Framework Adjustment 52
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: March 28, 2014 (Groundfish Oversight Committee)
Final Framework Meeting: June 18, 2014 (Council)
Date Submitted:

October 28, 2014

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 FMPs have been updated through a series of amendments and framework adjustments. Amendment 16, which became effective on May 1, 2010, was the most recent amendment to adopt 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. Amendment 17 is the most recent amendment but addresses state-operated permit banks. Eight framework adjustments have updated the measures in Amendment 16.

Amendment 16 made major changes to the FMP. The Amendment adopted a system of Annual Catch Limits (ACLs) and Accountability Measure (AMs) that are designed to ensure catches remain below desired targets for each stock in the management complex. The National Standard Guidelines provide advisory guidance (that does not have the effect or force of law) for the implementation of these requirements (50CFR 600.310(g)). AMs are management controls to prevent ACLs from being exceeded and to correct or mitigate overages of the ACL if they occur. AMs should address and minimize both the frequency and magnitude of overages and correct the problems that caused the overages in as short a time as possible. AMs can be either in season AMs or AMs for when the ACL is exceeded.
NMFS acknowledged in the publication of the guidelines that there is no requirement that AMs and ACLs be implemented as hard TACs or quotas, but conservation and management measures must be implemented so that the ACL is not exceeded and AMs must apply if the ACL is exceeded (74 FR 3184). While many measures in the management program are intended to control fishing mortality and might be interpreted to be AMs since they are "management controls to prevent the ACL from being exceeded," the term AM is usually applied to specific, automatic measures that are implemented either as an ACL is approached or after an ACL is exceeded.

This framework (Framework Adjustment 52, FW52) is intended to revise the accountability measures (AMs) for the groundfish fishery for the northern and southern windowpane flounder stocks. Revisions to the AMs could be applied retroactively for FY 2014 or any overages that occurred prior to FY 2014, where appropriate (i.e., AM would be revised in-season during FY 2014).

The *need* for this action is to modify management measures in order to ensure that overfishing does not occur consistent with the status of stocks and the requirements of MSA of 2006, and to minimize the economic impact of the current accountability measure for windowpane flounder. The *purpose* is to revise the groundfish fishery accountability measures for the northern and southern windowpane flounder stocks.

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 preferred management action.

If the Preferred Alternatives identified in this document are adopted, this action would implement a measure designed to mitigate any overage of the windowpane flounder ACL. Details of the measure summarized below can be found in Section 4.0.

The Preferred Alternatives include:

- *Commercial Fishery Measures.*
    - *Groundfish Fishery Accountability Measures for Windowpane Flounder Stocks.* The preferred alternatives would revise the AM for northern and southern windowpane flounder stocks for the groundfish fishery. If implemented, they would potentially scale back the AM in area or duration based on stock stock/biomass relative to catches and/or catch performance over a 2-year period.

Summary of Environmental Consequences

The environmental impacts of all of the alternatives under consideration are described in Section 1.0. 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 the social impacts are described in Section 7.5. Cumulative effects are described in Section 7.6. Summaries of the impacts 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 the current situation in FY 2014 as appropriate.

Biological Impacts
The Preferred Alternatives are designed to mitigate ACL overages for windowpane flounder stocks in the Northeast Multispecies fishery. The most important biological impact of the preferred alternatives is that they would control fishing mortality on northern and southern windowpane flounder stocks in order to prevent (or end) overfishing.

Essential Fish Habitat (EFH) Impacts
No significant adverse impacts on EFH are expected to result from the Preferred Alternatives. Impacts are expected to be low positive.

Impacts on Endangered and Other Protected Species
The Preferred Alternatives are not likely to impact protected species beyond those impacts described in previous regulations. As with EFH, the impacts are expected to be negligible as a result of changes to the AMs.

Economic Impacts
The Preferred Alternatives would not have adverse impacts on fishing vessels, purchasers of seafood products, ports, recreational anglers, and operators of party/charter businesses in excess of $100 million compared to the No Action. The Preferred Alternatives are predicted to have positive economic impacts relative to No Action. Comparison of economic impacts between the No Action and Preferred Alternatives depends on the likelihood of triggering the AMs. The No Action Alternative of implementing the Northern Windowpane Flounder Small AM Area may have a maximum upper bound cost of $3.5 million in groundfish revenue; while the Large Area could affect $8.2 million in revenue. Implementing the Southern Windowpane Flounder Small AM Area may have a maximum upper bound cost of almost $1 million in groundfish revenue; while the Large Southern Areas (1 and 2) could affect $3.1 million in revenue. Not all of these revenues are foregone, as fishermen can choose to fish inside the

areas with selective gear or other areas. The modifications of the AMs in the Preferred Alternatives would decrease the probability of incurring the full magnitude of the economic impacts. Overall, the economic impacts of the Preferred Alternatives are predicted to be positive.

Social Impacts
The Preferred Alternatives could have low positive social benefits relative to the No Action Alternative. The Preferred Alternatives could have positive impacts on the *Attitudes, Beliefs, and Values* of the fishermen, because the management would be more flexible based on stock condition and the performance of the fishery. The Preferred Alternatives may foster a sense of accountability within the fleet, giving the fishery the incentive to reduce catches. While implementation of the gear-restricted areas may result in negative social impacts, these impacts might only be short term if the restriction is lifted part-way through the fishing year. Thus, the overall social impacts of the Preferred Alternatives would be low positive relative to No Action.

Alternatives to the Proposed Action

There are a number of alternatives that would not be adopted. These include the No Action alternative and Option 4, which was not identified as a preferred alternative. Both alternatives are briefly described below.

- *Commercial Fishery Measures:*
    - *Groundfish Fishery Accountability Measures for Windowpane Flounder Stocks.* The No Action alternative would maintain the current AMs for the northern and southern windowpane flounder stocks for the groundfish fishery. Option 4 would alter the northern windowpane flounder stock area-based AM to SA522 and would be seasonal.

Impacts of Alternatives to the Proposed Action

The No Action alternative and Option 4 would not address the economic goals of the M-S Act as well as the preferred alternatives because it would not minimize economic impacts on the fishery when compared to the preferred alternative. Only the most significant impacts are highlighted below.

Biological Impacts
Because the No Action alternative and Option 4 would maintain the current AMs for the northern and southern windowpane flounder stocks for the groundfish fishery, these alternatives would have positive biological impacts on windowpane flounder because the AM is designed to mitigate any overages of the ACLs. Compared to the Preferred Alternative, the No Action alternative would have negligible biological impacts on windowpane flounder because all the alternatives modify the windowpane flounder AM that is designed to mitigate the effects of overfishing...

Essential Fish Habitat
Because the No Action alternative would maintain the current AMs for the northern and southern windowpane flounder stocks for the groundfish fishery, this alternative would have low positive Essential Fish Habitat impacts because the AM is designed to alter fishing behavior. Option 4 would have low negative impacts on EFH as effort displacement may be substantial considering the large size of SA 522.

Impacts on Endangered and Other Protected Species
The No Action alternative and Option 4 would not be expected to cause any effort shifts that would result in measureable impacts – either positive or negative – on protected species. Therefore, these alternatives are expected to have negligible impacts on protected resources.

Economic Impacts
The No Action Alternative and Option 4 would have negative economic impacts, because they would be expected to affect fishing behavior. Fishermen would have to alter their behavior, which may impose additional costs. The possible economic impacts of the No Action Alternative and Option 4 are expected to be more negative than may occur with the Preferred Alternative.

Social Impacts
Because the No Action alternative would maintain the current AMs for the northern and southern windowpane flounder stocks for the groundfish fishery, negative social impacts would be greater relative to the Preferred Alternative. Option would also have negative social impacts because a broader range of revenues may be affected. Because the AMs would apply to both the sector and common pool components of the fishery, it could help to promote perceptions of equity and fairness among the two fisheries.

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

GARFO	Greater Atlantic Regional Fisheries Office
GB	Georges Bank
GEA	Gear Effects Evaluation
GIFA	Governing International Fisheries Agreement
GIS	Geographic Information System
GARFO	Greater Atlantic Regional Fisheries Office
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
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	Weigh-out
YPR	Yield per recruit

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, was the most recent amendment to adopt 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 are challenging various provisions of Amendment 16, including the amendment's provisions related to sectors and some of the accountability measures. Eight framework adjustments have updated the measures in Amendment 16.

Amendment 16 made major changes to the FMP. The Amendment adopted a system of Annual Catch Limits (ACLs) and Accountability Measure (AMs) that are designed to ensure catches remain below desired targets for each stock in the management complex. The National Standard Guidelines provide advisory guidance (that does not have the effect or force of law) for the implementation of these requirements (50CFR 600.310(g)). AMs are management controls to prevent ACLs from being exceeded and to correct or mitigate overages of the ACL if they occur. AMs should address and minimize both the

frequency and magnitude of overages and correct the problems that caused the overages in as short a time as possible. AMs can be either in season AMs or AMs for when the ACL is exceeded.
NMFS acknowledged in the publication of the guidelines that there is no requirement that AMs and ACLs be implemented as hard TACs or quotas, but conservation and management measures must be implemented so that the ACL is not exceeded and AMs must apply if the ACL is exceeded (74 FR 3184). While many measures in the management program are intended to control fishing mortality and might be interpreted to be AMs since they are "management controls to prevent the ACL from being exceeded," the term AM is usually applied to specific, automatic measures that are implemented either as an ACL is approached or after an ACL is exceeded.

This framework (Framework Adjustment 52, FW52) is primarily intended to revise the accountability measures (AMs) for the groundfish fishery for the northern and southern windowpane flounder stocks. Revisions to the AMs would be applied retroactively for FY 2014 or any overages that occurred prior to FY 2014 (i.e., AM would be revised in-season during FY 2014).

3.2 Purpose and Need for the Action

Periodic frameworks are used to adjust strategies in response to the evaluations that adjust rebuilding plans and overfishing. This framework (Framework Adjustment 52, FW52) is primarily intended to meet regulatory requirements by modifying the groundfish fishery area-based accountability measures for windowpane flounder established in Framework 47. The action is needed to ensure that overfishing does not occur on windowpane flounder – a requirement of the MSA. The purpose of the action is to implement measures that will revise and codify accountability measures for northern and southern windowpane stocks. The revisions are further needed to minimize economic impacts on fishermen, and to better align the AMs with the requirements of the MSA.

The measures analyzed in this EA are intended to meet the goals and many of the objectives of the Northeast Multispecies FMP, as modified in Amendment 16.

To better demonstrate the link between the purpose and need for this action, Table 1 summarizes the need for the action and corresponding purposes.

Table 1 - Purpose and Need for Framework 52

Need for Framework 52	***Corresponding Purpose for Framework 52***
Ensure that overfishing does not occur consistent with the status of stocks, and the requirements of MSA	Measures to revise the groundfish fishery accountability measures for the northern and southern windowpane flounder stocks.
Minimize the economic impact of the current AMs	

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 terminated in 1982 with the adoption of the Interim Groundfish Plan, which used 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. A detailed discussion of the history of the FMP up to 1993 can be found in Amendment 5 (NEFMC 1993).

Amendment 5 was a major revision to the FMP. Adopted in 1994, it implemented a limited access program, reductions in time fished (days-at-sea, or DAS) for some fleet sectors and large seasonal Georges Bank and Southern New England area closures to help control mortality. Amendment 7 (NEFMC 1996), adopted in 1996, expanded the DAS program, accelerated the reduction in DAS first adopted in Amendment 5, and changed the seasonal area closures to year-round closures. After Amendment 7, there was a series of amendments and smaller changes (framework adjustments, FW) that are detailed in Amendment 13 (NEFMC 2003).

Amendment 13 was developed over a four-year period to meet MSA requirements such as adopting rebuilding programs for stocks that are overfished and ending overfishing. 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 had major changes to the FMP. It greatly expanded the sector program and implemented Annual Catch Limits in compliance with 2006 revisions to the M-S Act. There were 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 authorizes NOAA-sponsored state-operated permit banks and 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 was partially implemented on September 30, 2013; some measures are still in review. 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 50 was also implemented on May 1, 2013, and set specifications for many groundfish stocks and modified the rebuilding program for SNE/MA winter flounder. Framework 49 is a joint Northeast Multispecies/Atlantic Sea Scallop action that modified the dates for scallop vessel access to the year-round groundfish closed areas; this action was implemented on May 20, 2013. Framework 51 modified rebuilding programs for GOM cod and American plaice, set specifications for FY2014-2016 and modified management measures in order to ensure that overfishing does not occur including, additional management measures related to U.S./Canada shared stocks and yellowtail flounder in the groundfish and scallop fisheries.

The final documents for all prior 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.

3.5 Fishery Data Sources

This document includes fishery data from FY2009 to FY2013. This approach informs the analysis and provides a baseline for the public to better understand the operation of the fishery. Some differences in totals between this analysis and prior analyses exist.

A "groundfish trip" is defined here as a trip where groundfish is landed, and either applied to a sector Annual Catch Entitlement (ACE) or to the common pool ACL. Unless stated otherwise, NMFS compiled most of the gear and/or location-specific data presented here from VTRs, because it contains effort, gear, and positional data. Some of the data in this document, such as that concerning protected resources, is from the Northeast Fisheries Observer Program data set.

4.0 Alternatives Under Consideration

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 preferred management action.

4.1 Windowpane Flounder Accountability Measures in the Groundfish Fishery

The accountability measures (AMs) being considered for northern and southern windowpane flounder stocks in the groundfish fishery are reactive AMs. The alternatives to the No Action were developed based on the characteristics of the fishery and stock assessment. Windowpane flounder is not allocated to sectors and possession is prohibited; they are not considered to be commercially viable. The assessment for both stocks is index-based and uses the NEFSC trawl survey data. The transferability and feasibility of these AM alternatives to other non-allocated stocks has not been evaluated and cannot be used for other non-allocated stocks at this time.

These AMs are designed to apply to groundfish fishing activity by both common pool and sector groundfish fishing vessels. Since the design of these AMs is based on constraining all groundfish fishing activity, sectors cannot request an exemption from the AM provisions. The AM was originally established in Framework Adjustment 47 to the Multispecies (Groundfish) Fishery Management Plan.

4.1.1 Option 1: No Action

The groundfish fishery AM for either stock of windowpane is implemented if the total ACL is exceeded by more than the management uncertainty buffer (currently set at approximately 5%), and in the case of southern windowpane, if the groundfish fishery also exceeds its sub-ACL. If a sub-ACL is specified in the future for other fisheries, and AMs are developed for these fisheries, the AMs for the groundfish fishery or any other fisheries would only be triggered if both the total ACL for the stock and the fishery's sub-ACL are exceeded, including the fishery's share of any overage caused by the other sub-components.

Selective gear: Common pool and sector vessels fishing on a groundfish trip fishing with trawl gear are required to use selective trawl gear to minimize the catch of flatfish. 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). The AM does not apply to longline or gillnet gear, since these gears comprise such a small amount of the total catch of windowpane flounder.

Timing: The AM is implemented at the start of a fishing year, never in-season, and remains in place for the duration of that fishing year. In-season catch information is not readily available for state or non-groundfish fisheries, so a final ACL determination cannot typically be made until after the fishing year ends. If there is an overage the AM is implemented:

- At the start of Year 2 if, based on reliable data, NMFS determines in-season during Year 1 that the total ACL was exceeded; or
- At the start of Year 3, if final catch estimates after the end of Year 1, indicate that the total ACL was exceeded.

Areas: The size of the gear-restricted areas is based on the amount of the overage. The Small AM Area is implemented if the ACL overage is between the management uncertainty buffer and up to 20%. The Large AM Area is implemented if the ACL overage is more than 20%. The gear restricted areas are shown in Figure 1; the coordinates are provided in Table 2.

Figure 1 - Map of Windowpane Flounder AM Areas

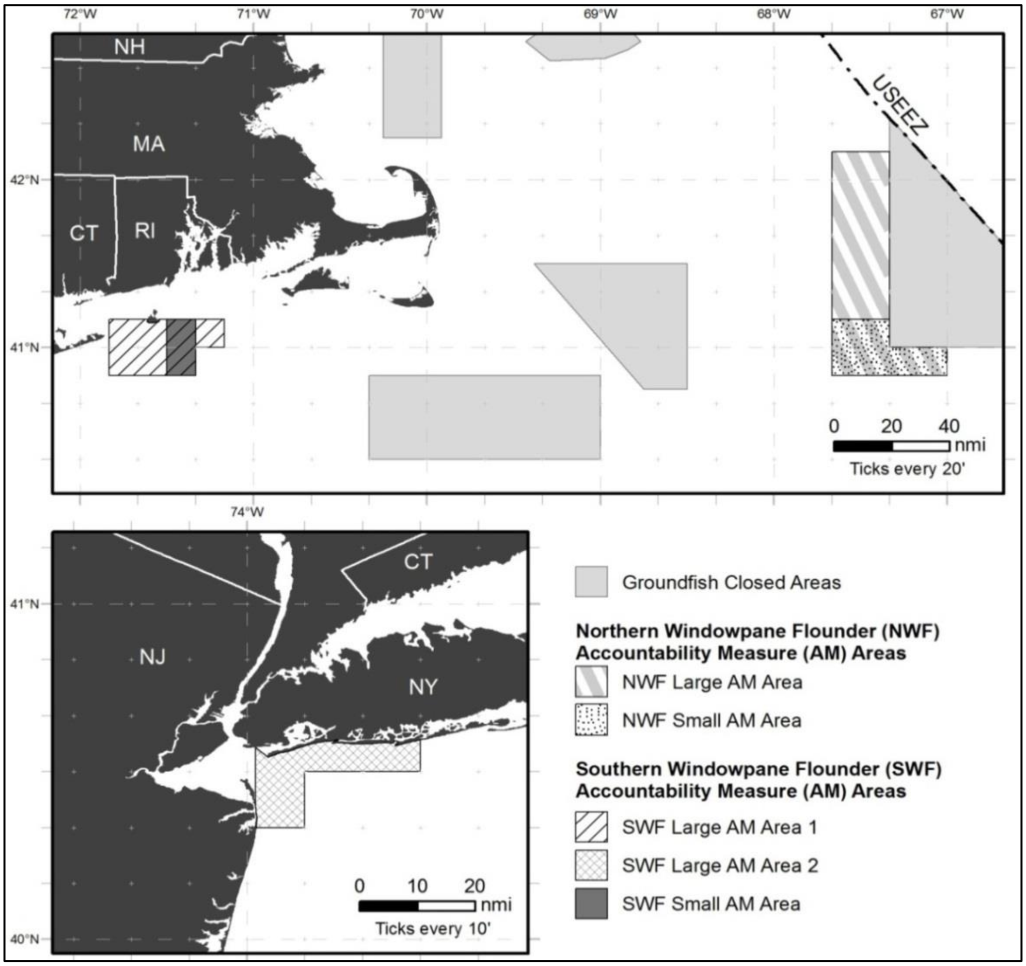


Table 2 - Windowpane Flounder AM Area Coordinates

Northern Windowpane Flounder Small AM Area		
Point	*N. Latitude*	*W. Longitude*
1	41°10′	67°40′
2	41°10′	67°20′
3	41°00′	67°20′
4	41°00′	67°00′
5	40°50′	67°00′
6	40°50′	67°40′
1	41°10′	67°40′

Northern Windowpane Flounder Large AM Area		
Point	*N. Latitude*	*W. Longitude*

1	42°10’	67°40’
2	42°10’	67°20’
3	41°00’	67°20’
4	41°00’	67°00’
5	40°50’	67°00’
6	40°50’	67°40’
1	42°10’	67°40’

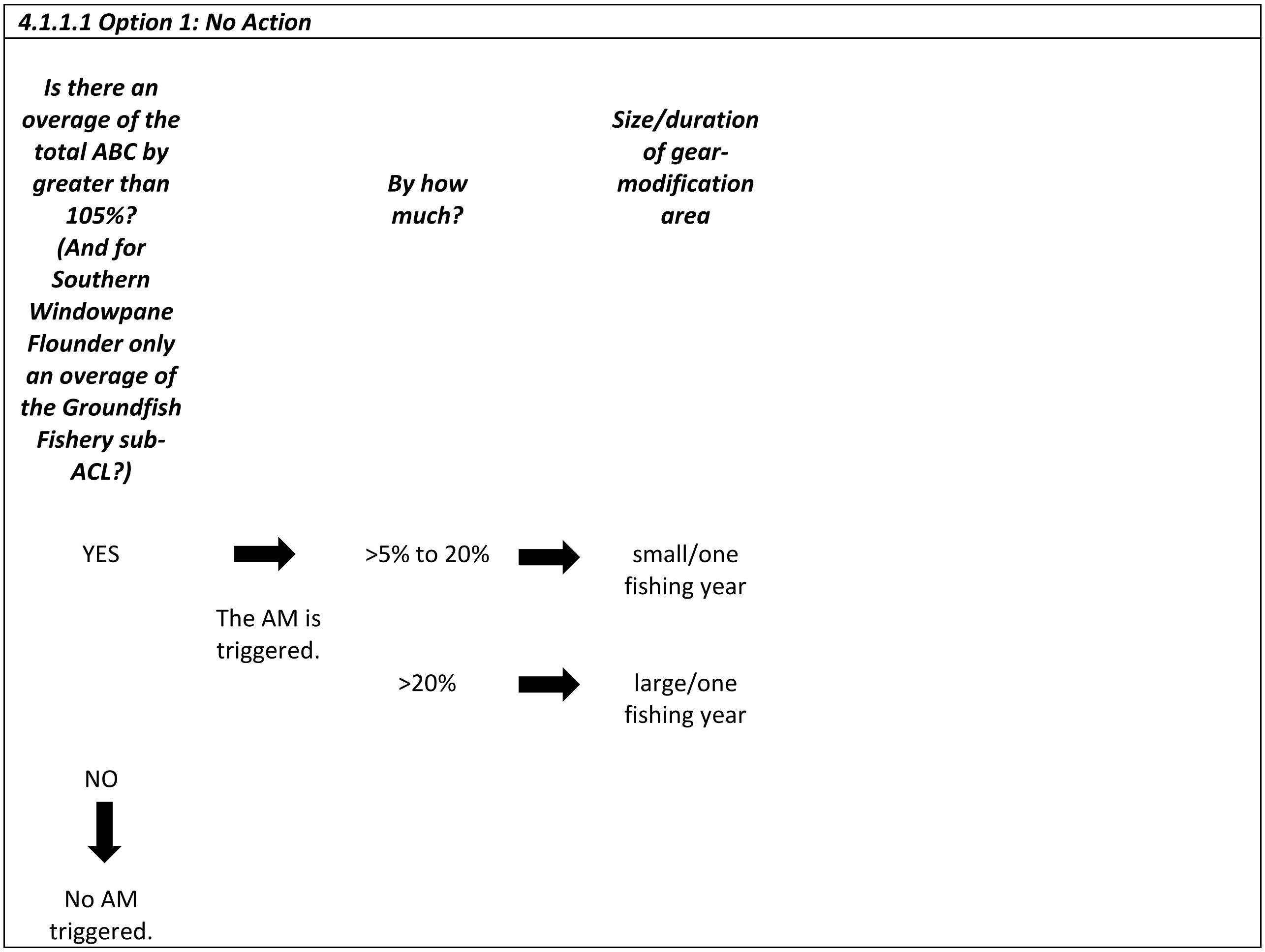
Southern Windowpane Flounder Small AM Area		
Point	*N. Latitude*	*W. Longitude*
1	41°10′	71°30′
2	41°10′	71°20′
3	40°50′	71°20′
4	40°50′	71°30′
1	41°10′	71°30′

Southern Windowpane Flounder Large AM Area 1		
Point	*N. Latitude*	*W. Longitude*
1	41°10’	71°50’
2	41°10’	71°10’
3	41°00’	71°10’
4	41°00’	71°20’
5	40°50’	71°20’
6	40°50’	71°50’
1	41°10’	71°50’

Southern Windowpane Flounder Large AM Area 2		
Point	*N. Latitude*	*W. Longitude*
1	([1])	73°30’
2	40°30’	73°30’
3	40°30’	73°50’
4	40°20’	73°50’
5	40°20’	([2])
6	([3])	73°58.5’
7	([4])	73°58.5’
8	40°32.6’ ([5])	73°56.4’ ([5])
1	([1])	73°30’

([1]) The southern-most coastline of Long Island, NY at 73°30′ W. longitude.
([2]) The eastern-most coastline of NJ at 40°20′ N. latitude, then northward along the NJ coastline to Point 6.
([3]) The northern-most coastline of NJ at 73°58.5′ W. longitude.
([4]) The southern-most coastline of Long Island, NY at 73°58.5′ W. longitude.
([5]) The approximate location of the southwest corner of the Rockaway Peninsula, Queens, NY, then eastward along the southern-most coastline of Long Island, NY (excluding South Oyster Bay), back to Point 1.

Figure 2 – Flow Chart of Option 1: No Action. Note that 5% is used for illustrative purposes to demonstrate the role of the management uncertainty buffer (i.e., 105% and > 5%).



4.1.2 Option 2: Area-Based Accountability Measure for Windowpane Flounder - Modified AM trigger that incorporates stock status and biomass (*Preferred Alternative*)

Note: Option 2 could be implemented in combination with Option 3.

When the Large AM Area has been triggered NMFS would determine whether the following criteria are met: 1) the stock is rebuilt and 2) the biomass criterion (defined as the 3-year centered average of the 3 most recent surveys multiplied by 75%F_{MSY} of the most recent assessment) is greater than the fishing year catch. If NMFS determines that these criteria are met only the Small AM Area would be implemented.

This alternative <u>would not change</u> the timing of AM implementation, requirement for the total ACL (and relevant sub-ACL) to be exceeded to trigger the AM, the selective gear required for trawl gear, the areas identified for the Large and Small Areas (Figure 1; Table 2), the overage percentages associated with the different sized AM areas or the current management uncertainty buffer of 5% as identified under the No Action alternative.

The AM would be implemented at the start of a fishing year (not in season), and would remain in place for the duration of that fishing year. In-season catch information is not readily available for state or non-groundfish fisheries, so a final ACL determination cannot typically be made until after the fishing year ends. If there is an overage the AM is implemented:

- At the start of Year 2 if, based on reliable data, NMFS determined in-season during Year 1 that the total ACL was exceeded; or
- At the start of Year 3, if final catch estimates after the end of Year 1, indicate that the total ACL was exceeded.

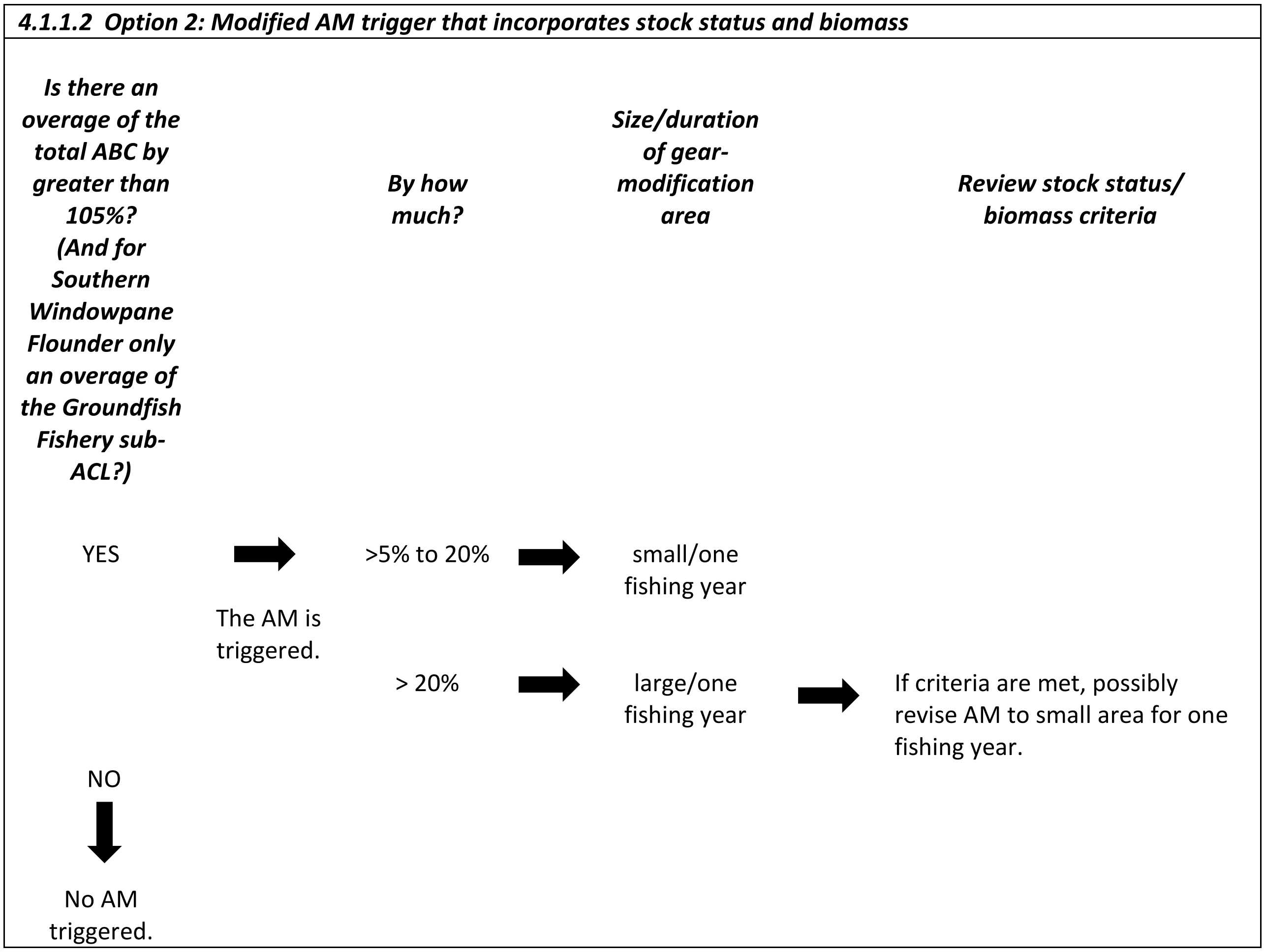
Rationale: This type of AM trigger would better account for the uncertainties in these index-based stocks because it would relate any potential overage in catch back to the biomass and exploitation trends as defined in the assessment. Using survey information to determine if AMs should be triggered is more appropriate for index based stocks that are not targeted by the fishery (no possession) and do not have ABCs and ACLs based on projection that account for increases in biomass over time. The fall survey can be used to determine if exploitation is below 75%F_{MSY} since the assessment is based on this index. Exploitation would be below 75%F_{MSY} if the 3-year average of the survey indexed multiplied by 75%F_{MSY} from the most recent accepted AIM model is greater than the monitoring catch. The approach would use new information on biomass to determine what the ABC would be and compare the catches to that value.

The comparison of fishing year catch with the biomass criteria would indicate whether stock size might have been underestimated at the time specifications were set. If the above criteria are met, and the biomass indicator is greater than fishing year catches, then fishing mortality is below 75%F_{MSY} based on the most recent assessment's overfishing definition. As a result, this updated survey information would suggest that the Large AM Area is unnecessary, and only the Small AM Area is needed to correct and mitigate the overage for either windowpane flounder stock. The approach used to make this determination is formulaic in order preserve objectivity and expediency. This option would allow for a comparison of observed fishing year catch with the biomass criteria, which would indicate whether stock size might have been underestimated at the time specifications were set and that overfishing is not likely occurring.

This option would minimize the economic impacts of the AM for a rebuilt stock while still correcting and mitigating any potential biological consequences of an overage. This approach is not intended for stocks that are overfished or in a rebuilding plan. Likewise, this approach is not intended to be applied to a stock that is experiencing overfishing. This AM could be applied retroactively to FY 2012, FY 2013, and/or FY 2014 catches.

The Council has selected Option 2 and Option 3 as preferred alternatives but these are not mutually exclusive. Options 2 and 3 could be implemented together in a way that would reduce economic impacts.

Figure 3- Flow chart of Option 2. Note that 5% is used for illustrative purposes to demonstrate the role of the management uncertainty buffer (i.e., 105% and > 5%).



4.1.3 Option 3: Area-Based Accountability Measure for Windowpane Flounder - Consideration of catch performance over the most recent two-year period when determining AM implementation (*Preferred Alternative*)

Note: Option 3 could be implemented in combination with Option 2.

This option would apply when the AM for either windowpane flounder stock is triggered for Year 3. Following an overage in Year 1, if it is determined that a subsequent underage of the total ACL has occurred in Year 2, the duration of the AM in Year 3 would be scaled back. NMFS would implement the necessary AM area on May 1 of Year 3, as required, and then would announce sometime on after August 31 if the AM was no longer necessary. NMFS would remove the AM, conditional on determining at the time the AM would be removed, that the ABC was not being exceeded in-season for the current fishing year.

This alternative <u>would not change</u> the timing of AM implementation, requirement for the total ACL (and relevant sub-ACL) to be exceeded to trigger the AM, the selective gear required for trawl gear, the areas identified for the Large and Small Areas (Figure 1; Table 2), the overage percentages associated with the different sized AM areas or the current management uncertainty buffer of 5% as identified under the No Action alternative.

The AM would be implemented at the start of a fishing year (not in season), and would remain in place for the duration of that fishing year. In-season catch information is not readily available for state or non-groundfish fisheries, so a final ACL determination cannot typically be made until after the fishing year ends. If there is an overage the AM is implemented:

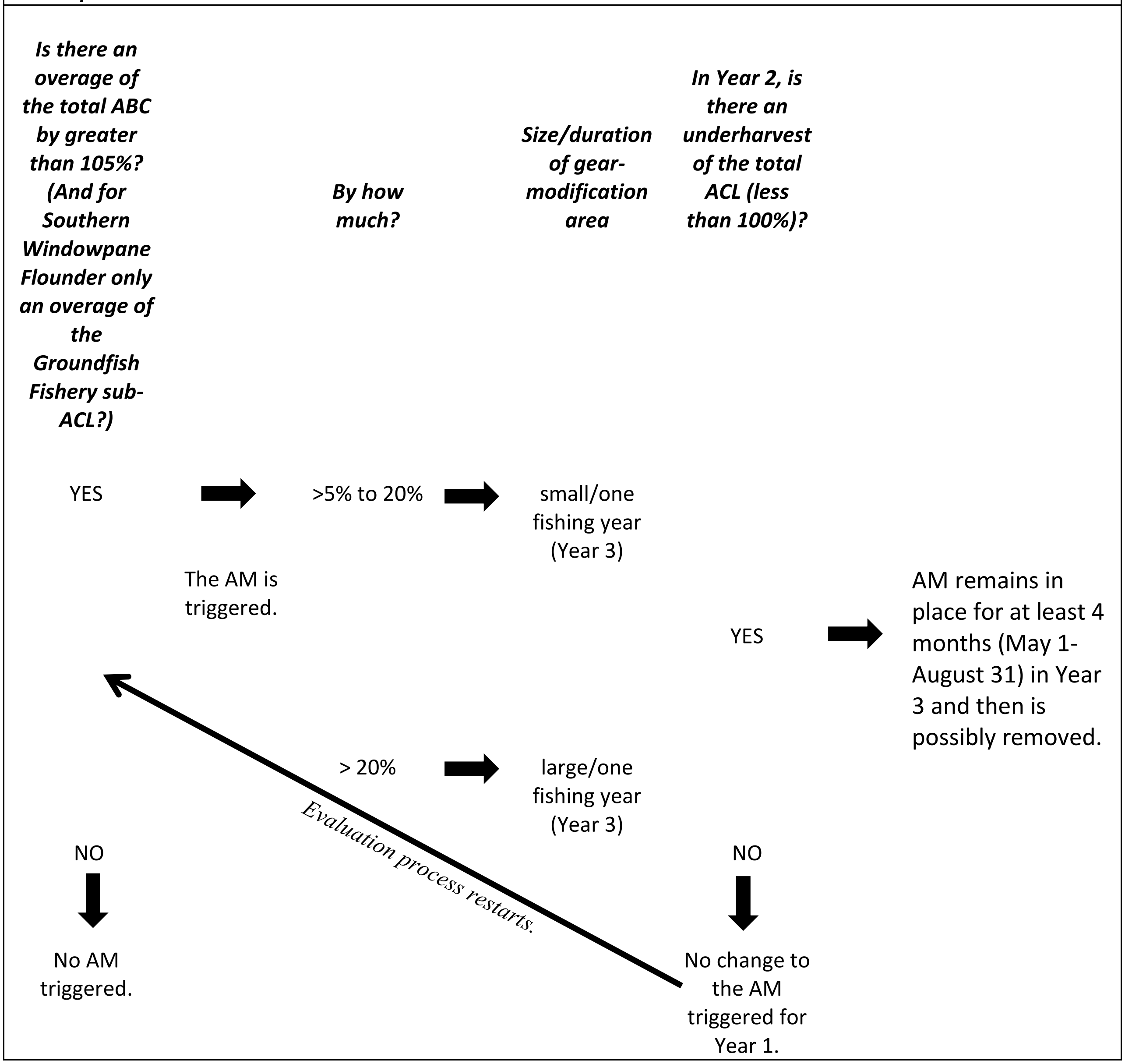
- At the start of Year 2 if, based on reliable data, NMFS determined in-season during Year 1 that the total ACL was exceeded; or
- At the start of Year 3, if final catch estimates after the end of Year 1, indicate that the total ACL was exceeded.

Rationale: Due to the possible delayed implementation of AMs for windowpane flounder stocks, it is possible that although an overage occurs in Year 1, a subsequent overage may not occur in Year 2. If an overage does not occur in Year 2, implementing an AM for the entire duration of Year 3 may not be operationally necessary. An underage in Year 2, coupled with an AM for at least 4 months of Year 3, would sufficiently correct and mitigate any overage for either windowpane flounder stock. This measure would also provide a greater incentive for vessels to voluntarily reduce catch of windowpane flounder in Year 2 to avoid the pending AM in Year 3, and would better prevent additional overages in Year 2. Because final catch accounting of windowpane flounder is not completed until August or September each year (due to the need to incorporate state waters and other sub-component catches), the AM must be put into place on May 1 of Year 3 and will not be removed prior to September 1 of Year 3. Furthermore, NMFS would remove the AM conditional on determining at the time the AM would be removed that the ABC was not being exceeded in-season for the current fishing year. This AM assumes that the operational issue that caused the Year 1 overage has been resolved in Year 2 and that the reduction in catch in year two is not a reflection of declines in stock biomass. This AM could be applied retroactively to FY 2012, FY 2013, and/or FY 2014 catches.

The Council has selected Option 2 and Option 3 as preferred alternatives but these are not mutually exclusive. Options 2 and 3 could be implemented together in a way that would reduce economic impacts.

Figure 4- Flow chart of Option 3. Note that 5% is used for illustrative purposes to demonstrate the role of the management uncertainty buffer (i.e., 105% and > 5%).

4.1.1.2 Option 3: Consideration of catch performance over the most recent two-year period when determining AM implementation



4.1.4 Option 4: Seasonal accountability measure for the northern windowpane flounder stock

For northern windowpane flounder only, the AM would require the use of approved selective trawl gear in SA 522 during specified seasons (Figure 5). Approved gears include the haddock separator trawl, the Ruhle trawl, the rope trawl, and any other gears authorized by the Council in a management action or approved for use consistent with the process defined at 50 CFR 648.85 (b)(6). There are no restrictions on longline or gillnet gear because these gear types comprise a small amount of the total catch for these stocks.

The duration of the AM would be dependent on the magnitude of the overage. The AM would be in place for May 1- August 31 for an overage greater than 5% and up to 20% and May 1- December 31 for an overage greater than 20%. These alternatives would not change the timing of AM implementation (catch data availability issues still apply), requirement for the total ACL (and relevant sub-ACL) to be exceeded to trigger the AM, the selective gear required for trawl gear, or the current management uncertainty buffer of 5% as identified under the No Action alternative.

Rationale: If this option was selected the AM would continue to be the No Action for southern windowpane flounder. The duration of the gear-restricted areas would be adjusted based on the magnitude of the overage. This would ensure that the overage was mitigated while minimizing economic impacts of the AM on the groundfish fishery. This AM was designed to be in place for a shorter duration than the current AM areas (i.e., less than one year). However, the trade-off of this approach was that a larger AM area was needed than the current AM areas (i.e., SA 522 has a greater spatial extent than the current AM areas) to achieve similar biological benefits. This AM could not be applied to the FY 2012 or FY 2013 overages because the seasonal AM would not be in place in time when FW 52 would be implemented to achieve biological benefits of a seasonal AM. However, the timing of this framework would allow for this AM to be retroactively applied to FY 2014 catches and beyond.

Figure 5- Map of Current Windowpane Flounder AM Areas on Georges Bank and Statistical Area 522

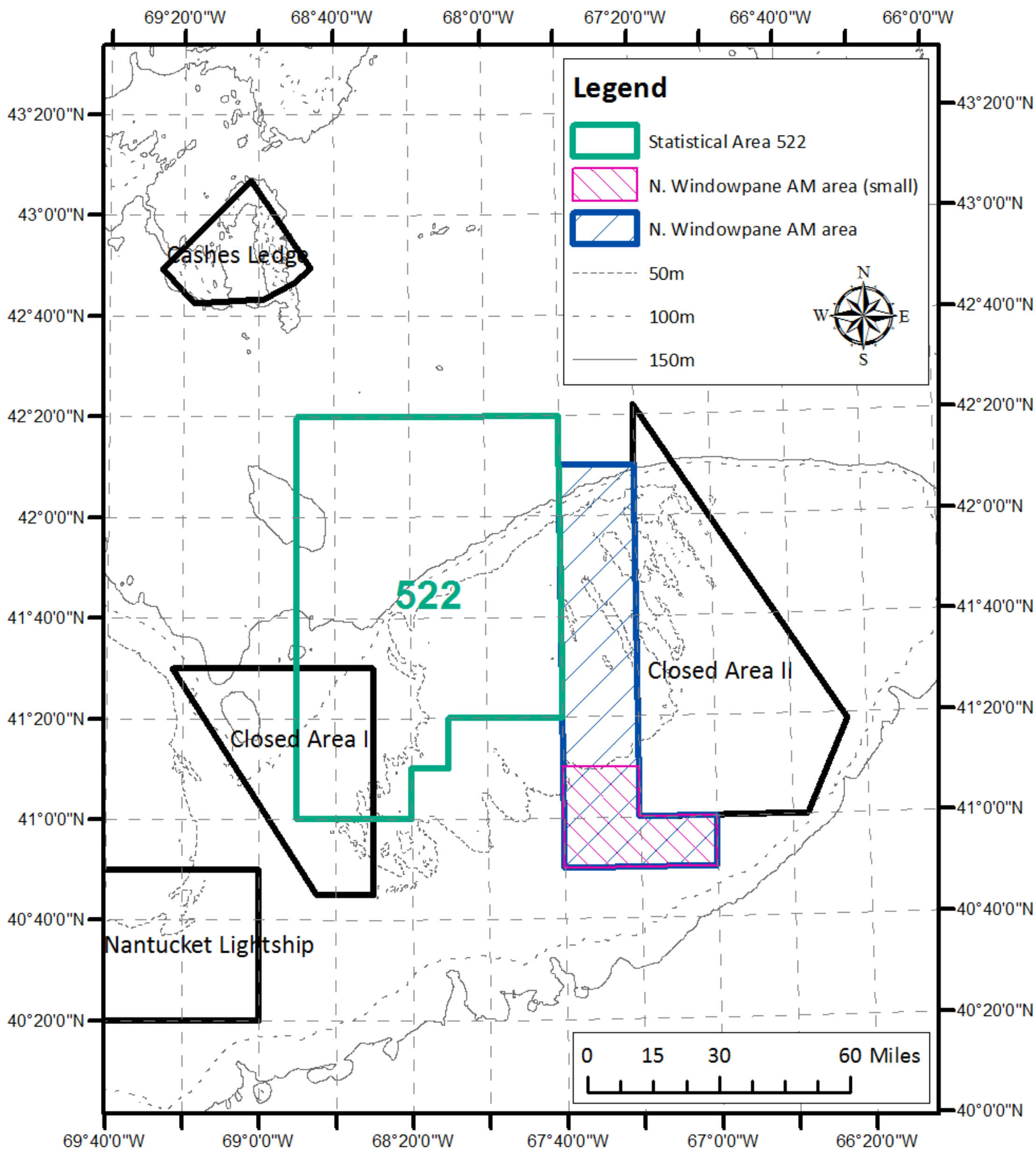
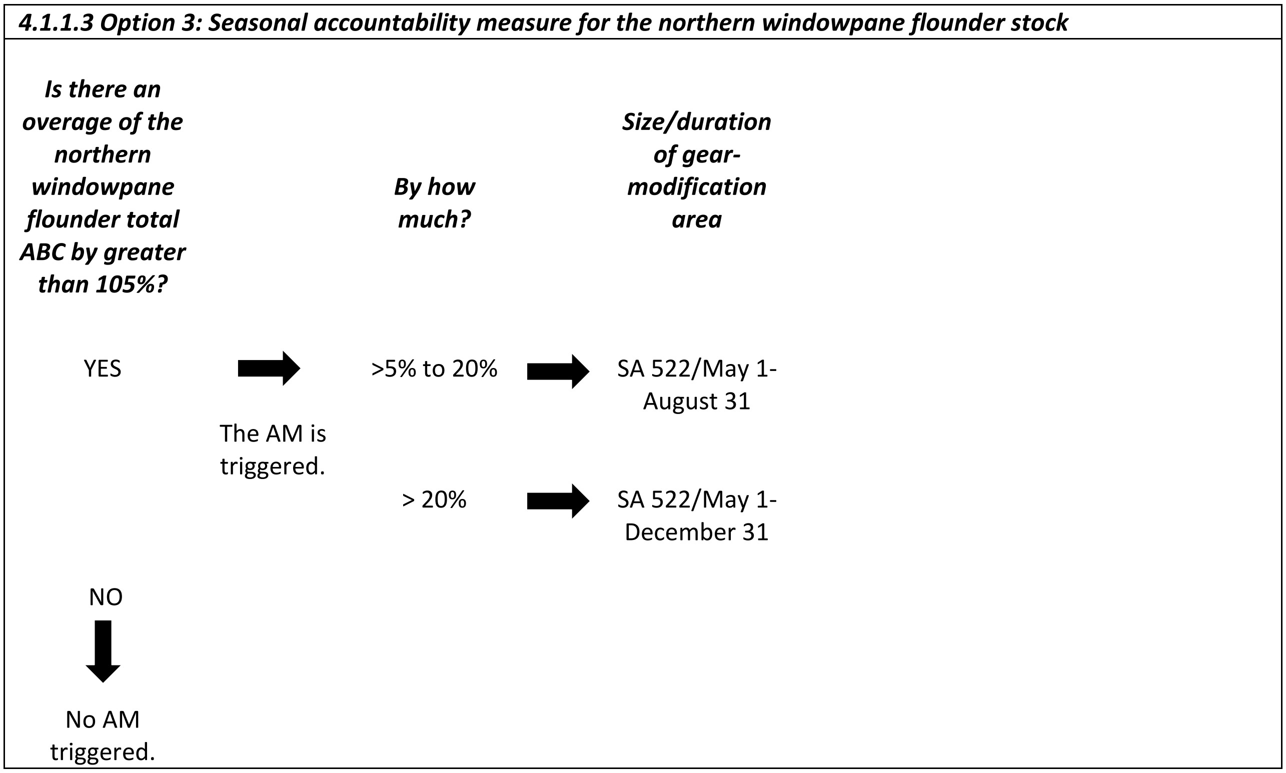


Figure 6- Flow chart of Option 4. Note that 5% is used for illustrative purposes to demonstrate the role of the management uncertainty buffer (i.e., 105% and > 5%).



