UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910 APR 10 2014

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE: Maine New-Hampshire Inshore Trawl Survey, NOAA Grant #NA13NMF4720104

LOCATION: The proposed research will take place in inshore coastal waters between the Massachusetts/New Hampshire border to the US/Canadian border, out to approximately 12 miles.

SUMMARY: The purpose of this project is to continue a time series (from 2000) of abundances of commercial and non-commercial species to aid fishery management decisions in the near shore waters from New Hampshire to Maine. The project consists of two, 30 day trawl surveys, in the spring and fall, through 2016. A total of approximately 240 stations are sampled, with tow durations of 20 minutes. This project provides fishery independent data that is a quantitative time-series on the distribution and relative abundance of benthic marine resources of the near shore Gulf of Maine waters along Maine and New Hampshire, and assists with NOAA/NMFS stock assessments. Work will be funded under NOAA grant #NA13NMF472010407 by Sally Sherman, Keri Stepanek of Maine Department of Marine Recourses, Booth Bay ME, and Doug Grout of New Hampshire Fish and Game Department, Durham New Hampshire.

RESPONSIBLE OFFICIAL:
William A. Karp, PhD,
Science and Research Director
NOAA Fisheries, Northeast Science Center
166 Water Street,
Woods Hole MA, 02543
508-495-2233

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact (FONSI) including the supporting environmental assessment (EA) is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the responsible official named above.

Sincerely,

for

Patricia A. Montanio
NOAA NEPA Coordinator

Enclosure

Final Environmental Assessment

for the

Maine-New Hampshire Inshore Trawl Survey

Prepared by
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

March 26, 2014

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Glossary of Acronyms and Terms

ALWTRP	Atlantic Large Whale Take Reduction Plan
ASMFC	Atlantic States Marine Fisheries Commission
ATL	Atlantic
BO	Biological Opinion
BDTRP	Bottlenose Dolphin Take Reduction Plan
C	Centigrade
CM	Centimeters
CPUE	catch-per-unit effort
DAS	Days-at-Sea
DSEIS	Draft Supplemental Environmental Impact Statement
DPS	Distinct Population Segment
E	East
EA	Environmental Assessment
EFH	Essential Fish Habitat
EEZ	Exclusive Economic Zone
EO	Executive Order
ESA	Endangered Species Act of 1973
FMC	Fishery Management Council
FMP	Fishery Management Plan
FV	Fishing Vessel
GIS	Geographic Information System
GOM	Gulf of Maine
HAPC	Habitat Areas of Particular Concern
HPTRP	Harbor Porpoise Take Reduction Plan
ITS	Incidental Take Statement
KG	Kilograms
KM	Kilometers
MAFMC	Mid-Atlantic Fishery Management Council
MDMR	Maine Department of Marine Resources
MSA	Magnuson-Stevens Fishery Conservation & Management Act, Magnuson-Steves Act
MMPA	Marine Mammal Protection Act of 1972
MRFSS	Marine Recreational Fisheries Statistics Survey
MT	Metric Ton
NCRP	Northeast Cooperative Research Program
NE	New England
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PBR	Potential Biological Removal
PDT	Plan Development Team
RFA	Regulatory Flexibility Act

SARC	Stock Assessment Review Committee
SAW	Stock Assessement Workshop
SRP	Scientific Research Permit
STSSN	Sea Turtle Stranding and Salvage Network
TEWG	Turtle Expert Working Group
TAC	Total Allowable Catch
US	United States
USFWS	US Fish and Wildlife Service
VEC	Valued Ecosystem Component
VR	Vulnerability rankings
VTR	Vessel trip report

1.0 Introduction

Fishery independent surveys provide key information supporting NOAA's mission to protect, restore, and manage the use of coastal and ocean resources through ecosystem based management. Since 2000, the Maine-New Hampshire Inshore Bottom Trawl Survey (ME-NH survey) has been conducting research cruises to supply fishery managers with important information on marine ecosystems and the status of fish stocks. The survey is designed to improve the quality of fish, shellfish, invertebrate and benthic resource data that are ultimately used for assessment, habitat designation and management/regulatory purposes. This environmental assessment (EA) describes and evaluates the environmental impact of the proposed 3-year (2014-2016) continuation of current and future fishery resource and ecosystem-based research surveys conducted through the ME-NH survey program.

The Maine-New Hampshire Inshore Bottom Trawl Survey is a collaboration between the National Marine Fisheries Service (NMFS) Northeast Fisheries Science Center (NEFSC), the Northeast Cooperative Research Program (NCRP), the Northeast Consortium, the Maine Department of Marine Resources (MDMR), the New Hampshire Fish and Game, T/R Fish Inc. and commercial fishermen along the coast of both Maine and New Hampshire. The ME-NH survey was designed and initiated to complement NOAA executed surveys in nearshore areas that had historically been unsurveyed by NOAA vessels due to rough bottom terrain and congestion from fixed gear

Bottom trawl surveys of the Gulf of Maine and Georges Bank have been conducted by the NMFS since fall 1963 and spring 1967 to provide fisheries managers with information on the condition of fish populations. Yet until the ME-NH survey began, about 80% of the historically important inshore waters (Goode 1884, Collins and Rathbun 1887, Rich 1929, Bigelow and Schroeder 1953) were not surveyed. As a result, prior to 2000, a scarcity of information existed from areas shallower than 300 ft.

The various resource and research surveys conducted and supported by NOAA are designed to meet the requirements of the Magnuson-Stevens Act by providing the best scientific information available to fishery conservation and management scientists and managers to support a management program that is able to respond to changing ecosystem conditions and to manage risk by developing science-based decision tools. Sustained ecosystem monitoring programs are essential for tracking the health of marine ecosystems. The ME-NH survey is a small part of a broader ecosystem monitoring program that meets this emerging critical need. The potential effects of survey activities must be weighed against the risk of inadequately characterizing the state of the ecosystem and potential human impacts on the system.

2.0 Purpose and Need for the ME-NH Survey

The purpose of the Maine-New Hampshire Inshore Trawl Survey is to provide a scientifically defensible quantitative time-series on the distribution and relative abundance of benthic marine resources in nearshore Gulf of Maine waters along the coast of Maine and New Hampshire. It is needed to fill a significant geographic and biological gap in knowledge from inshore areas that are inaccessible to NOAA survey vessels.

From the primary purpose the project also includes the following specific objectives:

- To develop recruitment indices for select species.
- To gather information on biological parameters (age at length, sexual maturity, food habits, and habitat use).
- To relate temperature and salinity to fish distribution.
- To assess efficacy of management measures.
- To foster a constructive working relationship between public and private sectors to improve marine resource management.

In addition to tracking mature animals, these surveys provide indices of juvenile abundance, which can indicate strong year classes before fish are vulnerable to commercial or recreational fisheries. Bottom trawl surveys assess the status of a stock over its entire distribution range, not just in small areas of commercial or recreational concern. These seasonal surveys also provide data to help monitor the processes of growth, maturity, predation, and mortality of a stock as well as trophic dynamics of fish communities. Results from these fishery independent cruises are vital for assessment biologists and fishery managers who work in close collaboration with the New England and Mid-Atlantic Fishery Management Councils (NEFMC, MAFMC) to develop management measures for the rebuilding and maintenance of overfished stocks.

3.0 Alternatives

3.1 Alternative 1 (Proposed Action) – Conduct the ME-NH Survey through a grant award to the Maine Department of Marine Resources

During the next three years (2014-2016), the ME-NH survey proposes to conduct fall (October and November) and spring (May and June) surveys utilizing the F/V *Robert Michael,* a 54-foot dragger. This EA will analyze the impacts of the operation of the program for the next three years (2014-2016).

Each seasonal survey is projected to take 25 days-at-sea (DAS) to complete and to sample a total of 120 stations. The survey area encompasses the coast of Maine and New Hampshire to the boundary of the territorial seas (i.e., 12 mautical miles) (Figure 1). The total survey area (approximately 4,520 mi^2) is stratified by depth and region. It includes four depth strata; 4-20 fathoms, 21-35 fathoms, and 36-55 fathoms, 56+ fathoms and five geographic regions. The shallowest depth was based on practical constraints imposed by the research vessel while the deeper boundary was selected to follow the territorial sea limit. The survey is based on a mixed model that combines one fixed station per stratum (n=20) selected based on historical importance (or in areas with no history, based on its representative quality) and 100 stratified random stations. The number of tows per stratum is apportioned according to its respective total area (Figure 1). The final survey design equates to a sampling density of about 1 station per 38 nm^2.

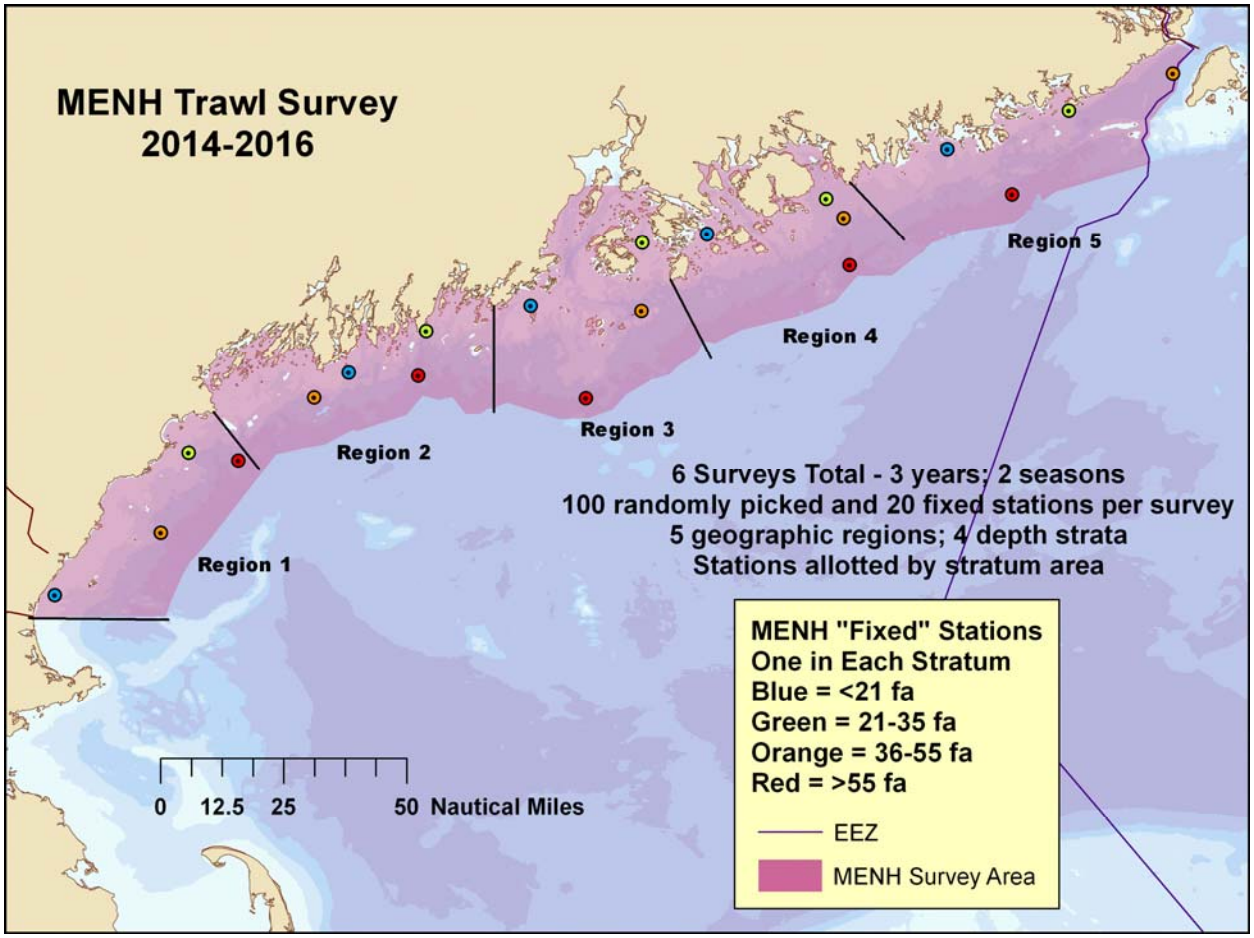

Figure 1. Maine-New Hampshire Survey area, including geographic regions and fixed survey stations

3.1.1 Survey Operations

The ME-NH survey uses a modified version of a Maine shrimp trawl; net tapers are cut to permit maximum height and tight bottom coverage. The footrope measures 70-feet with a roller frame of 6-inch rubber disks, a 10-foot bosom section with 8-inch disks, and a 59-foot headrope. It has 2-inch stretched measure polyethylene mesh overall with a 1-inch stretched mesh liner in the cod end. The ground gear is comprised of 60-foot top legs and 60-foot cookie covered bottom legs. It has #7.5 Bison steel doors.

