinniped	SEAL, GRAY	HALICHOERUS GRYPUS	5	2	5
TRAWL,OTTER,BOTTOM,FISH	turtle	TURTLE, LOGGERHEAD	CARETTA CARETTA	1	0	2

Gear Name	Species Category	Common Name	Scientific Name	2009 Takes	2010 Takes	2011 Takes
TRAWL,OTTER,BOTTOM,FISH	turtle	TURTLE, LEATHERBACK	DERMOCHELYS CORIACEA	0	1	0
TRAWL,OTTER,BOTTOM,HADDOCK SEPARATOR	cetacean	DOLPHIN,COMMON (OLD SADDLEBACK)	DELPHINUS DELPHIS (COMMON)	0	2	6
TRAWL,OTTER,BOTTOM,HADDOCK SEPARATOR	cetacean	WHALE, PILOT, NK	GLOBICEPHALA SP	1	1	1
TRAWL,OTTER,BOTTOM,HADDOCK SEPARATOR	pinniped	SEAL, GRAY	HALICHOERUS GRYPUS	0	0	1
TRAWL,OTTER,BOTTOM,RUHLE	cetacean	WHALE, PILOT, NK	GLOBICEPHALA SP	2	0	0
TRAWL,OTTER,BOTTOM,RUHLE	cetacean	DOLPHIN, WHITESIDED	LAGENORHYNCHUS ACUTUS	0	1	0
TRAWL,OTTER,BOTTOM,RUHLE	cetacean	DOLPHIN,COMMON (OLD SADDLEBACK)	DELPHINUS DELPHIS (COMMON)	1	0	0
TRAWL,OTTER,BOTTOM,RUHLE	pinniped	SEAL, GRAY	HALICHOERUS GRYPUS	0	0	1

Marine mammals are taken in gillnets, trawls, and trap/pot gear used in the Northeast Multispecies area. Documented marine mammal interactions in Northeast sink gillnet and Mid-Atlantic gillnet fisheries include harbor porpoise, white-sided dolphin, harbor seal, gray seal, harp seal, hooded seal, pilot whale, bottlenose dolphin (various stocks), Risso's dolphin, and common dolphin. Table 20 and Table 21 summarize the estimated mean annual mortality of small cetaceans and seals that are taken in the Northeast sink gillnet and Mid-Atlantic gillnet fisheries according to the most recent SAR for each particular species.

Documented marine mammal interactions with Northeast and Mid-Atlantic bottom trawl fisheries include minke whale, harbor porpoise, white-sided dolphin, harbor seal, gray seal, harp seal, pilot whale, and common dolphin. Table 22 and Table 23 provide the estimated mean annual mortality of small cetaceans and seals that are taken in the Northeast and Mid-Atlantic bottom trawl fisheries, based on the most recent SAR for each particular species. The data in these tables are based on takes observed by fishery observers as part of the Northeast Fisheries Observer Program (NEFOP).

Table 20 - Estimated Marine Mammal Mortalities in the Northeast Sink Gillnet Fishery

Species	**Years Observed**	**Mean Annual Mortality (CV)**	**Total PBR**
Harbor porpoise	05-09	559 (0.16)	701
Atlantic white-sided dolphin	05-09	36 (0.34)	190
Common dolphin (short-beaked)	05-09	26 (0.39)	1,000
Risso's dolphin	05-09	3 (0.93)	124
Western North Atlantic Offshore bottlenose dolphin	02-06	Unknown[+]	566
Harbor seal	05-09	332 (0.14)	Undetermined
Gray seal	05-09	678 (0.14)	Undetermined
Harp seal	05-09	174 (0.18)	Unknown
Hooded seal	01-05	25 (0.82)	Unknown

Source: Waring et al. (2009, 2012)

[+]While there have been documented interactions between the Western North Atlantic Offshore bottlenose dolphin stock and the Northeast sink gillnet fishery during the five year time period, estimates of bycatch mortality in the fishery have not been generated.

Table 21 - Estimated Marine Mammal Mortalities in the Mid-Atlantic Gillnet Fishery

Species	Years Observed	Mean Annual Mortality (CV)	Total PBR
Harbor porpoise	05-09	318 (0.26)	701
Common dolphin (short-beaked)	05-09	2.2 (1.03)	1,000
Risso's dolphin	05-09	7 (0.73)	124
Bottlenose dolphin	06-08		
Western North Atlantic Northern Migratory Coastal stock		5.27 (0.19) min; 6.02 (0.19) max	71
Western North Atlantic Southern Migratory Coastal stock	06-08	5.71 (0/31 min; 41.91 (0.14) max	96
Northern North Carolina Estuarine System stock	06-08	2.39 (0.25) min; 18.99 (0.11) max	Undetermined
Southern North Carolina Estuarine System stock	06-08	0.61 (0.30) min; 0.92 (0.21) max	16
Western North Atlantic Offshore stock	02-06	Unknown+	566
Harbor seal	05-09	45 (0.39)	Undetermined
Harp seal	05-09	57 (0.5)	Unknown

Source: Waring et al. (2009, 2012)

+While there have been documented interactions between the Western North Atlantic Offshore bottlenose dolphin stock and the Mid-Atlantic gillnet fishery during the five year time period, estimates of bycatch mortality in the fishery have not been generated.

Table 22 - Estimated Marine Mammal Mortalities in the Northeast Bottom Trawl Fishery

Species	Years Observed	Mean Annual Mortality (CV)	Total PBR
Minke whale	05-09	3.5 (0.34)	69
Harbor porpoise	05-09	6 (0.22)	701
Atlantic white-sided dolphin	05-09	160 (0.14)	190
Common dolphin (short-beaked)	05-09	23 (0.13)	1,000
Pilot whales*	05-09	12 (0.14)	93 (long-finned); 172 (short-finned)
Harbor seal	05-09	Unknown+	Undetermined
Gray seal	05-09	Unknown+	Undetermined
Harp seal	05-09	Unknown+	Unknown

Source: Waring et al. (2012)

*Total fishery-related serious injuries and mortalities to pilot whales (*Globicephala* sp.) cannot be differentiated to species due to uncertainty in species identification by fishery observers (Waring et al. 2012). However, separate PBRs have been calculated for long-finned and short-finned pilot whales.

[+]While there have been documented interactions between these species and the Northeast bottom trawl fishery during the five year time period, estimates of bycatch mortality in the fishery have not been generated.

Table 23 - Estimated Marine Mammal Mortalities in the Mid-Atlantic Bottom Trawl Fishery

Species	Years Observed	Mean Annual Mortality (CV)	Total PBR
Atlantic white-sided dolphin	05-09	23 (0.12)	190
Common dolphin (short-beaked)	05-09	110 (0.13)	1,000
Pilot whales*	05-09	30 (0.16)	93 (long-finned); 172 (short-finned)

Source: Waring et al. (2012)

*Total fishery-related serious injuries and mortalities to pilot whales (*Globicephala* sp.) cannot be differentiated to species due to uncertainty in species identification by fishery observers (Waring et al. 2012). However, separate PBRs have been calculated for long-finned and short-finned pilot whales.

Takes of large whales are typically not documented within observer records as large whales are typically entangled in fixed fishing gear and the chances of observing an interaction are small. Although large whales can become anchored in gear, they more often swim off with portions of the fishing gear; therefore, documentation of their incidental take is based primarily on the observation of gear or markings on whale carcasses, or on whales entangled and observed at-sea. Even if a whale is anchored in fishing gear, it is extremely difficult to make any inferences about the nature of the entanglement event and initial interaction between the whale and the gear. Frequently, it is difficult to attribute a specific gear type to an entangled animal based on observed scars or portions of gear remaining attached to whales or their carcasses; however, gillnet gear has been identified on entangled North Atlantic right whales, humpback whales, fin whales, and minke whales. Minke whales have been observed to be taken in the Northeast bottom trawl fishery by fishery observers. The annual estimated mortality and serious injury to minke whales from this fishery was 3.5 (CV = 0.34) between 2005 and 2009 (Waring et al. 2012). At this time, there is no evidence suggesting that other large whale species interact with trawl gear fisheries.

A number of marine mammal management plans are in place along the U.S. east coast to reduce serious injuries and deaths of marine mammals due to interactions with commercial fishing gear. Multispecies fishing vessels are required to adhere to measures in the Atlantic Large Whale Take Reduction Plan (ALWTRP), which manages from Maine through Florida, to minimize potential impacts to certain cetaceans. The ALWTRP was developed to address entanglement risk to right, humpback, and fin whales, and to acknowledge benefits to minke whales in specific Category I or II commercial fishing efforts that utilize traps/pots and gillnets. This includes the Northeast sink gillnet and Mid-Atlantic gillnet fisheries. The ALWTRP calls for the use of gear markings, area restrictions, weak links, and sinking groundline. Fishing vessels would be required to comply with the ALWTRP in all areas where gillnets were used.

Fishing vessels would also be required to comply, where applicable, with the seasonal gillnet requirements of the Bottlenose Dolphin Take Reduction Plan (BDTRP), which manages coastal waters from New Jersey through Florida, and Harbor Porpoise Take Reduction Plan (HPTRP), which manages coastal and offshore waters from Maine through North Carolina. The BDTRP spatially and temporally restricts night time use of gillnets and requires net tending in the Mid-

Atlantic gillnet region. The HPTRP aims to reduce interactions between harbor porpoises and gillnets in the Gulf of Maine, southern New England, and Mid-Atlantic regions. In New England waters, the HPTRP implements seasonal area closures and the seasonal use of pingers (acoustic devices that emit a sound) to deter harbor porpoises from approaching the nets. In Mid-Atlantic waters, the HPTRP implements seasonal area closures and the seasonal use of gear modifications for large mesh (7-18 in) and small mesh (<5 to >7 in) gillnets to reduce harbor porpoise bycatch.

An Atlantic Trawl Gear Take Reduction Team was formed in 2006 to address the bycatch of white-sided and common dolphins and pilot whales in Northeast and Mid-Atlantic trawl gear fisheries. While a take reduction plan with regulatory measures was not implemented (bycatch levels were not exceeding allowable thresholds under the MMPA), a take reduction strategy was developed that recommends voluntary measures to be used to reduce the chances for interactions between trawl gear and these marine mammal species. The two voluntary measures that were recommended are: 1) reducing the number of turns made by the fishing vessel and tow times while fishing at night; and 2) increasing radio communications between vessels about the presence and/or incidental capture of a marine mammal to alert other fishermen of the potential for additional interactions in the area.

Sea Turtles

Sea turtles have been caught and injured or killed in multiple types of fishing gear, including gillnets, trawls, and hook and line gear. However, impact due to inadvertent interaction with trawl gear is almost twice as likely to occur when compared with other gear types (NMFS 2009d). Interaction with trawl gear is more detrimental to sea turtles as they can be caught within the trawl itself and will drown after extended periods underwater. A study conducted in the Mid-Atlantic region showed that bottom trawling accounts for an average annual take of 616 loggerhead sea turtles, although Kemp's ridleys and leatherbacks were also caught during the study period (Murray 2006). Impacts to sea turtles would likely still occur under the Proposed Action even though sea turtles generally occur in more temperate waters than those in the Northeast Multispecies area.

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.

In an updated, preliminary analysis, the Northeast Fisheries Science Center (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.

The preliminary analysis apportioned the estimated total sturgeon takes to specific fishery management plans. The analysis estimates that between 2006 and 2010, a total of 15,587 Atlantic sturgeon were captured and discarded in bottom otter trawl (7,740 sturgeon) and sink gillnet (7,848 sturgeon) gear. The analysis results indicate that 7.1% (550 sturgeon) of sturgeon discards in bottom otter trawl gear could be attributed to the large mesh groundfish bottom trawl fisheries if a correlation of FMP species landings (by weight) was used as a proxy for fishing effort. Additionally, the analysis results indicate that 4.0% (314 sturgeon) of sturgeon discards in sink gillnet gear could be attributed to the large mesh groundfish gillnet fisheries if a correlation of FMP species landings (by weight) was used as a proxy for fishing effort.

These additional data support the conclusion from the earlier bycatch estimates that the multispecies fishery may interact with Atlantic sturgeon. Since the Atlantic sturgeon DPSs have been listed as endangered and threatened under the ESA, the ESA Section 7 consultation for the multispecies fishery has been reinitiated, and additional evaluation will be included in the resulting Biological Opinion to describe any impacts of the fisheries on Atlantic sturgeon and define any measures needed to mitigate those impacts, if necessary. It is anticipated that any measures, terms and conditions included in an updated Biological Opinion will further reduce impacts to the species.

On February 6, 2012, NMFS issued two final rules (77 FR 5880-5912; 77 FR 5914-5982) listing five Distinct Population Segments (OPS) of Atlantic sturgeon as threatened or endangered. Four DPSs (New York Bight, Chesapeake Bay, Carolina and South Atlantic) are listed as endangered and one DPS (Gulf of Maine) is listed as threatened. The effective date of the listing is April 6, 2012. The ESA and the Section 7 regulations (50 CFR 402.14) require that formal consultation be conducted when a new species is listed per the ESA that may occur within the action area. We anticipate completing a biological opinion assessing potential impacts to Atlantic sturgeon prior to the 2013 fishing year for the multispecies fleet.

On February 6, 2012, NMFS issued two final rules (77 FR 5880-5912; 77 FR 5914-5982) listing five Distinct Population Segments (OPS) of Atlantic sturgeon as threatened or endangered. Four DPSs (New York Bight, Chesapeake Bay, Carolina and South Atlantic) are listed as endangered and one DPS (Gulf of Maine) is listed as threatened. The effective date of the listing is April 6, 2012. Formal consultation under Section 7 of the ESA has been reinitiated and is ongoing for the NE multispecies fishery. The previous October 2010 Biological Opinion (BO) for this fishery concluded that the actions considered would not jeopardize the continued existence of any listed species. This BO will be updated to describe any impacts of the NE multispecies fishery on Atlantic sturgeon DPSs and define any measures needed to reduce those impacts, if necessary. Although interactions between Atlantic sturgeon and the groundfish fishery are likely to occur during the reinitiation period, NMFS determined in an August 28, 2012 memorandum that the amount of interactions is not likely to cause an appreciable reduction in survival and recovery of any of the five DPSs and would not violate ESA sections 7(a)(2) and 7(d).

6.5 Human Communities/Social-Economic Environment

This EA considers and evaluates the effect management alternatives may have on people's way of life, traditions, and community. These social impacts may be driven by changes in fishery flexibility, opportunity, stability, certainty, safety, and/or other factors. While it is possible that social impacts could be solely experienced by individual sector participants, it is more likely that impacts would be experienced across communities, gear types, and/or vessel size classes.

The remainder of this section reviews the Northeast multispecies fishery and describes the human communities potentially impacted by the Proposed Action. This includes a description of the sector and common pool participants groundfish fishing as well as their homeports. Because some of the changes being considered for sector operation plans in 2013 could have an effect on the lobster fishery an overview of that fishery is included as well.

6.5.1 Overview of New England Groundfish Fishery

New England's fishery has been identified with groundfish fishing both economically and culturally for over 400 years. Broadly described, the Northeast Multispecies fishery includes the landing, processing, and distribution of commercially important fish that live on the sea bottom. In the early years, the Northeast Multispecies fishery related primarily to cod and haddock. Today, the Northeast Multispecies FMP (large-mesh and small-mesh) includes a total of 13 species of groundfish (Atlantic cod, haddock, pollock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, Atlantic halibut, redfish, ocean pout, white hake, and wolffish) harvested from three geographic areas (Gulf of Maine, Georges Bank, and southern New England/Mid-Atlantic Bight) representing 19 distinct stocks.

Prior to the industrial revolution, the groundfish fishery focused primarily on cod. The salt cod industry, which preserved fish by salting while still at sea, supported a hook and line fishery that included hundreds of sailing vessels and shore-side industries including salt mining, ice harvesting, and boat building. Late in the 19th century, the fleet also began to focus on Atlantic halibut with landings peaking in 1896 at around 4,900 tons (4,445 mt).

From 1900 to 1930, the fleet transitioned to steam powered trawlers and increasingly targeted haddock for delivery to the fresh and frozen fillet markets. With the transition to steam powered trawling, it became possible to exploit the groundfish stocks with increasing efficiency. This increased exploitation resulted in a series of boom and bust fisheries from 1930 to 1960 as the North American fleet targeted previously unexploited stocks, depleted the resource, and then transitioned to new stocks.

In the early 1960's, fishing pressure increased with the discovery of haddock, hake, and herring off of Georges Bank and the introduction of foreign factory trawlers. Early in this time period, landings of the principal groundfish (cod, haddock, pollock, hake, and redfish) peaked at about 650,000 tons (589,670 mt). However, by the 1970's, landings decreased sharply to between

200,000 and 300,000 tons (181,437 and 272,155 mt) as the previously virgin GB stocks were exploited (NOAA 2007).

The exclusion of the foreign fishermen by the Fisheries Conservation and Management Act in 1976, coupled with technological advances, government loan programs, and some strong classes of cod and haddock, caused a rapid increase in the number and efficiency of U.S. vessels participating in the Northeast groundfish fishery in the late 1970's. This shift resulted in a temporary increase in domestic groundfish landings; however, overall landings (domestic plus foreign) continued to trend downward from about 200,000 tons (181,437 mt) to about 100,000 tons (90,718 mt) through the mid 1980's (NOAA 2007).

In 1986, the NEFMC implemented the Northeast Multispecies FMP with the goal of rebuilding stocks. Since Amendment 5 in 1994, the multispecies fishery has been administered as a limited access fishery managed through a variety of effort control measures including DAS, area closures, trip limits, minimum size limits, and gear restrictions. Partially in response to those regulations, landings decreased throughout the latter part of the 1980's until reaching a more or less constant level of around 40,000 tons (36,287 mt) annually since the mid 1990's.

In 2004, the final rule implementing Amendment 13 to the Northeast Multispecies FMP allowed for self-selecting groups of limited access groundfish permit holders to form sectors. These sectors developed a legally binding operations plan and operated under an allocation of GB cod. While approved sectors were subject to general requirements specified in Amendment 13, sector members were exempt from DAS and some of the other effort control measures that tended to limit the flexibility of fishermen. The 2004 rule also authorized implementation of the first sector, the GB Cod Hook Sector. A second sector, the GB Cod Fixed Gear Sector, was authorized in 2006.

Through Amendment 16, the NEFMC sought to rewrite groundfish sector policies with a scheduled implementation date of May 1, 2009. When that implementation date was delayed until FY 2010, the NMFS Regional Administrator announced that, in addition to a previously stated 18 percent reduction in DAS, interim rules would be implemented to reduce fishing mortality during FY 2009. These interim measures generally reduced opportunity among groundfish vessels through:

- differential DAS counting, elimination of the SNE/MA winter flounder SAP
- elimination of the state waters winter flounder exemption
- revisions to incidental catch allocations, and
- a reduction in some groundfish allocations (NOAA 2009).

In 2007, the Northeast Multispecies fishery included 2,515 permits. Of these permits about 1,400 were limited access, and 658 vessels actively fished. Those vessels include a range of gear types including hook, bottom longline, gillnet, and trawlers (NEFMC 2009a). In FY 2009, between 40 and 50 of these vessels were members of the GB Cod Sectors. The passage of Amendment 16 prior to FY 2010 issued in a new era of sector management in the New England groundfish fishery. Over 50 percent of eligible northeast groundfish multispecies permits and over 95 percent of landings history were associated with sectors in FY 2010. Approximately 56 percent of the eligible northeast groundfish multispecies permits constituting between approximately 99.4

percent and 77.5 percent of the various species ACLs were included in sectors for FY 2011. The remaining vessels were common pool groundfish fishing vessels.

Amendment 16 to the Northeast Multispecies Fishery Management Plan (FMP) was implemented for the New England groundfish fishery starting on May 1st 2010, the start of the 2010 fishing year. The new management program contained two substantial changes meant to adhere to the catch limit requirements and stock rebuilding deadlines of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSA). The first change developed "hard quota" annual catch limits (ACLs) for all 20 stocks in the groundfish complex. The second change expanded the use of Sectors, which are allocated subdivisions of ACLs called Annual Catch Entitlements (ACE) based on each sector's collective catch history. Sectors received ACE for nine of 13 groundfish species (14 stocks + quotas for Eastern U.S./ Canada cod and haddock; 16 ACEs) in the FMP and became exempt from many of the effort controls previously used to manage the fishery.

During the first year of sector management seventeen sectors operated, each establishing its own rules for using its allocations. Vessels with limited access permits that joined sectors were allocated 98% of the total commercial groundfish sub-ACL, based on their collective level of historical activity in the groundfish fishery. Approximately half (46%) of the limited access groundfish permits opted to remain in the common pool. Common pool vessels act independently of one another, with each vessel constrained by the number of DAS it can fish, by trip limits, and by all of the time and area closures. These restrictions help ensure that the groundfish catch of common pool vessels does not exceed the common pool's portion of the commercial groundfish sub- ACL for all stocks (about 2% for 2010) before the end of the fishing year.

In the second year of sector management 58% of limited access permits participated in one of 16 sectors or one of 2 lease only sectors. From 2010 to 2011 the number of groundfish limited access eligibilities belonging to a sector increased by 66, while the number of these permits in the common pool decreased by 85. At the start of the 2011 fishing year, vessels operating within a sector were allocated about 98% of the total groundfish sub-ACL, based on historical catch levels. Those vessels that opted to remain in the common pool were given access to about 2% of the groundfish sub-ACL based on the historic catch. The same effort controls employed in 2010 were again used in 2011, to ensure the groundfish catch made by common pool vessels did not exceed the common pool's portion of the commercial groundfish sub-ACL. Although some trends in the fishery are a result of management changes made to the fishery in the years prior to Amendment 16, many of these trends are also a reflection of the current system of sector management.

6.5.1 Trends in the Number of Vessels

In 2010, the first year of sector management, the Northeast Multispecies fishery issued 1,382 permits, not including groundfish limited access eligibilities held as Confirmation of Permit History (CPH). Out of these permits, 753 vessels belonged to a sector and 640 remained in the Common Pool (**Table 24**). Not all permitted vessels were active and not all active vessels fished groundfish. Of the 740 sector vessels issued groundfish permits, only 440 were considered active, having revenue from any landed species, and only 303 of those had revenue from at least one groundfish trip. Among common pool vessels, 456 were considered active, and only 142 vessels had made at least one groundfish trip.

The overall trend since the start of sector management has been a decreasing number of vessels with a limited access groundfish permit. By 2011 the total number of vessels with a limited access groundfish permit decreased slightly to 1,279. The number of vessels belonging to a sector actually increased to 772 in 2011 while the number of vessels in the Common Pool decreased to 518. Of the 772 sector vessels issued a groundfish permit in 2011, 446 were considered active, and only 301 of those had revenue from at least one groundfish trip. Among common pool vessels, 366 were considered active, and only 121 vessels had made at least one groundfish trip.

Table 24 - Number of vessels by fishing year

				2010			2011		
	2007	2008	2009	Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool
Vessels with a limited access groundfish permit	1413	1410	1431	1382	753	640	1279	772	518
... those with revenue from any species	1082	1012	957	890	440	456	805	446	366
... those with revenue from at least one groundfish trip	658	611	570	445	303	142	420	301	121
... those with no landings	331 (32%)	398 (28%)	474 (33%)	492 (36%)	313 (42%)	184 (29%)	474 (37%)	326 (42%)	152 (30%)

* These numbers exclude groundfish limited access eligibilities held as Confirmation of Permit History (CPH). Starting in 2010, Amendment 16 authorized CPH owners to join Sectors and to lease DAS. For purposes of comparison, CPH vessels are not included in the 2010 and 2011 data for either sector or common pool.

A key aspect of Amendment 16, and catch share programs in general, is the ability to jointly decide how a sector will harvest its ACE through redistribution within a sector and the ability to transfer ACE between sectors. Because it is then not possible to identify the extent to which inactive vessels in a sector may benefit if other sector vessels harvest their allocation, changes in the number of inactive vessels may describe a transfer of allocation and not necessarily vessels exiting the fishery. In 2010, 492 vessels (36%) were inactive (no landings). Of these inactive vessels, 313 were sector vessels and 184 were common pool vessels. By 2011 the total number of inactive vessels had declined to 474 but because the number of vessels with a limited access groundfish permit declined, there was only a slight rise in the relative proportion of inactive vessels (37%). The number of inactive sector vessels increased to 326 in 2011, but again because the number of vessels with a limited access groundfish permit belonging to a sector also increased, the relative proportion of inactive sector vessels (42%) remained the same. 152 common pool vessels were inactive in 2011, which is about 30% of the Common Pool. The number of inactive vessels in 2011 can be compared to the number of inactive vessels in other years: 331 vessels (32%) in 2007, 398 vessels (28%) in 2008, and 474 vessels (33%) in 2009.

Intentionally Blank

6.5.2 Trends in Landings

Total groundfish landings on trips made by vessels possessing a limited access groundfish permit in 2011 were 61.7 million pounds, which is an increase from 2010 but a decline from a recent high of 72.2 million pounds in 2008. Because only 16 groundfish stocks are limited by sector allocations it is important to consider the landings of non-groundfish species and groundfish species separately as a means of describing any possible shift in effort to other fisheries. Non-groundfish landings made by limited access vessels increased from 178.1 million pounds in 2010 to 213.8 million pounds in 2011. Total landings of all species made by limited access vessels in the Northeast Multispecies fishery was about 275.5 million pounds in 2011. This compares to landings ranging from 259.5 million pounds to 277.1 million pounds in the 2007–2010 fishing years (**Table 25**). While sector vessels accounted for 69% of all landings made in 2011, sector vessels also made 99% of groundfish landings and 60% of non-groundfish landings.

Table 25 - Landings in Thousands of Pounds by Year

				2010			2011		
Landings	**2007**	**2008**	**2009**	**Total**	**Sector Vessels**	**Common Pool**	**Total**	**Sector Vessels**	**Common Pool**
Total Landings	259448	277118	258954	236695	155529	81166	275506	85147	5580
Total Groundfish Landings	64004	72162	69775	58622	57217	1404	61721	61038	471
Total Non-groundfish Landings	195444	204955	189180	178073	98312	79762	213785	24108	5109

Combined, 161 million (live) pounds of ACE was allotted to the sectors in 2011 but only 70 million (live) pounds were landed. Of the 16 ACEs allocated to sectors, the catch of 7 stocks approached (>80% conversion) the catch limit set by the total allocated ACE (**Table 26**). By comparison, the catch of only 5 stocks approached the catch limit set by the total allocated ACE in 2010. The catch of white hake in 2011 was particularly close to reaching the limit, with 98% of the white hake ACE being realized. As was the case in 2010, the majority of the unrealized landings in 2011 were caused by a failure to land Georges Bank haddock. Collectively, East and West GB haddock, accounted for 63 million pounds (62%) of the un-landed ACE in 2011.

Table 26 - Catch and ACE (live lbs)

	2010			2011		
	Allocated ACE	Catch	% caught	Allocated ACE*	Catch	% caught
Cod, GB East	717,441	562,610	*78%*	**431,334**	**357,578**	***83%***
Cod, GB West	**6,563,099**	**5,492,557**	***84%***	9,604,207	6,727,837	*70%*
Cod, GOM	**9,540,389**	**7,991,172**	***84%***	**11,242,220**	**9,561,153**	***85%***
Haddock, GB East	26,262,695	4,122,910	*16%*	21,122,565	2,336,964	*11%*
Haddock, GB West	62,331,182	13,982,173	*22%*	50,507,974	6,101,400	*12%*
Haddock, GOM	1,761,206	819,069	*47%*	1,796,740	1,061,841	*59%*
Plaice	6,058,149	3,305,950	*55%*	7,084,289	3,587,356	*51%*
Pollock	35,666,741	11,842,969	*33%*	32,350,451	16,297,273	*50%*
Redfish	14,894,618	4,647,978	*31%*	17,369,940	5,951,045	*34%*
White hake	**5,522,677**	**4,687,905**	***85%***	**6,708,641**	**6,598,273**	***98%***
Winter flounder, GB	4,018,496	3,036,352	*76%*	**4,679,039**	**4,241,177**	***91%***
Winter flounder, GOM	293,736	178,183	*61%*	750,606	343,152	*46%*
Witch flounder	**1,824,125**	**1,528,215**	***84%***	2,839,697	2,178,941	*77%*
Yellowtail flounder, CC/GOM	1,608,084	1,268,961	*79%*	**2,185,802**	**1,743,168**	***80%***
Yellowtail flounder, GB	**1,770,451**	**1,625,963**	***92%***	**2,474,662**	**2,176,921**	***88%***
Yellowtail flounder, SNE	517,372	340,662	*66%*	**963,033**	**795,267**	***83%***
Grand Total	179,350,461	65,433,630	*36%*	172,111,201	70,059,346	*41%*

*includes FY2010 carryover

Notes: stocks with > 80% ACE conversion highlighted in bold font

6.5.3 Trends in Revenue

During the first year of sector management, groundfish revenues from vessels with limited access groundfish permits in 2010, were $83 million (**Table 27**). This was lower than 2007 – 2009 nominal revenues which ranged from $84.1 million in 2009 to $90.1 million in 2008. By 2011 the groundfish revenues from vessels with limited access groundfish permits had risen to $90.1 million. During the same time Non-groundfish revenues in 2011 were $240.7 million. Non-groundfish revenues from 2007 – 2010 ranged from $186.1 million in 2009 to $211.5million in 2010. Revenues from all species for 2011 totaled $330.8 million, which compares to pervious revenues that ranged from a low of $271.1 million in 2009 to a high of $298.2 million in 2007. Sector vessels accounted for about 71% of all revenue earned by limited access permitted vessels in 2011. Sector vessels also earned 99% of revenue from groundfish landings and 60% of non-groundfish revenue.

Table 27 - Revenue in Thousands of Dollars by Year

					2010			2011	
Landings	**2007**	**2008**	**2009**	**Total**	**Sector Vessels**	**Common Pool**	**Total**	**Sector Vessels**	**Common Pool**
Total Landings	$298,246	$291,479	$266,765	$294,505	$196,625	$97,880	$330,885	$233,922	$96,962
Total Groundfish Landings	$89,055	$90,132	$84,112	$82,984	$80,750	$2,234	$90,115	$89,144	$971
Total Non-groundfish Landings	$209,191	$201,347	$182,653	$211,521	$115,875	$95,645	$240,769	$144,778	$95,991

6.5.4 Trends in ACE Leasing

Starting with allocations in 2010, each sector was given an initial annual catch entitlement (ACE) determined by the pooled potential sector contribution (PSC) from each vessel joining that sector. A vessel's PSC is a percentage share of the total allocation for each allocated groundfish stock based on that vessel's fishing history. Once a sector roster and associated PSC is set at the beginning of a fishing year each sector is then able to distribute its ACE among its members. By regulation ACE is pooled within sectors, however most sectors seem to follow the practice of assigning catch allowances to member vessels based on PSC allocations. This is an important assumption because vessels catching more than their allocation of PSC must have leased additional quota either as PSC from within the sector or as ACE from another sector.

During the first year of sector management, 281 Sector-affiliated vessels had catch that exceeded their individual PSC allocations for at least one stock. These vessels are then assumed to have leased in an additional 22 million pounds of ACE and/or PSC with an approximate value of $13.5 million. In 2011 256 Sector-affiliated vessels had catch that exceeded their individual PSC allocations. To account for the additional catch these vessels would have had to lease an additional 31 million pounds of quota, either as PSC from within the sector or as ACE from another sector. Although the number of vessels leasing ACE fell by 9% the estimated number of pounds leased was almost 41% greater in 2011 than in 2010.

6.5.5 Trends in Effort

Some of the proposed benefits of a catch share system of management are the potential efficiency gains associated with increasing operational flexibility. Being released from the former effort controls but being held by ACLs, sector vessels were expected to increase their catch per unit effort by decreasing effort. Between 2009 and 2010, the total number of groundfish fishing trips and total days absent on groundfish trips declined by 48% and 27%, respectively (26,056 trips in 2009 vs. 13,441 trips in 2010; 24,237 days absent in 2009 vs. 17,614 days absent in 2010) (**Table 28**). During the second year of sector management, 2011, the number of groundfish fishing trips and total days absent on groundfish trips increased by 19% and 18% respectively (13,441 trips in 2010 vs. 15,929 trips in 2011; 17,614 days absent in 2010 vs. 20,724 days absent in 2011) (Table 4.6.5-1). Note, in the following analysis, a groundfish trip is defined as a trip where the vessel owner or operator declared, either through the vessel monitoring system or through the interactive voice response system, that the vessel was making a groundfish trip. The following data is taken from different source materials (VMS, etc.) than the data presented earlier in Section 4.1, and for the reasons stated in Section 4.1, this data may be slightly different than what is presented elsewhere in the document. While the number of groundfish fishing trips and total days absent on groundfish trips increased during the second year of sector management the number of non-groundfish trips, and days absent on non-groundfish trips, has decreased in 2011 (41,753 trips in 2010 vs. 36,386 trips in 2011; 31,552 days absent in 2010 vs. 27,913 days absent in 2011) (**Table 28**). Average trip length on both groundfish and non-groundfish trips were not statistically different during the time series (**Table 28**).

Table 28 - Effort by Active Vessels

	2007	2008	2009	2010			2011		
				Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool
Number of Groundfish Trips	27,004	26,468	26,056	13,441	11,159	2,282	15,929	13,642	2,287
Number of non-groundfish Trips	46,635	46,721	39,943	41,753	16,791	24,962	36,386	17,002	19,384
Number of days absent on groundfish trips	28,158	27,146	24,237	17,614	16,057	1,558	20,724	19,227	1,498
Number of days absent on non-groundfish trips	35,186	36,134	31,241	31,552	15,446	16,106	27,913	14,973	12,940
Average trip length on groundfish trips	7.63	7.82	0.94	1.31	1.44	0.69	1.30	1.41	0.66
(standard deviations)	(6.15)	(5.98)	(1.85)	(2.08)	(2.23)	(0.76)	(2.14)	(2.28)	(0.66)
Average trip length on non-groundfish trips	5.42	4.78	0.84	0.79	0.96	0.68	0.80	0.93	0.69
(standard deviation)	(5.95)	(5.67)	(1.57)	(1.47)	(1.69)	(1.30)	(1.45)	(1.65)	(1.24)

6.5.6 Trends in Fleet Characteristics

The groundfish fishery has traditionally been made up of a diverse fleet, comprised of a range of vessels sizes and gear types. Over the years, as vessels entered and exited the fishery, the "typical" characteristics defining the fleet changed as well. The groundfish fleet is divisible into four "vessel size categories," vessels less than 30 feet in length, vessels between 30 and 50 feet in length, vessels between 50 and 75 feet in length and vessels greater than 75 feet in length. As mentioned above, the number of active vessels in 2011 had declined compared to the previous three years and this decline occurred across all vessel size categories between 2009 and 2011. The number of vessels smaller than 30' has experienced the greatest decline of 32% between 2009 and 2011 (78 to 53 vessels; **Table 29**). The 30' to < 50' vessel size category, which has the largest number of active vessels, experienced a 16% decline (500 to 419 active vessels) during the past 3 years. Most (229) sector vessels fell into this 30' to 50' size category. The 50' to < 75' vessel size category, containing the second largest number of vessels, experienced an 11% reduction during 2009 to 2011 (247 to 220 active vessels). The 50' to < 75' size category also had the second largest number of sector vessels with 128. The number of active vessels in largest (75' and above) vessel size category declined by 9% between 2009 and 2011. The decline was relatively consistent across all four years in all vessel size categories.

Between the first two years of sector management, the numbers of vessels that joined a sector or stayed in the common pool were about evenly split within size categories with the exception of the largest and smallest categories. For active vessels larger than 75' total length, 67% belong to a sector in 2010 and 69% belong to a sector in 2011. Of active vessels in the smallest size category, those smaller than 30' in length, 84% remained in the common pool in 2010 while 89% of vessels smaller than 30' remained in the common pool in 2011. For active vessels in the 30' to 50' and 50' to 75' range there has been a growing proportion of vessels belonging to sectors. In 2010, active sector vessels comprised 47% and 54% of the 30' to 50' and 50' to 75' ranges respectively. By 2011, those proportions had increased to 55% and 58% of active sector vessels in the 30' to 50' and 50' to 75' ranges.

Table 29 - Vessel activity by size class

				2010			2011		
Vessel size	**2007**	**2008**	**2009**	**Total**	**Sector Vessels**	**Common Pool**	**Total**	**Sector Vessels**	**Common Pool**
Vessels with landings from any species									
Less than 30	83	77	78	70	11	59	53	6	47
30 to < 50	572	528	500	475	225	250	419	229	190
50 to < 75	289	267	247	231	125	106	220	128	92
75 and above	139	140	132	120	79	41	120	83	37
Total	1082	1012	957	896	440	456	812	446	366
Vessels with at least one groundfish trip									
Less than 30	29	26	33	23	2	21	19	1	18
30 to < 50	351	331	308	241	152	89	220	146	74
50 to < 75	194	175	156	117	88	29	115	92	23
75 and above	84	79	73	64	61	3	68	62	6
Total	658	611	570	445	303	142	422	301	121

Fishing effort, as described by either the number of trips taken or the total number of days absent, varies considerably by vessel size. In 2011 more than two thirds of groundfish trips were made by vessels ranging in size from 30 to 50 feet in total length (**Table 30**). Compared to 2010, 2011 saw increases in the numbers of groundfish trips and the total number of days absent on groundfish trips across almost all vessel size classes. In percentage terms, the largest increases in groundfish trips and days absent on groundfish trips occurred in the less than 30' vessel size category (100% and 69%, respectively). However, there were only a couple hundred trips per year in this vessel size category. In terms of magnitude, the 30' to < 50' vessel size category had the greatest increases in groundfish trips and days absent (1,874 more groundfish trips and 1,265 more days absent on groundfish trips from 2010 to 2011). The largest vessel class (75' and above) experienced a reduction of 5% in groundfish trips but an 11% increase in days absent on groundfish trips. The 50' to < 75' vessel size category had increases of about 19% in both groundfish trips and days absent on groundfish trips. From 2010- 2011, non-groundfish trips and the number of days absent on non-groundfish trips, has declined for all vessel size classes.

Table 30 - Vessel effort (as measured by number of trips and days absent) by vessel size category

				2010			2011		
Vessel Size	**2007**	**2008**	**2009**	**Total**	**Sector Vessels**	**Common Pool**	**Total**	**Sector Vessels**	**Common Pool**
Number of groundfish trips									
Less than 30	272	239	435	137	2	135	274	15	259
30 to < 50	18200	18453	19349	9240	7509	1731	11114	9401	1713
50 to < 75	7018	6356	4971	2829	2442	387	3368	3067	301
75 and above	1525	1424	1301	1235	1206	29	1173	1159	14
Total	27015	26472	26056	13441	11159	2282	15929	13642	2287
Number of non-groundfish trips									
Less than 30	2534	2249	1784	1703	370	1333	1372	258	1114
30 to < 50	28892	27586	23216	25204	9678	15526	21585	10443	11142
50 to < 75	11979	12825	12090	12321	5456	6865	10920	5036	5884
75 and above	3248	4073	2853	2523	1287	1236	2507	1264	1243
Total	46653	46733	39943	41751	16791	24960	36384	17001	19383
Number of days absent on groundfish trips									
Less than 30	101	82	160	61	1	60	103	7	96
30 to < 50	9580	9586	8794	5067	3958	1109	6332	5216	1116
50 to < 75	10701	9857	8278	5656	5305	351	6713	6447	266
75 and above	7750	7582	7006	6831	6792	38	7576	7558	19
Total	28132	27107	24237	17614	16057	1558	20724	19227	1498
Number of days absent on non-groundfish trips									
Less than 30	665	678	573	537	123	414	419	81	337
30 to < 50	11069	10455	8657	9540	3633	5906	8215	3683	4532
50 to < 75	13006	13557	12681	12545	6491	6053	11498	6414	5084
75 and above	10472	11483	9330	8930	5199	3731	7780	4795	2986
Total	35212	36173	31241	31551	15446	16105	27912	14972	12940

6.5.7 Fishing Communities

There are over 100 communities that are homeport to one or more Northeast groundfish fishing vessels. These ports occur throughout the coastal northeast and mid-Atlantic. Consideration of the social impacts on these communities from proposed fishery regulations is required as part of the National Environmental Policy Act (NEPA) of 1969 and the Magnuson Stevens Fishery Conservation and Management Act, 1976. Before any agency of the federal government may take "actions significantly affecting the quality of the human environment," that agency must prepare an Environmental Assessment (EA) that includes the integrated use of the social sciences (NEPA Section 102(2)(C)). National Standard 8 of the MSA stipulates that "conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities" (16 U.S.C. § 1851(a)(8)).

A "fishing community" is defined in the Magnuson-Stevens Act, as amended in 1996, as "a community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community" (16 U.S.C. § 1802(17)). Determining which fishing communities are "substantially dependent" on, and "substantially engaged" in, the groundfish fishery can be difficult. In recent amendments to the fishery management plan the council has categorized communities dependent on the groundfish resource into primary and secondary port groups so that community data can be cross-referenced with other demographic information. Descriptions of 24 of the most important communities involved in the multispecies fishery and further descriptions of North East fishing communities in general can be found on North East Fisheries Science Center's website (http://www.nefsc.noaa.gov/read/socialsci/community_profiles/).

Although it is useful to narrow the focus to individual communities in the analysis of fishing dependence there are a number of potential issues with the confidential nature of the information. There are privacy concerns with presenting the data in such a way that proprietary information (landings, revenue, etc.) can be attributed to an individual vessel or a small group of vessels. This is particularly difficult when presenting information on small ports and communities that may only have a small number of vessels and that information can easily be attributed to a particular vessel or individual.

6.5.7.1 Vessel Activity

At the state level, Massachusetts has the highest number of active vessels with a limited access groundfish permit. From 2007 to 2011 the total number of active vessels with revenue from any species on all trips declined 26% (1,082 to 805). All states have shown a decline in the number of active vessels since 2007, but the largest percentage decline has occurred in Connecticut where the number of active vessels dropped 39% by 2011 (**Table 31**). Just over half of the active vessels belonging to a sector have a homeport in Massachusetts (262 vessels), while New Jersey and Connecticut are the two states in the North East with the fewest vessels belonging to a sector. At the level of home port, there is even greater variation between the ports with regard to the numbers of active vessels.

Table 31 - Number of Active Vessels with Revenue from any Species (all trips) by Home Port and State

		Year								
					2010			2011		
Home Port State/City		2007	2008	2009	Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool
CT		18	13	13	12	4	8	11	4	7
MA		544	502	482	444	264	183	396	262	134
	BOSTON	80	69	67	57	41	16	53	41	12
	CHATHAM	46	41	42	43	31	12	39	28	11
	GLOUCESTER	124	116	115	109	70	39	95	68	27
	NEW BEDFORD	93	91	87	69	48	22	70	53	17
ME		128	116	114	103	63	40	88	70	20
	PORTLAND	22	18	17	17	15	2	16	15	1
NH		70	65	62	57	37	22	52	34	20
NJ		67	71	63	58	2	56	52	6	46
NY		98	100	97	95	15	80	92	16	76
RI		110	104	95	87	43	45	84	44	41
	POINT JUDITH	58	54	50	46	33	14	45	34	12
All Other States		47	41	35	39	13	26	37	14	23
Grand Total		1,082	1,012	957	890	440	456	805	446	366

Massachusetts is also the state with the highest number of active vessels with revenue from at least one groundfish trip. From 2007 to 2011 the total number of active vessels with revenue from at least one groundfish trip declined 36% (658 to 420). While all states showed a decline in the number of vessels making groundfish trips the largest percentage decline (59%: 41 to 17 vessels) occurred in New Jersey (**Table 32**). Of the sector vessels making groundfish trips in 2011 almost two thirds of them have a homeport in Massachusetts (186 vessels). Again, New Jersey and Connecticut are the two states with the fewest sector vessels making groundfish trips.

Table 32 - Number of Vessels with Revenue from at Least One Groundfish Trip by Home Port and State

		Year								
					2010			2011		
Home Port State/City		2007	2008	2009	Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool
CT		9	8	8	7	3	4	5	2	3
MA		341	321	312	238	189	49	224	186	38
	BOSTON	54	49	46	35	33	2	34	34	0
	CHATHAM	26	27	28	26	23	3	26	23	3
	GLOUCESTER	95	88	98	74	59	15	70	55	15
	NEW BEDFORD	60	62	52	33	29	4	37	32	5
ME		78	69	65	43	38	5	47	43	4
	PORTLAND	20	16	15	15	14	1	15	15	0
NH		44	42	42	32	26	6	29	23	6
NJ		41	34	26	21	1	20	17	1	16
NY		52	56	47	40	8	32	43	9	34
RI		78	70	60	55	34	21	49	32	17
	POINT JUDITH	43	36	32	31	28	3	28	27	1
All Other States		15	11	12	10	5	5	8	5	3
Grand Total		658	611	570	445	303	142	420	301	121

6.5.7.2 Employment

Along with the restrictions associated with presenting confidential information there is also limited quantitative socio-economic data upon which to evaluate the community specific importance of the multispecies fishery. In addition to the direct employment of captains and crew, the industry is known to support ancillary businesses such as gear, tackle, and bait suppliers; fish processing and transportation; marine construction and repair; and restaurants. Regional economic models do exist that describe some of these inter-connections at that level (Olson and Clay 2001, Thunberg 2007, Thunberg 2008, NMFS 2010, and Clay et al. 2008).

Throughout the Northeast, many communities benefit indirectly from the multispecies fishery but these benefits are often difficult to attribute. The direct benefit from employment in the fishery can be estimated by the number of crew positions. However, crew positions do not equate to the number of jobs in the fishery and do not make the distinction between full and part-time positions. Crew positions are measured by summing the average crew size of all active vessels on all trips. In 2011 vessels with limited access groundfish permits provided 2,129 crew positions with about half coming from vessels with home ports in Massachusetts. Since 2007, the total number of crew positions provided by limited access groundfish vessels has declined by 21% (2,687 positions to 2129). Declines in crew positions vary across home port states with some states adding crew positions in 2011 (**Table 33**). Vessels with a home port in Connecticut and New Hampshire have experienced the largest percentage decline (20%: 52 to 41 crew positions in CT and 28%: 139 to 100 crew positions in NH), while vessels home ported in New York have shown an increase in crew positions (3%: 204 to 211 crew positions). All other home port states had crew position reductions ranging from 10 to 18% between 2007 and 2011 (**Table 33**).

Table 33 - Number of Crew Positions and Crew-Days on Active Vessels by Home Port and State

Home Port State		2007	2008	2009	2010	2011
CT						
	Total CREW POSITIONS	52	39	38	39	41
	Total CREW-DAYS	4,261	3,779	3,317	3,614	3,067
MA						
	Total CREW POSITIONS	1,402	1,311	1,152	1,104	1,063
	Total CREW-DAYS	98,094	93,182	86,234	77,422	82,238
ME						
	Total CREW POSITIONS	276	250	216	220	204
	Total CREW-DAYS	17,872	15,882	14,414	14,427	14,148
NH						
	Total CREW POSITIONS	139	123	114	109	100
	Total CREW-DAYS	6,443	6,135	5,925	3,813	4,663
NJ						
	Total CREW POSITIONS	167	185	159	140	143
	Total CREW-DAYS	12,035	12,987	10,708	9,801	9,364
NY						
	Total CREW POSITIONS	204	214	205	201	211
	Total CREW-DAYS	16,656	15,975	15,479	15,020	15,439
RI						
	Total CREW POSITIONS	304	281	253	243	238
	Total CREW-DAYS	32,072	29,690	24,167	25,454	24,938
OTHER NORTHEAST	Total CREW POSITIONS	145	144	123	133	128
	Total CREW-DAYS	12,158	14,794	12,166	11,626	11,767
Total						
	Total CREW POSITIONS	2,687	2,545	2,260	2,190	2,129
	Total CREW-DAYS	199,593	192,423	172,410	161,178	165,624

A crew day is another measure of employment opportunity that incorporates information about the time spent at sea earning a share of the revenue. Similar to a “man-hour” this measure is calculated by multiplying a vessel’s crew size by the days absent from port, and since the number of trips affects the crew-days indicator, the indicator is also a measure of work opportunity. Conversely, crew days can be viewed as an indicator of time invested in the pursuit of “crew share” (the share of trip revenues received at the end of a trip). The time spent at sea has an opportunity cost. For example if crew earnings remain constant, a decline in crew days would reveal a benefit to crew in that less time was forgone for the same amount of earnings.

In 2011 vessels with limited access groundfish permits used 165,624 crew days with close to half coming from vessels with home ports in Massachusetts. Since 2007 the total number of crew days used by limited access groundfish vessels has declined by 17% (199,593 to 165,624 crew days). Declines in crew days occurred across all home port states, but since 2010 some states have experienced some small increases in the number of crew days (**Table 33**). Vessels with a home port in New Hampshire experienced the largest percentage decline in crew days (28%: 6,443 to 4,663 crew days), while vessels home ported in states other than CT, MA, ME, NH, NJ, NY, and RI had the lowest percentage decline (3%: 12,158 to 11,767 crew days). All other home port states had crew position reductions ranging from 10% to 17% between 2007 and 2011 (**Table 33**).

The number of crew positions and crew days give some indication of the direct benefit to communities from the multispecies fishery through employment. But these measures, by themselves, do not show the benefit or lack thereof at the individual level. Many groundfish captains and crew are second- or third-generation fishermen who hope to pass the tradition on to their children. This occupational transfer is an important component of community continuity as fishing represents an important occupation in many of the smaller port areas.

6.5.7.3 Consolidation and Redirection

The multiple regulatory constraints placed on common pool groundfish fishers are intended to control their effort and catch per unit effort (CPUE) as a means to limit mortality. Exemptions to many of these controls, which have been granted to sectors in previous years, may increase the CPUE of sector participants. As a result, sector fishermen may have additional time that they could direct towards non-groundfish stocks that they otherwise would not have pursued, resulting in redirection of effort into other fisheries. Additionally, to maximize efficiency, fishermen within a single sector may be more likely to allocate fishing efforts such that some vessels do not fish at all; this is referred to as fleet consolidation.

Both redirection and consolidation have been observed when management regimes for fisheries outside the Northeast United States (U.S.) shifted toward a catch share management regime such as sectors. For example, research following the rationalization of the halibut and sablefish fisheries by the North Pacific Fishery Management Council found individuals who received enough quota shares were able to continue fishing with less competition, greater economic certainty, and over a longer fishing season (Matulich and Clark 2001). However, individuals who did not receive enough of a catch share either bought or leased catch shares from other fishermen or sold their quota. Similarly, one year after implementation of the Bering Sea-Aleutian Island crab fishery Individual Transferable Quota (ITQ), a study found that about half of the vessels that fished the 2004/2005 Bering Sea Snow Crab fishery did not fish the following year. However, research on the ITQ plan for the British Columbia halibut fishery found efficiency gains were greatest during the first round of consolidation, and little incentive to increase efficiency (or continue consolidation) existed afterward (Pinkerton and Edwards 2009).

The scope of consolidation and redirection of effort that may be expected to result from sector operations in FY 2013 is difficult to predict. Data is now available for the first two years of expanded sector operations, FY 2010 and FY 2011, which is discussed above. In addition, the activities of FY 2012 sectors and individual sector's predictions for expected consolidation in FY 2013 are discussed further in Section 1.1.3.

6.5.7.4 Overview of the Ports for FY 2013 Sectors

Sector fishermen would utilize ports throughout the Middle Atlantic and New England. The sector operations plans listed home ports and landing ports that the sectors plan to use in FY 2013. The following table (Table 34) summarizes these ports.

Table 34 - Home Ports and Landing Ports for Sector Fishermen in FY 2013 (As reported by sectors in their FY 2013 operations plans)

State	Primary Ports[a]		Other Ports[b]	
Connecticut:	N/A		New London, Stonington	
Massachusetts	Boston	New Bedford	Barnstable	Provincetown
	Chatham	Newburyport	Dennis	
	Gloucester	Plymouth	Hyannis	
	Harwich	Rockport	Nantucket	
	Marshfield	Sandwich		
	Menemsha	Situate		
Maine	Boothbay Harbor		Bar Harbor	Saco
	Harpswell		Five Islands	South Bristol
	(Cundy's Harbor)		Jonesport	Southwest Harbor
	Kennebunkport		Phippsburg (Sebasco	Stonington
	Port Clyde		Harbor)	Tenant's Harbor
	Portland		Rockland	Tremont (Bass Harbor)
				Winter Harbor
New Hampshire	Portsmouth		N/A	
	Rye			
	Seabrook			
New Jersey	N/A		Barnegut Light	
			Cape May	
			Point Pleasant	
New York	Montauk		Hampton Bays- Shinnecock	
			Greenport	
Rhode Island	Point Judith		N/A	
	Newport			
Virginia	N/A		Chincoteague, Greenbackville	

Notes:

[a] Listed by one or more sector as a primary port in their FY 2013 operations plans. A primary port refers to those ports used to land the majority of catch from active sector vessels or where the majority of sector vessels are home ported.

[b] Includes those ports listed by one or more sector as a secondary port but not a primary port. The other ports category includes all remaining ports that may be used by sector vessels.

6.5.7.5 FY 2011 Regulated Groundfish Stock Catches

The Northeast Multispecies FMP specifies Annual Catch Limits (ACLs) for twenty stocks. Exceeding the ACL results in the implementation of Accountability Measures (AMs) to prevent overfishing. The ACL is sub-divided into different components. Those components that are subject to AMs are referred to as sub-ACLs. There are also components of the fishery that are not subject to AMs. These include state waters catches that are outside of federal jurisdiction, and a category referred to as “other sub-components” that combines small catches from various fisheries.

Table 35 through Table 38 compare FY 2011 catches to ACLs. This reconciliation was provided by NERO, and includes imputation for missing dealer records. As shown in Table 36, catches exceed ACLs for only two stocks: GOM/GB windowpane flounder and SNE/MA windowpane flounder. ACLs for these two stocks were also exceeded in FY 2010. AMs for those stocks were modified in FW 47 but have not yet been implemented.

Table 37 summarizes catches by non-groundfish components of the ACLs. Assignment of catches to a specific FMP is difficult unless the FMP uses a specific gear (e.g. the scallop fishery) or has a trip activity declaration (e.g. groundfish and monkfish trips). For this reason the assignment of catch to FMP should be viewed with caution. Nevertheless, this table indicates that much of the catch of SNE/MAB windowpane flounder is taken outside the groundfish fishery. The squid/whiting fishery on GB also catches a substantial amount of GB yellowtail flounder, particularly when compared to possible future quotas.

Because of difficulty in assigning catch to a specific FMP, catches of SNE/MA windowpane flounder were allocated by trawl gear mesh size (Table 38 and **Table 39**). As can be seen from these tables, large mesh bottom trawls (mesh size 5 inches and larger) account for a large part of the non-groundfish catch.

Table 35 – FY2011 catches of regulated groundfish stocks (metric tons, live weight)

Stock	Components with ACLs and sub-ACLs; (with accountability measures (AMs))							sub-components: No AMs	
	Total Groundfish	Groundfish Fishery	Sector	Common Pool	Recreational*	Midwater Trawl Herring Fishery**	Scallop Fishery	State Water	Other
	A to G	A+B+C	A	B	C	D	E	F	G
GB cod	3,405.9	3,276.7	3,215.3	61.5				38.9	90.2
GOM cod	6,347.1	6,101.8	4,368.0	93.4	1,640.3			216.4	28.8
GB Haddock	4,252.0	3,840.5	3,828.8	11.7		101.8		3.9	305.8
GOM Haddock	737.6	724.1	483.7	1.9	238.5	0.2		4.9	8.4
GB Yellowtail Flounder	1,117.0	990.0	988.0	2.0			83.9	0.0	43.2
SNE/MA Yellowtail Flounder	514.9	376.2	364.0	12.2			110.9	1.1	26.7
CC/GOM Yellowtail Flounder	853.1	806.5	795.1	11.4				38.5	8.1
Plaice	1,660.7	1,636.1	1,631.6	4.5				12.1	12.6
Witch Flounder	1,186.0	997.1	992.9	4.2				22.5	166.4
GB Winter Flounder	1,984.8	1,925.4	1,924.2	1.1				0.0	59.4
GOM Winter Flounder	287.3	160.8	158.2	2.6				113.3	13.2
SNE/MA Winter Flounder	298.7	93.9	86.9	7.0				40.0	164.9
Redfish	2,720.6	2,706.7	2,703.2	3.6				3.6	10.2
White Hake	3,035.5	3,028.5	3,014.4	14.1				2.6	4.4
Pollock	9,064.0	7,612.4	7,543.1	69.2				694.0	757.6
Northern Windowpane	191.3	156.5	156.2	0.3				0.0	34.8
Southern Windowpane	504.1	111.5	83.0	28.5				16.6	376.0
Ocean Pout	90.2	60.7	56.3	4.4				0.0	29.5
Halibut	52.1	42.6	41.4	1.2				7.1	2.5
Wolffish	33.0	32.9	32.2	0.7				0.0	0.1

[1]Catch includes any FY 2010 carryover caught by sectors in FY 2011.

Any value for a non-allocated species may include landings of that stock;

*Recreational estimates based on Marine Recreational Information Program (MRIP) data.

**Landings extrapolated from observer data.

misreporting of species and/or stock area; and/or estimated landings (in lieu of missing reports) based on vessel histories.

Table 36 - **FY 2011 catches as percent of ACL**

Stock	Components with ACLs and sub-ACLs; (with accountability measures (AMs))							sub-components: No AMs	
	Total Groundfish*	Groundfish Fishery*	Sector*	Common Pool	Recreational**	Midwater Trawl Herring Fishery	Scallop Fishery	State Water	Other
GB cod	68.0	68.8	68.9	66.1				81.1	47.2
GOM cod	69.2	74.1	83.4	89.9	58.1			36.3	9.6
GB Haddock	1.3	-	0.0	6.3		32.0		1.1	22.3
GOM Haddock	57.7	59.4	52.6	24.3	77.4	1.7		54.6	24.1
GB Yellowtail Flounder	78.9	86.7	88.1	10.1			41.8	NA	59.1
SNE Yellowtail Flounder	76.7	67.3	84.3	10.2			135.2	15.6	98.9
CC/GOM YTF	78.9	78.3	79.4	42.1				384.8	19.3
Plaice	42.3	43.8	44.7	6.4				35.5	9.1
Witch Flounder	84.8	74.1	75.3	16.8				161.0	302.5
GB Winter Flounder	85.1	86.9	87.4	8.2				NA	53.5
GOM Winter Flounder	52.4	45.0	46.5	16.5				69.5	41.3
SNE/MA Winter Flounder	35.5	12.9	NA	NA				55.6	366.4
Redfish	25.7	26.9	27.0	9.9				4.3	3.1
White Hake	88.9	93.5	93.9	50.4				7.9	3.3
Pollock	46.1	43.0	42.8	66.6				90.3	52.4
Northern Windowpane	118.8	142.2	NA	NA				0.5	71.0
Southern Windowpane	224.0	72.4	NA	NA				829.1	544.9
Ocean Pout	35.7	25.4	NA	NA				0.0	268.5
Halibut	68.6	129.1	NA	NA				18.1	61.6
Wolffish	42.8	45.1	NA	NA				0.0	2.4

* The percent of the FY 2011 catch limits caught does not include any FY 2010 carryover caught by sectors in FY 2011. FY 2010 carryover caught is not applied to the FY 2011 ACL.