5.0 Alternatives Considered and Rejected

No alternatives are in this section.

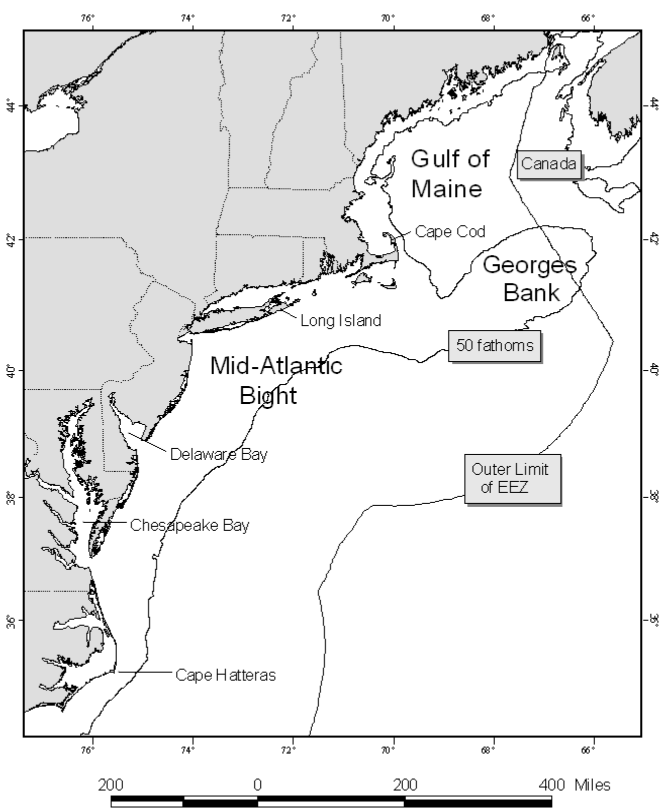
6.0 Affected Environment

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).

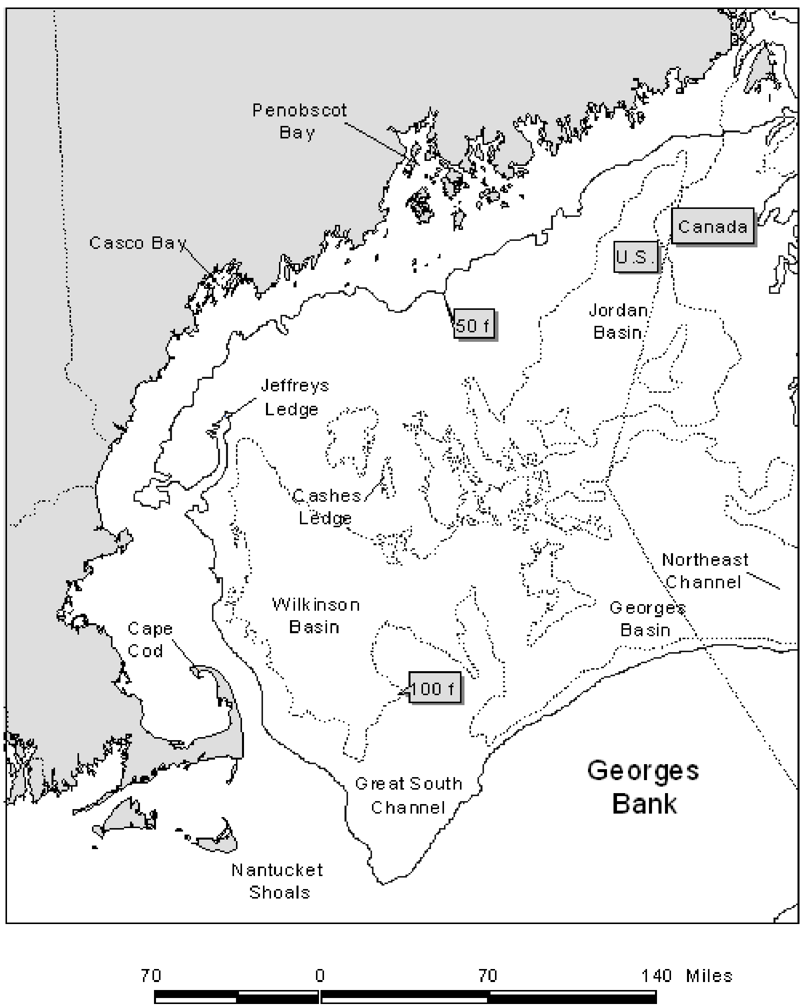
Figure 7 – Northeast U.S. Shelf Ecosystem



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 8 – 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. 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
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.

[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.

Two studies (Gabriel 1992; Overholtz & 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 & 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 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:

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

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 & 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 polychaetes 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 sub region 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.

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

6.1.4 Habitat requirements of groundfish (focus on demersal life stages)

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 3 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. EFH information for egg, juvenile, and adult life stages for these species was compiled from Stevenson et al. 2004 (Table 3). 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 3.

Table 3 – 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: Water Depth	Essential Fish Habitat: Substrate	Commercial Fishing Gear Used
Atlantic Cod	Gulf of Maine, Georges Bank and southward	Omnivorous (invertebrates and fish)	(J): 82-245 ft. (25-75 m) (A): 33-492 ft. (10-150 m)	(J): Cobble or gravel bottom substrates (A): Rocks, pebbles, or gravel bottom substrate	Otter trawl, bottom longlines, gillnets
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) (A): 131-492 ft. (40-150 m)	(J): Pebble and gravel bottom substrates (A): Broken ground, pebbles, smooth hard sand, smooth areas between rocky patches	Otter trawl, bottom longlines, gillnets
Acadian redfish	Gulf of Maine, deep portions of Georges Bank and Great South Channel	Crustaceans	(J): 82-1,312 ft. (25-400 m) (A): 164-1,148 ft. (50-350 m)	(J): Bottom habitats with a substrate of silt, mud or hard bottom (A): Same as for (J)	Otter trawl
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) (A): 49-1,198 ft. (5-365 m)	(J): Bottom habitats with aquatic vegetation or substrate of sand, mud or rocks (A): Hard bottom habitats including artificial reefs	Otter trawl, gillnets
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) (A): 328-2,297 ft. (100-700 m)	(J): Bottom habitat with a substrate of sand, gravel or clay (A): Same as for (J)	Otter trawl bottom longlines
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, mollusks & 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) (J): 262 ft. (<80 m) (A): 361 ft. (<110 m)	(L): Hard bottom nesting areas (J): Bottom habitat, often smooth areas near rocks or algae (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) (A): 16-1,066 ft. (5-325 m)	(J): Bottom habitat with seagrass beds or substrate of mud or fine-grained sand (A): Bottom habitats with substrate of mud or find grained sand	Otter trawl, gillnets
Yellowtail flounder	Gulf of Maine, Southern New England, Georges Bank	Amphipods and polychaetes	(J): 66-164 ft. (20-50 m) (A): 66-164 ft. (20-50 m)	(J): Bottom habitats with substrate of sand or sand and mud (A): Same as for (J)	Otter trawl
American plaice	Gulf of Maine, Georges Bank	Polychaetes, crustaceans, mollusks, echinoderms	(J): 148-492 ft. (45-150 m) (A): 148-574 ft. (45-175 m)	(J): Bottom habitats with fine grained sediments or a substrate of sand or gravel (A): Same as for (J)	Otter trawl
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) (A): 82-984 ft. (25-300 m)	(J): Bottom habitats with fine grained substrate (A): Same as for (J)	Otter trawl
Winter flounder	Gulf of Maine, Georges Bank, Mid-Atlantic Bight/Southern New England	Polychaetes, crustaceans	(E): 16 ft. (<5 m) (J): 0.3-32 ft. (0.1-10 m) (3-164 age 1+) (1-50 m) (A): 3.2-328 ft. (1-100 m)	(J): Bottom habitats with a substrate of mud or fine grained sand (A): Bottom habitats including estuaries with substrates of mud, sand, gravel	Otter trawl, gillnets
Atlantic wolffish	Gulf of Maine & Georges Bank	Mollusks, brittle stars, crabs, and	(J): 131, 2-787.4 ft.	(J): Rocky bottom and	Otter trawl, bottom

		sea urchins	(40-240 m)	coarse sediments	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)	

6.1.5 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 surf clam 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 3 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.

6.1.6 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 2013 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.

6.1.6.1 Gear Types

Table 4 - Description of the gear types used by the multispecies fishery

	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/ Use Duration	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

6.1.6.1.1 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 2009).

6.1.6.1.2 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.

6.1.6.1.3 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.

6.1.6.1.4 Hook and Line Gear

6.1.6.1.4.1 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. Handlines 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.

6.1.6.1.4.2 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.

6.1.6.1.4.3 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.

6.1.6.2 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(ICES 2000). This report identified a number of possible effects of bottom otter trawls on benthic habitats and 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;

- Changes are not likely to be permanent 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
- Changes are not likely to be permanent 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 (NRC 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 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 & Chuenpagdee 2003). This group evaluated the habitat effects of ten 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, so mobile gear vulnerability scores are the focus here in the exemption area analyses below.

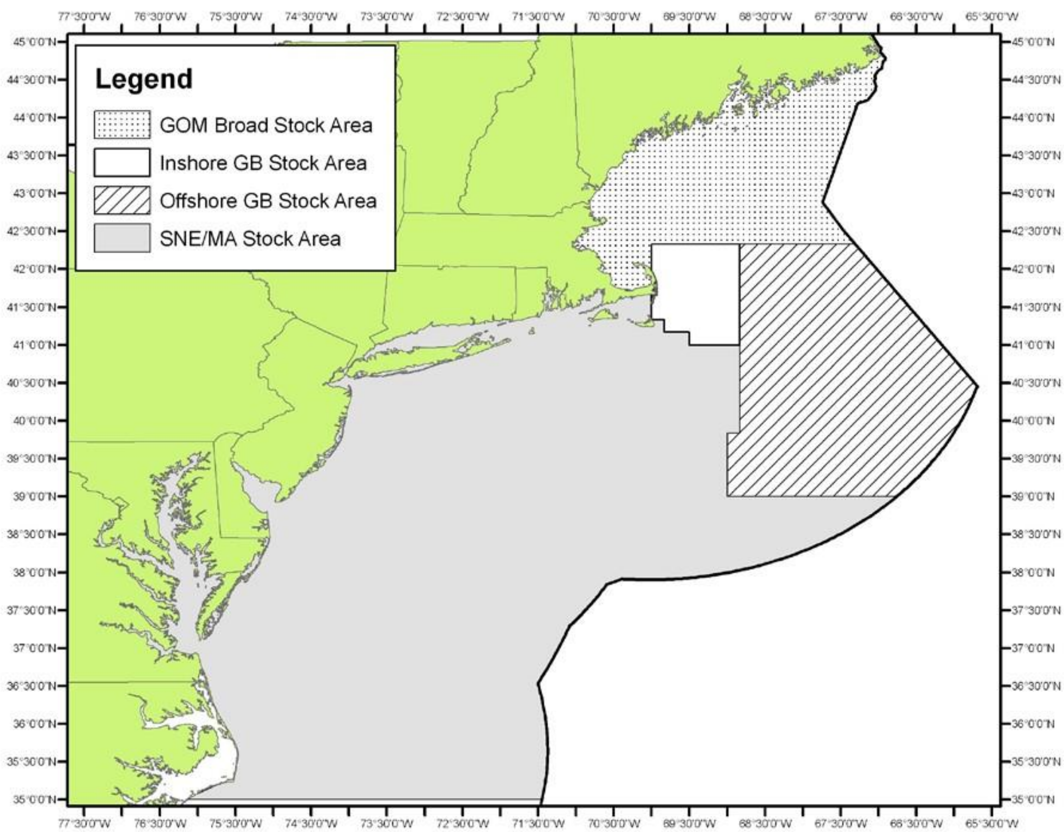
6.2 Groundfish Species

This section describes the life history and stock population status for each allocated fish stock the sectors harvest under the Northeast Multispecies FMP. Figure 16 identifies the four broad stock areas used in the fishery. Please refer to the species habitat associations described in Section 6.1.6 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 6.1.6.1) 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.noaa.gov/nefsc/habitat/efh/.

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 9 - 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 6.3. The Northeast Multispecies FMP does not 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 2009) 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. Currently, 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 and overfishing is not 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 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°C) and peaks when temperatures are approximately 40 to 43 °F (4.5 to 6°C). 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 2013 assessment for white hake concluded the stock is not overfished and overfishing is not occurring (NEFSC 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 (15ºC) 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 2011b).

6.2.1.16 GOM/GB 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.

6.2.1.17 SNE/MAB 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.

6.2.1.18 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).

6.2.1.19 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).

6.2.1.20 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.

6.2.2 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 5 (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 5 vary slightly between the two studies. For further information on fish habitat relationships, see Table 3.

Table 5 - 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 20 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 6 summarizes the status of the northeast groundfish stocks.

Table 6 - Status of the Northeast Groundfish Stocks for fishing year 2014

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 ≤ 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 ≥ ½ B_{MSY} and F >	
Not Overfished and not Overfishing Biomass ≥ ½ B_{MSY} and F ≤ F_{MSY}	Pollock (SARC 50) Acadian Redfish (assessment update) SNE/MA yellowtail flounder (SARC 54) American Plaice (assessment update) GOM Haddock (SARC 59) 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,

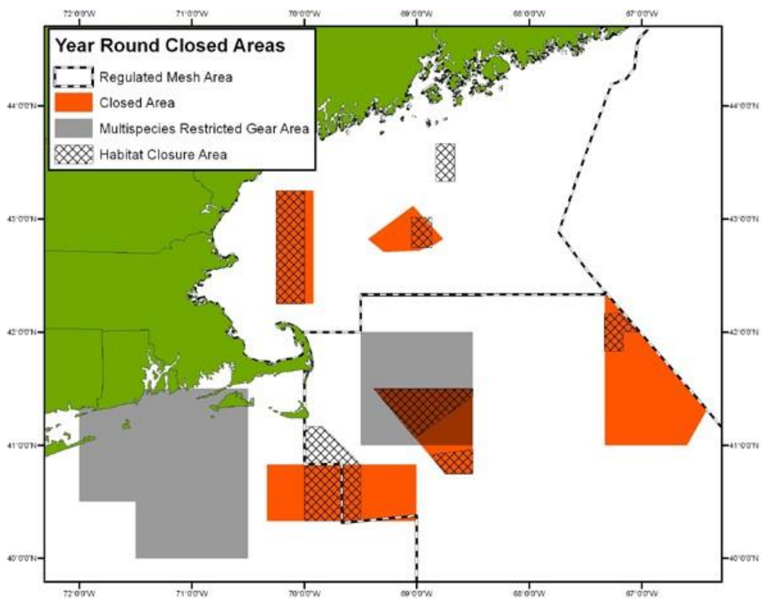
Northeast Fisheries Science Center. 2012. Assessment or Data Updates of 13 Northeast Groundfish Stocks through
2010. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-06; 789 p. Available from: National Marine Fisheries
Service, 166 Water Street, Woods Hole, MA 02543-1026

6.2.4 Areas Closed to Fishing

Select areas are closed to some level of fishing to protect the sustainability of fishery resources. Long- term closures result in the removal or reduction of fishing effort from important fishing grounds. Therefore, fishery related mortalities to stocks utilizing the closed areas should decrease. Figure 5 shows the Closed Areas for FY 2013.

Amendment 13 to the Northeast Multispecies FMP and Amendment 10 of the Atlantic Sea Scallop FMP established year-round habitat closed areas which are off-limits to all mobile, bottom-tending gear like trawls and dredges. These closures were designed to minimize the adverse effects of fishing on EFH for species managed by the NEFMC (Table 3). In many cases, these closed areas overlap portions of the groundfish mortality closures (see Figure 5). However, in other cases (Jeffreys Bank in the Gulf of Maine and the area southeast of Nantucket Island) they do not. NEFMC Omnibus EFH Amendment 2 is currently evaluating the closed habitat areas. Therefore, these areas may be changed or eliminated in the future. FW 48 allowed sectors to request exemptions to the closed areas. In addition, portions of four submarine canyons on the outer continental shelf are closed to all bottom trawling in order to protect vulnerable habitats for tilefish. Detailed descriptions and maps of these areas are available in Amendment 1 to the MAFMC Tilefish FMP.

Figure 10 - Northeast Multispecies Closed Areas and U.S./Canada



6.2.5 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, fluke, whiting and 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.

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 (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 ("non-regulated 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). Amendment 19 established Annual Catch Limits, Accountability Measures, and updated stock status definitions. Both stocks of silver hake are not overfished and are not experiencing overfishing (NEFSC 2011a).

6.3.7 Longfin 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 longfin 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 6.5.10.

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 the sectors. Table 7 shows that otter trawl gear caught the majority of non-allocated target species and bycatch between FY 1996 to FY 2006.

Table 7 – Landings (mt) for non-allocated target species and bycatch by gear type[a]

	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	2,646 [d]	151,505	491,280
Dogfish	24,368	61,914	72,712	39,852	--	--			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 1996-2006
[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 8, 15 marine mammal, sea turtle, and fish species are classified as endangered or threatened under the ESA, two others are candidate species under the ESA. The remaining species in Table 8 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 document.

6.4.1 Species Present in the Area

Table 8 lists the species, protected either by the ESA, the MMPA, or both, that may be found in the environment utilized by sectors. Table 8 also includes two candidate fish species, as identified under the ESA.

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 8 - Species Protected Under the Endangered Species Act and/or Marine Mammal Protection Act that May Occur in the Operations Area for the FY 2014 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
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
Dusky Shark (*Carcharhinus obscurus*)	Candidate
Pinnipeds	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Phoca groenlandicus*)	Protected
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.

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, 2013), 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 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.

NMFS issued a final rule designating critical habitat for the Northwest Atlantic Ocean DPS of the loggerhead sea turtle (*Caretta caretta*) within the Atlantic Ocean and the Gulf of Mexico in July 2014. Specific areas for designation included 38 occupied marine areas that contain one or a combination of habitat types: nearshore reproductive habitat, winter area, breeding areas, constricted migratory corridors, and/or *Sargassum* habitat. No areas, within U.S. jurisdiction, met the definition of critical habitat for loggerhead sea turtle for the North Pacific Ocean DPS. More information can be found at http://www.nmfs.noaa.gov/pr/species/turtles/criticalhabitat_loggerhead.htm#maps.

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. 2013), covering the time period between 2006 and 2010, 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 2.6 percent per year between 1990 and 2009. The total number of North Atlantic right whales is estimated to be at least 444 animals in 2009. The minimum rate of annual human-caused mortality and serious injury to right whales averaged 3.0 mortality or serious injury incidents per year during 2006 to 2010. Of these, fishery interactions resulted in an average of 2.4 mortality or serious injury incidents per year, all in U.S. waters. The potential biological removal (PBR) level for this stock is 0.9 animals per year (Waring et al. 2013). The Potential Biological Removal (PBR) level is the maximum number of animals, not including natural mortalities, which may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

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. The best estimate for the GOM stock of humpback whale population is 823 whales and current data suggest that the Gulf of Maine humpback whale stock is steadily increasing in size. The minimum rate of annual human-caused mortality and serious injury to humpback whales averaged 7.8 mortality or serious injury incidents per year during 2006 to 2010. Of these, fishery interactions resulted in an average of 5.8 mortality or serious injury incidents per year (5.2 from U.S. waters and 0.6 from Canadian waters). The PBR for this stock is 2.7 animals per year (Waring et al. 2013).

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 3,522 fin whales and 357 sei whales (Nova Scotia stock) (Waring et al. 2013) The best recent abundance estimate for sperm whales is the result of the 2011 survey – 1,593 (CV=0.36). The minimum population estimate for the western North Atlantic sperm whale is 1,187 (Waring et al. 2013). 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 2.0 mortality or serious injury incidents per year during 2006 to 2010. 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; Waring et al. 2013). The PBR for this stock is 5.6 animals per year. 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 (Waring et al. 2013). PBR for the Nova Scotia sei whale stock is 0.5 (Waring et al. 2013). For both fin and sei whales, these estimates are likely biased low due to the low detection rate for these species. During 2006-2010, annual average human caused mortality was 0.6 (Waring et al. 2013); sperm whales have not been documented as bycatch in the observed US Atlantic commercial fisheries. PBR for this stock is 2.4 animals per year (Waring et al. 2013).

Minke whales are not ESA-listed but are protected under the MMPA, with a minimum population estimate of 20,741 animals for the Canadian east coast stock (Waring et al. 2013). The minimum rate of annual human-caused mortality and serious injury averaged 5.0 per year during 2006 to 2010, and of these, 2.6 animals per year were recorded through observed fisheries and 1.0 per year were attributed to U.S. fisheries using stranding and entanglement data (Waring et al. 2013). PBR for this stock is 162 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. (2013) 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. 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. 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, they 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. Since pilot whales are difficult to differentiate at sea, they are generally considered *Globicephala* sp. when they are recorded at sea (Waring et al. 2013).

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) Waring et al. 2013). Their approximate year-round range extends from Nova Scotia, through the Bay of Fundy, and south through Maine to northern Massachusetts. 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. 2013). 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. 2013) year-round from Maine through southern Massachusetts. 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. 2013). 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); Waring et al.

2013). 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. 2013).

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).

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 (ASMFC 2007; Stein et al. 2004). Of these gear types, sink gillnet gear poses the greatest known risk of mortality for bycaught sturgeon. Sturgeon deaths were rarely reported in the otter trawl observer dataset , as well as sink gillnet and drift gillnet gear (ASMFC 2007).

Since the ESA listing of Atlantic sturgeon, the NEFSC has completed new population estimates using data from the Northeast Area Monitoring and Assessment (NEAMAP) survey (Kocik et al. 2013). Atlantic sturgeon are frequently sampled during the NEAMAP survey. NEAMAP has been conducting trawl surveys from Cape Cod, Massachusetts to Cape Hatteras, North Carolina in near shore waters at depths to 18.3 meters (60 feet) during the fall since 2007, and depths up to 36.6 meters (120 feet) during the spring since 2008 using a spatially stratified random design with a total of 35 strata and 150 stations per survey. The information from this survey can be directly used to calculate minimum swept area population estimates during the fall, which range from 6,980 to 42,160 with coefficients of variation between 0.02 and 0.57 and during the spring, which range from 25,540 to 52,990 with coefficients of variation between 0.27 and 0.65. These are considered minimum estimates because the calculation makes the unlikely assumption that the gear will capture 100% of the sturgeon in the water column along the tow path. Efficiencies less than 100% will result in estimates greater than the minimum. The true efficiency depends on many things including the availability of the species to the survey and the behavior of the species with respect to the gear. True efficiencies much less than 100% are common for most species. The NEFSC's analysis also calculated estimates based on an assumption of 50% efficiency, which reasonably accounts for the robust, yet not complete sampling of the Atlantic sturgeon, oceanic temporal and spatial ranges, and the documented high rates of encounter with NEAMAP survey gear and Atlantic sturgeon. For this analysis NMFS has determined that the best available scientific information for the status of Atlantic sturgeon at this time are the population estimates derived from NEAMAP swept area biomass (Kocik et al. 2013) because the estimates are derived directly from empirical data with few assumptions. NMFS has determined that using the median value of the 50% efficiency as the best estimate of the Atlantic sturgeon ocean population is most appropriate at this time. This results in a total population size estimate of 67,776 fish, which is considerably higher than the estimates that were available at the time of listing. This estimate is the best available estimate of Atlantic sturgeon abundance at the time of this analysis. The ASMFC has begun work on a benchmark assessment for Atlantic sturgeon to be completed in 2014, which would be expected to provide an updated population estimate and stock status. The ASMFC is currently collecting public submissions of data for use in the assessment: http://www.asmfc.org/uploads/file/pr20AtlSturgeonStockAssmtPrep.pdf.

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 (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 sectors 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). The marine range of the GOM DPS extends from the Gulf of Maine, throughout the Northwest Atlantic Ocean, to the coast of Greenland. 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). The trend in abundance of Atlantic salmon in the GOM DPS has been low and either stable or declining over the past several decades. The number of returning naturally-reared adults continues at low levels due to poor marine survival. 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).

Blue whales do not regularly occur in waters of the U.S. EEZ (Waring et al. 2011) (Waring et al. 2002) (Waring et al. 2002) (Waring et al. 2002) (Waring et al. 2002) (Waring et al. 2002) (Waring et al. 2002) (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 are no recent confirmed records of mortality or serious injury to blue whales in the IS Atlantic EEZ (Waring et al. 2011). 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 Preferred Alternatives 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. 2013). 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. 2013). 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. 2013). 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 in US Atlantic commercial fisheries between 2006 and 2010 (Waring et al. 2013). 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 sectors, would not have any adverse effects on the availability of prey for these species. The most recent Biological Opinion (BO) addressing the impacts of the Northeast Multispecies FMP on protected species is dated December 16, 2013 (NMFS 2013). 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 9 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.

Table 9 – 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.

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.

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 10 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 2014 ([79 FR 14418; March 14, 2014], also see Waring et al. 2013). Sink gillnets have the greatest potential for interaction with protected resources, followed by bottom trawls. There are no observed reports of interactions between groundfish bottom longline gear 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 10 - Marine Mammal Species and Stocks Incidentally Killed or Injured Based on Northeast Multispecies Fishing Areas and Gear Types (based on 2013 List of Fisheries)

Fishery Category	Fishery Type	Estimated Number of Vessels/Person	Marine Mammal Species and Stocks Incidentally Killed or Injured
Category I	Mid-Atlantic gillnet	5,509	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 Risso's dolphin, WNA Short-finned pilot whale, WNA White-sided dolphin, WNA
	Northeast sink gillnet	4,375	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 Long-finned Pilot whale, WNA Minke whale, Canadian east coast North Atlantic right whale, WNA Risso's dolphin, WNA Short-finned Pilot whale, WNA White-sided dolphin, WNA
Category II	Mid-Atlantic bottom trawl	631	Bottlenose dolphin, WNA offshore Common dolphin, WNA [a] Gray seal, WNA Harbor seal, WNA Long-finned pilot whale, WNA [a] Risso's dolphin, WNA Short-finned pilot whale, WNA [a] White-sided dolphin, WNA
	Northeast bottom trawl	2,987	Bottlenose dolphin, WNA

			offshore Common dolphin, WNA Gray seal, WNA Harbor porpoise, GOM/ Bay of Fundy Harbor seal, WNA Harp seal, WNA Long-finned pilot whale, WNA Minke whale, Canadian East Coast Short-finned pilot whale, WNA White-sided dolphin, WNA [a]
	Atlantic mixed species trap/pot [c]	3,467	Fin whale, WNA Humpback whale, GOM
Category III	Northeast/Mid-Atlantic bottom longline/hook-and-line	>1,207	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.

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 11 and Table **12** 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 13 and Table **14** 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 11 - Estimated Marine Mammals Mortalities in the Northeast Sink Gillnet Fishery

Species	Years Observed	Mean Annual Mortality (CV)	Total PBR
Harbor porpoise	06-10	511 (0.17)	706
Atlantic white-sided dolphin	06-10	38 (0.46)	304
Common dolphin (short-beaked)	06-10	30 (0.42)	529
Risso's dolphin	06-10	0	95
Western North Atlantic Offshore bottlenose dolphin	02-06	Unknown[+]	566
Harbor seal	06-10	280 (0.17)	Undetermined
Gray seal	06-10	794 (0.13)	Undetermined
Harp seal	06-10	218 (0.20)	Unknown
Hooded seal	01-05	25 (0.82)	Unknown

Source: Waring et al. (2009, 2011, 2013)

[+]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 12 - Estimated Marine Mammal Mortalities in the Mid-Atlantic Gillnet Fishery

Species	Years Observed	Mean Annual Mortality (CV)	Total PBR
Harbor porpoise	06-10	275 (0.29)	706
Common dolphin (short-beaked)	06-10	8.4 (0.55)	529
Risso's dolphin	06-10	6.4 (0.73)	95
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 3.47 (0.30) min; 19.79 (0.11) max	7.9
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	0.61 (0.22) min; 1.22 (0.18 max Unknown[+]	566
Harbor seal	06-10	50 (0.34)	Undetermined
Harp seal	06-10	63 (0.46)	Unknown

Source: Waring et al. (2009, 2011, 2012, 2013)
[+] 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 13 - Estimated Marine Mammal Mortalities in the Northeast Bottom Trawl Fishery

Species	Years Observed	Mean Annual Mortality (CV)	Total PBR
Minke whale	06-10	2.6 (0.46)	162
Harbor porpoise	06-10	4.5 (0.30)	706
Atlantic white-sided dolphin	06-10	12 (0.45)	304
Common dolphin (short-beaked)	06-10	20 (0.13)	529
Pilot whales*	05-09	12 (0.14)	93 (long-finned); 172 (short-finned)
Harbor seal	06-10	0.8 (4 animals/5 years)	Undetermined
Gray seal	06-10	6 (30 animals/5 years)	Undetermined
Harp seal	06-08	0	Unknown

Source: Waring et al. (2012, 2013)

*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.

Table 14 - Estimated Marine Mammal Mortalities in the Mid-Atlantic Bottom Trawl Fishery

Species	Years Observed	Mean Annual Mortality (CV)	Total PBR
Atlantic white-sided dolphin	06-10	20 (0.09)	304
Common dolphin (short-beaked)	06-10	103 (0.13)	529
Pilot whales*	05-09	30 (0.16)	93 (long-finned); 172 (short-finned)

Source: Waring et al. (2012, 2013)

*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 2.6 (CV = 0.46) between 2006 and 2010 (Waring et al. 2013). 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.

The NEFSC prepared an estimate of the number of encounters of Atlantic sturgeon in fisheries authorized by Northeast FMPs. The analysis estimates that from 2006 through 2010, there were averages of 1,239 and 1,342 encounters per year in observed gillnet and trawl fisheries, respectively, with an average of 2,581 encounters combined annually. Mortality rates in gillnet gear were approximately 20%. Mortality rates in otter trawl gear observed are generally lower, at approximately 5%. The highest incidence of sturgeon bycatch in sink gillnets is associated with depths of <40 meters, larger mesh sizes, and the months April-May. Sturgeon bycatch in ocean fisheries is actually documented in all four seasons with higher numbers of interactions in November and December in addition to April and May. Mortality is also correlated to higher water temperatures, the use of tie-downs, and increased soak times (>24 hours). Most observed sturgeon deaths occur in sink gillnet fisheries. For otter trawl fisheries, Atlantic sturgeon bycatch incidence is highest in depths <30 meters and in the month of June.

The NE multispecies fishery is prosecuted with both bottom otter trawl and sink gillnet gear. These data support the conclusion from the earlier bycatch estimates that the NE multispecies fishery may interact with Atlantic sturgeon. However, the more recent, larger population estimate derived from NEAMAP data (Kocik et al. 2013) suggests that the level of interactions with the NE multispecies fishery is not likely to have a significant adverse impact on the overall Atlantic sturgeon population, or any of the DPSs. On February 6, 2012, NMFS issued two final rules (77 FR 5880-5912; 77 FR 5914-5982) listing five DPS's 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 was reinitiated NE multispecies fishery to analyze potential impacts to Atlantic sturgeon. The resulting December 2013 Biological Opinion (BO) concluded that the actions considered would not jeopardize the continued existence of any listed species, including all five DPSs of Atlantic sturgeon.

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 economic and social impacts may be driven by changes in fishery flexibility, opportunity, stability, certainty, safety, and/or other factors. While it is possible that these impacts could be solely experienced by individual fishermen, it is more likely that impacts would be experienced across communities, gear types, and/or vessel size classes.

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 and their homeports. Table 15 contains a summary of major trends in the groundfish fishery. Additional information may be found in the FY2010, FY2011, and FY2012 performance reports for this fishery by the NEFSC (Kitts et al. 2011; Murphy et al. 2014; Murphy et al. 2012).

Table 15 - Summary of major trends in the Northeast multispecies fishery

	FY2009	FY2010			FY2011			FY2012		
	Total	Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool
Groundfish Gross Nominal Revenue	$82,510,132	$83,177,330	$81,123,145	$2,054,184	$90,453,455	$89,603,929	$849,526	$69,778,174	$69,135,759	$642,414
Non-groundfish Gross Nominal Revenue	$180,396,477	$210,631,484	$115,682,739	$94,948,745	$240,364,488	$144,718,459	$95,646,029	$235,730,686	$140,108,099	$95,622,587
Total Gross Nominal Revenue	$262,906,608	$293,808,814	$196,805,885	$97,002,930	$330,817,943	$234,322,388	$96,495,555	$305,508,860	$209,243,859	$96,265,001
Groundfish average price	$1.21/lb	$1.43/lb	$1.43/lb	$1.58/lb	$1.47/lb	$1.47/lb	$1.64/lb	$1.51/lb	$1.51/lb	$1.79/lb
Non-groundfish average price	$0.97/lb	$1.21/lb	$1.19/lb	$1.24/lb	$1.14/lb	$1.13/lb	$1.16/lb	$1.11/lb	$1.07/lb	$1.17/lb
Number of active vessels	916	854	435	419	776	442	337	764	446	320
Number of active vessels that took a groundfish trip	566	445	303	142	419	302	117	401	304	97
Number of groundfish trips	25,897	13,474	11,190	2,284	15,958	13,679	2,279	14,496	12,943	1,553
Number of non-groundfish trips	37,173	38,489	16,527	21,962	33,675	16,795	16,880	32,523	17,090	15,433
Number of days absent on groundfish trips	24,605	18,401	16,796	1,605	21,465	19,963	1,502	19,935	18,964	971
Number of days absent on non-groundfish trip	31,606	31,352	16,022	15,330	27,997	15,484	12,513	28,632	16,189	12,442
Total Crew Positions	2,416	2,255			2,161			2,136		
Total Crew-trips	148,153	123,885			122,003			116,334		
Total Crew-days	187,219	169,939			169,417			167,620		

Notes: Data includes all vessels with a valid limited access multispecies permit. Sector plus common pool vessel counts may exceed the total vessel count because vessels may switch between sector and common pool eligibilities during the fishing year. “Trips" refer to commercial trips in the northeast Exclusive Economic Zone (EEZ). Past reports included party/charter trips. From Murphy et al. (2014).

6.5.1 The 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 caught primarily cod and haddock. Today, the Northeast Multispecies FMP (large-mesh and small-mesh) includes 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 shoreside 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) (NOAA 2007).

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 (NOAA 2007).

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 rule 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 FY2010, the NMFS Regional Administrator announced that, in addition to a previously stated 18% reduction in DAS, interim rules would be implemented to reduce fishing mortality during FY2009. 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
- Reduction in some groundfish allocations (NOAA 2009).

In 2007, the Northeast multispecies fishery included 2,515 permits. Of these, about 1,400 were limited access. There were about 660 vessels that actively fished. Those vessels include a range of gear types: hook, bottom longline, gillnet, and trawl (NEFMC 2009a). In FY2009, between 40 and 50 of these vessels were members of the GB Cod Sectors. The passage of Amendment 16, implemented in FY2010, ushered in a new era of sector management in the New England groundfish fishery. Since FY2010, over 50% of eligible northeast groundfish multispecies permits and over 90% of landings history has been associated. The remaining vessels were common pool groundfish fishing vessels.

Amendment 16 to the Northeast Multispecies FMP was implemented for the New England groundfish fishery starting on May 1, 2010, the start of the 2010 fishing year. There were 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.[5] Sectors received ACE for nine of 13 groundfish species (14 stocks + quotas for Eastern US/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, 17 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 enrolled in one of 16 sectors or one of two 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 FY2011, 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

[5] 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.

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.

In FY12, 60% of limited access permits enrolled in sectors. From FY2011 to FY2012, the number of groundfish limited access eligibilities belonging to a sector increased by 22, while the number of these permits in the common pool decreased by 36. 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 reflect the current system of catch share management.

6.5.2 Fleet Characteristics

The overall trend since the start of sector management has been a decline in the number of vessels with a limited access groundfish permit, at a low of 1,177 in FY2012 (Table 16). Of those vessels, those with revenue from at least one groundfish trip have also declined, with 401 in FY2012. The proportion of vessels affiliated with a sector has increased each year since FY2010. A key aspect of Amendment 16 is the ability of a sector to jointly decide how its ACE will be harvested, through redistribution within a sector and/or transferring ACE between sectors. Because inactive sector vessels may benefit if other sector vessels harvest their allocation, changes in the number of inactive vessels may result from a transfer of allocation and not necessarily vessels exiting the fishery. Since FY2010, 35-37% of the vessels were inactive (no landings). Of these inactive vessels, 64-69% were affiliated with sectors.

Table 16 - Number of vessels by fishing year

	FY2009	FY2010	FY2011	FY2012
	As of May 1 each Fishing Year:			
Total groundfish limited access eligibilities	1,464	1,441	1,422	1,408
Eligibilities held as Confirmation of Permit History	81	94	168	228
	During any part of the fishing year*:			
Total eligible vessels	1,459	1,409	1,321	1,223
Eligible vessels that did not renew a limited access groundfish permit	28	26	42	46
Vessels with a limited access groundfish permit	1,431	1,383	1,279	1,177
	While under a limited access groundfish permit:			
... those with revenue from any species**	916	854	776	764
... those with revenue from at least one groundfish trip	566	445	419	401
... those with no landings	515	529	503	413
Percent of inactive (no landings) vessels	(36%)	(38%)	(39%)	(35%)

Source: Murphy et al (2014, Table 10).
* On May 1st of the fishing year the number of vessels will equal to the number of eligibilities not in Confirmation of Permit History (CPH). Over time the number of vessels will differ from the number of eligibilities because these eligibilities can be transferred from vessel to vessel during the fishing year. These numbers exclude groundfish limited access eligibilities held as 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 data for either Sector or Common Pool.
**Active vessels in this report received revenue from any species while fishing under a limited access groundfish permit.

6.5.3 Effort

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 number of active vessels has declined each year since at least FY2009. This decline has occurred across all vessel size categories (Table 17). Since FY2009, the 30' to < 50' vessel size category, which has the largest number of active groundfish vessels, experienced a 32% decline (305 to 206 active vessels). The <30' vessel size category, containing the least number of active groundfish vessels, experienced the largest (53%) reduction since FY2009 (34 to 16 vessels). The vessels in the largest (≥75') vessel size category experienced the least reduction (9%) since FY2009.

Table 17 - Vessel activity by size class

	FY2009	FY2010	FY2011	FY2012
Vessels with landings from any species				
Less than 30	73	65	51	48
30 to < 50	478	455	398	396
50 to < 75	236	217	211	205
75 and above	129	117	116	115
Total	**916**	**854**	**776**	**764**
Vessels with at least one groundfish trip				
Less than 30	34	24	20	16
30 to < 50	305	240	216	206
50 to < 75	157	118	117	115
75 and above	70	63	66	64
Total	**566**	**445**	**419**	**401**

Source: Murphy et al. (2014, Tables 13 and 14).

Some of the proposed benefits of a catch share system of management are the potential efficiency gains associated with increasing operational flexibility (NOAA 2010). Being released from the former effort controls, but being held to ACLs, sector vessels were expected to increase their catch per unit effort by decreasing effort. Between 2009 and FY2010, the number of groundfish fishing trips[6] and total days absent on groundfish trips declined by 48% and 27%, respectively (Table 18).[7] During the second year of sector management, 2011, the number of groundfish fishing trips and total days absent on groundfish trips increased. Effort on groundfish trips generally decreased in FY2012. Vessels took fewer groundfish trips, with fewer total days absent of groundfish trips, though average trip length increased slightly over FY2011.

The groundfish fleet overall took fewer non-groundfish trips in FY2012 than they did in FY2009-FY2011, but those trips are longer than they were in FY2010 and FY2011 (Table 18). The total number of non-groundfish trips taken by the fleet in FY2012 was 32,523 trips, a four year low and 3.4% lower than in FY2011. However, for the fleet overall, the total number of days absent on non-groundfish trips in FY2012 was higher than it was in 2011, with 635 (2.3%) more days absent. Furthermore, although the

[6] "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.
[7] The data is taken from different source materials (VMS, etc.) than other data in this document, and thus, may be slightly different than.

total number of days absent was 9.4% fewer than 2009, the average trip length in 2012 was the same as 2009 (0.92 days per trip) and higher than in 2010 and 2011 (0.86 days per trip).

Table 18 - Effort by active vessels

	FY2009	FY2010	FY2011	FY2012
Number of trips				
groundfish	25,897	13,474	15,958	14,496
non-groundfish	37,173	38,489	33,675	32,523
Number of days absent on trips				
groundfish	24,605	18,401	21,465	19,935
non-groundfish	31,606	31,352	27,997	28,632
Average trip length*				
groundfish	0.96	1.37	1.35	1.38
(std. dev.)	(1.74)	(2.14)	(2.20)	(2.19)
non-groundfish	0.92	0.86	0.86	0.92
(std. dev.)	(1.66)	(1.56)	(1.52)	(1.62)

Source: Murphy et al. (2014, Table 15).