A standard tow consists of towing the research net for 20 minutes at 2.5 knots in a straight line. At each station, the net is brought aboard and all fish are identified and sorted by species. A CTD profiler is deployed to collect temperature and salinity data. Collective weights are taken for all species. Lengths are taken on each individual unless the samples for that species are so large that they cannot be processed before the next tow. For large samples (e.g. herring) a representative sub-sample is taken of at least one hundred (100) individuals. Sex and maturity stage of individuals are determined for selected groundfish species. Stomach content analysis is performed on a smaller subset of species. Lobsters are immediately separated and processed for total weights (by sex), carapace length (mm), shell condition, presence and stage of eggs, V-notch condition, and trawl damage. Crabs, squid, scallops, and sea urchins are sampled for length and aggregate weight. Other invertebrates are identified, counted, and collectively weighed. The disposition and estimated survival rates of the 52 species that are state, federally or regionally managed that are captured during the survey are presented in Tables 4 and 5.

3.2 No Action Alternative – The ME-NH Survey is not conducted

This alternative is required by the National Environmental Policy Act (NEPA). Under the no action alternative, the grant supporting the ME-NH survey would not issued, and it is assumed that these surveys would not be conducted. Data provided by the surveys would not be collected to support the scientific and management purposes as outlined in Section 2.0.

3.3 Alternatives Considered but Rejected from Further Analysis

NMFS considered other methods to collect the specific ecosystem and fisheries data targeted by the ME-NH survey, such as alternative survey methodologies or utilizing other data sources, such as fishery dependent data (i.e., harvest data) and state, privately or federally supported fishery independent data collection surveys or programs. However, alternatives to the methodology utilized by the ME-NH survey were rejected from further analysis because alternative approaches, such as modifying the timing of the survey or the gear utilized, would not meet our need to maintain an objective unbiased sampling approach provided by this independent survey in this unique geographic location. The purpose and need of this action includes specific elements that would not be met if the operation, design or execution of the ME-NH survey were modified from current and past practices. The operation of the ME-NH survey, following the current design, is needed to collect high quality, fisheries independent data that is standardized and provides continuity of data. The numerous essential data fundamentals on abundance, distribution, sexual maturity, feeding ecology, size and age composition of stocks of economically and ecologically important species, including oceanographic and plankton data, are collected through a methodology that has been perfected over the last 12 years. To introduce different methodologies would not meet the purpose and need of the action and would undermine the value and importance of the ME-NH survey.

4.0 Affected Environment

The entire area surveyed by the ME-NH survey encompasses approximately 4,520 square nautical miles, and extends from the coasts of Maine and New Hampshire to the 12-mile territorial sea limit.

The following affected environment and environmental consequences of the alternatives focus on valued ecosystem components (VECs) and are identified as important to this action:

1. Physical Environment
2. Habitat and EFH
3. Fishery Resources
4. Protected Resources
5. Social and Economic Environment

NMFS staff determined that the five VECs are appropriate for the purpose of evaluating direct, indirect and cumulative effects of the proposed action based on the environmental components that have the potential to be affected by the NEFSC's research surveys, and statutory requirements to complete assessments of these factors under the Magnuson-Stevens Act, Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Regulatory Flexibility Act (RFA), and several Executive Orders (EO). The VECs are intentionally broad (for example, there is one devoted to protected resources, rather than just specific species of sea turtles) to allow for flexibility in assessing all potential resources and environmental factors that are likely to be impacted by the action.

4.1 Physical Environment

The geographic area and physical environment affected by the ME-NH survey occurs in a area of the Northwest Atlantic ocean is also known as the Northeast US Continental Shelf Large Marine Ecosystem (Sherman et al. 1996) and occurs withing the subsystem known as the Gulf of Maine (Figure 2). For more information about the physical characteristics of the environment described below, refer to Sherman et al. (1996); and Stevenson et al. (2004).

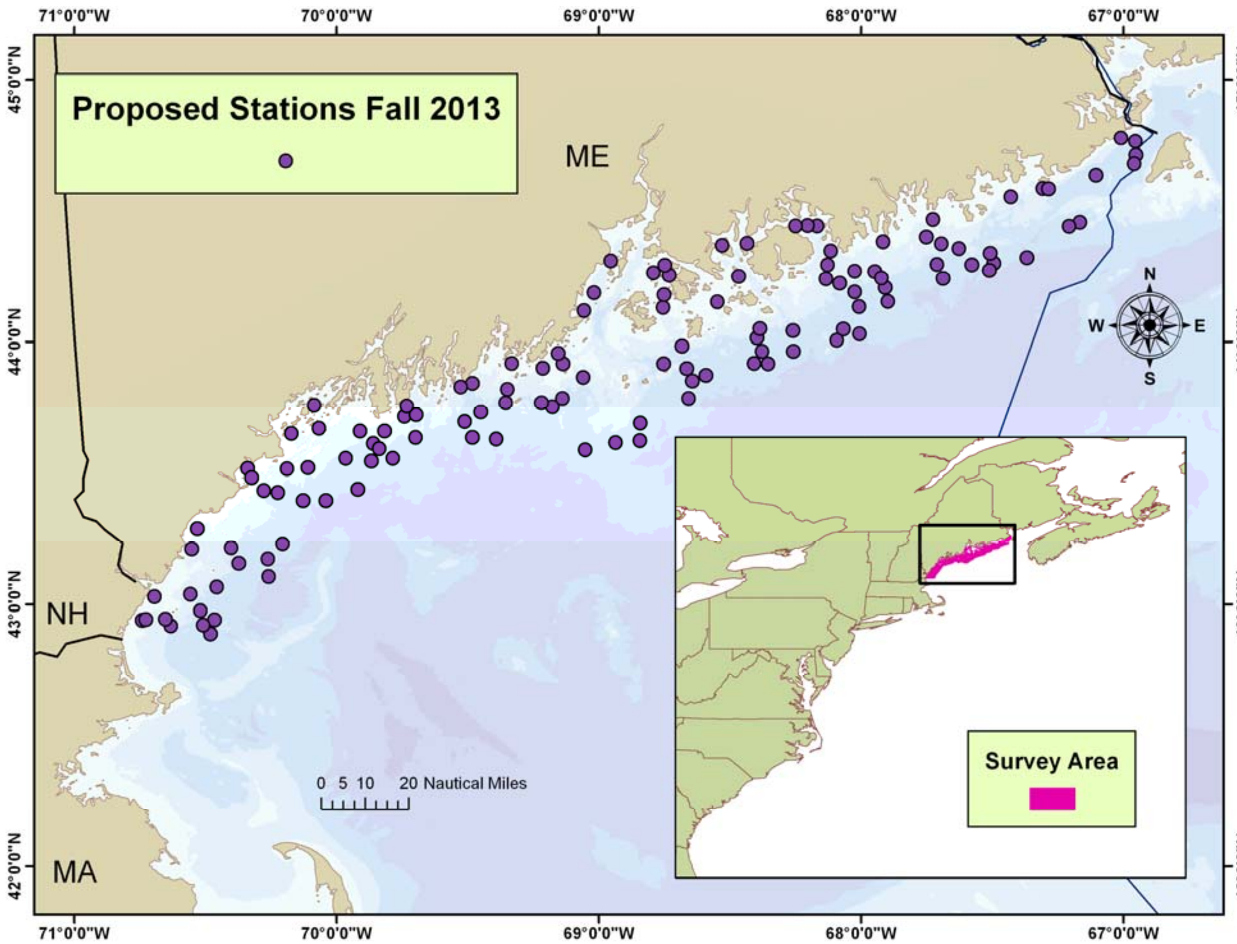

Figure 2. Survey area and proposed sampling stations for the fall 2013 Maine-New Hampshire Survey

4.1.1 Gulf of Maine

The Gulf of Maine is an enclosed coastal sea characterized by relatively cold waters and deep basins. The Gulf of Maine is bounded on the east by Browns Bank, on the north by Maine and Nova Scotia, on the west by Maine, New Hampshire, and Massachusetts, and on the south by Cape Cod and Georges Bank. Retreating glaciers (18,000-14,000 years ago) formed a complex system of deep basins, moraines, and rocky protrusions, leaving behind a variety of sediment types including silt, sand, clay, gravel, and boulders. These sediments are patchily distributed throughout the Gulf of Maine, and are largely related to the topography of the bottom.

Coastal bottom types are highly variable. Bedrock is the predominant substrate along the western edge of the gulf north of Cape Cod in a narrow band out to a depth of about 60 meters. Rocky areas become less common with increasing depth, but some rock outcrops are found in the deep, muddy basins. Mud is the second most common substrate in coastal waters. Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Many of these basins extend without interruption into deeper water. Gravel, often mixed with shell debris, is common adjacent to bedrock outcrops and in fractures in the rock. Large expanses of gravel are not common, but do occur near reworked glacial moraines and in areas where the seabed has been scoured by bottom currents. Gravel is most abundant at depths of 20 - 40 m, except in eastern Maine where a gravel-covered plain exists to depths of at least 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.

Surface currents in the Gulf of Maine are generally counterclockwise, influenced primarily by cold water masses moving in from the Scotian Shelf and offshore, although many small gyres and minor currents do occur. Freshwater runoff from the many rivers along the coast influences coastal circulation, as well. An important feature of the coastal waters in the gulf is the very high tides that reach an amplitude of five meters in eastern Maine and gradually diminish from east to west and cause strong bottom currents.

Information on the affected physical environment included in this EA was extracted from information from a number of primary sources that was summarized by Stevenson et al. (2004).

4.2 Habitat and Essential Fish Habitat (EFH)

Under the Magnuson-Stevens Act, EFH is defined as: “those waters and substrate necessary for fish spawning, breeding, feeding or growth to maturity". This includes all physical, chemical and biological elements of the areas that are used by fish.

In practice, the EFH for a managed species is designated for each life stage: eggs and larvae (normally pelagic) and juveniles and adults (pelagic and/or demersal). EFH applies to federally managed species in both state and federal jurisdictional waters throughout the range of the species. These federally managed species include those under the jurisdiction of MAFMC, NEFMC and NOAA Fisheries (Highly Migratory Species FMP). The commercial/recreational species managed by the states and Atlantic States Marine Fisheries Commission that are not included in federal FMPs are not covered by the EFH provisions. There are many forage fish species and those that contribute to the biodiversity of the oceanic ecosystem that are not managed by the states, ASMFC or under the federal FMPs. The designation of EFH by itself doesn't confer any protection of the bottom areas from nonfishing or fishing impacts.

The area affected by the proposed action (ME-NH survey) has been identified as EFH for a wide variety of species. EFH descriptions for species and life stages in the Gulf of Maine that occupy bottom habitats that are potentially vulnerable to the adverse effects of bottom trawling are listed in Table 1.