** To evaluate whether recreational catches exceeded any of the recreational sub-ACLs, the 2-year average of FY 2010 and FY 2011 was used.

Table 37 – FY 2011 catches by non-groundfish FMPs

Stock	Total	SCALLOP[1]	FLUKE	HAGFISH	HERRING	'LOBSTER/ CRAB'	MENHADEN	MONKFISH	REDCRAB	RESEARCH
GB cod	90.2	5.7	0.6	0.0	0.3	0.7	0.1	0.1	0.0	12.3
GOM cod	28.8	-	0.6	0.0	2.9	0.1	0.0	0.0	-	8.7
GB Haddock	305.8	2.4	8.2	-	14.4**	2.3	-	0.1	-	18.1
GOM Haddock	8.4	-	0.0	0.0	2.6**	0.1	-	-	-	0.2
GB Yellowtail Flounder	43.2	-**	0.1	0.0	1.0	0.0	-	0.0	0.0	-
SNE Yellowtail Flounder	26.7	-**	8.5	-	0.1	0.0	0.0	0.1	0.0	3.4
CC/GOM Yellowtail Flounder	8.1	2.9	0.1	0.0	0.5	0.0	0.0	0.0	-	2.5
Plaice	12.6	0.0	1.3	0.0	1.4	0.5	0.3	0.0	0.0	1.5
Witch Flounder	166.4	18.0	19.5	0.0	7.2	1.5	0.4	0.2	0.0	1.1
GB Winter Flounder	59.4	38.4	0.3	-	0.4	0.0	-	-	-	-
GOM Winter Flounder	13.2	2.0	0.0	0.0	0.2	0.0	-	-	-	0.2
SNE Winter Flounder	164.9	60.3	16.4	0.0	2.6	0.6	0.0	0.2	0.0	3.5
Redfish	10.2	0.0	3.1	0.0	0.2	0.1	0.0	0.0	0.0	0.1
White Hake	4.4	2.0	0.4	0.0	0.0	0.1	0.0	0.6	0.0	0.0
Pollock	757.6	-	0.8	0.0	0.5	0.2	0.1	0.0	0.0	0.6
Northern Windowpane	34.8	33.0	0.0	0.0	0.2	0.0	-	0.0	0.0	0.0
Southern Windowpane	376.0	135.3	75.9	-	1.6	0.6	0.1	0.6	0.0	0.0
Ocean Pout	29.5	6.4	6.5	0.0	0.4	0.1	0.0	0.0	0.0	0.0
Halibut	2.5	0.8	0.1	-	0.1	0.4	-	0.0	-	0.0
Wolffish	0.1	-	0.0	-	-	-	-	-	-	-

Values in metric tons of live weight

[1]Based on scallop fishing year March, 2011 through February, 2012

*Estimates not applicable. Recreational amounts are not attributed to the ACL consistent with the assessments for these stocks used to set FY 2011 quotas.

Table 37 – FY 2011 catches by non-groundfish FMPs (cont.)

Stock	SCUP	SHRIMP	SQUID	'SQUID/ WHITING'	SURFCLAM	TILEFISH	'WHELK/CONCH'	WHITING	UNKNOWN	REC
GB cod	0.2	0.0	0.2	0.1	0.0	0.0	0.0	0.0	15.2	54.6
GOM cod	2.5	0.7	0.4	3.1	0.0	-	0.0	2.6	7.3	-**
GB Haddock	5.5	0.1	98.8	52.0	-	-	-	0.9	102.9	NA*
GOM Haddock	-	0.5	0.0	0.8	-	-	0.0	1.9	2.4	-**
GB Yellowtail Flounder	0.2	0.0	0.2	40.7	-	-	0.0	-	1.0	
SNE Yellowtail Flounder	4.5	0.0	1.2	1.2	0.0	0.0	0.0	0.0	7.7	
CC/GOM Yellowtail Flounder	0.3	0.1	0.0	0.4	0.0	-	0.0	0.3	0.9	
Plaice	0.8	0.0	2.1	1.3	0.0	0.0	0.0	0.0	3.2	
Witch Flounder	13.0	0.2	35.3	20.7	0.0	0.0	0.1	0.8	48.3	
GB Winter Flounder	1.2	0.0	0.2	16.7	-	-	-	0.1	2.2	
GOM Winter Flounder	-	0.0	0.0	0.1	-	-	0.0	0.2	0.2	10.3
SNE Winter Flounder	8.3	0.0	19.5	6.8	0.0	0.0	0.0	0.1	34.9	11.7
Redfish	2.1	0.0	0.9	0.8	0.0	0.0	0.0	0.0	2.9	
White Hake	0.4	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.6	
Pollock	0.5	0.0	0.1	0.1	0.0	0.0	0.0	0.0	6.1	748.5
Northern Windowpane	0.0	0.0	0.0	1.4	0.0	-	0.0	0.1	0.1	
Southern Windowpane	48.7	0.0	17.8	14.9	0.0	0.0	0.0	0.1	80.5	
Ocean Pout	4.4	0.0	2.7	2.1	0.0	0.0	0.0	0.1	6.9	
Halibut	0.1	0.0	0.3	0.2	-	-	-	0.0	0.5	
Wolffish	-	-	-	-	-	-	-	-	0.1	

Table 38 – FY 2010 SNE/MA windowpane flounder catch by trawl gear mesh size

SECGEARFISH	ROUNDED_MESH	SPPNM	Windowpane Discarded (mt)	TRIP_COUNT	Total and Top Three Species Landed (mt)
OTF	<=4.5	TOTAL	12.4	6,543	43,954.4
OTF	<=4.5	SQUID (ILLEX)	5.2	338	16,675.1
OTF	<=4.5	SQUID (LOLIGO)	2.6	4,612	8,884.4
OTF	<=4.5	HERRING, ATLANTIC	1.5	642	4,814.9
OTF	5	TOTAL	39.6	905	2,603.6
OTF	5	SCUP	22.8	809	1,510.5
OTF	5	MENHADEN	2.8	9	184.3
OTF	5	FLOUNDER, SUMMER	2.7	797	177.5
OTF	5.5	TOTAL	90.0	2,321	5,867.7
OTF	5.5	FLOUNDER, SUMMER	48.5	2,252	3,169.9
OTF	5.5	SCUP	13.5	849	879.3
OTF	5.5	SKATES	3.9	820	253.9
OTF	6	TOTAL	48.4	2,203	3,219.9
OTF	6	FLOUNDER, SUMMER	18.0	2,121	1,184.2
OTF	6	SKATES	10.0	773	660.4
OTF	6	SCUP	6.6	1,038	433.1
OTF	6.5	TOTAL	52.7	2,868	3,509.6
OTF	6.5	SKATES	28.8	1,364	1,907.8
OTF	6.5	FLOUNDER, SUMMER	12.9	2,626	841.0
OTF	6.5	SCUP	4.5	1,713	291.9
OTF	>6.5	TOTAL	1.2	81	75.6
OTF	>6.5	SQUID (LOLIGO)	0.3	19	19.3
OTF	>6.5	SKATES	0.2	30	16.1
OTF	>6.5	FLOUNDER, SUMMER	0.2	59	10.4
OTF	TOTAL	TOTAL	244.3	14,387	59,230.7
		TOTAL NON-SCALLOP	244.5		
		SCALLOP	177.8		
		GRAND TOTAL	422.3		

Table 39 – FY 2011 SNE/MA windowpane flounder catch by trawl gear mesh size

SECGEARFISH	ROUNDED_MESH	SPPNM	Windowpane Discarded (mt)	TRIP_ COUNT	Total and Top Three Species Landed (mt)
OTF	<=4.5	TOTAL	27.3	5,564	45,081.9
OTF	<=4.5	SQUID (ILLEX)	12.5	348	18,663.0
OTF	<=4.5	SQUID (LOLIGO)	5.1	4,281	7,796.0
OTF	<=4.5	HERRING, ATLANTIC	3.4	578	5,131.3
OTF	5	TOTAL	41.1	1,122	3,351.8
OTF	5	SCUP	26.5	1,015	2,152.5
OTF	5	HAKE, SILVER	3.2	742	263.1
OTF	5	FLOUNDER, SUMMER	2.4	1,037	197.2
OTF	5.5	TOTAL	65.7	2,606	5,364.0
OTF	5.5	FLOUNDER, SUMMER	30.3	2,503	2,464.8
OTF	5.5	SCUP	14.7	995	1,192.5
OTF	5.5	SKATES	3.7	1,117	302.0
OTF	6	TOTAL	31.8	2,158	2,618.9
OTF	6	FLOUNDER, SUMMER	11.1	2,120	904.8
OTF	6	SKATES	10.2	906	832.9
OTF	6	SCUP	4.1	965	346.0
OTF	6.5	TOTAL	50.0	3,074	4,120.2
OTF	6.5	SKATES	26.2	1,461	2,177.7
OTF	6.5	FLOUNDER, SUMMER	9.0	2,873	728.3
OTF	6.5	SCUP	5.5	1,835	443.4
OTF	>6.5	TOTAL	1.4	58	117.7
OTF	>6.5	SKATES	0.5	33	44.5
OTF	>6.5	SQUID (LOLIGO)	0.3	25	21.5
OTF	>6.5	CROAKER, ATLANTIC	0.3	5	21.2
OTF	TOTAL	TOTAL OTTER TRAWL	217.4	13,972	60,654.5
		TOTAL NON-SCALLOP	217.9	180,938	245,079.7
		SCALLOP	135.3		
		GRAND TOTAL	353.1		

6.5.8 Introduction to Sector Data

FY 2010 marked the first year that the sector program landed the overwhelming majority of the groundfish ACL. This document includes sector data from FY 2010 and FY 2011. Data from FY 2009 is also included for vessels that were sector members in FY 2010. This approach informs the analysis and provides a baseline for the public to better understand the operation of the sector fishery. Some differences in totals between the 2009-2010 analysis and the current analysis may be noted for 2009 and 2010. These are due to updates to the source data (VTR database and Data Matching and Imputation database (DMIS)) as well a minor modification to the sector membership algorithm. Sector membership is now based on MRI rather than vessel permit number. The reason for this is that the MRIs within a sector do not change during the fishing year, whereas a vessel permit may move into or out of a sector (although this is rare). Hence, MRI is a more reliable means of tracking sector membership.

For the purpose of this EA, and for the management of the sector fishery, the Northeast Regional Office defines a "groundfish trip," as a sector trip where groundfish is landed, and applied to a sector ACE. This definition differs from other methods of defining a groundfish trip. Other methodologies use a sector VMS declaration to define a groundfish trip regardless of whether groundfish was landed and applied to a sector ACE. Unless stated otherwise, NMFS compiled most of the gear and/or location-specific data presented in this section, and elsewhere in the document from vessel trip reports (VTR). The Northeast Regional Office used VTR data because it contains effort data, and gear and positional information. NMFS took some of the data in the document, such as that concerning protected resources, from the Northeast fisheries observer data set. It is important that the reader be informed that there are different sources of fishery data (i.e., observer, self-reported, dealer, etc.), and the data used in this EA may be different than data published from other sources, such as reports from the Northeast Fishery Science Center, and from data published for other uses.

The EA analysis uses complete data sources. As such, we excluded trips with undefined gear, missing land dates, missing sector membership, and trips that did not submit a VTR. Such records may be included in other groundfish trip analysis and reports, but detailed trip data is required for the purpose of this EA. Total trip counts and catch counts in the EA may differ when comparing to the sector data available to the public on the NMFS website. Reasons for this difference include the following:

- The EA analyses use VTR and observer data (rationale explained above). The data on the sector website is from VMS, VTR, and dealer data. Therefore, a trip that was reported by a dealer, but which has no corresponding VTR, is displayed on the website, but not in the EA. Likewise, a trip that is reported only on the VMS declaration will be counted on the website, but is not included in the EA. This is the major source of trip count differences.
- The EA uses data from two years. The primary purpose of quota monitoring is to determine the ACE as accurately as possible. Because of this difference in purpose, NMFS matches trips between multiple data sources to account for misreporting. The EA has two data sources but uses them in separate analyses, thus it does not need to perform trip matching. Trip matching can have small effects on trip counts.
- Catch weights will differ between the EA and other publically available sector data because the EA uses landed weight, as estimated by fishermen and reported on the VTR, whereas NMFS reports dealer live weight on their website.

6.5.8.1 Annual Catch Entitlement Comparison

Each sector receives a total amount (in pounds) of fish it can harvest for each stock. This amount is the sector's Annual Catch Entitlement (ACE). To determine the ACE, the sum of all of the sector members' potential sector contributions (PSCs) (a percentage of the ACL) are multiplied by the ACL to get the sector's ACE. Since the annual ACE is dependent on the amount of the ACL for a given fishing year, the ACE may be higher or lower from year to year even if the sector's membership remained the same. As seen in **Table 40**, there are substantial shifts in ACE for various stocks between FY 2009 and FY 2012. As seen in the below data, there has been a general decrease in trips, and catch for sector vessels. In addition, there has been a shift in effort out of the groundfish fishery into other fisheries. However, these changes may correlate to a certain extent with the decrease in ACL.

Table 40 - Commercial Groundfish Sub ACL FY 2009 to FY 2012

Groundfish Stock	FY 2009 target/hard TAC (lbs)	FY 2010 ACL (lbs)	% Change 2009 to 2010	FY 2011 ACL (lbs)	% Change 2010 to 2011	FY 2012 ACL (lbs)	% Change 2011 to 2012
Witch Flounder	2,489,019	1,878,338	-24.53%	2,724,914	45.07%	3,192,294	8.34%
White Hake	5,238,183	5,635,015	7.58%	6,556,548	16.35%	7,237,776	10.39%
SNE/MA Yellowtail Flounder	857,598	683,433	-20.31%	1,155,222	69.03%	1,675,513	45.04%
Redfish	18,990,619	15,092,846	-20.52%	16,625,059	10.15%	18,653,483	10.40
Pollock	13,990,535	36,493,118	160.84%	30,758,895	-15.71%	27,804,700	-9.60%
Plaice	7,085,657	6,278,765	-11.39%	6,851,967	9.13%	7,226,753	5.47%
GOM Winter Flounder	835,552	348,330	-58.31%	348,330	0.00%	1,576,305	352.53%
GOM Haddock	3,448,030	1,818,814	-47.25%	1,715,196	-5.70%	1,439,619	-16.07
GOM Cod	23,642,373	10,068,512	-57.41%	10,637,304	5.65%	4,310,037	-59.48%
GB Yellowtail Flounder	3,564,875	1,814,404	-49.10%	2,517,679	38.76%	479,946	80.94%
GB Winter Flounder	4,418,064	4,082,961	-7.58%	4,424,678	8.37%	7,467,057	68.76%
GB Haddock West	171,861,356	62,725,923	-63.50%	46,164,798	-26.40%	45,322,632	-1.82%
GB Haddock East	24,471,311	26,429,016	8.00%	21,252,562	-19.59%	15,167,804	-28.63%
GB Cod West	10,965,793	6,816,693	-37.84%	9,041,157	32.63%	9,795,138	8.34%
GB Cod East	1,161,836	745,162	-35.86%	440,925	-40.83%	357,149	-19.00%
CC/GOM Yellowtail Flounder	1,895,975	1,717,401	-9.42%	2,072,345	20.67%	2,306,035	11.28%
Totals	294,916,777	182,628,733	-38.07%	163,287,579	-10.59%	153,712,242	-5.86%

Table 41 - Overfishing Limit, Acceptable Biological Catch and sub-ACLs for multispecies

Stock	OFL	U.S. ABC	Components with ACLs and sub-ACLs; (with accountability measures (AMs))							sub-components: No AMs	
			Total ACL	Groundfish sub-ACL	Sector sub-ACL	Common Pool sub-ACL	Recreational sub-ACL	Midwater Trawl Herring Fishery sub-ACL	Scallop Fishery sub-ACL	State Water	Other
			A to G	A+B+C	A	B	C	D	E	F	G
GB cod	7,311	4,766	4,540	4,301	4,208	93				48	191
GOM cod	11,715	9,012	8,545	7,649	4,721	104	2,824			597	299
GB Haddock	59,948	34,244	32,611	30,580	30,393	187		318		342	1,370
GOM Haddock	1,536	1,206	1,141	1,086	770	8	308	11		9	35
GB YTF	3,495	1,458	1,416	1,142	1,122	20			200.8	0	73
SNE YTF	2,174	687	641	524	404	120			82	7	27
CC/GOM YTF	1,355	1,041	992	940	913	27				10	42
Plaice	4,483	3,444	3,280	3,108	3,038	70				34	138
Witch Flounder	1,792	1,369	1,304	1,236	1,211	25				14	55
GB WFL	2,886	2,224	2,118	2,007	1,993	14				0	111
GOM WFL	1,458	1,078	524	329	313	16				163	32
SNE/MA WFL	2,117	897	842	726	NA	726				72	45
Redfish	10,903	8,356	7,959	7,541	7,505	36				84	334
White Hake	4,805	3,295	3,138	2,974	2,946	28				33	132
Pollock	21,853	16,900	16,166	13,952	13,848	104				769	1,445
N. Windowpane	225	169	161	110	NA	110				2	49
S. Windowpane	317	237	225	154	NA	154				2	69
Ocean Pout	361	271	253	239	NA	239				3	11
Halibut	130	78	76	33	NA	33				39	4
Wolffish	92	83	77	73	NA	73				1	3

6.5.9 Common Pool Groundfish Fishing Activity

With the adoption of Amendment 16 in 2010, most groundfish fishing activity occurs under sector management regulations. There are, however, a few vessels that are not members of sectors and continue to fish under the effort control system. Collectively, this part of the fishery is referred to as the common pool. These vessels fish under both limited access and open access groundfish fishing permits. Common pool vessels accounted for only a small amount of groundfish catch in FY 2011 (**Table 35**). The largest common pool catch (GOM cod, 93 mt) was only 2 percent of the total groundfish fishery catch of this stock. Common pool vessels caught about 7 percent of the SNE/MA winter flounder groundfish catch, and 3 percent of the SNE/MA yellowtail flounder groundfish fishery catch.

Common pool vessels landed 1.4 million pounds (live weight) of regulated groundfish in FY 2010, worth about $2 million in ex-vessel revenues. Landings declined to 544 thousand pounds worth $814,000 in FY 2011. Most common pool vessel groundfish fishing activity takes place in the state of Massachusetts. From FY 2010 to FY 2011, the activity from Maine ports declined dramatically. The primary ports for this activity are Gloucester, Portland, and New Bedford (**Table 43**, **Table 44**, **Table 45**).

The primary groundfish stocks landed by common pool vessels include GOM cod, GB cod, and pollock (Table 46). GB haddock was an important component in FY 2010 but not in FY 2011. Vessels using HA and HB permits on groundfish trips primarily target GB and COM cod, GOM haddock, and pollock.

For the common pool permits that landed at least one pound of regulated groundfish in either FY 2010 or FY 2011, groundfish revenues were a major portion of revenues on groundfish fishing trips. Groundfish revenues were 80 percent or more of the trip revenues for 49 percent of these vessels; they were 60 percent of the revenues for 61.5 percent of these vessels. Dependence on groundfish was greatest for HA permitted vessels, with 70 percent of these vessels earning all revenues on these trips from regulated groundfish.

Table 42 – FY2011 Common Pool catches

Stock	Cumulative Kept (mt)	Cumulative Discard (mt)	Cumulative Catch (mt)	Sub-ACL (mt)	Percent Caught
GB Cod East	1.8	0.0	1.8	4	44.9
GB Cod	58.1	3.4	61.5	93	66.1
GOM Cod	69.8	23.7	93.4	104	89.9
GB Haddock East	0.0	0.0	0.0	59	0.0
GB Haddock	11.7	0.0	11.7	187	6.3
GOM Haddock	1.9	0.1	1.9	8	24.3
GB Yellowtail Flounder	1.8	0.2	2.0	20	10.1
SNE/MA Yellowtail Flounder	11.5	0.8	12.2	120	10.2
CC/GOM Yellowtail Flounder	8.6	2.7	11.4	27	42.1
Plaice	3.9	0.5	4.5	70	6.4
Witch Flounder	3.9	0.3	4.2	25	16.8
GB Winter Flounder	1.1	0.1	1.1	14	8.2
GOM Winter Flounder	2.6	0.1	2.6	16	16.5
SNE/MA Winter Flounder	0.3	6.7	7.0	726	1.0
Redfish	3.4	0.2	3.6	36	9.9
White Hake	13.1	1.1	14.1	28	50.4
Pollock	65.5	3.8	69.2	104	66.6
Northern Windowpane	0.0	0.3	0.3	110	0.3
Southern Windowpane	2.2	26.3	28.5	154	18.5
Ocean Pout	0.0	4.4	4.4	239	1.8
Halibut	1.0	0.1	1.2	33	3.5
Wolffish	0.0	0.7	0.7	73	1.0

Table 43 – Summary of common pool fishing activity (confidential data excluded)

		HB	A	C	D	HA	Total
2010	Permits Landing Groundfish	64	58	5	6	34	163
	Groundfish Pounds Landed	18,116	1,383,650	1,733	2,329	36,844	1,442,672
	Groundfish Revenues	$42,961	$1,930,439	$3,857	$3,626	$59,727	$2,040,610
2011	Permits Landing Groundfish	62	47	6	5	32	147
	Groundfish Pounds Landed	39,295	400,603	36,929	2,910	91,585	571,321
	Groundfish Revenues	$47,535	$530,738	$62,304	$6,201	$167,838	$814,616

Table 44 – Common pool groundfish landings by state of trip (pounds, live weight) (confidential data excluded)

	2010	2011
MA	903,121	408,562
MD		5
ME	397,257	55,486
NH	7,536	34,445
NJ	11,803	18,665
NY	96,487	36,864
RI	26,446	15,288
VA	5	95
Grand Total	1,442,656	569,411

Table 45 – Common pool groundfish landings by trip port (pounds, live weight)(c0nfidnetila data excluded)

	2010	2011	Total
GLOUCESTER	427,043	270,533	697,576
PORTLAND	388,279	46,017	434,296
NEW BEDFORD	305,389	32,161	337,550
PROVINCETOWN	103,239	76,973	180,212
MONTAUK	79,045	20,820	99,864
LITTLE COMPTON	20,886	8,490	29,376
POINT PLEASANT	7,695	16,775	24,470
HAMPTON BAYS	12,743	6,626	19,369

Table 46 – Common pool landings by permit category and stock

FY 2010 Landings	HB	A	C	D	HA	Grand Total
CODGBW	3,405	115,809	899	1,456	6,514	128,083
CODGMSS	1,328	405,599	761		18,747	426,434
FLDSNEMA		3,311				3,311
FLWGB		12,975				12,975
FLWGMSS	2,905	43,620				46,525
FLWSNEMA	67	3,349	50		23	3,489
HADGBW	233	201,681		11	172	202,098
HADGM	383	13,403	3		1,074	14,863
HALGMMA	3,484	157			293	3,934
HKWGMMA	882	87,785			145	88,812
OPTGMMA	134					134
PLAGMMA	243	46,874				47,117
POKGMASS	3,745	299,944	15	859	9,788	314,351
REDGMGBSS	2	13,410	5	3	88	13,508
WITGMMA		56,310				56,310
WOLGMMA	0					0
YELCCGM	1,306	33,143				34,449
YELGB		17,135				17,135
YELSNE		29,144				29,144
Grand Total	18,116	1,383,650	1,733	2,329	36,844	1,442,672
FY 2011 Landings						
CODGBE		3,907				3,907
CODGBW	5,796	97,183	3,506	175	17,382	124,041
CODGMSS	1,834	62,772	21,988	2,733	63,928	153,255
FLDSNEMA		4,802				4,802
FLWGB		2,411				2,411
FLWGMSS	39	5,257	373			5,669
FLWSNEMA	125	540	1	2		668
HADGBE		10				10
HADGBW		25,655			97	25,752
HADGM	898	2,216	182		858	4,153
HALGMMA	989	75			178	1,243
HKWGMMA	60	24,635	3,862		236	28,793
PLAGMMA	7	7,852	686			8,545
POKGMASS	29,284	100,631	5,257		8,759	143,931
REDGMGBSS	182	7,031	38		147	7,398
WITGMMA		7,543	970			8,513
YELCCGM	74	18,889	66			19,029
YELGB		3,944				3,944
YELSNE	7	25,250				25,257
Grand Total	39,295	400,603	36,929	2,910	91,585	571,321

6.5.10 Recreational Fishing Activity

Several groundfish stocks are targeted by the recreational fishery (including private anglers, party boat operators, and charter vessel operators). Key targets for recreational fishermen in the GOM include GOM cod, GOM haddock, pollock, and GOM winter flounder. GB cod and haddock are targeted as well, but to a lesser extent, and SNE/MA winter flounder is also a target species. Amendment 16 ((Section 6.2.5, NEFMC 2009) included a detailed overview of recreational fishing activity.

With respect to this action, there could be large reductions in the ACLs for GOM haddock and GOM cod. Recreational removals of GOM cod declined by 72 percent from FY 2011 to FY 2012, while catches of GOM haddock declined by 7.5 percent. The number of angler trips also declined by about 30 percent (Table 47). The number of active permits also seems to show a slight decline since 2005, though FY 2012 data are preliminary (Table 48).

Table 47 – Recent recreational fishing activity for GOM cod and GOM haddock. Note that FY 2012 catches are an estimate since not all data are available.

	FY 2011	FY 2012
Angler Trips	235,343	164,684
Cod Total Catch (numbers, a+b1+b2)	1,387,441	728,291
Cod Removals (numbers, a+b1+(0.3*b2)))	773,085	410,231
Cod Removals (weight)	2,116	596
Haddock Total Catch (numbers, a+b1+b2)	180,761	320,893
Haddock Total removals (numbers, a+b1)	142,410	144,145
Haddock Total Removal (weight)	227	211

Table 48 – Recreational for hire permits reporting catches of a groundfish species from the Gulf of Maine

	Active Permits		
Calendar Year	Party	Charter	Grand Total
1999	60	85	145
2000	53	93	146
2001	60	110	170
2002	46	125	171
2003	55	119	174
2004	63	125	188
2005	62	136	198
2006	65	128	193
2007	53	133	186
2008	56	129	185
2009	53	131	184
2010	61	134	195
2011	48	130	178
2012 (preliminary)	41	95	136

6.5.11 Overview of the Atlantic Sea Scallop Fishery

The Scallop FMP was implemented in 1982 and limited entry followed in 1994 (Amendment 4). In the fishing years 2002-2011, the landings from the northeast sea scallop fishery stayed above 50 million pounds, surpassing the levels observed historically (Figure 5). The recovery of the scallop resource and consequent increase in landings and revenues was striking given that average scallop landings per year were below 16 million pounds during the 1994-1998 fishing years, less than one-third of the present level of landings. This section provide background information in terms of landings, revenues, permits, vessels and various ports and coastal communities in the Northeast Sea Scallop Fishery based on the Appendix I to Framework 24. Unless otherwise indicated, all the Tables referred below are included in the same Appendix (Appx. I, FRW 24).

The limited access scallop fishery consists of 347 vessels. It is primarily full-time, with 250 full-time (FT) dredge, 52 FT small dredge vessels and 11 FT net boats (Table 7 and Table 8, Appx. I, FRW 24). Since 2001, there has been considerable growth in fishing effort and landings by vessels with general category permits, primarily as a result of resource recovery and higher scallop prices. Amendment 11 implemented a limited entry program for the general category fishery reducing the number of general category permits after 2007. In 2011, there were 288 LAGC IFQ permits, 103 NGOM and 279 incidental catch permits in the fishery totaling 670 permits (Table 13, Appx. I, FRW 24). Although not all vessels with general category permits were active in the years preceding 2008, there is no question that the number of vessels (and owners) that hold a limited access general category permit under the Amendment 11 regulations are less than the number of general category vessels that were active prior to 2008 (Table 11 and Table 12, Appx. I, FRW 24).

Figure 6 shows that total fleet revenues more than quadrupled from about $120 million in 1994 to almost $600 million in 2011 (in inflation-adjusted 2011 dollars). Scallop ex-vessel prices increased after 2001 as the composition of landings changed to larger scallops that in general command a higher price than smaller scallops. However, the rise in prices was not the main factor that led to the increase in revenue in the recent years compared to 1994-1998. The increase in total fleet revenue was mainly due to the increase in scallop landings and the increase in the number of active limited access vessels during the same period.

There has been a steady decline in the total DAS used by the limited access scallop vessels from 1994 to 2011 fishing years as a result of the effort-reduction measures since Amendment 4 (1994) (Figure 7). The impact of the decline in effort below 30,000 days-at-sea since 2005 (with the exception of 2007) on scallop revenue per vessel was small, however, due to the increase in LPUE from about 1,600 pounds per day-at-sea in 2007 to over 2,300 pounds per day-at-sea in 2011.

The scallop fishery is facing a decline in 2013. Recruitment has been below average for several years on Georges Bank and overall biomass is lower than previous years. Most of the scallop access areas have lower biomass than years past, and several areas in the Mid-Atlantic will be closed in 2013 to protect smaller scallops for future access. Total catch in 2013 will be about 30% less than catch levels in 2012 and 2011. Catch is expected to increase again over 22,000 mt (about 50 million pounds) starting in 2016, if the high levels of recruitment in the Mid-Atlantic grow as projected (Figure 8).

Figure 5 – Scallop landings by permit category and fishing years 1994 – 2011 (dealer data)

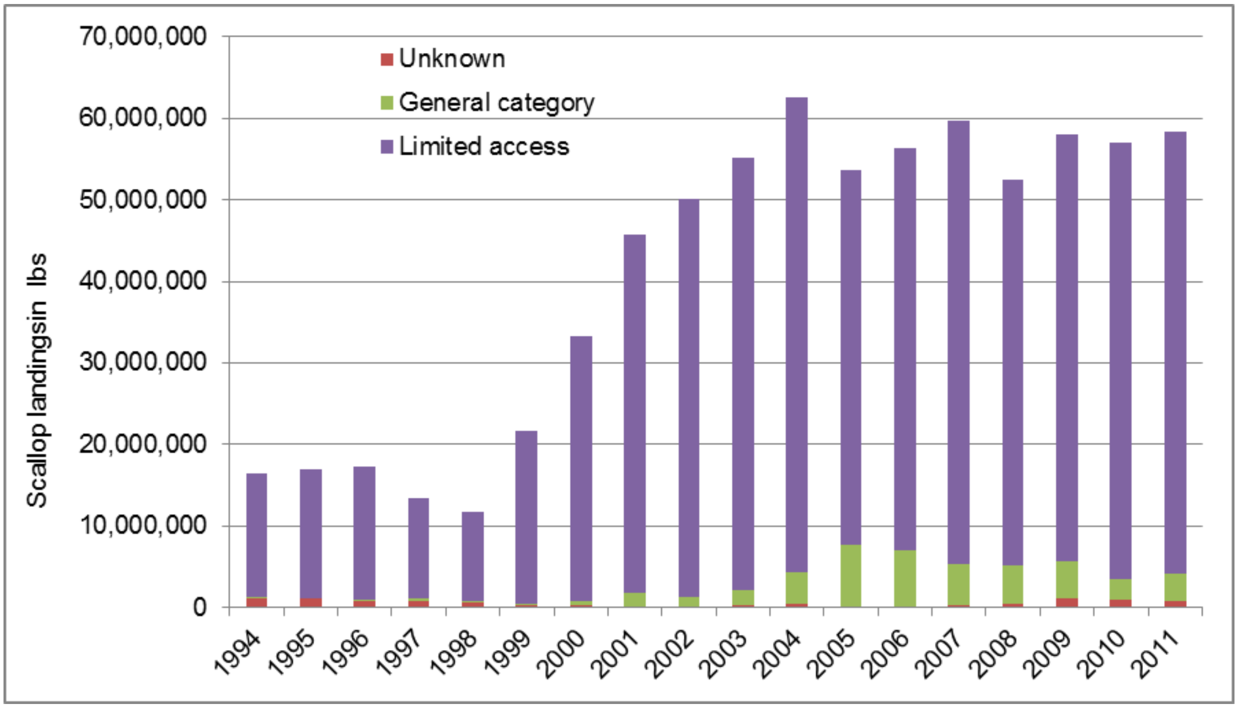


Figure 6 – Scallop revenue by permit category and fishing year in 2011 inflation adjusted prices (dealer data)

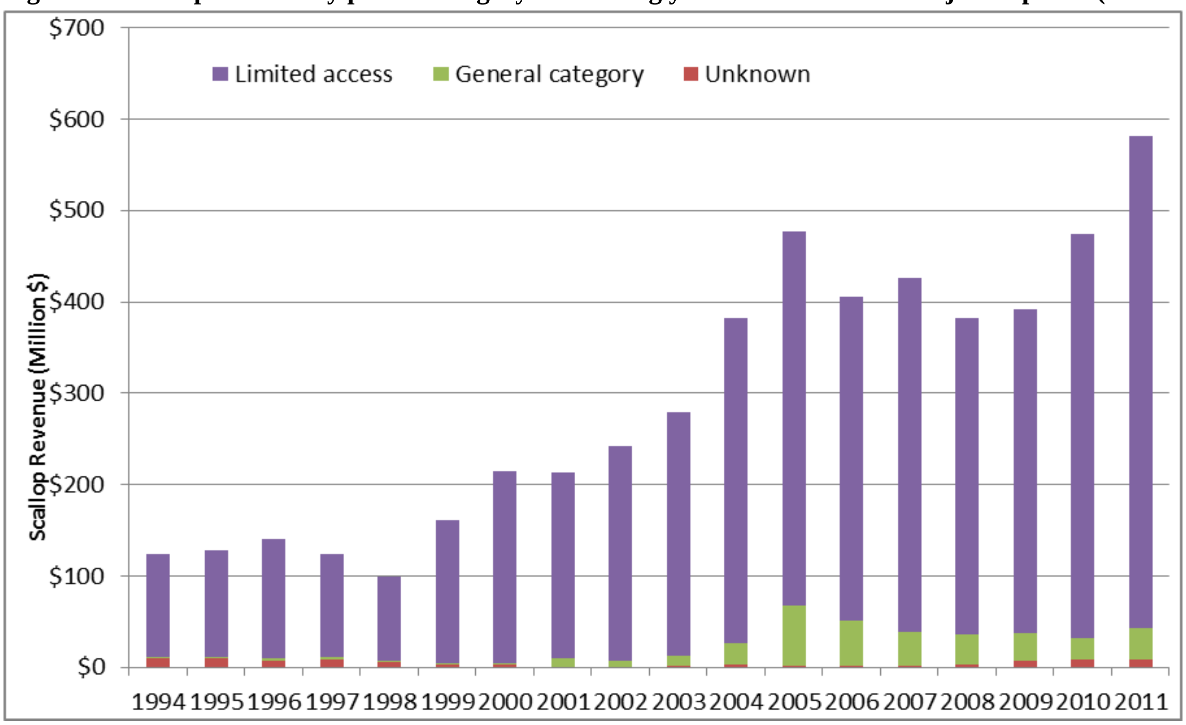


Figure 7 – Total DAS used (date landed – date sailed from VTR data) by all limited access vessels and LPUE

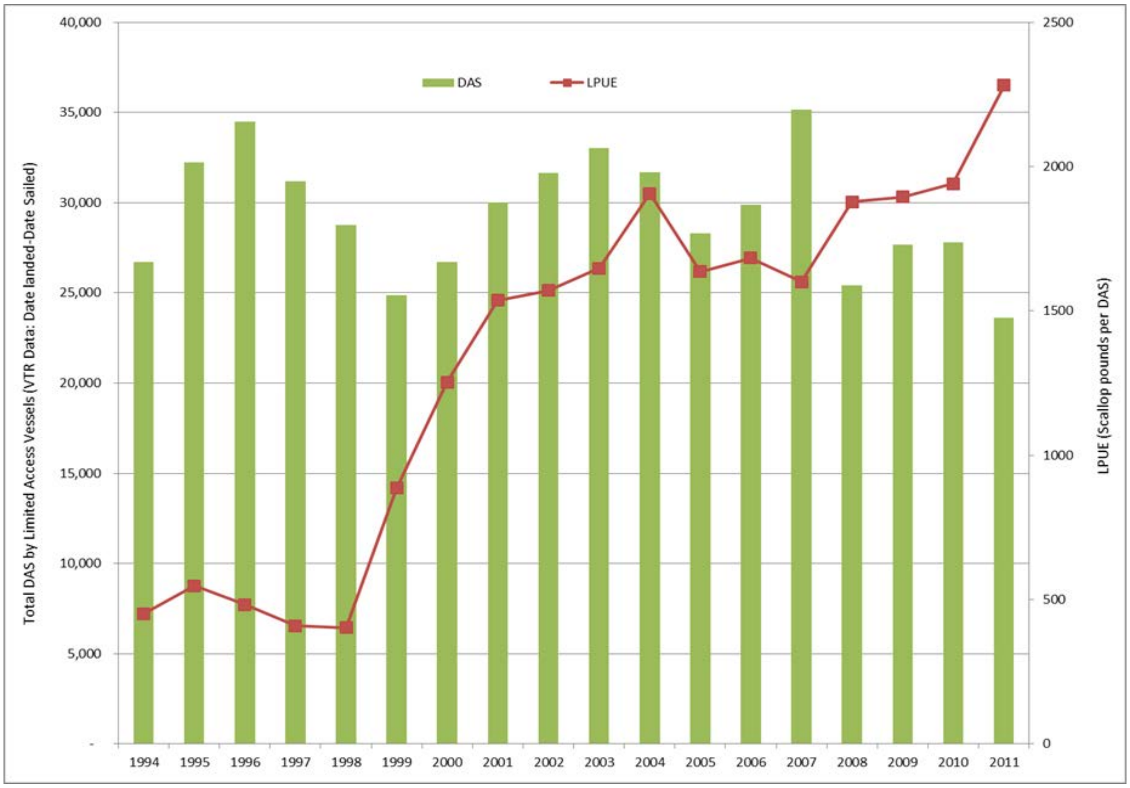
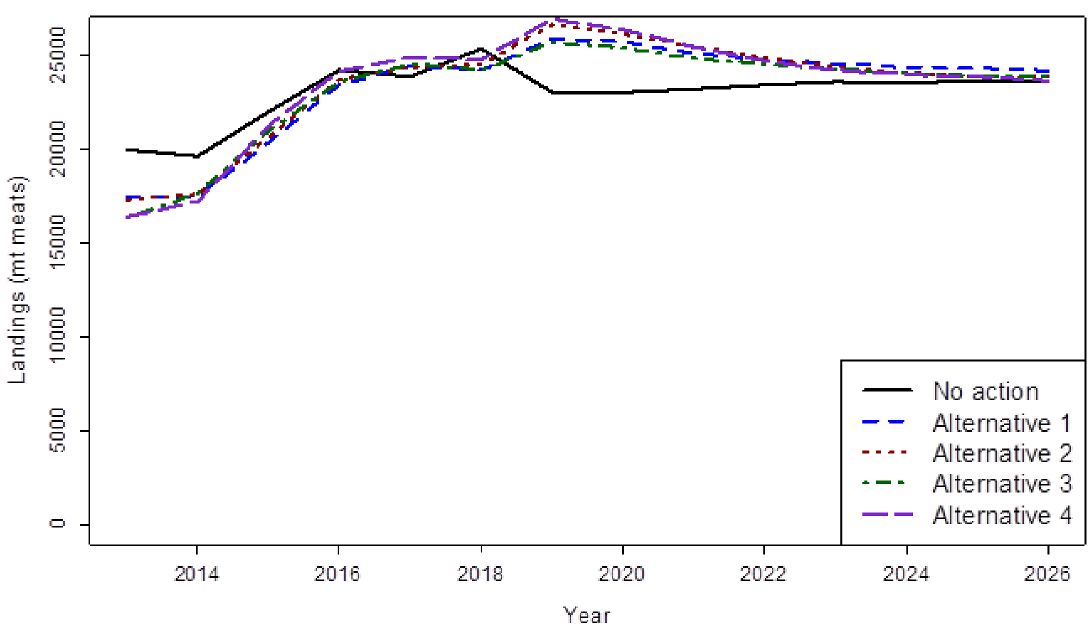


Figure 8 – Projection of future scallop catch under proposed FW25 specifications for FY 2013 (Alternative 2)



Most limited access category effort is from vessels using scallop dredges, including small dredges. The number of vessels using scallop trawl gear has decreased continuously and has been at 11 full-time trawl vessels since 2006 (Section 1.1.6 of Appx. I, FRW 24). Furthermore, according to the 2009-2010 VTR data, the majority of these vessels (10 out of 11 in 2010) landed scallops using dredge gear even though they had a trawl permit. Most general category effort is, and has been, from vessels using scallop dredge and other trawl gear. The percentages of scallop landings show that landings made with a scallop dredge in 2012 continue to be the highest compared to other general category gear types (Table 18 and Table 22, A Appx. I, FRW 24).

Both full-time and part-time limited access vessels had a high dependence on scallops as a source of their income. Full-time limited access vessels had a high dependence on scallops as a source of their income and the majority of the full-time vessels (94%) derived more than 90% of their revenue from the scallop fishery in 2011 (Table 37, Appx. I, FRW 24). Comparatively, part-time limited access vessels were less dependent on the scallop fishery in 2011, with only 37% of part-time vessels earning more than 90% of their revenue from scallops (Table 37, ibid).

Table 38 shows that general category permit holders (IFQ and NGOM) are less dependent on scallops compared to vessels with limited access permits. In 2011, less than half (43%) of IFQ permitted vessels earned greater than 50% of their revenue from scallops. Among active NGOM permitted vessels (that did not also have a limited access permit), 88% had no landings with scallops in 2011. Scallops still comprise the largest proportion of the revenue for IFQ general category vessels, accounting for 38.6% of these vessels revenue. Scallops still comprise the largest proportion of the revenue for IFQ general category vessels, accounting for 38.6% of these vessels revenue (Table 39 Appx I, FRW 24,). For NGOM vessels (that did not also have a limited access permit) scallop landings accounted for less than 1% of revenue in 2011. The composition of revenue for both the IFQ and NGOM general category vessels are shown in Table 39 (ibid).

The number of crew positions, measured by summing the average crew size of all active limited access vessels on all trips that included scallops, has increased slightly from 2,172 positions in 2007 to 2,262 positions in 2011 (a 4% increase) (Table 47, Appx. I, FRW 24). Broken out by home port state, the number of crew positions has stayed relatively constant during the past five years. Limited access vessels with a home port in Massachusetts and New Jersey experienced the largest percentage increase (5%: 969 to 1015 crew positions in MA and 15%: 490 to 564 crew positions in NJ). However, total crew effort in the limited access fishery, measured by crew days, declined from 207,088 to 160,355 (23%, Table 50, Appx I, FRW 24) from 2007 to 2011. The number of crew days on general category vessels followed a similar pattern as the general category crew positions and trips, with large declines in 2008 and 2010, but then an increase in days in 2011(Table 52, ibid.).

The landed value of scallops by port landing fluctuated from 1994 through 2011 for many ports. In 2011 New Bedford accounted for 53% of all scallop landings and it continues to be the number one port for scallop landings. Included in the top five scallop ports are: Cape May, NJ; Newport News, VA; Barnegat Light/Long Beach NJ; and Seaford, VA. It is also fair to describe the fishing activities in these ports as highly reliant on the ex-vessel revenue generated from scallop landings as scallop landings represent greater than 75% of all ex-vessel revenue for each of the ports (Table 59, Appx. I, FRW 24). There are also a number of ports with a comparatively small amount of ex-vessel revenue from scallops but where that scallop revenue represents a vast majority of the revenue from landings of all species (Table 60, ibid.). In 2011, in the ports of Newport News, VA and Seaford, VA; revenue from scallop landings accounted for 89.0% and 99.9% of all ex-vessel revenue respectively (Table 60, ibid.).

In terms of home state, the vessels from MA landed over 45% of scallops in 2010 and 2011 fishing years, followed by NJ with about 24.5% of all scallops landed by vessels homeported in this state (Appx. I, FRW 24). Scallops also comprise a significant proportion of revenue (and landings) from all species with over 90% of total revenue in VA, over 75% of total revenue in NC, over 60% of total revenue in MA and over 68% of total revenue in NJ (ibid.).

As in previous years, the largest numbers of permitted limited access scallop vessels have home ports of New Bedford, MA and Cape May, NJ, which represent 39% and 21% of all limited access vessels, respectively (Table 62, Appx. I, FRW 24). New Bedford also has the greatest number of general category scallop vessels, but while limited access vessels are mostly concentrated in the ports of New Bedford and Cape May, general category vessels are more evenly distributed throughout coastal New England. In addition to New Bedford, Point Judith, RI, Gloucester, MA, Boston, MA, Cape May, NJ and Barnegat Light, NJ, are all the homeport of at least 20 vessels with general category scallop permits (Table 63, ibid).

6.5.12 Overview of the American Lobster Fishery

Today, the commercial sector of the American lobster fishery and the communities involved in that fishery can be seen as the product of resource fluctuation, social and economic conditions as well as changes in management. These conditions impact, not only to the lobster fishery but other fisheries in the region as well. The numbers of fishermen entering or leaving the lobster fishery are often linked to the relative conditions of other fisheries. Also, because of the changes considered in the current sector operation plans could have an effect on the lobster fishery and its communities an overview of lobster fishery is included below.

The commercial lobster fishery is described as having started in the 1840s, concurrent with the development of the re-circulating seawater tank which allowed for an increased distribution of caught lobster (Acheson, 2010). Early in the fisheries history effort was managed by individual states with little interstate uniformity. It wasn't until 1972 that states along the Atlantic coast began cooperative management of the resource under a NMFS State-Federal Partnership Program. As part of this partnership program, the Northeast Maine Fisheries Board (NMFB) was formed to help research and expand management of the American lobster. Following implementation of the 1976 Fisheries Conservation and Management Act (FCMA), the NMFB developed a comprehensive management plan which was submitted to the newly created New England Fishery Management Council in 1978. This management plan would act as a precursor to the NEFMC's American Lobster Fishery Management Plan (ALFMP) that was eventually adopted in 1983. From 1983 to 1994 the lobster fishery was primarily managed through a standardized gear requirement, a minimum landed size and a prohibition on landing 'berried' females. The first real step in limiting effort in the fishery was not taken until 1994 when Amendment 5 to the FMP included a permit moratorium that restricted entry (Acheson, 1997).

Concurrent with the Federal management of the lobster fishery was the implementation of an Interstate Fishery Management Plan (ISFMP) developed by the ASMFC in 1978. The original plan's primary purpose was to establish regulatory uniformity across state and federal jurisdictions, but by 1995, it was becoming clear that maintaining separate management authority by the Atlantic States Marine Fisheries Commission (ASMFC) and its member states under the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) and the NMFS under the FCMA was not accomplishing a unified approach to lobster management. Federal authority over the lobster fishery was eventually transferred to the ASMFC in 1999, by which point seven different lobster conservation areas had been identified (Acheson, 2004). Currently each Lobster Conservation Management Area (LCMA) has its own effort reduction needs which are developed by the respective management team. Amendment 3 to the ISFMP set default trap limits for four of the management areas and Addendum 1 set trap limits for the remaining three.

In 1976 there were an estimated 10,356 vessels participating in the inshore trap fishery and 117 vessels participating in the offshore lobster fishery (Acheson, 1997). Since Amendment 3 and the transfer of federal authority to the ASMFC in 1999, vessel operators have had to apply for an area specific trap permit to fish in one of the seven LCMAs. These permits are not mutually exclusive and owners may apply for any permit for an area that they wish to fish. There are also specific permit categories for non-trap and charter/party fishing as well. Typically the area specific trap permits are used by the directed trap fishery while the non-trap permits are used by the much smaller offshore mobile gear fishery or so that vessels using non-trap gear may land incidentally caught lobsters.

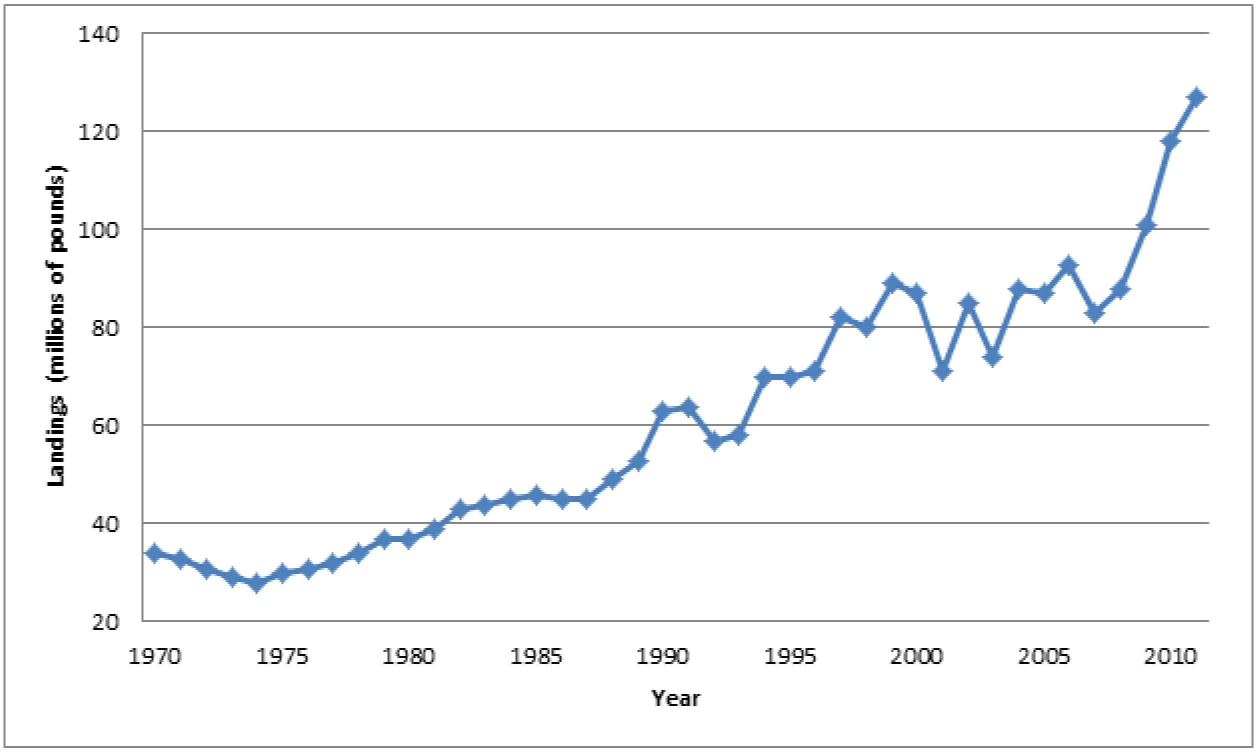
The total number of vessels with any type of lobster permit has stayed relatively constant since the change in management in 1999 (Table 49). The states of Maine and Massachusetts are home to the most vessels with a lobster permit, and combined they account for three quarters of permitted vessels (Table 49). There are some notable differences between the states with regard to the type of permits vessels have. Over the last twelve years, 96% - 99% of vessels with a homeport in Maine have had an area specific trap permit as opposed to only 4% - 8% having the non-trap permit. About half the vessels from other states possess a non-trap permit. For example, in 2011, 483 out of 908 vessels with a home port in Massachusetts have a non-trap permit while two thirds have an area specific trap permit.

Table 49 - Numbers of vessels by homeport state, lobster permit type and year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	3233	3253	3297	3217	3357	3353	3394	3288	3213	3175	3139	3116
ME												
Any LO permit	1187	1210	1286	1335	1417	1462	1527	1455	1413	1424	1428	1452
Non-trap	61	51	57	66	106	116	117	113	107	104	97	93
Charter	2	1	1	2	2	2	1	1				
Any area trap	1160	1189	1268	1314	1376	1409	1469	1404	1368	1375	1381	1414
NH												
Any LO permit	89	97	93	95	116	117	118	115	117	109	111	111
Non-trap	40	46	46	49	56	56	61	61	59	56	60	53
Charter	2	1	1	2	2	2	2	2	2	2	2	2
Any area trap	66	74	72	71	91	89	83	83	85	85	83	85
MA												
Any LO permit	1215	1185	1169	1114	1106	1055	1022	1016	986	974	944	908
Non-trap	442	449	466	474	500	498	497	521	520	518	500	483
Charter	5	3	7	7	8	7	6	7	8	8	7	6
Any area trap	892	894	885	814	793	742	716	684	656	635	617	589
RI												
Any LO permit	257	265	256	243	243	240	240	234	228	217	213	209
Non-trap	73	83	82	88	84	91	90	91	89	83	78	75
Charter	1	1	1	1	1	1	1	2	2	2	2	2
Any area trap	212	222	220	198	203	198	198	191	183	177	176	172
CT												
Any LO permit	32	37	37	34	33	30	30	30	30	31	28	27
Non-trap	12	16	17	18	22	21	21	21	21	20	20	19
Charter					2	2	2	2	2	2	4	4
Any area trap	25	31	30	25	24	22	21	22	21	22	22	22
NY												
Any LO permit	162	153	147	127	138	134	141	128	124	124	118	120
Non-trap	90	86	83	87	91	83	90	79	81	80	77	78
Charter	4	3	3	5	7	7	6	5	5	5	2	1
Any area trap	94	91	93	66	82	85	86	79	73	74	71	71
NJ												
Any LO permit	166	180	184	152	184	186	193	192	202	190	194	192
Non-trap	78	95	95	117	122	134	138	136	144	136	138	139
Charter	13	10	10	10	13	12	11	11	11	11	11	11
Any area trap	105	115	118	50	86	82	83	84	91	88	89	82

Although the fishery has existed for almost two centuries, consistent and relievable landing statistics are not available prior to 1950. From about 1957 through 1974, landings from the lobster fishery remained relatively constant at an average of about 30 million pounds per year. Landings of lobster steadily increased from 28 million pounds in 1974 to 64 million pounds in 1991 before declining to 57 million pounds in 1992 (Figure 9). Landings then continued to rise to 89 million pounds in 1999, after which lobster landings would oscillate almost year to year by nearly 15 million pounds from 2000 to 2007. In the most recent years lobster landings have experienced an unprecedented high exceeding 100 million pounds since 2009, and nearly reaching 127 million pounds in 2011.

Figure 9 – Trend in landings of American lobster 1970 - 2011



Maine has always been the leading producer of lobsters, but its share of total landings has fluctuated over time. Throughout the 1970s Maine accounted for between 52% and 61% of total lobsters landed from Maine to New Jersey (Table 50). Expansion of lobster landings during the 1980s, particularly in Massachusetts, reduced the share of lobster Maine supplies to less than 50% until the mid-1990s. However, since 2000 the contribution of the Maine lobster fishery to total landings increased steadily to more than 80% of the domestic harvest in 2004 before declining slightly 2005 - 2008. The increasing proportion of Maine landings is due to a combination of increased landings in Maine and declining landings in just about every other state.

Table 50 - Annual share or 5-year average annual share of lobster landings by state, 1970–2011

Year(s)	ME	NH	MA	RI	CT	NY	NJ
1970 - 1974	55.1%	1.9%	19.8%	12.8%	1.9%	3.9%	4.5%
1975 - 1979	58.3%	1.6%	24.0%	9.7%	2.0%	1.9%	2.5%
1980 - 1984	52.5%	2.5%	29.3%	8.4%	3.2%	2.5%	1.7%
1985 - 1989	43.7%	2.5%	32.6%	11.1%	3.8%	3.3%	3.0%
1990 - 1994	49.5%	2.7%	25.7%	11.0%	3.9%	5.1%	2.1%
1995 - 1999	55.9%	1.9%	19.3%	7.6%	3.9%	10.4%	0.9%
2000	65.9%	2.0%	18.2%	8.0%	1.6%	3.3%	1.0%
2001	68.2%	2.8%	17.0%	6.2%	1.9%	2.9%	0.8%
2002	74.7%	2.4%	15.1%	4.5%	1.3%	1.7%	0.3%
2003	74.6%	2.7%	15.5%	4.7%	0.9%	1.3%	0.3%
2004	81.1%	0.2%	12.8%	3.5%	0.7%	1.1%	0.4%
2005	78.3%	2.9%	11.3%	4.9%	0.8%	1.3%	0.4%
2006	78.4%	2.9%	11.9%	4.1%	0.9%	1.3%	0.5%
2007	77.3%	3.7%	12.3%	3.9%	0.7%	1.2%	0.8%
2008	79.3%	2.9%	12.0%	3.2%	0.5%	1.4%	0.7%
2009	80.7%	3.0%	11.7%	2.8%	0.5%	1.0%	0.3%
2010	81.7%	3.1%	10.8%	2.5%	0.3%	1.0%	0.6%
2011	83.0%	3.1%	10.6%	2.2%	0.1%	0.5%	0.6%

From 1970 up to the present, the American lobster fishery has been either the most or second most valuable fishery in the Northeast region. Nominal dockside revenue from American lobster has increased steadily from $33 million in 1970 to $314 million in 2000. Since 2000, revenues from lobster have fluctuated but most recently they have exceeded $400 million in 2010 and 2011 (Table 51). As with landings, Maine has consistently had the highest revenues from lobster of any NE state.

Table 51 - Lobster revenue (in thousands of dollars) by state and year 2000-2011

	ME	NH	MA	RI	CT	NJ	NY	Total
2000	$187,715	$7,081	$70,128	$28,103	$5,501	$3,694	$11,555	$314,070
2001	$153,982	$8,072	$53,469	$18,747	$5,453	$2,471	$7,357	$249,840
2002	$210,950	$8,164	$56,582	$15,875	$4,226	$1,139	$5,131	$302,200
2003	$205,715	$8,556	$52,373	$16,731	$3,170	$1,028	$4,426	$292,189
2004	$289,079	$925	$51,643	$14,593	$3,166	$1,800	$3,722	$365,186
2005	$317,948	$14,377	$48,793	$23,010	$3,821	$1,999	$4,396	$414,677
2006	$296,855	$13,915	$52,593	$18,408	$4,031	$2,533	$6,289	$394,918
2007	$280,645	$16,410	$51,268	$17,237	$3,222	$4,055	$5,288	$378,456
2008	$245,186	$12,268	$45,426	$12,994	$2,106	$3,215	$5,498	$326,962
2009	$237,379	$11,919	$42,561	$11,201	$1,914	$1,146	$3,932	$310,293
2010	$318,234	$14,835	$50,261	$12,371	$1,757	$2,910	$4,485	$405,058
2011	$334,974	$16,346	$53,334	$12,728	$816	$3,086	$2,533	$424,087

With respect to the influence of events occurring in other fisheries on the lobster fishery; prior to 1994 most fisheries in the Northeast region had been open access. The relative ease with which one could move between fisheries allowed vessel owners and operators participating in the lobster fishery to pursue other fisheries without having to qualify for any specific permit. At the same time, landings in the lobster fishery were increasing rapidly during the 1980s and early 1990s, drawing in additional effort that had previously been engaged in other fisheries. Once limited entry was introduced in the groundfish and scallop fisheries in 1994 many part-time lobster participants were excluded from those permit allocations as they failed to have the necessary landings to qualify. Because of resource depletion and the increasingly stringent regulations found in other fisheries, there has been a contraction of the lobster fishing industry that has increased dependence on lobster fishing (Thunberg, 2007). In the groundfish fishery there maybe contraction as well; lobster landings made by vessels in the groundfish fishery decreased by 1.4 million pounds between the first two years of sector management.