*****This is the average trip length of all individual trips that have non-missing values for days absent. Since some trip records have missing values for days absent, average trip length reported here may be higher than what is obtained by dividing the overall number of days absent by the overall number of trips.

6.5.4 Landings and Revenue

Total groundfish landings on trips made by vessels possessing a limited access groundfish permit in FY2012 were 46.3M pounds, which is the lowest landings since at least FY2009 (Table 19,Table 20). 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 178.1M pounds in FY2010 to 213.8M pounds in FY2011, and remained fairly steady at 212.0M pounds in FY2012. Total landings of all species made by limited access vessels in the Northeast multispecies fishery was 258.3M pounds in FY2012. This compares to landings ranging from 236.4M – 272.9M pounds in the 2009–2011 fishing years. In FY2012, sector vessels accounted for 68% of all landings, 99% of groundfish landings, and 62% of non-groundfish landings.

Table 19 – Total landings and revenue from all trips by fishing year

	FY2009	FY2010	FY2011	FY2012
Landed Pounds				
Groundfish	68,416,222	58,178,065	61,661,450	46,295,753
Non-Groundfish	185,631,323	174,269,060	211,226,012	211,983,492
Total Pounds	254,047,546	232,447,125	272,887,462	258,279,245
Gross Revenue				
Groundfish	$82,510,132	$83,177,330	$90,453,455	$69,778,174
(in 2010 dollars*)	($83,386,467)	($83,177,330)	($88,658,472)	($67,252,170)
Non-Groundfish	$180,396,477	$210,631,484	$240,364,488	$235,730,686
(in 2010 dollars*)	($182,312,457)	($210,631,484)	($235,594,629)	($227,197,123)
Total Revenue	$262,906,608	$293,808,814	$330,817,943	$305,508,860
(in 2010 dollars*)	($265,698,924)	($293,808,814)	($324,253,101)	($294,449,293)

Source: Murphy et al. (2014, Table 2).
* Deflated by the calendar year 2010 Q2 GDP Implicit Price Deflator.

Table 20 - Total landings and nominal revenue from groundfish trips by fishing year

	FY2009	FY2010	FY2011	FY2012
Landed Pounds				
Groundfish	68,362,567	58,067,026	61,520,629	46,238,230
Non-Groundfish	30,965,367	23,147,600	28,781,804	27,527,755
Total Pounds	99,327,934	81,214,627	90,302,433	73,765,985
Gross Revenue				
Groundfish	$82,456,833	$82,964,771	$90,237,532	$69,669,582
Non-Groundfish	$25,862,188	$22,339,660	$31,826,744	$25,768,848
Total Revenue	$108,319,021	$105,304,431	$122,064,276	$95,438,430

Source: Murphy et al. (2014, Table 3).
* Deflated by the calendar year 2010 Q2 GDP Implicit Price Deflator.

During the first year of sector management, groundfish revenues from vessels with limited access groundfish permits in FY2010, were $83.2M (Table 19, Table 20). This was slightly lower than FY2009 revenues. In FY2011, the groundfish revenues from vessels with limited access groundfish permits were $90.4M. Groundfish revenue in FY2012 decreased to a four-year low of $69.8 million (22.9% lower than in 2011). Non-groundfish revenue decreased to $235.7 million (2% lower than in FY2011), but was still higher than in FY2009 and FY2010. In FY2012, sector vessels accounted for about 69% of all revenue earned by limited access permitted vessels. Sector vessels also earned 99% of revenue from groundfish landings and 59% of non-groundfish revenue.

6.5.5 ACE Leasing

Starting with allocations in FY2010, each sector was given an initial ACE determined by the pooled potential sector contribution (PSC) from each entity joining that sector. Every limited access groundfish permit also has a tracking identification number called a Moratorium Right Identifier (MRI). PSC is technically allocated to MRIs, which are subsequently linked to vessels through Northeast Multispecies limited access fishing permits. 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 FY2010, 282 sector-affiliated MRIs had catch that exceeded their individual PSC allocations for at least one stock. These vessels are then assumed to have leased in an additional 22M pounds of ACE and/or PSC with an approximate value of $13.5M. In FY2011, 256 sector-affiliated vessels had catch that exceeded their individual PSC allocations. These vessels are then assumed to have leased in 31M pounds of quota. Although the number of vessels leasing ACE fell by 9% the estimated number of pounds leased was almost 41% greater in FY2011 than in FY2010 (Murphy, et al. 2012). There were 241 sector-affiliated MRIs had catch that exceeded individual PSC allocations for at least one stock. These MRIs leased in >23M pounds of ACE and/or PSC in FY2012 (Murphy, et al. 2014)

6.5.6 Fishing Communities

There are over 400 communities that have been the homeport or landing port to one or more Northeast groundfish fishing vessels since 2008. These ports occur throughout the New England and Mid-Atlantic. Consideration of the economic and social impacts on these communities from proposed fishery regulations is required by the National Environmental Policy Act (NEPA 1970) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA 2007). 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.

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 ports that may only have a small number of active vessels.

6.5.6.1 Primary and Secondary Fishing Ports

In recent amendments to the FMP (e.g., NEFMC 2009), communities dependent on the groundfish resource have been categorized into primary and secondary port groups, so that community data can be cross-referenced with other demographic information .

- ***Primary ports*** are those communities that are substantially engaged in the groundfish fishery, and which are likely to be the most impacted by groundfish management measures. Primary ports were selected based on groundfish landings greater than 1,000,000 lbs annually since FY1994 and/or the presence of significant groundfish infrastructure (e.g., auctions and co-ops). They have demonstrated a continued substantial engagement in the groundfish fishery.
- ***Secondary ports*** are those communities that may not be substantially dependent or engaged in the groundfish fishery, but have demonstrated some participation in the groundfish fishery since FY1994. Because of the size and diversity of the groundfish fishery, it is not practical to examine each secondary port individually, which is why most secondary ports are grouped with others in the same county or in geographically adjacent counties.

Using the above definitions provides a way to consider the impacts of management measures on every port in which some amount of groundfish has been landed since 1994, and identifies place-based fishing communities based on level of engagement. Because significant geographical shifts in the distribution of groundfish fishing activity have occurred, the characterization of some ports as “primary” or “secondary” may not reflect their historical participation in and dependence on the groundfish fishery.

Descriptions of communities involved in the multispecies fishery, and further descriptions of Northeast fishing communities in general, can be found on Northeast Fisheries Science Center’s website. There are snapshots of the human communities and fisheries of the Northeast with the most recent data available for key indicators of dependence on fisheries and other economic and demographic characteristics at http://www.nefsc.noaa.gov/read/socialsci/communitySnapshots.php. Detailed profiles regarding the historic, demographic, cultural, and economic context for understanding a community's involvement in fishing are at http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html

This action contains alternatives that are specific windowpane flounder and have the potential to impact the directed fisheries for flat fish such as winter flounder and yellowtail flounder. To help describe which port communities could be most affected by the alternatives under consideration, Table 22 identifies the landings by homeport for FY2012, using the primary ports identified in Table 21. Gloucester, Boston, and New Bedford/Fairhaven, Massachusetts are homeports to vessels landing the most flounder stocks in FY2012.

Table 21 - Primary and secondary multispecies port communities

Region	Multispecies Port Community	
	Primary	**Secondary**
Downeast ME	-	Jonesport, West Jonesport, Beals Island, Milbridge, Machias, Eastport, Dyers Bay
Upper Mid-Coast ME 1	-	Winter Harbor, Southwest Harbor, Bar Harbor, Northeast Harbor, Northwest Harbor
Upper Mid-Coast ME 2	-	Stonington, Sunshine/Deer Isle
Upper Mid-Coast ME 3	-	Rockland, St. George (Port Clyde), South Thomaston (Sprucehead), Owls Head, Friendship, Camden, Vinalhaven
Lower Mid-Coast ME 1	-	Bristol, South Bristol, Boothbay Harbor, East Boothbay (Boothbay), Breman (Medomak), Southport, Westport Island
Lower Mid-Coast ME 2	-	Sebasco Estates, Small Point, West Point, Five Islands, Phippsburg
Lower Mid-Coast ME 3	Portland	Cundys Harbor, Orrs Island, Yarmouth, Harpswell, East Harpswell, South Harpswell, Bailey Island, Cape Elizabeth
Southern Maine	-	York, York Harbor, Camp Ellis, Kennebunkport, Kittery, Cape Porpoise, Ogunquit, Saco, Wells
New Hampshire	Portsmouth	Rye, Hampton, Seabrook
North Shore MA	Gloucester	Rockport, Newburyport, Beverly, Salem, Marblehead, Manchester, Swampscott
South Shore MA	Boston	Scituate, Plymouth, Marshfield (Green Harbor)
Cape Cod MA	Chatham/ Harwichport	Provincetown, Sandwich, Barnstable, Wellfleet, Woods Hole, Yarmouth, Orleans, Eastham
Islands MA	-	Nantucket, Oak Bluffs, Tisbury, Edgartown
South Coast MA	New Bedford/ Fairhaven	Dartmouth, Westport
Western RI	Point Judith	Charlestown, Westerly, South Kingstown (Wakefield), North Kingstown (Wickford)
Eastern RI	-	Newport, Tiverton, Portsmouth, Jamestown, Middletown, Little Compton
Connecticut	-	Stonington, New London, Noank, Lyme, Old Lyme, East Lyme, Groton, Waterford
Long Island NY	Montauk/ Hampton Bays/ Shinnecock/ Greenport	Mattituck, Islip, Freeport, Brooklyn, Other Nassau and Suffolk Counties
Northern NJ	-	Point Pleasant, Belford, Long Beach/Barnegat Light, Barnegat, Highlands, Belmar, Sea Bright, Manasquan
Southern NJ	-	Cape May, Wildwood, Burleigh, Sea Isle City, Ocean City, Stone Harbor, Avalon

Table 22 - FY2012 landings (lbs.) of selected groundfish stocks by homeports

State	Port	GB Yellowtail Flounder	SNE/MA Yellowtail Flounder	CC/GOM Yellowtail Flounder	Witch flounder	GB Winter flounder	GOM Winter flounder	Total
ME	Portland	254	0	2,401	250,774	6,126	172,610	432,165
	Other	0	0	41,067	222,727	0	441,965	705,759
NH	Portsmouth	0	0	23,716	3,413	c	170,360	197,489
	Other	0	0	75,288	32,165	0	451,550	559,003
MA	Boston	30,126	12,819	356,281	490,721	15,471	692,359	1,597,777
	Chatham/Harwichport	c	0	13,450	55,702	0	c	*69,152
	Gloucester	3,073	104	453,490	339,481	5,357	1,646,086	2,447,591
	New Bedford/Fairhaven	284,578	94,107	366,042	370,627	45,504	105,227	1,266,085
	Other	c	1,391	500,517	145,529	c	744,294	*1,391,731
RI	Point Judith	25,915	539,433	c	30,140	306	c	*595,794
	Other	35,139	118,645	c	12,483	c	c	*166,267
NY	Eastern Long Island	c	119,561	0	6,922	c	0	*126,483
	Other	0	13,069	0	912	0	c	*13,981
**Other		11,194	24,649	20,022	60,625	391	105,023	221,904
Total		***390,279**	**923,778**	**1,852,274**	**2,022,221**	***73,155**	***4,529,474**	**4,798,273**

Notes:
** = Includes states not listed and landings from CPH permits not attributed to a state.
c = Confidential, because less than three ownership groups are included.
* = Total does not include confidential data.
Data from NEFSC, November 2013.

6.5.6.2 Vessel Activity in Primary Ports

All states have shown a decline in the number of active vessels with revenue from any species since at least FY2009 (Table 23). In FY2012, Massachusetts had the highest number of active vessels with a limited access groundfish permit and also the highest number of active vessels with revenue from at least one groundfish trip (52%, 207 vessels) (Table 24). From FY2009 to FY2012, the total number of active vessels with revenue from at least one groundfish trip declined 29% (566 to 401). While all states showed a decline in the number of vessels making groundfish trips, the largest percentage decline occurred in New Jersey (-57%).

Table 23 - Number of vessels with revenue from any species (all trips) by homeport and state

Home Port State/City	FY2009	FY2010	FY2011	FY2012
CT	12	11	11	10
MA	459	423	378	375
Boston	62	52	49	47
Chatham	42	43	39	38
Gloucester	110	105	91	92
New Bedford	86	69	70	69
ME	112	102	88	95
Portland	17	17	16	18
NH	53	50	46	41
NJ	61	56	49	47
NY	95	93	91	88
RI	93	86	83	77
Point Judith	48	45	44	44
Other Northeast	34	36	34	37
Grand Total*	**916**	**854**	**776**	**764**

* Note: State vessel counts may exceed the grand total vessel count because vessels may change home port during the fishing year.

Table 24 - Number of vessels with revenue from at least one groundfish trip by homeport and state

Home Port State/City	FY2009	FY2010	FY2011	FY2012
CT	8	7	5	5
MA	310	238	224	207
Boston	46	35	34	28
Chatham	28	26	26	23
Gloucester	97	74	70	61
New Bedford	51	33	37	36
ME	64	43	47	51
Portland	15	15	15	16
NH	40	32	29	25
NJ	26	21	17	11
NY	47	40	42	43
RI	61	55	49	54
Point Judith	33	31	28	33
Other Northeast	12	10	8	6
Grand Total*	**566**	**445**	**419**	**401**

* Note state vessel counts may exceed the grand total vessel count because vessels may change home port during the fishing year.

6.5.6.3 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 (Clay et al. 2007; NMFS 2010; Olson & Clay 2001a; b; Thunberg 2007).

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.[8] 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. In FY2012, vessels with limited access groundfish permits provided 2,146 crew positions, with 49% coming from vessels with homeports in Massachusetts (Table 25). Since at least FY2009, the total number of crew positions provided by limited access groundfish vessels has declined by. Changes in crew positions vary across homeport states, with Maine adding a few positions in FY2012.

Table 25 - Number of crew positions and crew days on active vessels by homeport and state

Home Port State		FY2009	FY2010	FY2011	FY2012
CT	Total crew positions	40	36	42	39
	Total crew days	3,700	3,996	3,001	4,312
MA	Total crew positions	1,231	1,132	1,067	1,053
	Total crew days	95,685	82,066	84,119	81,430
ME	Total crew positions	266	247	221	242
	Total crew days	15,539	15,541	14,783	16,252
NH	Total crew positions	110	107	105	96
	Total crew days	5,407	3,909	4,974	5,085
NJ	Total crew positions	162	149	145	148
	Total crew days	10,865	10,086	9,898	10,292
NY	Total crew positions	219	209	217	209
	Total crew days	16,997	15,772	16,031	14,908
RI	Total crew positions	267	253	248	232
	Total crew days	26,411	26,786	25,130	24,017
Other Northeast	Total crew positions	129	130	128	128
	Total crew days	12,615	11,784	11,480	11,322
Total	**Total crew positions**	**2,424**	**2,262**	**2,173**	**2,146**
	Total crew days	**187,219**	**169,939**	**169,417**	**167,620**

[8] Crew positions are measured by summing the average crew size of all active vessels on all trips.

A crew day[9] is another measure of employment opportunity that incorporates information about the time spent at sea earning a share of the revenue. 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 FY2012, vessels with limited access groundfish permits used 167,620 crew days, with 48% coming from vessels with homeports in Massachusetts (Table 25). Since at least FY2009, the total number of crew days used by limited access groundfish vessels across the Northeast has declined, though some states had an increase in crew days in FY2012.

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 Consolidation and Redirection

The multiple regulatory constraints placed on common pool groundfish fishermen 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, 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 US 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 & 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 & Edwards 2009). The scope of consolidation and redirection of effort that may be expected to result from sector operations in FY2014 is difficult to predict.

[9] Similar to a "man-hour," a "crew day" is calculated by multiplying a vessel's crew size by the days absent from port. Since the number of trips affects the crew-days indicator, the indicator is also a measure of work opportunity.

6.5.8 Regulated Groundfish Stock Catch

The Northeast Multispecies FMP specifies Annual Catch Limits (ACLs) for 20 stocks. Exceeding an ACL for a stock 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 26 to Table 28 compare FY2012 catches to ACLs. As shown in Table 27, 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 FY2010 and FY2011. AMs for those stocks were modified in FW47. Table 28 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.

Table 26 - FY2012 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	1,724.1	1,621.7	1,593.0	28.656				21.5	80.9
GOM Cod	3,903.8	3,854.9	2,181.1	29.9	1,644.0			44.6	4.3
GB Haddock	1,525.5	1,197.6	1,197.1	0.5		288.6		14.2	25.1
GOM Haddock	530.0	526.7	245.1	0.9	280.7	0.1		1.7	1.6
GB Yellowtail Flounder	384.9	215.5	215.2	0.3			164.0	0.0	5.4
SNE/MA Yellowtail Flounder	593.5	463.0	425.6	37.4			54.0	12.0	64.6
CC/GOM Yellowtail Flounder	1,012.3	957.6	954.3	3.2				33.7	20.9
Plaice	1,642.8	1,604.7	1,601.4	3.3				15.3	22.8
Witch Flounder	1,174.0	983.3	981.0	2.3				28.2	162.5
GB Winter Flounder	2,057.6	1,931.7	1,930.9	0.8				0.0	125.9
GOM Winter Flounder	322.8	260.0	258.0	2.0				60.2	2.6
SNE/MA Winter Flounder	315.9	106.0	104.8	1.1				58.9	151.0
Redfish	4,445.4	4,429.0	4,423.4	5.6				13.4	3.1
White Hake	2,485.4	2,470.6	2,446.8	23.8				2.8	12.0
Pollock	8,092.4	6,462.5	6,394.7	67.8				532.3	1,097.6
Northern Windowpane	208.9	129.6	129.5	0.1				2.3	77.0
Southern Windowpane	520.9	106.5	95.9	10.6				34.4	380.0
Ocean Pout	53.2	39.1	35.4	3.6				1.2	13.0
Halibut	75.7	60.7	57.4	3.3				13.3	1.7
Wolffish	32.4	30.2	30.0	0.1				1.0	1.2

Notes:
Catch includes any FY2011 carryover caught by sectors in FY2012. Data as of Nov. 5, 2013, Northeast Regional Office. Values for a non-allocated species may include landings of that stock; misreporting of species and/or stock area; and/or estimated landings (in lieu of missing reports) based on vessel histories.
*Recreational estimates based on Marine Recreational Information Program (MRIP) data. **Landings extrapolated from observer data.

Table 27 – FY2012 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	26.9	26.1	26.0	35.4				42.2	39.7
GOM Cod	58.3	60.4	47.4	37.3	74.2			17.6	6.9
GB Haddock	1.1	0.0	-	0.6		100.9		4.6	2.0
GOM Haddock	47.3	49.3	25.9	18.6	108.4	0.6		11.1	7.1
GB Yellowtail Flounder	70.3	58.5	59.1	6.1			104.5	n/a	23.9
SNE Yellowtail Flounder	59.3	55.8	63.7	24.4			42.5	120.2	161.5
CC/GOM YTF	83.5	82.9	84.7	13.0				96.4	91.0
Plaice	38.8	39.7	40.3	6.1				42.5	15.7
Witch Flounder	67.4	59.6	60.3	10.5				57.5	246.2
GB Winter Flounder	53.4	52.6	52.9	3.9				n/a	67.0
GOM Winter Flounder	28.1	32.0	32.9	7.8				22.1	4.9
SNE/MA Winter Flounder	52.4	35.0	n/a	n/a				33.7	120.8
Redfish	42.1	44.2	44.3	16.6				14.5	0.8
White Hake	67.2	70.5	70.3	91.6				3.8	11.0
Pollock	45.5	40.3	40.0	82.7				70.6	80.1
Northern Windowpane	128.2	100.5	n/a	n/a				115.9	233.2
Southern Windowpane	136.7	147.9	n/a	n/a				88.3	140.7
Ocean Pout	22.2	18.3	n/a	n/a				38.5	56.3
Halibut	91.2	168.7	n/a	n/a				30.8	42.2
Wolffish	42.0	41.3	n/a	n/a				99.2	40.6

Notes:
Data as of Nov. 5, 2013, Northeast Regional Office.
* With the exception of GOM cod the percent of the FY 2012 catch limits caught does not include any FY 2011 carryover caught by sectors in FY 2012. FY 2011 carryover caught is not applied to the FY 2012 ACL. For 2012 year-end accounting, all sector carryover for GOM cod should be counted against the groundfish sub-ACL. As with all other stocks, do not apply sector carryover for GOM cod against a sector's ACE or the sector sub-ACL for in-season monitoring.
** To determine if recreational AM is triggered, the Regional Administrator must use the 3-year average catch compared to the 3-year average of the recreational sub-ACL for a stock.

Table 28 - FY2012 Catches by Non-Groundfish FMPs (Metric Tons, Live Weight)

Stock	Total	Scallop¹	Fluke	Hagfish	Herring	Lobster/ Crab	Menhaden	Monkfish	Red Crab	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	-	-	-	-	-	-	-

Notes:
¹Based 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 FY2011 quotas.

Table 28 – **Cont.**

Stock	Scup	Shrimp	Squid	Squid/ Whiting	Surf Clam	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	N/A*
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	

6.5.9 Fishery Sub-Components

6.5.9.1 Sector Harvesting Component

In FY2010, the sector vessels landed the overwhelming majority of the groundfish ACL. Each sector receives a total amount of fish it can harvest for each stock, its Annual Catch Entitlement (ACE). Since the ACE is dependent on the amount of the ACL in a given fishing year, the ACE may be higher or lower from year to year even if the sector's membership remains the same. There are substantial shifts in ACE for various stocks between FY2009 and FY2012 (Table 29). There has been a general decrease in trips, and catch for sector vessels, and 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.

Combined, 161M (live) pounds of ACE was allotted to the sectors in FY2011, but only 70M (live) pounds were landed. Of the 16 stocks allocated to sectors, the catch of 7 stocks approached (>80% conversion) the catch limit set by the ACE (Table 30). By comparison, the catch of only five stocks approached the catch limit set by the total allocated ACE in FY2010. The catch of white hake in FY2011 was particularly close to reaching the limit, with 98% of the white hake ACE being realized. As was the case in FY2010, 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 63M pounds (62%) of the uncaught ACE in FY2011.

Table 29 - Commercial groundfish sub-ACL, FY 2009 to FY 2012

Groundfish Stock	FY2009 TAC (lbs)	FY2010 ACL (lbs)	% Change 2009 to 2010	FY2011 ACL (lbs)	% Change 2010 to 2011	FY2012 ACL (lbs)	% Change 2011 to 2012
GB cod W	10,965,793	6,816,693	-37.84%	9,041,157	32.63%	9,795,138	8.34%
GB cod E	1,161,836	745,162	-35.86%	440,925	-40.83%	357,149	-19.00%
GOM Cod	23,642,373	10,068,512	-57.41%	10,637,304	5.65%	4,310,037	-59.48%
GB haddock W	171,861,356	62,725,923	-63.50%	46,164,798	-26.40%	45,322,632	-1.82%
GB haddock E	24,471,311	26,429,016	8.00%	21,252,562	-19.59%	15,167,804	-28.63%
GOM Haddock	3,448,030	1,818,814	-47.25%	1,715,196	-5.70%	1,439,619	-16.07
GB Yellowtail Flounder	3,564,875	1,814,404	-49.10%	2,517,679	38.76%	479,946	80.94%
SNE/MA Yellowtail Fl.	857,598	683,433	-20.31%	1,155,222	69.03%	1,675,513	45.04%
CC/GOM Yellowtail Fl.	1,895,975	1,717,401	-9.42%	2,072,345	20.67%	2,306,035	11.28%
Plaice	7,085,657	6,278,765	-11.39%	6,851,967	9.13%	7,226,753	5.47%
Witch Flounder	2,489,019	1,878,338	-24.53%	2,724,914	45.07%	3,192,294	8.34%
GB Winter Flounder	4,418,064	4,082,961	-7.58%	4,424,678	8.37%	7,467,057	68.76%
GOM Winter Flounder	835,552	348,330	-58.31%	348,330	0.00%	1,576,305	352.53%
Redfish	18,990,619	15,092,846	-20.52%	16,625,059	10.15%	18,653,483	10.40
White Hake	5,238,183	5,635,015	7.58%	6,556,548	16.35%	7,237,776	10.39%
Pollock	13,990,535	36,493,118	160.84%	30,758,895	-15.71%	27,804,700	-9.60%
Totals	**294,916,777**	**182,628,733**	**-38.07%**	**163,287,579**	**-10.59%**	**153,712,242**	**-5.86%**

Table 30 - Annual Catch Entitlement (ACE) and catch (Live lbs.)

	2010			2011			2012		
	Allocated ACE	Catch	% caught	Allocated ACE*	Catch	% caught	Allocated ACE*	Catch	% caught
Cod, GB East	717,441	562,610	*78%*	**431,334**	**357,578**	***83%***	350,835	148,576	*42%*
Cod, GB West	**6,563,099**	**5,492,557**	***84%***	9,604,207	6,727,837	*70%*	10,542,407	3,363,415	*32%*
Cod, GOM	**9,540,389**	**7,991,172**	***84%***	**11,242,220**	**9,561,153**	***85%***	9,008,557	4,808,408	*53%*
Haddock, GB East	26,262,695	4,122,910	*16%*	21,122,565	2,336,964	*11%*	15,126,216	806,562	*5%*
Haddock, GB West	62,331,182	13,982,173	*22%*	50,507,974	6,101,400	*12%*	51,898,296	1,832,577	*4%*
Haddock, GOM	1,761,206	819,069	*47%*	1,796,740	1,061,841	*59%*	1,599,136	540,299	*34%*
Plaice	6,058,149	3,305,950	*55%*	7,084,289	3,587,356	*51%*	7,771,254	3,530,494	*45%*
Pollock	35,666,741	11,842,969	*33%*	32,350,451	16,297,273	*50%*	30,670,586	14,097,873	*46%*
Redfish	14,894,618	4,647,978	*31%*	17,369,940	5,951,045	*34%*	19,933,122	9,751,824	*49%*
White hake	**5,522,677**	**4,687,905**	***85%***	**6,708,641**	**6,598,273**	***98%***	7,527,513	5,394,273	*72%*
Winter flounder, GB	4,018,496	3,036,352	*76%*	**4,679,039**	**4,241,177**	***91%***	7,752,484	4,256,996	*55%*
Winter flounder, GOM	293,736	178,183	*61%*	750,606	343,152	*46%*	1,590,301	568,828	*36%*
Witch flounder	**1,824,125**	**1,528,215**	***84%***	2,839,697	2,178,941	*77%*	3,409,459	2,162,678	*63%*
Yellowtail flounder, CC/GOM	1,608,084	1,268,961	*79%*	**2,185,802**	**1,743,168**	***80%***	**2,448,240**	**2,103,947**	***86%***
Yellowtail flounder, GB	**1,770,451**	**1,625,963**	***92%***	**2,474,662**	**2,176,921**	***88%***	802,654	474,540	*59%*
Yellowtail flounder, SNE	517,372	340,662	*66%*	**963,033**	**795,267**	***83%***	1,422,815	938,303	*66%*
Total	179,350,461	65,433,630	*36%*	172,111,201	70,059,346	*41%*	171,853,874	54,779,592	*32%*

Notes:
*includes carryover from the prior fishing year.
Stocks with > 80% ACE conversion highlighted in bold.
2010 and 2011 data from Murphy et al (Table 37, 2012). FY12 data from NERO.

6.5.9.2 Common Pool Harvesting Component

With the adoption of Amendment 16, most commercial 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 FY2012 (Table 32). The largest common pool catch (pollock, 67.8 mt) was only 0.8% of the total groundfish fishery catch of this stock. Common pool vessels caught 0.8% of the GOM cod and 0.2% of the GOM haddock groundfish fishery catch.

Common pool vessels with limited access permits landed 1.3M lbs. (landed lbs.) of regulated groundfish in FY2010, worth over $2M in ex-vessel revenues (Table 31). Landings declined to 518K lbs., worth about $850,000 in FY2011and declined again in FY2012 to 358K lbs., worth $642,000. Most common pool vessel groundfish fishing activity takes place in the state of Massachusetts. From FY2010 to FY2011, the activity from Maine ports declined dramatically and from FY2011 to FY2012 the decline can be seen in Massachusetts (Table 32). The primary ports for this activity over the last 4 years (FY2009-2012) are Gloucester, Portland, and New Bedford (Table 33)

Table 31 - Summary of common pool fishing activity

		A	C	D	E	HA	Total
FY2010	Permits landing groundfish	78	4	6	5	33	**126**
	Groundfish lbs. landed	1,256,311	1,843	2,012	596	35,367	**1,296,129**
	Groundfish revenues	$1,981,076	$4,727	$3,643	$682	$64,056	**$2,054,184**
FY2011	Permits landing groundfish	61	6	3	12	32	**115**
	Groundfish lbs. landed	401,715	31,844	2,836	1,990	80,441	**518,831**
	Groundfish revenues	$601,506	$62,408	$7,042	$2,634	$175,929	**$849,526**
FY2012	Permits landing groundfish	56	6		8	25	**98**
	Groundfish lbs. landed	281,212	52,955		1,954	22,251	**358,414**
	Groundfish revenues	$479,051	$109,630		$2,522	$51,132	**$642,414**

Notes: Confidential data excluded.

Table 32 - Common pool groundfish landings by state of trip (landed lbs.)

	FY2010	FY2011	FY2012
CT	1,574	2,561	1,579
MA	809,231	372,282	169,662
MD		88	375
ME	344,783	49,559	49,260
NC	315		
NH	6,547	25,912	26,634
NJ	13,128	19,060	20,628
NY	94,900	37,115	58,331
RI	24,712	12,248	31,944
VA	916		
Total	**1,296,106**	**518,825**	**358,414**

Note: Confidential data removed

Table 33 - Common pool groundfish landings by port (landed lbs.)

Port	FY2010	FY2011	FY2012
Gloucester, MA	372,481	260,347	150,405
Portland, ME	333,852	40,520	34,054
New Bedford, MA	278,221	39,884	8,248
Provincetown, MA	100,952	51,561	2,116
Montauk, NY	75,460	17,894	54,212
Sandwich, MA	40,385	2,666	0
Point Judith, RI	3,478	4,708	13,161
Little Compton, NY	20,787	7,478	15,952
Hampton Bays, NY	13,512	6,807	3,770
Plymouth, MA	4,527	4,444	0
Rye, NH	1,491	20,304	21,845
Point Pleasant, NJ	9,043	16,932	15,195

The primary groundfish stocks landed by common pool vessels include GOM cod, GB cod, and pollock (Table 34). GB haddock was an important component in FY2010 but not in FY2011 or FY2012. 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 FY2010 or FY2011, groundfish revenues were a major portion of revenues on groundfish fishing trips. Groundfish revenues were 80% or more of the trip revenues for 49% of these vessels; they were 60% of the revenues for 61.5% of these vessels. Dependence on groundfish was greatest for HA permitted vessels, with 70% of these vessels earning all revenues on these trips from regulated groundfish.

Table 34 - Common pool landings (landed lbs.) by permit category and stock

FY2010 Landings	A	C	D	E	HA	Total
GB Cod W	109,582	1,120	1,269		6,179	118,150
GOM Cod	350,947	651			17,048	368,646
GB Haddock W	177,033				202	177,235
GOM Haddock	12,257				995	13,252
GB Yellowtail Flounder	17,260					17,260
SNE Yellowtail Flounder	32,901			596		33,497
CC/GOM Yellowtail Flounder	35,969				245	36,214
Plaice	48,020				112	48,133
Witch Flounder	57,158					57,158
GB Winter Flounder	13,011					13,011
GOM Winter Flounder	45,172				250	45,423
SNE Winter Flounder	4,646					4,646
Redfish	14,007				763	14,769
White Hake	68,756				139	68,894
Pollock	265,840		730		9,156	275,726
Southern Windowpane	3,566					3,566
Halibut	162				255	417
Wolffish	3					3
Total	**1,256,290**	**1,771**	**1,999**	**596**	**35,344**	**1,296,000**
FY2011 Landings	**A**	**C**	**D**	**E**	**HA**	**Total**
GB Cod W	102,450	3,186	168		15,577	121,382
GB Cod E	3,340					3,340
GOM Cod	53,984	18,816	2,666		54,982	130,448
GB Haddock W	33,053				85	33,138
GOM Haddock	1,945	161			763	2,869
GB Yellowtail Flounder	3,944			1,521		5,465
SNE Yellowtail Flounder	25,272					25,272
CC/GOM Yellowtail Flounder	23,408	66		19		23,493
Plaice	10,213	686				10,899
Witch Flounder	9,448	972				10,420
GB Winter Flounder	2,411					2,411
GOM Winter Flounder	5,257	374				5,631
SNE/MA Winter Flounder	816					816
Redfish	7,208	38			147	7,393
White Hake	19,901	2,890			177	22,968
Pollock	89,533	4,653			7,644	101,830
Northern Windowpane	850					850
Southern Windowpane	8,607					8,607
Halibut					1,065	1,065
Total	**401,640**	**31,842**	**2,834**	**1,540**	**80,441**	**518,297**

FY2012 Landings	A	C	D	E	HA	Total
GB Cod W	38,725	266			9,428	48,419
GOM Cod	13,209	22,379	16		8,983	44,587
GB Haddock W	13,373					13,373
GOM Haddock	1,117	420			470	2,007
GB Yellowtail Flounder	758			1,550		2,308
SNE Yellowtail Flounder	77,293			285		77,578
CC/GOM Yellowtail Flounder	876	799				1,675
Plaice	4,028	1,443				5,471
Witch Flounder	3,671	795				4,466
GB Winter Flounder	1,626					1,626
GOM Winter Flounder	669	1,775				2,444
SNE Winter Flounder	278					278
Redfish	11,678	253			25	11,956
White Hake	19,936	10,586			160	30,682
Pollock	92,614	14,221			3,122	109,957
Southern Windowpane	940					940
Ocean Pout		18				18
Halibut	218					218
Total	**281,010**	**52,955**	**16**	**1,835**	**22,188**	**358,004**

6.5.9.3 Recreational Harvesting Component

The recreational fishery includes private anglers, party boat operators, and charter vessel operators. Several groundfish stocks are targeted by the recreational fishery, including GOM cod, GOM haddock, pollock, and GOM winter flounder. GB cod and haddock are targeted as well, but to a lesser extent. 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.

Recreational removals of GOM cod declined by 72% from FY2011 to FY2012, but then increased slightly in FY2013. Removals of GOM haddock were more equivalent through the time series. The number of angler trips also declined by about 30% (Table 35). There were 122 active party or charter vessels catching cod or haddock in the Gulf of Maine in 2013, down from of 188-195 vessels between 2004-2010.

Table 35 - Recent recreational fishing activity for GOM cod and GOM haddock

	FY2011	**FY2012**	**FY2013**
Angler Trips	235,343	182,999	225,624
Cod Total Catch (numbers, a+b1+b2)	1,389,408	846,655	879,366
Cod Removals (numbers, a+b1+(0.3*b2)))	773,085	410,231	491,568
Cod Removals (weight, mt)	2,116	596	706
Haddock Total Catch (numbers, a+b1+b2)	184,709	369,427	654,227
Haddock Total removals (numbers, a+b1)	146,042	166,610	146,976
Haddock Total Removal (weight, mt)	231	211	256

Note: FY2013 catches are an estimate since not all data are available.

Table 36 - Recreational vessels catching cod or haddock from the Gulf of Maine

Calendar Year	Party	Charter	Total
1999	53	100	153
2000	48	103	151
2001	59	116	175
2002	43	130	173
2003	53	128	181
2004	64	124	188
2005	60	135	195
2006	62	126	188
2007	52	133	185
2008	54	128	182
2009	48	131	179
2010	60	135	195
2011	47	128	175
2012	44	108	152
2013	31	89	120

Notes: Includes catch (kept and discarded) from any of the Gulf of Maine statistical areas.
Source: NERO, January 2014.

6.5.10 Windowpane Flounder Catches in the Groundfish Fishery

This section provides background information in terms of the recent stock assessment for both windowpane flounder stocks, updated information from the NEFSC seasonal trawl surveys, the current management system, groundfish fishery AMs implemented in FY 2014, and recent trends in discards.

Background

The Council initiated FW 52 at its February 2014 meeting. The purpose of FW52 is to revise accountability measures (AMs) for the commercial groundfish fishery for southern and northern windowpane flounder stocks. The current AMs were triggered for FY 2014 due to overages of the overall annual catch limits (ACLs) in FY 2012 for both windowpane stocks. The Council requested that any revision to the current AMs be applied retroactive to FY 2014, or any overages that occurred prior to FY 2014.

The Council expressed concern that the current gear restricted area AMs may not effectively prevent overages, and could negatively impact the groundfish fishery, in particular due to considerable economic losses in targeted flatfish fisheries (e.g., winter flounder and yellowtail flounder fisheries). The Council also discussed whether the current status of the stocks should be considered when determining if AMs should be implemented. Any revisions to the AMs for windowpane flounder would be intended to mitigate overages that have already occurred, better ensure that additional overages do not occur in FY 2014 and beyond, and help minimize economic impacts of the AMs on the commercial groundfish fishery.

Current Management System

Neither windowpane flounder stock is allocated to groundfish sectors (i.e., non-allocated stocks), and possession is prohibited. Because the stocks are not allocated to sectors, the AMs apply to the entire commercial groundfish fishery (sector and common pool vessels), and sectors may not request an exemption from these AMs. For northern windowpane flounder, no other fishery receives an allocation of this stock. As a result, the commercial groundfish fishery is 100% accountable for any overages of the overall ACL, regardless of what fishery caused the overage. For FY 2013 and beyond, the scallop fishery and the “other” sub-component receive an allocation of southern windowpane flounder, and thus, the AMs for southern windowpane are only triggered for a fishery if it exceeds its sub-ACL, and the overall ACL is also exceeded.

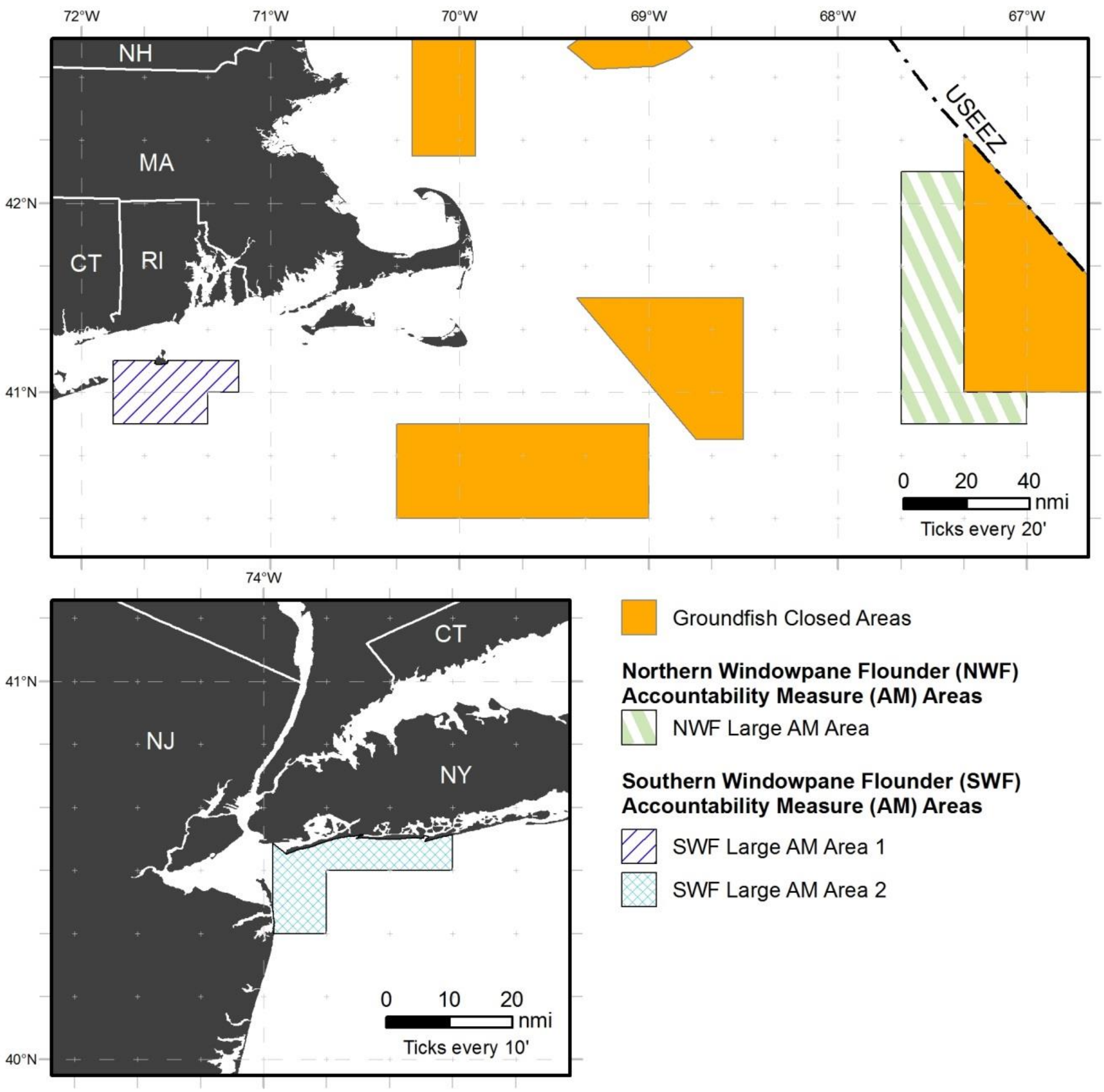
Groundfish Fishery AMs- The groundfish fishery AM for either stock of windowpane is implemented if the total ACL is exceeded by more than the management uncertainty buffer (which is approximately 5%), and in the case of southern windowpane, if the groundfish fishery also exceeds its sub-ACL.

Common pool and sector vessels fishing on a groundfish trip with trawl gear are required to use selective trawl gear to minimize catch of flatfish (e.g., separator trawl, Ruhle trawl, mini-Ruhle trawl, or rope separator trawl) when fishing in the AM areas (Figure 11). Only the small AM area is implemented if the ACL overage is less than 20%, and the large AM areas are implemented if the ACL overage is more than 20%. The AM does not apply to longline or gillnet gear since these gears comprise such a small amount of the total catch of windowpane flounder.

The AM is only implemented at the start of the fishing year, and never inseason. Inseason catch information is not readily available for state or non-groundfish fisheries, so a final ACL determination cannot typically be made until after the fishing year ends. The AM is implemented:

- <u>At the start of Year 2</u> if, based on reliable data, NMFS determined inseason during Year 1 that the total ACL was exceeded; or
- <u>At the start of Year 3</u>, if final catch estimates after the end of Year 1, indicate that the total ACL was exceeded.

Figure 11 - Northern and southern windowpane flounder AM areas as triggered for FY 2014.



<u>FY 2012 Windowpane Flounder Catches</u>

The ACLs for both windowpane flounder stocks were exceeded in FY 2012 thus triggering the AMs. The northern windowpane flounder catch limit was exceeded by 28%, and the southern windowpane flounder catch limit was exceeded by 36% (Table 37). Below additional detail on the non-groundfish fisheries catches for FY 2012 is also provided (Table 38).

Table 37 - FY 2012 windowpane flounder catches by the groundfish fishery and other fisheries.

Stock	OFL (mt)	ABC (mt)	Total ACL (mt)	Catch (mt)				% of Catch Limit Caught
				Total	Groundfish Fishery	State Waters	Non-Groundfish Fisheries	
Northern windowpane flounder	**230**	**173**	**163**	209	130	2	77	128%
Southern windowpane flounder	**515**	**386**	**381**	521	107	34	380	136%

Table 38 - FY 2012 windowpane flounder catch detail for non-groundfish fisheries.

Stock	Scallop	Fluke	Scup	Small-Mesh Fisheries (squid/whiting)	Unknown
Northern windowpane flounder	75.7	0.0	0.0	1.0	0.0
Southern windowpane flounder	125.8	75.9	65.8	28.0	80.4

Preliminary FY 2013 Windowpane Flounder Catches

Preliminary FY 2013 catch estimates for both stocks of windowpane flounder are presented in Table 39 based on data reported through April 30, 2014. Inseason catch estimates are not available for state waters or the other sub-component. The preliminary FY 2013 catch estimate for northern windowpane flounder (237 mt), which only includes commercial groundfish catches, exceeds both the FY 2013 ABC (151 mt), and the FY 2013 OFL (202 mt) (Table 40).