Table 1. EFH descriptions for all benthic life stages of federally-managed species in the Gulf of Maine that are potentially vulnerable to bottom trawling

Species	Life Stage	Depth (meters)	Bottom Type
American plaice	Juvenile	45 - 150	Fine grained sediments, sand, or gravel
American plaice	Adult	45 - 175	Fine grained sediments, sand, or gravel
Atlantic cod	Juvenile	25 - 75	Cobble or gravel
Atlantic cod	Adult	10 - 150	Rocks, pebbles, or gravel
Atlantic halibut	Juvenile	20 - 60	Sand, gravel, or clay
Atlantic halibut	Adult	100 - 700	Sand, gravel, or clay
Atlantic sea scallops	juvenile/adult	18 - 110	Cobble, shells, gravelly sand, and sand
Atlantic wolffish	Eggs	40 - 240	Rocky substrates in "nests"
Atlantic wolffish	juvenile/adult	40 - 240	Range from rocky to soft substrates
Haddock	Juvenile	35 - 100	Pebble and gravel
Haddock	Adult	40 - 150	Broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches
Little skate	juvenile/adult	0 - 137, mostly 73 - 91	Sandy or gravelly substrate or mud
Ocean pout	Eggs	<50	Generally sheltered nests in hard bottom in holes or crevices
Ocean pout	Juvenile	< 50	Close proximity to hard bottom nesting areas
Ocean pout	Adult	< 80	Smooth bottom near rocks or algae
Monkfish	juvenile/adult	25 - 200	Sand, rocks, gravel, and mud
Pollock	Juveniles	0 - 250	Aquatic vegetation, sand, mud, or rocks
Pollock	Adult	15 – 365	Bottom habitats (not specified)
Red hake	Juvenile	< 100	Shell fragments, including areas with an abundance of live scallops
Red hake	Adult	10 - 130	In sand and mud, in depressions
Redfish	Juvenile	25 - 400	Silt, mud, or hard bottom
Redfish	Adult	50 - 350	Silt, mud, or hard bottom
Silver hake	Juvenile	20 – 270	All substrate types
Smooth skate	juvenile/adult	31 – 874, mostly 110 - 457	Soft mud (silt and clay), sand, broken shells, gravel and pebbles
Thorny skate	juvenile/adult	18 - 2000, mostly 111 - 366	Sand, gravel, broken shell, pebbles, and soft mud
White hake	Juvenile	5 - 225	Seagrass beds, mud, or fine grained sand

Species	Life Stage	Depth (meters)	Bottom Type
White hake	Adult	5 - 325	Mud or fine-grained sand
Windowpane flounder	Juvenile	1 – 100	Mud or fine-grained sand
Windowpane flounder	Adult	1 – 75	Mud or fine-grained sand
Winter flounder	Juvenile	0 - 50	Mud or fine-grained sand
Winter flounder	Adult	1 - 100	Mud, sand, and gravel
Winter skate	juvenile/adult	0 - 371, mostly < 111	Sand and gravel or mud
Witch flounder	Juvenile	50 - 450 to 1500	Fine grained substrate
Witch flounder	Adult	25 - 300	Fine grained substrate
Yellowtail flounder	juvenile/adult	20 - 50	Sand or sand and mud

Source: NEFMC 1998

In general, EFH that occurs within the proposed survey area includes oceanic waters, seagrass beds, estuaries, and open bay areas, mud, sand, gravel and shell sediments, and rocky substrates. Vulnerable bottom habitat features also include structure-forming organisms such as sponges. Specific text descriptions and accompanying maps describing the characteristics and geographic distributions of EFH for species and life stages found in the Gulf of Maine can be accessed at http://www.habitat.noaa.gov/protection/efh/habitatmapper.html.

4.3 Fishery Resources

There are thousands of species of finfish, elasmobranchs and invertebrates that occur within the area surveyed by the ME-NH survey. During the 12 year history of the survey, 159 species have been collected and identified. Appendix B displays all of the species captured during the 2012 ME-NH survey, and Appendix A displays total capture of all managed species. The data has been sorted by total weight (kg) and by total number of individuals caught.

For the purposes of this EA, of the 159 species captured, the 52 that are either federally or state managed (by individual state or regional state agency) are presented in Table 2. Three species (cusk, hagfish and wolfish) have also been included due to possible future management actions. Atlantic sturgeon is included as it is managed under the Endangered Species Act (ESA). Detailed life history information about these species can be obtained at http://www.nefsc.noaa.gov/sos/. Species that are not managed under a federal or state program or that are of no conservation concern are not included in Table 2.

Table 2. List of species and management/jurisdiction and stock status (for Federally managed)

Species	Council	Fishery Management Plan	Stock Status (2012)
Atlantic Herring	NEFMC/MAFMC	Atlantic Herring FMP	-----
Butterfish	MAFMC	Atlantic Mackerel/Squid/Butterfish FMP	-----
Atlantic Mackerel	MAFMC	Atlantic Mackerel/Squid/Butterfish FMP	-----
Long Finned Squid	MAFMC	Atlantic Mackerel/Squid/Butterfish FMP	-----
Short Finned Squid	MAFMC	Atlantic Mackerel/Squid/Butterfish FMP	-----
Sea Scallop	NEFMC	Atlantic Sea Scallop FMP	-----
Northern Quahog/hard clam	MAFMC	Atlantic Surfclam & Ocean Quahog FMP	-----

Species	Council	Fishery Management Plan	Stock Status (2012)
Ocean Quahog clam	MAFMC	Atlantic Surfclam & Ocean Quahog FMP	-----
Bluefish	NEFMC/MAFMC	Bluefish FMP	-----
Atlantic Sturgeon	ESA	Conservation Concern	-----
Cusk	NEFMC	Future Management Action	-----
Atlantic Hagfish		Future Management Action	-----
Atlantic Wolffish		Future Management Action	Overfished
Striped Bass	ASMFC	Interstate FMP	-----
American Eel	ASMFC	Interstate FMP	-----
American Lobster	ASMFC	Interstate FMP	-----
Atlantic Menhaden	ASMFC	Interstate FMP	-----
Northern Shrimp	ASMFC	Interstate FMP	-----
Alewife	ASMFC	Interstate Shad and River Herring FMP	-----
Blueback Herring	ASMFC	Interstate Shad and River Herring FMP	-----
American Shad	ASMFC	Interstate Shad and River Herring FMP	-----
Monkfish	NEFMC	Monkfish FMP	-----
Atlantic Red Hake	NEFMC	NE Multispecies - Small Mesh FMP	-----
Silver Hake (whiting)	NEFMC	NE Multispecies - Small Mesh FMP	-----
White Hake	NEFMC	NE Multispecies - Small Mesh FMP	Overfished, Overfishing
Atlantic Cod	NEFMC	NE Multispecies FMP	Overfished, Overfishing
Atlantic windowpane flounder	NEFMC	NE Multispecies FMP	Overfished, Overfishing
Atlantic witch flounder	NEFMC	NE Multispecies FMP	Overfished, Overfishing
Winter Flounder	NEFMC	NE Multispecies FMP	Overfished
Yellowtail Flounder	NEFMC	NE Multispecies FMP	Overfished, Overfishing
Haddock	NEFMC	NE Multispecies FMP	Overfishing
Atlantic Halibut	NEFMC	NE Multispecies FMP	Overfished
American plaice (dab)	NEFMC	NE Multispecies FMP	-----
Pollock	NEFMC	NE Multispecies FMP	-----
Ocean Pout/Acadian redfish	NEFMC	NE Multispecies FMP	Overfished
Red Crab	NEFMC	Red Crab FMP	-----
Barndoor Skate	NEFMC	Skate FMP	-----
Clearnose Skate	NEFMC	Skate FMP	-----
Little Skate	NEFMC	Skate FMP	-----
Smooth Skate	NEFMC	Skate FMP	-----
Thorny Skate	NEFMC	Skate FMP	Overfished
Winter Skate	NEFMC	Skate FMP	-----
Spiny Dogfish	NEFMC/MAFMC	Spiny Dogfish FMP	-----
Sea Cucumber		State of ME	-----
Green Sea Urchin		State of ME	-----
Atlantic Summer Flounder	NEFMC/MAFMC	Summer Flounder/Scup/Black Sea Bass FMP	-----
Scup	MAFMC	Summer Flounder/Scup/Black Sea Bass FMP	-----
Black Sea Bass	MAFMC	Summer Flounder/Scup/Black Sea Bass FMP	-----
Atlantic Rock Crab			-----
Jonah Crab			-----
Rainbow Smelt			-----

Of the 52 species listed in Table 2, Table 3 displays both the total amout (in kilograms (kg)) and total number of each species caught over the 12 year operation of the survey. It also includes an average catch per year.

Table 3. Total weight, number and average weight of species caught during the ME-NH survey from 2000-2012

Species	Catch Weight (kg, total 2000-2012)	Catch Number (total 2000-2012)	Average Weight/Year
American Lobster	65,116.11	267,467.00	5,426.34
Atlantic Herring	50,938.44	2,530,279.00	4,244.87
Silver Hake	44,949.99	998,922.00	3,745.83
Spiny Dogfish	33,414.96	26,049.00	2,784.58
Northern Shrimp	15,661.58	2,680,224.00	1,305.13
Alewife	12,490.61	459,086.00	1,040.88
American Plaice	7,773.49	117,563.00	647.79
Winter Flounder	5,638.83	77,777.00	469.90
Red Hake	4,254.58	36,512.00	354.55
White Hake	3,930.20	38,227.00	327.52
Monkfish	3,619.85	6,075.00	301.65
Sea Cucumber	3,576.29	7,899.00	298.02
Acadian Redfish	3,279.43	41,509.00	273.29
Atlantic Cod	2,571.01	6,198.00	214.25
Jonah Crab	2,192.42	11,818.00	182.70
Butterfish	1,519.03	82,540.00	126.59
Witch Flounder	1,339.29	18,799.00	111.61
Blueback Herring	1,270.85	36,624.00	105.90
Atlantic Mackerel	1,247.63	14,623.00	103.97
Short Finned Squid	1,223.83	8,915.00	101.99
Rainbow Smelt	1,117.56	54,822.00	93.13
Little Skate	1,079.19	1,558.00	89.93
Thorny Skate	1,074.45	675.00	89.54
Yellowtail Flounder	1,073.07	4,415.00	89.42
Atlantic Halibut	1,064.85	821.00	88.74
Atlantic Rock Crab	907.45	7,025.00	75.62
Haddock	879.49	7,705.00	73.29
Sea Scallop	827.21	23,452.00	68.93
Long Finned Squid	591.59	43,449.00	49.30
Atlantic Sturgeon	557.95	52.00	46.50
Windowpane Flounder	410.34	12,015.00	34.20
American Shad	368.59	6,798.00	30.72
Winter Skate	258.82	227.00	21.57
Smooth Skate	217.96	487.00	18.16
Pollock	172.07	1,540.00	14.34
Scup	110.54	4,642.00	9.21
Ocean Pout	105.17	736.00	8.76
Atlantic Wolffish	73.84	14.00	6.15
Atlantic Menhaden	68.54	11,916.00	5.71
Barndoor Skate	36.67	20.00	3.06
Ocean Quahog	27.56	627.00	2.30
Red Crab	13.17	39.00	1.10
Green Sea Urchin	8.19	258.00	0.68
Northern Quahog	3.87	125.00	0.32
Bluefish	3.40	12.00	0.28
Atlantic Hagfish	3.36	30.00	0.28

Species	Catch Weight (kg, total 2000-2012)	Catch Number (total 2000-2012)	Average Weight/Year
Cusk	2.63	2.00	0.22
Black Sea Bass	2.18	8.00	0.18
Striped Bass	1.54	3.00	0.13
American Eel	1.27	6.00	0.11
Clearnose Skate	0.44	2.00	0.04
Summer Flounder	0.15	1.00	0.01

As evidenced in Table 3, for most species encountered by the survey less than 500 kg (1,100 lbs) are caught on average each year. For the vast majority of these species, a catch level of that amount is inconsequential when considered in relation to species abundance. As such, the analysis of impacts to fish species will focus on both those species for which catch is higher than an average of 500 kg per year and will also include any species of conservation concern. These species include American Lobster, Atlantic Herring, Silver Hake, Spiny Dogfish, Northern Shrimp, Alewife, American Plaice and Atlantic Sturgeon.