6.5.13 Small-Mesh Bottom Trawl Fishing on Georges Bank

This action considers two measures that could affect fisheries that use small-mesh bottom trawls on Georges Bank. It may adopt a requirement that these fisheries use selective trawl gear to reduce catches of GB yellowtail flounder, and it may adopt a sub-ACL for GB yellowtail flounder for small mesh fisheries. The two primary fisheries that use small-mesh on GB are the loligo squid and whiting fisheries. Often vessels make trips that land both species, so it is not always possible to assign a trip to one fishery or the other. This section provides a brief overview of fishing activity for those two fisheries.

Loligo squid and whiting are primarily caught by bottom otter trawls. The following analyses focus on normal bottom otter trawls, separator trawls, Ruhle trawls, and beam trawls that target these species on Georges Bank. There is also a small percentage of landings that cannot be attributed to gear that is included in the summaries. All weights are converted to live weights. Data are reported for calendar years, consistent with the way the loligo squid fishery is monitored. All data was extracted from the NMFS/NERO DMIS database.

A small number of vessels landed squid or whiting from the GB yellowtail flounder stock area in 2010 and 2011 (Table 52). Most loligo squid landings in 2010 and 2011 were taken in the SNE/MA area, with less than ten percent of the landings taken in the GB yellowtail flounder stock area (Table 53). Over 95% of the loligo squid caught in the GB yellowtail flounder stock area is caught in SAs 525 and 562 (Table 55). With respect to whiting, however, the GB yellowtail flounder stock area provided between 44% and 48% of total whiting landings (Table 54). Whiting is more broadly distributed in the GB yellowtail flounder stock area, with 25-30% taken in each of the SAs 522 and 525, and most of the remainder in SA 562 (Table 56).

Squid and whiting revenues from the GB yellowtail flounder stock area accounted for 24 percent of the revenues from these species on 2010, and 17 percent in 2011. For the trips that caught whiting or squid in the GB yellowtail flounder stock area, revenues from these two species accounted for over sixty percent of trip revenues. Whiting revenues were larger than squid revenues on these trips – squid accounted for 24-33 percent of the revenues from these two species (Table 57). Most of the landings from this area were in Massachusetts, with 57 percent of the revenues in 2010 and 72 percent of the revenues in 2011 from that state. Connecticut, Rhode Island, and New York were the primary other states with revenues from this area (Table 58).

Both loligo and whiting landings have a distinct seasonal component (Figure 10). Loligo landings are high in the fall and winter (first and fourth calendar year quarters) and decline in the spring and summer. Whiting landings reflect the opposite pattern.

Table 52 – Number of vessels landing whiting or loligo squid in 2010 and 2011 by broad stock areas

STOCK_AREAS	2010	2011
GOM	32	34
521	8	7
GBYTFAREA	34	30
SNEMA	320	296
OTHER	30	47
Grand Total	424	414

Table 53 – Landings of loligo squid by broad stock area, 2010 and 2011 (pounds, live weight)

STOCK_AREAS	2010	2011
GOM	38,806	17,112
521	4,154	647
GBYTFAREA	1,385,159	1,315,051
SNEMA	15,700,205	20,888,013
OTHER	60,315	117,520
Grand Total	17,188,639	22,338,343
GB YTF Area as %	8%	6%

Table 54 – Landings of whiting (silver and offshore hake) by broad stock area, 2010 and 2011 (pounds, live weight)

STOCK_AREAS	2010	2011
GOM	1,664,758	1,549,340
521	74,296	96,190
GBYTFAREA	8,747,531	7,717,515
SNEMA	7,684,438	7,979,919
OTHER	183,539	220,894
Grand Total	18,354,562	17,563,858
GB YTF Area as %	48%	44%

Table 55 – Percent of loligo squid landings from each statistical area in the GB yellowtail flounder stock area

AREA	2010	2011	Total
522	4%	1%	3%
525	57%	74%	66%
543	0%	0%	0%
561	0%	0%	0%
562	39%	24%	32%
Grand Total	100%	100%	100%

Table 56 – Percent of whiting landings from each statistical area in the GB yellowtail flounder stock area

AREA	2010	2011	Total
522	26.06%	26.62%	26.33%
525	25.73%	39.68%	32.27%
543	0.30%	0.39%	0.34%
561	0.01%	0.01%	0.01%
562	47.90%	33.29%	41.05%
Grand Total	100.00%	100.00%	100.00%

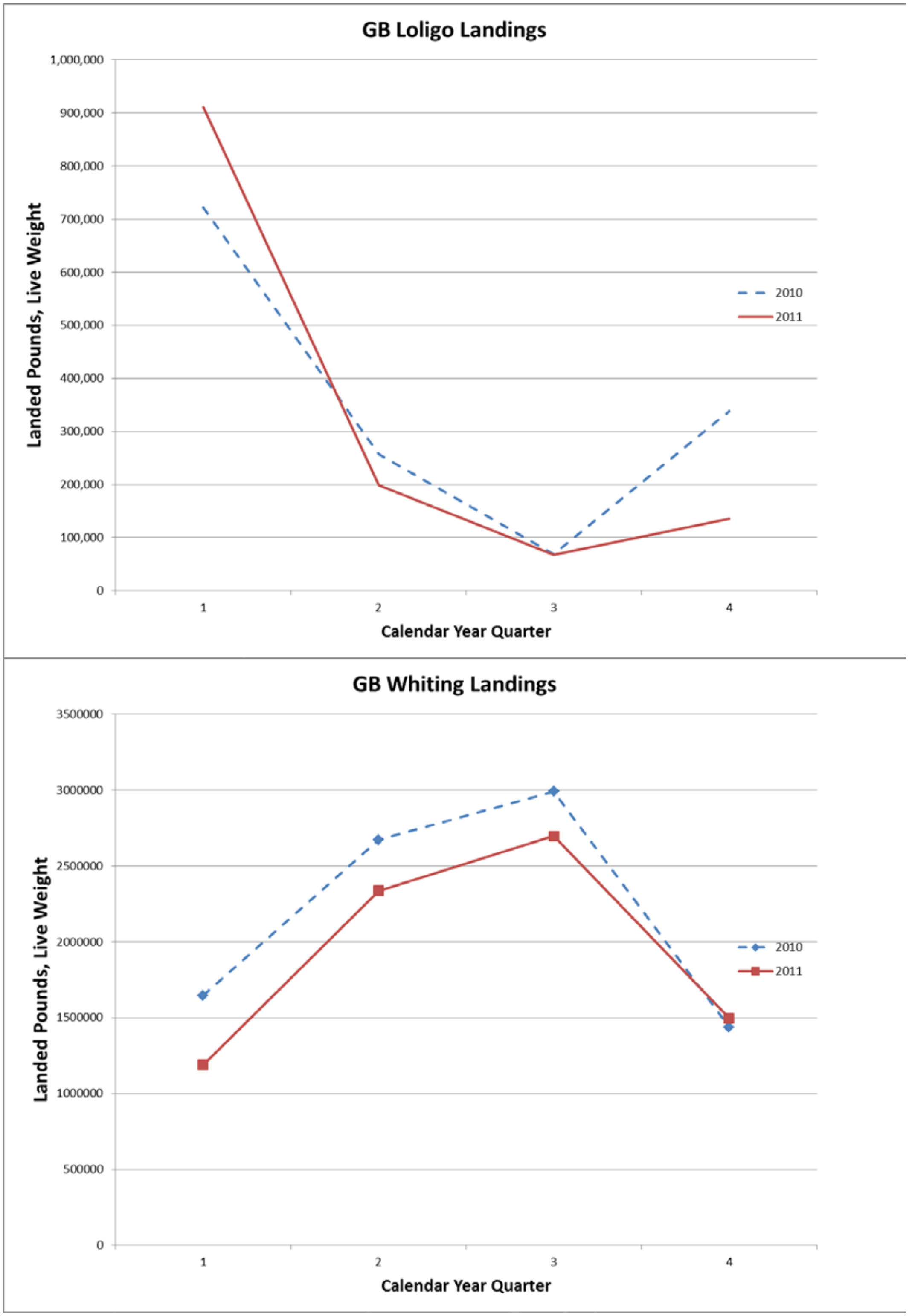
Table 57 – Revenues on squid and/or whiting trips by broad stock areas

YEAR	STOCK_AREAS	SQUID_DOLLARS	WHITING_DOLLARS	TOTAL_DOLLARS
2010	GOM	$42,269	$1,078,620	$6,849,033
	521	$6,770	$32,410	$1,369,161
	GBYTFAREA	$1,638,859	$5,275,521	$10,172,184
	SNEMA	$16,286,126	$4,780,527	$49,141,364
	OTHER	$58,925	$93,645	$600,828
2010 Total		$18,032,950	$11,260,722	$68,132,570
2011	GOM	$17,318	$999,571	$10,533,557
	521	$952	$77,317	$1,877,336
	GBYTFAREA	$1,636,814	$4,725,911	$9,930,530
	SNEMA	$24,443,913	$5,302,990	$70,296,182
	OTHER	$155,012	$110,631	$1,104,848
2011 Total		$26,254,009	$11,216,421	$93,742,453
Grand Total		$44,286,959	$22,477,143	$161,875,022

Table 58 – Revenues from squid and whiting trips by broad stock area

YEAR	DLR_STATE	SQUID_DOLLARS	WHITING_DOLLARS	TOTAL_DOLLARS
2010		$5,646	$109,616	$124,367
	CT	$167,228	$846,720	$1,169,255
	MA	$600,953	$3,021,961	$5,846,492
	ME	$0	$239	$53,647
	NY	$347,032	$910,419	$1,399,220
	RI	$517,999	$386,567	$1,579,202
2010 Total		$1,638,859	$5,275,521	$10,172,184
2011		$5,078	$43,050	$55,195
	CT	$82,915	$429,308	$588,666
	MA	$875,376	$3,805,886	$7,136,582
	ME	$0	$10	$10,443
	NJ	$1,134	$49	$1,433
	NY	$347,829	$276,891	$664,824
	RI	$324,482	$170,718	$1,473,387
2011 Total		$1,636,814	$4,725,911	$9,930,530
Grand Total		$3,275,672	$10,001,432	$20,102,714

Figure 10 – Seasonal pattern of loligo and whiting landings from Georges Bank (calendar years)



7.0 Environmental Consequences – Analysis of Impacts

7.1 Biological Impacts

Biological impacts discussed below focus on expected changes in fishing mortality for regulated multispecies stocks. Changes in fishing mortality may result in changes in stock size. Impacts on essential fish habitat and endangered or threatened species are discussed in separate sections. Impacts are discussed in relation to impacts on regulated multispecies and other species.

Throughout this section, impacts are often evaluated using an analytic technique that projects future stock size based on a recent age-based assessment. These projections are known to capture only part of the uncertainties that are associated with the assessments projections. There is evidence that in the case of multispecies stocks the projections tend to be optimistic when they extend beyond a short-term period (1-3 years). This means that the projections tend to over-estimate future stock sizes and under-estimate future fishing mortality. Attempts to find a way to make the projections more accurate have so far proven unsuccessful. These factors should be considered when reviewing impacts that use this tool.

7.1.1 Formal Rebuilding Programs and Annual Catch Limits

7.1.1.1 SNE/MA Winter Flounder Rebuilding Strategy

7.1.1.1.1 Option 1: No Action

Impacts on regulated groundfish

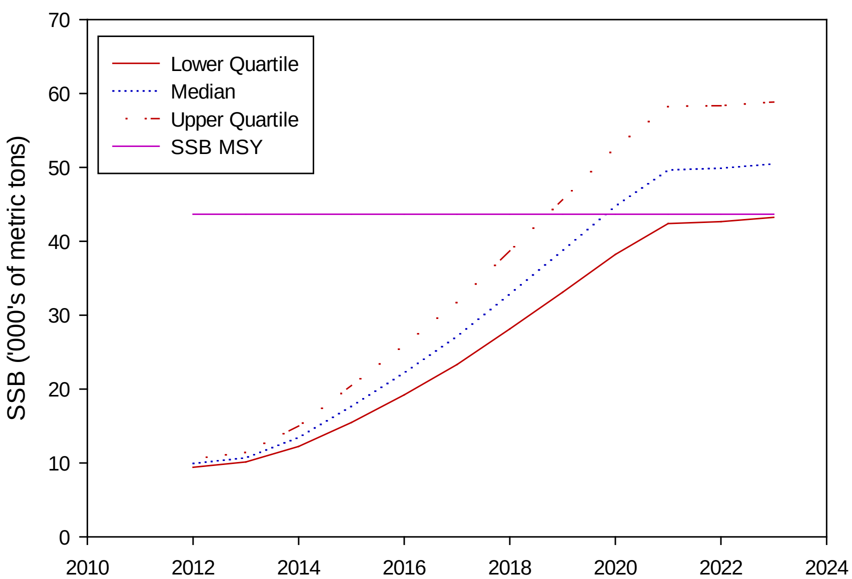
This option would keep the current rebuilding strategy for SNE/MA winter flounder, which targets rebuilding by 2014 with a median probability of success. The direct biological impacts of this measure would be on SNE/MA winter flounder. Because the stock cannot rebuild by that date in the absence of all fishing mortality, the current management strategy targets as low a fishing mortality rate as possible. The two-year (2010/2011) average resulting from this strategy was about F=0.07. This fishing mortality would be lower than that in Option 2, which would be expected to result in more rapid rebuilding of the stock. The stock would be expected to rebuild by 2019 with a median probability, three years earlier than the rebuilding date expected under Option 2. The rebuilding trajectory for this option is compared to the trajectory for F=0 (used to determine the maximum permissible rebuilding period) and Frebuild (Option 2) in Figure 12. Under No Action, the stock would not rebuild by 2014 but would rebuild by 2019 (Figure 11).

This option could also have indirect effects on other regulated groundfish stocks, since SNE/MA winter flounder is only part of a complex fishery. For example, during some times of the year, SNE/MA winter flounder and SNE/MA yellowtail flounder are caught on the same fishing trips. Limiting SNE/MA winter flounder catches may reduce catches of SNE/MA yellowtail flounder because it may deter some groundfish fishing trips (as compared to Option 2).

Impacts on other species

When compared to Option 2, this option may indirectly reduce interactions between the groundfish fishery and other species that are caught as bycatch on groundfish fishing trips because it may lead to fewer groundfish fishing trips in the SNE/MA winter flounder stock area. Counter to this possibility is the chance that vessels that would fish for SNE/MA winter flounder under Option 2 may target other species as a substitute. It is not clear how these two different behaviors would interact and whether the net result would be more or less catches of other species. ACL and AM systems for other stock, however, should prevent overfishing from occurring in either case and so the possible impacts would not be expected to compromise mortality targets.

Figure 11 - Projected SNE/MA winter flounder stock size under Option 1



7.1.1.1.2 Option 2: Revised Rebuilding Strategy (Preferred Alternative)

Impacts on regulated groundfish

This option would adopt a new rebuilding strategy for SNE/MA winter flounder and would target rebuilding by 2023 with a median probability of success. The assumption is that this change would lead to an additional change in management measures that would allow fishermen to land this stock. The direct impacts of this measure would be on SNE/MA winter flounder. The current estimate of the constant fishing mortality necessary to rebuild by 2023 is 0.175, which is higher than would be expected under

Option 1/No Action based on the mortality realized in 2010 and 2011. This would be expected to result in slower rebuilding of the stock. Under Option 2, the stock would rebuild by 2023 (Figure 12). The rebuilding trajectory for this option is compared to the trajectory for F=0 and No Action (Option 1) in Figure 13.The stock would rebuild three years later than the rebuilding date expected under Option 1/No Action.

This option could also have indirect effects on other regulated groundfish stocks, since SNE/MA winter flounder is only part of a complex fishery. During some times of the year, SNE/MA winter flounder and SNE/MA yellowtail flounder are caught on the same fishing trips. Increasing SNE/MA winter flounder catches (as compared to Option 1/No Action) may increase catches of SNE/MA yellowtail flounder because it may encourage more groundfish fishing trips. Since this stock is managed with ACLs and AMs, fishing mortality targets would not be expected to be exceeded.

One provision of this measure may help increase the pace of rebuilding. This measure would allow short term catch advice to be based on a fishing mortality that is less than Frebuild in order to take account of the uncertainty in stock projections. Setting catches in this manner – if that choice is made – may result in reducing fishing mortality below Frebuild and would be expected to expedite rebuilding. This option, however, would probably not rebuild as quickly as Option 1/No Action even if this is the case.

Since the stock could rebuild by 2019 in the absence of all fishing mortality, the maximum rebuilding period is ten years from the implementation date of the program. The rebuilding period is extended to the maximum period in order to minimize the impacts on fishing communities, as described in Section 7.4.1.1.2.

Impacts on other species

When compared to Option 1/No Action, this option may indirectly increase interactions between the groundfish fishery and other species that are caught as bycatch on groundfish fishing trips if it leads to more groundfish fishing trips. Counter to this possibility is the chance that vessels that would fish for other species under Option /No Action may target SNE/MA winter flounder as a substitute. It is not clear how these two different behaviors would interact and whether the net result would be more or less catches of other species. ACL and AM systems for other stock, however, would prevent overfishing from occurring in either case and so the possible impacts would not be expected to compromise mortality targets.

Figure 12 - Projected SNE/MA winter flounder stock size under Option 2

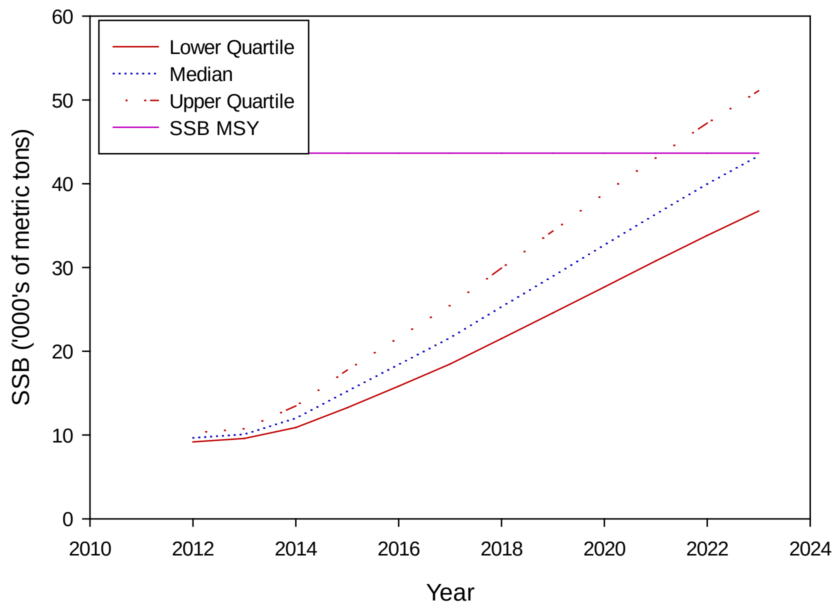
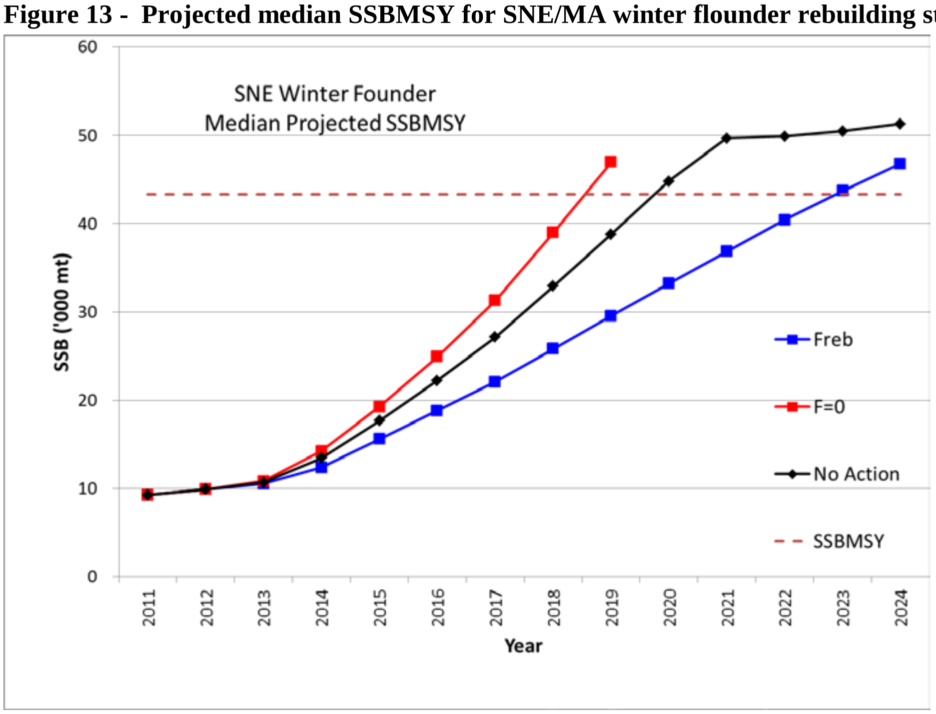


Figure 13 - Projected median SSBMSY for SNE/MA winter flounder rebuilding strategies



7.1.1.2 Annual Catch Limit Specifications

7.1.1.2.1 Option 1: No Action

Impacts on regulated groundfish

A number of groundfish stocks do not have FY 2013 specifications defined in previous actions. This option would not set specifications for these stocks in FY 2013; stocks with FY 2013 specifications from previous actions would be maintained and are not discussed further. The distribution of Annual Catch Limits (ACLs) to other fishery sub-components would be maintained.

No Overfishing Level (OFL), Acceptable Biological Catch (ABC) or ACLs would be defined for certain stocks in the multispecies fishery. Without specification of an ACL, a catch would not be allocated to the groundfish fishery (sectors or common pool vessels) and targeted groundfish fishing activity would not occur for these stocks. Catches would not be eliminated because there would probably be incidental catches or bycatch from other fisheries. The lack of an OFL makes it difficult to determine whether overfishing is likely to occur, however, with limited fishing activity the probability of overfishing would be low. Accountability Measures (AMs) would be maintained but are expected to have a low probability of being triggered without allocations.

In addition to the lack of targeted groundfish fishing activity on stocks without an ACL, certain provisions of the sector management system make it likely that fishing activity could be constrained even for stocks with an ACL that is specified. Current management measures require that a sector stop fishing in a stock area if it does not have ACE for a stock. Fishing can continue on stocks for which the sector continues to have ACE only if the sector can demonstrate it will not catch the ACE-limited stock. What these provisions mean is that in most cases there will be little opportunity for sector vessels to fish on stocks that have an ACL under this option because of this requirement. Since there would be no allocations for GOM cod, GOM haddock, GB cod, GB haddock, GB yellowtail flounder, witch flounder, white hake, plaice, CC/GOM yellowtail flounder from 2013-2015, the only area that most groundfish fishing activity could occur is the SNE area. As a result, in general this option would be expected to result in dramatically lower fishing mortality and more rapid stock rebuilding than would be the case for Option 2.

For stocks that have an age-based assessment, an age-based projection model was used to estimate the short-term impacts on stock size of setting the ABCs. These project the estimated median stock sizes expected to result by limiting catches to the ABC. Recent experience suggests that the projections tend to be biased high, predicting stocks sizes that are larger than realized and fishing mortality rates that are higher than expected (Groundfish Plan Development Team, pers. comm.). The effect of no groundfish allocations was explored in stock projections for the following stocks:

- Georges Bank Cod
- Gulf of Maine Cod
- Georges Bank Haddock
- Gulf of Maine Haddock

- Georges Bank Yellowtail Flounder
- Southern New England/Mid Atlantic Yellowtail Flounder
- Cape Cod/Gulf of Maine Yellowtail Flounder
- American Plaice
- Witch Flounder
- Redfish

Since there may be catches of these stocks in other fisheries the projections used an estimate of other sub-components catches to approximate the catches that might occur.

GB cod

Under Option 1, Georges Bank cod projections indicate an increase in SSB but it remains below the SSB_{MSY} from the updated assessment in 2012 (Figure 14). Option 1 does not differ greatly from the low or high catch projections from Option 2, however, increases in SSB are lower under Option 2. An additional projection based on the benchmark assessment shows a similar increase in SSB compared to the projection from the 2012 Assessment Update; SSB_{MSY} differs between the assessments but the SSB remains well below the SSB_{MSY} (Figure 15).

GOM cod

Under Option 1, Gulf of Maine cod projections indicate an increase in SSB occurs but it remains below the SSB_{MSY} from SAW 53 (Figure 16). Option 1 does not differ greatly from the low or high catch projections from Option 2, however, increases in SSB are lower under Option 2. Two additional projections based on the 2012 benchmark assessment base case and Mramp scenarios show a similar increase in SSB compared to the projection from the 2012 Assessment Update; SSB_{MSY} differs between the assessments and between the SAW 55 models but the SSB remains well below the SSB_{MSY} in all cases (Figure 17 and Figure 18).

GB Haddock

Georges Bank haddock SSB was estimated to be above the SSBMSY in 2010; projections indicate a further increase in SSB above the SSB_{MSY} under Option 1 (Figure 19). Option 1 would allow the SSB to increase to a higher level than under Option 2, with no apparent decline occurring in 2015.

GOM Haddock

Under Option 1, Gulf of Maine haddock projections indicate that SSB will increase after 2013 and there is some indication that the stock may increase above the SSB_{MSY} (Figure 20). Option 1 would allow for greater increases in SSB than Option 2.

GB Yellowtail Flounder

Under Option 1, Georges Bank yellowtail flounder biomass is projected to increase slightly but it remains well below the SSB_{MSY} (Figure 21). Option 1 would allow for greater increases in SSB than Option 2.

SNE/MA Yellowtail Flounder

Following a recent change in the recruitment assumption for SNEMA yellowtail flounder, the stock is fully rebuilt. Some increases in SSB are estimated under Option 1 (Figure 22). Option 1 results in continued increases in the stock over time. The SSB is projected to be larger under Option 1 than under Option 2.

CC/GOM Yellowtail Flounder

Under Option 1, Cape Cod/Gulf of Maine yellowtail flounder projections indicate that SSB will increase after 2013 and there is some indication that the stock may increase above the SSB_{MSY} (Figure 23). The SSB is projected to be larger under Option 1 than under Option 2.

Plaice

American plaice projections indicate an increase in SSB but it doesn't appear to increase the stock above the SSB_{MSY} from the updated assessment in 2012 (Figure 24). Under Option 1 there is a slight increase in stock size before 2013, followed by larger increases up to 2015. Larger increases in SSB occur under Option 1 than under Option 2.

Witch Flounder

Under Option 1, witch flounder projections indicate that SSB will increase after 2013 and there is some indication that the stock may increase above the SSB_{MSY} (Figure 25). Larger increases in SSB occur under Option 1 than under Option 2.

Redfish

Under Option 1, redfish SSB projections indicate a further increase in SSB above the SSB_{MSY} (Figure 26). The SSB also increases under Option 2 but it is lower than in Option 1.

Figure 14 - Projected GB Cod stock size

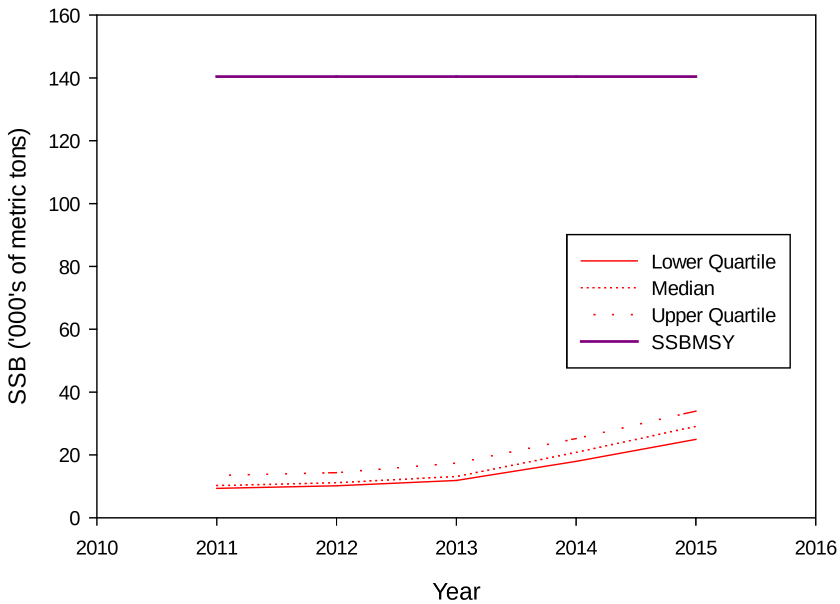


Figure 15 – Projected GB Cod stock size based on results of SARC 55

Figure 16 - Projected GOM Cod stock size

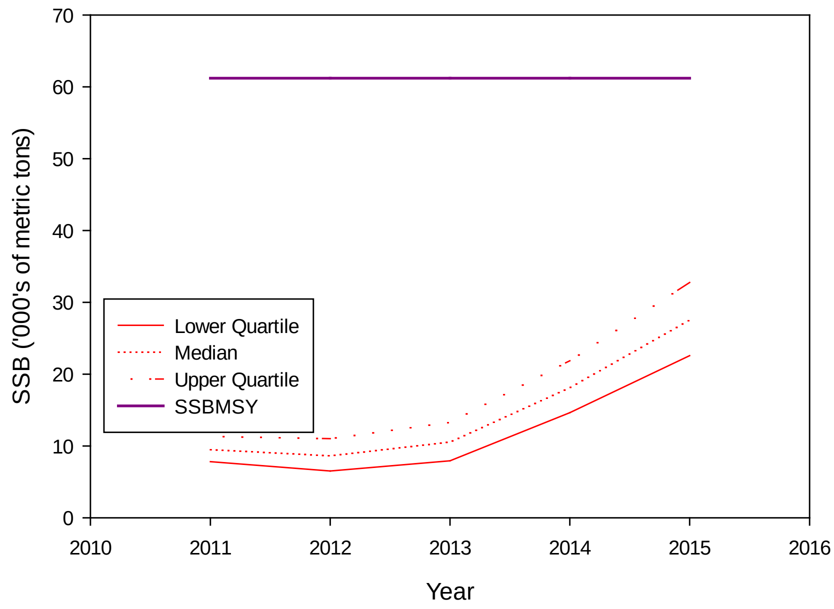


Figure 17 – Projected GOM Cod stock size based on SARC 55 base case scenario

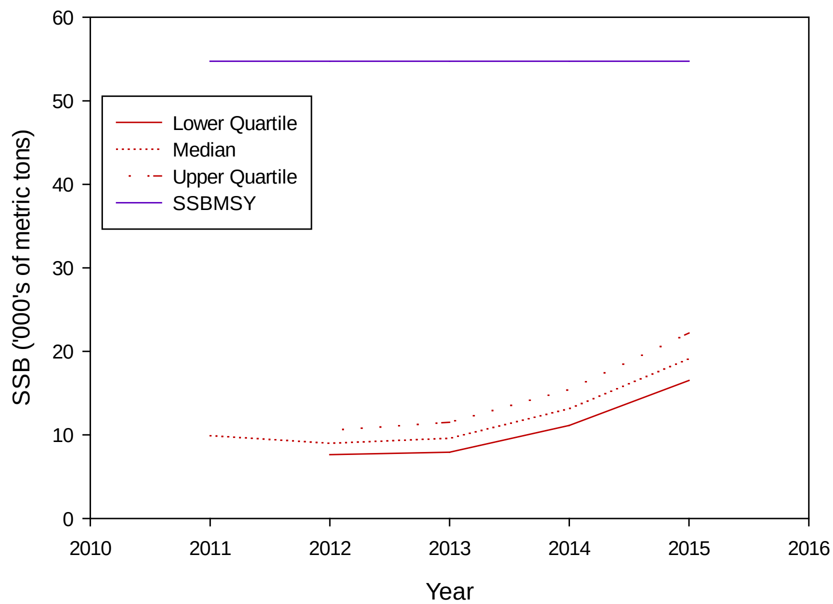


Figure 18 – Projected GOM Cod stock size based on SARC 55 Mramp scenario

Figure 19 - Projected GB Haddock stock size

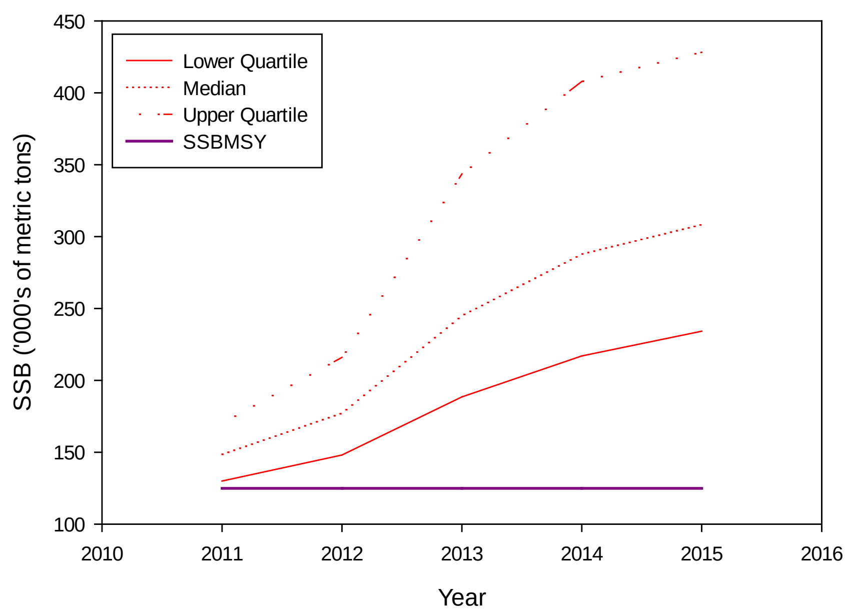


Figure 20 - Projected GOM Haddock stock size

Figure 21 - Projected GB Yellowtail Flounder stock size

Figure 22 - Projected SNEMA Yellowtail Flounder stock size

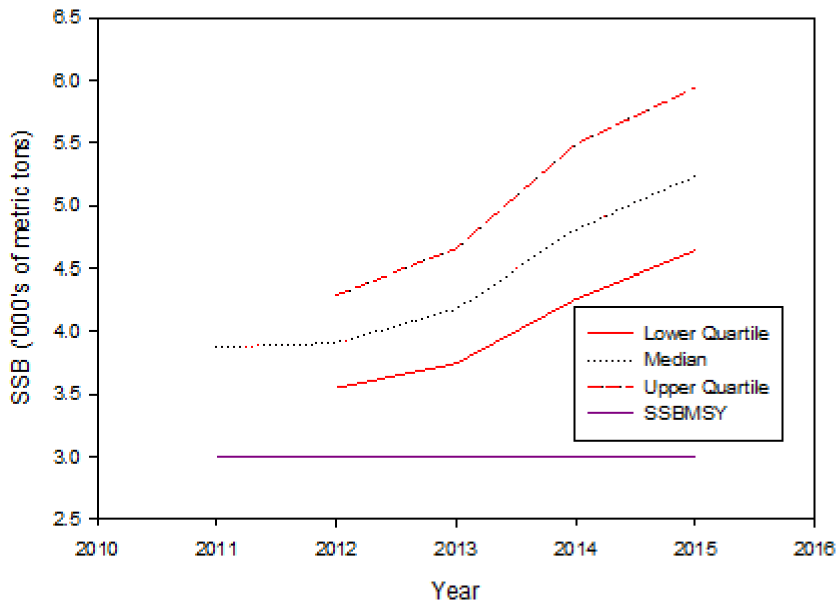


Figure 23 - Projected CC/GOM Yellowtail Flounder stock size

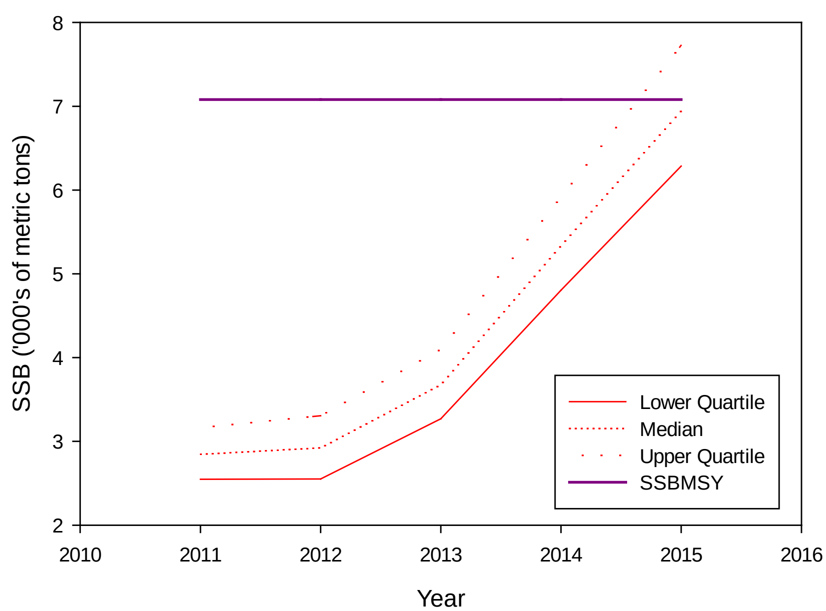


Figure 24 - Projected American Plaice stock size

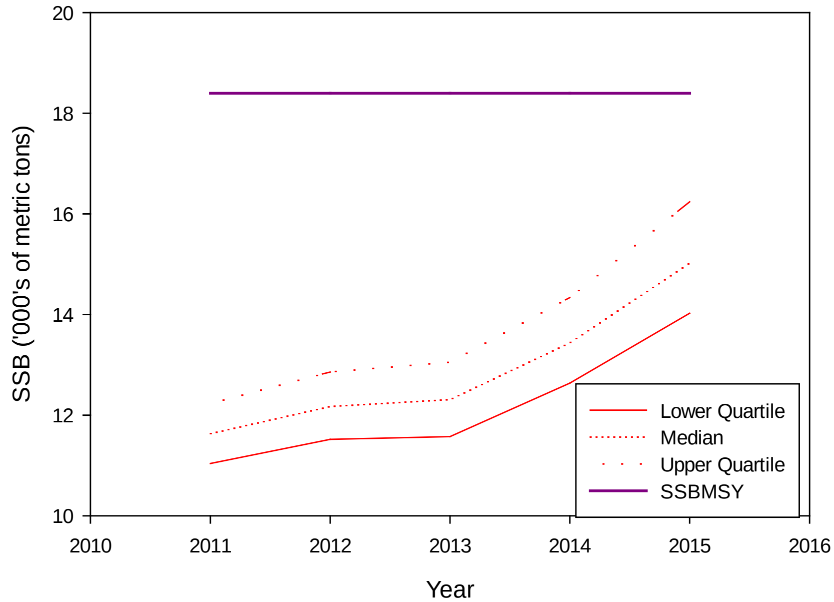


Figure 25 - Projected Witch Flounder stock size

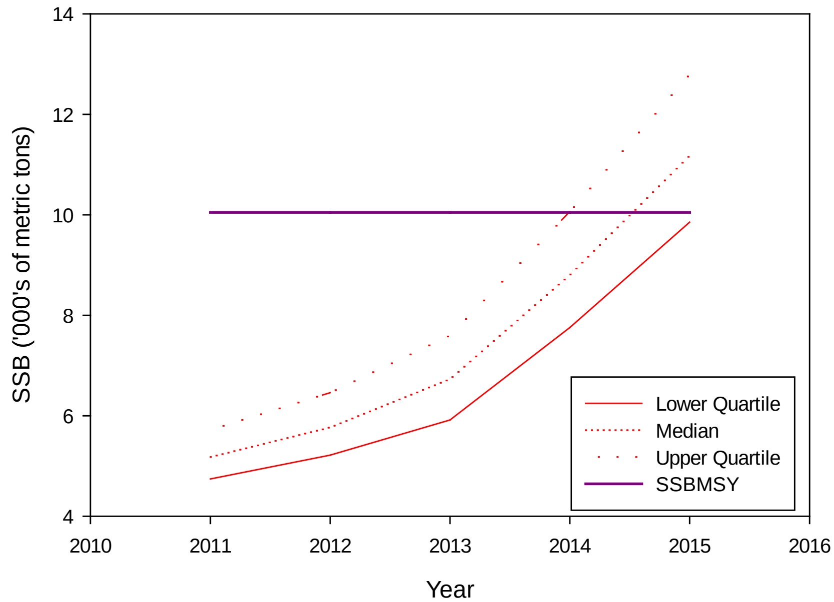
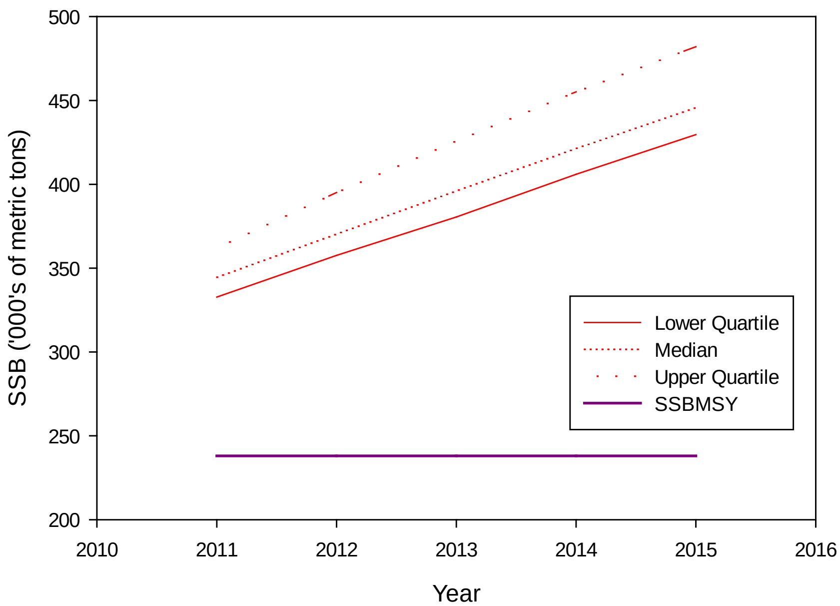


Figure 26 - Projected Redfish stock size



It is not possible to project stock sizes for the following stocks:

- Atlantic Halibut
- White Hake
- Northern Windowpane
- Southern Windowpane
- Ocean Pout
- Atlantic Wolffish

For index-assessed stocks an estimate of the probability of overfishing cannot be determined but the proposed ABC is based on the default control rule applied to the most recent estimate of stock size. As a result, if stock size does not decline then the proposed ABC would not be expected to result in overfishing. This is an unrealistic assumption – stock size could increase or decrease but is unlikely to remain constant - but past efforts to use the index projection model with these stocks have proven unreliable.

Table 59 – Review of ABC control rule performance for three stocks assessed with a survey index

Stock/Year	Catch	Realized Exploitation Index	OFL	Updated FMSY Proxy	F/FMSY	Catch/Projected Catch	Difference
S WINP							
2008	321	1.58	317	2.10	0.75	1.01	0.35
2009	463	1.86	317	2.10	0.89	1.46	0.65
2010	490	1.4	317	2.10	0.67	1.55	1.32
N WINP							
2008	376	0.841	225	0.44	1.91	1.67	-0.13
2009	440	0.998	225	0.44	2.27	1.96	-0.14
2010	236	0.515	225	0.44	1.17	1.05	-0.10
Ocean Pout							
2008	127	0.261	361	0.76	0.34	0.35	0.02
2009	168	0.373	361	0.76	0.49	0.47	-0.05
2010	127	0.311	361	0.76	0.41	0.35	-0.14

Impacts on other species

Adopting the Option 1/No Action specifications is not expected to have direct impacts on non-groundfish species. Indirect effects are generally likely to be beneficial given the expected reduced groundfish fishing activity. Catches of other species that occur on groundfish trips would decline as a result. There are only limited opportunities for groundfish vessels to target other stocks in other fisheries, so the shifting of effort into other fisheries is not likely to occur on a large scale. These other fisheries will also have ACLs and AMs so while such effort shifts may have economic effects the biological impacts should not be negative. Considering the differences between the ACLs of Option 1/No Action and Option 2, the fishing mortality on other stocks would probably be lower under Option 1/No Action.

7.1.1.2.2 Option 2: OFLs, ABCs, ACLs and other ACL sub-components for FY 2013 – FY 2015 (Preferred Alternative)

Option 2 would adopt new ABCs consistent with the best available science for GB cod, GOM cod, GB haddock, GOM haddock, GB yellowtail flounder, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American plaice, witch flounder, redfish, Atlantic halibut, white hake, northern windowpane, southern windowpane, ocean pout and Atlantic wolffish. The ABCs for other stocks were set in previous actions and not discussed here. Generally, increases in SSB are lower than those under Option 1.

Because this option would adopt FY 2013 - 2015 ABCs for the stocks listed above, and all the stocks have recent assessment updates or are currently undergoing a benchmark assessment, short-term projections can be used to estimate the probability of overfishing and short-term changes in stock size. These projections use catches equal to the ABCs that would be adopted if this option is selected. Since the management goal is to keep catches at or below ACLs, and ACLs are always less than the ABC, the projection results would be expected to slightly over-estimate the risk of overfishing and under-estimate future stock size. There is one factor that could modify this conclusion. Sectors are allowed to carry-over up to ten percent of their original ACE allocation to the following year if it is not caught for all stocks except those managed under the Understanding. This possibility and its effect on stock status is discussed later in this section.

Projected stock sizes are shown in Figure 27 through Figure 41 for these stocks and the probability of overfishing is listed in Table 60. These tables allow a comparison of projected future stock size to both 2012 and 2011. A comparison of probability of overfishing between the two options is difficult as Option 1/No Action has no OFLs defined for many stocks.

With respect to GB yellowtail flounder there is additional uncertainty in the short-term projection because the most recent assessment shows a retrospective pattern that over-estimates stock size and under-estimates fishing mortality in the terminal year of the assessment. An OFL has been declared undeterminable for this stock because of the large uncertainty about the assessment (Science and Statistical Committee, pers. Comm.). It is unknown whether the proposed ABC will cause overfishing as a result.

This option would adopt an ABC for GB cod of 2,506 mt. The ABC was selected to be consistent with current stock status and rebuilding requirements.

This option would adopt an ABC for GOM cod of 1550 mt and that is consistent with the results of the assessment that was completed in December 2012 and released in January 2013.

GB cod

The recent benchmark assessment indicates this stock is below the SSB_{MSY}. Under Option 1, the SSB is projected to increase marginally after 2013 but the SSB_{MSY} is still well above the projected SSB size. Option 1 does not differ greatly from Option 2, however, SSB increases are lower under Option 2 (Figure 27).

GOM cod

The recent benchmark assessment for this stock indicates that it is below the SSB_{MSY}. Under Option 2, the projections indicate an increase in SSB after 2013. Under Option 1, the SSB is projected to increase marginally after 2013 but the SSB_{MSY} is still well above the projected SSB size. For Option 2, two potential final numbers for GOM cod were analyzed, 1249 and 1550 mt. Under the 1249 mt catch, two scenarios were run dependent on the natural mortality assumption, base and ramp; both show an increase in SSB after 2013 but it remains well below SSB_{MSY} (Figure 28 and Figure 29). Under the 1550 mt catch, the projections were run dependent on the base and ramp natural mortality assumptions; SSB increases after 2013 but again is below SSB_{MSY} (Figure 30 and Figure 31). Option 1 does not differ greatly from the projections from Option 2, however, SSB increases are lower under Option 2.

GB Haddock

This stock is already over the SSB_{MSY}. Some increase in projected SSB size occurs under Option 2 but a decline is suggested to occur in 2015 (Figure 32). Option 2 would result in a near-doubling of stock size through 2015 and then a slow decline in the SSB and results in a smaller SSB size than Option 1. Impacts on GB haddock are complicated by uncertainty about the size of the 2010 year class. The 2012 Assessment Update indicated that this year class may be the largest estimated. Initial estimates of GB haddock large year class strengths tend to be larger than later estimates, so the projection shown here reduces the size of the 2010 year class to account for this experience.

GOM Haddock

This stock is below the SSB_{MSY}. A short term decrease in SSB is suggested prior to 2013 (Figure 33). Option 2 allows for lower SSB increases than Option 1.

GB Yellowtail Flounder

This stock is well below the SSB_{MSY}. Marginal increases in SSB occur under Option 2 catch of 1150 mt (Figure 36). Slightly greater increases in SSB occur under Option 2 than Option 1. Projections for the TMGC recommended catch showed an increase in SSB after 2013 for both the rho-adjusted and not rho-adjusted models. The increase in SSB was similar between the 1150 mt catch and the 500 mt catch not rho-adjusted model (Figure 34), which both indicated a slightly great increase in SSB when compared to Option 1. The rho-adjusted 500 mt catch model (Figure 35) indicated a lower increase in SSB compared to the 1150 mt catch and the not rho-adjusted 500 mt catch model but was similar to the increase in SSB under Option 1.

SNE/MA Yellowtail Flounder

This stock is above the SSB_{MSY}. Marginal increases in SSB occur under Option 2 (Figure 37). Option 1 allows for greater increases in SSB than Option 2.

CC/GOM Yellowtail Flounder

This stock is below the SSB_{MSY}. Under Option 2 some increases in SSB is projected (Figure 38). The SSB increases more under Option 1 than Option 2.

Plaice

This stock is below the SSB_{MSY}. Under Option 2 the SSB isn't projected to increase; it fluctuates around the current SSB size (Figure 39). Option 2 would result in lower SSB sizes than under Option 2.

Witch Flounder

This stock is currently below the SSB_{MSY} but projections suggest it may approach the SSBMSY by 2015 (Figure 40). Increases in SSB are lower under Option 2 than under Option 1.

Redfish

Redfish SSB projections indicate a further increase in SSB above the SSB_{MSY} under this scenario (Figure 41).The stock is above the SSB_{MSY} and is expected to increase during the projected years under Option 1. The SSB also increases under Option 2 but it is lower than in Option 1.

Figure 27 - Projection GB cod stock size under Option 2

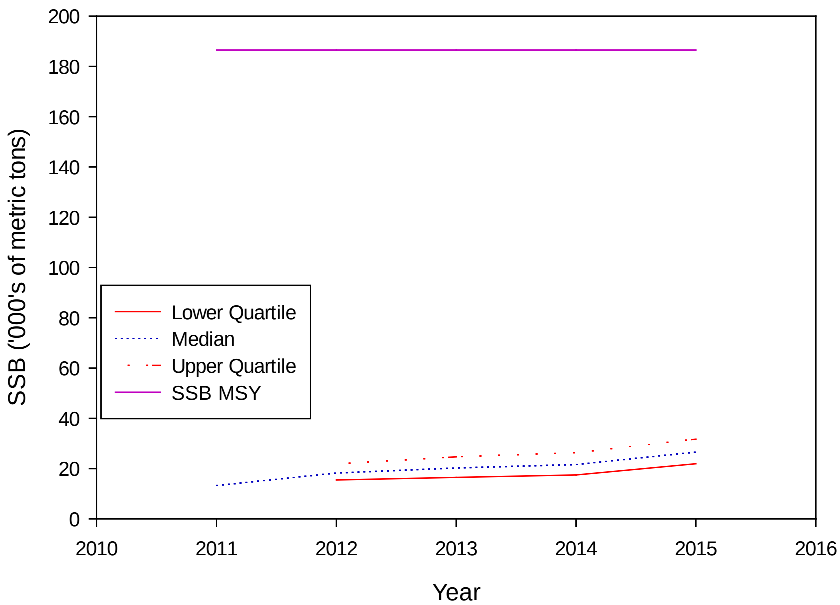


Figure 28 – Projected GOM cod stock size under Option 2 (1249 mt) base case scenario

Figure 29 – Projected GOM Cod stock size under Option 2 (1249 mt) ramp scenario

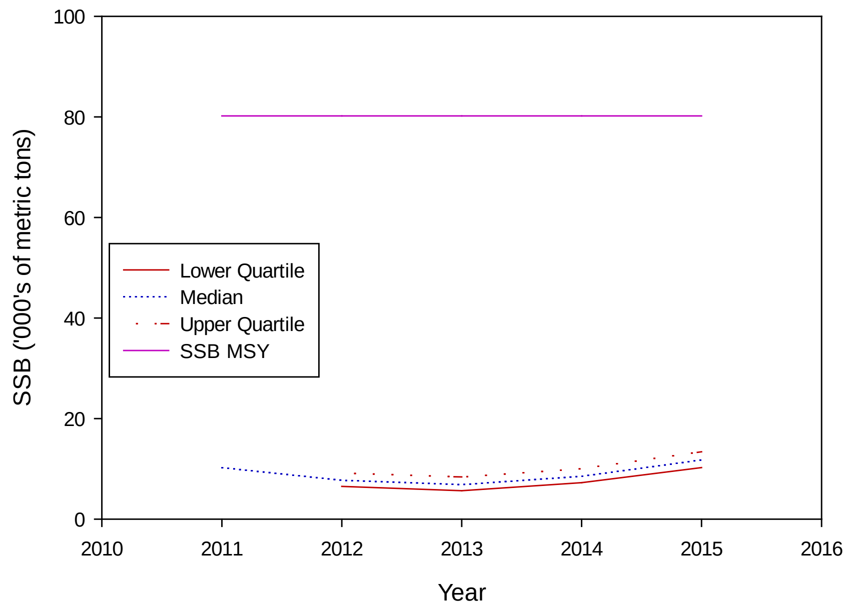


Figure 30 - Projected GOM cod stock size under Option 2 (1550 mt) base case scenario

Figure 31 - Projected GOM cod stock size under Option 2 (1550) ramp scenario

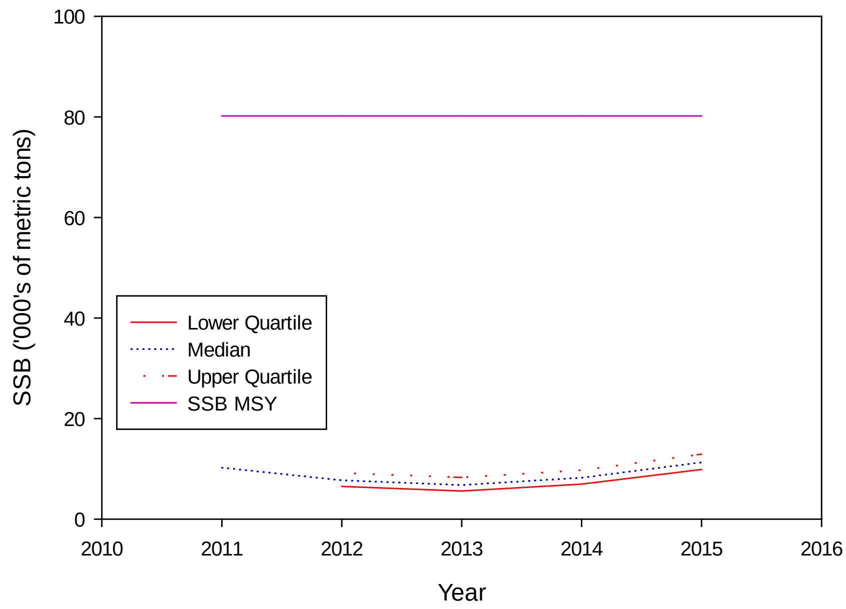


Figure 32 - Projected GB haddock stock size under option 2

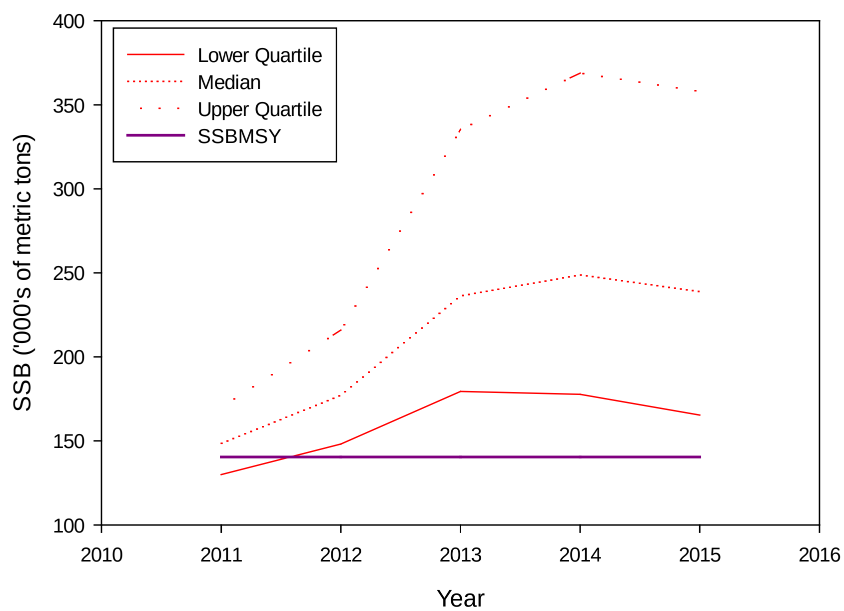


Figure 33 - Projected GOM haddock stock size under option 2

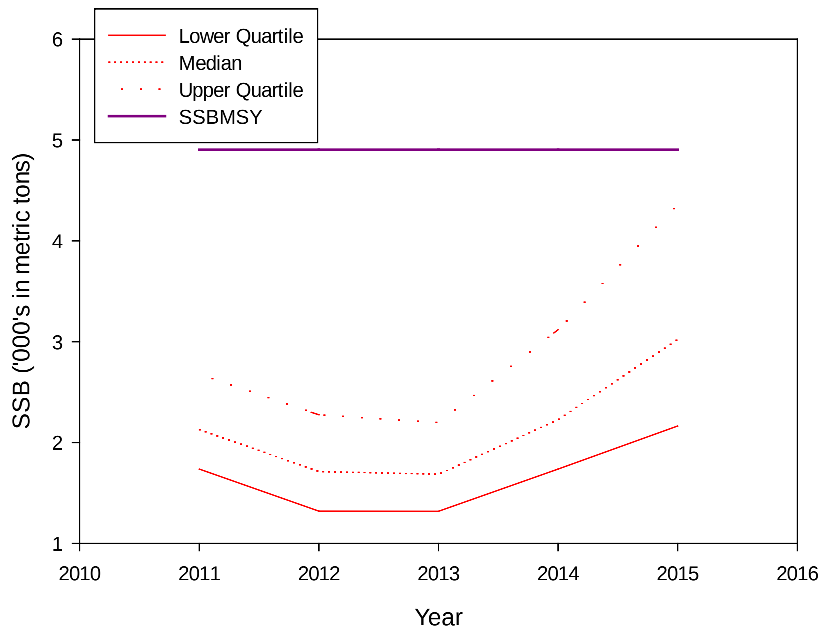


Figure 34 – Projected GB yellowtail flounder stock size under Option 2 (catch of 500 mt not rho-adjusted)