Table 39 - Preliminary FY 2013 windowpane flounder catches, data as reported through 6/30/2014.

Stock		Total	Groundfish	Scallop	State Waters	Other sub-component
Northern windowpane	Catch Limit	144	98	NA	2	44
	Preliminary FY 2013 Catch	237	237	NA	NA	NA
Southern windowpane	Catch Limit	527	102	183	55	186
	Preliminary FY 2013 Catch	224	120	104	NA	NA

2014 Windowpane AMs for the Groundfish Fishery

Due to the FY 2012 overages for both windowpane stocks, the respective AMs will be implemented for FY 2014. In addition because the overages for both stocks was greater than 20% of the ACL, both the large AM areas will be triggered for northern and southern windowpane (Figure 11). The AM will only apply to commercial groundfish vessels. Allocations for the scallop fishery and the other sub-component were not made until FY 2013, so groundfish vessels will be held 100% accountable for the FY 2012 overage, regardless of what fisheries contributed to the overage.

OFLs, ABCs, and ACLs for FY 2013-2015

The ABCs for FY 2013-FY 2015 for both stocks of windowpane flounder were held constant (Table 40). The SSC concluded that the index-based assessment projections for both windowpane flounder stocks are too unreliable for determining ABCs, and therefore, were not used to determine specifications for the windowpane flounder stocks. Instead, OFLs and ABCs were estimated from the most recent three year average of biomass from the fall survey. The OFL was calculated as the F_{MSY} proxy applied to the most recent biomass estimate. The ABC was calculated as 75% of F_{MSY} applied to the most recent biomass estimate. These specifications were implemented through FW 50 (see Appendix III to FW 50 for additional details).

Table 40 - OFLs, ABCs, and ACLs for FY 2013, FY 2014 and FY 2015 for both windowpane flounder stocks.

Stock	Year	OFL	ABC	Total ACL	Groundfish	Scallop	State Waters	Other sub-component
Northern windowpane	2013 2014 2015	202	151	144	98	NA	2	44
Southern windowpane	2013 2014 2015	730	548	527	102	183	55	186

Recent Assessment **-** Both stock assessments for the Northern (Gulf of Maine – Georges Bank) and Southern New England windowpane stocks are index based assessments using the AIM model.

However, the SSC concluded that the AIM model projections for both windowpane flounder stocks are too unreliable for determining ABCs. Subsequently, the windowpane flounder ABCs were estimated using a three year average of the fall biomass index multiplied by 75%F_{MSY}. This estimate was held constant for the three years specified (FY 2012-FY 2014).

In addition, fall windowpane flounder R/V Bigelow conversion coefficients were estimated at 1.901 for biomass and 2.044 for abundance. While, spring conversion coefficients were estimated at 3.311 for abundance and 3.069 for biomass. The R/V Bigelow survey indices were converted to R/V Albatross units.

Status of the Stocks

Both windowpane flounder stocks are assessed using a lagging 3-year moving average of the NEFSC fall survey biomass index. These assessments are based on data from fall NEFSC bottom-trawl surveys because the fall surveys demonstrate a stronger relationship with the fishery catch time series compared to the spring surveys (see GARM III). The stock assessments for windowpane flounder were most recently updated in 2012, and the assessment had a terminal year of 2010. A summary of the 2012 assessment results for both stocks is below. The assessments for both stocks are tentatively scheduled to be updated in early 2015, though it is unclear if the results of these updates will be available in time for the start of the 2015 fishing year, which begins on May 1, 2015.

Northern (GOM/GB) Windowpane Flounder**-** Biomass indices for this stock 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. Biomass was 29% of B_{MSY} in 2010 (NEFSC 2012). According to the 2012 assessment update, the stock was overfished and overfishing was occurring in 2010.

Southern (SNE/MAB) Windowpane Flounder- In 2009 and 2010, biomass indices for this stock were above the median, and the 2010 biomass was well above the B_{MSY} proxy (146%). According to the 2012 assessment update, the stock is not overfished and overfishing was not occurring (NEFSC 2012). As a result, NOAA Fisheries declared this stock rebuilt in May 2012.

Recent Survey Catches and Distribution

Survey Trends- The converted spring survey indices show a larger shift in the index for both stocks when the R/V Bigelow series began in 2009 (Figure 12-Figure 15). It is not clear if this is a reflection of increases in biomass or due to uncertainty with the calibration factors. The fall northern windowpane flounder stock biomass index increased in 2010 but the 2010-2011 indices were relatively low in comparison to previous years (Figure 12-Figure 13). Increases in the biomass indices from 2009-2013 relative to the mid-2000s were seen for the southern windowpane flounder stock (Figure 14-Figure 15).

Distribution- In general, windowpane founder are widely distributed across the shallower potions of Georges Bank and inshore waters of the Mid-Atlantic and Southern New England (Figure 16-Figure 17). Windowpane flounder are also more widely distributed into relatively deeper water in the spring survey in comparison to the fall survey.

Figure 12- Fall survey biomass index, stratified mean weight per tow (top), and survey abundance index, numbers per tow (bottom) for Northern (Gulf of Maine – Georges Bank) windowpane flounder. R/V Albatross trawl door, gear, and vessel conversion factors applied as appropriate. R/V Bigelow abundance and weight conversion factors applied from 2009-2013. Bootstrap 90% confidence intervals are also shown. Data Source: NEFSC fall bottom-trawl surveys 1975-2013.

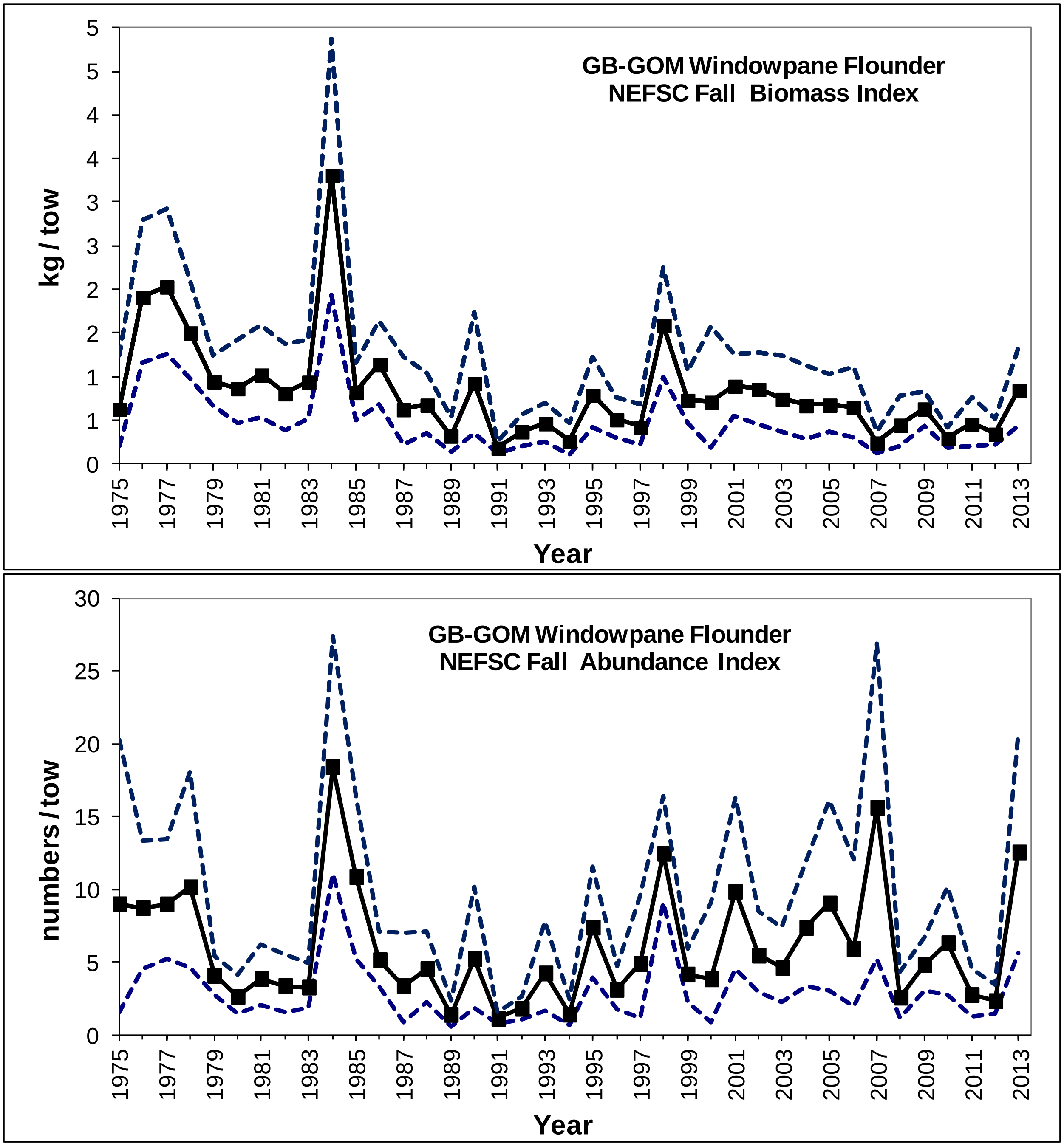


Figure 13 - Spring survey biomass index, stratified mean weight per tow (top), and survey abundance index, numbers per tow (bottom) for Northern (Gulf of Maine – Georges Bank) windowpane flounder. R/V Albatross trawl door, gear, and vessel conversion factors applied as appropriate. R/V Bigelow abundance and weight conversion factors applied from 2009-2013. Bootstrap 90% confidence intervals are also shown. Data Source: NEFSC spring bottom-trawl surveys 1975-2013.

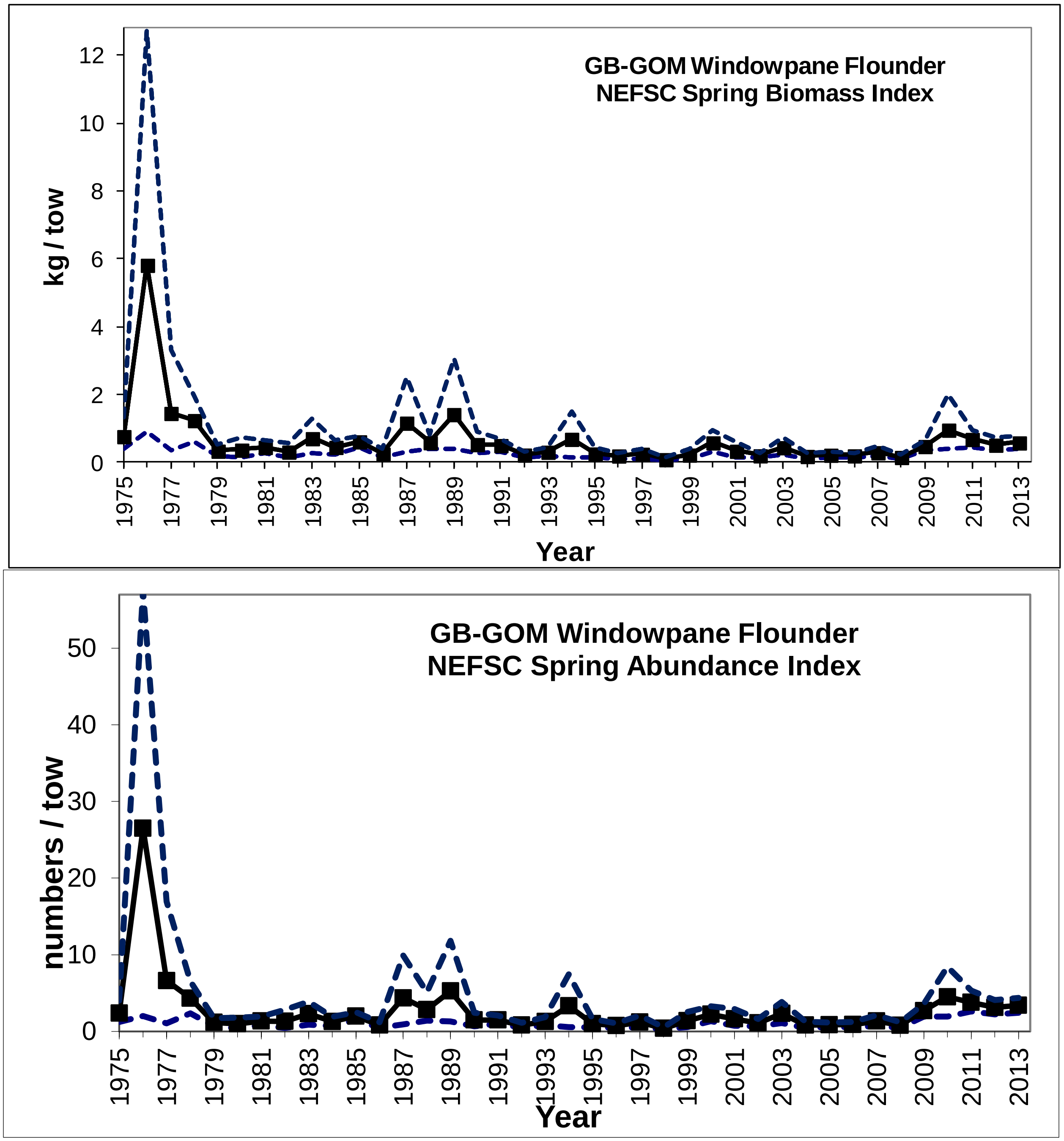


Figure 14 - Fall survey biomass index, stratified mean weight per tow (top), and survey abundance index, numbers per tow (bottom) for Southern (SNE) windowpane flounder. R/V Albatross trawl door, gear, and vessel conversion factors applied as appropriate. R/V Bigelow abundance and weight conversion factors applied from 2009-2013. Bootstrap 90% confidence intervals are also shown. Data Source: NEFSC fall bottom-trawl surveys 1975-2013.

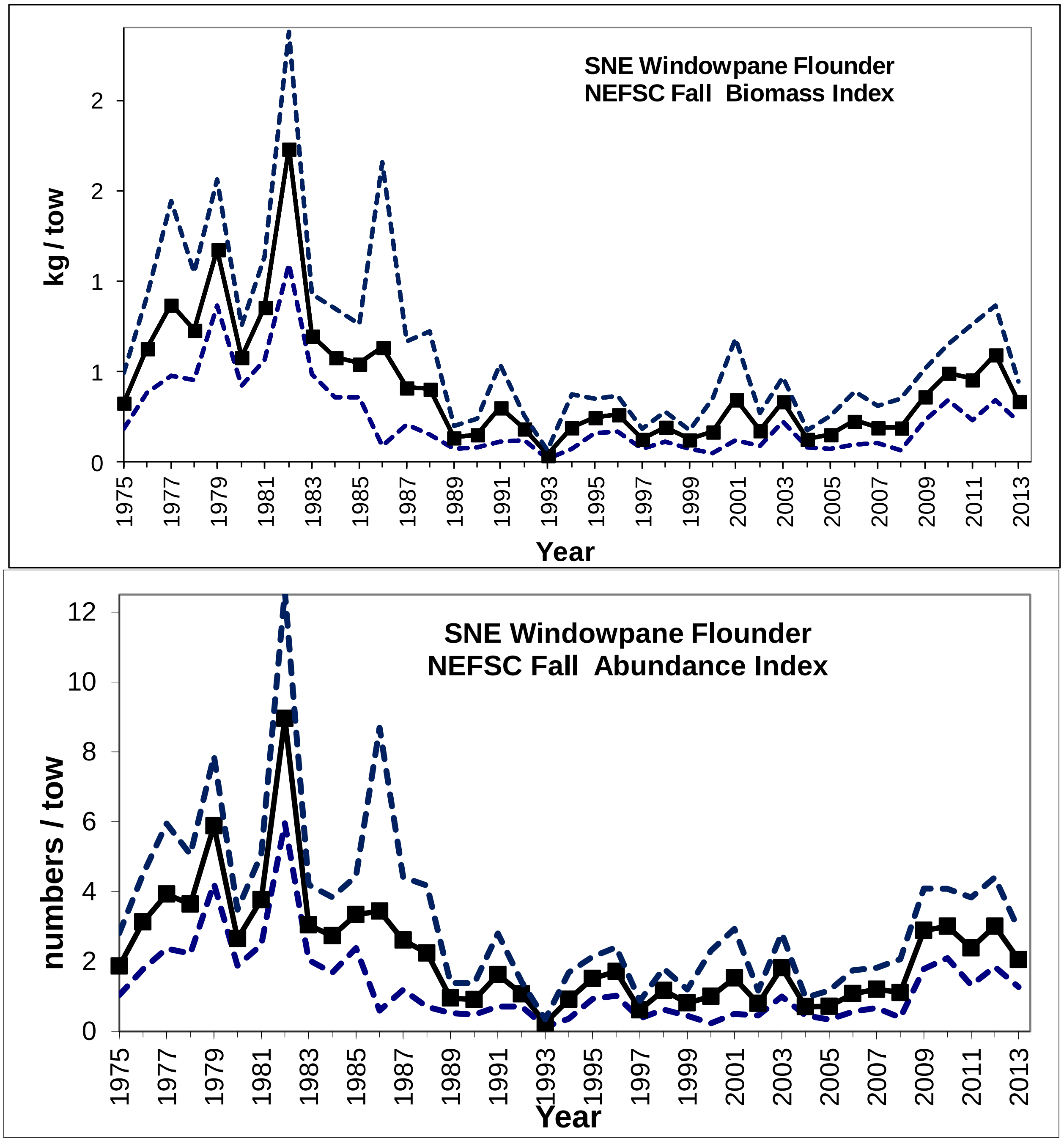
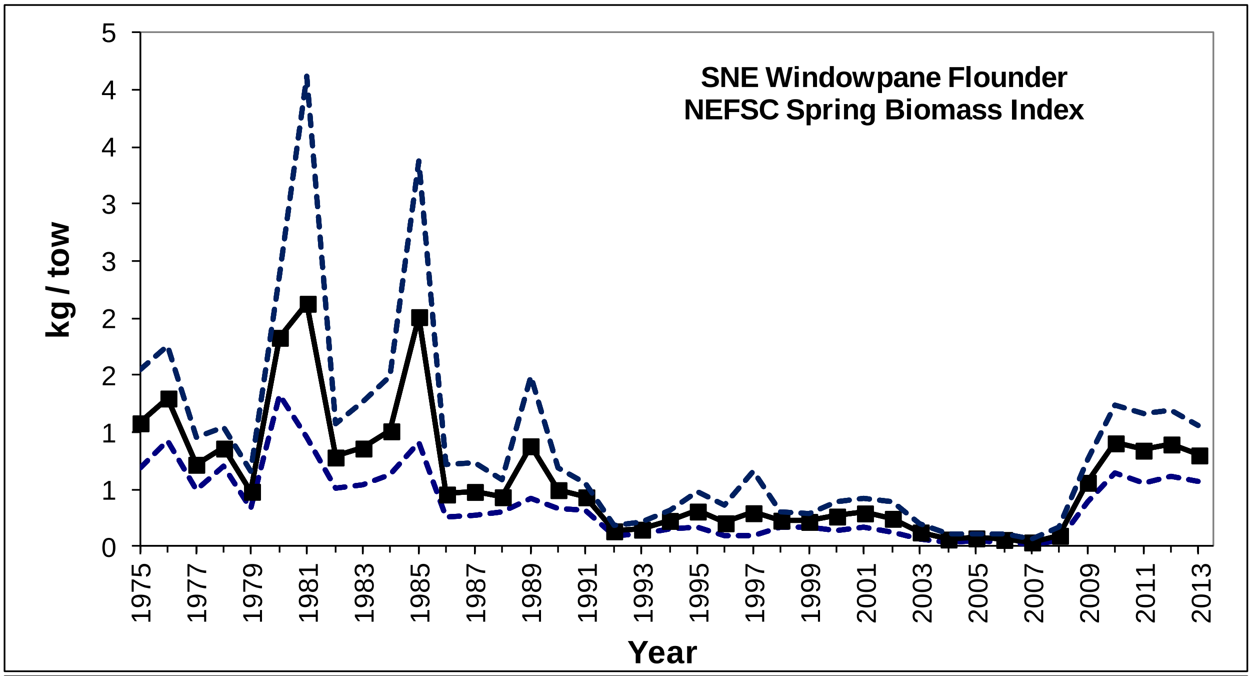


Figure 15 - Spring survey biomass index, stratified mean weight per tow (top), and survey abundance index, numbers per tow (bottom) for Southern (SNE) windowpane flounder. R/V Albatross trawl door, gear, and vessel conversion factors applied as appropriate. R/V Bigelow abundance and weight conversion factors applied from 2009-2013. Bootstrap 90% confidence intervals are also shown. Data Source: NEFSC spring bottom-trawl surveys 1975-2013.



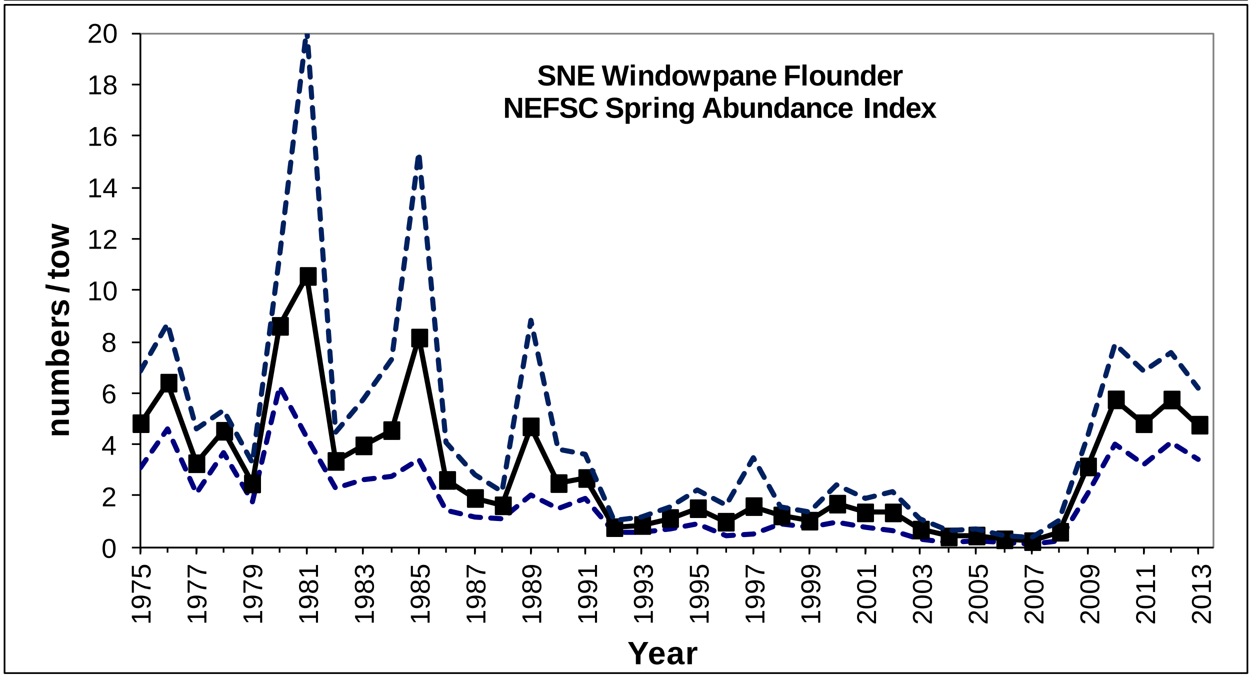


Figure 16 - Fall windowpane flounder bottom-trawl survey catches (number/tow) by year (2008-2013). Each black circle represents a survey tow with windowpane flounder catch present (i.e., survey tows with zero catches are not shown). The relative size the black circle represents the of the survey catch compared to other survey catches; the location of the survey tow is at the center of the circle. Note that surveys after 2008 were conducted on the R/V Bigelow. Data Source: NEFSC fall bottom-trawl surveys, 2008-2013. Maps are courtesy of the NEFSC.

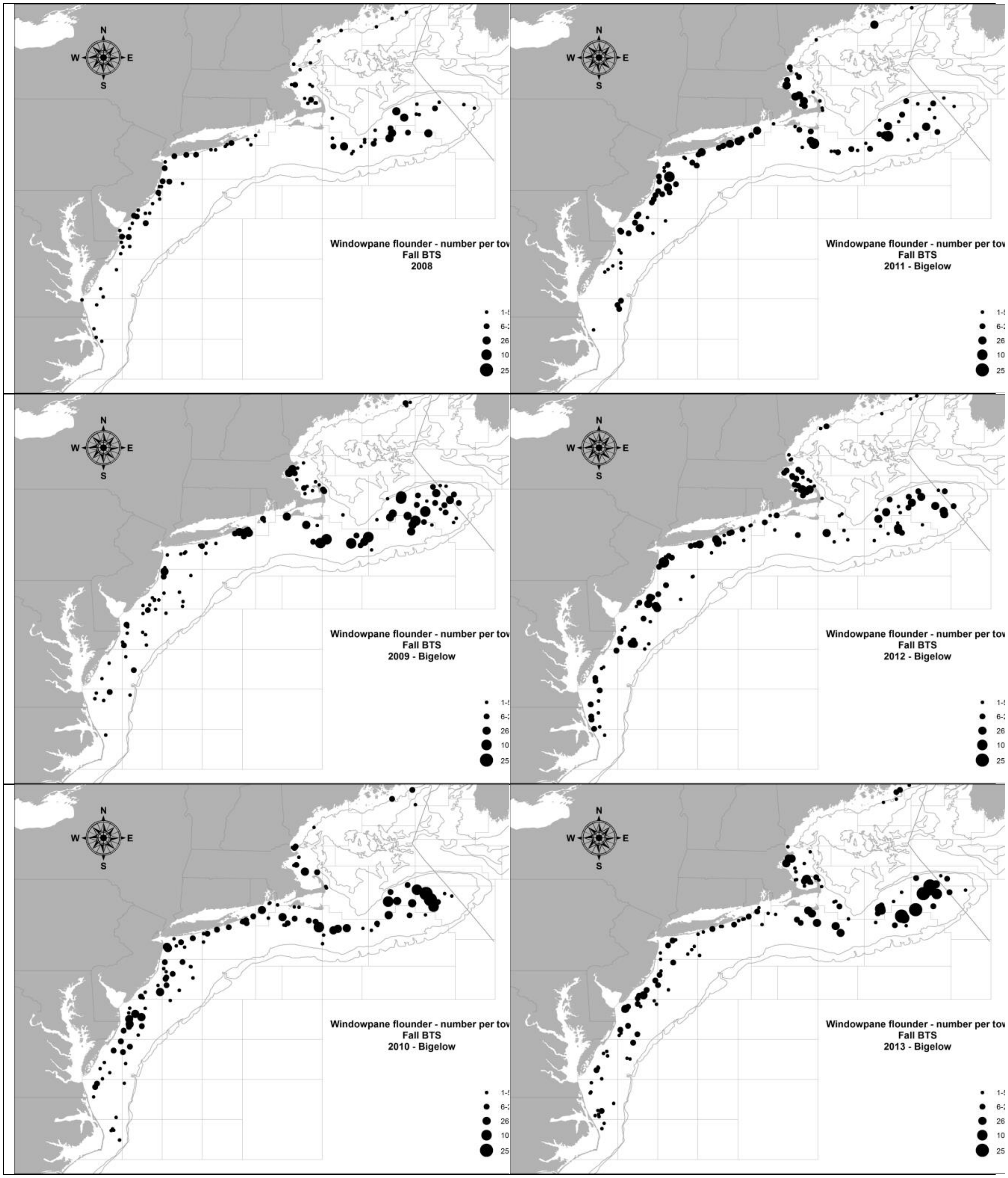
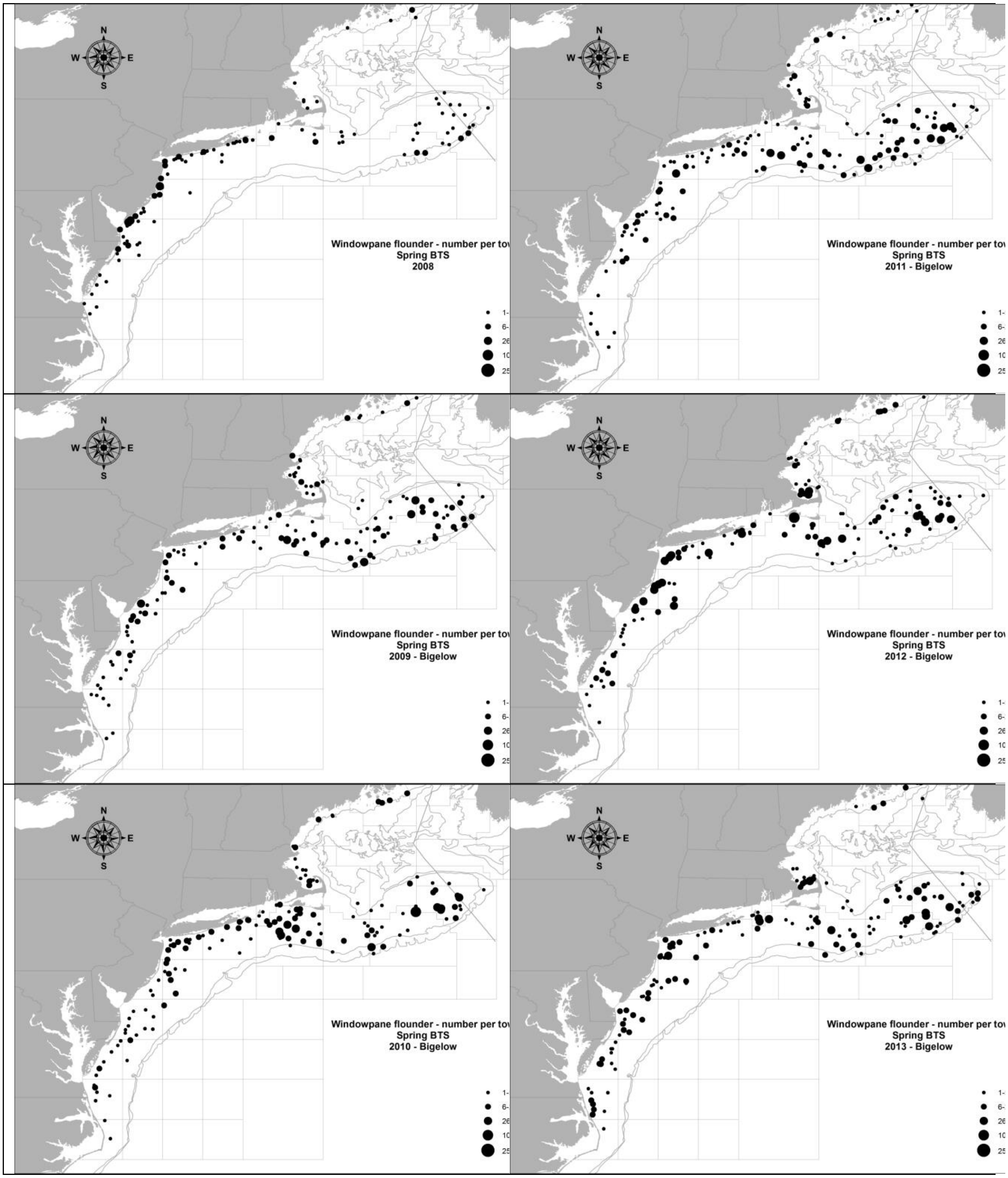


Figure 17 - Spring windowpane flounder bottom-trawl survey catches (number/tow) by year (2008-2013). Each black circle represents a survey tow with windowpane flounder catch present (i.e., survey tows with zero catches are not shown). The relative size the black circle represents the of the survey catch compared to other survey catches; the location of the survey tow is at the center of the circle. Note that surveys after 2008 were conducted on the R/V Bigelow. Data Source: NMFS fall bottom-trawl surveys, 2008-2013. Maps are courtesy of the NEFSC.



<u>Spatial and Temporal Patterns in Observed Discards of Windowpane Flounder</u>

Strong seasonal patterns in discards of windowpane were not observed when the PDT developed the original AMs in Framework Adjustment 47 (FW 47). The analysis to develop the AM areas in FW 47 included an examination of windowpane flounder discards and fishing effort data in a spatially explicit model.

For the purposes of this analysis, a sub-group of the PDT examined 2012 and 2013 data in an exploratory data analysis to examine if seasonal patterns in windowpane flounder discards were evident. The group has not had the opportunity to compare or adjust these patterns relative to the overall distribution of fishing effort data, or examine if these patterns are only reflected in recent data (i.e., do patterns persist when compared to previous years). Therefore, these observations should be considered preliminary at this time.

Temporal Trends in Recent Catches

The 2012 and preliminary 2013 fishing year trawl catch monitoring data from the Data Matching and Imputation System (DMIS) was used to determine if seasonal patterns in the discarding of windowpane flounder by stock has changed recently in the groundfish fishery.

Discard to kept all ratios from observed trips by month from fishing years 2012-2013 were used to detect possible seasonal discard patterns for each stock (Figure 18 and Figure 19). Trends in the total observed discards of windowpane flounder and the kept all species are also shown to aid in the interpretation of discard ratios (e.g., discard rates can increase due to a decrease in the kept all in a particular month).

Strong seasonal trends in the discard rate were not apparent for either stock. In addition, discard estimates through catch monitoring are not stratified over the course of a fishing year.

The Northern windowpane flounder stock (GOM-GB) had higher discard rates in many months in 2013 relative to 2012 (Figure 18). However discard rates were lower in January-March in both 2013 and 2014 (FY 2012 and 2013 respectively) for the GOM-GB stock.

Seasonal trends in discard rates for the Southern windowpane flounder stock (SNE) were less apparent (Figure 19). However, there were more seasonal trends in the observed kept all for the SNE stock. The SNE stock appears to have less groundfish effort from August to September. Note that no observed trips occurred in July and September of 2012 in SNE.

Spatial Trends in Recent Catches

Spatial trends in windowpane flounder were examined on all observed trawl hauls (NEFOP and ASM, from the Observer Database System, OBDBS) which caught windowpane flounder in calendar year 2012 and 2013. A small number of observed trips had kept landings of windowpane flounder.

Overall, most hauls catch less than 25 pounds of windowpane flounder as show in Figure 20 and Figure 21. Throughout the year, catches below and above 25 pounds occur in similar locations (Figure 22). Therefore, all catches were included in the following examination of the data.

Spatial patterns of all windowpane flounder catches were further examined with bimonthly groupings of hauls: January-February, March-April, Mary-June, July-August, September- October, and November to December (Figure 23 and Figure 24) separately for each year. Table 41 provides a summary of the data included in these groupings.

In general, there seems to have been more trawl effort (based on data in the OBDBS) on the northern edge of Georges Bank in 2013, which may have contributed to higher discards of windowpane flounder for the GOM-GB stock in 2013 relative to 2012 (Figure 22). In addition, there also appears to be more effort and windowpane discards coming from the northern edge of Georges Bank (within statistical area 522) in the first half of the fishing year (May - October) relative to the second half for both years (2012-2013). Statistical area 522 for the first half of the fishing year may be an appropriate alternative gear restricted area to the existing AM area for the GOM-GB stock. However, these preliminary findings would need to be examined further with other information to verify these conclusions.

For the SNE stock the gear restricted areas seem to be in areas where most of the discards were occurring in 2012 and 2013. There appears to be less effect of season for SNE windowpane discards.

Table 41- Observed bimonthly NEFOP and ASM trawl tow (hauls) data that caught windowpane flounder and had point location information.

year	months	Number of tows	total observed windowpane discards (lbs)	observed maximum (lbs)
2012	Jan-Feb	933	49,795	746
2012	March-April	893	50,074	1,311
2012	May-June	568	11,293	755
2012	July-Aug	373	6,990	179
2012	Sept-Oct	623	22,937	582
2012	Nov-Dec	999	27,976	583
2013	Jan-Feb	491	17,323	317
2013	March-April	776	29,990	441
2013	May-June	1,058	70,394	3,364
2013	July-Aug	989	32,726	412
2013	Sept-Oct	559	23,709	711
2013	Nov-Dec	659	23,465	509

Figure 18- Discard ratios (discard / kept all) (top), windowpane total observed discards (middle), and total observed kept all (bottom) by month for the GOM-GB windowpane stock using trawl gear in the groundfish fishing over the 2012-2013 fishing year using DMIS data.

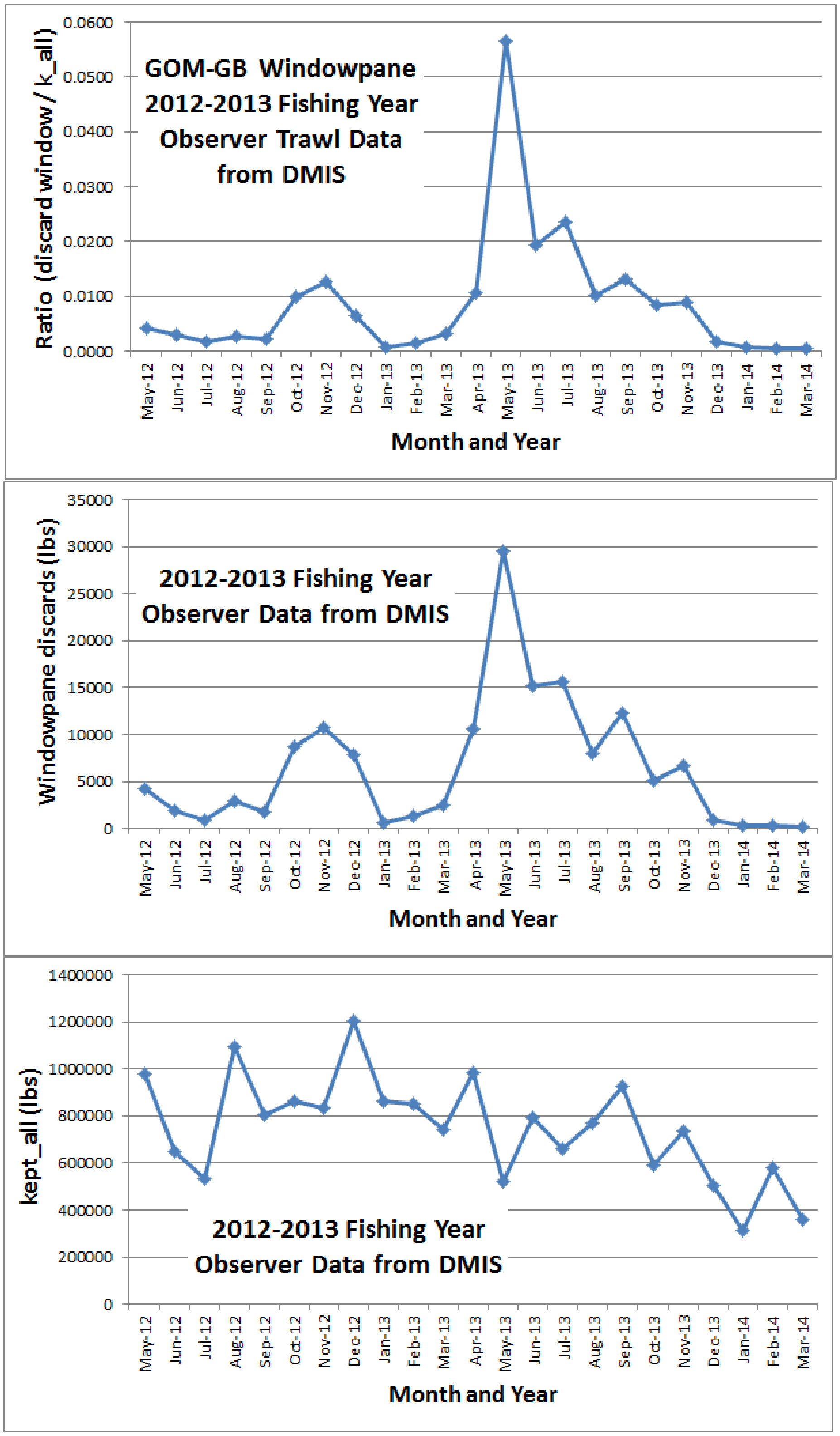


Figure 19- Discard ratios (discard / kept all) (top), windowpane total observed discards (middle), and total observed kept all (bottom) by month for the SNE windowpane stock using trawl gear in the groundfish fishing over the 2012-2013 fishing year using DMIS data. Note that no observed trips occurred in July and September of 2012 in SNE.

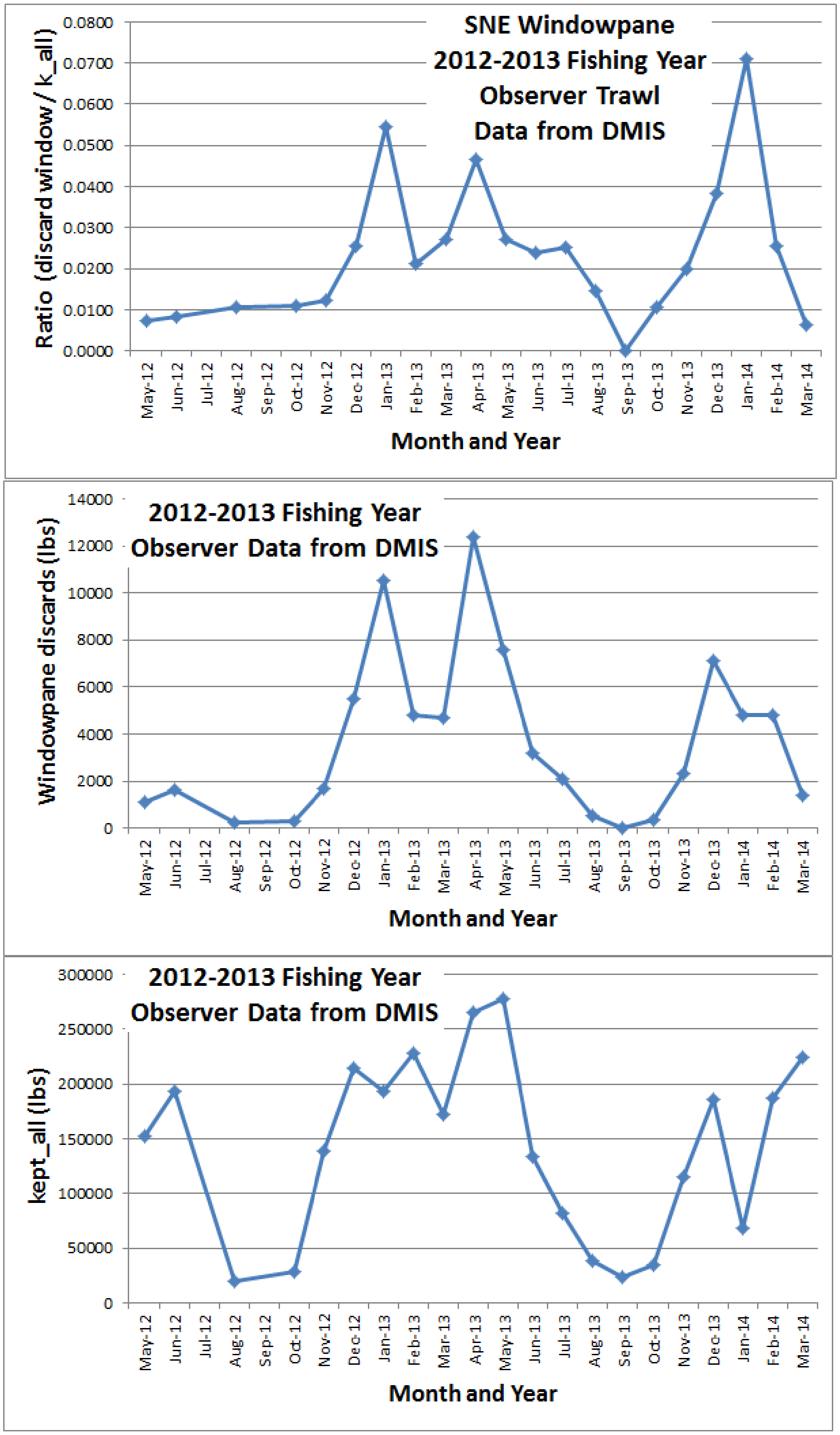


Figure 20- Frequency of NEFOP and ASM observed calendar year 2012 trawl tows which caught windowpane flounder by different weight bins. Total number of trips and tows observed is also given.