The disposition of fish and invertebrate species encountered during the survey is displayed in Tables 4 and 5.

Table 4. Disposition of catch; species for which 50% or more of individuals encountered are realeased dead

Species	% released alive	% sampled(lengths)	% sampled (other)	% released dead
alewife	0	35	5	100
striped bass	0	100	0	100
bluefish	0	100	0	100
butterfish	0	75	0	100
cod atlantic	5	100	50	95
cusk	0	100	0	100
spiny dogfish	50	90	5	50
flounder atlantic windowpane	20	98	0	80
flounder atlantic witch	5	98	25	95
flounder fourspot	10	100	0	90
flounder yellowtail	20	99	50	80
haddock	5	90	35	95
hake atlantic red	0	96	0	100
hake silver (whiting)	0	30	0	100
hake white	0	98	15	100
herring atlantic	0	5	1	100
herring blueback	0	60	0	100
mackerel atlantic	0	75	0	100
menhaden atlantic	0	60	0	100
monkfish	0	100	90	100
plaice american (dab)	2	70	10	98
pollock	0	95	0	100

Species	% released alive	% sampled(lengths)	% sampled (other)	% released dead
redfish acadian ocean perch	0	75	0	100
scallop sea	50	85	0	50
scup	0	80	0	100
sea bass black	50	100	0	50
shad american	0	90	1	100
shrimp northern	0	5	0	100
smelt rainbow	0	50	0	100
squid long finned	0	80	0	100
squid short-finned	0	95	0	100

Table 5 Disposition of catch; species for which 50% or more of individuals encountered are released alive

Species	% released alive	% sampled(lengths)	% sampled (other)	% released dead
northern quahog	100	0	0	0
ocean quahog	100	0	0	0
atlantic rock crab	95	98	0	5
jonah crab	95	97	0	5
red crab	100	100	0	0
sea cucumber	95	0	0	5
spiny dogfish	50	90	5	50
eel american	100	100	0	0
flounder atlantic summer	100	100	0	0
flounder winter	75	85	20	25
hagfish atlantic	100	100	0	0
halibut atlantic	98	100	2	2
lobster american	98	100	0	2
pout ocean	80	100	0	20
scallop sea	50	85	0	50
sea bass black	50	100	0	50
skate barndoor	95	100	0	5
skate clearnose	95	100	0	5
skate little	95	99	0	5
skate smooth	95	100	0	5
skate thorny	95	100	0	5
skate winter	95	100	0	5
sturgeon atlantic	100	100	0	0
wolffish atlantic	100	100	0	0

4.4 Protected Resources

The following protected species are found in the area utilized by the ME-NH survey. A number of the species are listed under the Endangered Species Act of 1973 as endangered or threatened, while others are identified as protected under the Marine Mammal Protection Act of 1972. Two right whale critical habitat designations (59 FR 28793, June 3, 1994) are located in the area in which the surveys are conducted. The information provided here summarizes the more detailed and extensive descriptions and life history information (provided in Sergeant 1962; Boulva and McLaren 1979; Lavigne and Kovacs 1988; Selzer and Payne 1988; Mead 1989; Kenney 1990; Rosel et al. 1999; Gaskin 1992; Katona et al. 1993; Read and Hohn 1995; Lesage and Hammill 2001; Perrin et al. 2002; Reeves et al. 2002; Clapham et al. 2003; Stenson et al. 2003; Stevick et al. 2003; Torres et al. 2003; Gilbert et al. 2005; Kraus and Rolland, 2007; and Waring et al. 2007).

Cetaceans	***Status***
Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*B. musculus*)	Endangered
Sei whale (*B. borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*B. acutorostrata*)	Protected
Cuvier’s beaked whale (*Ziphius cavirostris*)	Protected
Mesoplodon beaked whales (*Mesoplodon* spp.)	Protected
Pilot whale (*Globicephala* spp.)	Protected
Atlantic Spotted dolphin (*Stenella frontalis*)	Protected
Striped dolphin (*S. coeruleoalba*)	Protected
Risso’s dolphin (*Grampus griseus*)	Protected
Atlantic White-sided dolphin (*Lagenorhynchus acutus*)	Protected
White beaked dolphin (*L. albirostris*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Bottlenose dolphin: coastal stocks (*Tursiops truncatus*)	Depleted
Bottlenose dolphin: offshore stock (*T. truncatus*)	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected
Seals	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Pagophilus groenlandica*)	Protected
Hooded seal (*Crystophora cristata*)	Protected
Sea Turtles	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp’s ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Threatened/Endangered*
Loggerhead sea turtle (*Caretta caretta*)	Threatened

Fish

Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Atlanic sturgeon	Endangered/Threatened

*Green turtles in US waters are listed as threatened except for the Florida breeding population which is listed as endangered.

4.4.1 Species Not Likely to be Affected

4.4.1.1 Sea Turtles

Bottom trawls do have the potential to incidentally capture sea turtles, and sea turtle takes in bottom trawl gear have occurred in several fisheries including the U.S. shrimp trawl fishery (TWEG 1998, 2000), the Mid-Atlantic summer flounder winter trawl fishery (TEWG 1998, 2000; Murray 2008), the Delaware horseshoe crab fishery (Spotila et al., 1998), the whelk trawl fishery in South Carolina and Georgia (NMFS SEFSC 2001), the Mid-Atlantic long and short-finned squid bottom trawl fishery (Murray 2008), the Mid-Atlantic groundfish trawl fishery (Murray 2008), and the croaker-weakfish fly-net trawl fishery (Murray 2008). ESA-listed leatherback and loggerhead sea turtles may occur within the action area during the spring (May and June) and fall (October and November), but are more commonly found south of 41.0 latitude (Shoop and Kenny 1992; Department of the Navy 2005). The survey area is the northern limit of their range and the observed turtle density in this area is low (Shoop and Kenney 1992). Due to both their frequency of occurrence and the low level of survey fishing effort, the likelihood of interactions with sea loggerhead and leatherback sea turtles is negligible.

The ME-NH survey is not expected to interact with ESA-listed green, Kemp's ridley, and hawksbill sea turtles since these species rarely occur in the project area as temperatures restricts them to warmer waters further south (Musick and Limpus 1997). No interactions with any sea turtles have been reported since the inception of the program.

4.4.1.2 Marine Fishes

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They can be found in rivers along the western Atlantic coast from St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. 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). There are three known spawning populstions within the study area: two within the Kennebec-Asdroscoggin Sheepscot Estuarine Complex and one in the Penobscot River. There is no evidence to suggest that shortnose sturgeon utilize the lower bay and coast for foraging as they appear to prefer habitat further upriver in the vincinity of the head-of-tide interface (NMFS 1998). In general, shortnose sturgeon migrations are restricted to the fresh and brackish waters of their natal rivers (NMFS 1998). As such, the likelihood of interactions is negligible given that shortnose sturgeon are unlikely to occur in the study area (i.e., lower bays and coastal waters) and because the proposed effort for the survey is not expected to reach a scale where take occurs.

Wild populations of **Atlantic salmon** are found in rivers and streams from the lower Kennebec River north to the US - Canada border are listed as endangered under the ESA. These populations include those in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers and Cove Brook (i.e., Downeast Maine subpopulations). Juvenile salmon in New England rivers typically migrate to sea in May after a two to three year period of development in freshwater streams. Juveniles leave the Gulf of Maine and migrate to wintering grounds in the vicinity of Greenland and remain there for one to two winters before returning to US natal rivers in April and May. During the early fall, adults that have returned to their natal streams spawn in the upper reaches of the river, and overwinter until April in the lower river. Adults then return to their wintering grounds off Greenland beginning in April and May (Baum 1997). In 2001, a commercial fishing vessel engaged in fishing operations captured an adult salmon. Although this was subsequently determined to be an escaped aquaculture fish, it does show the potential for take of ESA-listed salmon in fishing gear. In addition, results from a 2001 post-smolt trawl survey in Penobscot Bay and 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.

It is extremely unlikely that the ME-NH survey will affect ESA-listed Atlantic salmon. Within the study area, Atlantic salmon are only expected to be present during the late spring (i.e., May and June), during which time only 20-22 tows will be conducted. The effort proposed by the survey is not expected to reach a scale where take occurs, and therefore the likelihood of interaction is discountable.

4.4.1.3 Small Cetaceans

Mortality of numerous small cetacean species (dolphins, pilot whales, and harbor porpoises) is associated with New England-based fishing gear. Seasonal abundance and distribution of each species off the coast of the Northeast U.S. varies with respect to life history characteristics. The most commonly observed small cetaceans recorded as bycatch in trawls are harbor porpoises, white-sided dolphins, common dolphins, and long- and short-finned pilot whales. While fishing interactions with trawl gear has occurred, it is not expected for this research survey. Because the ME-NH survey operates in near-shore waters, conducts a relatively small number of short tows each spring and fall, and because there have been no observed takes of any small cetaceans during research operations, the likelihood of interaction is negligible.

Minke whales off the eastern coast of the United States are considered to be part of the Canadian East Coast stock, which inhabits the area from the eastern half of the Davis Strait (45º W) to the Gulf of Mexico (Waring et al. 2007). Minke whales are common and widely distributed off the northeast US coast, particularly in the Georges Bank – Gulf of Maine regions (CeTAP 1982; Waring et al. 2007). They are designated at a non strategic stock in the Atlantic stock assessment report. Entanglement and mortalities have been reported in several fixed gear fisheries within the US EEZ (Waring et al. 2007). One freshly dead minke whale was caught in a bottom trawl in 2004 on the northeast tip of Georges Bank in US waters. Minke whales have also been observed feeding behind fishing trawls. No minke whale interactions have been reported as part of the ME-NH survey, and none are anticipated.

There are two species of **pilot whales** in the western Atlantic - the Atlantic or long-finned pilot whale and the short-finned pilot whale (CeTAP 1982; Waring et al. 2007). These species occur from Canada to Cape Hatteras. Short-finned pilot whales occupy tropical to warm temperate waters; therefore, seasonally their distribution may extend into shelf-edge waters north of Cape Hatteras. In late spring, pilot whales move onto Georges Bank and into the Gulf of Maine and more northern waters, and remain in these areas through late autumn (CeTAP 1982, Payne and Heinemann 1993; Waring et al. 2007). Pilot whales have been incidentally taken in several fisheries off the northeast US coast, including bottom trawl, Atlantic herring mid-water trawl, and Atlantic herring and Atlantic mackerel pair trawling (Waring et al. 2007). They have been observed to forage around fishing trawlers (Fertl and Leatherwood 1997). No pilot whale interactions have been reported as part of the ME-NH survey, and none are anticipated.

Common dolphin may be one of the most widely distributed species of cetaceans, as it is found world-wide in temperate, tropical, and subtropical seas. In the North Atlantic, common dolphins appear to be present along the coast over the continental shelf and slope along the 200-2000 m isobaths or over prominent underwater topography from 50º N to 40º S latitude (Evans 1994; CeTAP 1982; Selzer and Payne 1988; Waring et al. 1992). The species is less common south of Cape Hatteras, although schools have been reported as far south as eastern Florida (Gaskin 1992). They are widespread from Cape Hatteras northeast to Georges Bank (35˚ to 42˚ N) in outer continental shelf waters from mid-January to May (Hain et al. 1981; CeTAP 1982; Payne et al. 1984). Common dolphins move northward onto Georges Bank and the Scotian Shelf from mid-summer to autumn. Common dolphins are occasionally found in the Gulf of Maine, where temperature and salinity regimes are lower than on the continental slope of the Georges Bank/Mid-Atlantic region (Selzer and Payne 1988). Migration onto the Scotian Shelf and continental shelf off Newfoundland occurs during summer and autumn when water temperatures exceed 11º C (Sergeant et al. 1970; Gowans and Whitehead 1995).