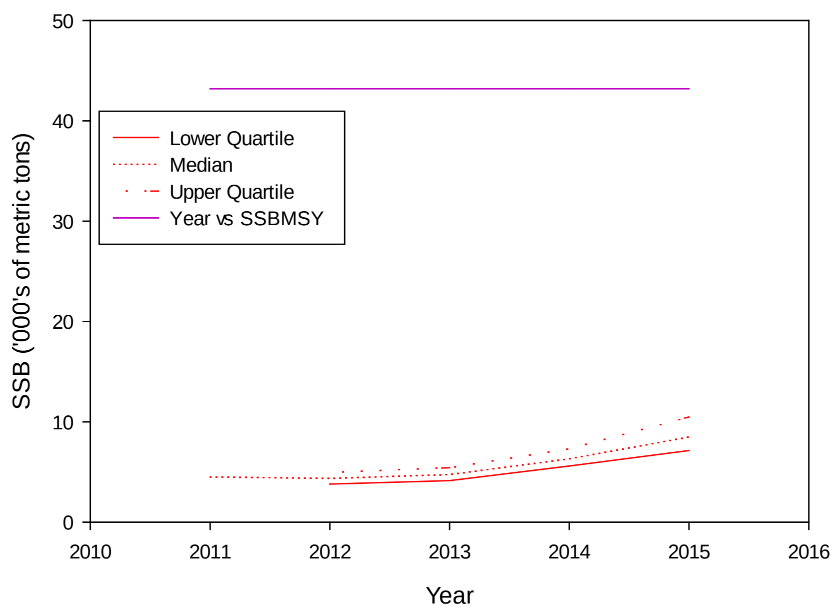


Figure 35 – Projected GB yellowtail flounder stock size under Option 2 (catch of 500 mt rho-adjusted)

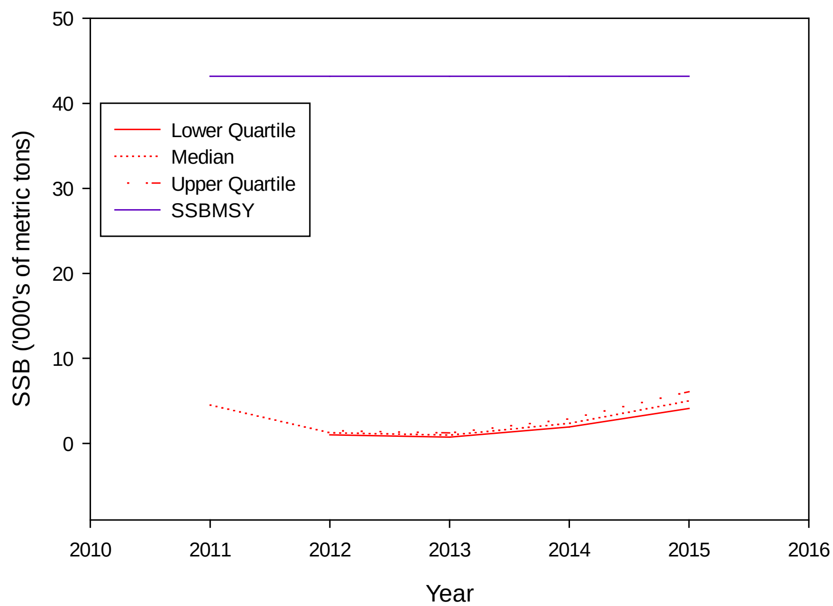


Figure 36 - Projected GB yellowtail flounder stock size under Option 2 (catch of 1150 mt)

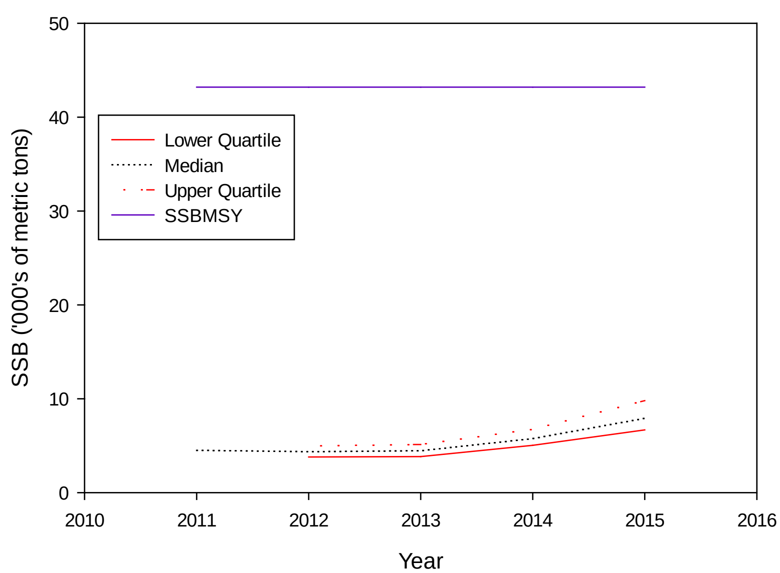


Figure 37 - Projected SNEMA yellowtail flounder stock size under option 2

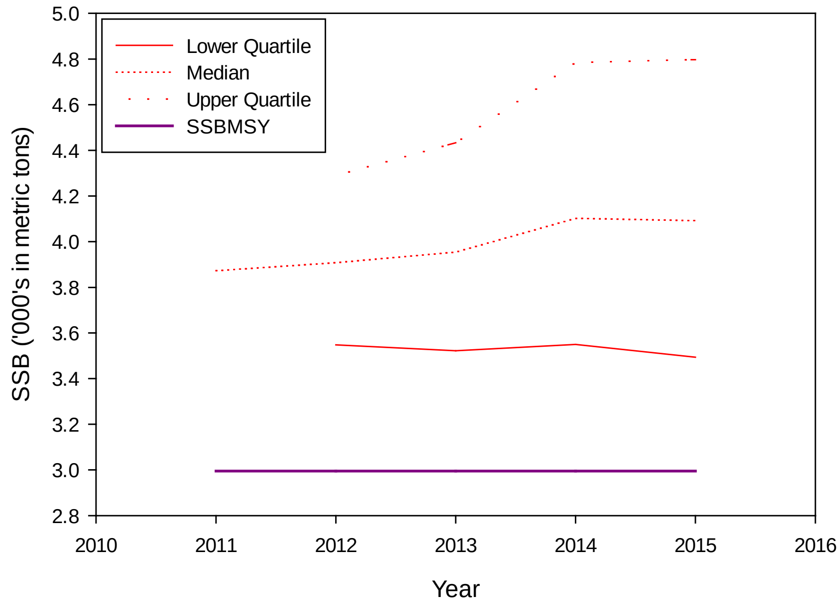


Figure 38 - Projected Cape Cod Gulf of Maine yellowtail flounder stock size under option 2

Figure 39 - Projected American Plaice stock size under option 2

Figure 40 - Projected witch flounder stock size under option 2

Figure 41 - Projected redfish stock size under option 2

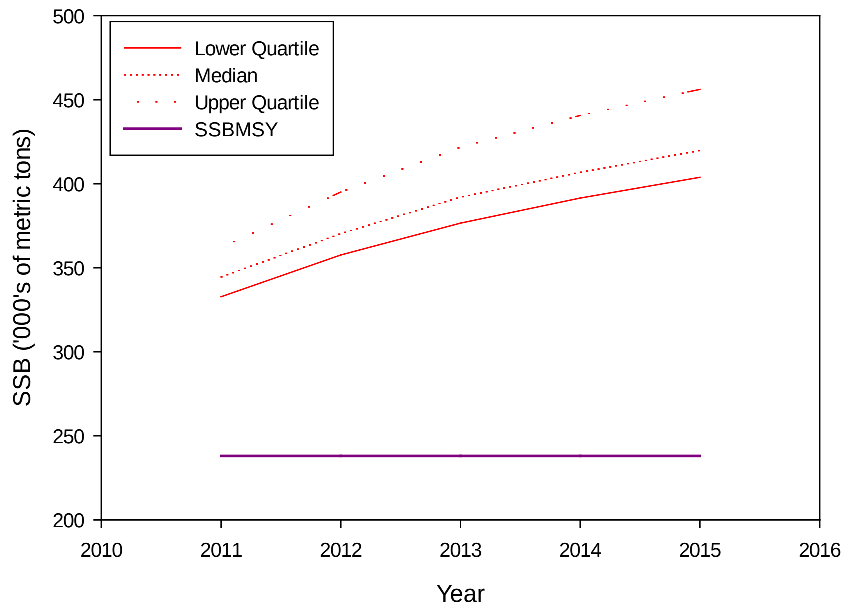


Table 60 - Estimated probability of overfishing if catch is equal to ABC

Species	Stock	2013	2014	2015
Cod	GB			
Cod	GOM			
Haddock	GB	0.000	0.000	0.01
Haddock	GOM	0.000	0.000	0.000
Yellowtail Flounder	GB	NE	NE	NE
Yellowtail Flounder	SNE/MA			
Yellowtail Flounder	CC/GOM	0.000	0.000	0.000
American Plaice		0.000	0.000	0.000
Witch Flounder				
Acadian Redfish		0.000	0.000	0.000

NE = Not Estimated

Impacts of Sector Carry-Over on Biological Impacts

As mentioned, sector management rules allow sectors to carry-over up to 10 percent of the initial ACE allocation from one year into the next. This effectively increases the amount of catch that a sector could take in the second year if not all of the ACE is caught the first year. This could affect the biological impacts of the proposed ABCs/ACLs if all of this allocated catch is caught in the second year. When ABCs and ACLs do not change much from one year to the next, the biological effects of carry-over are of lesser concern. When there are substantial declines in the ABC, however, the effects could be important. Evaluation of the impacts is difficult because the catches in each year are unknown and must either be estimated or assumed. A second complicating factor is that projections calculate ABCs based on a calendar year, but they are allocated for a fishing year that starts on May 1. This makes it more difficult to predict the biological effects because the timing of the additional catch can be important. Stock size and fishing mortality are based on calendar years and it makes no difference in a calendar year estimate if catch is taken in May rather than April of the same year, but it does make a difference if catch is taken in April of the following year. Third, if carry-over exists, that indicates that the entire sector sub-ACL was not caught in the previous year. This may mean that less catch was taken than assumed in the projection, with the result that the stock would be expected to grow more than projected, and more catch could presumably be harvested without overfishing. While this is not a 1 to 1 transfer from one year to the next, and does not result in an automatic adjustment to the ABC/ACL, it can change the catch that would result in overfishing that is used as the basis for setting the ABCs/ACLs. The FMP does not include an automatic adjustment to the OFL/ABC/ACL in year 2 if the ABC is not caught in year 1, so in effect if there is a catch underage then the OFL/ABC/ACL may be slightly mis-specified.

Many of the ABCs/ACLs proposed in this option are reductions from the values for 2012. For this reason, the effect of carry-over on possible catches in 2013 was examined to determine the stocks where carry-over might have an effect on the biological impacts previously described. Conceptually, if the carry-over amount is greater than the difference between the 2013 ABC and the 2013 ACL, fishing mortality may be higher, and future stock size lower, than described in the preceding section. The maximum possible carry-over was compared to the 2013 ACLs that would be adopted in this action to identify the stocks where carry-over might lead to a noticeable difference in the biological impacts. Table 61 summarizes the results; the percentage shown in the table indicates the relative difference between the 2013 ABC and the 2013 ACL plus carry-over. A positive value indicates that carry-over results in a larger available catch (ACL plus carry-over) than the 2013 ABC. Exploratory analyses indicated that available catches that are less than 10 percent greater than the ABC will not lead to biological impacts that differ substantially from those described above. There are six instances where carry-over results in available catches being more than 10 percent larger than the FY 2013 ABC. There is one instance (GOM cod) where carry-over results in available catches larger than the OFL. For all of these stocks, the projection used an estimate of 2012 catch in the projection; in all cases the estimated 2012 catch is low enough that a full 10 percent of the initial ACE can be carried over.

Table 61 – Impact of maximum carryover on FY 2013 available catches

Stock	Difference from ABC	Comments/2012 harvest scenario used in projection
GB Cod	**17%**	**Estimated 2012 catch**
GOM Cod	**18%**	**Estimated 2012 catch**
GB Haddock	2%	Estimated 2012 catch
GOM Haddock	**17%**	**Estimated 2012 catch**
GB Yellowtail Flounder	NA	Carryover not authorized
SNEMA Yellowtail Flounder	4%	Estimated 2012 catch
CCGOM Yellowtail Flounder	**14%**	**Estimated 2012 catch**
Plaice	**16%**	**Estimated 2012 catch**
Witch	**14%**	**Estimated 2012 catch**
GB Winter Flounder	6%	Projection assumed 2012 catch equals ABC
GOM Winter Flounder	3%	Projection assumed 2012 catch equals ABC
Redfish	3%	Estimated 2012 catch
White Hake	4%	Projection assumed 2012 catch equals ABC
Pollock	4%	Projection assumed 2012 catch equals ABC

There are six instances that need to be further examined to determine if the biological impacts as a result of carry-over differ substantially from those described. For this analysis it is assumed that the entire amount available is caught in FY 2013 (ACL plus carry-over). For these stocks this is a worst-case scenario, as in recent years the entire available catch of these stocks has not been harvested (this will be discussed below). In only one instance would it be expected that carry-over would lead to overfishing, though this is explored in more detail below.

Table 62 compares the projected median stock size and fishing mortality for the period 2013-2015, with and without the maximum carry-over from FY 2012 to FY 2013. The projections assume no adjustments to the 2014 and 2015 ABCs are made as a result of the carry-over, and the entire ABC (not the ACL) is assumed to be caught in FY 2014 and FY 2015. This comparison ignores the differences between fishing year and calendar year. The analysis for GOM cod is complicated by the recent GOM cod benchmark assessment. The assessment did not settle on one assessment model so results for both models are shown.

For all six stocks, the maximum carry-over from FY 2012 to FY 2013, if caught, would be expected to reduce the FY 2013 median SSB by one percent or less when compared to the value projected if there is no carry-over. The difference in projected SSB increases to 2-3 percent by FY 2014 for all six stocks, but is 2 percent or less in FY 2015. With respect to fishing mortality, the FY 2013 fishing mortality would be expected to be 15-20 percent higher in FY 2013 if the maximum carry-over is caught. By FY 2014 the difference in fishing mortality is four percent or less, and the difference is less in FY 2015.

For GOM cod, if the full carry-over is caught in FY 2013 then under either assessment/projection model the fishing mortality would be expected to exceed the F_{MSY} proxy of 0.18. Overfishing would end in FY 2014 under the base case model, but fishing mortality would be expected to exceed 0.18 until FY 2015 in the Mramp model.

These results, however, do not take into account whether the entire available catch of these stocks is likely to be harvested in 2013. With two years under the ACL system, the entire available catch has not been harvested for any allocated regulated groundfish stock (catches have exceeded the ACL for windowpane flounder stocks). This is primarily due to groundfish fishery catches being less than allocated, though other components of the fishery have also harvested less than their allocations in many instances (see **Table 36**). Indeed, many sectors intentionally withhold a percentage of the their available ACE to reduce the possibility of unexpected overages. A detailed accounting for FY 2011 is shown in Table 63 below. Carryover from FY 2010 to FY 2011 increased the possible catch of each sector to over 100 percent of the sub-ACL that was initially allocated to sectors. But the actual sector catch exceeded 90 percent of the available catch only for white hake. Another factor that suggests that catches will fall short of ACLs can be found in the economic analyses that indicate not all of the available ACE will be harvested because of interactions between stocks (see Section 7.4.1.2.2).

The overall conclusion from these analyses is that even if the FY 2013 available catch includes the maximum carry-over from FY 2012 to FY 2013, and all of that available catch is caught in FY 2013, the impacts on stock size and fishing mortality are minor and are small compared to the other assessment and projection uncertainties. With respect to status determination criteria, under these circumstances there is only one stock (GOM cod) where fishing mortality would exceed the F_{MSY} proxy. If the total available catch is not harvested, as has been the case in the recent past, then the biological impacts of carry-over would even be less than shown here.

Because these analyses rely on the projection model that is used to calculate future catches, the earlier cautions about the errors in that model should be considered when reviewing these results.

Stemming from the concerns outlined above regarding the impacts of carry-over, NMFS announced that the level of carry-over may be adjusted from the previously used 10% to a percentage deemed appropriate for the ACL.

Table 62 – Comparison of projected stock size and fishing mortality for six stocks under two different carry-over scenarios

Stock	Carryover	Median Projected SSB			Median Projected Fishing Mortality		
		2013	2014	2015	2013	2014	2015
GB cod	No	20,190	21,550	26,530	0.135	0.123	0.104
	Yes	20,126	21,212	26,208	0.156	0.125	0.106
GOM cod Base Case	No	9,340	11,860	16,630	0.17	0.143	0.104
	Yes	9,269	11,623	16,332	0.204	0.147	0.106
GOM cod Mramp M=0.4	No	6,770	8,210	11,260	0.267	0.252	0.178
	Yes	6,698	7,996	11,102	0.322	0.262	0.182
GOM haddock	No	1,689	2,284	3,096	0.346	0.342	0.334
	Yes	1,675	2,240	3,054	0.413	0.342	0.342
CC/GOM yellowtail flounder	No	3,459	4,603	5,746	0.195	0.145	0.112
	Yes	3,425	4,526	5,674	0.225	0.148	0.114
Plaice	No	11,939	11,638	11,865	0.135	0.135	0.135
	Yes	11,874	11,398	11,628	0.158	0.138	0.138
Witch Flounder	No	6,616	8,028	9,684	0.170	0.133	0.108
	Yes	6,598	7,926	9,578	0.196	0.135	0.109

Table 63 – FY 2011 Sector carry-over catch accounting

Stock	FY 2011 Available Annual Catch Entitlement (ACE)				FY11 Carryover*		
	FY11 Initial ACE	FY10 Carryover*	Total Available	Total Available as a Percent of Initial ACE		FY 11 Sector Catch	FY 11 Sector Catch as Percent of Total Available
	A	B	A + B	C	D	E	F
GB Cod	4,208	317	4,525	107.5	418	3,215	71%
GOM Cod	4,721	431	5,152	109.1	467	4,368	85%
GB Haddock	30,393	4,019	34,412	113.2	3,039	3,829	11%
GOM Haddock	770	79	849	110.2	77	484	57%
GB Yellowtail Flounder	1,122	NA	1,122	100.0	NA	988	88%
SNE Yellowtail Flounder	404	23	427	105.8	39	364	85%
CC/GOM Yellowtail Flounder	913	71	984	107.7	90	795	81%
American Plaice	3,038	275	3,313	109.0	302	1,632	49%
Witch Flounder	1,211	81	1,292	106.7	121	993	77%
GB Winter Flounder	1,993	182	2,175	109.1	149	1,924	88%
GOM Winter Flounder	313	13	326	104.1	31	158	49%
SNE Winter Flounder	NA	NA	NA	NA	NA	87	NA
Redfish	7,505	676	8,181	109.0	750	2,703	33%
White Hake	2,946	247	3,193	108.4	158	3,014	94%
Pollock	13,848	1,618	15,466	111.7	1,382	7,543	49%

Impacts on other species

In general, the specification of groundfish ABCs and ACLs by this option would not be expected to have direct impacts on most other species. Other species are caught on groundfish fishing trips and the ABCs/ACLs could indirectly affect species if they result in changes in groundfish fishing activity. When compared to Option 1/No Action, this option would be expected to result in more groundfish fishing effort and as a result catches of other species would be expected to be higher. This would be expected to result in higher fishing mortality rates for those species when compared to the No Action alternative. Species such as monkfish, skates, and spiny dogfish are among those most likely to be affected. All of these species are subject to management controls, and it is not likely that fishing mortality will exceed targets. Indeed, when compared to recent years, the reduction in groundfish ABCs/ACLs as proposed in this action would be expected to result in reduced catches of other species.

An additional species that could be affected by this option would be Atlantic sea scallops. The ABCs and ACLs that are proposed include specification of sub-ACLs of GB yellowtail flounder and SNE/MA yellowtail flounder for the sea scallop fishery. These sub-ACLs are designed to limit the incidental catch of yellowtail flounder by the scallop fishery, and exceeding the allocations results in triggering AMs in subsequent years. The sub-ACLs can affect fishing mortality and stock size of sea scallops through this mechanism.

The sea scallop GB yellowtail flounder sub-ACL proposed in this option is based on a proposed decision to allocate a fixed percentage of this stock to the fishery. In FY 2013, this percentage is based on 40 percent of the U.S. ABC. This amount exceeds the estimated catch of yellowtail flounder by the fishery in 2013 by a factor of more than 2. As a result, it is not likely that AMs will be triggered and there is unlikely to be any biological effects on sea scallops in 2013 or beyond as a result of this allocation.

For SNE/MA yellowtail flounder, this option proposes to allocate an amount that is based on 90 percent of the expected catch by the scallop fishery. The allocation is based on the high estimate of a range of estimates. There is a possibility that the fishery may exceed the sub-ACL, which would lead to implementation of an AM in a later year. If the AM restricts scallop fishing in the SNE area, it could shift scallop effort into other areas. The impacts of this AM on the fishing mortality and stock size of scallops are difficult to predict because future scallop management measures have not been defined.

7.1.2 Commercial and Recreational Fishery Measures

7.1.2.1 SNE/MA Winter Flounder Landing Restrictions

7.1.2.1.1 Option 1: No Action

Impact on Regulated Groundfish

This option would continue the prohibition on landing SNE/MA winter flounder. This measure has deterred fishing on this stock by both commercial and recreational fishermen in federal waters. As a result, fishing mortality for this stock was estimated to be well-below F_{MSY} in 2009 and 2010, with a two-year average of F=0.07. If this measure is adopted, fishing mortality would be expected to continue to be low and would probably be lower than under Option 2. As a result, the stock would probably rebuild more quickly than would be the case if Option 2 is adopted.

With respect to other regulated groundfish stocks, because this option would result in fewer groundfish fishing trips than Option 2, catches for other stocks would also probably be lower.

Impact on Other Species

This option would be expected to have little direct impact on other species. It is possible that because SNE/MA winter flounder cannot be landed, some fishermen may target other species to make up for the lost revenue. Management measures for those other fisheries would be expected to keep fishing mortality on those other species within acceptable limits. There would likely be little difference between the impacts on other species under this option and those under Option 2.

7.1.2.1.2 Option 2: Landing of SNE/MA Winter Flounder Permitted (Preferred Alternative)

Impacts on Regulated Groundfish

This option is likely to be adopted only if the SNE/MA winter flounder rebuilding strategy is modified (see Section 4.1.1.2). Because this option would permit the landing of SNE/MA winter flounder, it would be expected that commercial and recreational fishermen would target this stock more frequently than would be the case under Option 1/No Action. The expectation is that this would lead to increased catches and fishing mortality for this stock when compared to Option 1/No Action. Increasing fishing mortality would be expected to lead to a slower rebuilding trajectory for this stock. Assuming that catches are as high as the ABC, the rebuilding target would be reached in 2023 rather than the 2019 date expected under Option 1 /No Action (see Figure 12 and Figure 13). This would be the primary impact of this measure. It may also have indirect effects on other groundfish species, particularly SNE/MA yellowtail flounder. These two species are sometimes caught on the same groundfish fishing trips. If more trips occur because of increased targeting of SNE/MA winter flounder, then catches of other groundfish species would also be expected to increase.

Impacts on Other Species

This option would be expected to have little direct impact on other species. It is possible that because SNE/MA winter flounder could be landed, there may be less targeting of other species since fishermen may choose to target SNE/MA winter flounder. But it is more likely that SNE/MA winter flounder trips will be taken in addition to trips targeting other species, not in place of those trips. Management measures for those other fisheries would be expected to keep fishing mortality on those other species within acceptable limits. There would likely be little difference between the impacts on other species under this option and those under Option 1/No Action.

7.1.2.2 Commercial Fishery Accountability Measures

7.1.2.2.1 Option 1: No Action

Impacts on regulated groundfish

This option would not change existing AMs for the groundfish fishery – specifically, those AMs that are designed for SNE/MA winter flounder. The current AM for that stock bans possession by all commercial and recreational fishing vessels. FW 48 proposed an area-based AM but that has not yet been adopted.

The AM for SNE/MA winter flounder would remain a proactive prohibition on possession. While this requirement has resulted in catches that are well below the ACLs for these stocks, there isn't an additional measure that would be implemented if the ACL is exceeded. As a result, should that occur, this option is less likely to end overfishing than Option 2.

Impacts on other species

This option would not be expected to have any direct biological impacts on other species, and would be unlikely to differ from Option 2 in that regard.

7.1.2.2.2 Option 2: Revised Accountability Measures for SNE/MA Winter Flounder (Preferred Alternative)

Impacts on regulated groundfish

This option would adopt different AMs for sector and common pool vessels that would be applied if the sub-ACL for SNE/MA winter flounder was exceeded. Sector vessels would be allocated the stock, would be required to land legal-sized fish, and would be required to cease fishing in the stock area if the sector catch is expected to exceed its ACE. Controlling sector catches through a firm limit would be expected to result in more certain controls on catches than would be the case under Option 1/No Action.

This AM would impose area-based restrictions on common pool vessels if the common-pool sub-ACL for SNE/MA winter flounder is exceeded. The restrictions are designed to apply at certain times and in certain areas. If an AM is triggered selective gear is required in an area. Details are provided in section 4.2.2.2. It is important to note that this AM affects only common pool groundfish fishing activity, unlike Option 1/No Action. Since Option 1/No Action only prohibits possession and does not restrict fishing activity in any other way, this option would be expected to be more likely to limit common pool catches to the sub-ACL. In addition, other measures – such as the ability to adjust trip limits in-season – are also effectively a pro-active AM that would help limit common pool catches.

The technique used to identify the areas is described in detail in Appendix II but the following general overview will aid in understanding the biological impacts of the measure. Observer data and landings data were combined to determine where these stocks were being caught. SNE/MA winter flounder landings and discard data were examined. An estimate of catches in each ten minute square was developed for each stock and for the appropriate gear types (generally just trawl gear for SNE/MA winter flounder). There are limitations to the data that are described in the appendix that create uncertainties in this approach. While observer data can be accurately binned to relatively small areas, VTRs are the only source of landings data and there are known to be errors in the accuracy of the information reported by fishermen (see Palmer and Wigley 2009). The results should not be viewed as being precise estimates because of these limitations.

Once the catch data were binned by ten-minute square, a geostatistical test was applied to identify areas with statistically significant higher catches than the immediate area and the stock area as whole. These areas were used to select the AM areas where appropriate restrictions would be adopted. The size of the areas was selected based on the amount of catches that need to be affected. In addition, qualitative consideration was given to the data limitation previously described, the probability that effort may be displaced into other areas, and the likelihood that the measures may not be perfectly effective (see FW 47 for a discussion of compliance with Amendment 16 restricted gear areas, which suggests that area-based gear restrictions are not always complied with). In addition, this measure would only apply to common pool vessels fishing on groundfish fishing trips.

In general, the proposed AM areas, if implemented, would be expected to reduce trawl catches of the targeted stocks by requiring common pool vessels to use selective gear. These gears have been shown to reduce catches of flatfish, the major target of these AMs, in several experiments. It is likely that there would be some effort displacement that would reduce the effectiveness of the measures: rather than use selective gear in the AM area, some fishermen may continue to use non-selective trawls and shift their effort into other areas to target the species they would lose when using the selective gear. For sink gillnet and longline gear the proposed measure would prohibit fishing in the defined AM areas. While this would make the AM more effective in these areas for these gears, it is more probable that effort would be displaced into other areas.

As compared to Option 1/No Action, this measure would be expected to lead to more control on common-pool groundfish fishery catches of SNE/MA winter flounder because fishing effort is constrained. Because of the increased controls on catches it is more probably that this option will help to achieve mortality targets.

Impacts on other species

Option 2, if adopted, and if the AMs are triggered, may result in reduced fishing mortality for non-groundfish species that are caught on groundfish fishing trips. This is because the AMs either require use of selective trawl gear or close areas to goundfish fishing by sector vessels. The selective trawl gear would be expected to reduce catches of skates and monkfish in the AM areas. Mortality of these stocks under this measure would be expected to be lower than under any of the other options, including Option 1/No Action. These differences would only occur if the AMs are triggered because an ACL is exceeded.

7.2 Essential Fish Habitat Impacts

The Essential Fish Habitat impacts discussions below focus on changes in the amount or location of fishing that might occur as a result of implementing the various alternatives. This approach to evaluating adverse effects to EFH is based on two principles: (1) seabed habitat vulnerability to fishing effects varies spatially, due to variations in seabed substrates, energy regimes, living and non-living seabed structural features, etc., between areas and (2) the magnitude of habitat impacts is based on the amount of time that fishing gear spends in contact with the seabed. This seabed area swept (seabed contact time) is grossly related to the amount of time spent fishing, although it will of course vary depending on catch efficiency, gear type used, and other factors.

The area that is potentially affected by the proposed TACs has been identified to include EFH for species managed under the following Fishery Management Plans: NE Multispecies; Atlantic Sea Scallop; Monkfish; Atlantic Herring; Summer Flounder, Scup and Black Sea Bass; Squid, Atlantic Mackerel, and Butterfish; Spiny Dogfish; Tilefish; Deep-Sea Red Crab; Atlantic Surfclam and Ocean Quahog; Atlantic Bluefish; Northeast Skates; and Atlantic Highly Migratory Species.

7.2.1 Formal Rebuilding Programs, and Annual Catch Limits

7.2.1.1 SNE/MA Winter Flounder Rebuilding Strategy

7.2.1.1.1 Option 1: No Action

This option would maintain the current rebuilding strategy which has a target end date of 2014. Projections indicate that rebuilding will not occur within this timeframe. Continuing the No Action rebuilding strategy would result in continued zero possession limits for SNE/MA winter flounder and would likely result in less groundfish fishing activity in the SNE area when compared to Option 2.

7.2.1.1.2 Option 2: Revised Rebuilding Strategy (Preferred Alternative)

This option would revise the rebuilding strategy to a target date of 2023 with a median probability of success. This approach would allow for a slightly higher fishing mortality rate and therefore would likely lead to an ACL allocation that would allow the stock to be landed. Thus, indirectly, this measure would probably lead to increased fishing effort and therefore impacts to EFH in Southern New England when compared to Option 1/No Action. However, targeting fishing effort will be limited by ACLs for associated species, such as SNE/MA yellowtail flounder, which has a lower proposed 2013 ACL as compared to 2012. Thus, it is difficult to estimate how much a change in the rebuilding plan would indirectly contribute to increased fishing effort in southern New England.

7.2.1.2 Annual Catch Limit Specifications

7.2.1.2.1 Option 1: No Action

Under No Action, stocks with FY 2013 specifications from previous actions would be maintained at that level. However, a number of groundfish stocks do not have FY 2013 specifications defined in previous actions, specifically GOM cod, GOM haddock, GB cod, GB haddock, GB yellowtail flounder, witch flounder, white hake, plaice, and CC/GOM yellowtail flounder. This option would not set specifications for these stocks in FY 2013. Without specification of an ACL, a catch would not be allocated to the groundfish fishery and targeted groundfish fishing activity would not occur for these stocks. In addition, certain provisions of the sector management system make it likely that fishing activity could be constrained even for stocks with an ACL. Current management measures require that a sector stop fishing in a stock area if it does not have ACE for a stock. Fishing can continue on stocks for which the sector continues to have ACE only if the sector can demonstrate it would not catch the ACE-limited stock. What these provisions mean is that in most cases there would be little opportunity for sector vessels to fish on stocks that have an ACL under no action, and the only area that most groundfish fishing activity could occur is the SNE area. As a result, in general this option would be expected to result in dramatically lower fishing mortality and dramatically lower impacts to EFH and benthic habitats as compared to the alternative specifications (Option 2).

7.2.1.2.2 Option 2: Revised Annual Catch Limit Specifications (Preferred Alternative)

Option 2 would adopt new ACLs for GB cod, GOM cod, GB haddock, GOM haddock, GB yellowtail flounder, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American plaice, witch flounder, redfish, Atlantic halibut, white hake, northern windowpane, southern windowpane, ocean pout and Atlantic wolffish (total ACLs summarized in Table 64). The ACLs for other stocks were set in previous actions.

The ACLs for stocks not allocated to sectors, i.e. Atlantic halibut, northern windowpane, southern windowpane, ocean pout and Atlantic wolffish are similar to the 2012 ACLs (Table 64), with the exception of the southern windowpane ACL, which is about half the 2012 value. Because there are no directed fisheries for these species, the level at which these ACLs are set is not expected to have a large influence on the magnitude of EFH impacts in the groundfish fishery.

For the stocks with updated ACLs allocated in this action that are allocated to sectors, most of the 2013 ACLs are lower than those allocated in 2012, in some cases substantially lower. The exceptions to this are redfish, where the ACL is roughly 20% higher, and GB haddock, where the ACL is slightly higher. The fishery has not come close to catching the redfish and haddock ACLs recently for various reasons, so the ACL changes alone are not likely to result in increased fishing effort and increased impacts to EFH. The lower catch limits for the various other stocks are likely to decrease fishing, and therefore EFH impacts, across the groundfish fishery as a whole in comparison to 2012 levels. However, compared to Option 1/No Action, the alternative specifications below will likely have greater impacts to EFH since many stocks are not allocated under no action. It is difficult to predict how fishing effort may change in later years of this framework, i.e. fishing years 2014 and 2015, because ACLs for some key stocks (GB cod, haddock, and yellowtail) have not yet been determined. Effort would be expected to be higher than if Option 1/No Action is adopted, but will probably be lower than the status quo.

Table 64 – Comparison between 2012 and 2013 total ACLs for groundfish stocks. Only those stocks being updated via this framework are listed.

	Stock	2012 total ACL (mt)	2013 total ACL (mt) (2014-2015 ACLs below)
Allocated to sectors	GB cod	5,109	1,907 (Committee preferred) (TBD – transboundary)
	GOM cod	8,551	1,470 (Committee preferred) (TBD)
	GB haddock	27,637	27,936 (TBD – transboundary)
	GOM haddock	959	274 (323 in 2014, 412 in 2015)
	GB yellowtail flounder	1,045	480 (TBD – transboundary)
	SNE/MA yellowtail flounder	936	665 (same in 2014-2015)
	CC/GOM yellowtail flounder	1,104	523 (same in 2014-2015)
	American plaice	3,459	1482 (1442 in 2014, 1470 in 2015)
	Witch flounder	1,561	751 (same in 2014-2015)
	Acadian redfish	8,786	10,462 (10,909 in 2014, 11,393 in 2015)
	White hake	3,465	3,462 (TBD – assessment will be updated)
Not allocated to sectors	Atlantic halibut	83	96 (106 in 2014, 116 in 2015)
	Northern windowpane	225	144 (same in 2014-2015)
	Southern windowpane	225	540 (same in 2014-2015)
	Ocean pout	253	220 (same in 2014-2015)
	Atlantic wolffish	77	65 (same in 2014-2015)

7.2.2 Commercial and Recreational Fishery Measures

7.2.2.1 SNE/MA Winter Flounder Landing Restrictions

7.2.2.1.1 Option 1: No Action

This option would continue to prohibit retention of SNE/MA winter flounder. This would likely lead to fewer groundfish fishing trips than under Option 2, and thus may lead to lower fishing effort in the SNE/MA winter flounder stock area and reduced impacts to EFH.

FW 48 includes a preferred alternative that may modify the AM for SNE/MA winter flounder prior to implementation of this action. FW 48 would adopt an area-based AM that would require the use of selective trawl fishing gear in defined areas should the ACL be exceeded. This is not likely to lead to substantive changes in fishing effort when compared to Option 2 and any differences in impacts on EFH would likely be undetectable.

7.2.2.1.2 Option 2: Landing of SNE/MA Winter Flounder Permitted (Preferred Alternative)

This option would allow the landing of SNE/MA winter flounder by commercial and recreational groundfish fishing vessels. Sectors would be required to land all legal-sized SNE/MA winter flounder, and common pool vessels would be allowed to land legal-sized fish, subject to any trip limits or other in-season restrictions. In combination with the change in rebuilding strategy and the higher ACLs that result, permitting landing of this species will likely result in some increases in fishing effort and impacts to EFH in Southern New England when compared to Option 1/No Action.

7.2.2.1 Commercial Fishery Accountability Measures

7.2.2.1.1 Option 1: No Action

This option would maintain current AMs, specifically fishing restrictions in stock-areas if ACLs are exceeded, and pound-for-pound penalties in the following year. Currently, SNE/MA winter flounder cannot be possessed or landed by vessels issued a limited access NE multispecies permit, an open access NE multispecies Handgear B permit, or a limited access monkfish permit and fishing under the monkfish Category C or D permit provisions. As a result, this option might result in marginally less fishing effort and impacts to EFH than would be the case if Option 2 is adopted.

7.2.2.1.2 Option 2: Revised AM for SNE/MA Winter Flounder (Preferred Alternative)

This option would revise the AM for SNEMA winter flounder for sector and common pool vessels. This measure is linked to several other options that may be adopted: the revision to the SNE/MA winter flounder rebuilding plan (Section 4.1.1.2) and the removal of the landing prohibition (Section 4.2.1.2). If adopted this option would (1) treat SNEMA winter flounder as a stock allocated to sectors and subject to sector management provisions, (2) require the use of selective trawl gear in specified trawl SNE/MA winter flounder areas for common pool vessels if the common pool sub-ACL is exceeded. If the AM is triggered for either component, it may reduce fishing effort in the area and is expected to have marginal impact on EFH when compared to Option 1/No Action.

7.2.3 Summary of Essential Fish Habitat Impacts of the Preferred Alternatives

Because No Action does not set ACLs for many stocks, the allocations in this framework would result in increased EFH impacts vs. No Action. However, a more meaningful comparison examines current year vs. future habitat impacts. Due to the overall reductions in ACLs across multiple stocks, the combined alternative measures in this framework action are expected to result in reduced impacts to EFH and benthic habitat overall as compared to current (2012) fishing levels. In combination, the measures for SNE/MA winter flounder, specifically extending the rebuilding strategy, allowing landings, and revising the accountability measures, would likely lead to localized increases in habitat impacts because currently there is zero possession for this stock. However, the magnitude of the change in impacts to EFH as a result of the SNE/MA winter flounder measures is likely minimal in comparison to the reduction in impacts that will result from the other ACL reductions.

Table 65 – Expected EFH Impacts of the Preferred Alternatives relative to the other alternatives

Proposed Measure	**Expected Relative Habitat Impacts**	**Rationale**
Revised rebuilding strategy for SNE/MA winter flounder	Slight increase vs. No Action and Status Quo	Would allow stock to be targeted as compared to current zero possession
Annual Catch Limits	Increase vs. No Action; Large decrease vs. 2012 catch limits (Status Quo)	Increase compared to No Action because No Action does not allocate most stocks. Practically speaking, a decrease, because overall ACLs are lower, in some cases much lower, than 2012 levels.
Allow landing of SNE/MA winter flounder	Slight increase vs. No Action and Status Quo	Would allow stock to be targeted as compared to current zero possession
Revise AMs for SNE/MA winter flounder – require retention for sector vessels	Marginal impact vs. No Action and Status Quo	

7.3 Impacts on Endangered and Other Protected Species

7.3.1 Formal Rebuilding Programs, and Annual Catch Limits

7.3.1.1 SNEMA Winter Flounder Rebuilding Strategy

7.3.1.1.1 Option 1: No Action

This measure would maintain the current rebuilding strategy ending in 2014 that is unlikely to meet the rebuilding objective for SNEMA winter flounder. This management alternative would reduce fishing mortality to as close to zero as possible which would benefit protected species in the area. However, displaced fishing effort may impact protected species in other areas.

7.3.1.1.2 Option 2: Revised Rebuilding Strategy (Preferred Alternative)

This measure would alter the rebuilding strategy for SNEMA winter flounder with an end date of 2023. It would allow some catch but the short-term catch levels would be low and unlikely to greatly impact protected species. Fishing effort from other areas may be reduced if fishermen stop avoiding this species. Overall, this alternative would have neutral to beneficial impacts on protected species.

7.3.1.2 Annual Catch Limit Specifications

7.3.1.2.1 Option 1: No Action

For many stocks, there would be no groundfish sub-ACL under this option. This would reduce interactions with protected species as fishing activity would be expected to decrease. Option 1 may have more positive impacts on protected species than Option 2.

7.3.1.2.2 Option 2: Revised Annual Catch Limits for Modified Stocks (Preferred Alternative)

This option proposes to adopt new specifications and ACLs for FY 2013 -2015 for GB cod, GOM cod, GB haddock, GOM haddock, SNE/MA yellowtail flounder, CC/COM yellowtail flounder, GB yellowtail flounder, American plaice, witch flounder, redfish, Atlantic halibut, white hake, northern windowpane, southern windowpane, ocean pout and Atlantic wolffish. This measure includes the identification of ACLs, OFLs, and ABCs as required by the M-S Act and as implemented by Amendment 16. It also incorporates adoption of the incidental catch TACs for the special management programs that use Category B DAS.

As was mentioned in the analysis of the previous options, the greater the fishing effort, the more possibility that interactions with protected species may occur. The TACs, and therefore the total ABC for GB Cod and GB haddock for Option 2 do not differ from that for the No Action alternative. As a result, the impacts of the TACs to protected species under this option are not expected to differ from that described under the No Action alternative. The reduced cod TAC for the U.S./Canada area may result in a shift of available catch from the eastern area to the western area. The quantitative consequences of these changes are unknown, but could be positive if effort is reduced in seasonal high use areas and the reduction overlaps with the distribution of protected resources.

The majority of the ABCs in Option 2 Section 4.1.2.2 represent a decrease on the previous year, resulting in potentially reduced impacts on protected species through fishery interaction. For the stocks that have increasing ABCs, the increased amount is not expected to cause large changes to fishing behavior and is also not expected to increase impacts on protected species. The combination of the changes in ABCs may result in some shifts in fishing area but the overall impact is not expected to be great. There would not likely be much difference whether the 1,150 mt (the preferred alternative) or 500 mt GB yellowtail flounder ABC was adopted, because this affects only a small part of the fishery. The No Action alternative would be expected to have a lower impact on protected species as it would result in greatly reduced fishing activity.

It is important to note that all of the options which could cause increases or decreases in interactions with the fishery the overall impact to protected species is likely to be negligible, and the impacts are uncertain as quantitative analysis has not been performed. Catches in the fishery will still be constrained by other limitations placed on the fishery, such as those relating to the catch of other co-managed species and bycatch, thereby mitigating the impacts of the potential changes. Option 2 would have more negative impacts on protected species than Option 1/No Action. In comparison to FY 2012, however, Option 2 would have less impact on protected species because of the decline in ABCs/ACLs and the likely resultant decline in groundfish fishing activity.

7.3.2 Commercial and Recreational Fishery Measures

7.3.2.1 SNE/MA Winter Flounder Landing Restrictions

7.3.2.1.1 Option 1: No Action

This measure would continue to prohibit possession of SNEMA winter flounder; targeting of this species would not be expected to occur. This would not be expected to alter fishing effort in this region; therefore the impacts on protected species should not change. This may result in continued displacement of fishing effort to areas outside SNE/MA winter flounder range but the zero possession limit may not have resulted in great impacts to fishing behavior. Overall protected species would be expected to benefit from reduced fishing effort when compared to Option 2.

7.3.2.1.2 Option 2: Landing of SNE/MA Winter Flounder Permitted (Preferred Alternative)

This measure would allow the retention of SNEMA winter flounder; it would result in higher landings of SNE/MA winter flounder but is not expected to greatly increase fishing effort and therefore no increased interactions with protected species would be expected. Allowing landings of this species may shift some fishing effort into the species' range but this is not expected to impact protected species when compared to Option 1/ No Action. It may reduce fishing effort in other areas if fishermen stop trying to avoid them.

7.3.2.2 Commercial Fishery Accountability Measures

7.3.2.2.1 Option 1: No Action

This would not change the AM timing and would delay any impacts on protected species. Option 1 would have similar impacts on protected species as Option 2 but impacts would occur at a later period due to delayed timeline for AM implementation.

7.3.2.2.2 Option 2: Revised Accountability Measures for SNE/MA Winter Flounder (Preferred Alternative)

This option would revise the area-based AM for SNE/MA winter flounder that was proposed in FW48. The AM, if triggered, would require common pool vessels to use approved selective trawl gear to reduce the catch of flounders. The gear restrictions under the AM would decrease impacts on protected species. Any unforeseen shift in fishing effort to areas outside the AM areas, may increase fishing activity and impacts on protected species. For sector vessels, this option would treat SNE/MA winter flounder like other stocks allocated to sectors. If a sector exceeded its ACE of this stock, it would be required to cease fishing in the stock area. When compared to Option 1/No Action, if this AM is triggered it would be expected to result in reduced fishing activity and would be beneficial to protected or endangered species in the stock area.

7.4 Economic Impacts

7.4.1 Introduction

Consideration of the economic impacts of the changes made in this framework is required pursuant to the National Environmental Policy Act (NEPA) of 1969 and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976. NEPA requires that before any agency of the federal government may take "actions significantly affecting the quality of the human environment," that agency must prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS) that includes the integrated use of the social sciences (NEPA Section 102(2)(C)). The Magnuson-Stevens Act stipulates that the social and economic impacts to all fishery stakeholders should be analyzed for each proposed fishery management measure in order to provide advice to the Council when making regulatory decisions (Magnuson-Stevens Section 1010627, 109-47).

The National Marine Fisheries Service (NMFS) provides a series of guidelines to be used when performing economic reviews of regulatory actions. The key dimensions for this analysis are expected changes in net benefits to fishery stakeholders, the distribution of benefits and costs within the industry, and changes in income and employment (Guidelines for Economic Review of National Marine Fisheries Services Regulatory Actions, 2007). Where possible, cumulative effects of regulation will be identified and discussed. Other social concerns will be discussed in the subsequent social impacts section of this environmental assessment. The economic impacts presented here consists of both qualitative and quantitative analyses dependent on available data, resources, and the measurability of predicted outcomes. In general the regulations proposed in Framework 48 will impact revenue through changes to ACLs and fishery measures and will impact operating costs through the modification of accountability measures, sub-ACLs, and monitoring requirements/cost responsibilities. It is assumed throughout this analysis that changes in revenues will have downstream impacts on income levels and employment, however, these are only mentioned if directly quantifiable.

7.4.1 Formal Rebuilding Programs and Annual Catch Limits

7.4.1.1 SNE/MA Winter Flounder Rebuilding Strategy

7.4.1.1.1 Option 1: No Action

If this option would be adopted, the rebuilding strategy for SNE/MA winter flounder would continue to target an ending date of 2014 with a median probability of success. Since the stock is unlikely to rebuild by that date in the absence of all fishing mortality, the management objective would be to reduce fishing mortality to as close to 0 as possible until the stock is rebuilt. Relative to the scenarios considered in Option 2, this option provides the smallest discounted net economic benefit.

7.4.1.1.2 Option 2: Revised Rebuilding Strategy (Preferred Alternative)

This option would adopt a new strategy that would target rebuilding of SNE/MA winter flounder by 2023 with a median probability of success. Short-term catch advice during the rebuilding period may be reduced below the projected rebuilding catch in order to account for uncertainty in stock projections.

The current estimate of the rebuilding fishing mortality is F=0.175. This estimate would be revised during the course of the rebuilding program.

In addition to the No Action option and F=0, five rebuilding scenarios are analyzed. Fishing at F_{MSY} would provide the largest discounted net economic benefit over the ten year rebuilding timeline. However, this and the 75% F_{MSY} options fail to achieve the biomass rebuilding target in sufficient time to meet MSA requirements. Of the three F_{REB} scenarios that do achieve rebuilding targets, the scenario rebuilding the stock by 2023 (F_{REB} 2023) provides the largest discounted net economic benefit, 26% higher than the No Action option and 18% higher than the F_{REB} option that rebuilds in 2021 assuming a 3% discount rate.

Net Present Value (NPV) calculations

Comparison of alternative benefit streams over time requires discounting future benefits to convert all benefit streams to a present value. For this purpose, a discount rate of 3% was selected as recommended by NOAA to reflect the social rate of time preference (NOAA 1999). The Executive Branch Office of Management and Budget recommends a discount rate of 7% to estimate the rate of return on average investments. Both rates are included here for the sake of comparison. Net present values are calculated through 2023, the approximate terminal rebuilding date for this stock.

The NPV analysis translates the potential landing streams into future revenues, discounted as appropriate, by applying an average price to potential southern New England/mid-Atlantic winter flounder landings. Implicitly, this analysis assumes that all allocated fish are caught and a 10% discard rate is applied in all years to estimate landings. NPVs are of SNE/MA winter flounder landings alone and do not take into account potential revenue losses or gains from the sale of other stocks of groundfish. A simple linear regression was used to calculate an average price based on price and quantity relationships for winter flounder from 1996 – 2011.

Figure 42 Price and quantity relationship for winter flounder

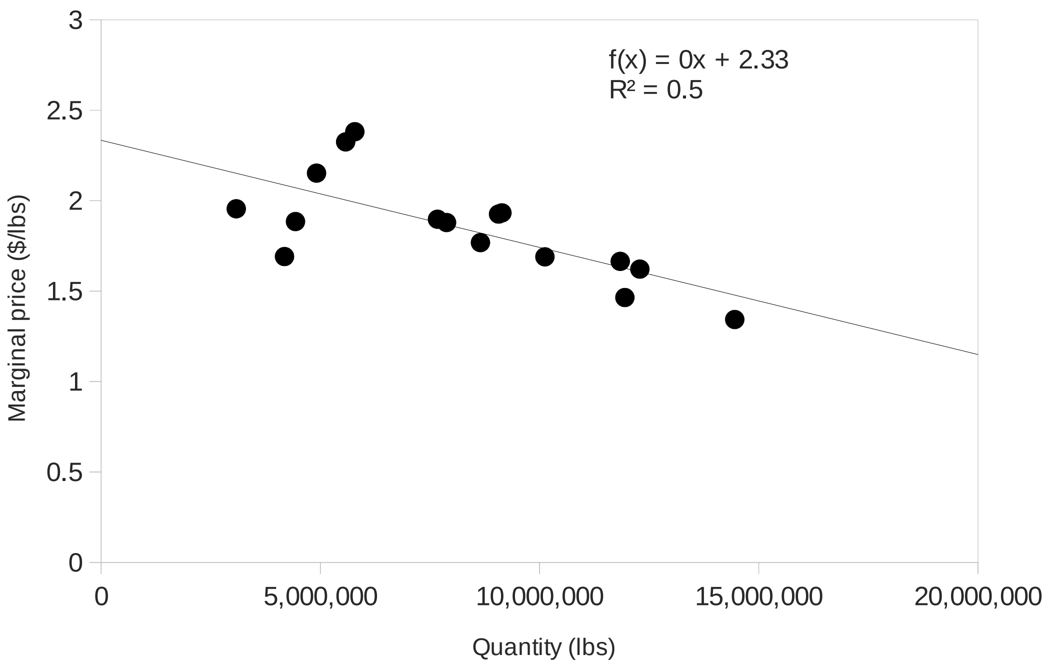


Table 66 – Average prices applied to landings in calculating NPV

	Fmsy	75Fmsy	Freb 2023	Freb 2022	Freb 2021	No Action	F=0
2013	$1.96	$2.04	$2.09	$2.13	$2.18	$2.22	$2.33
2014	$1.87	$1.95	$2.01	$2.07	$2.13	$2.19	$2.33
2015	$1.79	$1.88	$1.94	$2.00	$2.08	$2.15	$2.33
2016	$1.72	$1.81	$1.88	$1.94	$2.03	$2.11	$2.33
2017	$1.66	$1.74	$1.81	$1.88	$1.98	$2.07	$2.33
2018	$1.59	$1.67	$1.74	$1.82	$1.93	$2.03	$2.33
2019	$1.53	$1.60	$1.68	$1.76	$1.87	$1.98	$1.11
2020	$1.46	$1.53	$1.61	$1.69	$1.82	$1.18	$1.13
2021	$1.40	$1.47	$1.55	$1.63	$1.16	$1.17	$1.12
2022	$1.35	$1.41	$1.49	$1.19	$1.15	$1.16	$1.10
2023	$1.35	$1.41	$1.49	$1.19	$1.15	$1.16	$1.10

Table 67 – Anticipated landings under seven scenarios (mt)

	Fmsy	75Fmsy	Freb 2023	Freb 2022	Freb 2021	No Action	F=0
2013	2.732	2.105	1.716	0	0	0	0
2014	3.171	2.532	2.108	1.739	0	0	0
2015	3.95	3.23	2.729	2.278	1.71	0	0
2016	4.605	3.857	3.309	2.8	2.132	1.566	0
2017	5.187	4.448	3.871	3.318	2.562	1.901	0
2018	5.745	5.03	4.434	3.829	2.994	2.243	0
2019	6.317	5.627	5.014	4.364	3.447	2.602	0
2020	6.872	6.219	5.593	4.911	3.912	2.978	10.407
2021	7.418	6.798	6.158	5.449	4.374	9.843	10.257
2022	7.927	7.346	6.699	5.957	10.012	9.87	10.301
2023	8.392	7.843	7.191	9.699	10.046	10.003	10.462

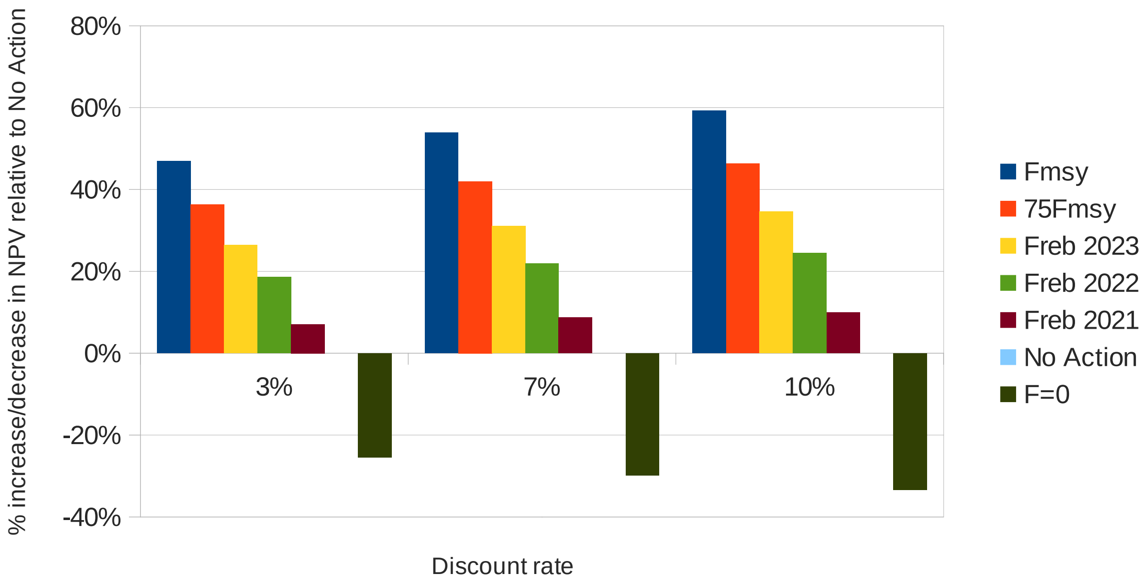
Table 68 – NPV of seven rebuilding options under three discount rate scenarios ($ millions)

discount rate	Fmsy	75Fmsy	Freb 2023	Freb 2022	Freb 2021	No Action	F=0
3%	173.3	160.8	149.1	132.8	120.9	108.9	88.0
7%	137.5	126.9	117.1	102.1	91.9	80.8	62.7
10%	117.3	107.8	99.2	85.0	75.9	65.5	49.1

Table 69 – relative change in NPV from No Action rebuilding strategy

discount rate	Fmsy	75Fmsy	Freb 2023	Freb 2022	Freb 2021	No Action	F=0
3%	59%	48%	37%	22%	11%	0%	-19%
7%	70%	57%	45%	26%	14%	0%	-22%
10%	79%	65%	51%	30%	16%	0%	-25%

Figure 43 NPV of seven rebuilding options under three discount rate scenarios



7.4.1.2 Annual Catch Limit Specifications

These analyses focus on vessels enrolled in the sector allocation system, which constitute nearly 99% of the landings of the commercial groundfish fishery. Two primary options and, under Option 2, four sub-Options are analyzed.

7.4.1.2.1 Option 1: No Action

By selecting Option 1, ACLs will be based on FW47 specifications for the years 2013-2014, which have missing values for many species (Table 70). Since many critical stocks will have no ACL specified at all, fishing would not be permitted for the species with undefined ACLs, nor would fishing be allowed in these species’ broad stock areas.

Table 70 – No Action Sector sub-ACLs (lbs)

SPECIES	STOCK	Sector sub-ACL
	American plaice	-
	GB East	-
Cod	GB West	-
	GOM	-
	GB East	-
Haddock	GB West	-
	GOM	-
	Halibut	-
	Ocean pout	
	Pollock	28,240,926
	Redfish	22,246,619
	White hake	-
Windowpane	North	-
	South	-
	GB	7,733,736
Winter flounder	GOM	1,521,835
	SNE/MA	742,950
	Witch flounder	-
	Wolffish	-
	CC/GOM	-
Yellowtail flounder	GB	-
	SNE	-

Between November 1, 2011 and October 31, 2012, 14,480 unique sector trips landed groundfish under the sector allocation system. Of these, no trips were able to catch (land or discard) any of the non-zero sub-ACL stocks. Consequently, the No Action option is unlikely to provide for any fishing opportunities or generate any revenue from groundfish fishing for Sector or Common Pool vessels. Even if catch of non-allocated stocks could be reduced to zero through the use of selective gear, new targeting practices for non-groundfish species, or market timing, and market prices increased due to reduced supply, it is unlikely gross revenues would surpass $10 million.

Since Option 1/No Action does not specify an ABC or ACL for GOM cod and GOM haddock, and this would stop all recreational fishing activity, Option 2 would provide more economic benefits to the recreational component of the fishery.

The precise impacts of this option on the scallop fishery are unclear. This option does not identify scallop fishery sub-ACLs for several groundfish stocks. While this would not prevent the scallop fishery from fishing in FY 2013, it is not clear if the absence of a sub-ACL would be treated as if the sub-ACL was zero. If this would be the case, then any catches of these stocks would lead to scallop fishery AMs in FY 2014 and/or later years. As a result, this option would result in large reductions in scallop fishery revenues when compared to Option 2. But if this is not the case and the scallop fishery catches of these stocks do not trigger AMs, then this option might allow for greater scallop fishery revenues than would be the case if AMs are triggered using the ACLs of Option 2.

7.4.1.2.2 Option 2: Revised Annual Catch Limit Specifications (Preferred Alternative)

Option 2 would adopt new ABCs for GB cod, GOM cod, GB haddock, GOM haddock, GB yellowtail flounder, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American plaice, witch flounder, redfish, Atlantic halibut, white hake, northern windowpane, southern windowpane, ocean pout and Atlantic wolffish.

Substantial reductions in available fishable quota are expected for several stocks, most notably GOM and GB cod, GOM haddock, American plaice, witch flounder, CC/GOM yellowtail flounder and GB yellowtail flounder. As in Framework 47, the Quota Change Model (QCM) is used to predict the potential impact of these non-marginal changes in quota.