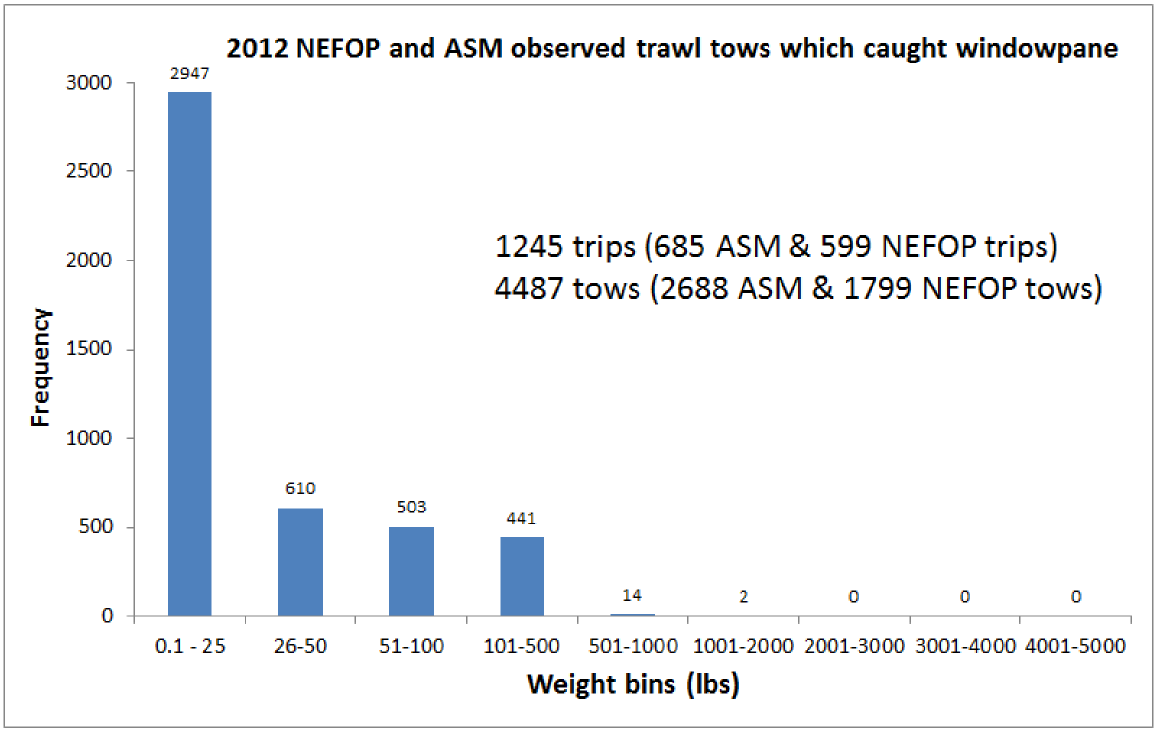


Figure 21- Frequency of NEFOP and ASM observed calendar year 2013 trawl tows which caught windowpane flounder by different weight bins. Total number of trips and tows observed is also given.

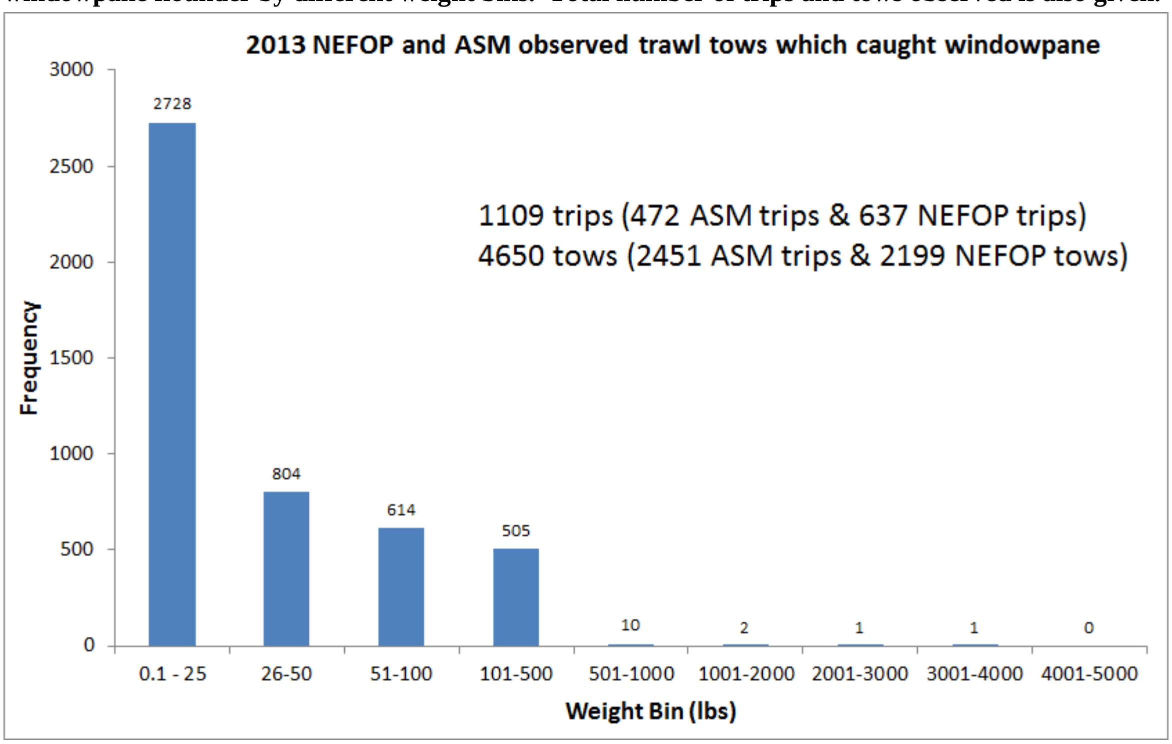


Figure 22 – Commercial trawl fishery windowpane flounder catches (lbs/haul) by calendar year (2012- left panels and 2013- right panels) and level (tows with 25 lbs or less- top panels, tows with greater than 25 lbs- bottom panels). Each circle represents a haul with windowpane flounder catches present (i.e., hauls with zero catches are not shown). The relative size the circle represents the magnitude of the catches, with the location of the haul at the center. Source: NEFOP and ASM, 2012-2013. Maps are courtesy of the NEFSC.

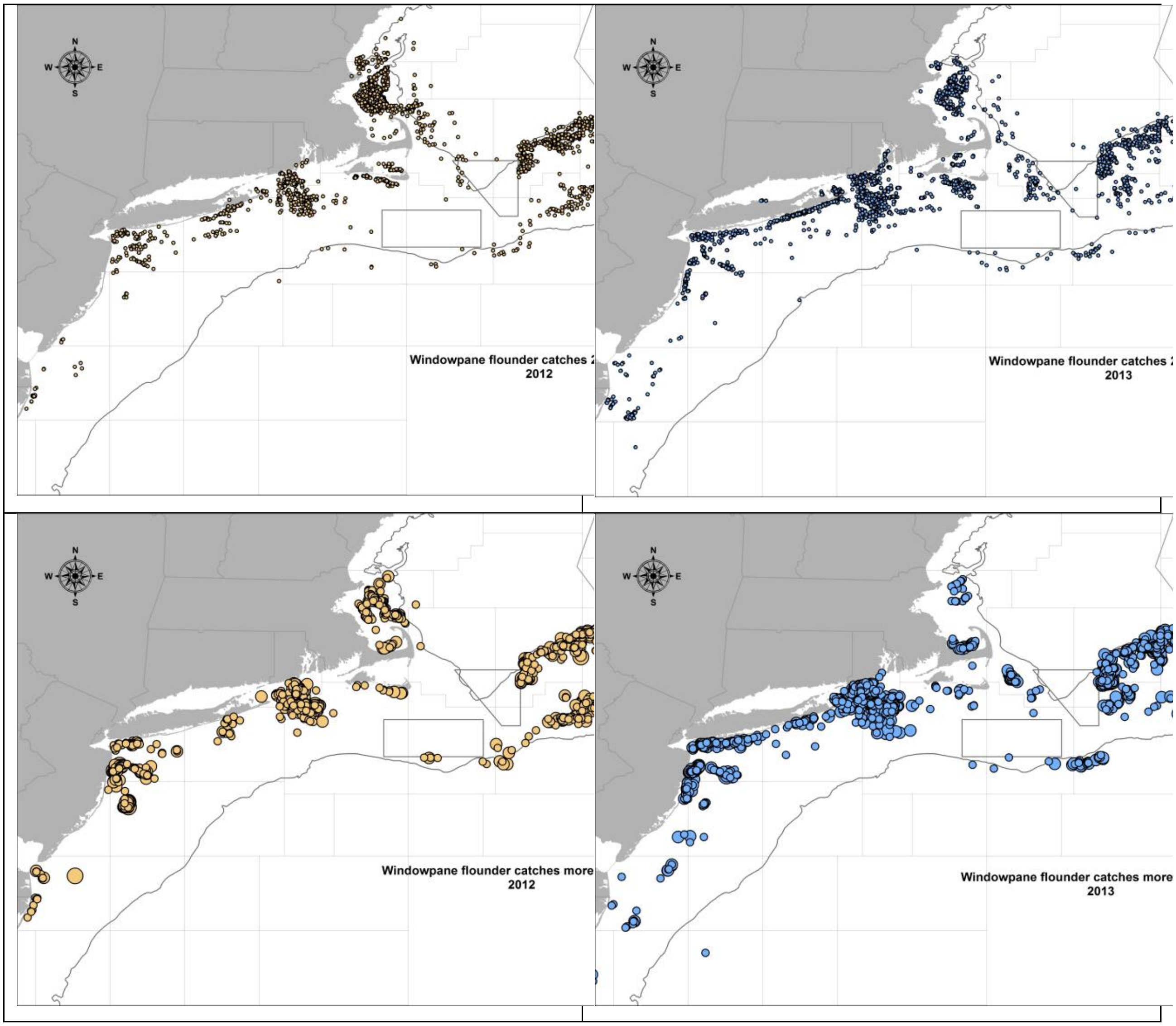


Figure 23- Commercial trawl fishery windowpane flounder catches (lbs/haul) by calendar year (2012- left panels and 2013- right panels) and bimonthly grouping (January-February, March-April, and May-June). Each circle represents a haul with windowpane flounder catches present (i.e., hauls with zero catches are not shown). The relative size the circle represents the magnitude of the catches, with the location of the haul at the center. Source: NEFOP and ASM, 2012-2013. Maps are courtesy of the NEFSC.

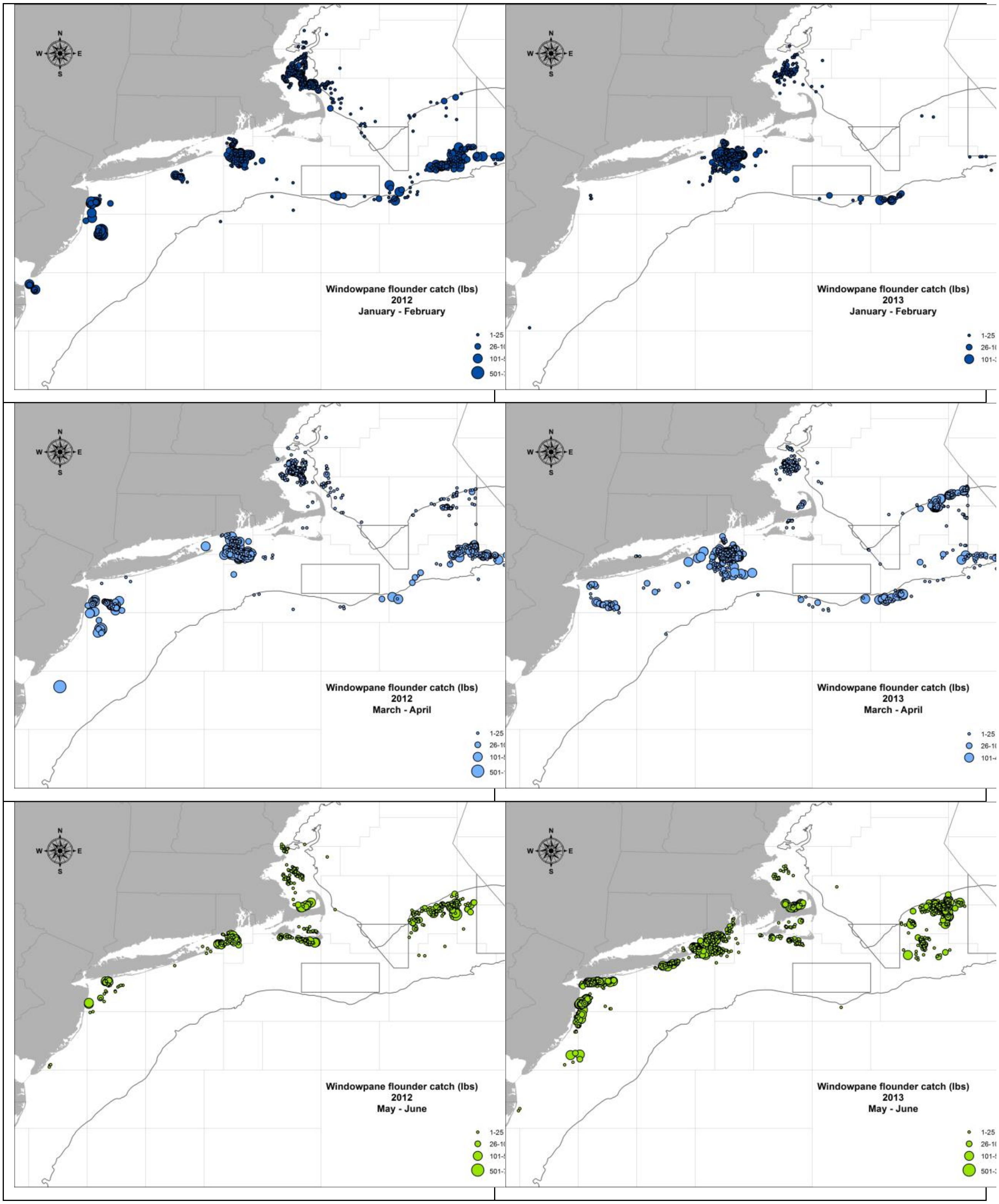
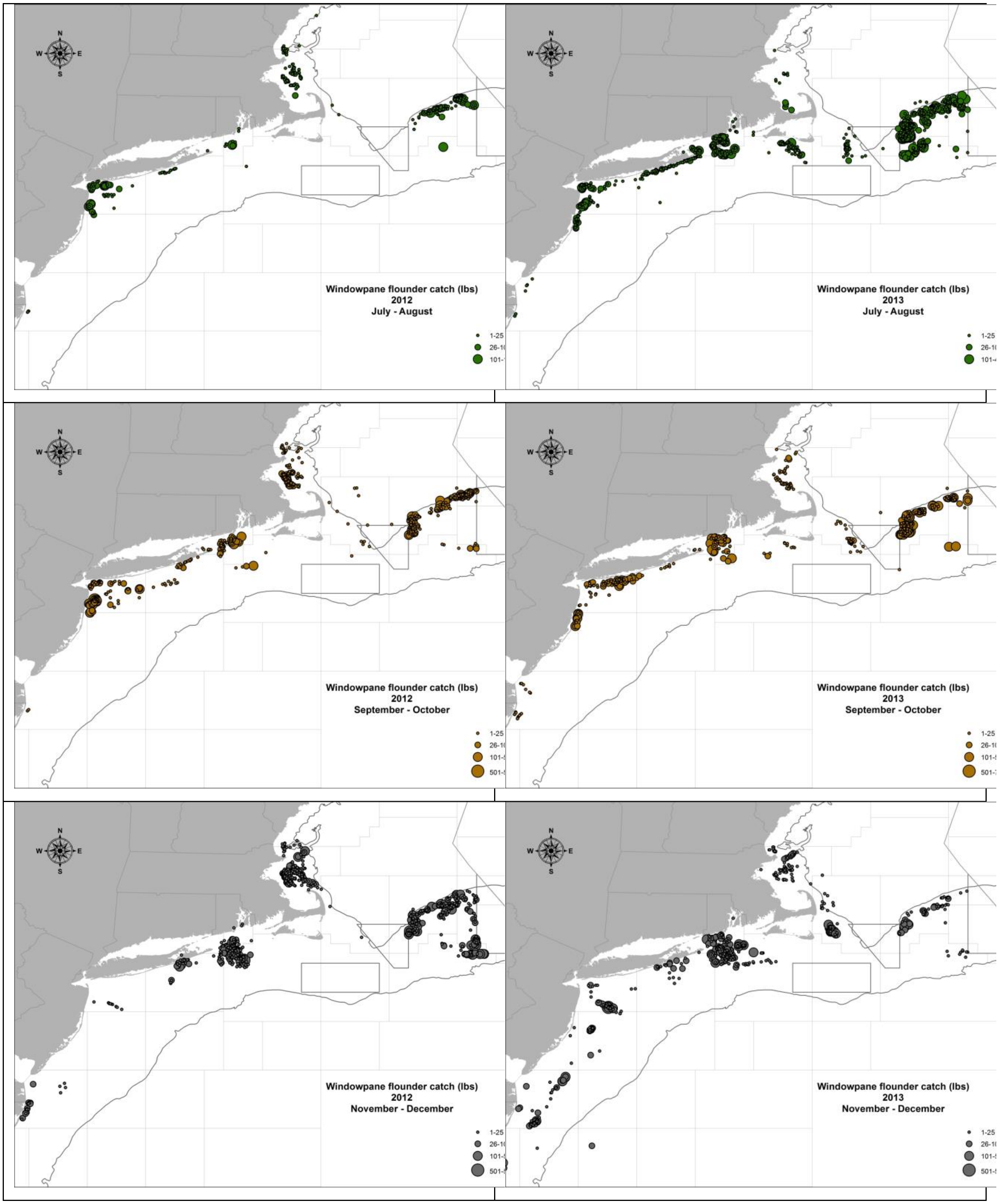


Figure 24- Commercial trawl fishery windowpane flounder catches (lbs/haul) by calendar year (2012- left panels and 2013- right panels) and bimonthly grouping (July-August, September-October, and November-December). Each circle represents a haul with windowpane flounder catches present (i.e., hauls with zero catches are not shown). The relative size the circle represents the magnitude of the catches, with the location of the haul at the center. Source: NEFOP and ASM, 2012-2013. Maps are courtesy of the NEFSC.



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. In general, the impacts associated with the measures in this action are anticipated to be minor and not significant.

7.1.1 Windowpane Flounder Accountability Measures in the Groundfish Fishery

7.1.1.1 Option 1: No Action

Impacts on regulated groundfish

This AM would maintain area-based gear restrictions. If an AM is triggered, selective gear is required in an area.

The technique used to identify AM areas is described in detail in Appendix I to Framework Adjustment 47. Observer and commercial landings data were analyzed to identify areas where these stocks were caught. Windowpane flounders are not allocated to sectors; most of the catch is discarded resulting in limited landings data. An estimate of discards for windowpane flounder stocks in each ten minute square was developed for trawl gear. Data limitations create uncertainty in this approach that are fully described in Appendix I (FW47). While observer data can be accurately binned to relatively small areas, VTRs are the only source of landings data and errors in the accuracy of the information reported by fishermen are known to exist (see Palmer and Wigley 2009). Therefore, the results cannot be viewed as precise estimates.

Once catch data were binned by ten-minute squares, a test was applied to identify areas with statistically significant higher catches than the immediate surrounding area and the stock area as a whole. These areas were used to select the AM areas where appropriate gear restrictions would be adopted. The size of the areas was selected based on the amount of catches that need to be affected. Because of data limitations, the results were also considered qualitatively to account for the probability that effort may be displaced into other areas and the likelihood that the measures may not be fully effective (see Section 6.5.5 of Framework Adjustment 47).

The AM areas would be expected to reduce trawl catches of the targeted stocks by requiring the use of selective gear. These gears have been shown to reduce catches of flatfish. It is difficult to predict what changes, if any, would occur in fishing behavior if the AM was implemented. Interactions with windowpane flounder and other flatfish (e.g. yellowtail flounder, winter flounder, and witch flounder) resources may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas. It is not likely that any effort shifts that might occur would result in measureable impacts – either positive or negative – on windowpane flounder. It is likely that there would be some effort displacement that could 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 areas outside the AM area in order to continue targeting certain species. However, as the AM areas were based on areas of highest interactions with windowpane flounder, the use of selective gear in these areas would be sufficient to mitigate the overage.

The use of the haddock separator trawl in the AM areas may benefit cod. However, it would be difficult to quantify that benefit without quantifying fishing activity using the haddock separator trawl in the AM area.

This option would have no in-season impacts as it is implemented at the start of the FY and cannot be modified during the fishing year. Overall, this alternative would have positive biological impacts on windowpane flounder because the AM is designed to end overfishing. However, when compared to Options 2, 3, 4, and the combination of Options 2 and 3, the No Action alternative would have negligible biological impacts on windowpane flounder because all the alternatives modify the windowpane flounder AM that is designed to mitigate the effects of overfishing.

Impacts on other species

If the AMs are implemented, the No Action alternative may result in reduced fishing mortality for non-groundfish species that are caught on groundfish fishing trips. The selective trawl gear would be expected to reduce catches of skates, monkfish, and lobster in the AM areas but only if the AM was triggered. Mortality of these stocks under this alternative would be expected to be similar to Options 2, 3, 4, and the combination of Options 2 and 3. Accordingly, Option 1 would have similar negligible biological impacts when compared to Options 2, 3, 4, and a combination of Options 2 and 3.

7.1.1.2 Option 2: Area-based accountability measure for windowpane flounder - Modified accountability measure trigger that incorporates stock status and biomass (*Preferred Alternative*)

This AM would maintain area-based gear restrictions. If an AM is triggered, selective gear is required in an area.

Impacts on regulated groundfish

Option 2 would modify the AM trigger for overages that exceed the total ACL by 20% (and any relevant sub-ACL); it would allow the AM area to be reduced from large to small, provided that the stock is rebuilt and the biomass criterion is larger than the monitoring catch. If these requirements are met then the overage has not had a large negative biological impact on the stock and the small area would adequately mitigate the ACL overage. It is possible that an increase in biomass could be overestimated or a decrease in biomass could be underestimated; therefore if the stock condition is worsening it may go unnoticed until the next available stock assessment.

If the AM was implemented, fishing with modified gears could continue in the AM areas; possession of windowpane flounder is currently prohibited. It is difficult to determine the impact this AM would have on fishing behavior, however, the AM may result in effort shifting outside of the AM area. Interactions with windowpane flounder and other flatfish (e.g. yellowtail flounder, winter flounder, and witch flounder) may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas. Option 2 would reduce the total area where selective gear use was required. If this reduction occurred after the start of the fishing year then non-selective gear effort would be expected to occur in the additional areas that constitute the large AM area.

The use of the haddock separator trawl in the AM areas may benefit cod. Shortening or removing the mandated use of this gear in AM areas would reduce the benefit to cod. However, it would be difficult to quantify that benefit without quantifying fishing activity using the haddock separator trawl in the AM area.

Option 2 could be applied mid-season in FY2014 to the southern windowpane flounder stock; northern windowpane is not rebuilt and does not meet the biomass criterion (see Appendix I). In FY2014 the large AM area (No Action alternative) was implemented for both northern and southern stocks. If Option 2 was adopted and implemented mid-season, the AM area for southern windowpane flounder would be reduced. This would have an overall negligible mid-season impact on the southern windowpane flounder stock because the ACL overage has been mitigated by the implementation of the AM.

Option 2 could be implemented in conjunction with Option 3. The combination of these 2 options could result in an overage of over 20% with no AM area in place after 4 months from the beginning of the FY. This is not considered to be detrimental to the windowpane flounder stocks as both options have strict conditions that must be met; these conditions were designed to mitigate the overage while reducing the economic impact. The combination of these options does not reduce that mitigation.

Overall, this alternative would have positive biological impacts on windowpane because the AM is designed to mitigate the ACL overage. However, when compared to Options 1, 3, 4, and including the combination of Options 2 and 3, Option 2 would have negligible biological impacts on windowpane flounder because all the alternatives modify the windowpane flounder AM that is designed to mitigate the effects of overfishing.

Impacts on other species

If the AM is triggered, Option 2 would result in reduced fishing mortality for non-groundfish species that are caught on groundfish fishing trips within the Small AM Area. The selective trawl gear would be expected to reduce catches of skates, monkfish, and lobster in the AM areas but only if the AM is triggered. Mortality of these stocks under Option 2 would be expected to be greater than under the No Action alternative if the AM area is reduced from large to small. Overall, changes in mortality would be dependent on changes in fishing behavior. Interactions with these stocks could increase if the number of tows must increase to achieve the desired yield of a target stock while using modified gears or fishing outside the AM areas could increase. Option 2 would have less positive impacts on other species than the No Action alternative but similar overall negligible impacts as Option 3, 4 and the combination of Options 2 and 3.

7.1.1.3 Option 3: Area-based accountability measure for windowpane flounder - Consideration of catch performance over the most recent two-year period when determining accountability measure implementation (*Preferred Alternative*)

This AM would maintain area-based gear restrictions. If an AM is triggered, selective gear is required in an area.

Impacts on regulated groundfish

Option 3 would take an underage of the total ACL in year 2 into account; if an underage of the total ACL occurred in year 2 then the AM would be lifted after August 31 of year 3. If no adequate underage occurs then no modification of the AM area occurs. An ACL overage implies that overfishing is occurring; an underage of the total ACL would imply that overfishing is no longer occurring and the AM can be scaled back.

Possession of windowpane flounder is currently prohibited and fishing with modified gears could continue in the AM areas. It is difficult to predict what changes, if any, would occur in fishing behavior because of this AM. Interactions with windowpane flounder and other flatfish (e.g. yellowtail flounder, winter flounder, and witch flounder) resources may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas.

The use of the haddock separator trawl in the AM areas may benefit cod. Shortening or removing the mandated use of this gear in AM areas would reduce the benefit to cod. However, it would be difficult to quantify that benefit without knowing fishing activity that would use the haddock separator trawl in the AM area.

Unlike Option 2, this option does not relate to stock condition. The AM would be removed without knowing the cause of the underage. If it was caused by a decrease in stock size and, therefore catch, then removal of the AM could be detrimental to the stock. However, the decrease in catch may be a direct result of fishermen actively avoiding interactions with windowpane flounder in order to reduce the duration of the AM.

Option 3 could be applied mid-season in FY2014 provided FY2013 catch was below the total ACL. In FY2014 the large AM area (No Action alternative) was implemented for both northern and southern stocks. If this option was adopted, implemented mid-season, and FY2013 catch was below the total ACL, the AM would be removed after August 31. This would have an overall negligible mid-season impact on the windowpane flounder stocks because the overage has been mitigated by the underage in FY2013.

Option 3 could be implemented in conjunction with Option 2. The combination of these 2 options could result in an overage of over 20% with no AM area in place after 4 months from the beginning of the FY. This is not considered to be detrimental to the windowpane flounder stocks as both options have strict conditions that must be met; these conditions were designed to mitigate the overage while reducing the economic impact. The combination of these options does not reduce that mitigation.

Overall, this alternative would have positive biological impacts on windowpane because the AM is designed to mitigate the ACL overage and incentivize industry to actively reduce flounder catch following an overage. However, when compared to Options 1, 2, 4, and including the combination of Options 2 and 3, Option 3 would have negligible biological impacts on windowpane flounder because all the alternatives modify the windowpane flounder AM that is designed to mitigate the effects of overfishing.

Impacts on other species
If the AM is triggered, Option 3 would result in reduced fishing mortality for non-groundfish species that are caught on groundfish fishing trips. The selective trawl gear would be expected to reduce catches of skates, monkfish, and lobster in the AM areas. Mortality of these stocks under Option 3 would be expected to be greater than under the No Action alternative if the AM was removed. Overall, changes in mortality would be dependent on changes in fishing behavior. Interactions with these stocks could increase if the number of tows must increase to achieve the desired yield of a target stock while using modified gears or fishing outside the AM areas could increase. Option 3 would have less positive impacts on other species than the No Action alternative but similar overall negligible impacts as Option 2, 4 and the combination of Options 2 and 3.

7.1.1.4 Option 4: Seasonal accountability measure for northern windowpane flounder stock

This AM would maintain area-based gear restrictions. If an AM is triggered, selective gear is required in an area.

Impacts on regulated groundfish

The selection of statistical area 522 as a substitution for the current AM area was based on examining recent (2012-2013) observed catches of windowpane flounder (see Section 6.5.10). The information suggests that more discarding is occurring on the northern edge of Georges Bank within 522, which is just west of the current AM area. For FY2014 with the current AMs in place, effort could shift into 522 which might drive discard rates up.

This option would require the use of modified gears by vessels using trawl gear in statistical area 522 if the total ACL for northern windowpane flounder is exceeded; the duration of the AM is dependent on the magnitude of the overage. Possession of windowpane flounder is currently prohibited and fishing with modified gears could continue in the AM areas. It is difficult to predict what changes, if any, would occur in fishing behavior because of this AM. Interactions with windowpane flounder and other flatfish (e.g. yellowtail flounder, winter flounder, and witch flounder) resources may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas. In addition, the use of the haddock separator trawl in the AM areas may benefit cod. However, it would be difficult to quantify that benefit without knowing fishing activity that would use the haddock separator trawl in the AM area. It is not likely that any effort shifts that might occur would result in measureable impacts – either positive or negative – on regulated groundfish species.

This option would have no in-season impacts in FY2014 as it must be implemented at the start of the FY and cannot be modified during the fishing year. Overall, this alternative would have positive biological impacts on windowpane because the AM is designed to mitigate the ACL overage. However, when compared to Options 1, 2, 3, and including the combination of Options 2 and 3, Option 4 would have negligible biological impacts on windowpane flounder because all the alternatives modify the windowpane flounder AM that is designed to mitigate the effects of overfishing.

Impacts on other species

Option 4, if adopted, and if the AM is implemented, may result in reduced fishing mortality for non-groundfish species that are caught on groundfish fishing trips. This is because the AMs require use of selective trawl gear. The selective trawl gear would be expected to reduce catches of skates and monkfish in the AM areas. Mortality of these stocks under Option 4 would be expected to be greater than under the No Action alternative if the AM was removed. Overall, changes in mortality would be dependent on changes in fishing behavior. Interactions with these stocks could increase if the number of tows must increase to achieve the desired yield of a target stock while using modified gears or fishing outside the AM areas could increase. Option 4 would have less positive impacts on other species than the No Action alternative but similar overall negligible impacts as Option 2, 3 and the combination of Options 2 and 3.

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 the implementation of 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 Surf clam and Ocean Quahog; Atlantic Bluefish; Northeast Skates; and Atlantic Highly Migratory Species.

7.2.1 Windowpane Flounder Accountability Measures in the Groundfish Fishery

7.2.1.1 Option 1: No Action

If adopted, the AMs for northern and southern windowpane flounder would remain as specified by FW47. For both stocks, exceeding the management uncertainty buffer (beyond 105%) would implement trawl gear restrictions in certain areas during either year 2 or year 3 based on ACL overages that occurred in year 1. Depending on the level of ACL overage, different sized gear restricted areas are implemented (5%-20%, small; >20%, large).

The gears authorized for use in the AM areas are intended to reduce catch of flatfish generally. The windowpane flounder stocks currently have zero possession limits and therefore windowpane is not a target species, so on the basis of this species alone, effort shifts and therefore changes in the extent of adverse impacts on EFH would not be expected. However, other flounders, including winter flounder, yellowtail flounder, witch flounder, and summer flounder, occur within the AM areas and their catchability would be reduced in the restricted gears. Thus, implementation of the gear restricted areas may cause a shift in fishing effort for these species to other areas because they will not be effectively captured with the restricted gears. This would only have an adverse effect on EFH if (1) the habitats in those other areas are more vulnerable than habitats in the AM areas, or (2) if catch efficiency is reduced significantly such that more bottom time is required to harvest these species elsewhere. The restricted gears also reduce catch of skates, monkfish, and lobster. While lobster are not targeted with trawl gear, trawl effort targeting skates and monkfish could also be displaced out of the AM areas. Haddock can be targeted effectively with the restricted gears, so the AM areas would not necessarily displace fishing effort focused on haddock.

In terms of habitat vulnerability, the southernmost AM area off New Jersey/New York contains high energy, sandy habitats, and is estimated to be low vulnerability by the Swept Area Seabed Impact (SASI) model (Map 1). However, there is some uncertainty in this estimation. Habitat classification data support in and around the AM area is moderate to high-moderate (Map 1), meaning that while the resolution of sediment samples underlying the SASI model analysis is fairly good, gears fully capable of sampling large substrates such as cobble or boulder were not used to collect the data underlying the substrate map, so if these higher vulnerability habitat types occur in the area they would be under sampled. Also, the SASI habitat type and vulnerability maps do not cover the areas of the AM area inside state waters, so the

AM area is only partially mapped and analyzed in this context. Despite these uncertainties, because habitats within and near the AM area are not highly vulnerable to impact, it is likely that any effort displaced out of the AM area is not being shifted onto more vulnerable habitat types, and implementation of the current AM area is not causing significant adverse effects to EFH via effort displacement.

In terms of fish distributions, survey data since 2000 (Map 2) show winter flounder inside the NY/NJ AM area, but the species can be found outside of the AM area as well, so there appear to be opportunities to harvest winter flounder relatively nearby without significant loss in efficiency/increases in swept area. Thus, while the AM area may cause a redistribution of effort directed towards winter flounder, increases in adverse impacts to habitat area not expected. Yellowtail flounder tend to occur further offshore and are not abundant in this AM area, and witch flounder occur offshore of the AM area.

The AM area off Rhode Island is better sampled in terms of substrate type, and lies mostly within the SASI domain (in Federal waters). The AM area and the surrounding habitats are generally sandy, with some areas of fine gravel, and are estimated to have relatively low vulnerability to fishing impacts. Data support in the area is high to very high (Map 3). Thus, effort displacement out of this area into other local areas is not expected to increase adverse habitat impacts.

In terms of fish distributions, survey data since 2000 show concentrations of winter flounder and yellowtail flounder inside the RI AM areas (small and large), but both species can be found west and east of the AM areas as well (Map 4), so there appear to be opportunities to harvest both species relatively nearby without significant loss in efficiency/increases in swept area. Witch flounder generally occur in deeper waters offshore of the AM area. Thus, while the AM areas may cause a redistribution of effort directed towards these species, increases in adverse impacts to habitat area not expected. This is especially true for the smaller AM area, which would displace less fishing effort than the larger area.

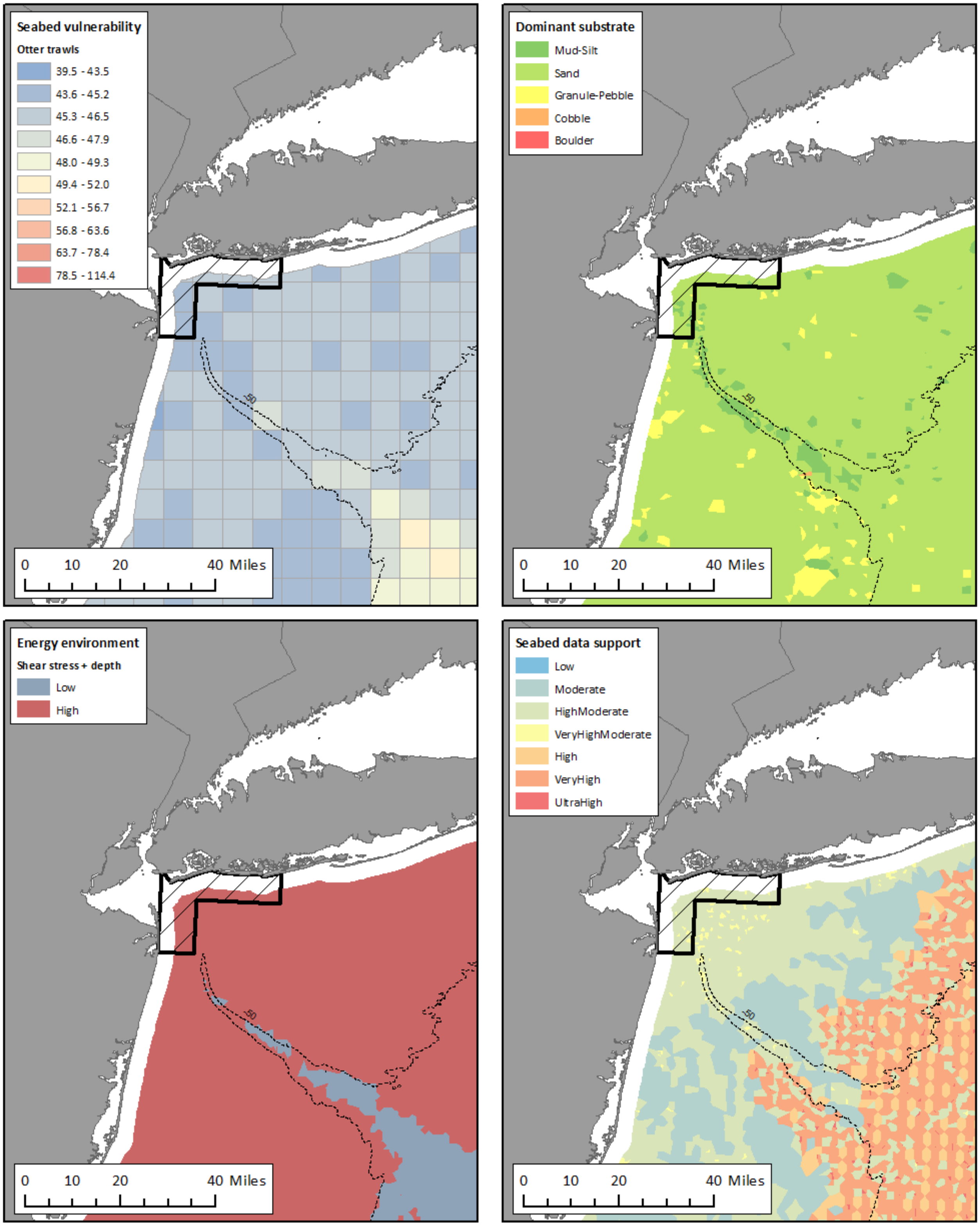
The AM area on Georges Bank is very well sampled in terms of substrate type, and includes a mix of habitat types that reflect the variety of seabed characteristics on eastern Georges Bank (Map 5). With the exception of the northwest and southeast corners of the area that extend into deeper waters, the AM area is generally high energy, with sand habitats in the southern half (below approximately 41° 35' N). The northern portion of the area contains elevated sand ridges interspersed with stretches of granule-pebble-cobble-dominated habitats. These hard-bottomed habitat types are estimated to be more vulnerable to fishing impacts, but they occur to the west and east of the AM area as well. Thus, while there are vulnerable habitats outside the AM area that would likely see increased fishing effort due to implementation of the AM, vulnerable habitats inside the AM area would be fished less frequently.[10]

In terms of fish distributions, survey data since 2000 indicate that yellowtail flounder tend to be more concentrated further east, with higher fish abundance inside the AM area and east of it in the current Closed Area II groundfish/habitat closure areas as compared to areas west of the AM area (Map 6). Winter flounder appear to be found in similar abundance on the shoal habitats west of the AM area as they are within the AM area. There are some higher winter flounder survey catch weights per tow inside Closed Area II, but this area is currently closed to trawling independent of any decisions made on the AM measures. Because winter flounder is currently at higher abundance, it is expected that this stock is a stronger driver of the distribution of effort on eastern Georges Bank vs. yellowtail flounder. Given that there appear to be concentrations of winter flounder outside the AM area, significant decreases in catch

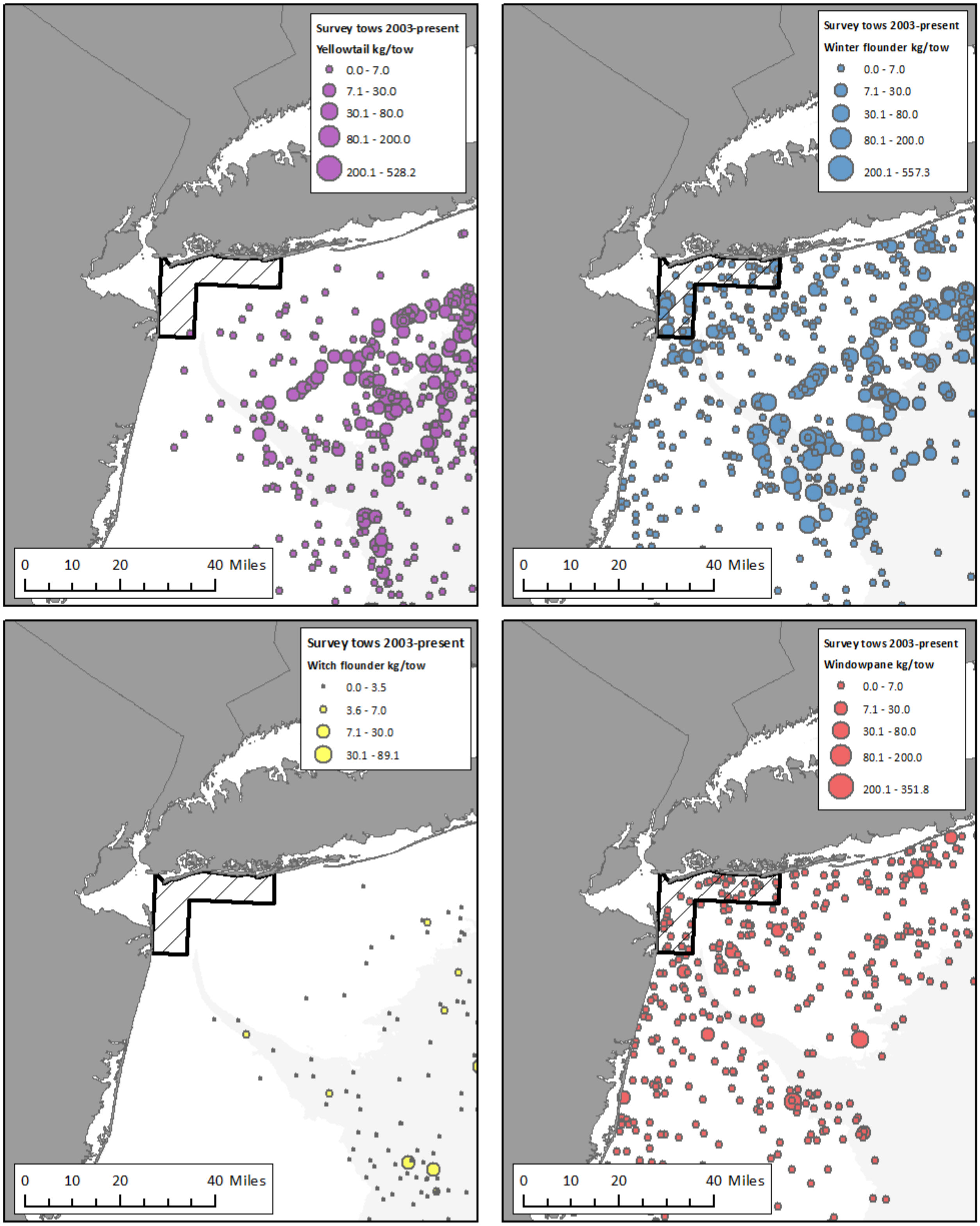
[10] Note that the Omnibus EFH Amendment (currently under development) includes various habitat management areas that overlap with the northern parts of this AM area, and therefore it is unclear how the AM and habitat areas in combination would affect the distribution of fishing effort on northeastern Georges Bank over the longer term.

efficiencies as a result of the AM area gear restrictions seem unlikely. Witch flounder are only caught in the northern and southern parts of the AM area as they tend to occur in deeper waters. Therefore, substantial habitat impacts due to effort displacement are unlikely to result from implementation of the No Action AM area. As for the RI AM area, greater effort displacement would be expected to result from the large vs. small AM area. The No Action alternative would have negligible impacts on EFH as effort displacement is not expected to be substantial. The No Action alternative would have low negative impacts on EFH compared to Options 2, 3, and the combination of Options 2 and 3, but low positive impacts when compared to Option 4.