Common dolphins have been incidentally taken in US and foreign bottom and pelagic trawl fisheries off the northeast US coast (Waring et al. 1990; Gerrior et al. 1994; Waring et al. 2007). They have occasionally been designated as strategic stocks in annual Atlantic stock assessment report, due to mortality in fishing operations. Common dolphins have been incidentally taken on two occasions (in 2004 and 2007) in NEFSC research trawl surveys. Even so, no common dolphin interactions have been reported as part of the ME-NH survey, and none are anticipated.

Altantic white-sided dophins are found in temperate and sub-polar waters of the North Atlantic, primarily in continental shelf waters to the 100m depth contour. The species inhabits waters from central West Greenland to North Carolina (about 35˚ N) and perhaps as far east as 43˚ W (Evans 1987). Distribution of sightings, strandings and incidental takes suggest the possible existence of three stocks units: Gulf of Maine, Gulf of St. Lawrence and Labrador Sea stocks (Palka et al. 1997). The Gulf of Maine stock of white-sided dolphins is most common in continental shelf waters from Hudson Canyon (approximately 39˚ N) north through Georges Bank, and in the Gulf of Maine to the lower Bay of Fundy. Sightings data indicate seasonal shifts in distribution (Northridge et al. 1997). During January to May, low numbers of white-sided dolphins are found from Georges Bank to Jeffreys Ledge (off New Hampshire), and even lower numbers are found south of Georges Bank, as documented by a few strandings observed on beaches of Virginia and North Carolina. From June through September, large numbers of white-sided dolphins are found from Georges Bank to the lower Bay of Fundy. From October to

December, white-sided dolphins occur at intermediate densities from southern Georges Bank to southern Gulf of Maine (Payne and Heinemann 1990). Sightings south of Georges Bank, particularly around Hudson Canyon, have been made at all times of the year but at low densities. The Virginia and North Carolina observations appear to represent the southern extent of the species range.

Prior to the 1970's, white-sided dolphins in US waters were found primarily offshore on the continental slope, while **white-beaked dolphins** (*L. albirostris*) were found on the continental shelf. During the 1970's, there was an apparent switch in habitat use between these two species. This shift may have been a result of the decrease in herring and increase in sand lance in the continental shelf waters (Katona et al. 1993; Kenney et al. 1996). While Atlantic white-sided dolphins have been incidentally taken in several US and foreign bottom and mid-water trawl fisheries off the northeast US coast (Waring et al. 1990; Waring et al. 2007), no interactions are anticipated as part of the ME-NH survey because of the minimal fishing effort and because no interactions have been reported in the 12 year history of the survey.

There are two morphologically and genetically distinct **bottlenose dolphin** morphotypes (Duffield et al. 1983; Duffield 1986) described as the coastal and offshore forms. Both inhabit waters in the western North Atlantic Ocean (Hersh and Duffield 1990; Mead and Potter 1995; Curry and Smith 1997) along the US Atlantic coast. The two morphotypes are genetically distinct based upon both mitochondrial and nuclear markers (Hoelzel et al. 1998). The offshore form is distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic Ocean. However, various studies have found the range of two morphotypes to overlap to some degree (Hersh and Duffield 1990; Torres et al. 2003; Garrison et al. 2003). Seasonally, bottlenose dolphins occur over the outer continental shelf and inner slope as far north as Georges Bank (CeTAP 1982; Kenney 1990). Sightings occurred along the continental shelf break from Georges Bank to Cape Hatteras during spring and summer (CeTAP 1982; Kenney 1990). Both morphotypes have been bycaught in a variety of fisheries off the northeast US coast (Waring et al. 2008), but only the offshore form has been documented in bottom and pelagic trawl fisheries (Gerrior et al. 1994; Waring et al. 2008). Because of the more southern distribution of bottlenose dolphins, and the lack of any interaction with ME-NH survey operations, it is not expected that any interaction would occur.

4.4.1.4 Pinnipeds

Harbor seals occupy all nearshore waters of the Atlantic Ocean and adjoining seas above about 30º N (Katona et al. 1993). In the western North Atlantic, they are distributed from the eastern Canadian Arctic and Greenland south to southern New England and New York, and occasionally to the Carolinas (Mansfield 1967; Boulva and McLaren 1979; Katona et al. 1993; Gilbert and Guldager 1998; Baird 2001). In US waters, breeding and pupping normally occur in waters north of the New Hampshire/Maine border, although breeding occurred as far south as Cape Cod in the early part of the twentieth century (Temte et al. 1991; Katona et al. 1993). Harbor seals are year-round inhabitants of the coastal waters of eastern Canada and Maine (Katona et al. 1993), and occur seasonally along the southern New England and New York coasts from September through late May (Schneider and Payne 1983). In recent years, their seasonal interval along the southern New England to New Jersey coasts has increased (Barlas 1999; Hoover et al. 1999; Slocum et al. 1999; Schroeder 2000; deHart 2002). Scattered sightings and strandings have been recorded as far south as Florida (NMFS unpublished data). A general southward movement from the Bay of Fundy to southern New England waters occurs in autumn and early winter (Rosenfeld et al. 1988; Whitman and Payne 1990; Barlas 1999; Jacobs and Terhune 2000). A northward movement from southern New England to Maine and eastern Canada occurs prior to the pupping season, which takes place from mid-May through June along the Maine Coast (Richardson 1976; Wilson 1978; Whitman and Payne 1990; Kenney 1994; deHart 2002). No pupping areas have been identified in southern New England (Payne and Schneider 1984; Barlas 1999). More recent information suggests that some pupping is occurring at high-use haulout sites off Manomet, Massachusetts. Harbor seals have been bycaught in several fisheries, including bottom trawls, off the northeast US coast (Waring et al. 2007). On one occasion a harbor seal was incidentally taken during a NEFSC research bottom trawl survey on Georges Bank. However, no interactions of harbor seals have been reported for the ME-NH survey, and because of the minimal fishing effort and short tow duration associated with the survey, no interactions are anticipated.

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. 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). No interactions of harp or hooded seals have been reported for the ME-NH survey, and because of limited trophic overlap, and the minimal fishing effort and short tow duration associated with the survey, no interactions are anticipated.

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 (Waring et al. 2013). 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. To date, bycatch has not been documented in US trawl fisheries, though the population is both increasing and expanding its range. However, no interactions of gray seals have been reported for the ME-NH survey, and because of the minimal fishing effort and short tow duration associated with the survey, no interactions are anticipated.

4.4.1.5 Large Marine Mammals

Large whales including **fin, right, humpback and minke** whales occur withing the ME-NH survey area. Takes of large whales are typically not documented within commercial fisheries 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. At this time, there is no evidence suggesting that other large whale species interact with trawl gear fisheries. No large whale interactions have been reported as part of the ME-NH survey, and none are anticipated.

4.4.1.6 Current Protections and Regulations

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. All fishing vessels are required to adhere to measures in the 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. The ALWTRP calls for the use of gear markings, area restrictions, weak links, and sinking groundline. Fishing vessels are required to comply with the ALWTRP in all areas where applicable.

Fishing vessels are also required to comply, where applicable, with the 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 (Figure X). 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.

There have been no reported interactions between the ME-NH survey and marine mammals.

4.4.2 Species Likely to be Affected

4.4.2.1 Marine Fish

4.4.2.1.1 Atlantic Sturgeon

The Gulf of Maine distinct population segment (DPS) of Atlantic sturgeon is listed as threatened under the ESA. Four others, the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs, are listed as endangered. Atlantic sturgeon are highly migratory and individuals from any of the five DPSs could occur within the action area. The range of all five DPSs include marine waters from Labrador Inlet, Labrador, Canada to Cape Canaveral, FL, including coastal bays and estuaries. In marine waters, Atlantic sturgeon occur most frequently in waters less than 50 meters in depth. There are no total population size estimates for any of the five Atlantic sturgeon DPSs at this time. However, there are two estimates of spawning adults per year for two river systems, including 870 spawning adults per year for the Hudson River and 343 spawning adults per year for the Altmaha River. These estimates represent only a fraction of the total population size as Atlantic sturgeon do not appear to spawn every year and these estimates do not include subadults or early life stages. Additional information about Atlantic sturgeon, including the 2012 listing and detailed life history information can be found in Dadswell *et al*. (1984), Smith (1985), Smith and Clugston (1997), Stein *et al*. (2004), Dadswell (2006), ASSRT (2007), Grunwald *et al*. (2008), Dunton *et al*. (2010), 77 FR 5880, and 77 FR 5914.

NMFS has concluded that unintended catch of Atlantic sturgeon in fisheries, vessel strikes, poor water quality, water availability, dams, lack of regulatory mechanisms for protecting the fish, and dredging to be the most significant threats to Atlantic sturgeon (77 FR 5880 and 77 FR 5913; February 6, 2012). Information on the numbers of Atlantic sturgeon captured or killed as a result of all of the noted threats is not available, except for an estimate of encounters by Northeast FMPs (NEFSC 2011). The analysis prepared by the NEFSC estimates that from 2006-2010 there were 2,250-3,862 encounters per year in observed gillnet and trawl fisheries, with an average of 3,118 encounters. Mortality rates in otter trawl gear are believed to be 5%, and 20% in gillnet gear. There are no commercial fisheries for Atlantic sturgeon in US waters, though a fishery does exist in Canadian waters. Over the 12 year history of the ME-NH survey, a total of 52 Atlantic sturgeon have been taken. All were reported to have been released alive and in good condition.

4.5 Social and Economic Environment

The direct impact of the proposed surveys on social and economic resources is small. As such, details of these resources are only generally described here.

The affected resources include the fisheries and associated businesses that occur within the affected survey area. The fisheries are managed under 15 federal FMPs that are developed by the two fishery management councils and implemented by NMFS under the Magnuson-Stevens Act (Table 2). The primary target species of the surveys and associated fisheries are listed in Section 4.3. Several of these species, e.g. summer flounder, scup, black sea bass, are managed by both a federal plan and ASMFC (state waters) plan. Other species collected in the normal operations of the survey are processed as well and these data are provided to the ASMFC for non-federal assessments.

Commercial fishermen that harvest species that inhabit the ME-NH survey area operate in federal waters (3-200 miles) with federal permits and in state waters (0-3 miles) under federal or state-only permits. The information provided by the surveys is important for all commercial fishermen that target federally managed species and/or federal data-dependent ASMFC species whether or not they have a federal permit. Also affected are the associated businesses that support commercial and recreational fisheries and the communities in which these fishermen live and/or do business. Federally permitted or state-only permitted party and charter businesses with some of the same species targets and their associated communities and businesses are also affected.

The federal component of these groups consists of approximately 1,544 unique vessels holding current federal fishing permits (as of 2013) in Maine and New Hampshire. Recreational fishermen pursue fish predominantly in state waters, are not required to have a federal or state permit and target a small subset of the large number of species whose assessments depend on federal survey data. Extensive information about northeast region recreational fishermen by Steinback, Gentner and Castle (2004) is at http://spo.nwr.noaa.gov under the Professional Papers link.