The QCM is a simulation model that selects trips from existing catch records that are representative of those trips most likely to take place under the new quota conditions. A pool of 100,000 actual trips is selected based on each trip's utilization of allocated ACE, using twelve months of fishery-dependent data from Nov 1, 2011 through Oct 31, 2012. The more efficiently a trip utilized its ACE, the more likely that trip is to be drawn into the pool, and, potentially, the more times that trip will be replicated within the pool. ACE efficiency is determined by the ratio of ACE expended to net revenues on a trip for each of the 16 allocated stocks. Net revenues are calculated as gross revenues minus trip costs minus quota leasing costs, where trip costs are based on observer data and quota leasing costs are estimated from an inter-sector lease value model based on FY 2011 and partial-year FY 2012 values (Murphy et. al, 2012). Trips that were particularly ACE-inefficient are not drawn into the pool at all. The model pulls trips from the pool at random, summing the ACE expended for the 16 allocated stocks as trips are drawn. When one stock's ACE reaches the allocated limit, no trips from that broad stock area are selected and the model continues selecting trips until quota limits are achieved in all three broad stock areas or for one of the unit stocks.

By running simulations based on actual trips, the model implicitly assumes that stock conditions existing during the data period (Nov 2011 – Oct 2012) are representative and that trips are repeatable. Use of existing trip net revenues requires an assumption of constant trip costs and constant quota costs. These assumptions will surely not hold—fisherman will continue to develop their technology and fishing practices to increase their efficiency, market conditions will induce additional behavior changes, and fishery stock conditions are highly dynamic. Fuel and other costs may rise due to larger economic shifts or shoreside industry consolidation. Quota lease prices will certainly increase under more restrictive allocations, though it is impossible to estimate the magnitude of these increases. In general, the model will under-predict true landings and/or revenues if stock conditions improve, if prices rise in response to lower quantities landed, and if fisherman become yet more efficient at maximizing the value of their ACE. Conversely, the model will over-predict true landing and/or revenues if stock conditions decline, markets deteriorate or fishing costs increase substantially. The model will over-predict landings if stock conditions for a highly constraining stock are such that catchability increases substantially and/or fisherman are unable to avoid the stock - in this circumstance, better than expected stock conditions may lead to worse than anticipated fishery performance. Minor differences between tables are due to summarizing the data in different categories.

Table 71 – Sector sub-ACLs (mt) for 2010-2013, including LOW and HIGH options

SPECIES	STOCK	2010	2011	2012	2013 - LOW	2013 - HIGH	2013 - LOW, incl. carryover	2013 - HIGH, incl. carryover
American plaice		2,748	3,108	3,223	1,718	1,718	1,890	1,890
	GB East	325	423	445	96	96	96	96
Cod	GB West	2,977	3,878	4,079	1,679	2,737	2,131	3,098
	GOM	4,327	4,825	3,619	657	814	1,018	1,176
	GB East	11,913	9,065	8,111	3,952	3,952	3,952	3,952
Haddock	GB West	28,273	21,515	19,252	22,172	22,172	24,908	24,908
	GOM	799	778	648	186	186	251	251
Halibut		-	-	-	-	-	-	-
Ocean pout		-	-	-	-	-	-	-
Pollock		16,178	13,952	12,530	12,810	12,810	14,063	14,063
Redfish		6,756	7,541	8,291	10,091	10,091	10,920	10,920
White hake		2,505	2,974	3,257	3,326	3,326	3,652	3,652
Windowpane	North	-	-	-	-	-	-	-
	South	-	-	-	-	-	-	-
	GB	1,823	2,007	3,367	3,508	3,508	3,859	3,859
Winter flounder	GOM	133	329	690	690	690	759	759
	SNE/MA	-	-	-	-	-	-	-
Witch flounder		827	1,236	1,426	601	601	744	744
Wolffish		-	-	-	-	-	-	-
	CC/GOM	729	940	1,021	467	467	569	569
Yellowtail flounder	GB	803	1,142	364	220	351	220	351
	SNE	235	524	607	455	455	516	516

Option 2, Scenario 1 (*GOM cod ABC = 1,249mt, GB ytf ABC = 500mt*)

This scenario is based on a GOM cod ABC of 1,249mt and a GB ytf ABC of 500mt, with all other allocations identical for other stocks. Full 10% carryover for authorized stocks is assumed. Under this scenario, gross groundfish revenues are predicted to be just over $58 million and all gross revenues on groundfish trips are predicted to be just over $77.5 million (Table 72). This represents approximately a 30% reduction in gross revenues relative to FY11 and a 20% reduction in revenues relative to predicted FY12 (Table 73). On a home-port state level, Connecticut is expected to have the largest percentage decline (64%) in gross revenue from FY11, followed by New Hampshire with a 42% predicted reduction. Maine is expected to be the least affected by these ACLs. As for major home-ports, Chatham, MA is expected to have the largest percentage decline (65%) in gross revenue and Portland, ME is expected to be the least affected (Table 73). The impacts to gross revenues are expected to be distributed non-uniformly across different vessel length categories as well, with the less than 30 foot category experiencing the largest drop in gross revenue compared to FY11 (80% reduction) (Table 74). Larger vessel classes are predicted to experience smaller declines in gross revenues, with the largest vessel size class (75+ ft) predicted to see less than a 20% decline in gross revenues. This result is not surprising since, relative to larger vessels, small vessels have less scalability in terms of landings and have a smaller geographic range. Net revenues, as opposed to gross revenues, are expected to decline much less substantially as lower allocations force fisherman to fish as efficiently as possible (Table 75). The relatively large decline in predicted trip costs (fuel, ice, food, etc.) reflects an anticipated actual reduction, but most likely over-estimates the efficiency gains that will be possible in FY13. For example, predicted trip costs for FY12 are substantially lower than actual costs in FY11 despite a similar number of trips, days absent, etc. This is in large part a function of the optimization component of the QCM, which selects the most profitable trips (often the lowest-cost trips) disproportionately. Similarly, crew-days, days absent and total Sector trips are all predicted to decline substantially relative to FY 2011, as the model predicts only the most efficient trips will occur under such highly restrictive quota allocations (Table 75). This represents fewer earning opportunities for crew members.

Table 72 – Predicted catch and gross revenue by stock from simulation model under Scenario 1 (*100 realizations*)

			Limit	Catch	Utilization	Ex-vsl value
am_plaice	**all**		4,166,981	3,037,007	73%	$4,032,130
cod	**gb_east**		211,642	147,763	70%	$197,328
cod	**gb_west**		4,698,579	3,988,314	85%	$7,983,819
cod	**gom**		2,245,221	2,212,439	99%	$5,229,224
haddock	**gb_east**		8,712,579	1,144,822	13%	$1,755,205
haddock	**gb_west**		54,912,838	2,172,338	4%	$3,638,522
haddock	**gom**		552,914	484,170	88%	$1,021,277
halibut	**all**		114,639	86,039	75%	$174,036
non_gfish	**all**		0	26,392,427	.	$18,950,117
ocean_pout	**all**		434,306	94,127	22%	$0
pollock	**all**		31,003,290	15,024,105	48%	$12,247,536
redfish	**all**		24,074,452	7,089,259	29%	$3,958,968
wh_hake	**all**		8,050,538	5,420,309	67%	$5,888,347
windowpane	**north**		216,051	206,547	96%	$14
windowpane	**south**		224,869	221,272	98%	$202
winter_fl	**gb**		8,507,110	3,411,995	40%	$6,672,491
winter_fl	**gom**		1,673,953	256,207	15%	$512,726
winter_fl	**sne_ma**		742,950	276,280	37%	$19,848
witch_fl	**all**		1,639,341	1,423,200	87%	$2,478,778
wolffish	**all**		136,685	54,935	40%	$0
yt_flounder	**cc_gom**		1,254,638	795,315	63%	$1,015,178
yt_flounder	**gb**		220,460	217,325	99%	$280,701
yt_flounder	**sne**		1,136,912	1,044,047	92%	$1,451,216
		Total:	**154,930,947**	**75,200,241**	**49%**	**$77,507,662**
	Total Groundfish:			**48,807,814**		**$58,653,156**

Table 73 – Predicted groundfish catch and gross revenue by homeport state and port under Scenario 1

	FY 2010	FY 2011	FY 2012 (predicted)		FY 2013 (predicted)		
	Ex-vessel value	Ex-vessel value	*Catch (lbs)*	Ex-vessel value	*Catch (lbs)*	Ex-vessel value	% change FY_11
Connecticut	**$ 35,081**	**$ 46,646**	-	$ -	-	$ -	
Massachusetts	**$ 58,006,800**	**$ 64,605,304**	***37,745,896***	**$ 52,731,815**	***31,067,074***	**$ 39,816,244**	***-38%***
Boston	*$14,251,495*	*$17,458,607*	*9,400,935*	*$12,688,230*	*8,942,389*	*$11,451,032*	*-34%*
Chatham	*$ 2,482,876*	*$ 2,582,201*	*533,255*	*$ 871,214*	*862,133*	*$ 1,231,053*	*-52%*
Gloucester	*$16,224,983*	*$16,807,126*	*12,103,185*	*$15,696,738*	*9,214,330*	*$10,202,252*	*-39%*
New Bedford	*$18,149,740*	*$20,387,478*	*11,020,427*	*$16,061,394*	*9,834,674*	*$13,905,760*	*-32%*
Maine	**$ 14,470,489**	**$ 14,599,316**	***17,064,192***	**$ 17,246,295**	***12,935,991***	**$ 12,804,321**	***-12%***
Portland	*$10,269,562*	*$ 9,683,130*	*12,024,665*	*$10,888,071*	*9,838,967*	*$ 8,981,195*	*-7%*
New Hampshire	**$ 3,347,576**	**$ 4,673,318**	***4,009,801***	**$ 5,245,415**	***2,527,307***	**$ 2,883,624**	***-38%***
New Jersey	**$ 97,897**	**$ 66,667**	-	$ -	-	$ -	
New York	**$ 909,309**	**$ 1,262,452**	***489,937***	**$ 840,959**	***371,338***	**$ 611,607**	***-52%***
Rhode Island	**$ 3,123,923**	**$ 3,144,732**	***648,535***	**$ 1,177,741**	***1,817,849***	**$ 2,307,475**	***-27%***
Point Judith	*$ 2,412,589*	*$ 2,284,227*	*430,807*	*$ 767,716*	*1,515,952*	*$ 1,854,129*	*-19%*
Other Northeast	**$ 511,277**	**$ 365,959**	***102,526***	**$ 161,131**	***72,697***	**$ 127,133**	***-65%***
TOTAL	**$ 80,502,351**	**$ 88,764,394**	***60,062,999***	**$ 77,405,622**	***48,806,337***	**$ 58,566,451**	***-34%***

Table 74 – Predicted groundfish catch and gross revenue by vessel length class under Scenario 1

Length class	FY 2010	FY 2011	FY 2012 (predicted)	FY 2013 (predicted)
<30'	$ 16,485,506	$ 496,779	$ 227,095	$ 22,913
30'to<50'	$ 24,689,727	$ 18,835,175	$ 21,245,400	$ 10,631,192
50'to<75'	$ 39,225,644	$ 28,294,806	$ 25,304,566	$ 18,953,300
75'+	$ 107,682	$ 41,142,431	$ 30,751,684	$ 28,950,139
TOTAL	**$ 80,508,560**	**$ 88,769,191**	**$ 77,528,744**	**$ 58,557,544**

Table 75 – Predicted outcomes under Scenario 1 based on 100 model realizations ($ millions)

		Gross revenue	Gross groundfish revenue	Net revenue	Total variable cost	*Trip cost*	*Quota cost*	*Sector cost*	Crew days	Days Absent	Number trips
	FY 2010	**$ 95.8**	**$ 80.5**	**$ 53.3**	**$ 42.5**	**$ 20.7**	**$ 21.8**		**55,992**	**16,023**	**9,738**
	FY 2011	**$ 109.8**	**$ 109.8**	**$ 88.8**	**$ 53.5**	**$ 56.6**	**$ 29.2**	**unknown**	**65,450**	**18,773**	**11,741**
	FY 2012 (predicted)	**$ 94.5**	**$ 94.5**	**$ 77.5**	**$ 57.0**	**$ 37.7**	**$ 17.1**		**58,125**	**17,563**	**12,536**
FY 2013 (predicted)	MIN	$ 63.2	$ 48.1	$ 39.7	$ 11.6	*$ 23.8*	*$ 10.6*	*$ 1.5*	40,483	11,668	6,679
	MAX	$ 84.1	$ 64.7	$ 51.7	$ 16.6	*$ 32.7*	*$ 14.1*	*$ 2.0*	53,528	15,233	8,020
	MEAN	**$ 77.5**	**$ 58.6**	**$ 47.9**	**$ 15.1**	***$ 29.8***	***$ 12.8***	***$ 1.8***	**49,609**	**14,093**	**7,378**
	STD	$ 3.9	$ 3.0	$ 2.4	$ 0.9	*$ 1.6*	*$ 0.7*	*$ 0.1*	2,465	710	333
	% change FY10	*-19%*	*-27%*	*-10%*	*-64%*	*44%*	*-41%*		*-11%*	*-12%*	*-24%*
	% change FY11	*-29%*	*-34%*	*-10%*	*-73%*	*2%*	*-53%*	*n/a*	*-24%*	*-25%*	*-37%*
	% change FY12(p)	*-18%*	*-24%*	*-16%*	*-60%*	*74%*	*-38%*		*-15%*	*-20%*	*-41%*

Option 2, Scenario 2 (*GOM cod ABC = 1,550mt, GB ytf = 1,150mt*)(Preferred Alternative)

This scenario is based on a GOM cod ABC of 1,550mt and a GB ytf ABC of 1,150mt, with all other allocations identical for other stocks. Full 10% carryover for authorized stocks is assumed. Under this scenario, gross groundfish revenues are predicted to be just over $64 million and all gross revenues on groundfish trips are predicted to be just over $84.5 million (Table 76). This represents approximately a 28% reduction in gross revenues relative to FY 2011 and an 18% reduction in revenues relative to predicted FY 2012 (Table 77). On a home-port state level, Connecticut is expected to have the largest percentage decline (60%) in gross revenue from FY 2011, followed by New Hampshire with a 37% predicted reduction. Maine is expected to be the least affected by these ACLs. As for major home-ports, Chatham, MA is expected to have the largest percentage decline (61%) in gross revenue and Portland, ME is expected to be the least affected (Table 77). The impacts to gross revenues are expected to be distributed non-uniformly across different vessel length categories as well, with the less than 30 foot category experiencing the largest drop in gross revenue compared to FY 2011 (75% reduction) (Table 78). Larger vessel classes are predicted to experience smaller declines in gross revenues, with the largest vessel size class (75+ ft) predicted to see less than a 16% decline in gross revenues. This result is not surprising since, relative to larger vessels, small vessels have less scalability in terms of landings and have a smaller geographic range. Net revenues, as opposed to gross revenues, are expected to decline much less substantially as lower allocations force fisherman to fish as efficiently as possible (Table 79). The relatively large decline in predicted trip costs (fuel, ice, food, etc.) reflects an anticipated actual reduction, but most likely over-estimates the efficiency gains that will be possible in FY 2013. For example, predicted trip costs for FY 2012 are substantially lower than actual costs in FY 2011 despite a similar number of trips, days absent, etc. This is in large part a function of the optimization component of the QCM, which selects the most profitable trips (often the lowest-cost trips) disproportionately. Similarly, crew-days, days absent and total sector trips are all predicted to decline substantially relative to FY 2011, as the model predicts only the most efficient trips will occur under such highly restrictive quota allocations (Table 79). This represents fewer earning opportunities for crew members.

Table 76 - Predicted catch and gross revenue by stock from simulation model under Scenario 2 (*100 realizations*)

		limit	catch	utilization	ex-vsl value
am_plaice	all	4,166,981	3,266,977	78%	$4,310,439
cod	gb_east	211,642	157,374	74%	$204,951
cod	gb_west	4,698,579	4,276,786	91%	$8,481,758
cod	gom	2,592,591	2,555,886	99%	$6,064,299
haddock	gb_east	8,712,579	1,247,856	14%	$1,907,272
haddock	gb_west	54,912,838	2,611,394	5%	$4,276,574
haddock	gom	552,914	492,920	89%	$1,035,824
halibut	all	114,038	91,754	80%	$181,511
non_gfish	all	0	27,321,206	.	$20,076,153
ocean_pout	all	433,634	94,148	22%	$0
pollock	all	31,003,290	15,726,463	51%	$12,804,245
redfish	all	24,074,452	7,410,777	31%	$4,146,881
wh_hake	all	8,050,538	5,665,542	70%	$6,151,051
windowpane	north	216,714	258,360	119%	$17
windowpane	south	224,710	205,715	92%	$194
winter_fl	gb	8,507,110	3,924,328	46%	$7,709,032
winter_fl	gom	1,673,953	262,644	16%	$524,138
winter_fl	sne_ma	742,950	276,585	37%	$20,168
witch_fl	all	1,639,341	1,529,818	93%	$2,651,999
wolffish	all	136,343	58,809	43%	$0
yt_flounder	cc_gom	1,254,638	932,316	74%	$1,184,261
yt_flounder	gb	774,338	749,541	97%	$994,474
yt_flounder	sne	1,136,912	1,003,257	88%	$1,385,226
	TOTAL	**155,831,085**	**80,120,454**	**51%**	**$84,110,466**
TOTAL GROUNDFISH			**52,799,248**		**$64,034,313**

Table 77 - Predicted groundfish catch and gross revenue by homeport state and port under Scenario 2

	FY 2010	FY 2011	FY 2012 (predicted)		FY 2013 (predicted)		
	Ex-vessel value	Ex-vessel value	*Catch (lbs)*	Ex-vessel value	*Catch (lbs)*	Ex-vessel value	% change FY11
Connecticut	**$ 35,081**	**$ 46,646**	-	$ -	***14,855***	**$ 17,265**	
Massachusetts	**$ 58,006,800**	**$ 64,605,304**	***37,745,896***	**$ 52,731,815**	***34,006,776***	**$ 44,034,809**	***-32%***
Boston	*$14,251,495*	*$17,458,607*	*9,400,935*	*$12,688,230*	*9,577,484*	*$12,280,124*	*-30%*
Chatham	*$ 2,482,876*	*$ 2,582,201*	*533,255*	*$ 871,214*	*732,808*	*$ 1,080,915*	*-58%*
Gloucester	*$16,224,983*	*$16,807,126*	*12,103,185*	*$15,696,738*	*9,675,167*	*$10,823,327*	*-36%*
New Bedford	*$18,149,740*	*$20,387,478*	*11,020,427*	*$16,061,394*	*11,433,084*	*$16,223,497*	*-20%*
Maine	**$ 14,470,489**	**$ 14,599,316**	***17,064,192***	**$ 17,246,295**	***13,593,139***	**$ 13,398,801**	***-8%***
Portland	*$10,269,562*	*$ 9,683,130*	*12,024,665*	*$10,888,071*	*10,371,142*	*$ 9,429,024*	*-3%*
New Hampshire	**$ 3,347,576**	**$ 4,673,318**	***4,009,801***	**$ 5,245,415**	***2,724,814***	**$ 3,174,342**	***-32%***
New Jersey	**$ 97,897**	**$ 66,667**	-	$ -	-	$ -	
New York	**$ 909,309**	**$ 1,262,452**	***489,937***	**$ 840,959**	***443,006***	**$ 715,857**	***-43%***
Rhode Island	**$ 3,123,923**	**$ 3,144,732**	***648,535***	**$ 1,177,741**	***1,944,524***	**$ 2,578,325**	***-18%***
Point Judith	*$ 2,412,589*	*$ 2,284,227*	*430,807*	*$ 767,716*	*1,552,275*	*$ 1,968,547*	*-14%*
Other Northeast	**$ 511,277**	**$ 365,959**	***102,526***	**$ 161,131**	***70,662***	**$ 120,975**	***-67%***
TOTAL	**$ 80,502,351**	**$ 88,764,394**	***60,062,999***	**$ 77,405,622**	***52,797,776***	**$ 64,040,375**	***-28%***

Table 78 - Predicted groundfish catch and gross revenue by vessel length class under Scenario 2

Length class	FY 2010	FY 2011	FY 2012 (predicted)	FY 2013 (predicted)
<30'	$ 16,485,506	$ 496,779	$ 227,095	$ 26,943
30'to<50'	$ 24,689,727	$ 18,835,175	$ 21,245,400	$ 11,076,572
50'to<75'	$ 39,225,644	$ 28,294,806	$ 25,304,566	$ 20,505,866
75'+	$ 107,682	$ 41,142,431	$ 30,751,684	$ 32,424,932
TOTAL	**$ 80,508,560**	**$ 88,769,191**	**$ 77,528,744**	**$ 64,034,313**

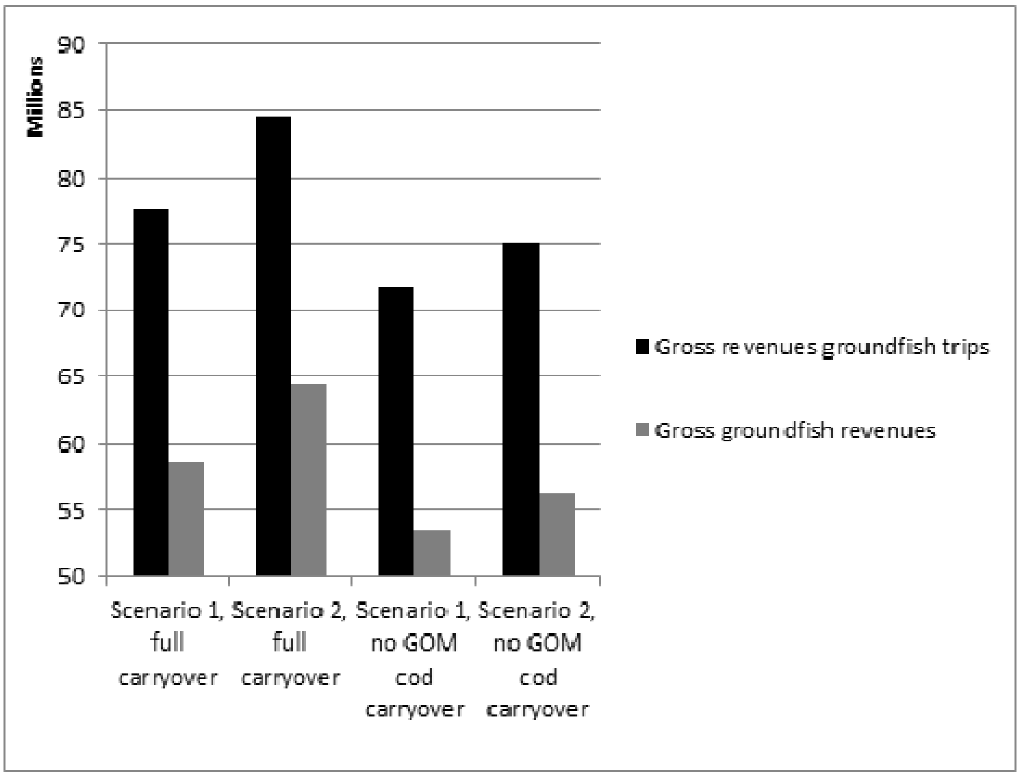
Table 79- Predicted outcomes under Scenario 2 based on 100 model realizations ($ millions)

		Gross revenue	Gross groundfish revenue	Net revenue	Variable cost	Trip cost	Quota cost	*Sector cost*	Crew days	Days Absent	Number trips
	FY 2010	**$ 95.8**	**$ 80.5**	**$ 53.3**	**$ 42.5**	**$ 20.7**	**$ 21.8**		**55,992**	**16,023**	**9,738**
	FY 2011	**$ 109.8**	**$ 109.8**	**$ 88.8**	**$ 53.5**	**$ 56.6**	**$ 29.2**		**65,450**	**65,450**	**18,773**
	FY 2012 (predicted)	**$ 94.5**	**$ 94.5**	**$ 77.5**	**$ 57.0**	**$ 37.7**	**$ 17.1**		**58,125**	**58,125**	**17,563**
FY 2013 (predicted)	MIN	$ 74.7	$ 56.4	$ 45.1	$ 14.9	$ 29.3	$ 12.7	$ 1.7	47,405	13,450	6,992
	MAX	$ 91.4	$ 68.5	$ 55.7	$ 18.6	$ 35.9	$ 15.3	$ 2.1	57,954	16,336	8,372
	MEAN	**$ 84.1**	**$ 64.0**	**$ 51.3**	**$ 16.8**	**$ 33.0**	**$ 14.2**	**$ 1.9**	**54,022**	**15,228**	**7,766**
	STD	$ 3.3	$ 2.5	$ 2.0	$ 0.8	$ 1.3	$ 0.5	$ 0.1	1,982	553	285
	% change FY10	*-12%*	*-20%*	*-4%*	*-60%*	*59%*	*-35%*		*-4%*	*-5%*	*-20%*
	% change FY11	*-23%*	*-28%*	*-4%*	*-70%*	*13%*	*-48%*	*N/A*	*-17%*	*-19%*	*-34%*
	% change FY12(p)	*-11%*	*-17%*	*-10%*	*-55%*	*93%*	*-31%*		*-7%*	*-13%*	*-38%*

Carry-over from FY 2012

Sector management rules allow sectors to carry-over up to 10 percent of the initial allocation from one year into the next. This effectively increases the amount of catch that a sector could take in the second year. All catch and revenue estimates presented in the preceding sections are based on Sectors being able to utilize their carryover. However, if carry-over was revoked or ACLs revised downward in such a way as to ensure allocations plus carry-over fell below the sector sub-ACL, it could substantially change the conclusions of this section. The biological impacts section of this document points out that allowing carry-over will only cause allocations to exceed OFL for GOM cod. As an exercise, the QCM was run with full carryover allowed for all authorized stocks except GOM cod. The results show that under both scenarios, eliminating carry-over for GOM cod reduces predicted gross revenues by approximately $4 million for Scenario 1 or $2.5 million for Scenario 2.

Figure 44 – Predicted gross revenues with full authorized carryover, and with full carryover less GOM cod



Impacts on Recreational Fishing Activity

Recreational fishermen target GOM haddock, GOM cod, pollock, and GOM winter flounder, with GOM cod and GOM haddock a particularly important part of the catch (see Amendment 16 for a description of the recreational fishery in the GOM). As shown in Section 6.5.10, there have been recent declines in recreational groundfish fishing activity. These declines are likely to continue given the low allocations for GOM cod and GOM haddock for FY 2013.

The Preferred Alternative would directly affect recreational anglers and have an indirect impact on charter/party operators through a potential change in passenger demand for charter/party fishing trips. While the exact measures that will be in place are unclear, the reductions in ACLs are likely to lead to a reduction in recreational fishing trips. Based on unpublished data, the measures needed to restrict recreational fishery removals to the GOM haddock ACL are likely to result in about 137,000 angler trips (Scott Steinback, pers. comm.). This would be a reduction of about 40 percent from the number of angler trips in FY 2011.

Since Option 1/No Action does not specify an ABC or ACL for GOM cod and GOM haddock, and this would stop all recreational fishing activity, Option 2 will provide more economic benefits to this component of the fishery. However, the reductions from FY 2012 ABCs/ACLs will likely lead to reduced revenues for these vessels.

Impacts on Scallop Fishing

The distribution of ACLs that is included in this option adopts allocations to the Atlantic sea scallop fishery for GB yellowtail flounder, SNE/MA yellowtail flounder, and SNE/MAB windowpane flounder. FW 48 considered several alternatives for these allocations, and that document analyzed the impacts of the different alternatives. FW 48 is currently under review. The following summary repeats the information from that document that applies to the specific allocations that are based on the FW 48 Preferred Alternatives. Option 1/No Action does not identify sea scallop sub-ACLs, because they have not been specified beyond FY 2012. In all cases, there are no management measures that would restrict scallop fishing activity in FY 2013 in the absence of a groundfish sub-ACL. It is unclear, however, how catches of those stocks in FY 2013 would be considered when determining whether AMs would be implemented in subsequent years. For this reason it is difficult compare Option 2 to Option 1/No Action.

FW 48 would establish a fixed percentage of the GB yellowtail flounder ABC that would be allocated to the scallop fishery. The percentage would be defined as 40 percent of the U.S. ABC in FY 2013, and 16 percent in subsequent years (FY 2014 and beyond). The 40 percent of U.S. ABC is equal to the medium estimate for yellowtail bycatch in the scallop fishery (85.3 mt), assuming the U.S. ABC would equal to 215 mt. The preferred alternative, however, adopts a U.S. ABC of 495 mt and the scallop sub-ACL that results would be 191.2 mt. This is more than double the medium estimate for scallop fishery catches in FY 2013 and the risks of exceeding the yellowtail sub-ACL for the scallop fishery in 2013 would be expected to be minor. Indeed, this value is 39 mt higher than the highest estimate of scallop fishery catches, or 152.8 mt.

Should the sub-ACL be exceeded, under the worst case AM scenario (no 2014 CAII trips), the estimated scallop revenue impact would be $16.2 million in 2014, assuming that this area was allocated the same number of trips if preferred alternative (Alt 2) was implemented in 2014 as well (109 FT limited access trips at 13,000 pounds per trip). Framework 24 is a one year action and the next framework may revise the open area DAS and access area trip allocations. However, these amounts represent the potential loss under the worst case scenario of a total CAII closure in 2014, since without such an AM trigger, the vessels would optimally be given the opportunity to fish in that area (if the resource conditions were similar to what is predicted at this point in time).

If the yellowtail sub-ACL was exceeded by less than 56%, however, CAII would still be open to fishing during some months depending on the overage amount. However, shifting landings to the other seasons would reduce the flexibility for vessel owners to choose where and when to fish with a possible increase in fishing costs. On the other hand, shifting effort to other seasons when the meat weights are highest (i.e. May and June) could possibly increase long-term landings and revenues to some extent, offsetting some of the negative effects of the effort shifts.

With respect to SNE./MA yellowtail flounder, this action proposes to allocate 90 percent of the high estimate of scallop fishery catches of this stock in each of the next three years, or 61 to 66 mt. This makes it less likely that the scallop fishery will exceed its ACL and be subject to AMs in subsequent years.

For SNE/MAB windowpane flounder, this preferred alternative allocates 36 percent of the ABC to the scallop fishery, based on the Preferred Alternative in FW 48. At present, there are no AMs that apply to this stock so this will not have any impacts on the scallop fishery. When AMs are developed in the next scallop action, however, the existence of this sub-ACL may constrain scallop fishing activity should the sub-ACL be exceeded.

7.4.2 Commercial and Recreational Fishery Measures

7.4.2.1 SNE/MA Winter Flounder Landing Restrictions

7.4.2.1.1 Option 1: No Action

This option would continue the prohibition on landing SNE/MA winter flounder. When compared to Option 2, this option would result in reduced fishing vessel revenues. Assuming the entire expected allocation of SNE/MA winter flounder to sectors and the common pool is landed, and an average ex-vessel price of $2.03 per pound, this option would be expected to result in a reduction in revenues of $5.4 million when compared to Option 2. This does not take into account that revenues of other stocks may be reduced as well since there may be fewer groundfish fishing trips as a result of the inability to land SNE/MA winter flounder.

7.4.2.1.2 Option 2: Landing of SNE/MA Winter Flounder Permitted (Preferred Alternative)

This option would result in an additional $5.4 million of groundfish ex-vessel revenues when compared to Option 1/No Action. This is based on the ACL that is the preferred alternative in Section 4.2.1. Most - $4.3 million – would be expected to accrue to sector vessels, while the remainder would accrue to common pool vessels. It is not possible to include this change in the QCM used to analyze the economic impacts of the revised ABCs/ACLs. The QCM uses recent fishing activity to create a simulation model, and because landing of this stock has been prohibited, there are not enough trips in the data to characterize future fishing activity.

7.4.2.2 Commercial Fishery Accountability Measures

7.4.2.2.1 Option 1: No Action

Option 1 would retain the current commercial fishery AMs for SNE/MA winter flounder as defined in Amendment 16 and modified by subsequent management actions. The current AM prohibits landing of this stock, but FW 48 submitted a preferred alternative that would eliminate this AM and adopt area-based restrictions if the ACL is exceeded.

The No Action AM - prohibition on landing – prevents any direct economic benefit from catching SNE/MA winter flounder. Unlike most AMs which are only triggered if an ACL is exceeded, this AM is always in place as a pro-active measure. While it has resulted in a low fishing mortality rate, any direct economic benefits will not be realized until the future and only if the AM is eliminated. When compared to Option 2, this AM would result in reduced economic benefits because landing is not allowed. A rough approximation of the lost revenues is $5.4 million, the amount of revenue generated from landing SNE/MA winter flounder if possession is allowed (Section 7.4.2.1.2).

Should the change in the AM that is included in FW 48 be adopted prior to the implementation of this action, then there would be no difference between the economic impacts of Option 1/No Action and Option 2 for common pool vessels because the AM would be the same. For sector vessels, the economic impacts would depend on whether landing of SNE/MA winter flounder is allowed or not, which is a different measure. If landing is not allowed, then the area-based AM would be applied to sectors and may result in reduced fishing opportunities for other stocks if the ACL is exceeded but would not close an entire stock area as would be the case in this situation if Option 2 would be adopted. As a result, the economic impacts of Option 1/No Action in this scenario would be less than Option 2, but cannot be readily quantified.

7.4.2.2.2 Option 2: Revised Accountability Measures SNE/MA Winter Flounder (Preferred Alternative)

This option would apply sector rules to sector catches of SNE/MA winter flounder, replacing the prohibition on landing. It would only be adopted if landing was allowed (see Section 7.4.2.1.2). This AM would allow economic benefits to accrue to the fishery from these catches, but if sectors approach their ACE they must stop fishing in the entire SNE/MA winter flounder stock area. Since this area extends north along the eastern side of Cape Cod, if sectors cannot constrain catches below the ACE then this AM could result in reduced catches of other stocks such as SNE/MAS yellowtail flounder. This would only occur if the AM is triggered. When compared to the no possession AM that is currently in place (Option 1/No Action), this AM would provide opportunities for revenues from SNE/MA winter flounder. If the area-based AM is adopted prior to implementation, this AM would again allow for increased revenues but may also lead to a closure of the area if fishing vessels cannot and sectors cannot manage their catches, reducing revenues from other stocks. This is not believed likely to occur, as the decision to allow landing hinges on a sufficiently large ACL to provide sectors a reasonable opportunity to manage their catches.

For common pool vessels, this AM would adopt the area-based AM that was included in FW 48. This AM will have less economic impact on common–pool vessels than the ban on possession because it may allow them to land approximately $1.1 million dollars of SNE/MA winter flounder.

7.5 Social Impacts

7.5.1 Introduction

The consideration of the social impacts of the changes made in this framework is required pursuant to the National Environmental Policy Act (NEPA) of 1969 and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976. NEPA requires that before any agency of the federal government may take "actions significantly affecting the quality of the human environment," that agency must prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS) that includes the integrated use of the social sciences (NEPA Section 102(2)(C)). Social science analysis is required by multiple sections of the MSA. Section 303(b)(6) on limited entry requires examination of "(A) present participation in the fishery, (B) historical fishing practices in, and dependence on, the fishery, (C) the economics of the fishery, (D) the capability of fishing vessels used in the fishery to engage in other fisheries, (E) the cultural and social framework relevant to the fishery and any affected fishing communities, and (F) any other relevant considerations." Section 303A provides guidelines for implementing social and economic components of Limited Access Privilege Programs (LAPPs). Section 303(a)(9) on preparation of Fishery Impact Statements notes they "shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on--(A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants." National Standard 8 stipulates that "conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities" (16 U.S.C. § 1851 *et seq*.). A fishing community is then defined as being "substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community" (16 U.S.C. § 1802 (17)).

The need to measure, understand and mitigate the social impacts of fisheries policy is an essential part of the management process. Managers have an obligation to consider how policy changes affect the human context of the fishery, including the direct and indirect impacts on the safety, wellbeing, quality of life, fishery dependence, culture and social structure of communities. These impacts can be felt at the individual, family and community level which can make measuring and considering them difficult as the impact variables are typically differentially distributed. There is general consensus however, as to the types of impact to be considered; the section of the human environment where the impacts may be felt; likely social impacts; and the steps to enhance positive impacts while mitigating negative ones (ICPGSIA, 2003).

Broadly defined, social impacts that need to be considered are the "social and cultural consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of society" (Burdge and Vanclay 1995). Identifying possible social impact variables is a topic of much debate but the development of standard definitions for a set of the most common and consequential social impacts are underway. The current National Marine Fisheries Service "Guidelines for Social Impact Assessment," provides some assistance in defining relevant social factors/variables. It is suggested that the following five social factors/variables should be considered when comparing the preferred management alternative to the alternatives not selected:

1. The *Size and Demographic Characteristics* of the fishery-related work force residing in the area; these determine demographic, income, and employment effects in relation to the work force as a whole, by community and region.
2. The *Attitudes, Beliefs and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding behavior of fishermen on the fishing grounds and in their communities.
3. The effects of proposed actions on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities.
4. The *Non-Economic Social Aspects* of the proposed action or policy; these include life-style issues, health and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.
5. The *Historical Dependence on and Participation* in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution and rights. (NMFS, 2007)

Longitudinal data describing these social factors region-wide and in comparable terms is limited, though the new surveys currently being implemented will begin to alleviate this. For this framework the "guidelines" document provides a range of variables to consider when predicting potential social impacts. It should also be noted that the academic literature on the subject has provided multiple lists of potential social variables, but it also cautions that such lists should not be considered "exhaustive" or "a checklist" (ICGPSIA, 1994; Vanclay, 2002; Burdge, 2004). Ultimately judgment must be used in choosing which variables are salient in any particular case.

Social factors specific to the Northeast (NE) Multispecies fishery and used in the SIA of Amendment 13 to the FMP were previously developed using a participatory process during a series of ten "social impact informational meetings." Based on comments provided by local stakeholders during these meetings five social impact factors were developed to describe the level of impact felt by fishing communities and families because of management changes: 1) regulatory discarding; 2) safety; 3) disruption in daily living; 4) changes in occupational opportunities and community infrastructure; and 5) formation of attitudes. These factors, while broad, overlap with those variables suggested by NMFS guidelines and have the added benefit of reflecting specific concerns of fishermen in the multispecies fishery.

In the preparation of this document, qualitative and quantitative methods have been used to assess the relative impact of the proposed management measures. Ports most closely involved with the multispecies fishery, and likely to be affected by the proposed measure, have been identified previously during the Amendment 13 social impact informational meetings, as well as more recently with the sector year end reports. While some management measures tend to produce certain types of social impacts it is not always possible to predict precise effects when there are multiple overlaying management measures such as in this proposed action. Also changes to the human environment often occur in small, incremental amounts and the character of a particular impact can be hidden by the gradual nature with which it occurs. Such impacts will be noted where they are possible to discern or where the potential for cumulative impacts seems likely. Therefore the discussion of social impacts for alternatives will indicate the likely directional impacts of specific measures e.g., positive, negative, or neutral.

7.5.2 Formal Rebuilding Programs and Annual Catch Limits

7.5.2.1 SNE/MA Winter Flounder Rebuilding Strategy

7.5.2.1.1 Option 1: No Action

Adopting Option 1, the No Action alternative, would retain the target rebuilding end date of 2014 for SNE/MA winter flounder. Given the current status of the stock it is unlikely that SNE/MA winter flounder will be rebuilt by 2014. Therefore the management objective under Option 1 will be to reduce fishing mortality to as close to zero as possible in an attempt to hasten rebuilding of the stock.

Social impacts associated with adopting Option 1 will depend largely on the management measures used to regulate fishing mortality and rebuild the SNE/MA winter flounder stock (see section 4.2.1). However, retaining the target rebuilding year of 2014 under Option 1 of this alternative would preclude many of the management options that might allow limited harvesting, in favor of the one measure most likely to offer the quickest rebuilding of the stock. Because Option 1 would dictate the necessary management measures to speed the rebuilding of the SNE/MA winter flounder stock, it could have a small negative social impact on the *Attitudes, Beliefs and Values* of the fishermen regarding management. To many vessel owners and operators in the NE Groundfish fishery, the rules that limit fishing are thought of as inflexible and as being based on poorly understood science (Acheson & Gardner, 2011). Option 1 could perpetuate this negative view of management and government when it comes to the flexibility of rebuilding targets.

7.5.2.1.2 Option 2: Revised Rebuilding Strategy (Preferred Alternative)

If Option 2 of the alternative is adopted, a revised rebuilding strategy would be implemented for the SNE/MA winter flounder stock with a target rebuilding year of 2023. By delaying the target rebuilding year this option could allow for some level of fishing effort to be directed on the SNE/MA winter flounder stock. Like Option 1/No Action, the most apparent social impacts related to this option will be dependent on the management measures used to regulate fishing mortality and rebuild the SNE/MA winter flounder stock. However, there may also be a small positive social impact to the *Attitudes, Beliefs and Values* of fishermen regarding the flexibility of management because Option 2 would not require the most rapid stock rebuilding measures.

7.5.2.2 Annual Catch Limit Specifications

7.5.2.2.1 Option 1: No Action

Adopting Option 1, the No Action alternative, would maintain the specifications for FY 2013 – FY 2014 adopted by FW 47. For a number of stocks there would be no specifications for these years. There would be no allocations made for the US/CA Resource Sharing Understanding quotas for FY 2013 and there would also be no specific allocations to the scallop fishery beyond FY 2012.

If Option 1 is adopted it will have a large negative social impact on the individuals and communities involved with the groundfish fishery. Because the groundfish ACLs for FY 2013 will be zero for most stocks, sectors will not be able to fish in most or all stock areas, which would essentially preclude all fishing for groundfish. With such a severe limitation on fishing opportunity, many fishermen may leave the fishery entirely or at least seek temporary opportunities in another fishery. Both possibilities would cause a change in the *Size and Demographics* of the groundfish fishery by reducing the number of vessels and fishermen involved. There is already a perception among many fishermen that there is a diminishing return on investment in the groundfish fishery that makes it hard to earn a living from fishing. In a 2010 telephone survey of multispecies permit holders 62% indicated that based on their fishing income at the time they could only remain in business for 1-2 years (Holland et. al. 2010). Option 1, would further limit the income potential of many groundfish fishermen, forcing some to leave the fishery.

For those fishermen that remain in the fishery there may be an incentive to adopt risky behavior such as deferring boat maintenance and replacement in an attempt to make ends meet (Lord, 2011). Other impacts to the *Life-style/Non-Economic Social Aspects* of the fishery could include reduced job satisfaction caused by the restrictions on catches and uncertainty about the future. Option 1 would also cause distrust in management because the lack of specifications and allocations would be seen as a failure on the part of management which would have a negative impact on the formation of *Attitudes and Beliefs*.

7.5.2.2.2 Option 2: Revised Annual Catch Limit Specifications (Preferred Alternative)

If Option 2 is adopted the specifications for FY 2013 through FY 2015 would be as specified in Table 8 (Section 4.1.2.2). Option 2 would adopt specifications for the U.S./CA Resource Sharing Understanding quotas and would also provide specific allocations to the scallop fishery for FY 2013. The social impacts of adopting Option 2, while negative, are much less severe than those caused by Option 1, the no action alternative.

Although, the adoption of the ACL specifications in Option 2 are less severe compared to the No Action alternative, they would still represent substantial reductions to the catch limits for many key species. Compared to the catch limits specified in previous frameworks for the years immediately prior to 2013, the reduction in catch limits specified under Option 2 would be expected to have some large negative social impacts. In an attempt to avoid quota limited stocks with low annual catch limits, vessel operators in the groundfish fishery would be forced to modify where and how they fish having a negative impact on the *Historic and Present Participation* in the fishery. These reduced catch limits set by Option 2, would also have a negative social impact on the *Size and Demographics* of the groundfish fishery because of a probable reduction in fishing opportunity, revenue and employment.

Another potential social impact, that is important to consider, is how the annual catch limit specifications proposed in Option 2 will affect the formation of *Attitudes and Beliefs* among fishermen, with regard to the science and management of the fishery. Acheson (2010) points out that groundfish fishermen in New England have an inherently different view of the ocean and its fisheries, than the views held by federal ocean/fisheries scientists. A fisherman's view is based largely on personal experience and their own proximal environment, which can be at odds with the larger environment described by fisheries scientists. It is in part because these differing views cannot always be reconciled that fishermen's opinion of federal fisheries science is so low in New England (Acheson, 2010; Acheson & Gardner, 2011; Holland et. al. 2010). Furthermore, fishermen tend to identify fishing effort as only one factor affecting the size of stocks, and that it may not be the most important one. Management controlling fishing pressure, as in the revised annual catch limit specifications set by Option 2, may not be perceived to be the most effective control of fish stocks size (Acheson, 2011). The reductions in catch limits included in Option 2, which are based on science that many NE fishermen consider flawed, could further erode the faith fishermen have in the quality of federal science. This continued lack of faith in the science used to direct management decisions could undermine the perceived legitimacy of future management actions and have a negative social impact on the formation of *Attitudes and Beliefs* about management.

U.S./Canada TACs

The U.S./Canada TACs for EGB cod, EGB Haddock and EGB yellowtail, specified under Option 2 of this measure are described in Table 4 (Section 4.1.2.1). The Council is considering two alternatives for EGB yellowtail flounder; the TMGC recommendation of 500 mt TAC for 2013, or an 1150 mt ABC to be considered in combination with a bycatch only fishery. A comparison of the proposed FY 2013 U.S. TACs and the FY 2012 U.S. TACs shown in Table 5 (Section 4.1.2.2) shows the percent change in U.S. allocations between the two years. For two of the three stocks the 2013 U.S. allocations will be substantially less than the allocations in 2012; the exception being the preferred alternative for GB yellowtail flounder..

If the U.S./Canada TACs specified under Option 2 are adopted it is expected that there would be some negative social impacts. Compared to Option 1 the No Action alternative, Option 2 would also have a negative impact on the *Size and Demographics* of the groundfish fishery but this impact would be less severe. The U.S. TACs for EGB cod, EGB haddock, and EGB yellowtail flounder, would be reduced by 41%, 43% and 62%/12% respectively under Option 2 which would reduce fishing opportunity in the Eastern Georges Bank stock area. The limitations imposed by the lowered TACs in the EGB could force fishermen to move to alternative fishing grounds or in some cases relocate their vessels to a different port as they adjust their fishing practices (Tuler et. al. 2008). Vessel operators, families and communities that are particularly reliant on the groundfish fishing opportunities in EGB will suffer the greatest social impacts.

Scallop Fishery Sub-ACLs

The scallop fishery sub-ACLs for GB yellowtail flounder, SNE/MA yellowtail flounder and possibly SNE/MA windowpane flounder, allocated under Option 2 of this measure are described in Table 6, Table 7 and Table 8 (Section 4.1.2.2). The specific allocations for yellowtail and windowpane flounder will be dependent on the method of specification adopted for yellowtail and whether a windowpane sub-ACL is established in this framework. The scallop fishery sub-ACLs allocated under Option 2 of this measure may cause a range of social impacts, differentially distributed, on the multispecies and scallop fleets.

Communities and individuals that have a greater dependence on the scallop fishery, compared to the multispecies fishery, may experience some small but negative social impacts associated with Option 2 of this measure. Scallop specific, sub-ACLs and AMs could be seen as overly restrictive and may affect the *Historic and Present Participation* negatively by changing the way people fish to avoid triggering an AM. Table 6 (Section 4.1.2.2) shows that of the possible Scallop FW 24 management alternatives and the estimated GB yellowtail flounder catch, most alternatives would be expected to exceed a GB yellowtail sub-ACL based on 16 percent of the GB YTF ABC. Only alternative 4 would be expected to catch less than the GB YTF sub-ACL, and only if the sub-ACL is based on the ABC for a yellowtail flounder bycatch only fishery. All of the GB YTF sub-ACLs being considered in this action would be considered restrictive and most would be considered unattainable.

Table 7 (Section 4.1.2.2) shows the possible Scallop FW 24 management alternatives and the estimated SNE/MA yellowtail flounder catch. The council must select an allocation for the scallop fishery but a SNE/MA yellowtail flounder sub-ACL based on 90 percent of the estimated catch would be seen as moderately restrictive by the scallop fishery and may affect the *Historic and Present Participation* negatively. The new SNE/MA windowpane flounder sub-ACL specific to the scallop fishery shown in Table 8 (Section 4.1.2.2) is a redistribution of the "other sub-component" sub-ACL that is no more restrictive than in previous years. It is unlikely that a new SNE/MA windowpane flounder sub-ACL specific to the scallop fishery set at a level commensurate with historic catches would cause any substantial changes in fishing behavior or social impacts. If a scallop specific AM is triggered due to any scallop sub-ACL overage, the *Size and Demographics* of the scallop fishery could be negatively affected as the AM could limit future fishing opportunity.

Compared to Option 1/No Action alternative, it is likely that Option 2 will provide some positive social benefits for individuals and communities involved in the multispecies fishery. The allocation of scallop specific sub-ACLs will have a positive influence on the *Attitudes and Beliefs* among groundfish fishermen because the distribution of both fishing rights and responsibility will be seen as more equitable. Compared to Option 1, the No Action alternative, the scallop specific sub-ACLs in Option 2 would provide some measure of security to the multispecies fishery that each total ACL would be less likely to be exceeded, or at least that the AM associated with the scallop sub-ACLs provides some deterrent. The additional perceived security provided by the scallop sub-ACL and the associated AM could reduce uncertainty in an individual's future planning of fishery operations which would have a positive effect on the *Life-style/Non-economic social aspects* of the fishery. Option 2 could exacerbate existing conflict between the scallop and groundfish fisheries over the issue of the scallop fisheries' groundfish takes, negatively affecting the *Social Structures and Organizations* of a community.

7.5.3 Commercial and Recreational Fishery Measures

7.5.3.1 SNE/MA Winter Flounder Landing Restrictions

7.5.3.1.1 Option 1: No Action

If Option 1, the No Action alternative is adopted the landing of SNE/MA winter flounder would continue to be prohibited to groundfish fishing vessels. In an attempt to discourage the targeting of SNE/MA winter flounder and hasten the rebuilding of the stock, current management prohibits the retention of all SNE/MA winter flounder caught by groundfish fishing vessels. Option 1 of this alternative would uphold this prohibition and it would likely cause a continuation of the practice of regulatory discarding which has a negative social impact on the fishery. Identified during the social impact informational meetings, prior to Amendment 13, regulatory discarding is a multidimensional social issue that has both a direct and an indirect impact on fishermen and their families. Regulatory discarding of marketable fish causes a loss of potential revenue which can have a negative effect on the *Size and Demographic Characteristics* of the fishery. It can also cause a demoralizing sense of waste among those forced to discard marketable fish, impacting the *Non-Economic Social Aspects* of the fishery. In this particular case, these social impacts would be expected to remain localized to the states and communities with vessels operating in the SNE/MA winter flounder stock area.

7.5.3.1.2 Option 2: Landing of SNE/MA Winter Flounder Permitted (Preferred Alternative)

Adopting Option 2 of this alternative would allow the landing of SNE/MA winter flounder by groundfish fishing vessels. Compared to Option 1/No Action, Option 2 would reduce the regulatory discarding of SNE/MA winter flounder, thereby reducing the negative social impacts commonly associated with the forced discard of marketable fish. Reduced regulatory discarding would have a positive social impact on the *Size and Demographic Characteristics* of fishery from increased landings as well as having a positive impact on the *Non-Economic Social Aspects* of the fishery.

7.5.3.2 Commercial Fishery Accountability Measures

7.5.3.2.1 Option 1: No Action

If Option 1, the No Action alternative is adopted, AMs for this fishery would remain as adopted by Amendment 16 and modified by subsequent framework actions. Analysis is complicated because the current AM is a simple ban on landing this stock, but FW 48 proposed an area-based AM.

The existing AM prohibits landing this stock. If the FW 48 AM is approved, under Option 1 an AM would be triggered if the total ACL for the stock is exceeded by more than the allowance for management uncertainty buffer. If triggered, the AM would require sector and common pool groundfish vessels to use selective trawl gear when fishing in the four selected management areas outlined in Section 4.2.2.2 of this framework. This area-based AM would not apply to vessels using longline or gillnet gears but would be in addition to a pound-for-pound penalty applied to the following year's ACE for sector vessels.

This option would maintain the most current groundfish fishery AMs and it is not expected to have any direct social impacts on the fishery, however, if a particular AM is triggered it is likely that there would be some negative social impacts. If an area-based AM is triggered by exceeding the total ACL of a particular species it would cause a disruption in fishing practices. As it is intended, this AM would change where and how the groundfish fishery fishes which would have an impact on the *Historic and Present Participation* in the fishery.

7.5.3.2.2 Option 2: Revised AM for SNE/MA Winter Flounder (Preferred Alternative)

This option is linked to a change to the SNE/MA winter flounder rebuilding plan (Section 4.1.1.2) and the removal of the SNE/MA winter flounder landing prohibition (Section 4.2.1.2). All three of these measures are preferred alternatives and together revise the management approach for SNE/MA winter flounder.

Adopting Option 2 of this alternative would revise the area-based gear restriction AM for SNE/MA winter flounder so that, if triggered, it would only apply to vessels in the common pool. Common pool vessels would be required to use selective trawl gear when fishing in the four selected management areas outlined in Section 4.2.2.2 of this framework.

Like Option 1, Option 2 is not expected to cause any substantial social impacts from maintaining a particular AM but if an AM is triggered it would be expected to cause a disruption in fishing practices of some vessels which would have an impact on their *Historic and Present Participation* in the fishery. Because the primary control of sector vessel effort is the availability of a given sector's ACE, and because sectors are penalized pound-for-pound for any overage in a fishing year, the additional area based gear restriction could be seen as a redundant or excessive form of control. Option 2 would apply the area-based gear restriction to only common pool vessels which are not subject to a pound-for-pound penalty as these vessels are not regulated by catch entitlements. Compared to the No Action alternative, Option 2 could have an additional positive social impact on the formation of *Attitudes, Beliefs and Values* of sector fishermen with regard to management, by eliminating excessive control in the AM.

7.6 Cumulative Effects Analysis

7.6.1 Introduction

A cumulative effects assessment (CEA) is a required part of an EIS or EA according to the Council on Environmental Quality (CEQ) (40 CFR part 1508.7) and NOAA's agency policy and procedures for NEPA, found in NOAA Administrative Order 216-6. The purpose of the CEA is to integrate into the impact analyses, the combined effects of many actions over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but rather, the intent is to focus on those effects that are truly meaningful. This section serves to examine the potential direct and indirect effects of the alternatives in Framework 48 together with past, present, and reasonably foreseeable future actions that affect the groundfish environment. It should also be noted that the predictions of potential synergistic effects from multiple actions, past, present and/or future will generally be qualitative in nature.

<u>Valued Ecosystem Components (VEC)</u>
As noted in Section 6.0 (Description of the Affected Environment), the VECs that exist within the groundfish fishery are identified and the basis for their selection is established. Those VECs were identified as follows:

1. Regulated groundfish stocks (target and non-target);
2. Non-groundfish species (incidental catch and bycatch);
3. Endangered and other protected species;
4. Habitat, including non-fishing effects; and
5. Human Communities (includes economic and social effects on the fishery and fishing communities).

<u>Temporal Scope of the VECs</u>
While the effects of historical fisheries are considered, the temporal scope of past and present actions for regulated groundfish stocks, non-groundfish species, habitat and the human environment is primarily focused on actions that have taken place since implementation of the initial NE Multispecies FMP in 1977. An assessment using this timeframe demonstrates the changes to resources and the human environment that have resulted through management under the Council process and through U.S. prosecution of the fishery, rather than foreign fleets. 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, this analysis examines the period between the expected implementation of this framework (May 1, 2013) and 2018.

<u>Geographic Scope of the VECs</u>
The geographic scope of the analysis of impacts to regulated groundfish stocks, non-groundfish species and habitat for this action is the total range of these VECs in the Western Atlantic Ocean, as described in the Affected Environment section of the document (Section 6.0). However, the analyses of impacts presented in this framework focuses primarily on actions related to the harvest of the managed resources. The result is a more limited geographic area used to define the core geographic scope within which the majority of harvest effort for the managed resources occurs. For endangered and protected species, the geographic range is the total range of each species (Section 6.4).

Because the potential exists for far-reaching sociological or economic impacts on U.S. citizens who may not be directly involved in fishing for the managed resources, the overall geographic scope for human communities is defined as all U.S. human communities. Limitations on the availability of information needed to measure sociological and economic impacts at such a broad level necessitate the delineation of core boundaries for the human communities. Therefore, the geographic range for the human environment is defined as those primary and secondary ports bordering the range of the groundfish fishery (Section 6.5) from the U.S.-Canada border to, and including, North Carolina.

Analysis of Total Cumulative Effects

A cumulative effects assessment ideally makes effect determinations based on the culmination of the following: (1) impacts from past, present and reasonably foreseeable future actions; PLUS (2) the baseline condition for resources and human communities (note – the baseline condition consists of the present condition of the VECs plus the combined effects of past, present and reasonably foreseeable future actions); PLUS (3) impacts from the Preferred Alternative and other alternatives.

A description of past, present and reasonably foreseeable future actions is presented in Table 81. The baseline conditions of the resources and human community are subsequently summarized although it is important to note that beyond the stocks managed under this FMP and protected species, quantitative metrics for the baseline conditions are not available. Finally, a brief summary of the impacts from the alternatives contained in this framework is included. The culmination of all these factors is considered when making the cumulative effects assessment.

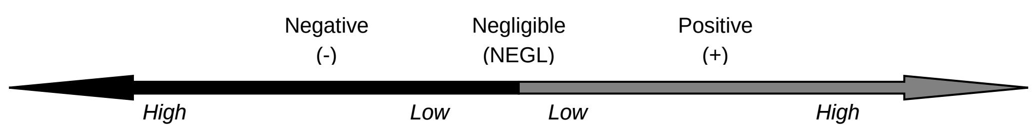
Impact Definitions for the tables in this section are as summarized in Table 80.

Table 80 – Impact definitions for cumulative effects analyses

VEC	Direction: Positive (+)	Direction: Negative (-)	Direction: Negligible/Neutral
Allocated target species, other landed species, and protected resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses

Impact Qualifiers:

All VECs: Mixed	**both positive and negative**
Low (L, as in low positive or low negative)	To a lesser degree
High (H; as in high positive or high negative)	To a substantial degree
Likely	Some degree of uncertainty associated with the impact



7.6.2 Past, Present and Reasonably Foreseeable Future Actions

The following is a synopsis of the most applicable past, present, and reasonably foreseeable future actions (PPRFFA) that have the potential to interact with the current action. For a complete historical list of PPRFFAs, please see Amendment 16 – the last EIS developed for the NE Multispecies FMP.