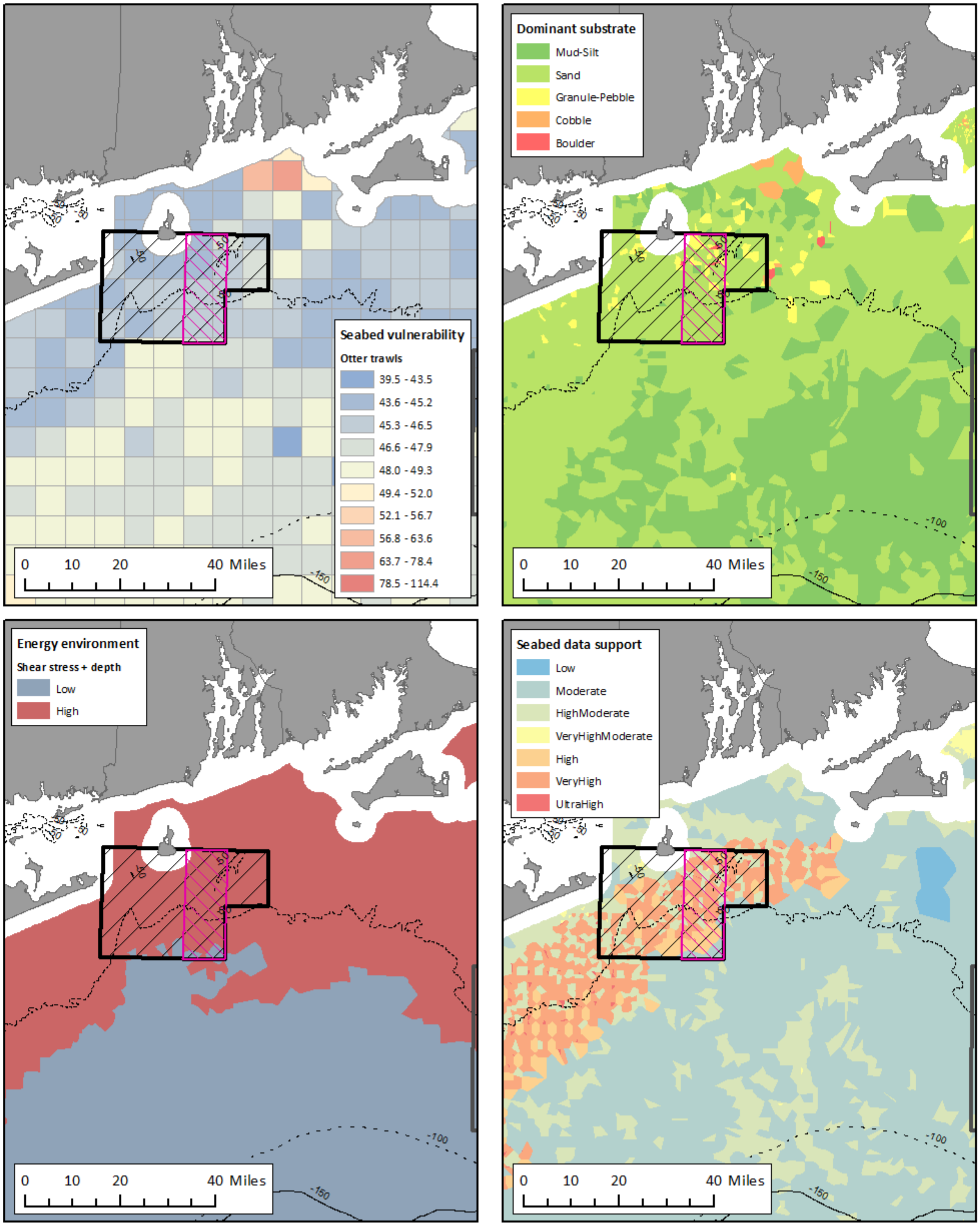
Map 1 – Seabed characteristics in and around windowpane AM area off New York/New Jersey.



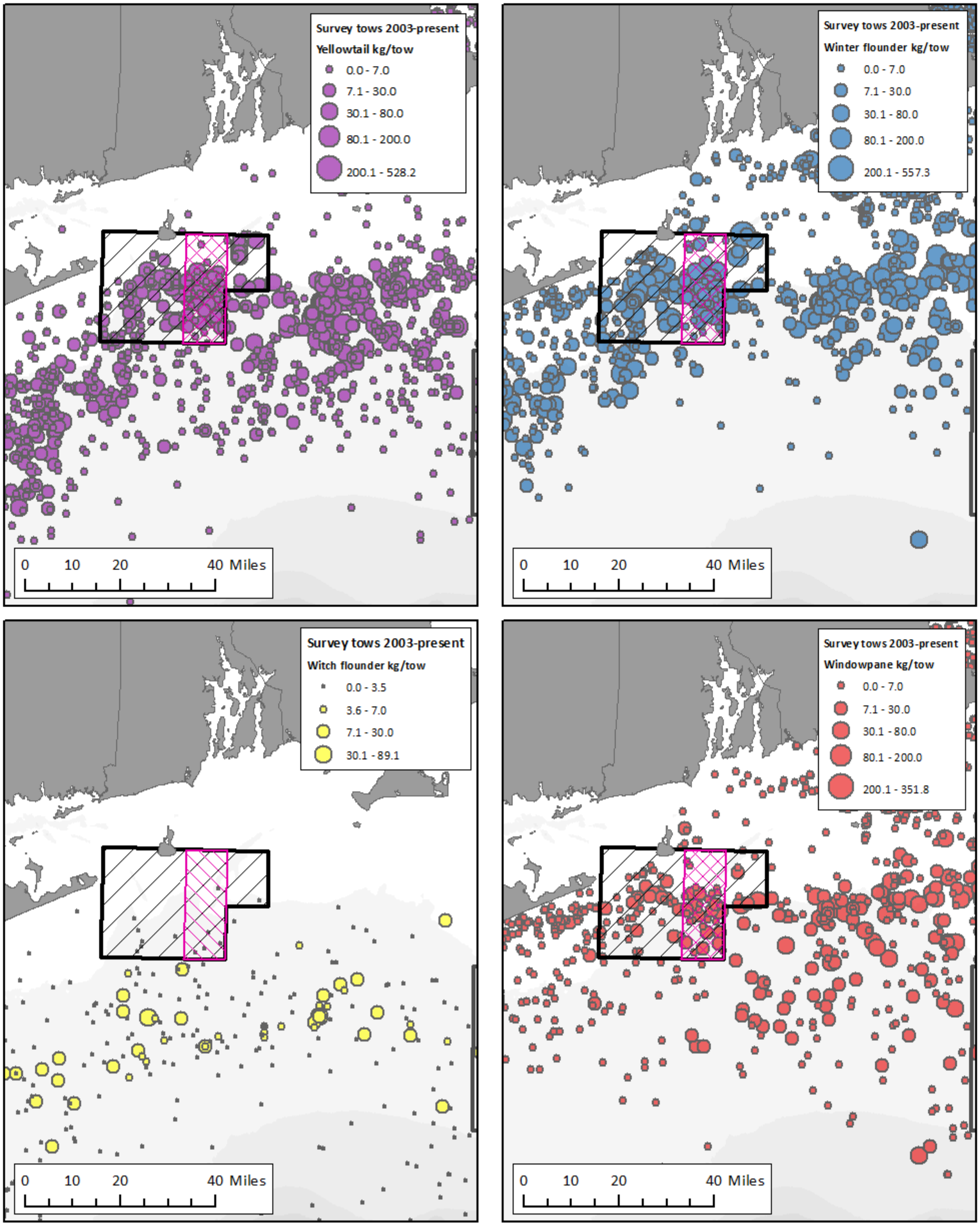
Map 2 – Flounder survey catch per tow 2002-2013 in and around windowpane AM area off New York/New Jersey.



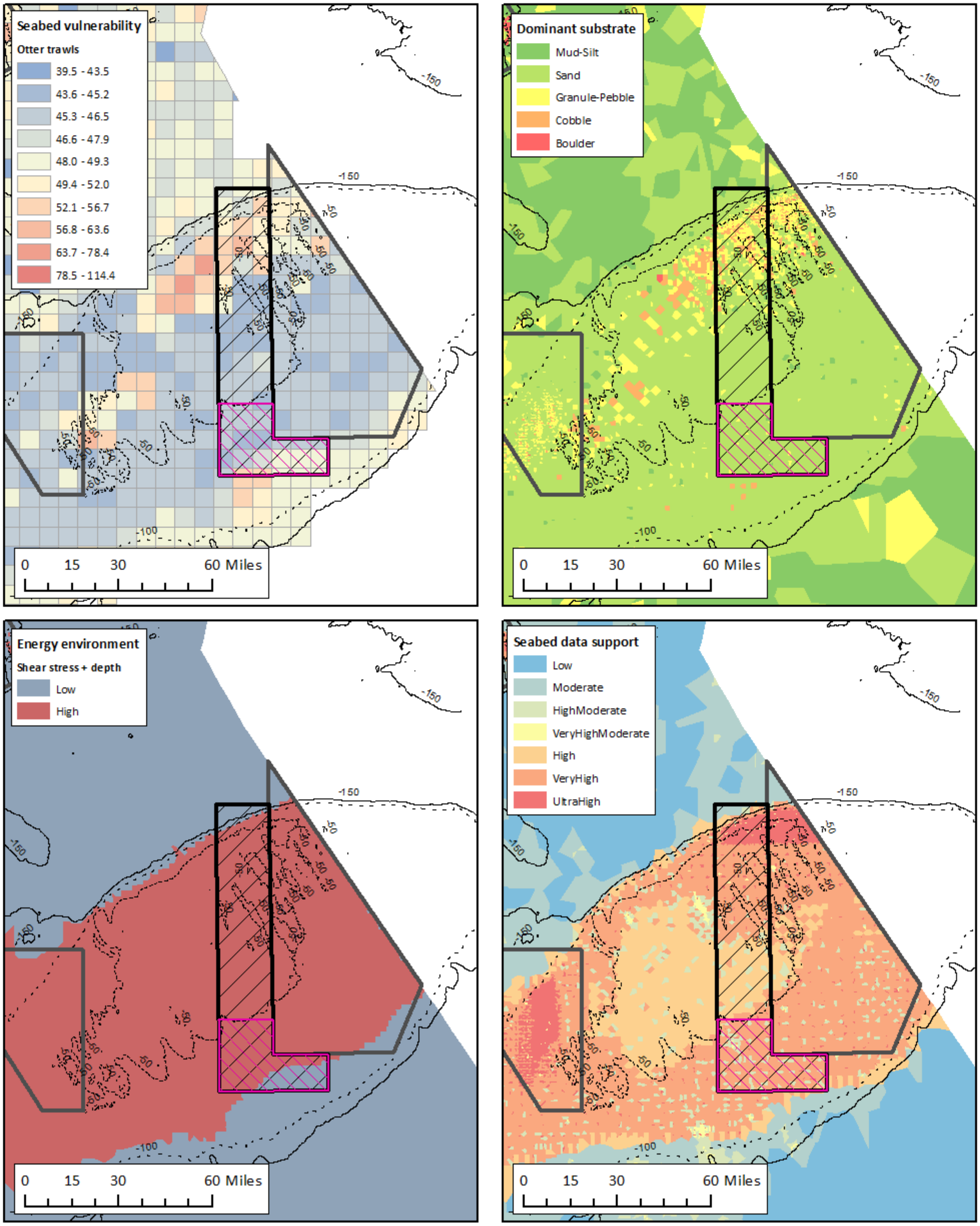
Map 3 – Seabed characteristics in and around windowpane AM area off Rhode Island.



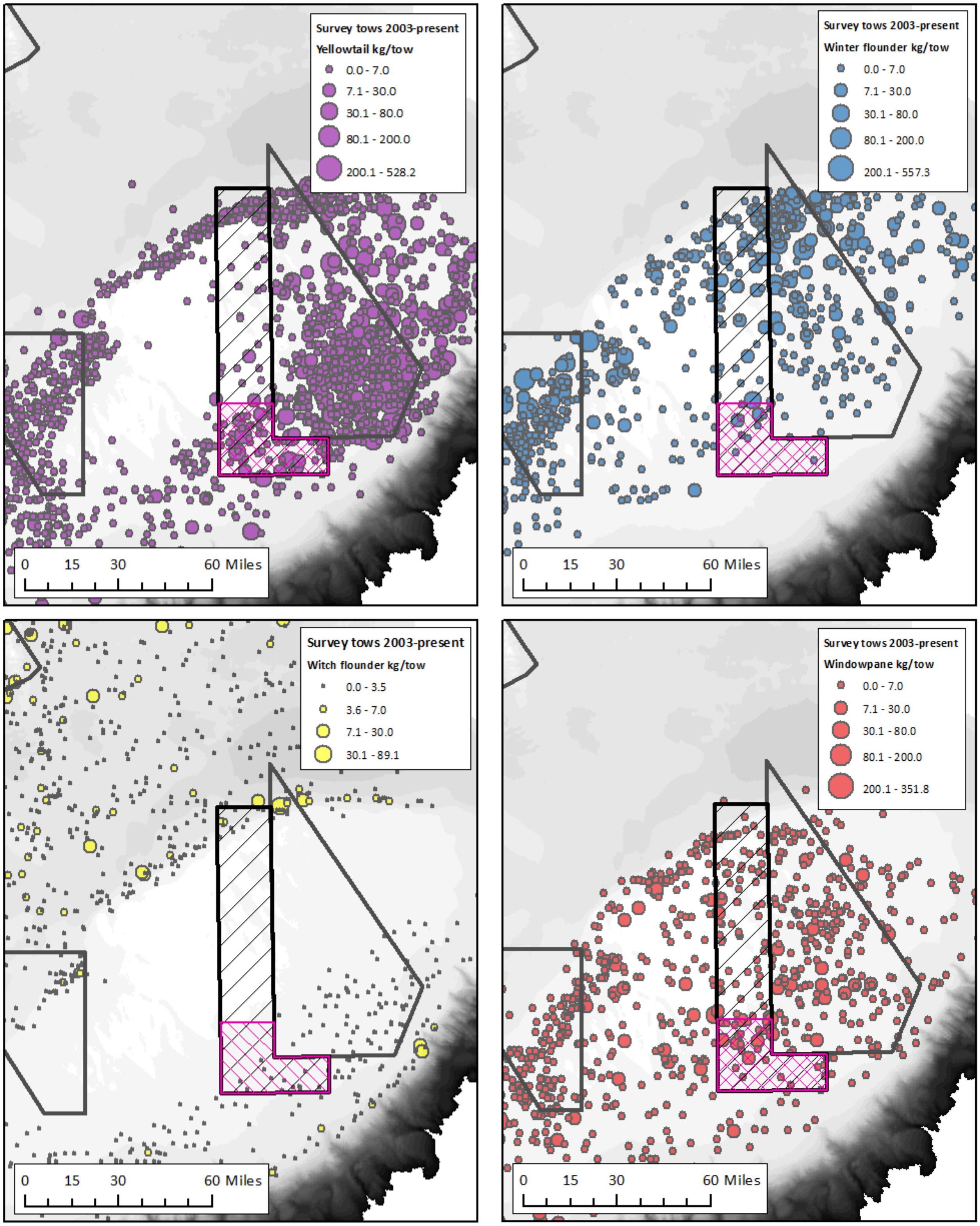
Map 4 – Flounder survey catch per tow 2002-2013 in and around windowpane AM areas off Rhode Island. Zero catch tows for each species are not plotted. Note the slightly different scale for witch flounder.



Map 5 – Seabed characteristics in and around windowpane AM area on Georges Bank.



Map 6 – Flounder survey catch per tow 2002-2013 in and around windowpane AM areas on Georges Bank. Zero catch tows for each species are not plotted. Note the slightly different scale for witch flounder.



7.2.1.2 Option 2: Area-based accountability measure for windowpane flounder - Modified accountability measure trigger that incorporates stock status and biomass (*Preferred Alternative*)

Option 2 would modify the accountability measure trigger to incorporate stock status and biomass if the ACL is exceeded by more than 20%. If specific criteria are met, the small AM area could be implemented instead of the large area for one or both stocks. Although significant increases in adverse effects are not expected to result from the larger AM areas, the smaller areas would have less effort displacement associated with them, and therefore a lesser potential for habitat impacts. Because this option makes implementation of the smaller AM areas more likely, it would have slightly positive impacts on habitat relative to the No Action alternative. Compared to the No Action alternative and Option 4, Option 2 would have low positive impacts on EFH. Option 2 would have similar low positive impacts as Option 3 and the combination of Options 2 and 3.

Option 2 could be implemented in conjunction with Option 3. This would result in the Large AM Area(s) being scaled back to the Small AM Area(s) and then the shortened duration of the Small AM Area(s). Impacts on Essential Fish Habitat would be identical to Option 3 and the combination of Options 2 and 3; low positive compared to the No Action alternative and Option 4.

7.2.1.3 Option 3: Area-based accountability measure for windowpane flounder - Consideration of catch performance over the most recent two-year period when determining accountability measure implementation (*Preferred Alternative*)

Option 3 would consider catch performance over the most recent two-year period when determining accountability measure implementation. The pounds over in year 1 do not necessarily need to be balanced exactly by pounds under in year 2. Rather, the concept is that if an overage does not occur in year 2, the operational issues that led to the overage in year 1 must have been resolved, such that the AM is no longer needed. Similar to Option 2 and the combination of Options 2 and 3, Option 3 reduces the chance of AM implementation relative to No Action, and therefore would have a slightly positive impact on habitats relative to No Action and Option 4 due to reduced potential for effort displacement.

Option 3 could be implemented in conjunction with Option 2. This would result in the Large AM Area(s) being scaled back to the Small AM Area(s) and then the shortened duration of the Small AM Area(s). Impacts on Essential Fish Habitat would be identical to Option 2; low positive compared to the No Action alternative and Option 4.

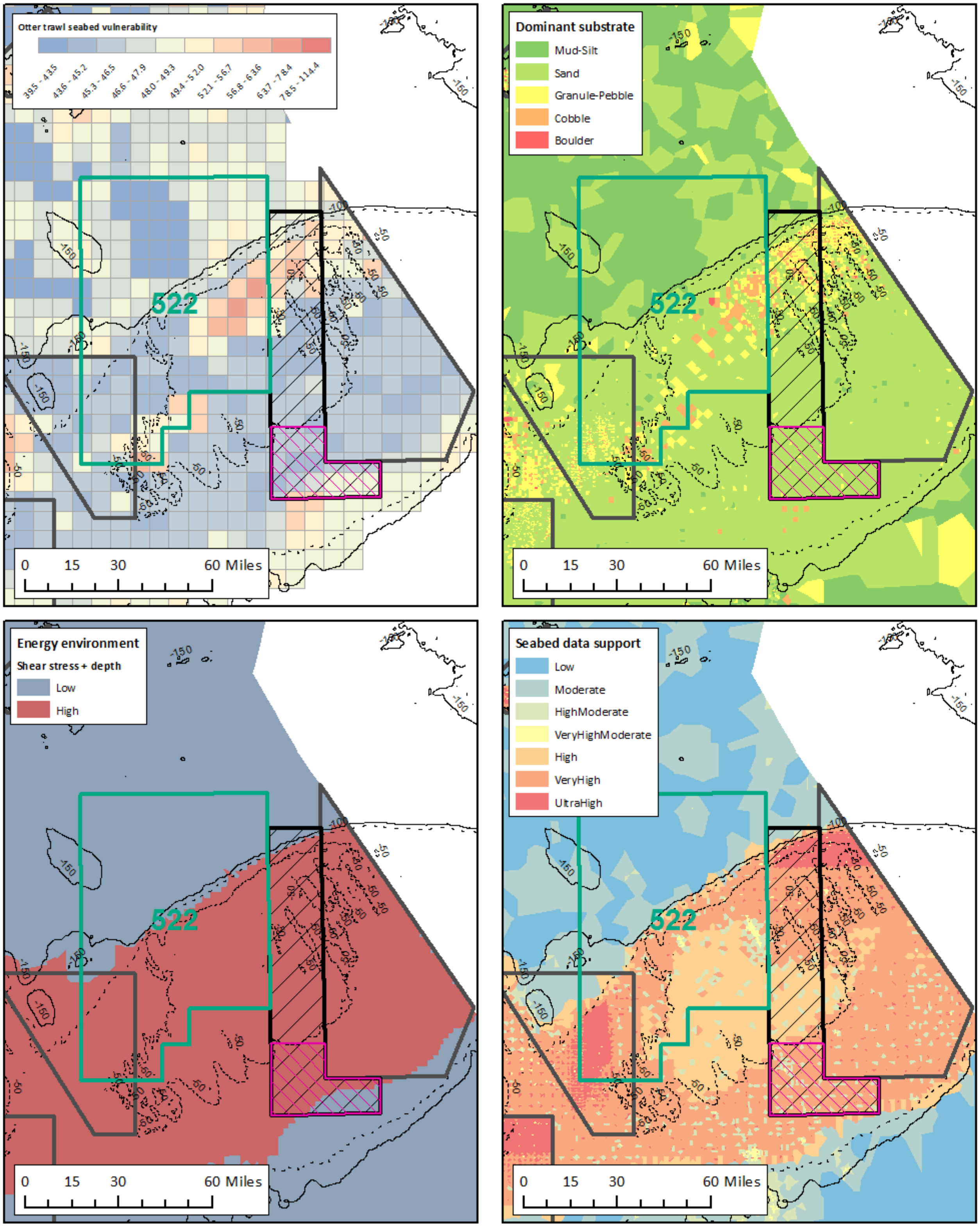
7.2.1.4 Option 4: Seasonal accountability measure for northern windowpane flounder stock

Option 4 would implement gear restrictions in a larger area, i.e. all of statistical area 522, over a shorter timeframe, as compared to the No Action AMs that cover smaller areas, but are in effect year round. Statistical area 522 is west of and adjacent to the current Georges Bank AM area. Analyses prepared for Omnibus Essential Fish Habitat Amendment 2 indicate that the deep water, northwestern part of the area is not heavily fished with trawls, nor is the southeastern part of the area which overlaps the shallowest part of Georges Bank. In addition, the western part of the area overlaps Closed Area I from which bottom trawl gear is already excluded (pending potential changes in the Omnibus EFH Amendment). However, the mid-depths along the edge of the bank are frequently fished by trawl gear that would be subject to the AM during May through August for a smaller overage and May through December for a larger overage. Even considering that parts of SA 522 are lightly fished, an AM area based on SA 522 covers a larger fished area as compared to the No Action Georges Bank AM area.

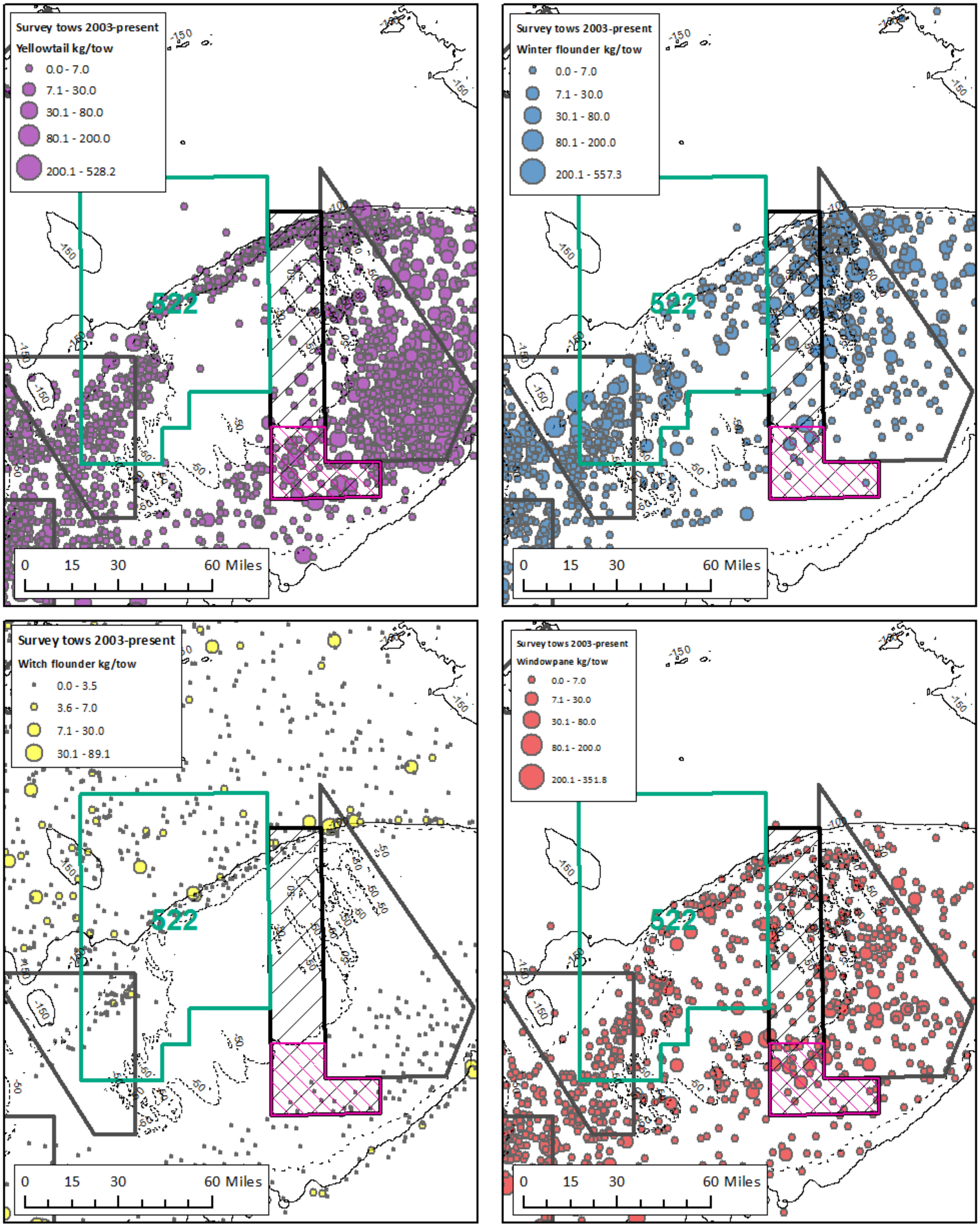
Habitat types in SA 522 include everything from low energy muds to high energy granule-pebble-cobble and high energy sand (Map 7). Portions of the area that are more heavily fished with trawls are estimated to have higher vulnerability to fishing impact, but other heavily fished areas are estimated to be less vulnerable (Map 7). Thus, while there are vulnerable habitats outside SA 522 that would likely see increased fishing effort due to implementation of the AM, vulnerable habitats inside the area would be fished less frequently.[11] Winter flounder and yellowtail flounder occur in SA 522 (Map 8), such that effort directed towards these stocks would be displaced in the seasons when restricted gears are required given that they cannot be targeted as effectively with the restricted gears. Effort directed towards winter flounder would likely be displaced to the east, into the area east of SA 522 and west of Closed Area II. Yellowtail flounder appear to be less abundant inside this potential AM area relative to the northeastern and southeastern parts of Georges Bank. Witch flounder occur along the margin of the bank and in deeper waters north of the bank. Option 4 would have low negative impacts on EFH as effort displacement may be substantial considering the large size of SA 522. Option 4 would have low negative impacts on EFH compared to the No Action alternative and Options 2, 3 and the combination of Options 2 and 3.

[11] As above, note that the Omnibus EFH Amendment (currently under development) includes various habitat management areas that overlap with the northern parts of this AM area, and therefore it is unclear how the AM and habitat areas in combination would affect the distribution of fishing effort on northeastern Georges Bank over the longer term

Map 7 – Seabed characteristics in and around statistical area 522 on Georges Bank (green outline). Current AM areas and year round closed areas are shown for reference.



Map 8 – Flounder survey catch per tow 2002-2013 in and around statistical area 522 on Georges Bank (green outline). Current AM areas and year round closed areas are shown for reference. Zero catch tows for each species are not plotted. Note the slightly different scale for witch flounder.



7.3 Impacts on Endangered and Other Protected Species

7.3.1 Windowpane Flounder Accountability Measures in the Groundfish Fishery

7.3.1.1 Option 1: No Action

Option 1 would constrain fishing activity in defined areas on Georges Bank (Figure 1) if the total ACL for northern windowpane flounder is exceeded and in defined areas in SNE (Figure 1) if the total ACL and Groundfish sub-ACL are exceeded for southern windowpane flounder. Vessels using trawl gear are required to use selective gear in the defined areas. Possession of windowpane flounder is currently prohibited and fishing with modified gears could continue in the AM areas. It is difficult to predict what changes, if any, would occur in fishing behavior because of this AM. Interactions with protected resources may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas. It is not likely that any effort shifts that might occur would result in measureable impacts – either positive or negative – on protected species. Therefore, this alternative is expected to have negligible impacts on protected resources. This option would have no in-season impacts as it is implemented at the start of the FY and cannot be modified during the fishing year. Option 1 would have similar negligible impacts on protected resources as Options 2, 3, 4 and the combination of Options 2 and 3.

7.3.1.2 Option 2: Area-based accountability measure for windowpane flounder - Modified accountability measure trigger that incorporates stock status and biomass (*Preferred Alternative*)

Option 2 would modify the AM trigger for overages that exceed the total ACL by 20% (and any relevant sub-ACL) that would allow the AM area be reduced from large to small, provided that the stock is rebuilt and the biomass indicator is larger than the monitoring catch. Possession of windowpane flounder is currently prohibited and fishing with modified gears could continue in the AM areas. It is difficult to predict what changes, if any, would occur in fishing behavior because of this AM. Interactions with protected resources may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas. It is not likely that any effort shifts that might occur would result in measureable impacts – either positive or negative – on protected species. Therefore, this alternative is expected to have negligible impacts on protected resources. Option 2 would have similar negligible impacts on protected resources as Options 1, 3, 4, and the combination of Options 2 and 3.

Option 2 could potentially be applied mid-season in FY2014 but only to the southern stock (northern windowpane is not rebuilt). Again, fishing behavior is difficult to predict but if any fishing effort shifted to outside of the large area, it would be reasonable to think that effort might shift back inside the additional areas that constitute the large AM area; any impacts that may occur would be negligible.

Option 2 could be implemented in conjunction with Option 3. Based on the impacts analysis of the individual Options, the combination of the two would still be expected to have negligible impacts on protected resources.

7.3.1.3 Option 3: Area-based accountability measure for windowpane flounder - Consideration of catch performance over the most recent two-year period when determining accountability measure implementation (*Preferred Alternative*)

Option 3 would take an underage of the total ACL in year 2 into account; if an underage of the total ACL occurred in year 2 then the AM would be lifted after August 31 of year 3. If no adequate underage occurs then no modification of the AM area occurs and it is in place for the entire fishing year. It is difficult to predict what changes, if any, would occur in fishing behavior because of this AM. Interactions with protected resources may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas. This option is not likely to result in any effort shifts that would result in measureable impacts – either positive or negative – on protected species. Therefore, this alternative is expected to have negligible impacts on protected resources. Option 3 would have similar negligible impacts on protected resources as Options 1, 2, 4, and the combination of Options 2 and 3.

Option 3 could be implemented in conjunction with Option 2. Based on the impacts analysis of the individual Options, the combination of the two would still be expected to have negligible impacts on protected resources.

7.3.1.4 Option 4: Seasonal accountability measure for northern windowpane flounder stock

This option would require the use of modified gears by vessels using trawl gear in statistical area 522 if the total ACL for northern windowpane flounder is exceeded; the duration of the AM is dependent on the magnitude of the overage. Possession of windowpane flounder is currently prohibited and fishing with modified gears could continue in the AM areas. It is difficult to predict what changes, if any, would occur in fishing behavior because of this AM. Interactions with protected resources may increase in areas that effort has shifted to but would decrease, accordingly, in the AM areas. It is not likely that any effort shifts that might occur would result in measureable impacts – either positive or negative – on protected species. It is not likely that any effort shifts that might occur would result in measureable impacts – either positive or negative – on protected species. Therefore, this alternative is expected to have negligible impacts on protected resources. Option 4 would have similar negligible impacts on protected resources as Options 1, 2, 3, and the combination of Options 2 and 3.

7.4 Economic Impacts

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 MSA 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 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 (NMFS 2007b). Where possible, cumulative effects of regulations will be identified and discussed. Other social concerns are discussed in Section 7.5. The economic impacts presented here consist of both qualitative and quantitative analyses dependent on available data, resources, and the measurability of predicted outcomes. In general, the regulations proposed in Framework 52 will impact revenue through changes to fishery measures and may, for particular fisheries, impact operating costs through the modification of accountability measures. 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 Windowpane Flounder Accountability Measures in the Groundfish Fishery

The AMs in Option 1/No Action were previously analyzed as part of Framework Adjustment 47 to the Groundfish FMP. That analysis is updated here, reflecting recent landings trends from the areas potentially impacted by the windowpane flounder accountability measures. Economic impact estimates are based on the types of fishing trips likely to be affected as reported in the VTR and observer databases. No distinction is made between sector and common pool vessels. All revenues are adjusted for inflation and reported in 2013 dollars. VTR trips reporting latitude and longitudes falling inside the affected areas are used for estimating economic impacts, drawing from data for FY 2010-2012. The AM areas considered here are relatively small and therefore, the trips with positions falling inside their boundaries comprise only a sample population of impacted trips. As the location of an entire trip is coded at one particular point, these coordinate data are assumed to be approximate and to broadly represent the type and level of activities in these areas. All gross revenues reported here are prorated from the sample population to total population estimate by inflating revenues by the appropriate percentage based on trips reporting and not reporting lat/lon data for the gear type and statistical area(s) best corresponding to each proposed management area. Gross revenues are reported as all revenues from groundfish permitted vessels on trips on which at least one pound of groundfish was landed. Option 2 and Option 3 include the same AM areas and the analysis of Option 1/No Action is used to compare between these options. However, the AM areas under Option 4 are different from Option 1/No Action, but a similar analysis was completed in order to facilitate comparison between the options.

7.4.1.1 Option 1: No Action

Under Option 1, the groundfish fishery AM for either stock of windowpane is implemented if the total ACL is exceeded by more than the management uncertainty buffer (currently set at approximately 5%), and in the case of southern windowpane, if the groundfish fishery also exceeds its sub-ACL. Vessels using trawl gear are required to use selective gear in the defined areas.

Option 1/No Action would result in no additional economic impacts because it is already in place. However, Option 1 has potential negative impacts should AM areas be triggered. The economic impacts of triggering the AM areas are a function of: (1) differences in profitability within the AM area between using selective vs. traditional gears, and/or (2) differences in profitability using selective gears inside vs. outside the AM area. Profitability itself is a function of costs and revenues, as well as species-specific resource availability. The AM areas could have net negative economic impacts if they result in:

- Lower stock-specific aggregate catches, due to lack of species availability outside of the AM area during the year gear restrictions are in place;
- Higher variable costs due to lower catch rates for economically important stocks either inside the AM area(s) when using selective gears, or outside the AM area(s) when using traditional gears;
- Higher gear costs associated with rigging and using selective gears.

Economic impacts are evaluated for Large and Small AMs areas.

<u>Northern Windowpane Flounder Large AM Area</u>
The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the Northern Windowpane Large AM Area is nearly $10.6 million dollars, accounting for 9% of total revenues (Table 42). Over $8 million dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented (Table 42). These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected by this option, as vessels may still elect to fish inside this area with selective gear or increase their fishing efforts outside this area.

The most impacted port is New Bedford, MA, where activities reported inside the AM area account for nearly 23% of the average revenues landed in that port by permitted groundfish vessels (Table 43).

The use of selective gear substantially changes the composition of the catch inside the Northern Windowpane Large AM Area. VTRs and observer data collected from tows inside the area both show a much higher proportion of haddock and pollock and lower proportion of flatfish when using selective gears, relative to traditional trawl gears (Table 44 and Table 45). Average revenues per tow for the selective gears in these areas were approximately 38% higher than per-tow revenues using traditional gears on observed trips, though fewer tows were observed (Table 45). VTR data indicates that traditional gears are more prevalent in this area. The higher average revenue per tow with selective gears is likely explained by seasonality and target species. It is unlikely, based on revealed gear preferences, that selective gears could generate higher revenues in this area throughout the course of the year. It is not clear if the loss of flatfish catch, primarily GB winter flounder and GB yellowtail flounder, could be made up for with traditional gears fished outside of the AM area.

Table 42 – Annual and three-year average revenues for all groundfish trips and trips reported inside the Northern Windowpane Flounder Large AM Area

	Gear Type	2010	2011	2012	*3 year avg.*
All groundfish trips	Bottom longline	$2,168,832	$2,355,103	$374,947	*$1,632,960*
	Gillnet	$10,695,643	$10,421,830	$8,860,372	*$9,992,615*
	Trawl, selective	$9,171,141	$4,856,866	$1,157,086	*$5,061,698*
	Trawl, traditional	$101,860,375	$114,204,644	$98,785,680	*$104,950,233*
	Total:	*$123,895,991*	*$131,838,442*	*$109,178,085*	*$121,637,506*
Groundfish trips reported in AM area	Bottom longline	$753,123	$357,460	$10,111	*$373,565*
	Gillnet			$288	*$96*
	Trawl, selective	$3,473,954	$2,002,507	$375,466	*$1,950,642*
	Trawl, traditional	$9,513,068	$9,326,815	$5,950,106	*$8,263,330*
	Total:	*$13,740,145*	*$11,686,782*	*$6,335,970*	*$10,587,824*
Percent of all revenues on groundfish trips	Bottom longline	35%	15%	3%	*23%*
	Gillnet	0%	0%	0%	*0%*
	Trawl, selective	38%	41%	32%	*39%*
	Trawl, traditional	9%	8%	6%	*8%*
	Total:	*11%*	*9%*	*6%*	*9%*

Notes: VTR data, 2013 constant dollars.

Table 43 – Ports with >$100K gross revenue on groundfish trips with landings from inside the Northern Windowpane Flounder Large AM Area, average of FY 10-12

		3-year average revenue		
State	**Landing port**	**AM Area**	**All groundfish**	**Percent of all groundfish revenues coming from AM area**
ME	Portland	$11,221	$4,597,840	0.24%
MA	Boston	$327,605	$12,691,511	2.58%
MA	Gloucester	$1,731,320	$23,869,559	7.25%
MA	Chatham	$323,961	$1,920,625	16.87%
MA	New Bedford	$7,994,660	$34,845,427	22.94%
MA	Provincetown	$2,502	$469,022	0.53%
MA	Nantucket	$6,968	$274,813	2.54%
MA	Harwichport	$49,604	$126,393	39.25%
RI	Point Judith	$147,522	$10,900,442	1.35%

Notes: VTR data, 2013 constant dollars.

Table 44 – Average annual reported revenue from inside the Northern Windowpane Flounder Large AM Area, FY 10-12

Trawl type	Cod	haddock	flats	pollock	white hake	skates	squids	other
Traditional	$759,960	$2,951,810	$3,760,119	$114,397	$1,532	$275,790	$2,605	$645,816
Selective	$115,792	$1,648,808	$176,196	$61,390	$0	$23,608	$0	$46,060

Notes: VTR data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Table 45 – Average revenue per tow for tows ending inside the Northern Windowpane Flounder Large AM Area, FY 10-12

Trawl type	# tows	cod	haddock	flats	pollock	white hake	skates	squids	other	*TOTAL*
Traditional	1032	$242	$654	$874	$54	$5	$148	$5	$253	*$2,235*
Selective	286	$205	$1,813	$136	$761	$14	$62	$0	$110	*$3,100*

Notes: Observer data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Northern Windowpane Flounder Small AM Area

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the Northern Windowpane Flounder Small AM Area is nearly $4.3 million dollars, accounting for 4% of total revenues (Table 46). Over $3.5 million dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented (Table 46). These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will elect to either fish inside this area with selective gear or increase their fishing efforts outside this area.

The most impacted port is New Bedford, MA, where activities reported inside the AM area account for over 9% of the average FY 10-12 revenues landed in that port by permitted groundfish vessels (Table 47).

The use of selective gear substantially changes the composition of the catch inside the Northern Small AM area. Both VTR and observer data collected from tows inside the area show a much higher proportion of haddock and lower proportion of flatfish relative to traditional trawl gears (Table 48 and Table 49). Average revenues per tow for the selective gears in this area were approximately 14% higher than per-tow revenues using traditional gears on observed trips, though fewer tows were observed (Table 49). VTR data indicates that traditional gears are more prevalent in this area. The higher average revenue per tow with selective gears is likely explained by seasonality and target species. It is unlikely, based on revealed gear preferences, that selective gears could generate higher revenues in this area throughout the course of the year. It is not clear if the loss of flatfish catch, primarily GB winter flounder and GB yellowtail flounder, could be made up for with traditional gears fished outside of the AM area.

Table 46 – Annual and three-year average revenues for all groundfish trips and trips reported inside the Northern Windowpane Flounder Small AM Area

	Gear Type	2010	2011	2012	*3 year avg.*
All groundfish trips	Bottom longline	$2,168,832	$2,355,103	$374,947	*$1,632,960*
	Gillnet	$10,695,643	$10,421,830	$8,860,372	*$9,992,615*
	Trawl, selective	$9,171,141	$4,856,866	$1,157,086	*$5,061,698*
	Trawl, traditional	$101,860,375	$114,204,644	$98,785,680	*$104,950,233*
	Total:	*$123,895,991*	*$131,838,442*	*$109,178,085*	*$121,637,506*
Groundfish trips reported in AM area	Trawl, selective	$1,775,731	$217,300	$91,057	*$694,696*
	Trawl, traditional	$6,102,540	$3,892,316	$717,804	*$3,570,887*
	Total:	*$7,878,272*	*$4,109,616*	*$808,861*	*$4,265,583*
Percent of all revenues on groundfish trips	Trawl, selective	82%	9%	24%	*43%*
	Trawl, traditional	57%	37%	8%	*36%*
	Total:	*6%*	*3%*	*1%*	*4%*

Notes: VTR data, 2013 constant dollars.

Table 47 – Ports with >$100K gross revenue on groundfish trips with landings from inside Northern Windowpane Flounder Small AM Area, average of FY 10-12

State	Landing port	3-year average revenue		
		AM Area	All groundfish	Proportion of all groundfish revenues coming from AM area
ME	Portland	$11,078	$4,597,840	0.24%
MA	Boston	$150,097	$12,691,511	1.18%
MA	Gloucester	$803,633	$23,869,559	3.37%
MA	New Bedford	$3,222,492	$34,845,427	9.25%
MA	Nantucket	$423	$274,813	0.15%
RI	Point Judith	$81,694	$10,900,442	0.75%

Notes: VTR data, 2013 constant dollars.

Table 48 – Average annual reported revenue from inside the Northern Windowpane Flounder Small AM Area, FY 10-12

Trawl type	Cod	haddock	flats	pollock	white hake	skates	squids	other
Traditional	$311,448	$1,605,508	$1,303,776	$8,731	$770	$100,457	$1,834	$151,527
Selective	$55,930	$677,030	$41,424	$42	$0	$5,474	$0	$1,645

Notes: VTR data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Table 49 – Average revenue per tow for tows ending inside the Northern Windowpane Flounder Small AM Area, FY 10-12

Trawl type	# tows	cod	haddock	flats	pollock	white hake	skates	squids	other	*TOTAL*
Traditional	516	$228	$865	$872	$10	$0	$171	$5	$211	*$2,362*
Selective	164	$171	$2,344	$109	$17	$0	$44	$0	$33	*$2,718*

Notes: Observer data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

<u>Southern Windowpane Flounder Large AM Area 1</u>

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the Southern Windowpane Flounder Large AM Area 1 is over $3 million dollars, accounting for 3% of total revenues (Table 50). Over $2.9 million dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented (Table 50). These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will most likely elect to increase their fishing efforts outside this area. In this case, even if revenues remain the same, vessel costs will rise due to longer steam time, decreased catch per unit effort, or both.

The most impacted port is Point Judith, RI, where activities reported inside the AM area account for over 19% of the average FY 10-12 revenues landed in that port by permitted groundfish vessels (Table 51). Other ports likely impacted are Montauk, NY which reported over $700,000 in groundfish revenue from the AM area (Table 51). Over 100% of groundfish revenues in New Shoreham, RI are from trips reported to have occurred within the AM area (Table 51); this (more than 100% of revenues) is likely to be a result of how null values are treated in the analysis.