5.0 Environmental Consequences of the Proposed Action and Alternatives

5.1 Impacts on the Physical Environment

5.1.1 Impacts of No Action

The no-action alternative would not include any survey activity and therefore would not result in any impacts on the physical environment. Recreational and commercial fishing activites are the greatest cause of adverse impacts to the physical environment in the study area. Currently occurring fishing activities would continue to contribute to alteration of the physical environment within the area covered by the surveys. This includes trap fishing, trawling, dredging, and setting of fixed nets. These activities are managed, and the impacts of the activities are evaluated, under one of 11 Federal fishery management plans or 7 state fishery management plans that operate within the study area (Figure 1).

5.1.2 Impacts on the Physical Environment of Alternative 1 - Conduct the ME-NH Survey

The bottom trawl activity performed as part of the ME-NH survey could affect the physical environment. Other components of the proposed action, such as normal survey vessel operations, would not be expected to affect the physical environment. This section describes the physical impact of bottom trawls on the physical habitat in the survey area. This gear alters bottom habitats in the following ways: (1) furrowing caused by the trawl doors; (2) smoothing of geological and biogenic features; (3) exposure and mortality of infauna; (4) removal, injury, and mortality of benthic vegetation and epifauna; (5) suspension and dispersal of fine sediments; (6) geochemical effects due to suspension and turnover of the sediment; and (7) relocation of cobbles and boulders. These conclusions are based on the results of several comprehensive gear impact evaluations (ICES 2000, NRC 2002, Morgan and Chuenpagdee 2003) and supported by a review of published gear impact studies relevant to fishing gears used and habitats found in the Northeast region of the U.S. (Stevenson et al. 2004) and the conclusions reached by a panel of experts at a workshop that was convened for the purpose of evaluating the effects of fishing gear on marine habitats off the northeastern U.S (NEFSC 2002). It is also generally accepted that coarser, harder substrates and the organisms that are associated with them are more susceptible to disturbance from bottom trawls and dredges and that recovery times are longer in benthic habitats that are less disturbed by natural causes, making them more vulnerable overall to fishing (NRC 2002).

The location of all tows conducted over the past 12 years of the ME-NH bottom trawl survey are overlaid with the bottoms types for the survey area in the following series of six maps (from north to south). The substrate data were collected during 1984-1991 and published originally as a series of seven maps by the Maine Geological Survey (see Barnhardt et al. 1996 at http://mapserver.maine.gov/conservation/mgs/mgsmaster.php), then digitized and made available as a GIS data layer. The positions of the start and end point of all tows made between fall 2000 and spring 2012 were obtained from the Maine Department of Marine Resources and mapped as straight lines. The substrate data are displayed for the four major substrate types: mud, sand, gravel, and rock. In some areas of the trawl survey located further offshore, bottom type information was not available. However, general inferences and conclusions regarding the impacts of the survey to the physical environment are still made using this, the best available data.