Table 81 - Summary of Effects on VECs from Past, Present, and Reasonably Foreseeable Future FMP and Other Fishery Related Actions

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Past and Present Fishing Actions					
Amendment 13 (2004) – Implemented requirements for stock rebuilding plans and dramatically cut fishing effort on groundfish stocks. Implemented the process for creating sectors and established the GB Cod Hook Gear Sector	L+	H+	+ .	L+ .	Mixed
FW 40A (2004) – allowed additional fishing on GB haddock for sector and non-sector hook gear vessels, created the GB haddock Special Access Pilot Program, and created flexibility by allowing vessels to fish inside and outside the U.S./Canada Area on the same trip	Negl	L-	L-	Negl	+

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
FW40B (2005) – Allowed Hook Sector members to use GB cod landings caught while using a different gear during the landings history qualification period to count toward the share of GB cod that will be allocated to the sector, revised DAS leasing and transfer programs, modified provisions for the Closed Area II yellowtail flounder SAP, established a DAS credit for vessels standing by an entangled whale, implemented new notification requirements for Category I herring vessels, and removed the net limit for trip gillnet vessels.	Negl to L+	L-	L-	Negl	L+
FW41 (2005) – Allowed for participation in the Hook Gear Haddock SAP by non-sector vessels	Negl	Negl	Negl to L -	Negl	+
FW42 (2006) – Implemented further reductions in fishing effort based upon stock assessment data and stock rebuilding needs, implemented GB Cod Fixed Gear Sector	L+	+	+	L+	Mixed
Atlantic Large Whale Take Reduction Plan	Negl to L-	Negl	Negl	+	L-
Monkfish Fishery Management Plan and Amendment 5 (2011) Implemented ACLs and AMs; set the specifications of DAS and trip limits; and make other adjustments to measures in the Monkfish FMP.	L+	+	+	+	Mixed
Spiny Dogfish Fishery Management Plan	Negl	Negl	+	Negl	L+

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Amendment 16 to the Northeast Multispecies FMP (2009) **Implemented DAS reductions and gear restrictions for the common pool, approved formation of additional 17 sectors**	+	+	+	+	Mixed
Skate Fishery Management Plan and Amendment 3 (2010) **Amendment 3 implemented final specifications for the 2010 and 2011 FYs, implemented ACLs and AMs, implemented a rebuilding plan for smooth skate and established an ACL and annual catch target for the skate complex, total allowable landings for the skate wing and bait fisheries, seasonal quotas for the bait fishery, new possession limits, in season possession limit triggers.**	+	+	+	+	-
FW 44 to the Northeast Multispecies FMP (2010) **Set ACLs, established TACs for transboundary U.S./CA stocks, and made adjustments to trip limits/DAS measures**	+	+	+	+	Mixed

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
FW 45 to the Northeast Multispecies FMP (2011) **Revised the biological reference points and stock status for pollock, updated ACLs for several stocks for FYs 2011–2012, adjusted the rebuilding program for GB yellowtail flounder, increased scallop vessel access to the Great South Channel Exemption Area, modified the existing dockside and at-sea monitoring requirements, established a GOM Cod Spawning Protection Area, authorized new sectors and adjusted TACs for stocks harvested in the US/ CA area for FY 2011.**	L+	L+	L+	L+	Mixed
FW 46 to the Northeast Multispecies FMP (2011) **Increased the haddock catch cap for the herring fishery to 1% of the haddock ABC for each stock of haddock.**	Negl	Negl	Negl	Negl	L-
Harbor Porpoise Take Reduction Plan (2010) **Plan was amended to expand seasonal and temporal requirements within the HPTRP management areas; incorporate additional management areas; and create areas that would be closed to gillnet fisheries if certain levels of harbor porpoise bycatch occurs.**	Likely +	Likely +	Likely +	Likely +	Likely -

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Scallop Amendment 15 (2011) **Implemented ACLs and AMs to prevent overfishing of scallops and yellowtail flounder; addressed excess capacity in the LA scallop fishery; and adjusted several aspects of the overall program to make the Scallop FMP more effective, including making the EFH closed areas consistent under both the scallop and groundfish FMPs for scallop vessels.**	Negl	L+	Negl	Negl	L+
Amendment 17 to the Northeast Multispecies FMP **This amendment looks to streamline the administration process whereby NOAA-sponsored, state-operated permit banks can operate in the sector allocation management program**	Negl	Negl	Negl	Negl	Negl

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
FW 47 to the Northeast Multispecies FMP (2012) **FW 47 measures include revisions to the status determination for winter flounder, revising the rebuilding strategy for GB yellowtail flounder, Measures to adopt ACLs, including relevant sub-ACLs and incidental catch TACs; adopting TACs for U.S/Canada area, as well as modifying management measures for SNE/MA winter flounder, restrictions on catch of yellowtail flounder in GB access areas and accountability measures for certain stocks**	Negl	+	+	Negl	-
Reasonably Foreseeable Future Fishing Actions					
Omnibus Essential Fish Habitat Amendment **Phase 2 of the Omnibus EFH Amendment would consider the effects of fishing gear on EFH and move to minimize, mitigate or avoid those impacts that are more than minimal and temporary in nature. Further, Phase 2 would reconsider closures put in place to protect EFH and groundfish mortality in the Northeast Region.**	Likely +	Likely +	Likely +	ND	ND
Harbor Porpoise Take Reduction Plan (Potential Future Actions) **Future changes to the plan in response to additional information and data about abundance and bycatch rates.**	Likely L+	Likely +	Likely +	Likely +	Likely -

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Amendment 3 to the Spiny Dogfish FMP **This amendment considers the establishment of a research set aside program, updates to EFH definitions, year-end rollover of management measures and revisions to the quota allocation scheme.**	Likely Negl	Likely Negl	Likely L+	Likely Negl	Likely L+
Framework 24 to the Atlantic Sea Scallop FMP (Framework 49 to the Northeast Multispecies FMP) **This framework sets specifications for scallop FY 2013 and 2014. It is also considering measures to refine the management of yellowtail flounder bycatch in the scallop fishery**	Likely Negl	Likely Negl to L+	Likely Negl to L+	Likely Negl	Likely - to +
FW 48 to the Northeast Multispecies FMP **This FW would modify the ACL components for several stocks, adjust AMs for commercial and recreational vessels, modify catch monitoring provisions, and allow sectors to request access to parts of groundfish closed areas.**	Mixed	+	+	+	Mixed

Noted: ND= Not determined

Table 82 summarizes the combined effects of past, present and reasonably foreseeable future actions that affect the VECs, i.e., actions other than those alternatives under development in this document.

Note that most of the actions affecting this framework and considered in Table 82 come from fishery-related activities (e.g., federal fishery management actions – many of which are identified above in Table 81). As expected, these activities have fairly straightforward effects on environmental conditions, and were, are, or will be taken, in large part, to improve those conditions. The reason for this is the statutory basis for federal fisheries management: the reauthorized Magnuson-Stevens Act. That legislation was enacted to promote long-term positive impacts on the environment in the context of fisheries activities. More specifically, the act stipulates that management comply with a set of National Standards that collectively serve to optimize the conditions of the human environment. Under this regulatory regime, the cumulative impacts of past, present, and future Federal fishery management actions on the VECs should be expected to result in positive long-term outcomes. Nevertheless, these actions are often associated with offsetting impacts. For example, constraining fishing effort frequently results in negative short-term socio-economic impacts for fishery participants. However, these impacts are usually necessary to bring about long-term sustainability of a given resource and as such should, in the long-term, promote positive effects on human communities, especially those that are economically dependent upon the managed resource.

Non-fishing activities were also considered when determining the combined effects from past, present and reasonably foreseeable future actions. Activities that have meaningful effects on the VECs include the introduction of chemical pollutants, sewage, changes in water temperature, salinity, dissolved oxygen, and suspended sediment into the marine environment. These activities pose a risk to the all of the identified VECs in the long term. Human induced non-fishing activities that affect the VECs under consideration in this document are those that tend to be concentrated in near shore areas. Examples of these activities include, but are not limited to agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging and the disposal of dredged material. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities.

Table 82 – Summary effects of past, present and reasonably foreseeable future actions on the VECs identified for Framework 50

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Regulated Groundfish Stocks	**Mixed** Combined effects of past actions have decreased effort, improved habitat protection, and implemented rebuilding plans when necessary. However, some stocks remain overfished	**Positive** Current regulations continue to manage for sustainable stocks	**Positive** Future actions are anticipated to continue rebuilding and strive to maintain sustainable stocks	**Short-term Negative** Several stocks are currently overfished, have overfishing occurring, or both **Long-Term Positive** Stocks are being managed to attain rebuilt status
Non-Groundfish Species	**Positive** Combined effects of past actions have decreased effort and improved habitat protection	**Positive** Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species	**Positive** Future actions are anticipated to continue rebuilding and target healthy stocks, thus limiting the take of discards/bycatch	**Positive** Continued management of directed stocks will also control incidental catch/bycatch
Endangered and Other Protected Species	**Positive** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources	**Positive** Current regulations continue to control effort, thus reducing opportunities for interactions	**Mixed** Future regulations will likely control effort and thus protected species interactions, but as stocks improve, effort will likely increase, possibly increasing interactions	**Positive** Continued effort controls along with past regulations will likely help stabilize protected species interactions
Habitat	**Mixed** Combined effects of effort reductions and better control of non-fishing activities have been positive but fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Effort reductions and better control of non-fishing activities have been positive but fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Future regulations will likely control effort and thus habitat impacts but as stocks improve, effort will likely increase along with additional non-fishing activities	**Mixed** Continued fisheries management will likely control effort and thus fishery related habitat impacts but fishery and non-fishery related activities will continue to reduce habitat quality
Human Communities	**Mixed** Fishery resources have supported profitable industries and communities but increasing effort and catch limit controls have curtailed fishing opportunities	**Mixed** Fishery resources continue to support communities but increasing effort and catch limit controls combined with non-fishing impacts such as high fuel costs have had a negative economic impact	**Short-term Negative** As effort controls are maintained or strengthened, economic impacts will be negative **Long-term Positive** As stocks improve, effort will likely increase which would have a positive impact	**Short-term Negative** Revenues would likely decline dramatically in the short term and may remain low until stocks are fully rebuilt **Long-term Positive** Sustainable resources should support viable communities and economies

Impact Definitions:
-Regulated Groundfish Stocks, Non-groundfish species, Endangered and Other Protected Species: positive=actions that increase stock size and negative=actions that decrease stock size
-Habitat: positive=actions that improve or reduce disturbance of habitat and negative=actions that degrade or increase disturbance of habitat
-Human Communities: positive=actions that increase revenue and well-being of fishermen and/or associated businesses and negative=actions that decrease revenue and well-being of fishermen and/or associated businesses

7.6.3 Baseline Conditions for Resources and Human Communities

For the purposes of a cumulative effects assessment, the baseline conditions for resources and human communities is considered the present condition of the VECs plus the combined effects of the past, present, and reasonably foreseeable future actions. The following table (Table 83) summarizes the added effects of the condition of the VECs (i.e., status/trends from Section 7.6.2) and the sum effect of the past, present and reasonably foreseeable future actions (from Table 82 above). The resulting CEA baseline for each VEC is exhibited in the last column (shaded). In general, straightforward quantitative metrics of the baseline conditions are only available for the managed resources, non-target species, and protected resources. The conditions of the habitat and human communities VECs are complex and varied. As such, the reader should refer to the characterizations given in Sections 7.2 and 7.6.1, respectively. As mentioned above, this cumulative effects baseline is then used to assess cumulative effects of the proposed management actions in Table 84.

Table 83 – Cumulative effects assessment baseline conditions of the VECs

VEC		Status/Trends, Overfishing	Status/Trends, Overfished	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 82)	Combined CEA Baseline Conditions
Regulated Groundfish Stocks	GB Cod	***Yes***	***Yes***	**Negative** – short term: Several stocks are currently overfished, have overfishing occurring, or both; **Positive** – long term: Stocks are being managed to attain rebuilt status	**Negative** – short term: Overharvesting in the past contributed to several stocks being overfished or where overfishing is occurring; **Positive –** long term: Regulatory actions taken over time have reduced fishing effort and with the addition of Amendment 16, stocks are expected to rebuild in the future
	GOM Cod	***Yes***	***Yes***		
	GB Haddock	No	No		
	GOM Haddock	***Yes***	No		
	GB Yellowtail Flounder	***Yes***	***Yes***		
	SNE/MA Yellowtail Flounder	No	No		
	CC/GOM Yellowtail Flounder	***Yes***	***Yes***		
	American Plaice	No	No		
	Witch Flounder	***Yes***	***Yes***		
	GB Winter Flounder	No	No		
	GOM Winter Flounder	No	***Yes***		
	SNE/MA Winter Flounder	No	***Yes***		
	Acadian Redfish	No	No		
	White Hake	***Yes***	***Yes***		
	Pollock	No	No		
	Northern (GOM-GB) Windowpane Flounder	***Yes***	***Yes***		
	Southern (SNE-MA) Windowpane Flounder	No	No		
	Ocean Pout	No	***Yes***		
	Atlantic Halibut	No	***Yes***		
	Atlantic Wolffish	n/a	***Yes***		

Table 83 **cont'd.**

VEC		Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 82)	Combined CEA Baseline Conditions
Non-groundfish Species (principal species listed in section 6.3)	**Monkfish**	Not overfished and overfishing is not occurring.	**Positive** – Continued management of directed stocks will also control incidental catch/bycatch.	**Positive** – Although prior groundfish management measures likely contributed to redirecting effort onto non-groundfish species, as groundfish rebuild this pressure should lessen and all of these species are also managed through their own FMP.
	Dogfish	Not overfished and overfishing is not occurring.		
	Skates	Thorny skate is overfished but overfishing is not occurring. All other skate species are not overfished and overfishing is not occurring.		
Habitat		Fishing impacts are complex and variable and typically adverse (see section 6.1); Non-fishing activities had historically negative but site-specific effects on habitat quality.	**Mixed** – Future regulations will likely control effort and thus habitat impacts but as stocks improve, effort will likely increase along with additional non-fishing activities. An omnibus amendment to the FMP with mitigating habitat measures is under development.	**Mixed** - reduced habitat disturbance by fishing gear but impacts from non-fishing actions, such as global warming, could increase and have a negative impact.
Protected Resources	**Sea Turtles**	Leatherback, Kemp's ridley and green sea turtles are classified as endangered under the ESA and loggerhead sea turtles are classified as threatened.	**Positive** – reduced gear encounters through effort reductions and management actions taken under the ESA and MMPA have had a positive impact	**Positive** – reduced gear encounters through effort reductions and additional management actions taken under the ESA and MMPA.
	Large Cetaceans	Of the baleen whales (right, humpback, fin, blue, sei and minke whales) and sperm whales, all are protected under the MSA and with the exception of minke whales, all are listed as endangered under the ESA.		
	Small Cetaceans	Pilot whales, dolphins and harbor porpoise are all protected under the MSA, the HPTRP and the Large Whale Take Reduction Plan Amendment		
	Pinnipeds	ESA classification: Endangered, number of nesting females below sustainable level; taken by *Loligo* trawl		

Table 83 **cont'd.**

VEC	Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 82)	Combined CEA Baseline Conditions
Human Communities	Complex and variable (see Section 6.5). Although there are exceptions, generally groundfish landings have decreased for most New England states since 2001. Declines in groundfish revenues since 2001 have also generally occurred.	**Negative** – Although future sustainable resources should support viable communities and economies, continued effort reductions over the past several years have had negative impacts on communities	**Negative –** short term: lower revenues would continue until stocks are sustainable **Positive** – long term: sustainable resources should support viable communities and economies

7.6.4 Summary Effects of Framework 50 Actions

The alternatives contained in Framework 50 can be divided into two broad categories, as seen in Table 84 (summary of impacts from action – for a complete discussion of impacts please see Section 7.0 of document). First, this action adjusts the SNE/MA winter flounder rebuilding strategy and modifies OFLs/ABCs/ACLs. Second, the action adopts commercial and recreational fishing measures including measures to allow the retention of SNE/MA winter flounder and changes to the AM for SNE/MA winter flounder.

Amendment 16 defined the fishing mortality targets needed to rebuild groundfish stocks and end overfishing, and adopted a complex suite of measures designed to achieve these mortality objectives. This action further builds upon the specifications adopted in Frameworks 44, 45, 46, 47 and 48 that used available data to translate those mortality targets into specific amounts of fish. These quantities must be defined in order to implement the ACLs and AMs called for in the amendment. The ACLs identified in FW 50 (implemented concurrently with FW48) are thus consistent with the amendment. The proposed revision to the SNE/MA winter flounder rebuilding plan is needed to continue the rebuilding of that stock that was started in Amendment 13, but not completed by 2014 as originally planned.

The second broad category of measures adopted by this action are measures that affect the prosecution of the commercial and recreational fishery. The changes proposed are all designed to modify management measures to accommodate the landing of SNE/MA winter flounder, which was prohibited by Amendment 16. Commercial and recreational vessels would be permitted to land this stock. AMs are also modified to prevent the sub-ACL from being exceeded.

In general, the adoption of all of these measures will benefit groundfish stocks because collectively they make it more likely that mortality targets are reasonable and will not be exceeded. The measures that constitute the Proposed Action (if based on the Preferred Alternatives) are designed to achieve the rebuilding objectives for the Northeast Multispecies fishery. The most important biological impact of the proposed measures is that they would control fishing mortality on Northeast Multispecies stocks in order to prevent (or end) overfishing and rebuild overfished stocks. The preferred alternative changes to SNE/MA winter flounder management measures AMs would also contribute to achieving these objectives by providing additional fishing revenues that will benefit both fishermen and their communities. The measures are not likely to impact non-groundfish stocks, protected species, or habitat to any great extent when compared to the No Action alternative, since these proposed specifications differ only slightly from the No Action alternative. The ACLs are likely to have negative impacts on communities in the short term, but as stocks rebuild communities should benefit from larger future catches.

Table 84 – Summary of Impacts expected on the VECs

Management Measure		VECs				
		Managed Resources	**Non-target Species**	**Protected Resources**	**Habitat Including EFH**	**Human Communities**
UPDATES TO STATUS DETERMINATION CRITERIA, FORMAL REBUILDING PROGRAMS, AND ANNUAL CATCH LIMITS	**REVISED SNE/MA WINTER FLOUNDER REBUILDING PLAN**	**Mixed** – Continues rebuilding of this stock, but progress may be slower than the No Action alternative	**No Impact/ Neutral** – Provided rebuilding continues, additional impacts to non-target species are not anticipated	**No Impact/ Neutral** – Provided rebuilding continues, additional impacts to protected species are not anticipated	**No Impact/ Neutral** – Provided rebuilding continues, additional impacts to habitat are not anticipated	**Positive** – Overall revenues will increase as stock rebuilds; revised plan allows for some landings from this stock
	REVISED OFL/ABCS/ ACLS	**Positive** –. These ABCs, ACLs, and sub-ACLs, and the AMs will impose tighter controls on fishing mortality for these stocks using the best available science. This, combined with past management efforts, should contribute to stock rebuilding and provide positive cumulative impacts	**No Impact/ Neutral –** Provided rebuilding continues, additional impacts to non-target species are not anticipated	**No Impact/ Neutral –** Provided rebuilding continues, additional impacts to protected species are not anticipated	**No Impact/ Neutral –** Provided rebuilding continues, additional impacts to habitat are not anticipated	**Mixed** – While the Preferred Alternative produces more revenues than No Action, reduced ACLs (as compared to recent years) will result in large reductions in fishing revenues in the short term. Overall revenues will increase as stocks.

Table 84 cont'd.

Management Measure		VECs				
		Managed Resources	**Non-target Species**	**Protected Resources**	**Habitat Including EFH**	**Human Communities**
COMMERCIAL and REC FISHERY MEASURES	**SNE/MA WINTER FLOUNDER LANDING RESTRIC-TIONS**	**Negative –** will lead to higher fishing mortality and slower stock rebuilding, but progress should still meet legal require-ments	**No impact** –measures are not expected to create additional impacts to non-target species	**No impact** –measures are not expected to create additional impacts to non-target species	**No impact** –measures are not expected to create additional impacts to non-target species	**Positive** – Landings will provide additional commercial fishing revenues and recreational opportuni-ties
	ACCOUNTABILITY MEASURES	**Positive –** More effective accountability measures will reduce risk of exceeding mortality targets on these stocks and promote rebuilding	**No impact** –measures are not expected to create additional impacts to non-target species	**No impact** –measures are not expected to create additional impacts to non-target species	**No impact** –measures are not expected to create additional impacts to non-target species	**Mixed –** Overall revenues will increase as stocks rebuild, however restrictions may constrain fishing

7.6.5 Cumulative Effects Summary

The regulatory atmosphere within which Federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of resources, habitat, and human communities. Consistent with NEPA, the M-S Act requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, impacts on all VECs (except short-term impacts to human communities) from past, present and reasonably foreseeable future actions, when combined with baseline conditions, have generally been positive and are expected to continue in that manner for the foreseeable future. This is not to say that some aspects of the various VECs are not experiencing negative impacts, but rather that when taken as a whole and compared to the level of unsustainable effort that existed prior to and just after the fishery came under management control, the overall long-term trend is positive.

Table 84 provides as a summary of likely cumulative effects found in the various groups of management alternatives contained in Framework 50. The CEA baseline that, as described above in Table 83, represents the sum of the past, present, and reasonably foreseeable future (identified hereafter as "other") actions and conditions of each VEC. When an alternative has a positive effect on a VEC, for example, reduced fishing mortality on a managed species, it has a positive cumulative effect on the stock size of the species when combined with the "other" actions that were also designed to increase stock size. In contrast, when an alternative has a negative effect on a VEC, such as increased mortality, the cumulative effect on the VEC would be negative and tend to reduce the positive effects of the "other" actions. The resultant positive and negative cumulative effects are described below for each VEC.

<u>Managed Resources</u>

As noted in Table 83, the combined impacts of past federal fishery management actions have led to short-term impacts that result in overfishing and/or overfished status for several stocks. However, management measures, in particular modifications implemented through Amendment 16 to the FMP, are expected to yield rebuilt sustainable groundfish stocks in the future. The actions proposed by Framework 50 are expected to continue this trend. The adoption of a revised rebuilding plan for SNE/MA winter flounder and the revised ABCs/ACLs will have the largest biological impacts. The revised rebuilding strategy will continue to rebuild SNE/MA winter flounder, but at a slower pace than the No Action alternative. The revised ABCs/ACLs are designed to meet fishing mortality targets and to promote stock rebuilding. The two other measures – allowing landings of SNE/MA winter flounder, and changing the SNE/MA winter flounder AMs – are linked to the revised rebuilding strategy and will have similar effects. The past and present impacts, combined with the Preferred Alternative and future actions which are expected to continue rebuilding and strive to maintain sustainable stocks, should yield positive non-significant impacts to managed resources in the long term.

<u>Non-Target Species</u>

As noted in Table 83, the combined impacts of past federal fishery management actions have decreased fishing effort and improved habitat protection for non-target species. Current management measures, including those implemented through Amendment 16 to the FMP, are expected to continue to control effort, and decrease bycatch and discards. The actions proposed by Framework 50 are expected to continue this trend. The primary mechanism is through the reduced ABCs/ACLs (reduced from recent years). The modifications in management measures for SNE/MA winter flounder are not expected to affect non-target species. The past and present impacts, combined with the Preferred Alternative and future actions which are expected to continue rebuilding and strive to maintain sustainable stocks, should yield positive non-significant impacts to non-target species.

Protected Resources

As noted in Table 83, the combined impacts of past federal fishery management actions have reduced fishing effort, and therefore reduced interactions with protected resources. Current management measures, including those implemented through Amendment 16 to the FMP, are expected to continue to control effort and catch, and therefore continue to lessen interactions with protected resources. The actions proposed by Framework 50 are expected to continue this trend; however, as stocks rebuild to sustainable levels, future actions may lead to increased effort, which may increase potential interactions with protected species. The reductions in ABCs/ACLs may provide short-term benefits to protected resources as groundfish fishing effort will decline, but as stocks rebuild effort may increase. Changes to management measures for SNE/MA winter flounder are not expected to affect protected species. Overall, the combination of past, present, and future actions is expected to stabilize protected species interactions and lead to positive impacts to protected species.

Habitat, Including EFH

As noted in Table 83, the combined impacts of past federal fishery management actions have reduced fishing effort, and therefore have been positive for habitat protection. In addition, better control of non-fishing activities has also been positive for habitat protection. However, both fishing and non-fishing activities continue to decrease habitat quality. None of the fishery specifications measures are expected to have substantial impacts on habitat or EFH. The reduced ABCs/ACLs may result in reduced groundfish fishing activity and provide some minor short-term benefits to habitat. Overall, the combination of past, present, and future actions is expected to reduce fishing effort and hence reduce damage to habitat; however, it is likely that fishing and non-fishing activities will continue to degrade habitat quality.

Human Communities

As noted in Table 83 the combined impacts of past federal fishery management actions have reduced effort, and therefore have curtailed fishing opportunities. Past and current management measures, including those implemented through Amendment 16 to the FMP, will maintain effort and catch limit controls, which together with non-fishing impacts such as rising fuel costs have had significant negative short term economic impacts on human communities. The specifications for FY 2013 (FW50) are expected to have long-term positive impacts on human communities as they promote stock rebuilding, but in the short-term, impacts are likely to be negative and significant. Reductions in ACLs for GOM and GB cod will likely cause a short term significant negative impact on human communities. Modifying the SNE/MA winter flounder rebuilding plan, and allowing landings from this stock, will provide some benefits to fishing communities but will not outweigh the negative effects of the other reduced ABCs/ACLs. However, this action alone is not expected to have significant socioeconomic impacts beyond what was anticipated in Amendment 16. Overall, the combination of past, present, and future actions is expected to enable a long term sustainable harvest of groundfish stocks, which should lead to a long term positive impact on fishing communities and economies.

8.0 Applicable Law

8.1 Magnuson-Stevens Fishery Conservation and Management Act

8.1.1 Consistency with National Standards

Section 301 of the Magnuson-Stevens Act requires that regulations implementing any fishery management plan or amendment be consistent with the ten national standards listed below.

Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.
Amendment 16 to the Northeast Multispecies FMP adopted measures designed to end overfishing on the groundfish stocks that were subject to excessive fishing pressure at the time of its development. This action adjusts those measures in a way that is designed to maximize optimum yield while preventing overfishing and continuing rebuilding plans. For overfished fisheries, the Magnuson-Stevens Act defines optimum yield as the amount of fish which provides for rebuilding to a level consistent with producing the maximum sustainable yield from the fishery. The measures are designed to achieve the fishing mortality rates, and yields, necessary to rebuild the overfished stocks as well as to keep fishing mortality below overfishing levels for stocks that are not in a rebuilding program. The measures in Section 4.1 that modify the SNE/MA winter flounder rebuilding plan and adjust ACLs set controls on catch to ensure that the appropriate fishing mortality rates are implemented. Changes to commercial and recreational fishery measures in Section 4.2 implement and adjust programs to achieve the desired mortality levels and to facilitate realizing benefits from harvesting SNE/MA winter flounder.

Conservation and management measures shall be based on the best scientific information available.
The Preferred Alternatives are based on the most recent estimates of stock status available for each of twenty stocks included in the management unit. These estimates are mostly in the form of information provided by the Northeast Fisheries Science Center in the GARM III proceedings and subsequent assessments. In the case of Atlantic wolffish, stock status was estimated by the NEFSC in the proceedings of the Data Poor Working Group (DPWG). The most recent (2012) TRAC proceedings, SARC 50 for pollock, the SARC 52 for winter flounders, SARC 54 for SNE/MA yellowtail flounder, 2012 Groundfish Assessment Updates, and the SARC 55 for GOM and GB cod were also used to update stock status. Additionally, the proposed mortality limits were determined based on the scientific advice of the SSC, which recommends ABCs to the Council.

With respect to bycatch information, the action uses bycatch information from the most recent assessments. Bycatch data from observer reports, vessel logbooks, or other sources must be rigorously reviewed before conclusions can be drawn on the extent and amount of bycatch. While additional observer data has been collected since the most recent assessments were completed, it has not been analyzed or reviewed through the stock assessment process and thus cannot be used.

The economic analyses in this document are based primarily on landings, revenue, and effort information collected through the NMFS data collection systems used for this fishery.

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

The Preferred Alternatives manage each individual groundfish stock as a unit throughout its range. Management measures specifically designed for one stock, including ACLs, are applied to the entire range of the stock. In addition, the groundfish complex as a whole is managed in close coordination. Management measures are designed and evaluated for their impact on the fishery as a whole.

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

The Preferred Alternatives do not discriminate between residents of different states. They are applied equally to all permit holders, regardless of homeport or location. While the measures do not discriminate between permit holders, they do have different impacts on different participants. This is because of the differences in the distribution of fish and the varying stock levels in the complex. For example, potentially low ACLs on GOM cod could differentially impact fishermen in the northern states who rely more heavily on that particular stock. Some of these impacts may be localized, as often communities near the stock may have developed small boat fisheries that target it. These distributive impacts are difficult to avoid given the requirement to rebuild overfished stocks. Even if the measures are designed to treat all permit holders the same, the fact that fish stocks are not distributed evenly, and that individual vessels may target specific stocks, means that distributive impacts cannot be avoided.

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

The Preferred Alternatives are not expected to significantly reduce the efficiency of fishing vessels. These measures are considered practicable since they allow rebuilding of depleted groundfish stocks and have considered efficiency to the greatest extent possible. Some of the Preferred Alternatives in fact increase efficiency, including the removal of restrictions on yellowtail flounder catch in scallop fishery access areas and removal of restricted gear areas, and allowing the landing of SNE/MA winter flounder. None of the measures in this action have economic allocation as their sole purpose – all are designed to contribute to the control of fishing mortality.

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

The primary controls used in this management plan - effort controls and sectors - allow each vessel operator to fish when and how it best suits his or her business. Vessels can make short or long trips, and can fish in any open area at any time of the year. The measures allow for the use of different gear, vessel size, and fishing practices. The specific measures adopted in this action do not reduce this flexibility.

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

While some of the measures used in the management plan, and proposed by this action, tend to increase costs, those measures are necessary for achieving the plan's objectives. As an example, measures that reduce the efficiency of fishing vessels, including specific gear requirements such as are proposed in the AMs for common pool vessels, tend to increase the costs of fishing vessels since fishing catches are reduced. These measures accomplish other goals, however, by allowing groundfish stocks to rebuild. The measures do not duplicate other regulatory efforts. Management of multispecies stocks in federal waters is not subject to coordinated regulation by any other management body. Absent Council action, a coordinated rebuilding effort to restore the health of the overfished stocks would not occur.

The Council considered the costs and benefits of a range of alternatives to achieve the goals and objectives of this FMP. It considered the costs to the industry of taking no action relative to adopting the measures herein. The expected benefits are greater in the long-term if stocks are rebuilt, though it is clear there are substantial short-term declines in revenue and possible increases in costs that can be expected.

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

Consistent with the requirements of the Magnuson-Stevens Act to prevent overfishing and rebuild overfished stocks, the Preferred Alternatives may restrict fishing activity through the implementation of low ACLs on certain stocks in order to achieve rebuilding targets. Analyses of the impacts of these measures show that landings and revenues are likely to decline for many participants in upcoming years due to the rebuilding programs in place for many stocks. In the short term, these declines will probably have negative impacts on fishing communities throughout the region, but particularly on those ports that rely heavily on groundfish. These declines are unavoidable given the M-S Act requirements to rebuild overfished stocks. The need to control fishing mortality means that catches cannot be as high as would likely occur with less stringent management measures.

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

Many measures adopted in Amendment 16 were designed to limit the discards of both groundfish and some other species, including the sector management program, and this action is expected to continue those benefits with no substantial changes. This action will remove a prohibition on landing SNE/MA winter flounder, which will reduce discards of that stock.

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

Measures adopted in Amendment 16 were designed to improve safety in spite of low ACLs anticipated by subsequent actions in the near future. The flexibility inherent in sector management and the ability to use common pool DAS at any time are key elements of the measures that promoted safety. The Preferred Alternatives, in conjunction with Amendment 16 measures, are the best option for achieving the necessary mortality reductions while having the least impact on vessel safety.

8.1.2 Other M-SFCMA requirements

Section 303 (a) of FCMA contains 14 required provisions for FMPs. These are discussed below. It should be emphasized that the requirement is imposed on the FMP. In some cases noted below, the M-S Act requirements are met by information in the Northeast Multispecies FMP, as amended. Any fishery management plan that is prepared by any Council, or by the Secretary, with respect to any fishery, shall—

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

Foreign fishing is not allowed under this management plan or this action and so specific measures are not included to specify and control allowable foreign catch. The measures in this management plan are designed to prevent overfishing and rebuild overfished stocks. There is one international agreement that is germane to multispecies management. On December 20, 2010, the International Fisheries Clarification Act stipulated that the U.S./Canada Resource Sharing Understanding, implemented through Amendment 13, can be considered an international agreement for the purposes of setting ACLs. The proposed measures (including U.S./Canada TACs) are consistent with that Understanding with one exception. The Preferred Alternative for GB yellowtail flounder would adopt a quota that is higher than that recommended by the Transboundary Management Guidance Committee.

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

Amendment 16 included a thorough description of the multispecies fishery from 2001 through 2008, including the gears used, number of vessels, landings and revenues, and effort used in the fishery. This action provides a summary of that information and additional relevant information about the fishery in Section 6.5.

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

The present biological status of the fishery is described in Section 6.2.1. Likely future conditions of the resource are described 7.6.5. Impacts resulting from other measures in the management plan other than the specifications included here can be found in Amendment 16. The maximum sustainable yield for each stock in the fishery is defined in Amendment 16 and optimum yield for the fishery is defined in Amendment 9.

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

U.S. fishing vessels are capable of, and expected to, harvest the optimum yield from this fishery as specified in Amendment 16. U.S. processors are also expected to process the harvest of U.S. fishing vessels. None of the optimum yield from this fishery can be made available to foreign fishing.

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

Current reporting requirements for this fishery have been in effect since 1994 and were originally specified in Amendment 5. They were slightly modified in Amendments 13 and 16, and VMS requirements were adopted in FW 42. The requirements include Vessel Trip Reports (VTRs) that are submitted by each fishing vessel. Dealers are also required to submit reports on the purchases of regulated groundfish from permitted vessels. Current reporting requirements are detailed in 50 CFR 648.7.

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

Provisions in accordance with this requirement were implemented in earlier actions, and continue with this action. For common pool vessels, the carry-over of a small number of DAS is allowed from one fishing year to the next. If a fisherman is unable to use all of his DAS because of weather or other conditions, this measure allows his available fishing time to be used in the subsequent fishing year. Sectors will also be allowed to carry forward a small amount of ACE into the next fishing year. This will help sectors react should adverse weather interfere with harvesting the entire ACE before the end of the year. Neither of these practices requires consultation with the Coast Guard.

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

Essential fish habitat was defined for Atlantic wolffish in Amendment 16, and for all stocks in an earlier action. A summary of the EFH can be found in Section 6.1.

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

Scientific and research needs are not required for a framework adjustment. Current research needs are identified in Amendment 16.

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

Impacts of this framework on fishing communities directly affected by this action and adjacent areas can be found in Section 7.5.

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

Objective and measurable Status Determination Criteria for all species in the management plan were presented in Amendment 16, and have been updated in subsequent frameworks, most recently FW 48.

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

A Standardized Bycatch Reporting Methodology omnibus amendment was adopted by the Council in June 2007. The SBRM was subsequently dismissed by a court ruling and a revised SBRM is under development. None of the measures in this framework are expected to increase bycatch beyond what was considered in Amendment 16.

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

This management plan does not include a catch and release recreational fishery management program and thus does not address this requirement.

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

As noted above, the description of the commercial, recreational, and charter fishing sectors was fully developed in Amendment 16, and the commercial sector is updated and summarized in this document (Section 6.5).

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

This preferred alternative does not allocate harvest restrictions or stock benefits to the fishery. Such allocations were adopted in Amendment 16 and subsequent frameworks, while this action adjusts catch limits for some stocks within the existing allocation structure.

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

The mechanism for establishing annual catch limits was adopted by Amendment 16. This action uses that mechanism to specify ACLs for future fishing years.

8.1.3 EFH Assessment

This essential fish habitat (EFH) assessment is provided pursuant to 50 CFR 600.920(e) of the EFH Final Rule to initiate EFH consultation with the National Marine Fisheries Service.

8.1.3.1 Description of Action

The purpose of the Framework 50 (Northeast Multispecies FMP) Preferred Alternatives is to adopt modifications to management measures that will incorporate new information relative to effective program administration and setting catch levels that are necessary to achieve the fishing mortality targets required by Amendment 16.

In general, the activity described by this action, fishing for groundfish species, occurs off the New England and Mid-Atlantic coasts within the U.S. EEZ. Thus, the range of this activity occurs across the designated EFH of all Council-managed species (see Amendment 11 to the Northeast Multispecies FMP for a list of species for which EFH was designated, the maps of the distribution of EFH, and descriptions of the characteristics that comprise the EFH). EFH designated for species managed under the Secretarial Highly Migratory Species FMPs are not affected by this action, nor is any EFH designated for species managed by the South Atlantic Council as all of the relevant species are pelagic and not directly affected by benthic habitat impacts.

The Preferred Alternatives are described in Section 4.0. The alternatives include the following general measures:

- A revised rebuilding strategy for SNE/MA winter flounder
- Updated TACs for stocks managed consistent with the U.S./Canada Resource Sharing Understanding
- Revisions to the administration of scallop fishery groundfish sub-ACLs
- Revised ACL specifications for FY 2012 – FY 2014
- Removal of the prohibition on landing SNE/MA winter flounder
- Revisions to AMs for SNE/MA winter flounder

8.1.3.2 Assessing the Potential Adverse Impacts

Refer to the Habitat Impacts of the Alternatives (Section 7.2, summarized in Section 7.2.3) for a tabular look at the summary impacts of the Preferred Alternatives. Nearly all measures are expected to have neutral impacts on habitat.

Measures with Potential Negative Effects on EFH

Extending the SNE/MA winter flounder rebuilding plan, and allowing that stock to be landed may result in a small increase in the number of groundfish fishing trips in the SNE/MA winter flounder stock area when compared to No Action. This increase in effort may result in a small increase in the adverse effects of fishing on EFH in this area. It is not expected that these effects will be measureable and they are likely to be outweighed by the effects of the revised ACLs that are discussed in the following paragraph.

Measures with Potential Positive Effects on EFH

The revised ACLs that are the preferred alternative may benefit EFH by reducing fishing effort in a broad area when compared to recent fishing activity. As shown by the economic analysis, the number of days fished is expected to decline when compared to either FY 2011 or FY 2012. These reduced effects on EFH would be expected to continue for several years, but as stocks rebuild fishing effort may increase.

Table 85 – Summary of possible effects to EFH as a result of the Preferred Alternatives

	Preferred Alternative
Possible negative impacts	Revised rebuilding strategy for SNE/MA winter flounder
	Allow landings of SNE/MA winter flounder
Neutral Impacts	Revised AMs for SNE/MA winter flounder
Possible Positive Impacts	Annual Catch Limits
Uncertain Impacts	N/A

8.1.3.3 Minimizing or Mitigating Adverse Impacts

Section 7.2, (habitat impacts of the alternatives) demonstrates that the overall habitat impacts of all the measures combined in this action have neutral impacts relative to the baseline habitat protections established under Amendment 13 to the Northeast Multispecies FMP. As such, additional measures to mitigate or minimize adverse effects of the multispecies fishery on EFH beyond those established under Amendment 13 are not necessary.

8.1.3.4 Conclusions

The Preferred Alternatives are unlikely to have noticeable impacts on EFH; there may be slight positive benefits when compared to the other alternatives.

8.2 National Environmental Policy Act (NEPA)

NEPA provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is designed to meet the requirements of both the M-S Act and NEPA. The Council on Environmental Quality (CEQ) has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508), as has NOAA in its agency policy and procedures for NEPA in NAO 216-6 §5.04b.1. All of those requirements are addressed in this document, as referenced below.

8.2.1 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b) and NAO 216-6 §5.04b.1. They are included in this document as follows:

- The need for this action are described in Section 3.2;
- The alternatives that were considered are described in Section 4.0;
- The environmental impacts of alternatives are described in Section 7.0;
- The agencies and persons consulted on this action are listed in Section 8.2.4.

This document includes the following additional sections that are based on requirements for an Environmental Impact Statement (EIS).

- An Executive Summary can be found in Section 1.0.
- A Table of Contents can be found in Section 2.0.
- Background and purpose are described in Section 2.0.
- A summary of the document can be found in Section 1.0.
- A brief description of the affected environment is in Section 6.0.
- Cumulative impacts of the Preferred Alternatives are described in Section 7.6.
- A determination of significance is in Section 8.2.2.
- A list of preparers is in Section 8.2.3.
- The index is in Section 9.3

8.2.2 Finding of No Significant Impact (FONSI)

National Oceanic and Atmospheric Administration Order (NAO) 216-6 (revised May 20, 1999) provides sixteen criteria for determining the significance of the impacts of a final fishery management action. These criteria are discussed below:

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

Response: The Preferred Alternatives cannot reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action. With respect to the target species in the Northeast Multispecies fishery the Preferred Alternatives adopt catch limits or management measures that are consistent with target fishing mortality rates that promote rebuilding and/or sustaining stock sizes.

(2) *Can the Preferred Alternatives reasonably be expected to jeopardize the sustainability of any non-target species?*

Response: For fishery resources that are caught incidental to groundfish fishing activity, there is no indication in the analyses that the alternatives will threaten sustainability. The Preferred Alternatives will probably result in declines in overall groundfish fishing effort because of the reductions in many ACLs from FY 2012 levels. Since the fishery does not currently jeopardize non-target species it is not likely that these alternatives will change that status.

(3) *Can the Preferred Alternatives 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?*

Response: The Preferred Alternatives cannot reasonably be expected to cause substantial damage to the oceans and coastal habitats and/or essential fish habitat. Analyses described in section 7.2 indicate that only minor impacts are expected.

(4) *Can the Preferred Alternatives be reasonably expected to have a substantial adverse impact on public health or safety?*

Response: Nothing in the Proposed Action can be reasonably expected to have a substantial adverse impact on public health or safety. Measures adopted in Amendment 16 were designed to improve safety in spite of low ACLs anticipated by subsequent actions in the near term future. The flexibility inherent in sector management and the ability to use common pool DAS at any time are key elements of the measures that promoted safety. The Preferred Alternatives, in conjunction with Amendment 16 measures, are the best option for achieving the necessary mortality reductions while having the least impact on vessel safety.

(5) *Can the Preferred Alternatives reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?*

Response: The Preferred Alternatives cannot be reasonably expected to adversely affect endangered or threatened species. As discussed in Section 7.3, these species are expected to have very minimal impacts from the minor changes in fishing effort that are proposed by this action.

(6) *Can the Preferred Alternatives 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.)?*

Response: The Preferred Alternatives are not expected to have a substantial impact on biodiversity and/or ecosystem function with the affected area. The use of ACLs will tightly control catches of target and incidental regulated groundfish stocks. Catches of target and incidental catch species under this program will be consistent with the mortality targets of Amendment 16, and thus will not have a substantial impact on predator-prey relationships or biodiversity. Particular measures within this action will have no more than minimal adverse impacts to EFH. It is therefore reasonable to expect that there will not be substantial impact on biodiversity or ecosystem function.

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

Response: The Preferred Alternatives are designed to continue the groundfish rebuilding programs that were first adopted in Amendment 13 to the Northeast Multispecies Fishery Management Plan and modified in subsequent actions, including Amendment 16. The environmental assessment documents that no significant natural or physical effects will result from the implementation of the Preferred Alternatives. As described in Section 7.1.1, the catch limits in this action are designed to continue rebuilding. The action cannot be reasonably expected to have significant impacts on habitat or protected species, as the impacts are expected to fall within the range of those resulting from Amendments 13 and 16. The action's potential economic and social impacts are also addressed in the environmental assessment (Sections 7.4 and 7.5), as well as in the Executive Order 12866 review (Section 8.11) and the Initial Regulatory Flexibility Act review (Section 8.11.2). The proposed catch limits are expected to result in short-term reductions in total groundfish revenues on groundfish fishing trips of $24.8 million when compared to FY 2011, and $13.5 million when compared to FY 2012. These impacts will not be evenly distributed. Smaller vessels and those vessels that fish in the inshore Gulf of Maine are likely to have greater adverse effects on fishing revenue than offshore vessels, specifically due to the reductions in ACLs for GOM cod, CC/GOM yellowtail flounder, witch flounder, and GOM haddock.

While these declines in revenues are substantial, because they are less than $100 million they are not considered significant under the criteria used for E.O. 12866. The Preferred Alternatives, however, may place small entities (defined as those generating less than $500K in annual sales) at a competitive disadvantage relative to large entities, particularly for vessels participating in the commercial groundfish fishery (8.11.2).

NMFS has determined that despite the potential socio-economic impacts resulting from this action, there is no need to prepare an EIS. The purpose of NEPA is to protect the environment by requiring Federal agencies to consider the impacts of their proposed actions on the human environment, defined as " the natural and physical environment and the relationship of the people with that environment." The EA for FW 50 describes and analyzes the preferred alternatives and concludes that there will be no significant impacts to the natural and physical environment. While some fishermen, shore-side businesses, and others may experience impacts to their livelihood, these impacts, in and of themselves, do not require the preparation of an EIS, as supported by NEPA's implementing regulations at 40 C.F.R. 1508.14. Consequently, because the EA demonstrates that the action's potential natural and physical impacts are not significant, the execution of a FONSI remains appropriate under this criteria.

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

Response: Some aspects concerning the science used to formulate the preferred alternatives on the quality of human environment are expected to be controversial. There is controversy over the scientific evaluation of current stock status that is used to determine future catches. This is particularly the case for GOM cod.

The GOM cod stock has been assessed three times since 2008: in 2008 (GARM III), in 2011 (SARC 53) and in 2012 (SARC 55). The SARC 53 assessment found that stock size was over-estimated at GARM III and concluded that the stock was overfished and overfishing was occurring, when the expectation after GARM III was that the stock would be rebuilt by 2012. In addition, in order to end overfishing, the assessment concluded that large catch reductions were needed in 2012. This assessment result was unexpected and led to a decision to repeat the assessment in 2012. Several specific criticisms were leveled at the 2011 assessment. These were considered by the Council's Scientific and Statistical Committee, which identified four issues that they felt needed to be addressed: cod stock structure, recreational catch estimates due to changes in the reporting system, discard mortality assumptions, and the applicability of catch per unit effort (CPUE) as an assessment input. A plan was developed to investigate these four issues as part of a new assessment.

In December 2012, a new assessment of GOM cod was performed. Three of the four issues identified by the SSC were addressed. Based on a review and fishermen's inputs, discard mortality assumptions were modified. CPUE was explored as an input but was not incorporated based on evidence that it was not a reliable indicator of abundance. Finally, new recreational catch estimates were used in the assessment. The issue of cod stock structure is still under review and results of that review are not yet available for use. The 2012 GOM cod assessment thus addressed most of the issues related to the scientific controversy over the 2011 GOM cod assessment.

The 2012 GOM cod assessment review panel, however, forwarded two assessment models for use in developing management advice. The two models differ in their assumption on natural mortality. One model is based on a fixed natural mortality rate while the other reflects an increase in natural mortality in recent years. Under either model, overfishing is occurring and the stock is overfished. There remains some question about the choice of reference points (fishing mortality and biomass) for the model that is based on an increase in natural mortality. While the status of the stock probably would not change, different reference points may lead to different short-term catch advice.

Based on the consistency of the results from the two GOM cod assessments, there seems little substance to the argument that catches for GOM cod should be significantly higher. Indeed, there have been a few comments that both the GOM and GB cod quotas are too high and should be reduced further. Issues related to reference points do warrant further attention and the SSC has recommended that these be investigated further.

Another concern raised over the assessments used to set the ABCs/ACLs in this action is that for many stocks the most recent data used in the assessments was from 2010. This is the case for all of the stocks last assessed in the 2012 Groundfish Assessment Updates, and includes several stocks important to inshore fishermen such as GOM haddock, witch flounder, plaice, CC/GOM yellowtail flounder, pollock, and GOM winter flounder. Arguments have been made that since 2010 there is evidence of increased recruitment for some of these stocks that is not reflected in the proposed ABCs/ACLs. Until this is confirmed, however, the ABCs/ACLs cannot be increased without an increased probability of overfishing.

Another area of controversy is the concern that the economic impact analyses understate the true negative impacts of the low ACLs that are the preferred alternative. Many of the complaints focus on the analyses of fishing costs and the effects of costs associated with sectors on the profitability of individual fishing businesses. This may be the case, but there are data limitations and data confidentiality restrictions that inhibit the ability to analyze and describe impacts in more detail. For example, within sectors there is often a redistribution of ACE from one vessel to another, but there is no data on the costs associated with those exchanges – only leases of ACE between sectors are reported. In any case, the economic impact analyses do indicate that the consequences for fishermen and communities are likely to be severe because of declines in revenues as a result of the reduced ACLs.

(9) *Can the Preferred Alternatives 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?*

Response: No, the Preferred Alternatives cannot be reasonably expected to result in substantial impacts to unique areas or ecological critical areas. The only designated HAPC in the areas affected by this action is protected by an existing closed area that would not be affected by this action. In addition, vessel operations around the unique historical and cultural resources encompassed by the Stellwagen Bank National Marine Sanctuary would not likely be altered by this action. As a result, no substantial impacts are expected from this action.

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

Response: The Preferred Alternatives are not expected to result in highly uncertain effects on the human environment or involve unique or unknown risks. The measures used in this action are similar to those adopted in past management actions, and these prior actions have reduced fishing mortality on many stocks and initiated stock rebuilding. While there is a degree of uncertainty over how fishermen will react to the proposed measures, the analytic tools used to evaluate the measures attempt to take that uncertainty into account and reflect the likely results as a range of possible outcomes. For example, the economic analysis in Section 7.4 illustrates the distribution of results that are expected rather than provide only a point estimate. Overall, the impacts of the Preferred Alternatives can be, and are, described with a relative amount of certainty. The economic impacts will clearly be negative and may affect the ability of many fishermen to remain in business.

(11) *Is the Preferred Alternative related to other actions with individually insignificant, but cumulatively significant impacts?*

Response: The Proposed Action is not related to other actions with individually insignificant but cumulatively significant impacts. Recent management actions in this fishery include FW 42, FW 43, Amendment 16, FW 44, FW 45, FW 46, FW 47, FW 48, and FW 49. FW 42 developed specific measures implementing programs adopted by Amendment 13; each was determined to be insignificant. FW 43 adopted limits on groundfish bycatch by mid-water trawl herring vessels and was not determined to have a significant effect on either the groundfish or herring fisheries. Amendment 16 had significant impacts and thus required the preparation of an EIS, while Frameworks 44 and 46 set specifications as required under Amendment 16 and made relatively minor adjustments to the sector administration program. Framework 46 modified the amount of haddock that may be caught by the midwater herring fishery. Framework 47 adjusted several ABCs/ACLs for FY 2012, FW 48 modified many of the ABC/ACL provisions, AMS, and monitoring provisions, and FW 49 adjusted the timing of scallop vessel access to access areas on GB. The measures in this action were anticipated by Amendment 16 and thus cannot be said to have different cumulative impacts that were not foreseen and addressed in the amendment. Therefore, the Preferred Alternatives, when assessed in conjunction with the actions noted above, would not have significant impacts on the natural or physical environment.

(12) *Are the Preferred Alternatives likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural or historical resources?*

Response: The Preferred Alternatives are not likely to affect objects listed in the National Register of Historic Places or cause significant impact to scientific, cultural, or historical resources. The only objects in the fishery area that are listed in the National Register of Historic Places are ship wrecks, including several in the Stellwagen Bank National Marine Sanctuary. The current regulations allow fishing within the Stellwagen Bank National Marine Sanctuary. The Preferred Alternatives would not regulate current fishing practices within the sanctuary. However, vessels typically avoid fishing near wrecks to avoid tangling gear. Therefore, this action would not result in any adverse effects to wrecks.

(13) *Can the Preferred Alternatives reasonably be expected to result in the introduction or spread of a non-indigenous species?*

Response: This action would not result in the introduction or spread of any non-indigenous species, as it would not result in any vessel activity outside of the Northeast region.

(14) *Are the Preferred Alternatives likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?*

Response: No, the Preferred Alternatives are not likely to establish precedent for future actions with significant effects. The Preferred Alternatives adopt measures that are designed to react to the necessity to reduce fishing mortality for several groundfish stocks in order to achieve the fishing mortality targets adopted by Amendment 16 and subsequent framework actions. As such, these measures are designed to address a specific problem and are not intended to represent a decision about future management actions that may adopt different measures.

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

Response: The Preferred Alternatives are intended to implement measures that would offer further protection of marine resources and would not threaten a violation of Federal, state, or local law or requirements to protect the environment.

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

Response: As specified in the responses to the first two criteria of this section, the Preferred Alternatives are not expected to result in cumulative adverse effects that would have a substantial effect on target or non-target species. This action would maintain fishing mortality within M-S Act requirements for several groundfish stocks, with no expected increase in mortality for non-target and non-groundfish stocks.

FONSI STATEMENT: In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for Framework Adjustment 50 to the Northeast Multispecies Fishery Management Plan, it is hereby determined that Framework Adjustment 50 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 required.

____________________________________ ______________________

John K. Bullard

Northeast Regional Administrator, NOAA Date:

8.2.3 List of Preparers; Point of Contact

Questions concerning this document may be addressed to:

Mr. Thomas Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950
(978) 465-0492

This document was prepared by:

Michelle Bachman, New England Fishery Management Council (NEFMC)
Evan Bing-Sawyer, National Marine Fisheries Service, Northeast Fisheries Science Center (NEFSC)
Deirdre Boelke, NEFMC
Mark Brady, NMFS Northeast Regional Office (NERO)
Daniel Caless, NERO
Timothy Cardiasmenos, NERO
Steven Correia, Massachusetts Division of Marine Fisheries (MA DMF)
Chad Demarest, Northeast Fisheries Science Center (NEFSC)
Dr. Demet Haksever, NEFMC
Sarah Heil, NERO
Dr. Fiona Hogan, NEFMC
Melissa Hooper, NERO
Dr. Drew Kitts, NEFSC
Thomas Nies, NEFMC (plan coordinator)
Paul Nitschke, NEFSC
Loretta O'Brien, NEFSC
Michael Ruccio, NERO
Sally Sherman, Maine Department of Marine Resources (ME DMR)

8.2.4 Agencies Consulted

The following agencies were consulted in the preparation of this document:

Mid-Atlantic Fishery Management Council
New England Fishery Management Council, which includes representatives from the following additional organizations:
- Connecticut Department of Environmental Protection
- Rhode Island Department of Environmental Management
- Massachusetts Division of Marine Fisheries
- New Hampshire Fish and Game
- Maine Department of Marine Resources

National Marine Fisheries Service, NOAA, Department of Commerce
United States Coast Guard, Department of Homeland Security

8.2.5 Opportunity for Public Comment

Some of the elements of this action were first considered as part of FW 48, and so the meetings for that action are also listed below. The Preferred Alternatives were developed during the period January 2012 through January 2013 and were discussed at the following meetings. Opportunities for public comment were provided at each of these meetings.

Date	Meeting Type	Location
2012		
6/19-21/2012	Council Meeting	Holiday Inn by Bay, Portland, ME
8/2/12	Oversight Committee	Sheraton Harborside, Portsmouth, NH
8/24/12	Science and Statistical Committee	Boston, MA
9/11/12	GF PDT	MA DMF, New Bedford, MA
10/1/12	GF PDT Conference Call	
10/11/12	Oversight Committee	Ashworth By the Sea, Hampton, NH
10/2/12	GF PDT	Holiday Inn, Mansfield, MA
10/3/12	Recreational Advisory Panel	Holiday Inn, Peabody, MA
10/4/12	Groundfish Advisory Panel	Holiday Inn, Peabody, MA
11/5/12	Groundfish OS Mtg	Holiday Inn By the Bay, Portland, ME
11/13-11/15/12	Council Meeting	Newport Marriott, Newport, RI
11/19/12	Science and Statistical Committee	Boston, MA
11/28/12	Groundfish PDT Conference Call	
12/19/2011	Groundfish OS Meeting	Wakefield, MA
12/12/2012	Council Meeting	Wakefield, Ma

Date	Meeting Type	Location
1/8/2013	GF PDT Conference Call	
1/11/2013	GF PDT Conference Call	
1/18/2013	GF PDT Meeting	Milford, MA
1/23/2013	Scientific and Statistical Committee	Boston, MA
1/24-1/25/2013	Groundfish Oversight Committee Meeting	Portland, ME
1/30/2013	Council Meeting	Portsmouth, NH

8.3 Endangered Species Act

Section 7 of the Endangered Species Act 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. NMFS has concluded that the proposed framework adjustment and the prosecution of the multispecies fishery is not likely to jeopardize any ESA-listed species or alter or modify any critical habitat, based on the discussion of impacts in this document and on the assessment of impacts in the Amendment 16 Environmental Impact Statement.

For further information on the potential impacts of the fishery and the proposed management action on listed species, see Section 7.3 of this document.

8.4 Marine Mammal Protection Act

The NEFMC has reviewed the impacts of the Preferred Alternatives on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA. Although they are likely to affect species inhabiting the multispecies management unit, the measures will not alter the effectiveness of existing MMPA measures, such as take reduction plans, to protect those species based on overall reductions in fishing effort that have been implemented through the FMP

For further information on the potential impacts of the fishery and the proposed management action on marine mammals, see Section 7.3 of this document.

8.5 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 Section 930.36(c) of the regulations implementing the Coastal Zone Management Act, NMFS made a general consistency determination that the Northeast Multispecies Fishery Management Plan (FMP), including Amendment 16, and Framework Adjustment 50, is consistent to the maximum extent practicable with the enforceable policies of the approved coastal management program of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. This general consistency determination applies to the current NE Multispecies Fishery Management Plan (FMP), and all subsequent routine federal actions carried out in accordance with the FMP such as Framework Adjustments and specifications. A general consistency determination is warranted because Framework Adjustments to the FMP are repeated activities that adjust the use of management tools previously implemented in the FMP. A general consistency determination avoids the necessity of issuing separate consistency determinations for each incremental action. This determination was submitted to the above states on October 21, 2009. To date, the states of North Carolina, Rhode Island, Virginia, Connecticut, New Hampshire, and Pennsylvania have concurred with the General Consistency Determination. Consistency was inferred for those states that did not respond.

8.6 Administrative Procedure Act

This action was developed in compliance with the requirements of the Administrative Procedure Act, and these requirements will continue to be followed when the proposed regulation is published. 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.

8.7 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.

8.7.1 Utility of Information Product

The information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the Preferred Alternatives on, the measures proposed, and the impacts of those measures. A discussion of the reasons for selecting the Preferred Alternatives is included so that intended users may have a full understanding of the Preferred Alternatives 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.

This document is available in several formats, including printed publication, CD-ROM, and online through the Council's web page in PDF format. 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.

8.7.2 Integrity of Information Product

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.

8.7.3 Objectivity of Information Product

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. These update assessments were reviewed by the SAW 50 (NEFSC 2010), the Groundfish Assessment Review Meeting III (GARM III; NEFSC 2008), the Northeast Data Poor Stocks Working Group (DPWG 2009), and SAW 52 (NEFSC 2011) which all included participation by independent stock assessment scientists. 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 Groundfish Plan Development Team/Monitoring Committee.