Table 50 – Annual and three-year average revenues for all groundfish trips and trips reported inside the Southern Windowpane Flounder Large AM Area 1

	Gear Type	2010	2011	2012	*3 year avg.*
All groundfish trips	Bottom longline	$2,168,832	$2,355,103	$374,947	*$1,632,960*
	Gillnet	$10,695,643	$10,421,830	$8,860,372	*$9,992,615*
	Trawl, selective	$9,171,141	$4,856,866	$1,157,086	*$5,061,698*
	Trawl, traditional	$101,860,375	$114,204,644	$98,785,680	*$104,950,233*
	Total:	*$123,895,991*	*$131,838,442*	*$109,178,085*	*$121,637,506*
Groundfish trips reported in AM area	Bottom longline	$10,635	$1,383		*$4,006*
	Gillnet	$16,851	$71,218	$172,958	*$87,009*
	Trawl, selective	$17,923	$17,723		*$11,882*
	Trawl, traditional	$2,159,542	$4,022,909	$2,787,480	*$2,989,977*
	Total:	*$2,204,951*	*$4,113,233*	*$2,960,438*	*$3,092,874*
Percent of all revenues on groundfish trips	Bottom longline	1%	0%	0%	0%
	Gillnet	0%	1%	2%	1%
	Trawl, selective	0%	0%	0%	0%
	Trawl, traditional	2%	4%	3%	3%
	Total:	*2%*	*3%*	*3%*	*3%*

Notes: VTR data, 2013 constant dollars.

Table 51 – Ports with >$100K gross revenue on groundfish trips with landings from inside Southern Windowpane Flounder Large AM 1, average of FY 10-12

State	Landing port	3-year average revenue		
		AM Area	All groundfish	Proportion of all groundfish revenues coming from AM area
MA	Boston	$2,667	$12,682,918	0.02%
MA	New Bedford	$45,242	$34,582,542	0.13%
MA	Westport	$151	$3,396	4.45%
RI	Newport	$15,153	$157,733	9.61%
RI	Other Newport	$3,948	$58,069	6.8%
RI	Point Judith	$2,104,059	$10,560,180	19.92%
RI	Little Compton	$44,888	$132,356	33.91%
RI	New Shoreham	$2,459	$2,394	102.72%
CT	Stonington	$81,082	$1,094,181	7.41%
CT	New London	$25,193	$1,876,624	1.34%
NY	Montauk	$793,400	$5,147,090	15.41%
NY	Shinnecock	$11,028	$438,073	2.52%
NJ	Point Pleasant	$7,783	$370,525	2.1%

Notes: VTR data, 2013 constant dollars.

Selective gears have not been used extensively in this area thus far, indicating that it is generally more profitable to fish with traditional gears (Table 52). Average revenues per tow for selective gears and traditional gears in this area cannot be compared as there were no observed tows using selective gear for FY 2010-12 (Table 53). Whether it will be more profitable to fish in other areas or to continue fishing inside this area with selective gears depends on the profitability of other fishing options. Given the relatively small size of these areas, the additional trip costs (steaming time, etc.) are likely to be small. The true cost will be the difference between the profitability of fishing inside these areas and the profitability of making those trips in the next best outside area.

Table 52 – Average annual reported revenue from inside the Southern Windowpane Flounder Large AM Area 1, FY 10-12

Trawl type	cod	haddock	flats	pollock	white hake	skates	squids	other
Traditional	$319,669	$26	$956,521	$94	$88,530	$221,188	$80,354	$1,414,618
Selective	$11,679	$0	$4,637	$0	$0	$1,203	$175	$216

Notes: VTR data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Table 53 – Average revenue per tow for tows ending inside the Southern Windowpane Flounder Large AM Area 1, FY 10-12

Trawl type	# tows	cod	haddock	flats	pollock	white hake	skates	squids	other	*TOTAL*
Traditional	85	$371	$11	$303	$0	$53	$514	$52	$565	*$1,869*
Selective	0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Notes: Observer data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Southern Windowpane Flounder Large AM AREA 2

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the Southern Windowpane Flounder Large AM Area 2 is over $180,000 dollars, accounting for less than 1% of total revenues (Table 54). Over 99% of this revenue is from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented. These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will most likely elect to increase their fishing efforts outside this area. In this case, even if revenues remain the same, vessel costs will rise due to longer steam time, decreased catch per unit effort, or both.

Table 54 – Annual and three-year average revenues for all groundfish trips and trips reported inside the Southern Windowpane Flounder Large AM Area 2

	Gear Type	2010	2011	2012	*3 year avg.*
All groundfish trips	Bottom longline	$2,168,832	$2,355,103	$374,947	*$1,632,960*
	Gillnet	$10,695,643	$10,421,830	$8,860,372	*$9,992,615*
	Trawl, selective	$9,171,141	$4,856,866	$1,157,086	*$5,061,698*
	Trawl, traditional	$101,860,375	$114,204,644	$98,785,680	*$104,950,233*
	Total:	*$123,895,991*	*$131,838,442*	*$109,178,085*	*$121,637,506*
Groundfish trips reported in AM area	Bottom longline	$0	$0	$0	$0
	Gillnet	$0	$0	$0	*$0*
	Trawl, selective	$0	$0	$0	$0
	Trawl, traditional	$58,500	$285,254	$198,728	*$180,827*
	Total:	*$58,500*	*$285,254*	*$198,728*	*$180,827*
Percent of all revenues on groundfish trips	Bottom longline	0%	0%	0%	0%
	Gillnet	0%	0%	0%	0%
	Trawl, selective	0%	0%	0%	0%
	Trawl, traditional	0%	0%	0%	0%
	Total:	*0%*	*0%*	*0%*	*0%*

Notes: VTR data, 2013 constant dollars.

The most impacted port is Belford, NJ, where activities reported inside the AM area account for $89,438, 18% of the average FY10-12 revenues landed in that port by permitted groundfish vessels (Table 55).

Selective gears have not been used in this area, indicating that it is generally more profitable to fish with traditional gears (Table 56). Average revenues per tow for selective gears and traditional gears in this area cannot be compared as there were no observed tows using selective gear for FY 2010-12 (Table 57). Whether it will be more profitable to fish in other areas or to continue fishing inside this area with selective gears depends on the profitability of other fishing options. Given the relatively small size of these areas, the additional trip costs (steaming time, etc.) are likely to be small. The true cost will be the difference between the profitability of fishing inside these areas and the profitability of making those trips in the next best outside area.

Table 55 – Ports with >$100K gross revenue on groundfish trips with landings from inside Southern Large AM Area 2, average of FY 10-12

State	Landing port	3-year average revenue		
		AM Area	All groundfish	Proportion of all groundfish revenues coming from AM area
RI	Point Judith	$23,717	$10,560,180	0.22%
NY	Freeport	$6,139	$18,815	32.63%
NY	Montauk	$65,351	$5,147,090	1.27%
NY	Point Lookout	$29,843	$268,298	11.12%
NJ	Point Pleasant	$365	$370,525	0.10%
NJ	Belford	$89,438	$496,027	18.03%

Notes: VTR data, 2013 constant dollars.

Table 56 – Average annual reported revenue from inside Southern Large AM Area 2, FY 10-12

Trawl type	cod	haddock	flats	pollock	white hake	skates	squids	other

Traditional	$160	$0	$12,398	$0	$5,102	$8,208	$80,799	$74,267
Selective	$0	$0	$0	$0	$0	$0	$0	$0

Notes: VTR data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Table 57 – Average revenue per tow for tows ending inside Southern Large AM Area 2, FY 10-12

Trawl type	# tows	cod	haddock	flats	pollock	white hake	skates	squids	other	*TOTAL*
Traditional	320	$17	$0	$7,259	$8	$621	$5,093	$130,906	$5,817	*$2,149*
Selective	0									

Notes: Observer data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

<u>Southern Windowpane Flounder Small AM Area</u>

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the Southern Windowpane Flounder Small AM Area is over $900,000 dollars, accounting for 1% of total revenues (Table 58). Over $900,000 dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented (Table 58). These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will most likely elect to increase their fishing efforts outside this area. In this case, even if revenues remain the same, vessel costs will rise due to longer steam time, decreased catch per unit effort, or both.

Table 58 – Annual and three-year average revenues for all groundfish trips and trips reported inside the Southern Windowpane Flounder Small AM Area

	Gear Type	2010	2011	2012	*3 year avg.*
All groundfish trips	Bottom longline	$2,168,832	$2,355,103	$374,947	*$1,632,960*
	Gillnet	$10,695,643	$10,421,830	$8,860,372	*$9,992,615*
	Trawl, selective	$9,171,141	$4,856,866	$1,157,086	*$5,061,698*
	Trawl, traditional	$101,860,375	$114,204,644	$98,785,680	*$104,950,233*
	Total:	*$123,895,991*	*$131,838,442*	*$109,178,085*	*$121,637,506*
Groundfish trips reported in AM area	Bottom longline	$8,611			*$2,870*
	Gillnet	$12,475	$25,947	$46,073	*$28,165*
	Trawl, selective	$2,584	$3,366		*$1,983*
	Trawl, traditional	$646,489	$1,006,904	$1,152,458	*$935,284*
	Total:	*$670,159*	*$1,036,217*	*$1,198,531*	*$968,302*
Percent of all revenues on groundfish trips	Bottom longline	0%	0%	0%	0%
	Gillnet	0%	0%	1%	0%
	Trawl, selective	0%	0%	0%	0%
	Trawl, traditional	1%	1%	1%	1%
	Total:	*1%*	*1%*	*1%*	*1%*

Notes: VTR data, 2013 constant dollars.

The majority of groundfish revenues reported in the AM Area for all gear types were reported on trips landing in Point Judith, RI, accounting for 8% of the average FY10-12 revenues landed in that port by permitted groundfish vessels (Table 59).

Selective gears have not been used extensively in this area thus far, indicating that it is generally more profitable to fish with traditional gears (Table 60). Average revenues per tow for selective gears and traditional gears in this area cannot be compared as there were no observed tows using selective gear for FY 2010-12 (Table 61). Whether it will be more profitable to fish in other areas or to continue fishing inside this area with selective gears depends on the profitability of other fishing options. Given the relatively small size of these areas, the additional trip costs (steaming time, etc.) are likely to be small. The true cost will be the difference between the profitability of fishing inside these areas and the profitability of making those trips in the next best outside area.

Table 59 – Ports with >$100K gross revenue on groundfish trips with landings from inside the Southern Windowpane Flounder Small AM Area, average of FY 10-12

State	Landing port	3-year average revenue		
		AM Area	All groundfish	Proportion of all groundfish revenues coming from AM area
MA	Boston	$2,667	$12,682,918	0.02%
MA	New Bedford	$37,962	$34,582,542	0.11%
CT	Stonington	$27,497	$1,094,181	2.51%
RI	Newport	$15,592	$157,733	9.89%
RI	Other Newport	$3,642	$58,069	6.27%
RI	Point Judith	$847,652	$10,560,180	8.03%
RI	Little Compton	$15,596	$132,356	11.78%
NY	Montauk	$39,161	$5,147,090	0.76%
NY	Shinnecock	$6,901	$438,073	1.58%

Notes: VTR data, 2013 constant dollars.

Table 60 – Average annual reported revenue from inside the Southern Windowpane Flounder Small AM Area, FY 10-12

Trawl type	cod	haddock	flats	pollock	white hake	skates	squids	other
Traditional	$232,712	$25	$460,445	$51	$4,896	$61,258	$8,541	$198,398
Selective	$650	$0	$1,897	$0	$0	$317	$62	$81

Notes: VTR data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Table 61 – Average revenue per tow for tows ending inside the Southern Windowpane Flounder Small AM Area, FY 10-12

Trawl type	# tows	cod	haddock	flats	pollock	white hake	skates	squids	other	*TOTAL*
Traditional	278	$309	$0	$402	$0	$21	$203	$83	$377	*$1,395*
Selective	0									

Notes: Observer data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail

flounder, American plaice and windowpane flounder.

Summary

In summary, as previously analyzed in FW47 and updated here, the No Action Alternative of implementing the Northern Windowpane Flounder Small AM Area may have a maximum upper bound cost of \$3.5 million in groundfish revenue; while the Large Area could affect \$8.2 million in revenue. Implementing the Southern Windowpane Flounder Small AM Area may have a maximum upper bound cost of almost \$1 million in groundfish revenue; while the Large Southern Areas (1 and 2) could affect \$3.1 million in revenue. Not all of these revenues are foregone, as fishermen can choose to fish inside the areas with selective gear or other areas. Whether it will be more profitable to fish in other areas or to continue fishing inside these areas with selective gears depends on the profitability of other fishing options. Given the relatively small size of most of the small AM areas, the additional trip costs (steaming time, etc.) are likely to be small. This does not necessarily hold for the large AM areas, where changes in catch composition between selective and traditional gears, combined with species-level availability outside the areas, could mean a reduction in total catch for affected vessels and, by extension, ports. Even if revenues remain the same, or increase, post-AM areas, costs associated with additional steam time and reduced catchability will mean that profits will be lower as a result of these measures. It is difficult to quantitatively predict the magnitude of the losses, conditioned on the upper bounds previously reported.

Application of the No Action Alternative in FY2014

The large AMs for both stock areas were implemented in FY2014. Option 1/No Action will have negative economic impacts , because it will actually affect fishing behavior and the AM applies to both common pool and sector vessels fishing on a groundfish trip fishing with trawl gear. At a minimum, fishermen will have to alter their behavior, which may impose additional costs. At a maximum, it could reduce revenue by \$11.3 million, since the larger areas have been implemented simultaneously. The maximum possible economic impacts of Option 1/No Action are expected to be more negative than may occur with either Option 2 or 3. For the Northern Windowpane Flounder AM Areas, the economic impacts are expected to be less negative than may occur with Option 4.

7.4.1.2 Option 2: Area-Based Accountability Measure for Windowpane Flounder - Modified accountability measure trigger that incorporates stock status and biomass (*Preferred Alternative*)

This option only applies to overages of the total ACL greater than 20% (and the relevant sub-ACL is also exceeded) that triggers the Large AM Area. In this case, the appropriate body within NMFS would determine whether the following criteria are met: 1) the stock is rebuilt and 2) the biomass indicator (defined as the 3-year centered average of the 3 most recent surveys multiplied by 75%F_{MSY} of the most recent assessment) is greater than the monitored catch. If NMFS determines that these criteria are met, only the Small AM Area would be implemented.

The AM areas in Option 2 are identical to those in Option 1/No Action, therefore the range of potential economic impacts is the same as those discussed in Section 7.4.1.1. Thus, comparing economic impacts between Option 1/No Action and Option 2 depends on the likelihood of triggering the AM. The reduction in size of the AM area decreases the probability of incurring the full magnitude of the economic impacts. The negative economic impacts of Option 2 are lower relative to Option 1/No Action, Option 3 and Option 4. Because of this, Option 2 would have likely low positive impacts compared to the No Action alternative.

If Option 2 was implemented in conjunction with Option 3, economic Impacts on the groundfish fishery would be identical to those described above for Option 2.

7.4.1.3 Option 3: Area-Based Accountability Measure for Windowpane Flounder - Consideration of catch performance over the most recent two-year period when determining accountability measure implementation (*Preferred Alternative*)

Under Option 3, following an overage in Year 1, if it is determined that a subsequent underage has occurred in Year 2, the AM is removed in Year 3.

The AM Areas in Option 3 are identical to those in Option 1/No Action, therefore the range of potential economic impacts are the same as those discussed in Section 7.4.1.1. Thus, comparing economic impacts between Option 1/No Action and Option 3 depends, on the likelihood of triggering the AM. The potential removal of the AM in Year 3 decreases the probability of incurring the full magnitude of the economic impacts. The economic impacts of Option 3 are likely to be less negative than would occur with Option 1/No Action and Option 4. Relative to Option 2, the economic impacts of Option 3 would be positive. Because the AMs are implemented for at least a portion of the year, there are some economic costs, but these costs are less than those under any of the other alternatives. As a result, this option has low positive impacts compared to the no action alternative.

If Option 2 was implemented in conjunction with Option 3, economic Impacts on the groundfish fishery would be identical to those described above for Option 2.

4.1.1.3 Option 4: Seasonal accountability measure for the northern windowpane flounder stock

Under Option 4, which applies to northern windowpane flounder only (no action for the southern stock), the AM would require the use of approved selective trawl gear in SA 522 during specified seasons. The duration of the AM would be dependent on the magnitude of the overage. The AM would be in place for May 1 - August 31 for an overage between 5% and 20% and May 1 - December 31 for an overage over 20%.

The economic impacts of triggering the AM areas are a function of (1) differences in profitability within the AM area between using selective vs. traditional gears, and/or (2) differences in profitability using selective gears inside vs. outside the AM area. Profitability itself is a function of costs and revenues, as well as species-specific resource availability. The AM areas could have net negative economic impacts if they result in:

- Lower stock-specific aggregate catches, due to lack of species availability outside of the AM area during the year gear restrictions are in place;
- Higher variable costs due to lower catch rates for economically important stocks either inside the AM area when using selective gears, or outside the AM area when using traditional gears; and
- Higher gear costs associated with rigging and using selective gears.

Whether it will be more profitable to fish in other areas or to continue fishing inside these areas with selective gears depends on the profitability of other fishing options. The use of selective gear can potentially change the composition of the catch inside the AM area, likely resulting in a lower proportion of flatfish relative to traditional trawl gears.

<u>Northern Windowpane Flounder Short Seasonal AM Area (May 1- August 31)</u>
The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the Northern Windowpane Flounder Short Seasonal AM Area is over $7 million dollars, accounting for 6% of total revenues (Table 62). Over $7 million dollars of total revenues are from trips fishing with traditional trawl gear which would no longer be allowed in this area if the AM is adopted and implemented (Table 62).

These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected by this option, as vessels may still elect to fish inside this area with selective gear or increase their fishing efforts outside this area.

The most impacted port is New Bedford, MA, where activities reported inside the AM area account for over 16% of the average revenues landed in that port by permitted groundfish vessels (Table 63). The use of selective gear substantially changes the composition of the catch inside the Northern Short Seasonal AM Area. VTRs and observer data collected from tows inside the area both show a higher proportion of haddock and lower proportion of flatfish when using selective gears, relative to traditional trawl gears (Table 64 and Table 65). Average revenues per tow for the selective gears in these areas were approximately 37% lower than per-tow revenues using traditional gears on observed trips, though fewer tows were observed (Table 65). VTR data indicate that traditional gears are more prevalent in this area.

Table 62 – Annual and three-year average revenues for all groundfish trips and trips reported inside the Northern Windowpane Flounder Short Seasonal AM Area

	Gear Type	**2010**	**2011**	**2012**	***3 year avg.***
All groundfish trips	Bottom longline	$2,168,832	$2,355,103	$374,947	*$1,632,960*
	Gillnet	$10,695,643	$10,421,830	$8,860,372	*$9,992,615*
	Trawl, selective	$9,171,141	$4,856,866	$1,157,086	*$5,061,698*
	Trawl, traditional	$101,860,375	$114,204,644	$98,785,680	*$104,950,233*
	Total:	*$123,895,991*	*$131,838,442*	*$109,178,085*	*$121,637,506*
Groundfish trips reported in Option 3 Area (May-Aug)	Bottom longline	$88,636	$18,146	$8,688	*$38,490*
	Gillnet	$71,655	$12,396	$26,028	*$36,693*
	Trawl, selective	$310,115	$264,011	$68,846	*$214,324*
	Trawl, traditional	$6,102,567	$6,815,515	$8,982,557	*$7,300,213*
	Total:	*$6,572,972*	*$7,110,068*	*$9,086,120*	*$7,589,720*
Percent of all revenues on groundfish trips	Bottom longline	4%	1%	2%	2%
	Gillnet	1%	0%	0%	0%
	Trawl, selective	3%	5%	6%	4%
	Trawl, traditional	6%	6%	9%	7%
	Total:	*5%*	*5%*	*8%*	*6%*

Notes: VTR data, 2013 constant dollars.

Table 63--Ports with over $100K gross revenue on groundfish trips with landings from inside the Northern Windowpane Flounder Short Seasonal AM Area, average of FY 10-12

State	Landing port	3-year average revenue		
		AM Area	All groundfish	Proportion of all groundfish revenues coming from AM area
ME	Portland	$51,860	$4,597,840	1.13%
MA	Boston	$498,713	$12,691,511	3.93%
MA	Gloucester	$1,028,710	$23,869,559	4.31%
MA	Chatham	$39,926	$1,920,625	2.08%
MA	New Bedford	$5,715,360	$34,845,427	16.40%
MA	Provincetown	$2,873	$469,022	0.61%
MA	Nantucket	$23,713	$274,813	8.63%
RI	Point Judith	$195,361	$10,900,442	1.79%
CT	Stonington	$23,418	$1,111,962	2.11%
CT	New London	$50,118	$1,962,701	2.55%
NY	Montauk	$114,247	$5,408,171	2.11%

Notes: VTR data, 2013 constant dollars.

Table 64– Average annual reported revenue from inside the Northern Windowpane Flounder Short Seasonal AM Area, FY 10-12

Trawl type	cod	haddock	flats	pollock	white hake	skates	squids	other
Traditional	$1,448,297	$1,106,860	$2,879,090	$159,524	$14,643	$159,619	$31,605	$1,483,817
Selective	$52,517	$206,128	$58,771	$13,714	$0	$3,201	$116	$21,438

Notes: VTR data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Table 65– Average revenue per tow for tows ending inside the Northern Windowpane Flounder Short Seasonal AM Area, FY 10-12

Trawl type	# tows	cod	haddock	flats	pollock	white hake	skates	squids	other	*TOTAL*
Traditional	1303	$355	$436	$646	$250	$32	$104	$11	$410	*$2,244*
Selective	125	$176	$741	$176	$66	$6	$186	$0	$46	*$1,397*

Notes: Observer data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

<u>Northern Windowpane Flounder Long Seasonal AM Area (May 1- December 31)</u>

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the Northern Windowpane Flounder Long Seasonal AM Area is over $13 million dollars, accounting for 11% of total revenues (Table 66). Over 96% of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented (Table 66). These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected by this option, as vessels may still elect to fish inside this area with selective gear or increase their fishing efforts outside this area.

Table 66 – Annual and three-year average revenues for all groundfish trips and trips reported inside the Northern Windowpane Flounder Long Seasonal AM Area

	Gear Type	2010	2011	2012	*3 year avg.*
All groundfish	Bottom longline	$2,168,832	$2,355,103	$374,947	*$1,632,960*

trips	Gillnet	$10,695,643	$10,421,830	$8,860,372	*$9,992,615*
	Trawl, selective	$9,171,141	$4,856,866	$1,157,086	*$5,061,698*
	Trawl, traditional	$101,860,375	$114,204,644	$98,785,680	*$104,950,233*
	Total:	*$123,895,991*	*$131,838,442*	*$109,178,085*	*$121,637,506*
Groundfish trips reported in Option 3 Area (May-Dec)	Bottom longline	$209,909	$27,066	$8,688	*$81,888*
	Gillnet	$77,680	$15,150	$26,028	*$39,620*
	Trawl, selective	$441,885	$593,981	$76,106	*$370,658*
	Trawl, traditional	$11,084,476	$13,059,091	$15,577,884	*$13,240,483*
	Total:	*$11,813,950*	*$13,695,288*	*$15,688,707*	*$13,732,648*
Percent of all revenues on groundfish trips	Bottom longline	10%	1%	2%	*5%*
	Gillnet	1%	0%	0%	*0%*
	Trawl, selective	5%	12%	7%	*7%*
	Trawl, traditional	11%	11%	16%	*13%*
	Total:	*10%*	*10%*	*14%*	*11%*

Notes: VTR data, 2013 constant dollars.

The most impacted port is New Bedford, MA, where activities reported inside the AM area account for over 30% of the average revenues landed in that port by permitted groundfish vessels (Table 67).

The use of selective gear substantially changes the composition of the catch inside the northern short seasonal AM area. VTRs and observer data collected from tows inside the area both show a higher proportion of haddock and lower proportion of flatfish when using selective gears, relative to traditional trawl gears (

Table **68** and Table 69). Average revenues per tow for the selective gears in these areas were approximately 15% lower than per-tow revenues using traditional gears on observed trips, though fewer tows were observed (Table 69). VTR data indicate that traditional gears are more prevalent in this area.

Table 67 - Ports with >$100K gross revenue on groundfish trips with landings from inside the Northern Windowpane Flounder Long Seasonal AM Area, average of FY 10-12

State	Landing port	3-year average revenue		
		AM Area	All groundfish	Proportion of all groundfish revenues coming from AM area
ME	Portland	$45,388	$4,597,840	0.99%
MA	Boston	$807,390	$12,691,511	6.36%
MA	Gloucester	$1,733,790	$23,869,559	7.26%
MA	Chatham	$46,449	$1,920,625	2.42%
MA	New Bedford	$10,610,217	$34,845,427	30.45%
MA	Provincetown	$2,805	$469,022	0.60%
MA	Nantucket	$53,192	$274,813	19.36%
MA	Harwichport	$27,931	$126,393	22.10%
RI	Point Judith	$299,316	$10,900,442	2.75%
CT	Stonington	$33,061	$1,111,962	2.97%
CT	New London	$123,973	$1,962,701	6.32%
NY	Montauk	$151,538	$5,408,171	2.80%

Notes: VTR data, 2013 constant dollars.

Table 68– Average annual reported catch from inside the Northern Windowpane Flounder Long Seasonal AM Area, FY 10-12

Trawl type	cod	haddock	flats	pollock	white hake	skates	squids	other
Traditional	$2,208,421	$1,770,046	$5,241,164	$255,069	$28,895	$311,616	$90,660	$3,412,625
Selective	$66,362	$275,743	$77,857	$36,202	$0	$3,685	$116	$52,844

Notes: VTR data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

Table 69– Average revenue per tow for tows ending inside the Northern Windowpane Flounder Long Seasonal AM Area, FY 10-12

Trawl type	# tows	cod	haddock	flats	pollock	white hake	skates	squids	other	*TOTAL*
Traditional	2379	$319	$402	$631	$170	$30	$151	$16	$551	*$2,270*
Selective	226	$226	$666	$201	$405	$6	$184	$0	$239	*$1,929*

Notes: Observer data, 2013 constant dollars. Flats include winter flounder, fluke, witch flounder, yellowtail flounder, American plaice and windowpane flounder.

<u>Summary</u>

In summary, implementing the Northern Windowpane Flounder Short Seasonal AM Area (May 1-August 31) may have a maximum upper bound cost of $7.3 million in groundfish revenue; while the Long Seasonal AM area (May 1-December 31) could affect $13.2 million in revenue. Not all of these revenues are foregone, as fishermen can choose to fish inside the areas with selective gear or could fish in other areas. Whether it will be more profitable to fish in other areas or to continue fishing inside these areas with selective gears depends on the profitability of other fishing options. Given the relatively large size of the Seasonal AM Areas, the additional trip costs (steaming time, etc.) are likely to be substantial. Changes in catch composition between selective and traditional gears, combined with species-level availability outside the areas, could mean a reduction in total catch for affected vessels and, by extension, ports. Even if revenues remain the same, or increase with implementation of the AMs, costs associated with additional steam time and reduced catchability could result in lower profits as a result of Option 3. It is difficult to quantitatively predict the magnitude of the losses, conditioned on the upper bounds previously reported. The economic impacts of Option 4 are likely to be more negative than would occur with Option 1/No Action or Options 2 and 3, since a broader range of revenues may be affected.

Table 70- Overview of the alternatives and potential for in-season change for FY 2014 groundfish fishery AMs.

Would the groundfish fishery AMs potentially change in-season during FY2014 for each of the alternatives, accounting retroactively for FY 2012 and FY 2013 monitoring catches?					
Northern Windowpane Flounder Stock					
Monitoring Catch Fishing Year	**% of Total Annual Catch Limit Caught**	**Option 1: No Action**	**Option 2**	**Option 3**	**Option 4**
2012	128% *(209 mt/163 mt)*	*NO*	*NO*	*NO*	*NO*
2013	165%* *(237.2 mt/144 mt)*	*NO*	*NO*	*NO*	*NO*
Southern Windowpane Flounder Stock					
2012	Total ACL: 137% *(521 mt/381 mt)* Groundfish sub-ACL: 147.9% *(106.5 mt/72 mt)*	*NO*	*YES Possibly scaled back to small area gear-based AMs depending upon if stock status/biomass criteria are met.*	*NO*	*Not applicable.*
2013	If there is an underharvest of the total ACL…. Total ACL: 42%** *(223.6 mt)/527 mt)*** Groundfish sub-ACL: 102%** (119.6 mt/102 mt)**	*NO*	*NO*	YES *Since there is an underharvest in Year 2 (FY2013 catches) following an overage in Year 1(FY2012 catches), the AM remains in place for at least 4 months (May 1-August 31) in Year 3 (FY 2014) then is possibly removed.****	*Not applicable.*

*Preliminary commercial groundfish fishery (sector and common pool) catch monitoring only (237.2 mt), May 9, 2014. Source: http://www.nero.noaa.gov/aps/monitoring/nemultispecies.html; does not include other components.
**Preliminary commercial groundfish fishery (sector and common pool) catch monitoring only (119.6 mt), report run on May 9, 2014; scallop fishery catches (104 mt), report run on March 6, 2014; does not include other components. Source: http://www.nero.noaa.gov/aps/monitoring/nemultispecies.html
*** Depending on the timing of final catch information and implementation date of FW52.

7.5 Social Impacts

National Standard 8 (NS8) requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. Thus, continued overall access to fishery resources is a consideration, but not a guarantee that fishermen will be able to use a particular gear type, harvest a particular species of fish, fish in a particular area, or fish during a certain time of the year.

A fundamental difficulty exists in forecasting social change relative to management alternatives, since communities or other societal groups are constantly evolving in response to external factors (e.g., market conditions, technology, alternate uses of waterfront, and tourism). Certainly, management regulations influence the direction and magnitude of economic and social change, but attribution is difficult with the tools and data available. While the focus here is on the economic and social impacts of the proposed fishing regulations, external factors may also influence change, both positive and negative, in the affected communities. External factors may also lead to unanticipated consequences of a regulation, due to cumulative impacts. These factors contribute to a community's ability to adapt to new regulations.

When examining potential social impacts of management measures, it is important to consider impacts on the following: the fishing fleet (vessels grouped by fishery, primary gear type, and/or size); vessel owners and employees (captains and crew); groundfish dealers and processors; final users of groundfish; community cooperatives; fishing industry associations; cultural components of the community; and fishing families. While some management measures may have a short-term negative impact on some communities, these should be weighed against potential long-term benefits to all communities which can be derived from a sustainable groundfish fishery.

The social impact factors outlined below can be used to describe the Northeast multispecies fishery, its sociocultural and community context and its participants. These factors or variables are considered relative to the management alternatives and used as a basis for comparison between alternatives. Use of these kinds of factors in social impact assessment is based on NMFS guidance (NMFS 2007a) and other texts (e.g., Burdge 1998). Longitudinal data describing these social factors region-wide and in comparable terms is limited. While this analysis does not quantify the impacts of the management alternatives relative to the social impact factors, qualitative discussion of the potential changes to the factors characterizes the likely direction and magnitude of the impacts.

The social impact factors fit into five categories:

- *Size and Demographic Characteristics* of the fishery-related workforce residing in the area; these determine demographic, income, and employment effects in relation to the workforce as a whole, by community and region.
- The *Attitudes, Beliefs, and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding the behavior of fishermen on the fishing grounds and in their communities.
- The effects of the proposed action on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities, as well as effects on the community's social structure, politics, etc.
- The *Non-Economic Social Aspects* of the proposed action; these include lifestyle, health, and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.
- 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 2007a).

7.5.1 Introduction

Entities to which the alternatives apply
The alternatives under consideration would apply to the commercial groundfish fishery, regardless of which fishery component contributed the most towards exceeding the ACL of windowpane flounder. More specifically, the alternatives would apply to the groundfish trawl fleet. The longline and gillnet fisheries comprise a very small amount of the total catch of windowpane flounder and are less likely to catch flatfish. Thus, the alternatives have the potential to negatively impact the *Attitudes, Beliefs, and Values* of fishermen in their perceptions of fairness amongst the fishery components and within the groundfish fishery. Closing the fishery to certain gear types in certain areas may cause resentment or conflict between fishing groups, a negative social impact in the form of changes to *Social Structure and Organization*.

Impacts of gear modifications, generally
The social impacts likely to result from changes to gear modifications are related to the compliance cost for vessels and the ability of gear suppliers to adapt. The magnitude and nature of the impacts would depend on the cost and catch efficiency of the new gear, the current availability of the new gear, and the choices fishermen must make between whether or not to fish in the areas where the new gear is required. New gear and equipment sometimes must be ordered months in advance, resulting in changes to daily routines when these modifications cannot be met in a timely and cost-efficient manner. Further, the cost of making such changes may prove to be a burden for some businesses. Gear modifications can alter daily routines and make long-term planning difficult. The social impacts can be manifested in changes to the *Social Structure and Organization* of the fishery and communities and to the *Attitudes, Beliefs and Values* of the fishery participants and other stakeholders.

For affected fishing businesses, gear modifications can be an economic burden. The ability of a business to adapt to new gear regulations will depend on its current economic situation and ability to cover the short-term costs of the gear. If the new gear requirement is substantially different from current gear requirements, it is likely that the most marginal vessels will not be able to cover the costs of the new gear and will be forced to seek alternative fisheries or stop fishing altogether. For the vessels that can cover the short-term costs of the gear, long-term impacts are related more to the loss of revenues from fishing that may occur because of the new gear. For example, the selective trawl gear may affect the catch per unit effort of affected vessels. Thus a vessel may have to increase effort (longer or more tows) to achieve the same amount of catch. Over the long-term, this may result in more significant economic impacts and, ultimately, more severe dislocation of vessels in the fishery.

For gear suppliers and related support services, gear modifications can affect short-term and long-term business planning. If the gear required by the Proposed Action is not readily available, gear suppliers must order it well in advance of the effective date of the new regulation. The uncertainty associated with the implementation of new gear modification regulations necessitates gear suppliers to wait until it is definite that a new gear will be required. It is too risky and too expensive to order stock prior to an official announcement of a new regulation. This can leave gear suppliers uncertain about the short-term needs for their business and make it impossible to develop long-term business strategies.

Impacts of gear-restricted areas, generally
The alternatives under consideration may impose gear-restricted areas rather than outright closures, however, the impacts may be similar to that of closed areas, particularly for vessels that do not already have or are unable to acquire the gear that would be required to access these areas. Social impacts of closed areas may tend to be more far-reaching in nature than social impacts from other management measures that are more administrative in nature, although the impacts are not as great as those that may result from very low catch limits. Area closures tend to have the most significant impacts on disruption in

daily living and changes in occupational opportunities and community infrastructure, potentially affecting the *Size and Demographic Characteristics* of the fishery-related workforce. Area-based restrictions such as these are likely to cause effort shift to other areas, which could change opportunities and infrastructure in homeports and landing ports. Additionally, closures often lead to a concentration of effort localized at the boundaries of closures, which can lead to crowding and gear conflicts among fishermen. This congestion could have a negative impact on *Social Structure and Organization*. Reductions in groundfish fishing opportunities compromise business flexibility and can have direct impacts on fishing activity within a port, consequently impacting the shoreside facilities that are dependent on the affected vessels. If vessels from certain ports choose to relocate or not to operate as a result of these closures, social impacts associated with economic loss could occur, including increased uncertainty and instability in the fishery and/or community, problems finding and keeping crew members on a year-round basis, family and business financial problems, overall increased stress at the individual, family, and community level, and reductions in job satisfaction.

The ability to adapt to closed areas is highly variable and largely dependent on the physical location of the closed areas. Less mobile fishermen may bear a heavier burden, as they are less able to easily switch harvest areas. Smaller vessels will be less able to adapt to closures of areas near shore as their range is limited, and they cannot easily target offshore areas. The most impacted communities will be those that are geographically proximate to the area and/or that serve as the homeport for vessels that fish there. In the near-term, area closures could reduce the *Size and Demographic Characteristics* of the fishery-related workforce and alter the *Historical Dependence on and Participation in* the fishery.

Area closures could help stocks rebuild, which would have positive long-term impacts on the businesses and communities that depend on groundfish species. These benefits are difficult to analyze, because of the uncertainty associated with the magnitude of the benefit, how these benefits would be distributed among fishing communities and the timing of these impacts. For example, vessels that are unable to adapt to new restrictions in the short-term may not be able to benefit from the potential stock increases in the long-term. Additionally, the short-term impacts on markets, processing capability, and other infrastructure during the period of adjustment may be such that these shoreside resources are lost and unable to recover in the future when potential stock increases occur.

The alternatives under consideration incentivize the industry to develop long-term bycatch avoidance strategies and may reduce bycatch through industry-based initiatives. This would have a positive impact on the *Attitudes, Beliefs, and Values* of stakeholders in their perception that the fishery is being managed more sustainably.

Impacts of FW52 gear-restricted areas, specifically

The alternatives under consideration contain several options for gear-restricted areas as AMs for the commercial groundfish fishery (Figure 1, Figure 5) in the waters of Southern New England/Mid-Atlantic (SNE/MA) and on Georges Bank (GB). Implementing a gear-restriction in the relatively inshore SNE/MA area would result in different social impacts than an area offshore on GB, because of the differences between the fisheries that operate in these two areas and the ports on which they depend. The SNE/MA restricted areas would likely impact smaller vessels, which would not normally venture to GB. Conversely, the GB area restrictions would more likely impact larger vessels. The trawl fishery in the SNE/MA area tends to be a flatfish fishery, so a flatfish-excluding gear restriction may essentially result in a de facto fishery closure. The gear restriction on GB prevents vessels from targeting winter flounder offshore, but this area also supports a substantial haddock fishery, though vessels that focus on flatfish may be less adaptable to the AMs than vessels more capable of stitching target fisheries. More specific impacts of each alternative are discussed in Section 7.5.2.

Communities most likely affected

The communities that are likely to experience substantial impacts from the alternatives under consideration include those associated with trips using gear that would not be allowed if the AM is adopted and implemented. Communities listed in Table 71 were identified through the economic analysis of Vessel Trip Report (VTR) data (Section 7.4) and are the principal ports associated with more than three trips during FY10-12 using traditional (non-selective) trawl gear in the respective Accountability Measure Areas. It is important to note that this is not an exhaustive list of communities that may be impacted.

Table 71 also includes Social Indicators of Fishing Community Vulnerability and Resilience for these communities. Social indicators are useful in understanding how these communities may be affected by regulatory change. These indicators were developed for three categories of vulnerability: 1) social indices, which represent general vulnerability of a community, regardless of the importance of fishing in that community; 2) gentrification indices, which represent factors which may threaten working waterfronts and shoreside infrastructure; and 3) fishing dependence indices, which represent the importance of and dependence on fishing in that community. Within each category, separate indices are calculated. These indices were selected based on literature and previous research and correspond to different components of vulnerability that will affect communities. Each indicator is scored from low to high vulnerability (1=Low, 2=Moderate, 3=High). These levels are calculated from the standard deviation of each community's individual vulnerability score. Standard deviations <0.499 are scored as "low" (1), standard deviations of 0.500-0.999 are scored as "moderate" (2), and standard deviations >1.000 above the mean are scored as "high" (3). For more information on the development and use of the Social Indicators see Jepson and Colburn (2013) or NMFS (2014).

The AMs under consideration trigger either a large or a small area gear-restriction, depending on the extent to which the ACL has been exceeded or other factors. Given the relative sizes of the Small and Large AM Areas, a trigger of the larger gear-restricted area is likely to result in more negative social impacts than the small gear-restriction area, particularly if the groundfish fishery is less able to harvest the allowable catch of co-occurring target stocks.

Table 71 - Social indicators of ports with over three trips during FY10-12 using traditional (non-selective) trawl gear in the AM Areas.

		Social Vulnerability Indices						Gentrification Indices			Commercial Fishing Dependence	
State	**Port**	**Personal Disruption**	**Population Composition**	**Poverty**	**Labor Force Structure**	**Housing Characteristics**	**Housing Disruption**	**Retiree Migration**	**Urban Sprawl**	**Natural Amenities**	**Com. Fishing Reliance**	**Com. Fishing Engagement**
ME	Portland	2	1	3	1	2	1	1	1	2	1	3
MA	Boston	3	3	3	1	1	1	1	3	1	1	3
MA	Fairhaven	2	1	2	1	2	1	1	1	1	1	3
MA	Gloucester	1	1	1	1	1	1	1	1	1	3	3
MA	New Bedford	3	3	3	1	2	2	1	1	1	2	3
MA	Woods Hole	1	1	1	3	1	1	3	2	3	1	1
CT	Mystic	1	1	1	1	1	1	1	1	1	1	1
CT	New London	3	3	3	1	2	1	1	1	2	1	2
CT	Stonington	2	1	1	1	1	1	1	1	1	1	2
NC	Beaufort	3	1	3	2	3	1	1	1	1	2	2
NC	Wanchese	1	1	1	1	3	1	2	1	1	3	3
NJ	Belford	1	1	1	1	1	3	1	1	2	3	3
NJ	Cape May	1	1	1	3	1	3	3	1	3	3	3
NJ	PT. Pleasant	1	1	1	1	1	1	1	1	1	1	3
NJ	PT. Pleasant Beach	1	1	1	1	1	3	1	2	2	2	3
NJ	Toms River	1	1	1	1	1	1	1	1	1	1	2
NY	Freeport	2	3	2	1	1	2	1	3	1	1	3
NY	Greenport	2	3	3	2	1	3	1	2	1	1	1
NY	Hampton Bays/ Shinnecock	1	1	1	1	1	3	1	3	1	1	3
NY	Islip	1	1	1	1	1	1	1	2	1	1	1
NY	Montauk	1	1	1	2	1	3	1	2	3	3	3
NY	New York	3	3	3	1	1	2	1	3	1	1	2
NY	Pt. Lookout	1	1	1	1	1	2	1	3	1	3	2
RI	Narragansett/ Pt. Judith	1	1	1	1	1	2	1	1	3	3	3
RI	Newport	1	1	1	1	1	2	1	1	1	1	3
VA	Hampton	2	2	2	1	2	1	1	1	2	1	3

Notes: Social Indicator scores: 1 = Low, 2 = Moderate, 3 = High. See Jepson and Colburn (2013) for description of indicators.

7.5.2 Windowpane Flounder Accountability Measures in the Groundfish Fishery

7.5.2.1 Option 1: No Action

This AM would impose area-based gear restrictions if the total ACL for any of these stocks is exceeded. If an AM is triggered, specific selective gear would be required in a specific area for the entire fishing year (Section 4.1.1). It is important to note that this AM affects all groundfish fishing activity, including sector and common pool.

If Option 1 is selected, there would be no additional social impacts relative to the status quo. Because the proposed gear-restricted areas would apply the AMs to both the sector and common pool components of the fishery, it could help to promote perceptions of equity and fairness among the two fisheries. If the AMs are triggered, Option 1 could have negative social impacts. The gears approved for use in these areas under the AMs are designed to minimize the catch of flatfish. Use of these gears would likely have a detrimental impact to the winter flounder and yellowtail flounder fisheries in these areas, as directed trips for these species are unlikely to occur as a result. With recent reductions in quotas for other stocks, many fishermen have diversified by targeting the flounder stocks. The primary groundfish ports of Gloucester, Boston, and New Bedford, Massachusetts are home to vessels landing the most flounder stocks in FY2012 (Table 22). These ports are likely to be impacted should these AMs be triggered; however these landings include all trip types. Only directed groundfish trips would be affected.

Depending on which AM Area is triggered, different communities will be impacted. Table 72 to Table 76 identify the principal ports with number of trips within each AM area in fishing years 2010-2012 using gear that would not be allowed if the AM is adopted and implemented. The Northern Windowpane AM areas will particularly impact ports in Massachusetts and Rhode Island. Gloucester, MA and Narragansett/Point Judith RI are vulnerable to impacts, due to their high reliance on commercial fishing, while ports such as New Bedford, MA and Boston, MA have high Social Vulnerability (Table 71). The Southern Windowpane Small AM area will most likely impact ports in New York and Rhode Island (Table 74), specifically Narragansett/Point Judith, RI which has a high level of vulnerability due to its dependence on commercial fishing (Table 71). The Southern Windowpane Large Areas will also impact ports in New Jersey and North Carolina. Communities with high levels of vulnerability from their reliance on and engagement in commercial fishing (Table 71) include Montauk, NY, Belford, NJ and Wanchese, NC.