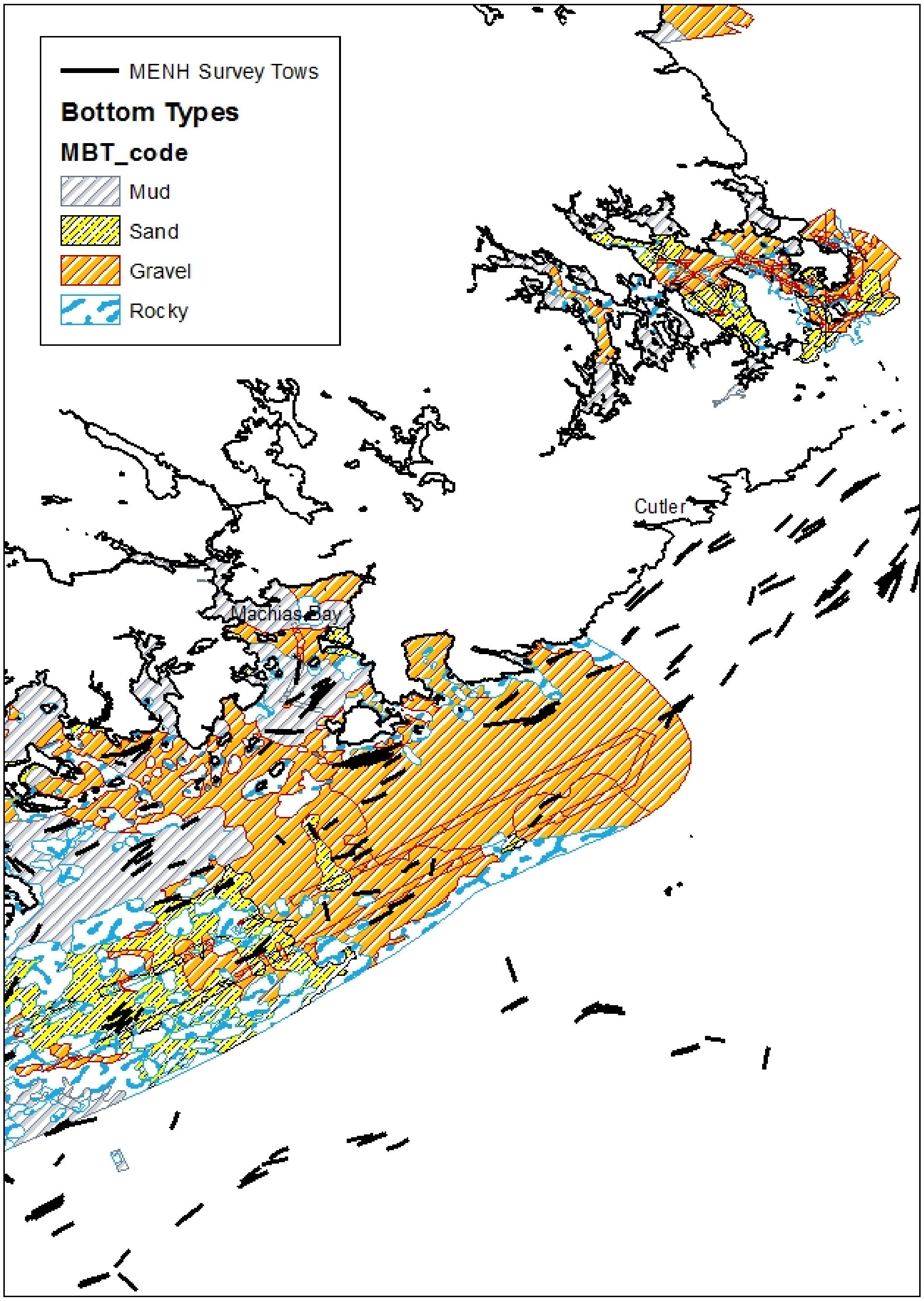

Figure 3. Survey tows and bottom type, Cutler to Jonesport

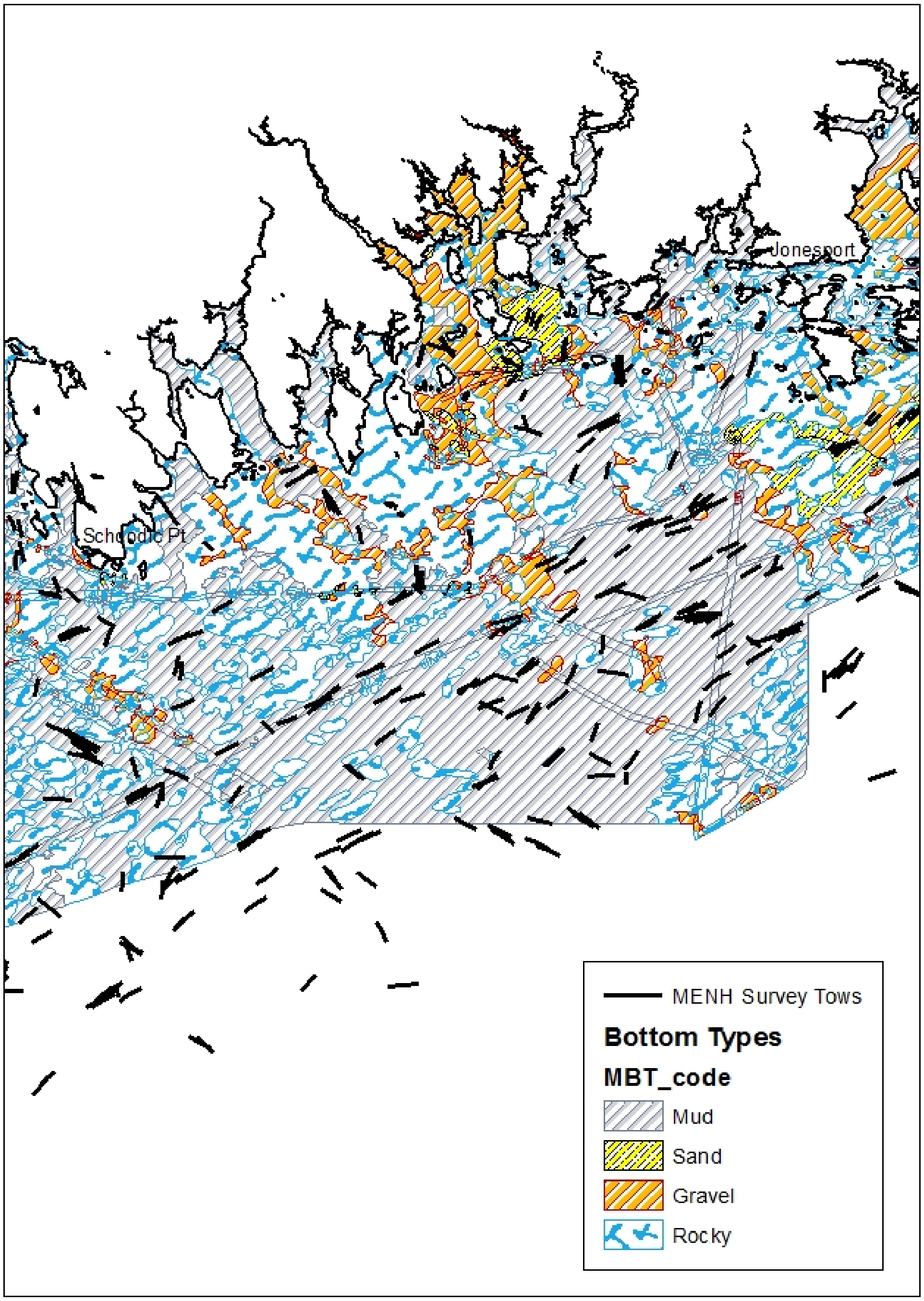

Figure 4. Survey tows and bottom type, Jonesport to Schoodic Point

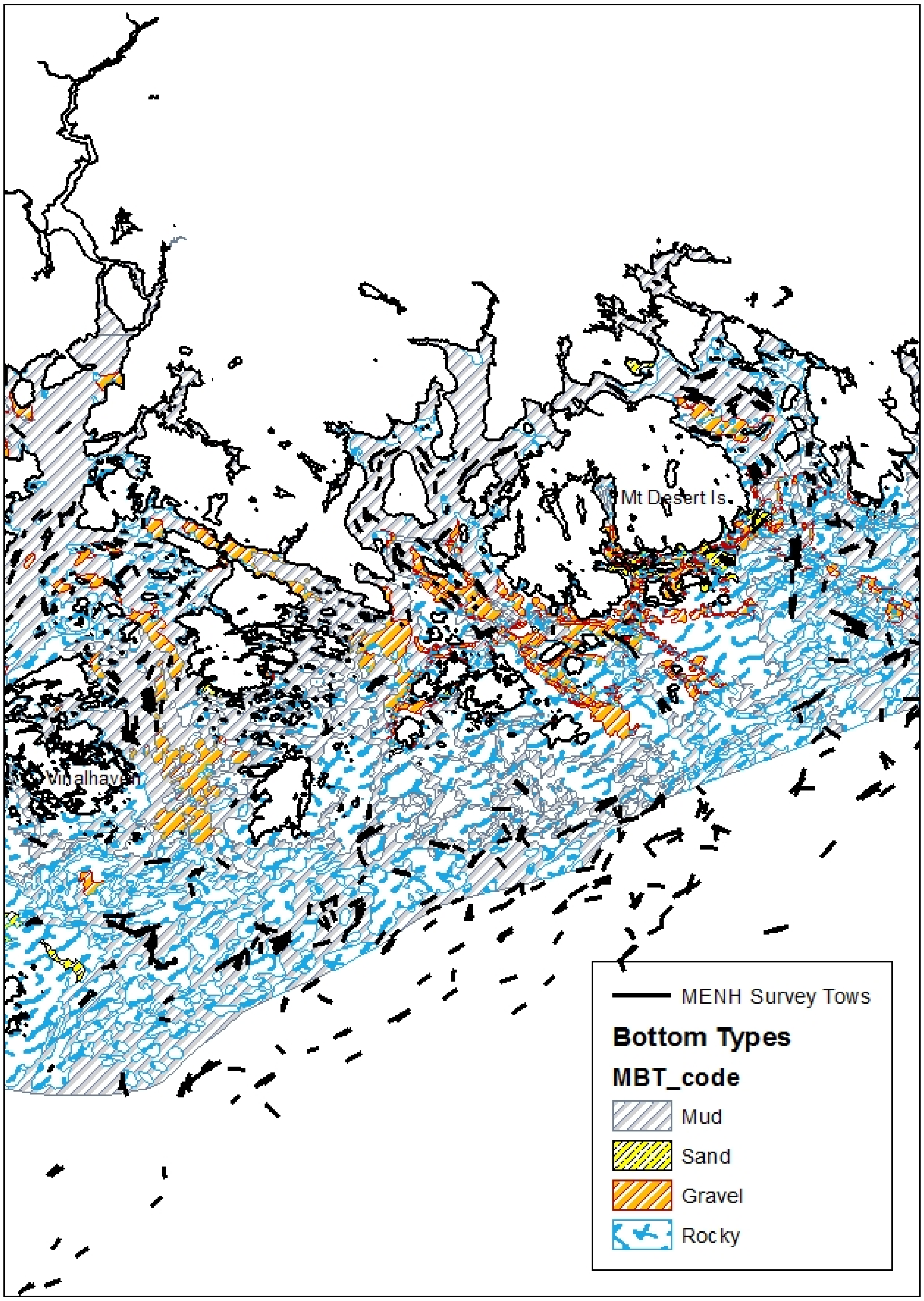

Figure 5. Survey tows and bottom type, Schoodic Point to Vinalhaven (outer Penobscot Bay)