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 Preferred Alternatives were conducted using information from the most recent complete calendar years, through 2010, and in some cases includes information that was collected during the first eight months of calendar year 2011. Complete data were not available for calendar year 2010. The data used in the analyses provide the best available information on the number of harvesters in the fishery, the catch (including landings and discards) by those harvesters, the sales and revenue of those landings to dealers, the type of permits held by vessels, the number of DAS used by those vessels, the catch of recreational fishermen and the location of those catches, and the catches and revenues from various special management programs. 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 the groundfish fishery.

The policy choices are clearly articulated, in Section 4.0 of this document, 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 7.0 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.

8.8 Executive Order 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 in FW 50. 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.

8.9 Executive Order 13158 (Marine Protected Areas)

The Executive Order on Marine Protected Areas requires each federal agency whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions, and, to the extent permitted by law and to the maximum extent practicable, in taking such actions, avoid harm to the natural and cultural resources that are protected by an MPA. The E.O. directs federal agencies to refer to the MPAs identified in a list of MPAs that meet the definition of MPA for the purposes of the Order. The E.O. requires that the Departments of Commerce and the Interior jointly publish and maintain such a list of MPAs. As of the date of submission of this FMP, the list of MPA sites has not been developed by the departments. No further guidance related to this Executive Order is available at this time.

8.10 Paperwork Reduction Act

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. The authority to manage information and recordkeeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

FW 47 does not modify existing collection of information requirements implemented by previous amendments to the FMP that are subject to the PRA, including:

- Reporting requirements for SAPs and the Category B (regular) DAS Program
- Mandatory use of a Vessel Monitoring System (VMS) by all vessels using a groundfish DAS
- Changes to possession limits, which will change the requirements to notify NMFS of plans to fish in certain areas
- Provisions to allow vessel operators to notify NMFS of plans to fish both inside and outside the Eastern U.S./CA area on the same fishing trip

8.11 Regulatory Impact Review

8.11.1 Executive Order 12866

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 8.11 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.

E.O. 12866 requires a review of proposed regulations to determine whether or not the expected effects would be significant, where a significant action is any regulatory action that may:

- Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

- Raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in the Executive Order.

8.11.1.1 Objectives

The goals and objectives of Framework Adjustment 50 are the same as those detailed in Amendment 16 to the Northeast Multispecies Fishery FMP and are as follows:

Goal 1: Consistent with the National Standards and other required provisions of the Magnuson-Stevens Fishery Conservation and Management Act and other applicable law, manage the northeast multispecies complex at sustainable levels.

Goal 2: Create a management system so that fleet capacity will be commensurate with resource status so as to achieve goals of economic efficiency and biological conservation and that encourages diversity within the fishery.

Goal 3: Maintain a directed commercial and recreational fishery for northeast multispecies.

Goal 4: Minimize, to the extent practicable, adverse impacts on fishing communities and shoreside infrastructure.

Goal 5: Provide reasonable and regulated access to the groundfish species covered in this plan to all members of the public of the United States for seafood consumption and recreational purposes during the stock rebuilding period without compromising the Amendment 13 objectives or timetable. If necessary, management measures could be modified in the future to insure that the overall plan objectives are met.

Goal 6: To promote stewardship within the fishery.

Objective 1: Achieve, on a continuing basis, optimum yield (OY) for the U.S. fishing industry.

Objective 2: Clarify the status determination criteria (biological reference points and control rules) for groundfish stocks so they are consistent with the National Standard guidelines and applicable law.

Objective 3: Adopt fishery management measures that constrain fishing mortality to levels that are compliant with the Sustainable Fisheries Act.

Objective 4: Implement rebuilding schedules for overfished stocks, and prevent overfishing.

Objective 5: Adopt measures as appropriate to support international transboundary management of resources.

Objective 6: Promote research and improve the collection of information to better understand groundfish population dynamics, biology and ecology, and to improve assessment procedures in cooperation with the industry.

Objective 7: To the extent possible, maintain a diverse groundfish fishery, including different gear types, vessel sizes, geographic locations, and levels of participation.

Objective 8: Develop biological, economic and social measures of success for the groundfish fishery and resource that insure accountability in achieving fishery management objectives.

Objective 9: Adopt measures consistent with the habitat provisions of the M-S Act, including identification of EFH and minimizing impacts on habitat to the extent practicable.

Objective 10: Identify and minimize bycatch, which include regulatory discards, to the extent practicable, and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

8.11.1.2 Description

A description of the entities affected by this Framework Adjustment, specifically the stakeholders of the New England Groundfish Fishery, is provided in Section 6.5.1 of this document.

8.11.1.3 Problem Statement

The need and purpose of the actions proposed in this Framework Adjustment are set forth in Section 3.2 of this document and are incorporated herein by reference.

8.11.1.4 Analysis of Alternatives

This section provides an analysis of each proposed alternative of FW50 as mandated by EO 12866. The focus will be on the expected changes 1) in net benefits and costs to stakeholders of the New England Groundfish Fishery, 2) changes to the distribution of benefits and costs within the industry, 3) changes in income and employment, 4) cumulative impacts of the regulation, and 5) changes in other social concerns. Much of this information is captured already in the detailed economic impacts and social impacts analyses of Sections 7.4 and 7.5 of this document. This RIR will summarize and highlight the major findings of the economic impacts analysis provided in section 7.4 of this document, as mandated by EO 12866. For social impacts of each alternative, see Section 7.5.

When assessing net benefits and costs of the regulations, it is important to note that the analysis will focus on producer surplus only, namely the impacted fishing businesses. Consumer surplus is not expected to be affected by any of the regulatory changes proposed in FW50, given the large supply of domestic and foreign seafood imports.

8.11.1.4.1 Updates to Status Determination Criteria, Formal Rebuilding Programs and Annual Catch Limits

SNE/MA Winter Flounder Rebuilding Strategy

A detailed description of this alternative can be found in Section 4.1.1 of this document.

Option 1: No Action

If this option would be adopted, the rebuilding strategy for SNE/MA winter flounder would continue to target an ending date of 2014 with a median probability of success. Since the stock is unlikely to rebuild by that date in the absence of all fishing mortality, the management objective would be to reduce fishing mortality to as close to 0 as possible until the stock is rebuilt. Relative to the scenarios considered in Option 2, this option provides the smallest discounted net economic benefit.

Option 2: Revised Rebuilding Strategy (Preferred Alternative)

A detailed net present value (NPV) analysis of estimated future landings under different target mortality rates for SNE/MA winter flounder is presented in Section 7.4.1.1.2 of this document. The Magnusson-Stevens Act (MSA) stipulates that rebuilding plans for fisheries deemed to be overfished are not to exceed 10 years unless biological, environmental, or international management constraints are prohibitive of such a timeframe (Section 304(e)(4)(A)(ii)). In summary, of the three fishing mortality rates which would satisfy the MSA time requirements for stock rebuilding, Freb 2023 provides the largest discounted net economic benefit using discount rates of 3%, 7%, and 10%. Under a 3% discount rate, Freb 2023 represents a $40.2 million (37%) increase in NPV from the No Action option. Depending on actual stock growth rates and associated management adjustments to the mortality rate during the rebuild phase, this figure may overestimate or underestimate the true impact.

Annual Catch Limit Specifications

A detailed description of this alternative can be found in Section 4.1.2 of this document.

Option 1: No Action

Under Option 1, ACLs will be based on FW47 specifications for the years 2013-2014, which have missing values for many species (Table 70). Since many critical stocks will have no ACL specified at all, fishing would not be permitted for the species with undefined ACLs, nor would fishing be allowed in these species' broad stock areas. In FY 2011 there were no trips able to target pollock or winter flounder without catching other, zero-allocation stocks. Consequently it is highly likely that commercial fishing for groundfish would not be permitted for Sector or Common Pool vessels under this option. Even if catch of non-allocated stocks could be reduced to zero through the use of selective gear, new targeting practices for non-groundfish species, or market timing, and market prices increased due to reduced supply, it is unlikely gross revenues would surpass $10 million. Under such circumstances, extreme industry consolidation would be expected, leading to the loss of many groundfish fishing jobs and a reduction in household income for fishing families. Shore-side infrastructure, including service and gear providers, as well as wholesalers, could become unprofitable due to the reduced business and may be forced to shut down, further impacting market prices and local communities.

Option 2: Revised Annual Catch Limit Specifications

Option 2 would specify new ABCs for GB cod, GOM cod, GB haddock, GOM haddock, GB yellowtail flounder, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American plaice, witch flounder, redfish, Atlantic halibut, white hake, northern windowpane, southern windowpane, ocean pout and Atlantic wolffish. The new ABCs will be based on latest benchmark stock assessment information and many would be substantially lower than FY 2012 ABCs. Section 7.4.1.2.2 of this document presents the results of a quota change model (QCM) simulation to predict sector trips that would likely occur under the new ACLs in FY2013 and the associated economic impacts. The QCM was run for two different scenarios using low (Scenario 1) and high (Scenario 2) ACL estimates for GOM cod and GB yellowtail flounder with static ACL estimates for all other species[5] (Table 71). Both scenarios have similar estimated economic impacts, though Scenario 1 has a slightly larger negative impact. Expected groundfish gross revenues for FY2013 are expected to be 28-30% less than in FY2011 and 18-20% less than those predicted for FY 2012 (Table 72 and Table 76). Expected gross revenues for all species on groundfish trips for FY2013 are expected to be 23-25% less than in FY2011 and 11-13% less than predicted FY2012 values (Table 75,Table 79). These estimated revenue reductions could increase if the assumption of full 10% carryover is removed.

The home port states of Connecticut, New Hampshire, and New Jersey are expected to have the largest percentage declines in landings value since FY2011. In terms of magnitude, Massachusetts is predicted to see the largest overall decline in gross revenue since FY2011 with a decrease of approximately $21 million. Of all major home ports in the Northeast, Chatham, MA is expected to have the largest percentage decline in landings value since FY2011, though all ports will be negatively affected (Table 77).

It is clear from the simulation that the impacts will be non-uniformly distributed across vessel length classes. The economic impact is expected to fall heaviest on the smallest vessel length class (less than 30 feet) and is expected to taper off as vessel length increases up to the largest vessel length class (greater than 75 feet). This result is not surprising since, relative to larger vessels, small vessels have less scalability in terms of landings and have a smaller geographic range.

Under both scenarios, net revenues are expected to decline much less substantially than gross revenues. Gross revenues on sector trips in FY2013 are expected to decline by a range of $26 million to $27 million (23% to 25%) from FY2011 and net revenues are expected to decline by a range of only $2 to $3 million (4% to 6%). This is due in part to limitations of the QCM trip selection process which underestimates actual trip costs and in part to efficiency gains that are predicted to occur. Maintaining net revenues would most likely occur at the expense of smaller vessels operating at a low profit margin that would be forced to lease their quota or sell their permits. The QCM also predicts that crew-days, days absent and total Sector trips would decline substantially relative to FY 2011, since only the most efficient trips are expected to occur under such highly restrictive quota allocations. Fewer operating vessels and days absent would translate into a reduction in earning opportunities for crew members.

8.11.1.4.2 Commercial and Recreational Fishery Measures

SNE/MA Winter Flounder Landing Restrictions

A detailed description of this alternative can be found in Section 4.2.1 of this document.

Option 1: No Action

This option would continue the prohibition on landing SNE/MA winter flounder. When compared to Option 2, this option would result in reduced fishing vessel revenues. Assuming the entire projected

[5] The ACLs used for the QCM simulation assume the preferred values associated with this option for the US/Canada Management area TACs as well as the scallop fishery yellowtail flounder sub-ACLs (see Section 4.1.2.2).

allocation of SNE/MA winter flounder to sectors and the common pool is landed, and an average ex-vessel price of $2.03 per pound, this option would be expected to result in a reduction in revenues of $5.4 million when compared to Option 2. This does not take into account that revenues of other stocks may be reduced as well since there may be fewer groundfish fishing trips as a result of the inability to land SNE/MA winter flounder.

Option 2: Landing of SNE/MA Winter Flounder Permitted (Preferred Alternative)

This option would result in an additional $5.4 million of groundfish ex-vessel revenues when compared to Option 1/No Action. This is based on the ACL that is the preferred alternative in Section 4.2.1. Most of the increase, $4.3 million, would be expected to accrue to sector vessels, while the remainder would accrue to common pool vessels. It is not possible to include this change in the QCM used to analyze the economic impacts of the revised ABCs/ACLs. The QCM uses recent fishing activity to create a simulation model, and because landing of this stock has been prohibited, there are not enough trips in the data to characterize future fishing activity.

Commercial Fishery Accountability Measures

A detailed description of this alternative can be found in Section 4.2.2 of this document.

Option 1: No Action

Option 1 would retain the current commercial fishery AMs for SNE/MA winter flounder as defined in Amendment 16 and modified by subsequent management actions. The current AM prohibits landing of this stock, but FW 48 submitted a preferred alternative that would eliminate this AM and adopt area-based restrictions if the ACL is exceeded. The impacts of this option depend on whether or not the area-based AM measure from FW48 is adopted prior to the implementation of this action and whether or not the separate landing restriction measure discussed in Section 4.2.1 is lifted. If possession is allowed and the FW48 area-based AM measure has not yet been adopted, then there would be approximately $5.4 million in foregone revenue from selecting Option 1 as opposed to Option 2 since the current AM prohibits landing SNE/MA winter. If possession is allowed and the FW48 AM has also been adopted, this option would have the same impacts for common pool vessels as Option 2 since Option 2 has the same rules for common pool vessels as the AM described in FW48 which would remain in place under Option 1. As for sector vessels, the impact will depend on the value of the landed SNE/MA winter flounder stock versus the cost and likelihood of broad stock area closures upon ACE exhaustion. This is not readily quantifiable. Since Option 2 would only be selected if landing of SNE/MA winter flounder is permitted, Option 1 is the only alternative in the no possession scenario and the impacts are the same as those corresponding to the SNE/MA winter flounder AM that persists at the time, either no possession or the FW48 area-based AM. For a more detailed discussion refer to section 7.4.2.1.2 of this document.

Option 2: Revised AM for SNE/MA Winter Flounder (Preferred Alternative)

This option would apply sector rules to sector catches of SNE/MA winter flounder, replacing the prohibition on landing or the area-based AM from FW48, whichever is currently in place. If the AM that prohibits landing is still active, then this option would allow common pool and sector vessels to produce revenues from the species that would not otherwise be possible under Option 1. As discussed in section 7.4.2.2.2 a rough approximation of the value of the proposed allocation for this stock is $5.4 million dollars, $1.1 million of which would accrue to common pool vessels and the rest to sectors. There is a risk however for sector vessels, that they exhaust their ACE prematurely within the fishing year and are no longer able to fish in the broad SNE/MA stock area. This could have negative economic impacts in terms of lost revenue from the catch of other species or increased costs from having to fish outside of the area. If on the other hand, the FW48 area-based AM has been adopted prior to this action, then the impacts to common pool vessels would be consistent across both this option and Option 1, but for sector vessels the impacts are not so clear cut between the two options. That's because under either option, sector vessels would be able to generate revenues from SNE/MA species up to the estimated value of their full allocation, approximately $4.3 million. The difference lies in the likelihood and costs associated with overages to the overall ACL and groundfish sub-ACL that trigger the area-based AM from FW48, or the likelihood and costs associated with sector-level closure of the broad SNE/MA winter flounder stock area resulting from exceeding sector ACE. Given the high number of unknowns associated with such a comparison it is not possible to quantify at this time. If as discussed in section 7.4.1.1.2, it is unlikely that sectors will exceed their ACE, then this option would likely have greater economic benefits than Option 1 since it gives sectors greater flexibility in how they land their allocation, potentially translating into higher revenues or lower costs.

8.11.1.5 Determination of Significance

The Proposed Action is not predicted to have an adverse impact on fishing vessels, purchasers of seafood products, ports, recreational anglers, and operators of party/charter businesses in excess of $100 million. Adverse economic impacts will result from this proposed action throughout the range of the groundfish fishery, including reduced income and employment opportunities. These impacts are estimated to be most significant for smaller vessels fishing in the inshore GOM. ACE trading and leasing will mitigate some of the adverse effects, and these transfer payments are expected to flow from larger vessels to smaller vessels, particularly those hailing from inshore Gulf of Maine ports. The potential decrease in gross revenues from fishing on sector trips under this action is estimated to be $26 million to $27 million from the FY 2011 observed revenues, falling short of the $100 million standard for significance. The only scenario that could come close to the $100 million mark would be under the No Action alternative where no new ACLs are set for selected and fishing for those species is prohibited entirely. Since total predicted gross revenues on groundfish trips for 2012 are below $100 million, and since much of the industry capitalization could be recovered through the sale or repurposing of assets, it is unlikely that the total pecuniary impact would surpass the threshold of significance as defined by E.O. 12866, even under such dire circumstances. A total shutdown could however impact local fishing communities in a material way, through a reduction in jobs and local expenditures as well as damage to cultural heritage. If such a circumstance were to come to pass, it would then be classified as significant under E.O. 12866.

8.11.2 Regulatory Flexibility Act

8.11.2.1Introduction

The purpose of the Regulatory Flexibility Analysis (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of various alternatives contained in the FMP or amendment (including framework management measures and other regulatory actions) and to ensure the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct an IRFA for each proposed rule. The IRFA is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. An IRFA is conducted to primarily determine whether the proposed action would have a "significant economic impact on a substantial number of small entities." In addition to analyses conducted for the RIR, the IRFA provides: 1) A description of the reasons why action by the agency is being considered; 2) a succinct statement of the objectives of, and legal basis for, the proposed rule; 3) a description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply; 4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; and, 5) an identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule.

8.11.2.2Description of reasons why action by the agency is being considered

The need and purpose of the actions are set forth in Section 3.2 of this document and are incorporated herein by reference.

8.11.2.3Statement of the objectives of, and legal basis for, the proposed rule

The goals and objectives of Framework Adjustment 50 are the same as those detailed in Amendment 16 to the Northeast Multispecies Fishery FMP. In general, FW 50 is intended to modify catch limits and management measures to ensure that overfishing does not occur, while at the same time achieving optimal yield (OY).

8.11.2.4Description and estimate of the number of small entities to which the proposed rule will apply

The Small Business Administration (SBA) defines a small business as one that is:

- independently owned and operated

- not dominant in its field of operation
- has annual receipts not in excess of -
  - $4.0 million in the case of commercial harvesting entities, or
  - $7.0 million in the case of for-hire fishing entities

- or if it has fewer than -
  - 500 employees in the case of fish processors, or
  - 100 employees in the case of fish dealers.

This framework action impacts mainly commercial harvesting entities engaged in the limited access groundfish as well as both the limited access general category and limited access scallop fisheries.

Regulated Commercial Harvesting Entities

Limited Access groundfish harvesting permits
The limited access groundfish fisheries are further sub-classified as those enrolled in the Sector allocation program and those in the Common Pool. Sector vessels are subject to Sector-level stock-specific Annual Catch Entitlements (ACE) that limit catch of allocated groundfish stocks. Accountability measures (AMs) include a prohibition on fishing inside designated areas once 100% of available Sector ACE has been caught, as well as area-based gear and effort restrictions that are triggered when catch of non-allocated groundfish stocks exceed Allowable Catch Limits (ACLs). Common Pool vessels are subject to various Days-at-sea and trip limits designed to keep catches below ACLs set for vessels enrolled in this program. In general, Sector-enrolled businesses rely more heavily on sales of groundfish species than Common Pool-enrolled vessels. At the beginning of the 2012 Fishing Year (May 1, 2012) there were 1,382 individual limited access permits. Each of these was eligible to join a Sector or enroll in the Common Pool. Alternatively they could also allow their permit to expire by failing to renew it. 827 permits were enrolled in the Sector program and 584 were in the Common Pool.

Limited access scallop harvesting permits
The limited access scallop fisheries are further sub-classified as Limited Access (LA) scallop permits and Limited Access General Category (LGC) scallop permits. LA scallop permit businesses are subject to a mixture of days-at-sea (DAS) and dedicated area trip restrictions. LGC scallop permit businesses are able to acquire and trade LGC scallop quota and there is an annual cap on quota/landings. At the beginning of the 2012 Fishing Year (March 1, 2012) there were 342 active LA scallop and 603 active LGC permits.

Permit-level data are presented for illustrative purposes, with gross receipts averaged across CY 2010-2012 (Table 86 and Table 87).

Table 86 – Number of permits held in potentially impacted fisheries

	Total permits	Sector permits	Common Pool permits	Limited Access Scallop permits	Limited Access GC Scallop	Both Sector and LA Scallop permits	Both Sector and LGC Scallop permits	Both Common Pool and LA Scallop permits	Both Common Pool and LGC Scallop permits
2010	1916	747	709	343	649	26	239	24	88
2011	1845	804	607	336	613	31	227	25	81
2012	1838	827	584	342	603	35	232	23	77

Table 87 – Gross sales associated with potentially impacted permits

Gross sales category	Number permits	Median gross sales	Median gross sales of groundfish	Median gross sales of scallops
0	644	$0	$0	$0
<$50K	248	$12,143	$3,693	$0
$50-100K	105	$77,518	$15,876	$0
$100-500K	481	$211,653	$62,140	$446,383
$500K-1mil	134	$698,289	$166,705	$495,123
$1-4mil	384	$1,631,354	$194,572	$1,666,564
$4-10mil	26	$4,364,661	$1,002,113	$4,115,054

Ownership entities in regulated commercial harvesting businesses

Individually-permitted vessels may hold permits for several fisheries, harvesting species of fish that are regulated by several different fishery management plans, even beyond those impacted by the proposed action. Furthermore, multiple permitted vessels and/or permits may be owned by entities affiliated by stock ownership, common management, identity of interest, contractual relationships or economic dependency. For the purposes of this analysis, ownership entities are defined by those entities with common ownership personnel as listed on permit application documentation. Only permits with identical ownership personnel are categorized as an ownership entity. For example, if five permits have the same seven personnel listed as co-owners on their application paperwork, those seven personnel form one ownership entity, covering those five permits. If one or several of the seven owners also own additional vessels, with sub-sets of the original seven personnel or with new co-owners, those ownership arrangements are deemed to be separate ownership entities for the purpose of this analysis.

A summary of regulated ownership entities within potentially impacted fisheries

Ownership data are available for the four primary sub-fisheries potentially impacted by the proposed action from 2010 onward. However, current data do not support a common ownership entity data field across years. For this reason only one year's gross receipts will be reported, with calendar year 2011 serving as the baseline year for this analysis. Calendar year 2012 data are not yet available in a fully audited form.

In 2011 there were 1,370 distinct ownership entities identified. Of these, 1,312 are categorized as small and 58 are large entities as per SBA guidelines (Table 88).

These totals may mask some diversity among the entities. Many, if not most, of these ownership entities maintain diversified harvest portfolios, obtaining gross sales from many fisheries and not dependent on any one. However, not all are equally diversified. Those that depend most heavily on sales from harvesting species impacted directly by the proposed action are most likely to be affected. By defining dependence as deriving greater than 50% of gross sales from sales of either regulated groundfish or from scallops, we are able to identify those ownership groups most likely to be impacted by the proposed regulations. Using this threshold, we find that 135 entities are groundfish-dependent with 131 small and four large. We find that 47 entities are scallop-dependent with 39 small and 8 large (Table 89).

Table 88 – Description of entities regulated by the Proposed Action

sales	Size standard	Number of ownership entities	Average number permits owned per entity	Maximum permits owned per entity	Median gross sales per entity	Average gross sales per entity	Average groundfish sales per entity	Average scallop sales per entity
$0	small	448	1.1	35	$0	$0	$0	$0
<$50K	small	150	1.1	6	$11,809	$16,069	$6,467	$0
$50-100K	small	88	1.1	3	$77,698	$75,342	$18,221	$0
$100-500K	small	334	1.2	4	$222,265	$244,526	$97,889	$0
$500K-1mil	small	103	1.5	7	$680,218	$700,954	$278,618	$546,111
$1-4mil	small	189	1.9	8	$1,806,443	$2,030,334	$704,861	$1,777,724
$4mil+	large	58	7.0	36	$7,950,960	$10,753,380	$2,398,832	$5,137,942
Total ownership entities:		*1370*						

Table 89 – Description of groundfish and scallop dependent entities regulated by the Proposed Action

Entity type	sales	Size standard	Number of ownership entities	Average number permits owned per entity	Maximum permits owned per entity	Median gross sales per entity	Average gross sales per entity	Average groundfish sales per entity	Average scallop sales per entity
groundfish_dependent	<$50K	small	13	1.0	1	$7,944	$13,980	$10,827	$0
groundfish_dependent	$50-100K	small	6	1.0	1	$81,481	$76,726	$58,902	$0
groundfish_dependent	$100-500K	small	61	1.6	4	$245,176	$256,524	$205,415	$0
groundfish_dependent	$500K-1mil	small	23	2.2	7	$791,387	$769,666	$564,253	$0
groundfish_dependent	$1-4mil	small	28	3.1	8	$1,546,338	$1,636,644	$1,373,636	$0
groundfish_dependent	$4mil+	large	4	4.8	8	$6,618,976	$6,984,382	$5,575,181	$2,005,277
scallop_dependent	$500K-1mil	small	4	1.0	1	$711,928	$708,607	$0	$546,111
scallop_dependent	$1-4mil	small	35	1.5	4	$1,975,662	$2,150,028	$204	$1,958,618
scallop_dependent	$4mil+	large	8	6.6	13	$10,423,610	$11,075,904	$41,363	$7,292,324
		groundfish dependent	*135*						
		scallop dependent	*47*						
		total dependent	*182*						

Limited access herring permits[6]

The Northeast Multispecies Fishery Management Plan allows for sub-allocations of regulated groundfish stocks for the purposes of bycatch in other fisheries, including sub-allocation of haddock intended as regulated bycatch for vessels permitted to fish for Atlantic herring under the Atlantic Herring Fishery Management Plan. Because the proposed action will decrease the available GOM and GB haddock Allowable Biological Catch for the groundfish fishery, vessels permitted in the Atlantic herring fishery are technically regulated by this action.

Table 90 categorizes the number of large and small permit holders in the herring fishery over the 2010-2012 time period. Note that open-access (Category D) permit holders, while quite numerous, are subject to fairly low possession limits for herring, are responsible for very small levels of landings, and derive relatively little revenue from this fishery. In 2012, there were 3 large entities and 86 small entities which had limited access permits. Another 1,984 small vessels held open access permits.

Table 90 – Description of large and small regulated herring entities (# vessels)

	2010		2011		2012	
Permit Cat	**Large**	**Small**	**Large**	**Small**	**Large**	**Small**
A	0	43	3	39	3	37
B	0	4	0	4	0	4
C	0	49	0	47	0	45
D	0	2,276	0	2,124	0	1,984

Table 91 summarizes numbers of vessels, mean gross revenues, and mean gross revenues from herring associated with potentially impacted limited-access (A, B, or C) permits in 2012.

Table 91 – Gross sales for herring fishing entities by permit in 2012

Gross sales category	Number of Permits	Mean Gross sales	Mean sales of herring
0	15		
<$50K	4	$ 22,567	$ -
$50-100K	6	$ 73,943	$ 990
$100-500K	15	$ 261,931	$ 83,350
$500K-1M	15	$ 764,142	$ 185,495
$1-4M	39	$ 1,726,859	$ 416,479
$4+M	3	$ 5,263,488	$ 1,905,180

Ownership data are available for 2010 onward. Data for 2010-2012 are presented, although data for the calendar year 2012 are preliminary. Table 92 describes the large and small entities. While there are entities that hold limited-access herring permit (A/B/C) with gross receipts greater than $4M, none of these entities reported any herring revenues during 2010-2012; these

[6] The description of small and large entities in the herring fishery is excerpted from the Herring FMP FW2 IRFA. As such, there is potential overlap between the ownership groups identified here and the groundfish/scallop dependent entities presented by this IRFA.

entities are unlikely to be affected by the proposed action's changes to the sub-allocation for the herring fishery.

Table 92 – Gross sales for herring entities by ownership group

		2010		2011		2012	
	Revenue group	Some Herring Landings	No herring Landings	Some Herring Landings	No herring Landings	Some Herring Landings	No herring Landings
Small	<$4M	28	42	23	41	21	40
Large	>=$4M	0	1	0	4	0	3

Framework Adjustment 46 to the Northeast Multispecies fishery created separate mid-water trawl fishery haddock sub-ACLs for GB haddock and GOM haddock equal to 1% of the respective ABCs. In the event that the herring fishery exceeds their sub-allocation of haddock for either stock, harvesting restrictions in GB and GOM AM areas for herring will go into effect and the total amount of the overage will be deducted from the following fishing year's sub-ACL as well. The economic impacts section (8.4) of the Northeast Multispecies FMP FW46 presents a detailed simulation of MWT haddock catch levels under different levels of observer coverage. It concludes that based on historical fishing activity through March 2011, it is unlikely that the 1% sub-ACLs for haddock would be exceeded in any given year.

The mid-water trawl (MWT) sub-ACL for GB haddock is expected to decrease by 13 mt (5%) under the proposed action. The MWT sub-ACL for GOM haddock is expected to decrease by 6 mt (67%). If haddock bycatch rates for the MWT herring fishery change disproportionately to haddock biomass levels for FY2013, there could be risk of an overage to the haddock catch cap. Under those circumstances MWT herring vessels might face increased costs from avoidance strategies to prevent AMs or lost herring revenue from triggering the AMs. Because the ABCs are based off of latest stock assessment information and the MWT haddock sub-ACLs will be calculated at a fixed rate of 1%, it is unlikely that the MWT haddock AMs will be triggered as a result of the proposed action. As a result, small regulated entities that derive revenues from the herring fishery are not expected to be impacted by changes to the MWT sub-ACLs proposed by this action.

Regulated Recreational Harvesting Entities

Party/charter permits are issued as an open access category I permit under the Northeast Multispecies FMP. During FY 2010, 762 party/charter permits were issued. 332 of the 762 open access party/charter permit holders reported taking and retaining any species on at least one for-hire trip. No limited access commercial permit holders reported taking passengers for hire in 2010. 285 party/charter permits reported catching at least one cod or haddock in FY 2010. While all party/charter fishing businesses who catch cod or haddock may be affected by the proposed action, it is important to note that of 285 active party/charter businesses reported to have caught cod or haddock, 148 reported fishing in the Gulf of Maine stock area (Table 93).

Table 93 – Party/charter fishing trips and participating vessels, 2010-2012 (source: NMFS VTR)

		2010	2011	2012
All party/charter	**#trips**	17,622	17,281	15,536
	#vsls	351	356	280
Party/charter retaining at least 1 cod or haddock	**#trips**	10,790	10,215	8,274
	#vsls	305	302	224
At least 1 cod or haddock, fishing in the GOM cod stock area	**#trips**	8,824	7,878	6,927
	#vsls	165	151	117

For regulated party/charter operators the median value of gross receipts from passengers was just over $9,000 and did not exceed $500K in any year during 2001 to 2010. Therefore, all regulated party/charter operators are determined to be small entities under the RFA.

8.11.2.5Description of the projected reporting, record-keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records

The proposed rules in FW 50 are not expected to create any additional reporting, record-keeping or other compliance requirements.

8.11.2.6Identification of all relevant Federal rules, which may duplicate, overlap or conflict with the proposed rule

No relevant Federal rules have been identified that would duplicate or overlap with the proposed action.

8.11.2.7Significance of economic impacts on small entities

Substantial number criterion

In colloquial terms, substantial number refers to "more than a few." Given that the majority of entities in the commercial and recreational groundfish, scallop and herring industries, both at the permit and ownership entity level, earn less than $4 million annually, all of the proposed alternatives will have impacts on a substantial number of small entities.

Significant economic impacts

The outcome of "significant economic impact" can be ascertained by examining two factors: disproportionality and profitability.

- Disproportionality refers to whether or not the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities.

- Profitability refers to whether or not the regulations significantly reduce profits for a substantial number of small entities.

The proposed action may place small entities at a significant competitive disadvantage relative to large entities, particularly those small entities engaged in the commercial groundfish fishery. Analysis predicts that smaller entities, those generating less than $500K in annual gross sales, will be the most impacted with predicted gross sales losses on the order of 20-25% in total gross sales and 50-80% in gross sales from groundfish. Large entities (>$4mil) are predicted to face gross sales declines on the order of 5-10% and declines in gross sales from groundfish of approximately 20-25%.

Impacts on profitability from the proposed action are more uncertain, with the QCM predicting only a slight decrease in profitability. Because the model intentionally selects for the most profitable trips, it likely over-estimates the ability of the fishery to achieve significant efficiency gains under the proposed action. This result is almost certainly optimistic, and the proposed action will likely result in reductions in profitability for a substantial number of small entities.

Impacts to groundfish-dependent small entities
The provision to change the rebuilding strategy for SNE/MA winter flounder and the provision to lift the restriction on landing SNE/MA winter flounder are not expected to have adverse economic impacts on groundfish dependent small entities nor are they expected to place small entities at a competitive disadvantage. Setting a new rebuild target date of 2023 as described in section 7.4.1.1.2 of this document may allow for an estimated $40.2 million dollar increase in NPV over the no action option, assuming landing restrictions are also lifted. By permitting SNE/MA winter flounder to be landed, SNE/MA winter flounder regulatory discards would now have economic value to fishing businesses. Section 7.4.2.1.2 of this document predicts the FY2013 allocation of SNE/MA winter flounder to be worth $5.4 million in terms of ex-vessel gross revenues if landing is permitted.

The provision to revise the SNE/MA winter flounder AMs has the potential to impact the profitability of groundfish dependent small entities. The impacts will depend on whether or not the SNE/MA winter flounder AM proposed in FW48 has already been adopted. If it has not, then the FW50 AM option would remove the no possession mandate and would allow revenue to accrue from SNE/MA winter flounder. As discussed earlier, landings for this species would be worth approximately $5.4 million in FY2013 and the net present value of the future revenue stream over the ten-year rebuilding period would be approximately $40.2 million. There is the potential for increased operating costs under the new AM if restricted areas are activated for common pool vessels as a result of exceeding the common pool sub-ACL or the broad stock area is closed to sectors as a result of ACE exhaustion. This would most likely be outweighed by the increase in revenue from landings. If on the other hand, the FW48 AM has been adopted, then the impacts of the revised AM in FW50 would be based on the probability and cost of closures under each respective AM. Given that sector rules would provide more flexibility in terms of managing landings, it seems likely that net revenues for groundfish dependent small entities would be slightly higher under the AM proposed in FW50 than the one proposed in FW48. A more detailed discussion of the potential impacts can be found in Section 7.4.1.2.2 of this document.

The results of the QCM simulation discussed in Section 7.4.1.2.2 clearly indicate that those entities which are dependent on groundfish landings will be negatively impacted. Gross revenues for the groundfish industry are predicted to decrease in FY2013 by a range of $26 million to $27 million (23% to 25%) from FY2011. The QCM predicts net revenues will decrease by a much lower percentage (4% to 6%), but it is due in part to the model optimization, which selects the most profitable trips from the sample. As shown in Table 94, groundfish dependent small entities are expected to be disproportionately impacted by the proposed regulation, especially those that earn less than $500K annually. Though it is unclear how much of the lost revenue will be offset by efficiency gains, it seems likely that the profitability of many small entities will be significantly reduced under the proposed groundfish ACLs.

Table 94 – Median gross sales across entities in each sales group

Sales Cat	2011 Gross Sales	2011 Gross Sales on Groundfish Trips	2013 Gross Sales on Groundfish Trips	Change in Gross Sales*	Change in Gross Sales on Groundfish Trips
<$50K	$ 39,072	$ 7,612	$ 1,721	-6%	-84%
$50-100K	$ 81,601	$ 43,489	$ 19,019	-23%	-70%
$100-500K	$ 32,041	$ 137,661	$ 63,440	-25%	-52%
$500K-1mil	$ 706,059	$ 489,131	$ 281,113	-10%	-15%
$1-4mil	$ 1,577,738	$ 1,224,472	$ 1,088,850	-8%	-18%
$4-10mil	$ 1,938,227	$ 2,328,048	$ 1,890,108	-9%	-21%
$10mil+	$ 8,407,928	$ 5,038,893	$ 4,056,079	-5%	-24%

*Assumes non-groundfish gross sales are same as in 2011.

Impacts to scallop-dependent small entities

The scallop fishery GB yellowtail flounder sub-ACL is expected to decrease by 115.4 mt (38%) and the SNE/MA yellowtail flounder sub-ACL is expected to decrease by 65 mt (52%) under the proposed action. If scallop vessels participating in either open-area or access-area trips exceed their sub-allocation of yellowtail flounder bycatch and either the total yellowtail flounder (GB or SNE/MA) ACL is exceeded or the scallop fishery exceeds its ACL by 50 percent or more, yellowtail AMs for that stock will go into effect the following FY, as defined in Amendment 15 of the Atlantic Sea Scallop FMP and modified in FW23. The length of the AM area closures would be determined by the overage percent.

As discussed in FW23 of the Atlantic Sea Scallop FMP, the SNE/MA closures are not expected to have large impacts on the limited access fleet given that only 4.6% of the total landings of FT dredges and even a smaller proportion of the landings for full-time small dredges come from these areas. With regards to GB yellowtail flounder if the overage is greater than 56%, there would be no access to CA2 and the revenues would decline by $16.2 million (present value of revenues) and total economic benefits would decrease by $16.9 million (Section 7.4.2.3.1 of the Northeast Multispecies FMP FW 48). If the overage is less than 56%, the AM areas will be open to fishing part of the year, so fishing effort could be moved to other months. Shorter scallop fishing windows could increase operating costs and have potential negative price impacts from short-term supply increases. If the effort was shifted to other seasons when the meat weights are highest, there could be some positive impacts on the long-term revenues, possibly offsetting some of the negative economic effects.

The proposed action specifies a scallop fishery GB yellowtail sub-ACL that is 40% of the US ABC. This is equal to 192.1 mt which is greater than the high estimate of GB yellowtail bycatch (152.8 mt) in the scallop fishery under preferred Alternative 2 submitted in the Atlantic Sea Scallop FMP FW24. As such, it is unlikely that a significant overage will occur and thus scallop dependent small entities are not expected to be significantly impacted in terms of profitability.

Impacts to recreational fishing businesses

Impacts of the proposed action on regulated small entities are uncertain. The proposed action does significantly reduce GOM cod, GB cod and GOM haddock allocations; however, the proposed action does not expressly change the recreational fishing measures currently in place. Status quo bag limits, closed seasons and minimum fish sizes will be evaluated in a subsequent action to determine if they are likely to be sufficient to achieve the recreational sub-ACLs for these stocks. Impacts will be neutral if the regulations remain unchanged. If the regulations become more restrictive, small recreational fishing businesses may be negatively impacted. If bag limits or size limits decrease substantially and/or seasons are shortened or closed, demand for recreational trips could be diminished resulting in lower gross revenues for small recreational fishing businesses.

8.11.2.8Description of significant alternatives to the proposed rule and discussion of how the alternatives attempt to minimize economic impacts on small entities

This IRFA is intended to analyze the impacts of the alternatives described in Section 4.0 of FW 50 on small entities. These alternatives include modifications to the SNE/MA winter flounder rebuilding strategy, changes to the ABCs and sub-ACLs for many groundfish stocks, changes to the restriction on landing SNE/MA winter flounder, and changes to the commercial AM for SNE/MA winter flounder. For each of these four major categories, there is one alternative option that could be selected in place of the Proposed Action.

8.11.2.8.1 SNE/MA Winter Flounder Rebuilding Strategy Option 1: No Action

If this option would be adopted, the rebuilding strategy for SNE/MA winter flounder would continue to target an ending date of 2014 with a median probability of success. Since the stock is unlikely to rebuild by that date in the absence of all fishing mortality, the management objective would be to reduce fishing mortality to as close to 0 as possible until the stock is rebuilt. Relative to the scenarios considered in Option 2, this option provides the smallest discounted net economic benefit.

Annual Catch Limit Specifications Option 1: No Action

Under Option 1, ACLs will be based on FW47 specifications for the years 2013-2014, which have missing values for many species. Since many critical stocks will have no ACL specified at all, fishing would not be permitted for the species with undefined ACLs, nor would fishing be allowed in these species' broad stock areas. A detailed discussion of potential economic impacts is presented in Section 7.4.1.2.1 of this document. Between November 1, 2011 and October 31, 2012, only $35,763 in gross revenues was reported from sector trips that did not catch (land or discard) any of the zero-sub-ACL stocks and that did not occur in any of the broad stock areas associated with those stocks. Assuming full utilization of SNE/MA yellowtail flounder and current FY2012 prices, an upper bound estimate of groundfish revenue would be $1 million dollars. Under such assumptions gross sector revenues could reach an upper bound of $3.3 to $4 million dollars if ACE efficiency remains consistent with the trips identified in the analysis. Even if sector vessels became more efficient through the use of selective gear, new targeting practices for non-groundfish species, or market timing, and market prices increased due to reduced supply, it is unlikely gross revenues would surpass $10 million. Under such circumstances, extreme industry consolidation would be expected, leading to the loss of many groundfish fishing jobs and a reduction in household income for fishing families. Some of the reduction in income could be offset through lease transfers of SNE/MA yellowtail flounder, but it would likely be minimal. Shore-side infrastructure, including service and gear providers, as well as wholesalers, could become unprofitable due to the reduced business and may be forced to shut down, further impacting market prices and local communities.

SNE/MA Winter Flounder Landing Restrictions Option 1: No Action

This option would continue the prohibition on landing SNE/MA winter flounder. When compared to Option 2, this option would result in reduced fishing vessel revenues. Assuming the entire projected allocation of SNE/MA winter flounder to sectors and the common pool is landed, and an average ex-vessel price of $2.03 per pound, this option would be expected to result in a reduction in revenues of $5.4 million when compared to Option 2. This does not take into account that revenues of other stocks may be reduced as well since there may be fewer groundfish fishing trips as a result of the inability to land SNE/MA winter flounder.

Commercial Fishery Accountability Measures Option 1: No Action

Option 1 would retain the current commercial fishery AMs for SNE/MA winter flounder as defined in Amendment 16 and modified by subsequent management actions. The current AM prohibits landing of this stock, but FW 48 submitted a preferred alternative that would eliminate this AM and adopt area-based restrictions if the ACL is exceeded. The impacts of this option depend on whether or not the area-based AM measure from FW48 is adopted prior to the implementation of this action and whether or not the separate landing restriction measure discussed in Section 4.2.1 is lifted. If possession is allowed and the FW48 area-based AM measure has not yet been adopted, then there would be approximately $5.4 million in foregone revenue from selecting Option 1 as opposed to Option 2 since the current AM prohibits landing SNE/MA winter. If possession is allowed and the FW48 AM has also been adopted, this option would have the same impacts for common pool vessels as Option 2 since Option 2 has the same rules for common pool vessels as the AM described in FW48 which would remain in place under Option 1. As for sector vessels, the impact will depend on the value of the landed SNE/MA winter flounder stock versus the cost and likelihood of broad stock area closures upon ACE exhaustion. This is not readily quantifiable. Since Option 2 would only be selected if landing of SNE/MA winter flounder is permitted, Option 1 is the only alternative in the no possession scenario and the impacts are the same as those corresponding to the SNE/MA winter flounder AM that persists at the time, either no possession or the FW48 area-based AM. For a more detailed discussion refer to section 7.4.2.2.2 of this document.

Intentionally Blank

9.0 References

9.1 Glossary

Adult stage: One of several marked phases or periods in the development and growth of many animals. In vertebrates, the life history stage where the animal is capable of reproducing, as opposed to the juvenile stage.

Adverse effect: Any impact that reduces quality and/or quantity of EFH. May include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include sites-specific of habitat wide impacts, including individual, cumulative, or synergistic consequences of actions.

Aggregation: A group of animals or plants occurring together in a particular location or region.

Anadromous species: fish that spawn in fresh or estuarine waters and migrate to ocean waters

Amphipods: A small crustacean of the order Amphipoda, such as the beach flea, having a laterally compressed body with no carapace.

Anaerobic sediment: Sediment characterized by the absence of free oxygen.

Anemones: Any of numerous flowerlike marine coelenterates of the class Anthozoa, having a flexible cylindrical body and tentacles surrounding a central mouth.

Annual Catch Entitlement (ACE): Pounds of available catch that can be harvested by a particular sector. Based on the total PSC for the permits that join the sector.

Annual total mortality: Rate of death expressed as the fraction of a cohort dying over a period compared to the number alive at the beginning of the period (# total deaths during year / numbers alive at the beginning of the year). Optimists convert death rates into annual survival rate using the relationship
S=1-A.

ASPIC (A Surplus Production Model Incorporating Covariates): A non-equilibrium surplus production model developed by Prager (1995). ASPIC was frequently used by the Overfishing Definition Panel to define B_{MSY} and F_{MSY} reference points. The model output was also used to estimate rebuilding timeframes for the Amendment 9 control rules.

Bay: An inlet of the sea or other body of water usually smaller than a gulf; a small body of water set off from the main body; e.g. Ipswich Bay in the Gulf of Maine.

Benthic community: *Benthic* means the bottom habitat of the ocean, and can mean anything as shallow as a salt marsh or the intertidal zone, to areas of the bottom that are several miles deep in the ocean. *Benthic community* refers to those organisms that live in and on the bottom. (*In* meaning they live within the substrate; e.g, within the sand or mud found on the bottom. See *Benthic infauna*, below)

Benthic infauna: See *Benthic community*, above. Those organisms that live *in* the bottom sediments (sand, mud, gravel, etc.) of the ocean. As opposed to *benthic epifauna*, that live *on* the surface of the bottom sediments.

Benthivore: Usually refers to fish that feed on benthic or bottom dwelling organisms.

Berm: A narrow ledge typically at the top or bottom of a slope; e.g. a berm paralleling the shoreline caused by wave action on a sloping beach; also an elongated mound or wall of earth.

Biogenic habitats: Ocean habitats whose physical structure is created or produced by the animals themselves; e.g, coral reefs.

Biomass: The total mass of living matter in a given unit area or the weight of a fish stock or portion thereof. Biomass can be listed for beginning of year (Jan-1), Mid-Year, or mean (average during the entire year). In addition, biomass can be listed by age group (numbers at age * average weight at age) or summarized by groupings (e.g., age 1^+, ages 4+ 5, etc). See also spawning stock biomass, exploitable biomass, and mean biomass.

B_{MSY}: The stock biomass that would produce MSY when fished at a fishing mortality rate equal to F_{MSY}. For most stocks, B_{MSY} is about ½ of the carrying capacity. The proposed overfishing definition control rules call for action when biomass is below ¼ or ½ B_{MSY}, depending on the species.

$B_{threshold}$: 1) A limit reference point for biomass that defines an unacceptably low biomass i.e., puts a stock at high risk (recruitment failure, depensation, collapse, reduced long term yields, etc). 2) A biomass threshold that the SFA requires for defining when a stock is overfished. A stock is overfished if its biomass is below $B_{threshold}$. A determination of overfished triggers the SFA requirement for a rebuilding plan to achieve B_{target} as soon as possible, usually not to exceed 10 years except certain requirements are met. In Amendment 9 control rules, $B_{threshold}$ is often defined as either $1/2B_{MSY}$ or 1/4 B_{MSY}. $B_{threshold}$ is also known as $B_{minimum}$.

B_{target}: A desirable biomass to maintain fishery stocks. This is usually synonymous with B_{MSY} or its proxy.

Biomass weighted F: A measure of fishing mortality that is defined as an average of fishing mortality at age weighted by biomass at age for a ranges of ages within the stock (e.g., ages 1^+ biomass weighted F is a weighted average of the mortality for ages 1 and older, age 3^+ biomass weighted is a weighted average for ages 3 and older). Biomass weighted F can also be calculated using catch in weight over mean biomass. See also fully-recruited F.

Biota: All the plant and animal life of a particular region.

Bivalve: A class of mollusks having a soft body with platelike gills enclosed within two shells hinged together; e.g., clams, mussels.

Bottom roughness: The inequalities, ridges, or projections on the surface of the seabed that are caused by the presence of bedforms, sedimentary structures, sedimentary particles, excavations, attached and unattached organisms, or other objects; generally small scale features.

Bottom tending mobile gear: All fishing gear that operates on or near the ocean bottom that is actively worked in order to capture fish or other marine species. Some examples of bottom tending mobile gear are otter trawls and dredges.

Bottom tending static gear: All fishing gear that operates on or near the ocean bottom that I snot actively worked; instead, the effectiveness of this gear depends on species moving to the gear which is set in a particular manner by a vessel, and later retrieved. Some examples of bottom tending static gear are gillnets, traps, and pots.

Boulder reef: An elongated feature (a chain) of rocks (generally piled boulders) on the seabed.

Bryozoans: Phylum aquatic organisms, living for the most part in colonies of interconnected individuals. A few to many millions of these individuals may form one colony. Some bryozoans encrust rocky surfaces, shells, or algae others form lacy or fan-like colonies that in some regions may form an abundant component of limestones. Bryozoan colonies range from millimeters to meters in size, but the individuals that make up the colonies are rarely larger than a millimeter. Colonies may be mistaken for hydroids, corals or seaweed.

Burrow: A hole or excavation in the sea floor made by an animal (as a crab, lobster, fish, burrowing anemone) for shelter and habitation.

Bycatch: (v.) the capture of nontarget species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program.

Capacity: the level of output a fishing fleet is able to produce given specified conditions and constraints. Maximum fishing capacity results when all fishing capital is applied over the maximum amount of available (or permitted) fishing time, assuming that all variable inputs are utilized efficiently.

Catch: The sum total of fish killed in a fishery in a given period. Catch is given in either weight or number of fish and may include landings, unreported landings, discards, and incidental deaths.

Closed Area Model: A General Algebraic Modeling System (GAMS) model used to evaluate the effectiveness of effort controls used in the Northeast Multispecies Fishery. Using catch data from vessels in the fishery, the model estimates changes in exploitation that may result from changes in

DAS, closed areas, and possession limits. These changes in exploitation are then converted to changes in fishing mortality to evaluate proposed measures.

Coarse sediment: Sediment generally of the sand and gravel classes; not sediment composed primarily of mud; but the meaning depends on the context, e.g. within the mud class, silt is coarser than clay.

Commensalism: See *Mutualism*. An interactive association of two species where one benefits in some way, while the other species is in no way affected by the association.

Continental shelf waters: The waters overlying the continental shelf, which extends seaward from the shoreline and deepens gradually to the point where the sea floor begins a slightly steeper descent to the deep ocean floor; the depth of the shelf edge varies, but is approximately 200 meters in many regions.

Control rule: A pre-determined method for determining fishing mortality rates based on the relationship of current stock biomass to a biomass target. Amendment 9 overfishing control rules define a target biomass (B_{MSY} or proxy) as a management objective. The biomass threshold ($B_{threshold}$ or B_{min}) defines a minimum biomass below which a stock is considered overfished.

Cohort: see year class.

Crustaceans: Invertebrates characterized by a hard outer shell and jointed appendages and bodies. They usually live in water and breathe through gills. Higher forms of this class include lobsters, shrimp and crawfish; lower forms include barnacles.

Days absent: an estimate by port agents of trip length. This data was collected as part of the NMFS weighout system prior to May 1, 1994.

Days-at-sea (DAS): the total days, including steaming time that a boat spends at sea to fish. Amendment 13 categorized DAS for the multispecies fishery into three categories, based on each individual vessel's fishing history during the period fishing year 1996 through 2001. The three categories are: Category A: can be used to target any groundfish stock; Category B: can only be used to target healthy stocks; Category C: cannot be used until some point in the future. Category B DAS are further divided equally into Category B (regular) and Category B (reserve).

DAS "flip": A practice in the Multispecies FMP that occurs when a vessel fishing on a Category B (regular) DAS must change ("flip") its DAS to a Category A DAS because it has exceeded a catch limit for a stock of concern.

Demersal species: Most often refers to fish that live on or near the ocean bottom. They are often called benthic fish, groundfish, or bottom fish.

Diatoms: Small mobile plants (algæ) with silicified (silica, sand, quartz) skeletons. They are among the most abundant phytoplankton in cold waters, and an important part of the food chain.

Discards: animals returned to sea after being caught; see Bycatch (n.)

Dissolved nutrients: Non-solid nutrients found in a liquid.

Echinoderms: A member of the Phylum Echinodermata. Marine animals usually characterized by a five-fold symmetry, and possessing an internal skeleton of calcite plates, and a complex water vascular system. Includes echinoids (sea urchins), crinoids (sea lillies) and asteroids (starfish).

Ecosystem-based management: a management approach that takes major ecosystem components and services—both structural and functional—into account, often with a multispecies or habitat perspective

Egg stage: One of several marked phases or periods in the development and growth of many animals. The life history stage of an animal that occurs after reproduction and refers to the developing embryo, its food store, and sometimes jelly or albumen, all surrounded by an outer shell or membrane. Occurs before the *larval* or *juvenile stage*.

Elasmobranch: Any of numerous fishes of the class Chondrichthyes characterized by a cartilaginous skeleton and placoid scales: sharks; rays; skates.

Embayment: A bay or an indentation in a coastline resembling a bay.

Emergent epifauna: See *Epifauna*. Animals living upon the bottom that extend a certain distance above the surface.

Epifauna: See *Benthic infauna*. *Epifauna* are animals that live on the surface of the substrate, and are often associated with surface structures such as rocks, shells, vegetation, or colonies of other animals.

Essential Fish Habitat (EFH): Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998).

Estuarine area: The area of an estuary and its margins; an area characterized by environments resulting from the mixing of river and sea water.

Estuary: A water passage where the tide meets a river current; especially an arm of the sea at the lower end of a river; characterized by an environment where the mixing of river and seawater causes marked variations in salinity and temperature in a relatively small area.

Eutrophication: A set of physical, chemical, and biological changes brought about when excessive nutrients are released into the water.

Euphotic zone: The zone in the water column where at least 1% of the incident light at the surface penetrates.

Exclusive Economic Zone (EEZ): a zone in which the inner boundary is a line coterminous with the seaward boundary of each of the coastal States and the outer boundary is line 200 miles away and parallel to the inner boundary

Exempt fisheries: Any fishery determined by the Regional Director to have less than 5 percent regulated species as a bycatch (by weight) of total catch according to 50 CFR 648.80(a)(7).

Exploitable biomass: The biomass of fish in the portion of the population that is vulnerable to fishing.

Exploitation pattern: Describes the fishing mortality at age as a proportion of fully recruited F (full vulnerability to the fishery). Ages that are fully vulnerable experience 100% of the fully recruited F and are termed fully recruited. Ages that are only partially vulnerable experience a fraction of the fully recruited F and are termed partially recruited. Ages that are not vulnerable to the fishery (including discards) experience no mortality and are considered pre-recruits. Also known as the partial recruitment pattern, partial recruitment vector or fishery selectivity.

Exploitation rate (u): The fraction of fish in the exploitable population killed during the year by fishing. This is an annual rate compared to F, which is an instantaneous rate. For example, if a population has 1,000,000 fish large enough to be caught and 550,000 are caught (landed and discarded) then the exploitation rate is 55%.

Fathom: A measure of length, containing six feet; the space to which a man can extend his arms; used chiefly in measuring cables, cordage, and the depth of navigable water by soundings.

Fishing mortality (F): A measurement of the rate of removal of fish from a population caused by fishing. This is usually expressed as an instantaneous rate (F) and is the rate at which fish are harvested at any given point in a year. Instantaneous fishing mortality rates can be either fully recruited or biomass weighted. Fishing mortality can also be expressed as an exploitation rate (see exploitation rate) or less commonly, as a conditional rate of fishing mortality (m, fraction of fish removed during the year if no other competing sources of mortality occurred. Lower case m should not be confused with upper case M, the instantaneous rate of natural mortality).

$F_{0.1}$: a conservative fishing mortality rate calculated as the F associated with 10 percent of the slope at origin of the yield-per-recruit curve.

F_{MAX}: a fishing mortality rate that maximizes yield per recruit. F_{MAX} is less conservative than $F_{0.1}$.

F_{MSY}: a fishing mortality rate that would produce MSY when the stock biomass is sufficient for producing MSY on a continuing basis.

$F_{threshold}$: 1) The maximum fishing mortality rate allowed on a stock and used to define overfishing for status determination. Amendment 9 frequently uses F_{MSY} or F_{MSY} proxy for

$F_{threshold.}$ 2) The maximum fishing mortality rate allowed for a given biomass as defined by a control rule.

Fishing effort: the amount of time and fishing power used to harvest fish. Fishing power is a function of gear size, boat size and horsepower.

Framework adjustments: adjustments within a range of measures previously specified in a fishery management plan (FMP). A change usually can be made more quickly and easily by a framework adjustment than through an amendment. For plans developed by the New England Council, the procedure requires at least two Council meetings including at least one public hearing and an evaluation of environmental impacts not already analyzed as part of the FMP.

Furrow: A trench in the earth made by a plow; something that resembles the track of a plow, as a marked narrow depression; a groove with raised edges.

Glacial moraine: A sedimentary feature deposited from glacial ice; characteristically composed of unsorted clay, sand, and gravel. Moraines typically are hummocky or ridge-shaped and are located along the sides and at the fronts of glaciers.

Glacial till: Unsorted sediment (clay, sand, and gravel mixtures) deposited from glacial ice.

Grain size: the size of individual sediment particles that form a sediment deposit; particles are separated into size classes (e.g. very fine sand, fine sand, medium sand, among others); the classes are combined into broader categories of mud, sand, and gravel; a sediment deposit can be composed of few to many different grain sizes.

Growth overfishing: Fishing at an exploitation rate or at an age at entry that reduces potential yields from a cohort but does not reduce reproductive output (see recruitment overfishing).

Halocline: The zone of the ocean in which salinity increases rapidly with depth.

Habitat complexity: Describes or measures a habitat in terms of the variability of its characteristics and its functions, which can be biological, geological, or physical in nature. Refers to how complex the physical structure of the habitat is. A bottom habitat with *structure-forming organisms*, along with other three dimensional objects such as boulders, is more complex than a flat, featureless, bottom.

Highly migratory species: tuna species, marlin, oceanic sharks, sailfishes, and swordfish

Hydroids: Generally, animals of the Phylum Cnidaria, Class Hydrozoa; most hydroids are bush-like polyps growing on the bottom and feed on plankton, they reproduce asexually and sexually.

Immobile epifaunal species: See *epifauna*. Animals living on the surface of the bottom substrate that, for the most part, remain in one place.

Individual Fishing Quota (IFQ): federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by an individual person or entity

Juvenile stage: One of several marked phases or periods in the development and growth of many animals. The life history stage of an animal that comes between the *egg* or *larval stage* and the *adult stage*; juveniles are considered immature in the sense that they are not yet capable of reproducing, yet they differ from the larval stage because they look like smaller versions of the adults.

Landings: The portion of the catch that is harvested for personal use or sold.

Land runoff: The part of precipitation, snowmelt, or irrigation water that reaches streams (and thence the sea) by flowing over the ground, or the portion of rain or snow that does not percolate into the ground and is discharged into streams instead.

Larvae stage: One of several marked phases or periods in the development and growth of many animals. The first stage of development after hatching from the *egg* for many fish and invertebrates. This life stage looks fundamentally different than the juvenile and adult stages, and is incapable of reproduction; it must undergo metamorphosis into the juvenile or adult shape or form.