Table 72 – Principal ports with number of trips within the Northern Windowpane Flounder Small AM area in fishing years 2010-2012 using gear that would not be allowed if the AM is adopted and implemented

State	Port	2010	2011	2012
ME		10		
	Portland	10		
MA		123	117	46
	Boston	10	5	
	Fairhaven		5	
	Gloucester	15	6	
	New Bedford	96	95	40
	Woods Hole		6	
RI		22	12	
	Narragansett/Point Judith	22	12	
NY		6		
NC		7	4	
	Wanchese	5	4	
Total		**170**	**140**	**52**

Table 73 - Principal ports with number of trips within the Northern Windowpane Flounder Large AM Area in fishing years 2010-2012 using gear that would not be allowed if the AM is adopted and implemented.

State	Port	2010	2011	2012
ME		4	4	8
	Portland	4	4	8
MA		111	169	208
	Boston	6	18	12
	Gloucester	7	13	15
	New Bedford	96	126	164
	Woods Hole		11	14
RI		5	11	6
	Narragansett/Point Judith	5	11	6
Total		**121**	**186**	**225**

Table 74 - Principal ports with number of trips within the Southern Windowpane Flounder Small AM Area in fishing years 2010-2012 using gear that would not be allowed if the AM is adopted and implemented.

State	Port	2010	2011	2012
MA				8
	Fall River			4
RI		134	163	211
	Narragansett/Point Judith	133	163	203
	Newport			8
NY		19	7	19
	Greenport		4	6
	Montauk	15		7
	Shinnecock			6
Total		**157**	**175**	**240**

Table 75 - Principal ports with number of trips within the Southern Windowpane Flounder Large AM Area 1 in fishing years 2010-2012 using gear that would not be allowed if the AM is adopted and implemented.

State	Port	2010	2011	2012
RI		288	351	287
	Narragansett/Point Judith	288	351	283
	Newport			4
CT		22	14	18
	Mystic		7	
	New London			4
	Stonington	21	7	13
NY		175	305	244
	Greenport	8	7	4
	Hampton Bays/Shinnecock		9	7
	Islip			8
	Montauk	166	289	225
NJ			4	
VA		4		
	Hampton	4		
Total		**490**	**677**	**552**

Table 76 - Principal ports with number of trips within the Southern Windowpane Flounder Large AM Area 2 in fishing years 2010-2012 using gear that would not be allowed if the AM is adopted and implemented.

State	Port	2010	2011	2012
RI			14	15
	Narragansett/Point Judith		14	15
NY		88	171	174
	Freeport	33	84	103
	Greenport			6
	Islip			10
	Montauk		27	18
	New York	16	29	
	Point Lookout	36	18	37
	Shinnecock		11	
NJ		98	115	150
	Belford	92	91	122
	Cape May			19
	Point Pleasant		8	9
	Point Pleasant Beach		10	
	Toms River		5	
NC				32
	Beaufort			4
	Wanchese			28
Total		**189**	**303**	**373**

7.5.2.2 Option 2: Area-based accountability measure for windowpane flounder - Modified accountability measure trigger that incorporates stock status and biomass (*Preferred Alternative*)

Option 2 is the same as the No Action option, except that when overages of the total ACL >20% occur (and the relevant sub-ACL is also exceeded), triggering the Large AM Area, the appropriate body within NMFS would determine whether the following criteria are met: 1) the stock is rebuilt and 2) the biomass indicator (defined as the 3-year centered average of the 3 most recent surveys multiplied by 75%F_{MSY} of the most recent assessment) is greater than the monitored catch. If NMFS determines that these criteria are met, only the Small AM Area would be implemented rather than the large.

If Option 2 is selected and the criteria are not met, the social impacts would be the same as those of the No Action Option. If the Large AM Area is triggered and the criteria are met, the social impacts would be more positive than the No Action alternative. Gear-restricted area(s) would still be implemented, but on a smaller scale. This could have positive impacts on the *Attitudes, Beliefs, and Values* of the fishermen, because the management would be more flexible based on stock condition. Specific communities likely impacted by each AM Area are identified in Table 72 - Table 76. Vulnerability indices for these communities are listed in Table 71.

If Option 2 was implemented in conjunction with Option 3, social Impacts on the groundfish fishery would be identical to those described above for Option 2.

7.5.2.3 Option 3: Area-based accountability measure for windowpane flounder - Consideration of catch performance over the most recent two-year period when determining accountability measure implementation (*Preferred Alternative*)

Under Option 3, following an overage in Year 1, if it is determined that a subsequent underage has occurred in Year 2, the AM would be removed in Year 3. NMFS would implement the necessary AM area on May 1, and then would announce sometime on after August 31 if the AM was no longer necessary.

If Option 3 is selected, this could result in positive social impacts on the *Attitudes, Beliefs, and Values* of the fishermen, because the management is being flexible relative to the performance of the fishery. This option may foster a sense of accountability within the fleet, giving the fishery the incentive to reduce catch in Year 2 and the flexibility for the fleet to choose how to achieve that. While implementation of the gear-restricted area may result in negative social impacts, these impacts might only be short term if the restriction is lifted part-way through the fishing year. Thus, the overall social impacts of this option would be low positive relative to No Action. Specific communities likely impacted by each AM Area are identified in Table 72 - Table 76. Vulnerability indices for these communities are listed in Table 71.

If Option 2 was implemented in conjunction with Option 3, social Impacts on the groundfish fishery would be identical to those described above for Option 2.

7.5.2.4 Option 4: Seasonal accountability measure for northern windowpane flounder stock

Under Option 4, the AM for Northern windowpane flounder would require the use of approved selective trawl gear in SA 522 during specified seasons. The duration of the AM would be dependent on the magnitude of the overage. The AM would be in place for May 1 - August 31 for an overage between 5% and 20% and May 1 - December 31 for an overage over 20%. This option would not change the timing of AM implementation, requirement for the total ACL (and relevant sub-ACL) to be exceeded to trigger the AM, the selective gear required for trawl gear, or the current management uncertainty buffer of 5% as identified under the No Action alternative. Under Option 3, the No Action alternative would apply for the southern windowpane flounder stock.

If Option 4 is selected, the social impacts would depend on the duration of the gear restriction, with the shorter gear-restricted gear having less negative impacts. The size of this gear restricted area would be larger than the areas considered under Options 1, 2, and 3, though the duration may be shorter depending on fishery performance (Figure 5). The economic impacts of Option 4 are likely to be more negative than would occur with Option 1/No Action or Options 2 and 3, since a broader range of revenues may be affected (Section 4.1.1.3). Thus, Option 4 would likely have more negatively social impacts fishing communities relative to the other options. Specific communities likely impacted by each AM Area are identified in Table 72 - Table 76. Vulnerability indices for these communities are listed in Table 71.

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 52 together with past, present, and reasonably foreseeable future actions that affect the human 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.

Valued Ecosystem Components (VEC)
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).

Temporal Scope of the VECs
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 (November, 2014) and 2020.

Geographic Scope of the VECs
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

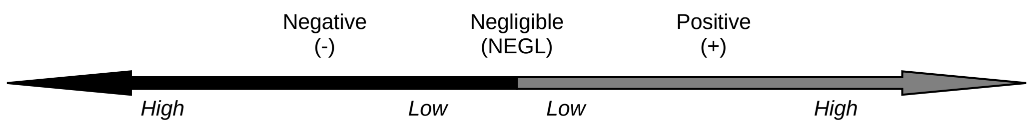
A cumulative effects assessment ideally makes effect determinations based on the culmination of the following: (1) impacts from past, present and reasonably foreseeable future actions; PLUS (2) the baseline condition for resources and human communities (note – the baseline condition consists of the present 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 78 . 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 77.

Table 77 - Impact definitions for cumulative effects analyses.

	Direction		
VEC	**Positive (+)**	**Negative (-)**	**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 78- 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 streamlined 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	-
Secretarial Amendment to Establish Annual Catch Limits and Accountability Measures for the Small-Mesh Multispecies Fishery **This amendment established the mechanism for implementing ACLs and AMs.**	Negl to L+	Negl	Negl	Negl	Negl to +
Amendment 3 to the Spiny Dogfish FMP **This amendment established 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+

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Framework 24 to the Atlantic Sea Scallop FMP (Framework 49 to the Northeast Multispecies FMP) **This framework set specifications for scallop FY 2013 and 2014. It is also considered 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 modified 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
FW50 to the Multispecies FMP **This FW adopted FY2013-2015 ACLs and specifications for the U.S./Canada Total Allowable Catches (TACs)**	+	+	+	Negl	-
FW51 to the Multispecies FMP **This FW adopted FY2014-2014 ACLs and specifications for the U.S./Canada Total Allowable Catches (TACs) and included changes to management measures**	Mixed	+	+	Negl	Mixed
Framework 25 to the Atlantic Sea Scallop FMP **This framework sets specifications for scallop FY 2014 and 2015. It is also considering accountability measures for windowpane flounder stocks.**	Likely Negl	Likely Negl to L+	Likely Negl to L+	Likely Negl	Likely - to +

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
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 -
FW53 to the Multispecies FMP **This FW would adopt FY2015-2017 ACLs and specifications for the U.S./Canada Total Allowable Catches (TACs) and changes to management measures**	Mixed	+	+	Negl	Mixed
Framework 26 to the Atlantic Sea Scallop FMP **This framework sets specifications for scallop FY 2016 and 2017. It is also considering accountability measures for northern windowpane flounder.**	Likely Negl	Likely Negl to L+	Likely Negl to L+	Likely Negl	Likely - to +

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
A18 to the Multispecies FMP **This amendment would create accumulation limits, a fishery for Handgear A, inshore/offshore measures for GOM cod, and trading mechanism for US/CA stocks.**	**Mixed**	**+**	**+**	**Negl**	**Mixed**

Noted: ND= Not determined

Table 78 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 79 come from fishery-related activities (e.g., federal fishery management actions – many of which are identified above in Table 78). 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.

Framework Adjustment 53 (FW 53) is considering establishing a sub-ACL for northern windowpane flounder for the scallop fishery. Concurrently, Framework Adjustment 26 (FW 26) to the Scallop FMP is considering establishing an AM for the scallop fishery for the northern windowpane flounder. The sub-

ACL combined with the AMs may reduce flatfish bycatch in the scallop fishery overall, which may have potentially positive cumulative impacts on the groundfish resource and groundfish fishery.

Table 79- Summary effects of past, present and reasonably foreseeable future actions on the VECs identified for Framework 52.

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 80) summarizes the added effects of the condition of the VECs (i.e., status/trends from Section 6.2.1) and the sum effect of the past, present and reasonably foreseeable future actions (from Table 79 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 6.1 and 6.5 , respectively. As mentioned above, this cumulative effects baseline is then used to assess cumulative effects of the proposed management actions in Table 81.

Table 80- 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 79)	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	No	No		
	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 80 cont'd.

VEC		Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 79)	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.
	Fish	Atlantic salmon, Shortnose sturgeon, and Atlantic sturgeon are classified as endangered under the ESA; Atlantic sturgeon Gulf of Maine DPS is listed as threatened; cusk and dusky shark are candidate species		
	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 longfin trawl		

Table 80 cont'd.

VEC	Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 79)	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 52 Actions

The alternatives contained in Framework 52 are focused on changes to management measures. The action modifies commercial groundfish fishing measures including accountability measures for northern and southern windowpane flounder stocks.

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, 48, 50, and 51 that used the best available science 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 AMs identified in FW 52 are thus consistent with the amendment. These measures affect the prosecution of the commercial fishery. The proposed changes would modifies commercial groundfish fishing measures including accountability measures for northern and southern windowpane flounder stocks, and would allow for more flexibility for the fishing industry.

In general, the adoption of these measures will benefit groundfish stocks because it will be more likely that mortality targets will not be exceeded. The Preferred Alternatives are designed to mitigate ACL overages in the windowpane flounder stocks of the Northeast Multispecies fishery. The measure is 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 modifications to the accountability measures continue to reduce catches of windowpane flounder stocks when compared to the No Action alternative.

Table 81- Summary of Impacts expected on the VECs.

Management Measure		VECs				
		Managed Resources	**Non-target Species**	**Protected Resources**	**Habitat Including EFH**	**Human Communities**
COMMERCIAL FISHERY MEASURES	**GROUNDFISH FISHERY ACCOUNTABILITY MEASURES FOR NORTHERN AND SOUTHERN WINDOWPANE FLOUNDER**	**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 protected resources	**No impact** – measures are not expected to create additional impacts to habitat	**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 80 provides as a summary of likely cumulative effects found in the various groups of management alternatives contained in Framework 52. The CEA baseline that, as described above in Table 81, 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 81, 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 action proposed by Framework 52 is expected to continue this trend. The adoption of revised accountability measures for the groundfish fishery for northern and windowpane flounder stocks are designed to meet fishing mortality targets and to promote stock rebuilding. 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. In addition, the cumulative impacts of FW 26 to the Scallop FMP on groundfish species are likely negligible and potentially positive for windowpane flounder.

Non-Target Species

As noted in Table 81, 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 action proposed by Framework 52 is expected to continue this trend. The primary mechanism is through the reduced ABCs/ACLs (reduced from recent years). The modifications in management measures 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 81, 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 action proposed by Framework 52 is 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 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, non-significant cumulative impacts to protected species.

Habitat, Including EFH

As noted in Table 81, 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. The management measures are not 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, resulting in slightly positive, non-significant cumulative impacts. However, it is likely that fishing and non-fishing activities will continue to degrade habitat quality.

Human Communities

As noted in Table 81, 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 and subsequent framework actions, 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. Modifying the AMs for northern and windowpane flounder stocks will provide some benefits to groundfish fishing communities. However, this action alone is not expected to have significant socioeconomic impacts beyond what was anticipated in Amendment 16. In addition, the cumulative impacts of FW 26 to the

Scallop FMP on the groundfish fishery are likely to be negligible and potentially positive for the windowpane flounder fishery. 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 groundfish fishery AMs for northern and southern windowpane flounder implement and adjust programs to achieve desired mortality levels.

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 northern windowpane flounder and southern windowpane flounder. These estimates are mostly in the form of information provided by the Northeast Fisheries Science Center in the NE Groundfish 2012 Updates Integrated Peer Review Meeting. Additionally, the 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 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. 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. 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 effort 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 the groundfish fishery, 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 AMs for northern and southern windowpane flounder stocks. 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.

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 Alternative, in conjunction with Amendment 16 measures, is 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 are consistent with that Understanding.

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. Likely future conditions of the resource are described 7.1.1.3. Impacts resulting from other measures in the management plan other than the measures 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 and Frameworks 44, 45, 47, 49, 50, and 61. 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 6.1.5.

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 are 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;

The Standardized Bycatch Reporting Methodology omnibus amendment was dismissed by the U.S. Court of Appeals for the District of Columbia Circuit in 2011 (No. 10-5299 Oceana, Inc. v. Gary F. Locke). That method no longer applies to this framework. 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, while this action adjusts management measures 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 includes adjustments to measures to ensure accountability for northern and southern windowpane flounder stocks.

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 52 (Northeast Multispecies FMP) Preferred Alternative is to adopt modifications to management measures that will incorporate new information relative to effective program administration 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 Alternative is described in Section 4.0. The alternative includes the following general measure:

- Revised northern and southern windowpane flounder AMs for the groundfish fishery

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 Alternative. Nearly all measures are expected to have neutral impacts on habitat.

Measures with Potential Negative Effects on EFH

None of the measures have potential negative effects on EFH.

Measures with Potential Positive Effects on EFH

The measures have low positive effects with respect to EFH.

Table 82- Summary of possible effects to EFH as a result of the Preferred Alternative

	Preferred Alternative
Possible negative impacts	
Neutral Impacts	
Possible Positive Impacts	Revised northern and southern windowpane flounder AMs for the groundfish fishery
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 Alternative is unlikely to have noticeable impacts on EFH; there may be low 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 8.2.3 and 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 3.0.
- 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

8.2.2 Finding of No Significant Impact (FONSI)

National Oceanic and Atmospheric Administration Order (NAO) 216-6 (revised May 20, 1999) provides 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 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. 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 options 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 and AMs 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 Alternative. As described in Section 7.1.1, the AMs in this action are designed to continue rebuilding/ promote target catch levels. 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 8.11.1) and the Initial Regulatory Flexibility Act review (Section 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 52 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.

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. This action proposes to implement Option 2 and/or Option 3, with agency discretion for the final implementation. Both Options are predicted to have positive economic impacts relative to No Action. AMs resulting in gear restrictions in the small AM areas affect $6.3 mil less revenues on groundfish trips in the Northern area, and $4.1mil less in the Southern area, than the two large areas, implying that the costs associated with the gear-restricted area—redirection of fishing effort, higher operational costs, lower catch rates, different species composition—will be much lower under the proposed action than the No Action option. Overall, the economic impacts of the proposed action are predicted to be positive.

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

Response: The effect of the Preferred Alternatives on the quality of human environment is not expected to be highly controversial in the context of NEPA. Alternatives in this document that modify AMs are expected to improve the ability to achieve mortality targets while minimizing economic impacts to fishing communities and fishermen so that society reaps benefits from fishery resources.

(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. 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. Overall, the economic impacts of the proposed action are predicted to be positive.

(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, FW 49, FW 50, and FW 51. 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. Framework 50 adjusted ABCs/ACLs for FY 2013. Framework 51 adjusted ABCs/ACLs for FY 204 and changes management measures. 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 Alternative, 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 Alternative 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 52 to the Northeast Multispecies Fishery Management Plan, it is hereby determined that Framework Adjustment 52 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.

Regional Administrator, Greater Atlantic Regional Fisheries Office, NOAA	Date

8.2.3 List of Preparers; Point of Contact

Questions concerning this document may be addressed to:

Mr. Thomas A. 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 (NEFMC)
Daniel Caless, NMFS Greater Atlantic Regional Fisheries Office (GARFO)
Timothy Cardiasmenos (GARFO)
Steven Correia, Massachusetts Division of Marine Fisheries (MA DMF)
Dr. Jamie Cournane (NEFMC)
Chad Demarest, Northeast Fisheries Science Center, (NEFSC)
Rachel Feeney (NEFMC)
Sara Heil (GARFO)
Anna Henry (NEFSC)
Dr. Fiona Hogan (NEFMC)
Susan Murphy (GARFO)
Thomas Nies (NEFMC)
Paul Nitschke (NEFSC)
Sally Sherman, Maine Department of Marine Resources
Michael Ruccio (GARFO)
Dr. William Whitmore (GARFO)

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

The Preferred Alternatives were developed during the period February 2014 through June 2014 and was discussed at the following meetings. Opportunities for public comment were provided at each of these meetings.

Date	Meeting Type	Location
2/25-26/14	Council Meeting	DoubleTree Hilton, Danvers, MA
3/28/14	Groundfish Oversight Committee	Omni Providence, Providence, RI
4/1/14	Groundfish Advisory Panel	Sheraton Colonial, Wakefield, MA
4/5/14	Groundfish Oversight Committee	Sheraton Colonial, Wakefield, MA
6/9/14	Groundfish Oversight Committee	Hampton Inn & Suites, Providence, RI
6/17-19/14	Council Meeting	Holiday Inn by the Bay, Portland, ME

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. The NEFMC has concluded, at this writing, 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.

The Council does acknowledge that endangered and threatened species may be affected by the measures proposed, but impacts should be minimal especially when compared to the prosecution of the fishery prior to implementation of Amendment 16. The NEFMC is now seeking the concurrence of the National Marine Fisheries Service with respect to Framework Adjustment 52.

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 47, 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 multistage 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 54 (NEFSC 2012), the NE Groundfish 2012 Updates Integrated Peer Review Meeting (NEFSC 2012), and SAW 55 (NEFSC 2013) 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 Alternative were conducted using information from the most recent complete calendar years, through 2012, and in some cases includes information that was collected during the first eight months of calendar year 2013. Complete data were not available for calendar year 2014. 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 52. 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 52 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; and
- 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:

1* 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;

2* Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

3* Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

4* 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 52 derive from 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 trans-boundary 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 FW52 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 benefits and costs of the regulations, it is important to note that the analysis will focus on the producer surplus generated by impacted fishing businesses. Consumer surplus is not expected to be affected by any of the regulatory changes proposed in FW52, as these regulations are unlikely to affect consumer welfare due to substitutes and imports.

8.11.1.4.1 Commercial and Recreational Fishery Measures

8.11.1.4.1.1 Accountability Measures

A detailed description of this alternative can be found in Section 4.2.1 of this document.

8.11.1.4.1.1.1 Option 1: No Action

Option 1/No Action would result in no additional economic impacts over the status quo. However the status quo has potential negative impacts should AM areas be triggered. The economic impacts of triggering the AM areas are a function of (1) differences in profitability within the AM area between using selective vs. traditional gears, and/or (2) differences in profitability using selective gears inside vs. outside the AM area. Profitability itself is a function of costs and revenues, as well as species-specific resource availability. The AM areas could have net negative economic impacts if they result in:

- lower stock-specific aggregate catches, due to lack of species availability outside of the AM area during the year with gear restrictions in place;
- higher variable costs due to lower catch rates for economically important stocks either inside the AM area(s) when using selective gears, or outside the AM area(s) when using traditional gears;
- higher gear costs associated with rigging and using selective gears.

Economic impacts of the No Action option are evaluated for large and small AMs within each stock area. Additional details and summary tables may be found in Section 7.4 of this document.

<u>Northern Windowpane Flounder AM – LARGE</u>
The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the northern windowpane large AM area is nearly $10.6 million dollars, accounting for 9% of total revenues. Over $8 million dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented.. These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected by this option, as vessels may still elect to fish inside this area with selective gear or increase their fishing efforts outside this area.

<u>Northern Windowpane Flounder AM – SMALL</u>
The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the northern windowpane small AM area is nearly $4.3 million dollars, accounting for 4% of total revenues. Over $3.5 million dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented. These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will elect to either fish inside this area with selective gear or increase their fishing efforts outside this area.

Southern Windowpane Flounder AM – LARGE AREA 1

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the southern windowpane flounder large AM area 1 is over $5.7 million dollars, accounting for 5% of total revenues. Over $4.2 million dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented. These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will most likely elect to increase their fishing efforts outside this area. In this case, even if revenues remain the same, vessel costs will rise due to longer steam time, decreased catch per unit effort, or both.

Southern Windowpane Flounder AM –LARGE AREA 2

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the southern windowpane flounder large AM area 2 is over $1.6 million dollars, accounting for 1% of total revenues. Over 99% of this revenue is from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented. These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will most likely elect to increase their fishing efforts outside this area. In this case, even if revenues remain the same, vessel costs will rise due to longer steam time, decreased catch per unit effort, or both.

Southern Windowpane Flounder AM – SMALL

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the southern windowpane flounder small area is over $1.4 million dollars, accounting for 1% of total revenues. Over $1 million dollars of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented. These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected as vessels will most likely elect to increase their fishing efforts outside this area. In this case, even if revenues remain the same, vessel costs will rise due to longer steam time, decreased catch per unit effort, or both.

Summary of Economic Impacts of the No Action Option

In summary, as previously analyzed in FW47 and updated here, the No Action Alternative of implementing the small northern windowpane flounder AM area may have a maximum upper bound cost of $3.5 million in groundfish revenue; while the larger area could affect $8.2 million in revenue. Implementing the small southern windowpane flounder AM area may have a maximum upper bound cost of $1 million in groundfish revenue; while the larger southern areas (1 and 2) could affect $5.8 million in revenue. Not all of these revenues are foregone, as fishermen can choose to fish inside the areas with selective gear or could fish in other areas. Whether it will be more profitable to fish in other areas or to continue fishing inside these areas with selective gears depends on the profitability of other fishing options. Given the relatively small size of most of the small AM areas, the additional trip costs (steaming time, etc.) are likely to be small. This does not necessarily hold for the Large AM areas, where changes in catch composition between selective and traditional gears, combined with species-level availability outside the areas, could mean a reduction in total catch for affected vessels and, by extension, ports. Even if revenues remain the same, or increase, post-AM areas, costs associated with additional steam time and reduced catchability will mean that profits will be lower as a result of these measures. It is difficult to quantitatively predict the magnitude of the losses, conditioned on the upper bounds previously reported.

Application of the No Action Alternative in FY2014

Since FW47, these AMs have not been triggered for the groundfish fishery. However, the large AMs for both stock areas were implemented for FY2014. Option 1/No Action will have negative economic impacts, because it will actually affect fishing behavior and the AM applies to both common pool and sector vessels fishing on a groundfish trip fishing with trawl gear. At a minimum, fishermen will have to alter their behavior, which may impose additional costs. At a maximum, it could reduce revenue by $14 million, since the larger areas have been implemented simultaneously. The maximum possible economic impacts of Option 1/No Action are expected to be more negative than may occur with Option 2. For the northern windowpane flounder areas, the economic impacts are expected to be less negative than may occur with Option 3. The No Action alternative would result in no additional impacts over the status quo.

8.11.1.4.1.1.2 Option 2: Area-Based Accountability Measure for Windowpane Flounder - Modified accountability measure trigger that incorporates stock status and biomass (Preferred Alternative)

The AM areas in Option 2 are identical to those in Option 1/No Action, therefore the range of potential economic impacts are the same as those discussed in Section 7.4.1.1. Thus, comparing economic impacts between Option 1/No Action and Option 2 depends on the likelihood of triggering the AM. The potential reduction in size of the AM area decreases the likelihood of triggering the large AM areas, decreasing the probability of incurring the full magnitude of the economic impacts. The economic impacts of Option 2 are likely positive relative to Option 1/No Action and Option 4, though triggering the small area would have negative impacts.

8.11.1.4.1.1.3 Option 3: Area-Based Accountability Measure for Windowpane Flounder - Consideration of catch performance over the most recent two-year period when determining accountability measure implementation. (Preferred Alternative)

The AM Areas in Option 3 are identical to those in Option 1/No Action, therefore the range of potential economic impacts are the same as those discussed in Section 7.4.1.1. Thus, comparing economic impacts between Option 1/No Action and Option 3 depends, on the likelihood of triggering the AM. The potential removal of the AM in Year 3 decreases the probability of incurring the full magnitude of the economic impacts. The economic impacts of Option 3 are likely to be less negative than would occur with Option 1/No Action and Option 4. Relative to Option 2, the economic impacts of Option 3 would be positive.

8.11.1.4.1.1.4 Option 4: Seasonal accountability measure for northern windowpane flounder stock

The economic impacts of triggering the AM areas are a function of (1) differences in profitability within the AM area between using selective vs. traditional gears, and/or (2) differences in profitability using selective gears inside vs. outside the AM area. Profitability itself is a function of costs and revenues, as well as species-specific resource availability. The AM areas could have net negative economic impacts if they result in:

- lower stock-specific aggregate catches, due to lack of species availability outside of the AM area during the year with gear-restrictions in place;
- higher variable costs due to lower catch rates for economically important stocks either inside the AM area when using selective gears, or outside the AM area when using traditional gears;
- higher gear costs associated with rigging and using selective gears.

Whether it will be more profitable to fish in other areas or to continue fishing inside these areas with selective gears depends on the profitability of other fishing options. The use of selective gear can potentially change the composition of the catch inside the AM area, likely resulting in a lower proportion of flatfish relative to traditional trawl gears.

<u>Northern Windowpane Flounder Seasonal AM –SHORT (May 1- August 31)</u>

The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the northern windowpane flounder short seasonal AM area is over $7 million dollars, accounting for 6% of total revenues (Table 21). Over $7 million dollars of total revenues are from trips fishing with traditional trawl gear which would no longer be allowed in this area if the AM is adopted and implemented (Table 21). These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected by this option, as vessels may still elect to fish inside this area with selective gear or increase their fishing efforts outside this area.

<u>Northern Windowpane Flounder Seasonal AM – LONG (May 1- December 31)</u>
The average annual revenue (FY10-12) by groundfish fishing vessels estimated from trips in the northern windowpane long seasonal AM area is over $13 million dollars, accounting for 11% of total revenues (Table 25). Over 96% of total revenues are from trips fishing with traditional trawl gear, which would no longer be allowed in this area if the AM is adopted and implemented (Table 25). These revenues represent the upper bound cost associated with this option. It is, however, likely that only a portion of these revenues will be affected by this option, as vessels may still elect to fish inside this area with selective gear or increase their fishing efforts outside this area.

<u>Summary</u>
In summary, implementing the short seasonal northern windowpane flounder AM area (May 1-August 31) may have a maximum upper bound cost of $7.3 million in groundfish revenue; while the longer seasonal gear-restricted area (May 1-December 31) could affect $13.2 million in revenue. Not all of these revenues are foregone, as fishermen can choose to fish inside the areas with selective gear or could fish in other areas. Whether it will be more profitable to fish in other areas or to continue fishing inside these areas with selective gears depends on the profitability of other fishing options. Given the relatively large size of the seasonal AM area, the additional trip costs (steaming time, etc.) are likely to be substantial. Changes in catch composition between selective and traditional gears, combined with species-level availability outside the areas, could mean a reduction in total catch for affected vessels and, by extension, ports. Even if revenues remain the same, or increase, post-AM areas, costs associated with additional steam time and reduced catchability could result in lower profits as a result of Option 4. It is difficult to quantitatively predict the magnitude of the losses, conditioned on the upper bounds previously reported.

The economic impacts of Option 3 are likely to be more negative than would occur with Option 1/No Action or Option 2, since a broader range of revenues maybe affected.

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. This action proposes to implement Options 2 and 3, with agency discretion for the final implementation. Both Options are predicted to have positive economic impacts relative to No Action. AMs resulting in a gear restriction in the small AM areas affect $6.3mil less revenues on groundfish trips in the Northern area, and $4.1mil less in the Southern area, than the two large areas, implying that the costs associated with the gear restricted areas—redirection of fishing effort, higher operational costs, lower catch rates, different species composition—will be much lower under the proposed action than the No Action option. Overall, the economic impacts of the proposed action are predicted to be positive.

8.11.2 Initial Regulatory Flexibility Act

8.11.2.1 Introduction

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.

8.11.2.2 Description 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.

8.11.2.3 Statement of the objectives of, and legal basis for, the proposed rule

The goals and objectives of Framework Adjustment 52 are the same as those detailed in Amendment 16 to the Northeast Multispecies Fishery FMP. In general, FW 52 is intended to modify groundfish fishery accountability measures for the northern and southern windowpane flounder stocks.

8.11.2.4 Description and estimate of the number of small entities to which the proposed rule will apply

Small entities include "small businesses," "small organizations," and "small governmental jurisdictions." The Small Business Administration (SBA) has established size standards for all major industry sectors in the U.S. including commercial finfish harvesters (NAICS code 114111), commercial shellfish harvesters (NAICS code 114112), other commercial marine harvesters (NAICS code 114119), for-hire businesses (NAICS code 487210), marinas (NAICS code 713930), seafood dealers/wholesalers (NAICS code 424460), and seafood processors (NAICS code 311710). A business primarily involved in finfish harvesting is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $20.5

million for all its affiliated operations worldwide. For commercial shellfish harvesters, the other qualifiers apply and the receipts threshold is $5.5 million. For other commercial marine harvesters, for-hire businesses, and marinas, the other qualifiers apply and the receipts threshold is $7.5 million. A business primarily involved in seafood processing is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual employment, counting all individuals employed on a full-time, part-time, or other basis not in excess of 500 employees[12] for all its affiliated operations worldwide. For seafood dealers/wholesalers, the other qualifiers apply and the employment threshold is 100 employees. A small organization is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field. Small governmental jurisdictions are governments of cities, boroughs, counties, towns, townships, villages, school districts, or special districts, with population of fewer than 50,000.

This proposed action impacts commercial fish harvesting entities engaged in the Northeast multispecies limited access fishery. A description of the specific permits that are likely to be impacted is included below for informational purposes, followed by a discussion of the impacted businesses (ownership entities) which can include multiple vessels and/or permit types. For the purposes of the RFA analysis, the ownership entities, not the individual vessels, are considered to be the regulated entities.

Regulated Commercial Fish Harvesting Entities

Limited Access Northeast Multispecies harvesting permits

The limited access groundfish[13] 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 percent 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. All limited access multispecies permit holders are eligible to participate in the sector allocation program, however many permit holders select to remain in the common pool fishery as a result of low catch histories and in turn, low Potential Sector Contributions (PSC) for groundfish stocks.

[12] In determining a concern's number of employees, SBA counts all individuals employed on a full-time, part-time, or other basis. This includes employees obtained from a temporary employee agency, professional employee organization or leasing concern. SBA will consider the totality of the circumstances, including criteria used by the IRS for Federal income tax purposes, in determining whether individuals are employees of a concern. Volunteers (i.e., individuals who receive no compensation, including no in-kind compensation, for work performed) are not considered employees. Where the size standard is number of employees, the method for determining a concern's size includes the following principles: (1) the average number of employees of the concern is used (including the employees of its domestic and foreign affiliates) based upon numbers of employees for each of the pay periods for the preceding completed 12 calendar months; (2) Part-time and temporary employees are counted the same as full-time employees. [*PART 121—SMALL BUSINESS SIZE REGULATIONS §121.106*]

[13] The species managed under the Northeast multispecies FMP are commonly referred to as groundfish.

As of May 1, 2014 (beginning of fishing year 2014) there were 1,046 individual limited access permits[14]. 613 of these permits were enrolled in the sector program and 433 were in the common pool. Of these 1,046 limited access multispecies permits, 767 had landings of any species and 414 had groundfish landings in FY 2013.

Ownership entities in regulated fish 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 entities are identified on June 1st of each year based on the list of all permit numbers, for the most recent complete calendar year, that have applied for any type of Northeast Federal fishing permit. The current ownership data set is based on calendar year 2013 permits and contains average gross sales associated with those permits for calendar years 2011 through 2013.

Matching the potentially impacted permits described above (Fishing Year 2014) to the calendar year 2013 ownership data, results in 868 distinct ownership entities. Of these, 855 are categorized as small and 13 are categorized as large entities per the SBA guidelines (Table 83 and Table 84).

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 regulated species associated with a specific fishery, we are able to identify those ownership groups most likely to be impacted by the proposed regulations[15]. Using this threshold, we find that 114 entities are groundfish-dependent, all of which are small and all of which are finfish commercial harvesting businesses (Table 85). Of the 114 groundfish-dependent entities, 102 have some level of participation in the sector program and 12 operate exclusively in the common pool.

[14] For purposes of this analysis, groundfish limited access eligibilities held as Confirmation of Permit History (CPH) are not included because although they may generate revenue from ACE leasing, they do not generate any gross sales from fishing activity and thus would not be classified as commercial fishing entities.

[15] Charter/party vessels are prohibited from selling fish though some ownership entities may have recreational and commercial permits. Entities designated as charter businesses derive the largest part of their gross sales from for-hire fees from passengers.

Table 83- Description of regulated entities by business type and size

Business Type	Small	Large	Total
Charter	39	0	39
Finfish	378	0	378
Shellfish	291	13	304
No Revenues	147	0	147
Total	**855**	**13**	**868**

* Business type is based on the fishing activity that generated the highest gross sales for each entity. Ownership entities with zero sales were defaulted into the finfish category.

Table 84 - Description of regulated entities by gross sales

Sales	Number of entities	Number of large businesses	Average number of fishing permits owned per entity	Maximum fishing permits per entity	Median gross sales per entity	Mean gross sales per entity
<$50K	268	0	1.2	36	$2,082	$9,740
$50-100K	96	0	1.1	2	$74,169	$74,710
$100-500K	323	0	1.3	5	$211,812	$236,344
$500K-1mil	78	0	1.4	5	$729,500	$733,243
$1-5.5mil	87	0	1.8	12	$1,574,360	$1,925,144
$5.5-20.5mil	11	8	1.7	6	$7,716,052	$8,257,405
$20.5mil+	5	5	7.8	25	$22,967,309	$23,312,445
Total ownership entities	*868*					

Table 85 - Description of groundfish-dependent entities regulated by the Proposed Action

Sales	Number of entities	Number of large businesses	Average number of fishing permits owned per entity	Maximum fishing permits per entity	Median gross sales per entity	Mean gross sales per entity	Median groundfish sales per entity	Mean groundfish sales per entity
<$50K	10	0	1.3	3	$10,665	$18,467	$3,363	$5,366
$50-100K	5	0	1.2	2	$80,138	$77,862	$20,063	$25,307
$100-500K	57	0	1.5	4	$193,021	$232,008	$104,450	$134,790
$500K-1mil	18	0	2.1	5	$738,240	$771,419	$477,286	$490,127
$1-5.5mil	24	0	3.1	12	$1,492,711	$1,928,132	$1,109,154	$1,252,107
$5.5-20.5mil	0	0	0.0	0	$0	$0	$0	$0
$20.5mil+	0	0	0.0	0	$0	$0	$0	$0
Total ownership entities	*114*							

8.11.2.5 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 requirement and the type of professional skills necessary for the preparation of the report or records

The proposed rules in FW 52 are not expected to create any additional reporting, record-keeping or other compliance requirements.

8.11.2.6 Identification 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.

8.11.2.7 Significance of economic impacts on small entities

Substantial number criterion

In colloquial terms, substantial number refers to "more than a few." The majority of the regulated entities impacted by this action are considered small, but the proposed alternative is expected to have a *positive* impact 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.

While the proposed action is expected to have positive economic impacts, small entities are not expected to be at a significant competitive disadvantage relative to large entities. Impacts on profitability from the proposed action are likely to positively affect both small and large entities in a broadly similar manner.

8.11.2.8 Description of impacts on small entities

This Initial Regulatory Flexibility Act (IRFA) analysis is intended to analyze the impacts of the alternatives described in Section 4.0 of FW 52 on small entities. The proposed action alters the criteria for triggering Accountability Measures for windowpane flounder, and may result in either smaller AM areas (i.e., duration or size) in the north and south areas or a decreased likelihood of triggering AMs in either/both areas. These provisions are expected to positively impact profitability of small entities regulated by this action.

Economic impacts to groundfish-dependent small entities

The proposed action is expected to result in either a lower probability of triggering an AM or, if an AM is triggered, a smaller gear restricted area (i.e., duration or time). In all cases the proposed action is expected to have positive economic impacts to small groundfish-dependent entities relative to the no action alternative. A more detailed discussion of the expected economic and social impacts can be found in Section 7.4 and Section 7.5 of this document, respectively.

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 yearclass.

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.

Almeida, F.P. 1987. Status of the silver hake resources off the northeast coast of the United States. Nat. Mar. Fish. Serv. NE Fish. Sci. Center, Woods Hole Lab., Woods Hole, MA, Ref. Doc. 87-03, 60 pp.

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.

Best, P.B., J. L. Bannister, R.L. Brownell, Jr., and G.P. Donovan (eds.). 2001. Right whales: worldwide status. J. Cetacean Res. Manage. (Special Issue). 2. 309 pp.

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.

Bolles, K.L., and G.A. Begg. 2000. Distinction between silver hake (*Merluccius bilinearis*) stocks in US waters of the northwest Atlantic based on whole otolith morphometrics. Fishery Bulletin 98:3.

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.

Brodziak, J.K.T., and W.K. Macy III. 1996. Growth of long-finned squid, *Loligo pealei*, in the northwest Atlantic. Fishery Bulletin 94 (2): 212 – 236.

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 RJ. 1998. A Conceptual Approach to Social Impact Assessment. Revised ed. Madison (WI): Social Ecology Press. 284 p.

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/.

Clay PM, Colburn LL, Olson J, Pinto da Silva P, Smith SL, Westwood A, Ekstrom J. Community Profiles for the Northeast US Fisheries. August 22, 2012. Woods Hole (MA): Northeast Fisheries Science Center; Available from: http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html.

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.

Falk-Petersen, I.R., and T.K. Hasen. 1991. Reproductive biology of wolffish *Anarhichas lupus* from north-Norwegian waters. Int. Coun. Explor. Mer., Demersal Fish. Comm. ICES CM 1991/G:14:17.

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.

Holland DS, Pinto da Silva P, Wiersma J. 2010. A Survey of Social Capital and Attitudes Toward Management in the New England Groundfish Fishery. In: Northeast Fisheries Science Center Reference Document. Woods Hole (MA): US Dept. of Commerce Northeast Fisheries Science Center. Ref. Doc. 10-12. 13 p.

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.

Jacobson, L. 2005. Essential fish habitat source document: longfin inshore squid, *Loligo pealeii*, life history and habitat characteristics, Second Edition. NOAA Tech. Memo. NMFS-NE- 193, 42 p. http://www.nefsc.noaa.gov/nefsc/publications/tm/tm193/

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.

Jepson, M., L.L. Colburn. 2013. Development of Social Indicators of Fishing Community Vulnerability and Resiliance in the U.S. Southeast and Northeast Regions. Silver Spring (MD): Department of Commerce. NOAA Tech. Memo. NMFS-F/SPO-129. 64 p.

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.

Kitts A, Bing-Sawyer E, McPherson M, Olson J, Walden J. 2011. Report for Fishing Year 2010 on the Performance of the Northeast Multispecies (Groundfish) Fishery (May 2010 - April 2011). December 2011. Woods Hole (MA): NOAA Fisheries Northeast Fisheries Science

Center. 11-12. 44 p.

Kocik, J., Lipsky, C., Miller, T., Rago, P., & Shepherd, G. 2013. An Atlantic Sturgeon Population Index for ESA Management Analysis. U.S. Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-06; 36 p. Available at: www.nefsc.noaa.gov/nefsc/publications/.

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. 1993. 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., Caless, D., Walden, J., and Benjamin, S. 2014. 2012 Final Report on the Performance of the Northeast Multispecies (Groundfish) Fishery (May 2012 – April 2013). Woods Hole: NEFSC. NOAA Fisheries Northeast Fisheries Science Center. 14-01. 121 p.

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 (NMFS). 2013. Endangered Species Act Section 7 Consultation on the Continued Implementation of Management Measures for the Northeast Multispecies, Monkfish, Spiny Dogfish, Atlantic Bluefish, Northeast Skate Complex, Mackerel/Squid/Butterfish, and Summer Flounder/Scup/Black Sea Bass Fisheries. Consultation No. F/NER/2012/0196.

National Marine Fisheries Service (NMFS). Social Indicators. Silver Spring (MD): Department of Commerce; Available from: http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

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.

NMFS. 2007b. Guidelines for the Economic Review of National Marine Fisheries Service Regulatory Actions. Washington (DC): NMF Service. 49 p.

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

NEFSC. 2002. Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern United States, October 23-25, 2001, Boston, Massachusetts. Woods Hole (MA): US Department of Commerce. Northeast Fisheries Science Center Reference Document 02-01. 86 p.

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). 2011a. 51st Northeast Regional Stock Assessment Workshop (51st SAW) Assessment Report. U.S. Dept. Commer, Northeast Fish. Sci. Cent. Ref. Doc. 11-02; 856 pp. Available at: http://www.nefsc.noaa.gov/publications/crd/crd1102/1102.pdf.

Northeast Fisheries Science Center (NEFSC). 2011b. 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

NEFSC. Social Sciences Branch [Internet]. 2012. Woods Hole (MA): NMFS Northeast Fisheries Science Center; Available from: http://www.nefsc.noaa.gov/read/socialsci/index.html.

Northeast Fisheries Science Center (NEFSC). 2013. 55th Northeast 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.

NEFSC. 2013a. 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Summary Report. Woods Hole (MA): U.S. Department of Commerce. Northeast Fisheries Science Center Ref. Doc. 13-04. 42 p.

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).

Perrin, W.F., B. Wursig, and J.G.M. Thewissen (eds.). 2002. Encyclopedia of Marine Mammals. Academic Press, San Diego, CA.

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.

Roper, C.F.E., M.J. Sweeney, and C.E. Nauen. 1984. Cephalopods of the World. An annotated and illustrated catalogue of species of interest to fisheries. FAO Fisheries Synopsis. 125, 227 pp.

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 GT, Josephson E, Maze-Foley K, Rosel, PE, editors. 2013. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2012. NOAA Tech Memo NMFS NE 223; 419 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