Lethrinids: Fish of the genus *Lethrinus*, commonly called emperors or nor'west snapper, are found mainly in Australia's northern tropical waters. Distinctive features of Lethrinids include thick lips, robust canine teeth at the front of the jaws, molar-like teeth at the side of the jaws and cheeks without scales. Lethrinids are carnivorous bottom-feeding fish with large, strong jaws.

Limited-access permits: permits issued to vessels that met certain qualification criteria by a specified date (the "control date").

Lutjanids: Fish of the genus of the Lutjanidae: snappers. Marine; rarely estuarine. Some species do enter freshwater for feeding. Tropical and subtropical: Atlantic, Indian and Pacific Oceans.

Macrobenthos: See *Benthic community* and *Benthic infauna*. Benthic organisms whose shortest dimension is greater than or equal to 0.5 mm.

Maturity ogive: A mathematical model used to describe the proportion mature at age for the entire population. A_{50} is the age where 50% of the fish are mature.

Mean biomass: The average number of fish within an age group alive during a year multiplied by average weight at age of that age group. The average number of fish during the year is a function of starting stock size and mortality rate occurring during the year. Mean biomass can be aggregated over several ages to describe mean biomass for the stock. For example the mean biomass summed for ages 1 and over is the 1^+ mean biomass; mean biomass summed across ages 3 and over is 3^+ mean biomass.

Megafaunal species: The component of the fauna of a region that comprises the larger animals, sometimes defined as those weighing more than 100 pounds.

Mesh selectivity ogive: A mathematical model used to describe the selectivity of a mesh size (proportion of fish at a specific length retained by mesh) for the entire population. L_{25} is the length where 25% of the fish encountered are retained by the mesh. L_{50} is the length where 50% of the fish encountered are retained by the mesh.

Meter: A measure of length, equal to 39.37 English inches, the standard of linear measure in the metric system of weights and measures. It was intended to be, and is very nearly, the ten millionth part of the distance from the equator to the north pole, as ascertained by actual measurement of an arc of a meridian.

Metric ton: A unit of weight equal to a thousand kilograms (1kgs = 2.2 lbs.). A metric ton is equivalent to 2,205 lbs. A thousand metric tons is equivalent to 2.2 million lbs.

Microalgal: Small microscopic types of algae such as the green algae.

Microbial: Microbial means of or relating to microorganisms.

Minimum spawning stock threshold: the minimum spawning stock size (or biomass) below which there is a significantly lower chance that the stock will produce enough new fish to sustain itself over the long term.

Mobile organisms: organisms that are not confined or attached to one area or place, that can move on their own, are capable of movement, or are moved (often passively) by the action of the physical environment (waves, currents, etc.).

Molluscs: Common term for animals of the phylum Mollusca. Includes groups such as the bivalves (mussels, oysters etc.), cephalopods (squid, octopus etc.) and gastropods (abalone, snails). Over 80,000 species in total with fossils back to the Cambrian period.

Mortality: see Annual total mortality (A), Exploitation rate (u), Fishing mortality (F), Natural mortality (M), and instantaneous total mortality (Z).

Motile: Capable of self-propelled movement. A term that is sometimes used to distinguish between certain types of organisms found in water.

Multispecies: the group of species managed under the Northeast Multispecies Fishery Management Plan. This group includes whiting, red hake and ocean pout plus the regulated species (cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish).

Mutualism: See *Commensalism*. A symbiotic interaction between two species in which both derive some benefit.

Natural disturbance: A change caused by natural processes; e.g. in the case of the seabed, changes can be caused by the removal or deposition of sediment by currents; such natural processes can be common or rare at a particular site.

Natural mortality: A measurement of the rate of death from all causes other than fishing such as predation, disease, starvation, and pollution. Commonly expressed as an instantaneous rate (M). The rate of natural mortality varies from species to species, but is assumed to be M=0.2 for the five critical stocks. The natural mortality rate can also be expressed as a conditional rate (termed n and not additive with competing sources of mortality such as fishing) or as annual expectation of natural death (termed v and additive with other annual expectations of death).

Nearshore area: The area extending outward an indefinite but usually short distance from shore; an area commonly affected by tides and tidal and storm currents, and shoreline processes.

Nematodes: a group of elongated, cylindrical worms belonging to the phylum Nematoidea, also called thread-worms or eel-worms. Some non-marine species attack roots or leaves of plants, others are parasites on animals or insects.

Nemerteans: Proboscis worms belonging to the phylum Nemertea, and are soft unsegmented marine worms that have a threadlike proboscis and the ability to stretch and contract.

Nemipterids: Fishes of the Family Nemipteridae, the threadfin breams or whiptail breams. Distribution: Tropical and sub-tropical Indo-West Pacific.

Northeast Shelf Ecosystem: The Northeast U.S. Shelf Ecosystem has been described as including 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.

Northwest Atlantic Analysis Area (NAAA): A spatial area developed for analysis purposes only. The boundaries of this the area are within the 500 fathom line to the east, the coastline to the west, the Hague line to the north, and the North Carolina/ South Carolina border to the south. The area is approximately 83,550 square nautical miles, and is used as the denominator in the EFH analysis to determine the percent of sediment, EFH, and biomass contained in an area, as compared to the total NAAA.

Nutrient budgets: An accounting of nutrient inputs to and production by a defined ecosystem (e.g., salt marsh, estuary) versus utilization within and export from the ecosystem.

Observer: any person required or authorized to be carried on a vessel for conservation and management purposes by regulations or permits under this Act

Oligochaetes: See *Polychaetes*. Oligochaetes are worms in the phylum Annelida having bristles borne singly along the length of the body.

Open access: describes a fishery or permit for which there is no qualification criteria to participate. Open-access permits may be issued with restrictions on fishing (for example, the type of gear that may be used or the amount of fish that may be caught).

Opportunistic species: Species that colonize disturbed or polluted sediments. These species are often small, grow rapidly, have short life spans, and produce many offspring.

Optimum Yield (OY): the amount of fish which A) will provide the greatest overall benefit to the nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems; B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery

Organic matter: Material of, relating to, or derived from living organisms.

Overfished: A conditioned defined when stock biomass is below minimum biomass threshold and the probability of successful spawning production is low.

Overfishing: A level or rate of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis.

Peat bank: A bank feature composed of partially carbonized, decomposed vegetable tissue formed by partial decomposition of various plants in water; may occur along shorelines.

Pelagic gear: Mobile or static fishing gear that is not fixed, and is used within the water column, not on the ocean bottom. Some examples are mid-water trawls and pelagic longlines.

Phytoplankton: Microscopic marine plants (mostly algae and diatoms) which are responsible for most of the photosynthetic activity in the oceans.

Piscivore: A species feeding preferably on fish.

Planktivore: An animal that feeds on plankton.

Polychaetes: Polychaetes are segmented worms in the phylum Annelida. Polychaetes (poly-chaetae = many-setae) differ from other annelids in having many setae (small bristles held in tight bundles) on each segment.

Porosity: The amount of free space in a volume of a material; e.g. the space that is filled by water between sediment particles in a cubic centimeter of seabed sediment.

Possession-limit-only permit: an open-access permit (see above) that restricts the amount of multispecies a vessel may retain (currently 500 pounds of "regulated species").

Potential Sector Contribution (PSC): The percentage of the available catch a limited access permit is entitled to after joining a sector. Based on landings history as defined in Amendment 16. The sum of the PSC's in a sector is multiplied by the groundfish sub-ACL to get the ACE for the sector.

Pre-recruits: Fish in size or age groups that are not vulnerable to the fishery (including discards).

Prey availability: The availability or accessibility of prey (food) to a predator. Important for growth and survival.

Primary production: The synthesis of organic materials from inorganic substances by photosynthesis.

Recovery time: The period of time required for something (e.g. a habitat) to achieve its former state after being disturbed.

Recruitment: the amount of fish added to the fishery each year due to growth and/or migration into the fishing area. For example, the number of fish that grow to become vulnerable to fishing gear in one year would be the recruitment to the fishery. "Recruitment" also refers to new year classes entering the population (prior to recruiting to the fishery).

Recruitment overfishing: fishing at an exploitation rate that reduces the population biomass to a point where recruitment is substantially reduced.

Regulated groundfish species: cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish. These species are usually targeted with large-mesh net gear.

Relative exploitation: an index of exploitation derived by dividing landings by trawl survey biomass. This measure does not provide an absolute magnitude of exploitation but allows for general statements about trends in exploitation.

Retrospective pattern: A pattern of systematic over-estimation or underestimation of terminal year estimates of stock size, biomass or fishing mortality compared to that estimate for that same year when it occurs in pre-terminal years.

Riverine area: The area of a river and its banks.

Saurids: Fish of the family Scomberesocidae, the sauries or needlefishes. Distribution: tropical and temperate waters.

Scavenging species: An animal that consumes dead organic material.

Sea whips: A coral that forms long flexible structures with few or no branches and is common on Atlantic reefs.

Sea pens: An animal related to corals and sea anemones with a featherlike form.

Sediment: Material deposited by water, wind, or glaciers.

Sediment suspension: The process by which sediments are suspended in water as a result of disturbance.

Sedentary: See *Motile* and *Mobile organisms*. Not moving. Organisms that spend the majority of their lives in one place.

Sedimentary bedforms: Wave-like structures of sediment characterized by crests and troughs that are formed on the seabed or land surface by the erosion, transport, and deposition of particles by water and wind currents; e.g. ripples, dunes.

Sedimentary structures: Structures of sediment formed on the seabed or land surface by the erosion, transport, and deposition of particles by water and wind currents; e.g. ripples, dunes, buildups around boulders, among others.

Sediment types: Major combinations of sediment grain sizes that form a sediment deposit, e.g. mud, sand, gravel, sandy gravel, muddy sand, among others.

Spawning adult stage: See *adult stage*. Adults that are currently producing or depositing eggs.

Spawning stock biomass (SSB): the total weight of fish in a stock that sexually mature, i.e., are old enough to reproduce.

Species assemblage: Several species occurring together in a particular location or region

Species composition: A term relating the relative abundance of one species to another using a common measurement; the proportion (percentage) of various species in relation to the total on a given area.

Species diversity: The number of different species in an area and their relative abundance

Species richness: See *Species diversity*. A measurement or expression of the number of species present in an area; the more species present, the higher the degree of species richness.

Species with vulnerable EFH: If a species was determined to be “highly” or “moderately” vulnerable to bottom tending gears (otter trawls, scallop dredges, or clam dredges) then it was included in the list of species with vulnerable EFH. Currently there are 23 species and life stages that are considered to have vulnerable EFH for this analysis.

Status Determination: A determination of stock status relative to $B_{threshold}$ (defines overfished) and $F_{threshold}$ (defines overfishing). A determination of either overfished or overfishing triggers a SFA requirement for rebuilding plan (overfished), ending overfishing (overfishing) or both.

Stock: A grouping of fish usually based on genetic relationship, geographic distribution and movement patterns. A region may have more than one stock of a species (for example, Gulf of Maine cod and Georges Bank cod). A species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

Stock assessment: determining the number (abundance/biomass) and status (life-history characteristics, including age distribution, natural mortality rate, age at maturity, fecundity as a function of age) of individuals in a stock

Stock of concern: a regulated groundfish stock that is overfished, or subject to overfishing.

Structure-forming organisms: Organisms, such as corals, colonial bryozoans, hydroids, sponges, mussel beds, oyster beds, and seagrass that by their presence create a three-dimensional physical structure on the bottom. See *biogenic habitats.*

Submerged aquatic vegetation: Rooted aquatic vegetation, such as seagrasses, that cannot withstand excessive drying and therefore live with their leaves at or below the water surface in shallow areas of estuaries where light can penetrate to the bottom sediments. SAV provides an important habitat for young fish and other aquatic organisms.

Surficial sediment: Sediment forming the sea floor or land surface; thickness of the surficial layer may vary.

Surplus production: Production of new stock biomass defined by recruitment plus somatic growth minus biomass loss due to natural deaths. The rate of surplus production is directly proportional to stock biomass and its relative distance from the maximum stock size at carrying capacity (K). B_{MSY} is often defined as the biomass that maximizes surplus production rate.

Surplus production models: A family of analytical models used to describe stock dynamics based on catch in weight and CPUE time series (fishery dependent or survey) to construct stock biomass history. These models do not require catch at age information. Model outputs may include stock biomass history, biomass weighted fishing mortality rates, MSY, F_{MSY}, B_{MSY}, K, (maximum population biomass where stock growth and natural deaths are balanced) and r (intrinsic rate of increase).

Survival rate (S): Rate of survival expressed as the fraction of a cohort surviving the a period compared to number alive at the beginning of the period (# survivors at the end of the year / numbers alive at the beginning of the year). Pessimists convert survival rates into annual total mortality rate using the relationship A=1-S.

Survival ratio (R/SSB): an index of the survivability from egg to age-of-recruitment. Declining ratios suggest that the survival rate from egg to age-of-recruitment is declining.

TAC: Total allowable catch. This value is calculated by applying a target fishing mortality rate to exploitable biomass.

Taxa: The plural of taxon. Taxon is a named group or organisms of any rank, such as a particular species, family, or class.

Ten-minute- "squares" of latitude and longitude (TMS): Are a measure of geographic space. The actual size of a ten-minute-square varies depending on where it is on the surface of the earth, but in general each square is approximately 70-80 square nautical miles in this region. This is the spatial area that EFH designations, biomass data, and some of the effort data have been binned into for analysis purposes in various sections of this document.

Topography: The depiction of the shape and elevation of land and sea floor surfaces.

Total Allowable Catch (TAC): The amount (in metric tons) of a stock that is permitted to be caught during a fishing year. In the Multispecies FMP, TACs can either be "hard" (fishing ceases when the TAC is caught) or a "target" (the TAC is merely used as an indicator to monitor effectiveness of management measures, but does not trigger a closure of the fishery).

Total mortality: The rate of mortality from all sources (fishing, natural, pollution) Total mortality can be expressed as an instantaneous rate (called Z and equal to F + M) or Annual rate (called A and calculated as the ratio of total deaths in a year divided by number alive at the beginning of the year)

Trophic guild: Trophic is defined as the feeding level within a system that an organism occupies; e.g., predator, herbivore. A guild is defined as a group of species that exploit the same class of environmental resources in a similar way. The trophic guild is a utilitarian concept covering both structure and organization that exists between the structural categories of trophic groups and species.

Turbidity: Relative water clarity; a measurement of the extent to which light passing through water is reduced due to suspended materials.

Two-bin (displacement) model: a model used to estimate the effects of area closures. This model assumes that effort from the closed areas (first bin) is displaced to the open areas (second bin). The total effort in the system is then applied to the landings-per-unit-effort (LPUE) in open areas to obtain a projected catch. The percent reduction in catch is calculated as a net result.

Vulnerability: In order to evaluate the potential adverse effects of fishing on EFH, the vulnerability of each species EFH was determined. This analysis defines vulnerability as the likelihood that the functional value of EFH would be adversely affected as a result of fishing with different gear types. A number of criteria were considered in the evaluation of the vulnerability of EFH for each life stage including factors like the function of habitat for shelter, food and/or reproduction.

Yield-per-recruit (YPR): the expected yield (weight) of individual fish calculated for a given fishing mortality rate and exploitation pattern and incorporating the growth characteristics and natural mortality.

Yearclass: also called cohort. Fish that were spawned in the same year. By convention, the "birth date" is set to January 1st and a fish must experience a summer before turning 1. For example, winter flounder that were spawned in February-April 1997 are all part of the 1997 cohort (or year-class). They would be considered age 0 in 1997, age 1 in 1998, etc. A summer flounder spawned in October 1997 would have its birth date set to the following January 1 and would be considered age 0 in 1998, age 1 in 1999, etc.

Z: instantaneous rate of total mortality. The components of Z are additive (i.e., Z = F+M)

Zooplankton: See *Phytoplankton.* Small, often microscopic animals that drift in currents. They feed on detritus, phytoplankton, and other zooplankton. They are preyed upon by fish, shellfish, whales, and other zooplankton.

9.2 Literature Cited

Acheson JM. 1997. The Politics of Managing the Maine Lobster Industry: 1860 to the present. Human Ecol. 25(1):1-25.

Acheson, JM. 2004. The Development of the Maine Lobster Co-management Law. Workshop in Political Theory and Policy Analysis. Bloomington Indiana June (pp. 2-6).

Acheson, JM. 2010. Failure and Success in Fisheries Management in the Gulf of Maine. Anthropology News, 51(7): 25-25.

Acheson, J. M., & Gardner, R. 2011. Modeling Disaster: The Failure of the Management of the New England Groundfish Industry. North American Journal of Fisheries Management, 31(6): 1005-1018.

Aguilar, A. 2002. Fin whale, Balaenoptera physalus. In W.F. Perrin, B. Würsig, and J.G.M. Thewissen (eds.), Encyclopedia of Marine Mammals (p. 435-438). San Diego: Academic Press.

Atlantic States Marine Fisheries Commission Technical Committee (ASMFC TC). 2007. Special Report to the Atlantic Sturgeon Management Board: Estimation of Atlantic sturgeon bycatch in coastal Atlantic commercial fisheries of New England and the Mid-Atlantic. August 2007. 95 pp.

Atlantic States Marine Fisheries Commission. 2009. American Lobster Stock Assessment Report for Peer Review. Stock Assessment report No. 09-01 (Supplement). 316 pp. Available at: http://www.asmfc.org/

Atlantic Sturgeon Status Review Team (ASSRT). 2007. Status review of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). National Marine Fisheries Service. February 23, 2007. 188 pp.

Attard, J. and C. Hudon. 1987. Embryonic development and energetic investment in egg production in relation to size of female lobster (Homarus americanus). Canadian Journal of Fisheries and Aquatic Sciences 44: 1157 – 1164.

Blaxter, J.H.S., D. Danielssen, E. Moksness, and V. Oiestad. 1983. Description of the early development of the halibut, Hippoglossus hippoglossus and attempts to rear the larvae past first feeding. Marine Biology 73: 99 – 107.

Bowen, B.W., A.L. Bass, S.-M. Chow, M. Bostrom, K.A. Bjorndal, A.B. Bolten, T. Okuyama, B.M. Bolker., S. Epperly, E. Lacasella, D. Shaver, M. Dodd, S.R. Hopkins-Murphy, J.A. Musick, M. Swingle, K. Rankin-Baransky, W. Teas, W.N. Witzell, and P.H. Dutton. 2004. Natal homing in juvenile loggerhead turtles (Caretta caretta). Molecular Ecology 13:3797-3808.

Braun-McNeill, J., and S.P. Epperly. 2004. Spatial and temporal distribution of sea turtles in the western North Atlantic and the U.S. Gulf of Mexico from Marine Recreational Fishery Statistics Survey (MRFSS). Marine Fisheries Review 64(4):50-56.

Brown, M.B., O.C. Nichols, M.K. Marx, and J.N. Ciano. 2002. Surveillance of North Atlantic right whales in Cape Cod Bay and adjacent waters. 2002. Final report to the Division of Marine Fisheries, Commonwealth of Massachusetts. 29 pp., September 2002.

Burdge, R. J., & Vanclay, F. 1995. Social impact assessment. Environmental and social impact assessment, 31–66.

Carr, H.A. and H.O. Milliken. 1998. Conservation engineering: options to minimize fishing's impacts to the sea floor. Pp. 100–103 in E.M. Dorsey and J. Pederson, eds. Effects of Fishing Gear on the Sea Floor of New England. Conservation Law Foundation, Boston, MA. 160 pp.

Chang, S., P. L. Berrien, et al. 1999. Essential Fish Habitat Source Document: Windowpane, Scophthalmus aquosus, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-137. 40pp.

Clapham, P.J., S.B. Young, R.L. Brownell, Jr. 1999. Baleen whales: conservation issues and the status of the most endangered populations. Mammal Review 29(1): 35-60.

Clark, S.H. (editor) 1998. Status of fishery resources off the Northeastern United States for 1998. NOAA Technical Memorandum NMFS-NE-115. 149 pp.

Clark, S.H., and R. Livingstone, Jr. 1982. Ocean pout Macrozoarces americanus. Fish distribution, Marine Ecosystem Analysis (MESA) New York Bight Atlas Monograph 15: 76 – 79.

Clay, P.M., L.L Colburn, J. Olson, P. Pinto da Silva. 2008. Community Profiles for the Northeast US Fisheries. Available at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/.

Cohen, A.C. 1976. The systematics and distribution of Loligo (Cephalopoda, Myopsida) in the western North Atlantic, with descriptions of two new species. Institute of Malacology.

Collette, B.B. and G. Klein-MacPhee. 2002. Bigelow and Schroeder's Fishes of the Gulf of Maine, Smithsonian Books, Washington, D.C.

Colvocoresses, J.A. and J.A. Musik. 1984. Species associations and community composition of middle Atlantic bight continental shelf demersal fishes. U.S. Fisheries Bulletin 82(2):295-313.

Conant, T.A., P.H. Dutton, T. Eguchi, S.P. Epperly, C.C. Fahy, M.H. Godfrey, S.L. MacPherson, E.E. Possardt, B.A. Schroeder, J.A. Seminoff, M.L. Snover, C.M. Upite, and B.E. Witherington. 2009. Loggerhead sea turtle (Caretta caretta) 2009 status review under the U.S. Endangered Species Act. Report of the Loggerhead Biological Review Team to the National Marine Fisheries Service, August 2009. 222 pp.

Cooper, R.A., and J.R. Uzmann. 1971. Migrations and growth of deep-sea lobsters, Homarus americanus. Science 171: 288 – 290.

Cournane, J.M. 2010. Spatial management of groundfish resources in the Gulf of Maine and Georges Bank. Dissertation, University of New Hampshire.

Dadswell, M. 2006. A review of the status of Atlantic sturgeon in Canada, with comparisons to populations in the United States and Europe. Fisheries 31: 218-229.

DeAlteris, J. 1998. Effects of the T/B North Cape oil spill on the surf clam, Spisula solidissima, in the coastal waters of Southern Rhode Island. Report to Beak Consultants, 30 March 1998.

Dovel, W. L. and T. J. Berggren. 1983. Atlantic sturgeon of the Hudson River estuary, New York. New York Fish and Game Journal 30: 140-172.

Dunton, K.J., A. Jordaan, K.A. McKown, D.O. Conover, and M.G. Frisk. 2010. Abundance and distribution of Atlantic sturgeon (Acipenser oxyrinchus) within the Northwest Atlantic Ocean determined from five fishery-independent surveys. Fish. Bull. 108:450-465.

Everhart, W.H., and W.D. Youngs. 1981. Principles of Fishery Science. Ithaca, NY, Cornell University Press.

Fogarty, M. 2007. "Efficacy of fishery closures in the Gulf of Maine." In Bayley, H, C. Cavanaugh, and P. Galardi, eds. Western Gulf of Maine Closure Area 2007 Symposium Report.

University of New Hampshire.

Gabriel, W. 1992. Persistence of demersal fish assemblages between Cape Hatteras and Nova Scotia, northwest Atlantic. Journal of Northwest Atlantic Fisheries Science 14:29-46.

Grosslein, M.D., and T.R. Azarovitz. 1982. Fish distribution. Monograph 15. MESA New York Bight Atlas. New York Sea Grant Institute, Albany, New York.

Guidelines for Economic Review of National Marine Fisheries Services Regulatory Actions. 2007. Retrieved December 3, 2012, from NOAA Fisheries Policy Directives: http://www.nmfs.noaa.gov/sfa/domes_fish/EconomicGuidelines.pdf

Halliday, R.G., and A.T. Pinhorn. 2002. A review of the scientific and technical bases for policies on the capture of small fish in North Atlantic groundfish fisheries. Fisheries Research 57 (3): 211 – 222.

Hart D.R. and A.S. Chute. 2004. Essential Fish Habitat Source Document: Sea Scallop, Placopecten magellanicus, Life History and Habitat Characteristics (2nd ed.), NOAA/NMFS Tech. Mem. NE-198.

Haug, T., and B. Gulliksen. 1988. Fecundity and oocyte sizes in ovaries of female Atlantic halibut, Hippoglossus hippoglossus (L.). Sarsia 73: 259 – 261.

Hayes, M.L. 1983. Active fish capture methods in Nielson, L.A.; Johnson, D.L., eds. Fisheries techniques. Bethesda, MD: Am. Fish. Soc.; p. 123-145.

Holland, B.F., Jr., and G.F. Yelverton. 1973. Distribution and biological studies of anadromous fishes offshore North Carolina. Division of Commercial and Sports Fisheries, North Carolina Dept. of Natural and Economic Resources, Special Scientific Report No. 24. 130 pp.

Horwood, J. 2002. Sei whale, Balaenoptera borealis. In W.F. Perrin, B. Würsig, and J.G.M. Thewissen, eds., Encyclopedia of Marine Mammals (pp. 1069-1071). San Diego: Academic Press.

International Council for the Exploration of the Seas (ICES). 2000. Effects of Different Types of Fisheries on North Sea and Irish Sea Benthic Ecosystems. Report of the ICES Advisory Committee on the Marine Environment 2000. ICES Coop. Res. Rep. No. 241, 27 pp.

Interorganizational Committee on Principles and Guidelines for Social Impact Assessment. 1994. Guidelines and Principles for Social Impact Assessment. Impact Assessment. 12(2), 107-152.

Interorganizational Committee on Principles and Guidelines for Social Impact Assessment. (2003). Principles and guidelines for SIA in the USA. Impact Assess. Proj. Appraisal 21(3):231–250.

James, M.C., R.A. Myers, and C.A. Ottenmeyer. 2005. Behaviour of leatherback sea turtles, Dermochelys coriacea, during the migratory cycle. Proc. R. Soc. B, 272: 1547-1555.

Jennings, S., M.J. Kaiser, and J.D. Reynolds. 2001. Marine Fisheries Ecology. Blackwell Science, Oxford.

Kahnle, A.W., K.A. Hattala, and K.A. McKown. 2007. Status of Atlantic sturgeon of the Hudson River Estuary, New York, USA. American Fisheries Society Symposium 56:347-363.

Kahnle, A.W., K.A. Hattala, K. McKown. 2007. Status of Atlantic sturgeon of the Hudson River estuary, New York, USA. In J. Munro, D. Hatin, K. McKown, J. Hightower, K. Sulak, A. Kahnle, and F. Caron (editors). Proceedings of the symposium on anadromous sturgeon: Status and trend, anthropogenic impact, and essential habitat. American Fisheries Society, Bethesda, Maryland.

Katona, S.K., V. Rough and D.T. Richardson, A field guide to whales, porpoises, and seals from Cape Cod to Newfoundland, Smithsonian Institution Press: Washington, DC, 316 pp., 1993.

Kaufman, L. 2007. Stable isotopic signatures in catch composition in groundfishes indicate local processes at work in the WGOMCA. In Bayley, H, C. Cavanaugh, and P. Galardi, eds. Western Gulf of Maine Closure Area 2007 Symposium Report. University of New Hampshire.

Keats, D.W., G.R. Smith, and D.H. Steele. 1985. Reproduction and egg guarding by atlantic wolffish (Anarchichas lupus: Anarhichidae) and ocean pout (Macrozoarces americanus: Zoarcidae) in Newfoundland waters. Can. J. Zool. 63: 2565 – 2568.

Keinath, J.A., J.A. Musick, and R.A. Byles. 1987. Aspects of the biology of Virginias sea turtles: 1979-1986. Virginia J. Sci. 38(4): 329-336.

Kenney, R.D. 2002. North Atlantic, North Pacific and Southern Right Whales. pp. 806-813, In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals. Academic Press, San Diego, CA.

King, D. & J. G. Sutinen. 2010. Rational Compliance and the liquidation of Northeast groundfish resources. Marine Policy, 34(1), 7-21.

Kocik, J.F, and T.F. Sheehan. 2006. Atlantic Salmon. http://www.nefsc.noaa.gov/sos/spsyn/af/salmon/archives/41_AtlanticSalmon_2006.pdf

Kynard, B. and M. Horgan. 2002. Ontogenetic behavior and migration of Atlantic sturgeon, Acipenser oxyrinchus oxyrinchus, and shortnose sturgeon, A. brevirostrum, with notes on social behavior. Environmental Behavior of Fishes 63: 137-150.

Lacroix, G.L., D. Knox and M.J.W. Stokesbury. 2005. Survival and behavior of post-smolt Atlantic salmon in coastal habitat with extreme tides. Journal of Fish Biology. 66(2): 485 – 498.

Laney, R.W., J.E. Hightower, B.R. Versak, M.F. Mangold, W.W. Cole Jr., and S.E. Winslow. 2007. Distribution, habitat use, and size of Atlantic sturgeon captured during cooperative winter tagging cruises, 1988-2006. In Anadromous sturgeons: habitats, threats, and management (J. Munro, D. Hatin, J.E. Hightower, K. McKown, K.J. Sulak, A.W. Kahnle, and F. Caron (eds.)), p. 167-182. Am. Fish. Soc. Symp. 56, Bethesda, MD.

Lazzari, M.A. and B.Z. Stone. 2006. Use of submerged aquatic vegetation as habitat by young-of-the-year epibenthic fishes in shallow Maine nearshore waters. Estuarine, Coastal and Shelf Science 69:591-606.

Lindeboom, H.J., and S.J. de Groot. 1998. Impact II. The effects of different types of fisheries on the North Sea and Irish Sea benthic ecosystems. NIOZ Rapport 1998-1. 404 p.

Lindholm, J., P. J. Auster, et al. 2007. Site fidelity and movement of adult Atlantic cod Gadus morhua at deep boulder reefs in the western Gulf of Maine, USA. Marine Ecology Progress Series 342: 239-247.

Lock, M.C. and D.B. Packer. 2004. Essential Fish Habitat Source Document: Silver Hake, Merluccius bilinearis, Life History and Habitat Characteristics, Second Edition. NOAA Technical Memorandum NMFS-NE-186. http://www.nefsc.noaa.gov/nefsc/pulications/tm/tm186/tm186.pdf

Lough, R. G., P. C. Valentine, et al. 1989. Ecology and distribution of juvenile cod and haddock in relation to sediment type and bottom currents on eastern Georges Bank. Marine Ecology Progress Series 56(1-2): 1-12.

Matulich, S., and Clark, M. 2001. Efficiency and Equity Choices in Fishery Rationalization Policy Design: An examination of the North Pacific and Sablefish IFQ policy impacts on processor. State of Alaska, Alaska Department of Fish and Game, Washington State University.

Mercer, S., G. E. Brown, S. Clearwater and Z. Yao. Observations of the copulatory behavior of the ocean pout, *Macrozoarces americanus*. Can. Field Nat. 107:243-244.

Methratta, E. T. and J. S. Link 200). Seasonal variation in groundfish habitat associations in the Gulf of Maine-Georges Bank region. Marine Ecology Progress Series 326: 245-256.

Methratta, E. T. and J. S. Link 2007. Ontogenetic variation in habitat associations for four flatfish species in the Gulf of Maine-Georges Bank region. Journal of fish biology 70(6): 1669-1688.

Methven, D.A. and J.A. Brown. 1991. Time of hatching affects development, size, yolk volume and mortality of newly hatched *Macrozoarces americanus* (Pisces: *Zoarcidae*). Canadian Journal of Zoology 69(8): 2161 – 2167.

Miller, J.M., Burke, J.S., Fitzhugh, G.R., 1991. Early life history patterns of Atlantic North American flatfish: likely (and unlikely) factors controlling recruitment. Neth. J. Sea Res. 27, 261–275.

Mirarchi, F. 1998. Bottom trawling on soft substrates in E.M. Dorsey; J. Pederson, eds. Effects of fishing gear on the sea floor of New England. Conservation Law Foundation, Boston, MA.

Moore, E. 1947. Studies on the marine resources of southern New England. VI. The sand flounder, Lophopsetta aquosa (Mitchill): a general study of the species with special emphasis on age determination by means of scales and otoliths. Bull. Bingham Oceanogr. Collect. 11(3): 1 – 79.

Morgan, L.E. and R. Chuenpagdee. 2003. Shifting Gears: Addressing the collateral impacts of fishing methods in U.S. waters, Pew Science Series on Conservation and the Environment, Washington D.C., Island Press, 41 p.

Morreale, S.J. and E.A. Standora. 2005. Western North Atlantic waters: Crucial developmental habitat for Kemp's ridley and loggerhead sea turtles. Chel. Conserv. Biol. 4(4):872-882.

Morreale, S.J., and E.A. Standora. 1998. Early life stage ecology of sea turtles in northeastern U.S. waters. NOAA Technical Memorandum NMFS-SEFSC-413:1-49.

Morse, W.W., Able, K.W., 1995. Distribution and life history of windowpane, *Scophthalmus aquosos,* off the Northeastern United States. Fishery Bulletin 93, 674-693.

Morse, W.W., M.P. Fahay, and W.G. Smith. 1987. MARMAO surveys of the continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia (1977 – 1984). Atlas No. 2. Annual distribution patterns of fish larvae. NOAA Tech. Mem. NMFS-F/NEC-47. 215 pp.

Murawski, S.A., R. Brown, H.-L. Lai, P.J. Rago and L. Hendrickson. 2000. Large-scale closed areas as a fishery-management tool in temperate marine systems: the Georges Bank experience. Bull. Mar. Sci. 66: 775-798.

Murawski, S.A., Wigley, S.E., Fogarty, M.J., Rago, P.J., and Mountain, D.G. 2005. Effort distribution and catch patterns adjacent to temperate MPAs. ICES Journal of Marine Science, 62: 1150-1167.

Murphy, T., Kitts, A., Records, D., Demarest, C., McPherson, M., Walden, J., et al. 2012. 2011 Final Report on the Performance of the Northeast Multispecies (Groundfish) Fishery (May 2011 – April 2012). Woods Hole: NEFSC.

Murray, K.T. 2006. Estimated average annual bycatch of loggerhead sea turtles (Caretta caretta) in U.S. Mid-Atlantic bottom otter trawl gear, 1996-2004. U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 06-19, 26pp.

Musick, J.A., and C.J. Limpus. 1997. Habitat utilization and migration in juvenile sea turtles. Pages 137-164 in P.L. Lutz and J.A. Musick, eds. The Biology of Sea Turtles. Boca Raton, Florida: CRC Press.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1991. Recovery plan for U.S. population of Atlantic green turtle Chelonia mydas. Washington, D.C.: National Marine Fisheries Service. 58 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1992. Recovery plan for the Kemp’s ridley sea turtle. National Marine Fisheries Service, Washington, D.C. 40 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1992. Recovery plan for leatherback turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C. 65 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 1995. Status reviews for sea turtles listed under the Endangered Species Act of 1973. National Marine Fisheries Service, Silver Spring, Maryland. 139 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 2007a. Loggerhead sea turtle (Caretta caretta) 5 year review: summary and evaluation. National Marine Fisheries Service, Silver Spring, Maryland. 65 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 2007b. Leatherback sea turtle (Dermochelys coriacea) 5 year review: summary and evaluation. National Marine Fisheries Service, Silver Spring, Maryland. 79 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 2007c. Kemp’s ridley sea turtle (Lepidochelys kempii) 5 year review: summary and evaluation. Silver Spring, Maryland: National Marine Fisheries Service. 50 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 2007d. Green sea turtle (Chelonia mydas) 5 year review: summary and evaluation. Silver Spring, Maryland: National Marine Fisheries Service. 102 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). 2008. Recovery plan for the Northwest Atlantic population of the loggerhead turtle (Caretta caretta), Second revision. Washington, D.C.: National Marine Fisheries Service. 325 pp.

National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC). 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-455. 343 pp.

National Marine Fisheries Service (NMFS). 1991a. Final recovery plan for the humpback whale (Megaptera novaeangliae). Prepared by the Humpback Whale Recovery Team for the national Marine Fisheries Service, Silver Spring, Maryland. 105 pp.

National Marine Fisheries Service (NMFS). 1991b. Final recovery plan for the North Atlantic right whale (Eubalaena glacialis). Prepared by the Right Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 86 pp.

National Marine Fisheries Service (NMFS). 1998b. Recovery Plan for the Shortnose Sturgeon (Acipenser brevirostrum). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 104 pages.

National Marine Fisheries Service (NMFS). 1998b. Unpublished. Draft recovery plans for the fin whale (Balaenoptera physalus) and sei whale (Balaenoptera borealis). Prepared by R.R. Reeves, G.K. Silber, and P.M. Payne for the National Marine Fisheries Service, Silver Spring, Maryland. July 1998.

National Marine Fisheries Service (NMFS). 2005. Recovery Plan for the North Atlantic Right Whale (Eubalaena glacialis). National Marine Fisheries Service, Silver Spring, MD.

National Marine Fisheries Service (NMFS). 2009a. Hawksbill Turtle (Eretmochelys imbricate). Available at http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.htm

National Marine Fisheries Service (NMFS). 2009b. Endangered Species Act Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan. Biological Opinion. February 5, 2009.

National Marine Fisheries Service (NMFS). 2010. Interactive Fisheries Economic Impacts Tool. Available at: https://www.st.nmfs.noaa.gov/pls/apex32/f?p=160:7:3415449084930703.

National Marine Fisheries Service, U.S. Fish and Wildlife Service, and SEMARNAT. 2011. Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (Lepidochelys kempii), Second Revision. National Marine Fisheries Service. Silver Spring, Maryland 156 pp. plus appendices.

National Marine Fisheries Service (NMFS). 2007. Appendix 2-g: Guidelines for the Assessment of the Social Impact of Fishery Management Actions. Washington DC: NMFS.

National Marine Fisheries Service (NMFS). December 1, 2008. Final List of Fisheries for 2009. Federal Register Vol. 73, No. 231, p. 73032-73076.

National Marine Fisheries Service (NMFS). 2009. Fishing Communities of the United States, 2006. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-98, 84 p. Available at: http://www.st.nmfs.noaa.gov/st5/publication/index.html

National Marine Fisheries Service. (NMFS) 2010. Recovery plan for the fin whale (Balaenoptera physalus). National Marine Fisheries Service, Silver Spring, MD. 121 pp.

National Marine Fisheries Service (NMFS) and Southeast Fisheries Science Center (SEFSC). 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. US Department of Commerce, National Marine Fisheries Service, Miami, Florida, SEFSC Contribution PRD-00/01-08: 46.

National Oceanic and Atmospheric Administration (NOAA). 2007. Status of Fishery Resources off the Northeastern US Aggregate Resource and Landings Trends. Available at: http://www.nefsc.noaa.gov/sos/agtt/.

National Oceanic and Atmospheric Administration (NOAA). 2009. Small Entity Compliance Guide. June 24, 2009.

National Research Council (NRC). 1990. Decline of sea turtles: causes and prevention. National Academy Press, Washington D.C. 259 pages.

National Research Council (NRC). 2002. Effects of Trawling and Dredging on Seafloor Habitat. National Academy Press. 126 p.

Neilson,J.D., J.F. Kearney, P.Perley, and H. Sampson. 1993. Reproductive biology of Atlantic halibut (Hippoglossus hippoglossus) in Canadian waters. Canadian Journal of Fisheries and Aquatic Sciences 50: 551 – 563.

Nelson, G.A., and M.R. Ross. 1992. Distribution, growth and food habits of the Atlantic wolffish (Anarhichas lupus) from the Gulf of Maine-Georges Bank region. Journal of Northwest Atlantic Fishery Science 13: 53 – 61.

Neuman, M.J., D.A. Witting, and K.W. Able. 2001. Relationships between otolith microstructure, otolith growth, somatic growth and ontogenetic transitions in two cohorts of windowpane. Journal of fish Biology 58: 967 – 984.

New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Council (MAFMC). 1998. Monkfish Fishery Management Plan. Newburyport, MA. Available at: http://www.nefmc.org/monk/index.html.

New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Council (MAFMC). 2003. Framework Adjustment 2 to the Monkfish Fishery Management Plan. 97 pp. with appendixes. Newburyport, MA. Available at: http://www.nefmc.org/monk/index.html.

New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Council (MAFMC). 2007. Northeast Region Standardized Bycatch Reporting Methodology. Available at: http://www.nefmc.org/issues/sbrm/index.html.

New England Fishery Management Council (NEFMC). 1985. The Northeast Multispecies Fishery Management Plan.

New England Fishery Management Council (NEFMC). 1994. Amendment 5 to the Northeast Multispecies Fishery Management Plan.

New England Fishery Management Council (NEFMC). 1996. Amendment 7 to the Northeast Multispecies Fishery Management Plan.

New England Fishery Management Council (NEFMC). 2000. Amendment 12 to the Northeast Multispecies Fishery Management Plan. http://www.nefmc.org/mesh/index.html

New England Fishery Management Council (NEFMC). 2003. Final Amendment 13 to the Northeast Multispecies Fishery Management Plan Including a Final Supplemental Environmental Impact Statement and an Initial Regulatory Flexibility Analysis. Newburyport, MA. Available at: http://www.nefmc.org/nemulti/index.html.

New England Fishery Management Council (NEFMC). 2007. Final Amendment 11 to the Atlantic Sea Scallop Fishery Management Plan with Environmental impact Statement, Regulatory Impact Review, and Regulatory Flexibility Analysis. Newburyport, MA. Approximately 550 pp. plus 4 appendices. Available at http://www.nefmc.org/scallops/index.html.

New England Fishery Management Council (NEFMC). 2009a. Draft Final Amendment 3 to the Fishery Management Plan (FMP) for the Northeast Skate Complex and Final Environmental Impact Statement (FEIS). Newburyport, MA. 459 pp. Available at: http://www.nefmc.org/skates/index.html.

New England Fishery Management Council (NEFMC). 2009b. Final Amendment 16 to the Northeast Multispecies Fishery Management Plan Including a Final Supplemental Environmental Impact Statement and an Initial Regulatory Flexibility Analysis. Newburyport, MA. Available at: http://www.nefmc.org/nemulti/index.html.

New England Fishery Management Council (NEFMC). 2010. Framework Adjustment 44 to the Northeast Multispecies Fishery Management Plan, Including an Environmental Assessment, Regulatory Impact Review, Initial Regulatory Flexibility Analysis. Newburyport, MA. 306 pp. Available at: http://www.nefmc.org/nemulti/index.html.

New England Fishery Management Council (NEFMC). 2011. Framework Adjustment 46 to the Northeast Multispecies Fishery Management Plan, Including an Environmental Assessment, Regulatory Impact Review, Initial Regulatory Flexibility Analysis. Newburyport, MA. 299 pp. Available at: http://www.nefmc.org/nemulti/index.html.

New England Fishery Management Council (NEFMC). 2011. Framework Adjustment 45 to the Northeast Multispecies Fishery Management Plan, Including an Environmental Assessment, Regulatory Impact Review, Initial Regulatory Flexibility Analysis. Newburyport, MA. 408 pp. Available at: http://www.nefmc.org/nemulti/index.html.

New England Fishery Management Council (NEFMC). 2013. Framework 24 to the Scallop Fishery Management Plan and Framework 49 to the Northeast Multispecies Fishery Management Plan. http://www.nefmc.org/scallops/index.html.

Northeast Data Poor Stocks Working Group (NDPSWG). 2009. The Northeast Data Poor Stocks Working Group Report, December 8-12, 2008 Meeting. Part A. Skate Species Complex, Deep Sea Red Crab, Atlantic Wolffish, Scup, and Black Sea Bass. US Dept. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 09-02; 496 p.

Northeast Fisheries Science Center (NEFSC). 2002. Assessment of 20 Northeast Groundfish Stocks through 2001: a report of the Groundfish Assessment Review Meeting (GARM), Northeast Fisheries Science Center, Woods Hole, MA, October 8-11, 2001.

Northeast Fisheries Science Center (NEFSC). 2002. Report of the 30th Northeast regional Stock Assessment Workshop (30th SAW): Stock Assessment Review Committee (SARC) Consensus Summary of Assessments. Northeast Fisheries Science Center, Woods Hole, MA. NEFSC Reference Document 00-03.t of the 30thrthea

Northeast Fisheries Science Center (NEFSC). 2005. Assessment of 19 Northeast Region Groundfish Stocks through 2004: Groundfish Assessment Review Meeting (2005 GARM; GARM II). NEFSC Reference Document 05-13.

Northeast Fisheries Science Center (NEFSC). 2007. 44th Northeast Regional Stock Assessment Workshop (44th SAW): Assessment Report. U.S. Dept. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 07-10; 661 pp. Available at: http://www.nefsc.noaa.gov/publications/crd/crd0710/crd0710.pdf.

Northeast Fisheries Science Center (NEFSC). 2007. 45th Northeast Regional Stock Assessment Workshop (45th SAW). 2007. 45th SAW assessment summary report. U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 07-11; 37 pp. Available at: http://www.nefsc.noaa.gov/publications/crd/crd0711/crd0711.pdf.

Northeast Fisheries Science Center (NEFSC). 2008a. Assessment of 19 Northeast Groundfish Stocks through 2007: Report of the 3rd Groundfish Assessment Review Meeting (GARM III), Northeast Fisheries Science Center, Woods Hole, Massachusetts, August 4-8, 2008. US Dep.

Commer., NOAA Fisheries, Northeast Fish Sci Cent Ref Doc. 08-15; 884 p.

Northeast Fisheries Science Center (NEFSC). 2008b. 47th Northeast Regional Stock Assessment Workshop (47th SAW). 2008. 47th SAW assessment summary report. U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 08-11; 22 pp. Available at: http://www.nefsc.noaa.gov/publications/crd/crd0811/

Northeast Fisheries Science Center (NEFSC). 2010. 50th Northeast Regional Stock Assessment Workshop (50th SAW): Assessment Report. U.S. Dept. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 10-17; 844 pp. Available at: http://www.nefsc.noaa.gov/publications/crd/crd1017/crd1017.pdf.

Northeast Fisheries Science Center (NEFSC). 2011. 52nd Northeast Regional Stock Assessment Workshop (52nd SAW): Assessment Report. U.S. Dept. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 11-17; 968 pp. Available at: http://www.nefsc.noaa.gov/saw/saw52/crd1117.pdf.

Northeast Fisheries Science Center (NEFSC). 2012a. Assessment or Data Updates of 13 Northeast Groundfish Stocks through 2010. Northeast Fisheries Science Center Reference Document 12-06. Available at: http://nefsc.noaa.gov/publications/crd/crd1206/.

Northeast Fisheries Science Center (NEFSC). 2012b. 54th Northeast Regional Stock Assessment Workshop (54th SAW): Assessment Summary Report. U.S. Dept. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 12-14; 45 pp. Available at: http://www.nefsc.noaa.gov/saw/saw52/crd1214.pdf

Northeast Fisheries Science Center (NEFSC). 2013. 55th Notheast Regional Stock Assessment Workshop (55th SAW): Assessment Report. U.S. Dept. Commer., Northeast Fish. Sci. Cent. Ref Doc. In preparation. Available at: http://www.nefsc.noaa.gov/saw/reports.html.

Northeast Region Essential Fish Habitat Steering Committee (NREFHSC). 2002. Workshop on the Effects of Fishing Gear on Marine Habitats Off the Northeastern United States, October 23-25, 2001, Boston, Massachusetts. Northeast Fish Sci Cent Ref Doc 02-01; 86.

O'Brien, L. J. Burnett, and R.K. Mayo. 1993. Maturation of nineteen species of finfish off the northeast coast of the United States, 1985 – 1990. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Olsen, Y.H., and D. Merriman. 1946. Studies on the marine resource of Southern New England. IV. The biology and economic importance of the ocean pout, Macrozoarces americanus (Bloch and Schneider). Bull. Bing. Oceanogr. Collect. 9(4): 1 – 184.

Olson J, Clay PM. 2001. An Overview of the Social and Economic Survey Administered during Round II of the Northeast Multispecies Fishery Disaster Assistance Program." Reference: US Dep. Commer., NOAA Tech. Memo. NMFS NE 164; 69 p.

Orach-Meza, F.L. 1975. Distribution and abundance of Ocean Pout, Macrozoarces americanus (Bloch and Schneider) 1801 in the western North Atlantic Ocean. MS thesis. University of Rhode Island.

Overholtz, W.J. and A.V. Tyler. 1985. Long-term responses of the demersal fish assemblages of Georges Bank. U.S. Fisheries Bulletin 83(4):507-520.

Palmer, M.C., and Wigley, S.E. 2009. Using Positional Data from Vessel Monitoring Systems to Validate the Logbook-Reported Area Fished and the Stock Allocation of Commercial Fisheries Landings. North American Journal of Fisheries Management, 29: 928-942.

Pavlov, D.A. and E. Moksness. 1994. Production and quality of eggs obtained from wolffish (Anarhichas lupus) reared in captivity. Aquaculture 122(4): 295 – 312.

Pavlov, D.A. and G.G. Novikov. 1993. Life history and peculiarities of common wolffish (Anarhichas lupus) in the White Sea. ICES Journal of Marine Science 50(3): 271 – 277.

Pereira, J.J., R. Goldberg, J.J. Ziskowski, P.L. Berrien, W.W. Morse and D.L. Johnson. 1999. Essential Fish Habitat Source Document: Winter flounder, Pseudopleuronectes americanus, life history and habitat characteristics. NOAA Tech. Mem. NMFS-NE-138. National Marine Fisheries Service, Woods Hole, MA.

Pereira, J., E.T. Schultz, and P.J. Auster. 2012. Site dependence or density dependence: using geospatial analysis to test models of habitat use and inform conservation and management. I. Yellowtail flounder (Limanda ferruginea) on Georges Bank. Mar. Eco. Prog. Ser. (In press).

Perry, S.L., D.P. DeMaster, and G.K. Silber. 1999. The great whales: History and status of six species listed as endangered under the U.S. Endangered Species Act of 1973. Mar. Fish. Rev. Special Edition. 61(1): 59-74.

Pinkerton, E., and Edwards, D.N. 2009. The elephant in the room: the hidden costs of leasing individual transferable fishing quotas. Marine Policy, 33, 707-713.

Pratt, S. 1973. Benthic fauna. Pp. 5-1 to 5-70 in: Coastal and offshore environmental inventory, Cape Hatteras to Nantucket Shoals. University of Rhode Island, Marine Publication Series No. 2. Kingston, RI.

Sainsbury, J. C. 1996. Commercial fishing methods: an introduction to vessels and gears, Fishing News Books, Third Edition.

Schueller, P. and D. L. Peterson. 2006. Population status and spawning movements of Atlantic sturgeon in the Altamaha River, Georgia. Presentation to the 14th American Fisheries Society Southern Division Meeting, San Antonio, February 8-12th, 2006. Scott, W. B. and E. J. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada Bulletin 184: 966 pp.

Scott, J.S. 1982a. Depth, temperature and salinity preferences of common fishes of the Scotian Shelf. J. Northwest Atl. Fish. Sci. 3: 29-39.

Scott, W.B. and M.G. Scott. 1988. Atlantic Fishes of Canada. Can. Bull. Fish. Aquat. Sci. 219, 731 pp.

Sears, R. 2002. Blue whale, Balaenoptera nusculus. Pages 112-116 in W.F. Perrin, B. Wursig, and J.G.M. Thewissen, eds. Encyclopedia of Marine Mammals. San Diego: Academic Press.

Sherman, K., N.A. Jaworski, T.J. Smayda, eds. 1996. The northeast shelf ecosystem – assessment, sustainability, and management. Blackwell Science, Cambridge, MA. 564 p.

Shoop, C.R., and R.D. Kenney. 1992. Seasonal distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herpetological Monographs 6:43-67.

Sigourney, D.B., M.R. Ross, J. Brodziak, and J. Burnett. 2006. Length at age, sexual maturity and distribution of Atlantic halibut, Hippoglossus hippoglossus L., off the Northeast USA. NW Atl Fish Sci 36: 81 – 90.

Steimle, F.W. and C. Zetlin. 2000. Reef habitats in the middle Atlantic bight: abundance, distribution, associated biological communities, and fishery resource use. Mar. Fish. Rev. 62:

24-42.

Stein, A. B., K. D. Friedland, and M. Sutherland. 2004a. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the Northeast United States. North American Journal of Fisheries Management 24: 171-183.

Stein, A.B., K. D. Friedland, and M. Sutherland. 2004b. Atlantic sturgeon marine distribution and habitat use along the northeastern coast of the United States. Transaction of the American Fisheries Society 133:527-537.

Stevenson, D., L. Chiarella, D. Stephan, R. Reid, K. Wilhelm, J. McCarthy, and M. Pentony. 2004. Characterization of the fishing practices and marine benthic ecosystems of the northeast U.S. shelf, and an evaluation of the potential effects of fishing on essential fish habitat. NOAA Tech. Memo. NMFS-NE-181. 179 p.

Sullivan, M. C., R. K. Cowen, et al. 2006. Applying the basin model: Assessing habitat suitability of young-of-the-year demersal fishes on the New York Bight continental shelf. Continental Shelf Research 26(14): 1551-1570.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan, and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. Mar. Mamm. Sci. 9: 309-315.

Taning, A. V. 1936. On the eggs and young stages of the halibut. Medd. Fra Kom. For Havundersokelser, Serie Fiskeri, Vol IO 4: 1 – 23.

Templeman, W. 1986. Some biological aspects of Atlantic wolffish (Anarhichas lupus) in the Northwest Atlantic. Journal of Northwest Atlantic Fishery Science. 7(7): 57 – 65.

Theroux, R.B. and M.D. Grosslein. 1987. Benthic fauna. Pp. 283-195 in: R.H. Backus (ed.), Georges Bank. MIT Press, Cambridge, MA.

Theroux, R.B. and R.L. Wigley. 1998. Quantitative composition and distribution of the macrobenthic invertebrate fauna of the continental shelf ecosystems of the northeastern United States. NOAA Technical Report NMFS 140. U.S. Dept. of Commerce, Seattle, WA.

Thunberg, E.M. 2007. Demographic and economic trends in the Northeastern United States lobster (Homarus americanus) fishery, 1970–2005. U.S. Dep. Commer., Northeast Fish. Sci. Cent. Ref. Doc. 07-17; 64 p.

Thunberg, E.M. 2008. Trends in Selected Northeast Region Marine Industries. NOAA Technical Memorandum NMFS NE 211; 107 p.

Transboundary Resources Assessment Committee (TRAC). 2011. Proceedings of the Transboundary Resources Assessment Committee for Eastern Georges Bank Cod and Haddock, and Georges Bank Yellowtail Flounder: Report of Meeting held 21-24 June 2011. Available at: http://www2.mar.dfo-mpo.gc.ca/science/trac/proceedings/TRAC_pro_2011_01.pdf.

Turtle Expert Working Group (TEWG). 1998. An assessment of the Kemp's ridley (Lepidochelys kempii) and loggerhead (Caretta caretta) sea turtle populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409:1-96.

Turtle Expert Working Group (TEWG). 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-444:1-115.

Turtle Expert Working Group (TEWG). 2007. An assessment of the leatherback turtle population in the Atlantic Ocean. NOAA Technical Memorandum NMFS-SEFSC-555, 116 pp.

Turtle Expert Working Group (TEWG). 2009. An assessment of the loggerhead turtle population in the Western North Atlantic Ocean. NOAA Technical Memorandum NMFS-SEFSC-575:1-131.

Tyler, A.V. 1971. Periodic and resident components in communities of Atlantic fishes. J. Fish. Res. Board Can. 28: 935-946.

USFWS (U.S. Fish and Wildlife Service) and NMFS (National Marine Fisheries Service). 1992. Recovery plan for the Kemp's ridley sea turtle (Lepidochelys kempii). St. Petersburg, Florida: National Marine Fisheries Service. 40 pp.

Uzmann, J.R., R.A. Cooper and K.J. Pecci. 1977. Migration and dispersion of tagged American lobsters, Homarus americanus, on the southern New England continental shelf. NOAA Tech. Rep. NMFS-SSRF 705, p. 1 – 91.

Valentine, P.C. and R.G. Lough. 1991. The sea floor environment and the fishery of eastern Georges bank. Dept. of Interior, U.S. Geological Survey, Open File Report 91-439.

Vanclay, F. (2002). Conceptualizing social impacts. Environmental Impact Assessment Review, 22(3), 183-211.

VMS/Enforcement meeting Sheraton Harborside Portsmouth, NH. 2011. (October 20). Retrieved December 8, 2012, from New England Fishery Management Council: http://www.nefmc.org/issues/enforce/meetsum/enforcement_oct11.pdf

Waring, G.T , R. A. Blaylock, J. W. Hain, L. J. Hansen, D. L. Palka and. 1995. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments. NOAA Tech. Memo. NMFS-SEFSC-363, 211 pp

Waldman, J. R., J. T. Hart, and I. I. Wirgin. 1996. Stock composition of the New York Bight Atlantic sturgeon fishery based on analysis of mitochondrial DNA. Transactions of the American Fisheries Society 125: 364-371.

Waring, G.T., E. Josephson, C.P. Fairfield-Walsh, and K. Maze-Foley, (eds). 2006. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2005. NOAA Technical Memorandum NMFS-NE-194. Available at: http://www.nmfs.noaa.gov/pr/sars/region.htm

Waring, G.T., E. Josephson, C.P. Fairfield-Walsh, and K. Maze-Foley. 2007. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2006, 2nd edition, US Department of Commerce, NOAA Technical Memorandum NMFS -NE -201.

Waring GT, Josephson E, Maze-Foley K, and Rosel PE, editors. 2009. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2009. NOAA Tech Memo NMFS NE 213; 528 p.

Waring GT, Josephson E, Maze-Foley K, Rosel, PE, editors. 2011. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2010. NOAA Tech. Memo. NMFS NE 219; 598 p.

Waring GT, Josephson E, Maze-Foley K, Rosel, PE, editors. 2012. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2011. NOAA Tech Memo NMFS NE 221; 319 p.

Waring, G.T., E. Josephson, K. Maze-Foley, Rosel, P.E. (eds). 2010. US Atlantic and Gulf of Mexico marine mammal stock assessments -- 2010. NOAA Tech Memo NMFS NE 219; 598

pp.

Waring GT, Josephson E, Maze-Foley K, Rosel, PE, editors. 2012. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2011. NOAA Tech Memo NMFS NE 221; 319 p.

Waring, G.T., J. M. Quintal and C. P. Fairfield. 2002. U. S. Atlantic and Gulf of Mexico marine mammal stock assessments - 2002. NOAA Tech. Memo. NMFS-NE-169, 318 pp.

Watling, L. 1998. Benthic fauna of soft substrates in the Gulf of Maine. Pp. 20-29 in: Effects of fishing gear on the sea floor of New England, E.M. Dorsey and J. Pederson (eds.). MIT Sea Grant Pub. 98-4.

Whitehead, H. 2002. Estimates of the current global population size and historical trajectory for sperm whales. Mar. Ecol. Prog. Ser. 242: 295-304.

Wiley, D.N., R.A. Asmutis, T.D. Pitchford, and D.P. Gannon. 1995. Stranding and mortality of humpback whales, Megaptera novaeangliae, in the Mid-Atlantic and southeast United States, 1985-1992. Fishery Bulletin 93(1):196-205.

Williamson, J. 1998. Gillnet fishing in E.M. Dorsey, J. Pederson, eds. Effects of fishing gear on the sea floor of New England. MIT Sea Grant Pub. 98-4:87-89.

Wolff, T. 1978. Maximum size of lobsters (Homarus) (Decapoda, Nephropidae). Crustaceana 1 – 14.

Yao, Z. and L.W. Crim. 1995. Copulation, spawning and parental care in captive ocean pout. Journal of Fish Biology 47: 171 – 173.

9.3 Index

Intentionally Blank