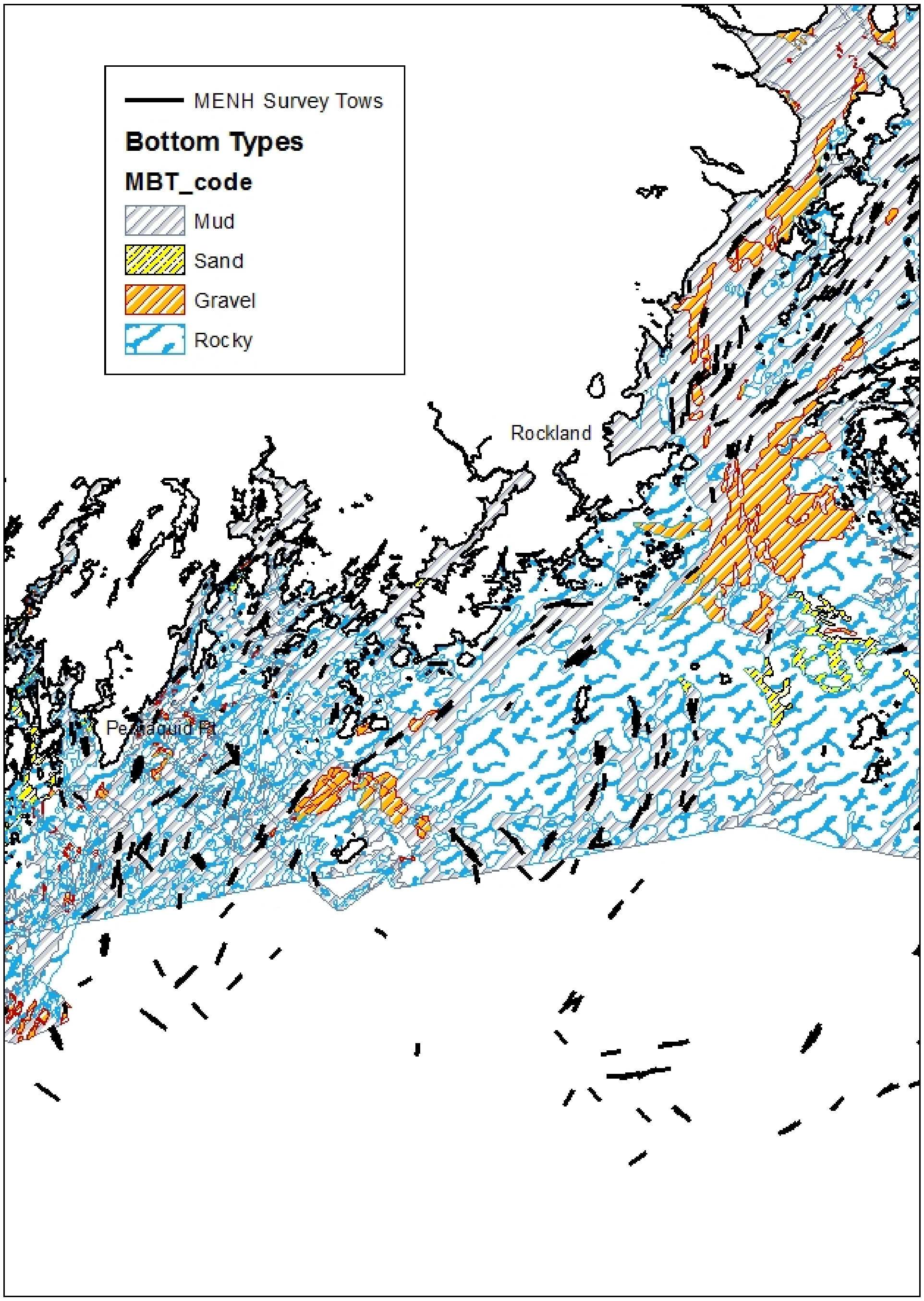

Figure 6. Survey tows and bottom type, Vinalhaven to Pemaquid Point

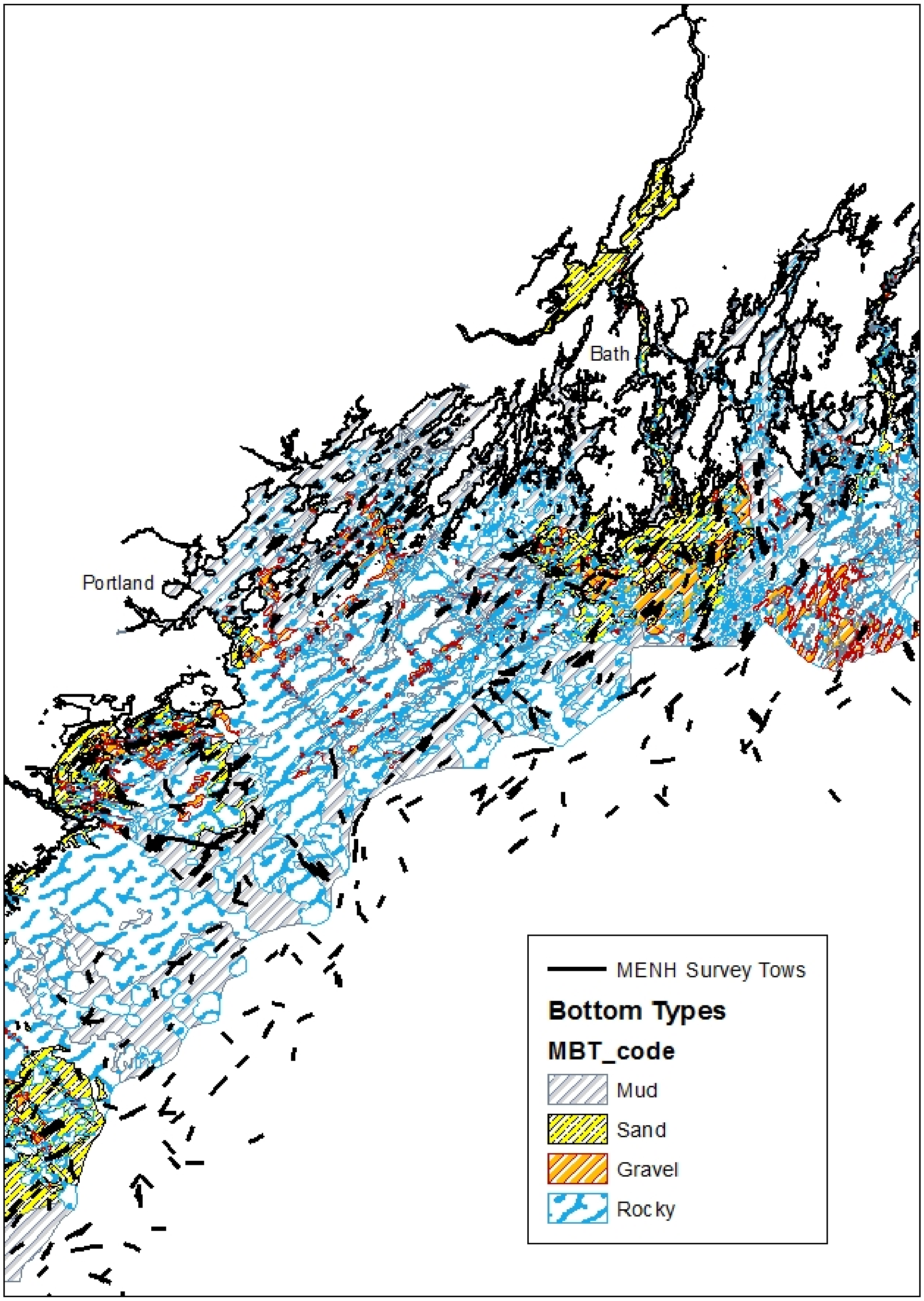

Figure 7. Survey tows and bottom type, Pemaquid Point to Saco Bay

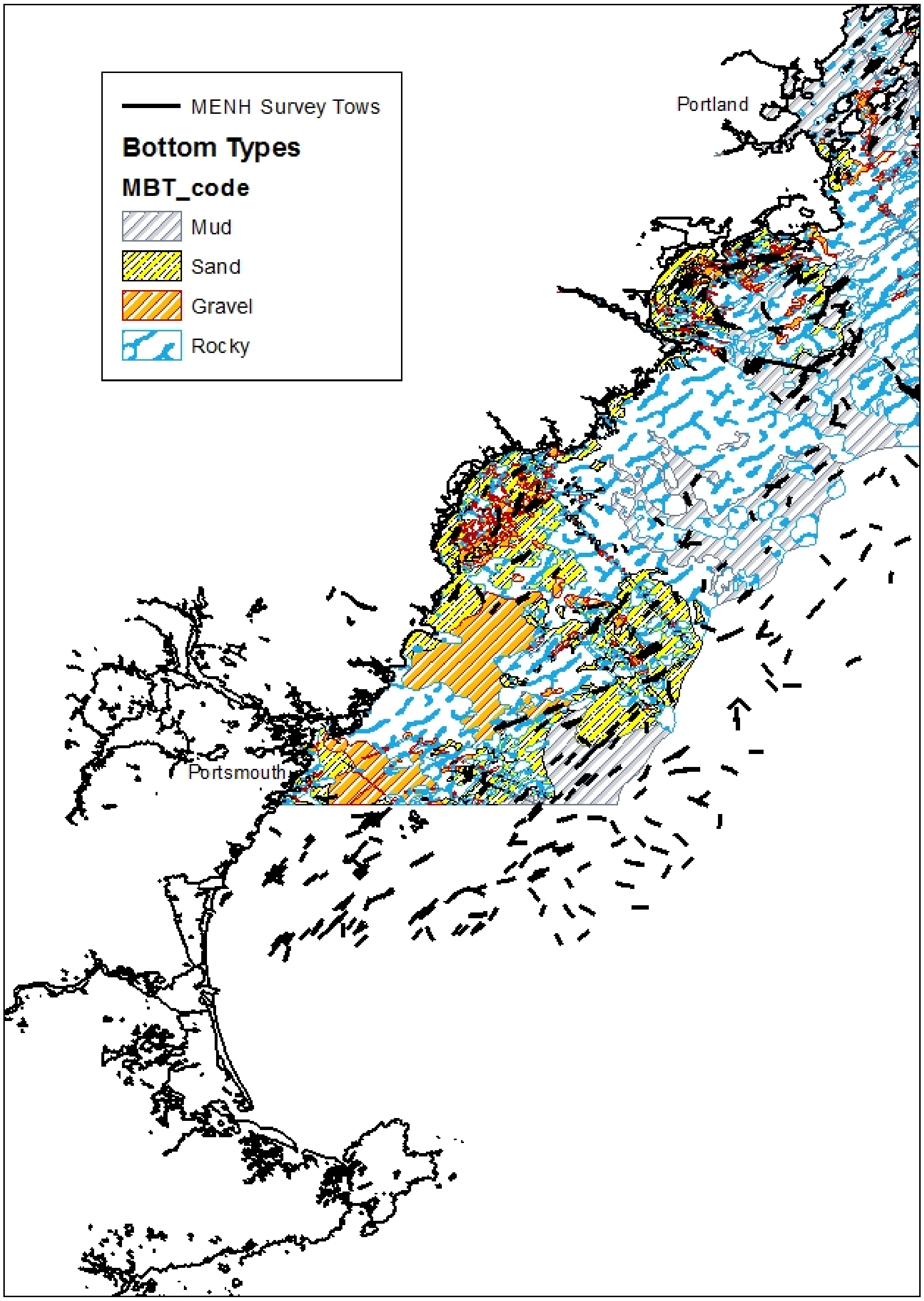

Figure 8. Survey tows and bottom type, Portland to Portsmouth

5.2 Impacts on Habitat and EFH

5.2.1 Impacts on Habitat and EFH of the No Action Alternative

The no-action alternative would not result in any impacts on habitat and EFH. Currently occurring fishing activities, primarily lobster fishing, would continue to contribute to habitat alteration within the area covered by the surveys. The impacts of currently occurring fishing activites are assessed through the state managed lobster fishery or one of 11 Federal FMPs or 7 state FMP that may occur within the study area (Table 2).

5.2.2 Impacts on Habitat and EFH of Alternative 1 - Conduct the ME-NH Survey

An analysis of the degree of overlap between the survey tows and substrate types shows that mud and sand habitats are subjected to much more trawling activity than gravel or rocky substrates (Table 6). The survey area is dominated by mud and rock habitats (40% and 41%, respectively), with much less gravel (12%) and sand (7%), but the ratios of total tow length to total area of each substrate type show that there is very little trawling effort in gravel and rocky areas. This is also discernible in the maps shown above (Figures 3-8). Mud and sand bottom habitats in the Gulf of Maine are less vulnerable to the adverse impacts of bottom trawling than gravel (granule-pebble) and rock (cobble, boulder) substrates.

Table 6. Number of miles towed relative to area of four primary bottom types during fall 2000 - spring 2012 ME-NH bottom trawl survey in the Gulf of Maine

Bottom Type	Tow Miles	Area (mi2)	Tow miles/Area
Mud	1,100	1,612	0.682
Sand	170	273	0.623
Gravel	115	473	0.243
Rocky	53	1,626	0.032
All	1,438	3,984	0.361

Furthermore, because the footrope of the survey trawl does not have rock-hopper ground gear, the net cannot be towed in rough or rocky bottom areas without being damaged. Use of this gear, therefore, guarantees that mud and sand habitats will be trawled much more often than more vulnerable gravel and rocky habitats.

In addition to supporting fewer structure-forming benthic organisms that require hard substrates to grow on, mud and sand sediments are more susceptible to disturbance from waves and bottom currents. Due to the high tides along the Maine coast (see Section 4.1.1), bottom currents are very strong and cause more disturbance to softer sediments than the occasional bottom trawl tow. This is more likely in shallower water, but tidal currents at a depth of 100 meters in eastern Maine have been recorded to often exceed maximum velocities of 40 cm/sec, a velocity sufficiently strong to erode and transport silt and sand sediments (D. Stevenson, personal communication). Also, unlike areas that are repeatedly trawled by commercial vessels, survey tows for the most part do not overlap (see maps) and their effects are, therefore, temporally and spatially more discrete.

The direct impact of the ME-NH survey cruises on EFH and habitat is negligible when compared to the no action alternative. As described above, short recovery times in mud and sand habitats that are regularly disturbed by bottom currents far exceed the minimal effects of infrequent survey tows. Furthermore, recovery is enhanced because survey tows are made in different locations every year.

NMFS carefully considers any proposal to utilize bottom tending mobile gear, particularly in areas that do not experience high disturbance through commercial fishing activity. NMFS has determined that benefit of the scientific information generated by the NEFSC surveys outweigh any adverse impact to habitat, particularly considering the minimal and temporary nature of the impacts and the concentration in effort on bottom types that recover from the impacts of bottom tending mobile gear more readily than others.

5.3 Impacts on Fishery Resources

5.3.1 Impacts of No Action

The no-action alternative would not result in any direct impacts on fishery resources due to survey activity. There would be no mortality of any fish species. Indirectly, the loss of key data regarding nearshore Gulf of Maine species that is collected through the ME-NH survey would create an information gap that is vital for fisheries management.

5.3.2 Impacts of the Proposed Action – Conduct ME-NH Survey

As described in Section 4.3, 159 species have been collected as part of the ME-NH survey over the last 12 years. Based on the information provided in section 4.3, the analysis of impacts to fish species will focus on both those species for which catch is higher than an average of 500 kg per year and will also include any species of conservation concern. These species include American Lobster, Atlantic Herring, Silver Hake, Spiny Dogfish, Northern Shrimp, Alewife, American Plaice and Atlantic Sturgeon.

Commercial and recreational fisheries that operate in the geographic scope of the proposed survey areas include bottom and pelagic trawl, gillnet, longline, seine, shellfish dredge, trap, rod and reel and hand net fisheries. A list of state and federally regulated fisheries in the Northeast region and the status of their respective stocks are available in Section 4.3 and Table 2. Other regulated fisheries include nearshore gillnet, trawl and trap fisheries in the area including Maine scallop divers, and whelk. The state and Federal FMPs are generally associated with positive long-term impacts to managed species, using regulatory action to bring about long-term sustainability to fish stocks.

The impacts of the ME-NH survey on local and regional fisheries is negligible when compared to the size and scope of associated commercial and recreational fisheries (Table 7). The magnitude of the survey and the limited scope of surveying activities, including overall annual survey tow duration, results in a trivial impact to fish stocks that is virtually indistinguishable from current fishing operations. It is important to note that because one of the key objectives of surveys is to estimate abundance and distribution of juvenile fish before they reach harvestable size, the body and codend mesh size on survey gear is generally smaller than regulated and utilized in commercial fisheries. In some cases, this results in the capture of larger numbers of smaller sized fish in comparison with commercial landings.

We note that comparison of survey and fishery catches provide a convenient and useful metric to gauge potential impacts of survey activities. However, the actual impact of survey activities on resource species is dependent on the survey removals measured against population size. For species under restrictive management or for which limited markets exist, the population sizes are substantially higher than the fishery removals and survey removals.

Table 7. Average weight per year and comparison to either ACL or commercial landings of species encountered during the ME-NH survey

Species	Catch Weight (mt, total 2000-2012)	Average Weight (mt)/Year	2012 ACL/2012 landings (mt)	% of ACL* or commercial landings (2012)	Disposition
American Lobster	65.12	5.43	67,831	0.0001	98% released alive
Atlantic Herring	50.94	4.24	87,683	0.0000*	100% released dead
Silver Hake	44.95	3.75	12,518	0.0003*	100% released dead
Spiny Dogfish	33.41	2.78	20,292	0.0001*	50% released alive
Northern Shrimp	15.66	1.31	2,418	0.0005	100% released dead
Alewife	12.49	1.04	729	0.0014	100% released dead
American Plaice	7.77	0.65	3459	0.0002*	98% released dead
Atlantic Wolffish	0.07	0.01	77	0.0001*	100% released alive
Atlantic Halibut	1.06	0.09	83	0.0011*	98% released alive
Atlantic Sturgeon	0.56	0.05	N/A	N/A	100% released alive

Table 7 provides a comparison of the average 2000-2012 annual removals by the ME-NH survey for 10 species representing the greatest amount of survey bycatch (more than 500 kg/year) and species of conservation concern. Generally, survey catches in all cases are less than one hundredth of one percent of either reported commercial landings (which do not include commercial discards, or recreational landings and discards) or the 2012 annual catch limits (ACL) that were developed for each species.

In addition to the miniscule percentage of either annual catch limits or commercial catch, for the species of noted conservation concern – Atlantic wolffish, halibut and sturgeon – either 100 or 98 percent of individuals that are encountered are then released alive. The same is true for American lobster. While it is unclear the percentage of released individuals do survive, it can be assumed that some percentage do survive. This decreases mortality as a result of survey activities even further. While Atantic sturgeon are listed in this table, they are evaluated as part of the Protected Species section (section 5.4) due to their status under the ESA.

For some species, such as Atlantic herring and silver hake, 100 percent of the catch is released dead. Even still, Table 7 demonstrates that the percentage of the annual catch limits, serving as a proxy for impact to the population, is so small as to approach zero. In fact, the amount of herring caught by the survey is such a tiny percentage of the ACL that it appears as zero.

Over the next three years, the impacts of the ME-NH survey are reasonably expected to be the same as described herein. The comparison of survey catches to commercial catches/ACL provided in Table 7 evaluated data from the 12 year survey period, and the level of catches for the surveys are expected to be similar over the next three year period. As such, it is anticipated that the surveys would not have an impact to any affected fishery resource that is biologically significant.

As compared to the no action alternative, in which no survey would be conducted and there would be no fish removals, the proposed action would result in removals and expected mortality as described in Sections 4.3 and above. The impact to fishery resources is minimal, and no biologically significant or population level impacts are expected.

In summary, survey activities generally utilize sampling gear that is neglible relative to commercial standards and survey activities are limited in scope relative to the overall area of the habitat and resource size for most fish stocks. As a result, survey catches are generally negligible relative to other sources of removals and overall resource abundance and do not represent a measurable adverse impact to any fish population.

5.4 Impacts on Protected Resources

5.4.1 Impacts on Protected Resources of Alternative 1 - Conduct the ME-NH survey

While the ME-NH survey has the potential to interact with protected species, based upon the overlap of survey operations and species distructions, as described in Section 4.4, there have been no observed interactions with any protected species aside from Atlantic sturgeon in the 12 year survey history. The brief description of the species and the support for negligible expected interaction with the survey gear are included in Section 4.4. Based on that information, the proposed survey poses no increased or additional risk to ESA-listed or otherwise protected marine mammals, sea turtles and most fish species over the three year project period (2014-2016) as compared to the no-action alternative. The project is of limited duration, size, and magnitude, and represents no change in effort since 2000.

Of all protected and ESA-listed species, there have only been documented takes of Atlantic sturgeon in the ME-NH survey (see Appendix A). The action area for the proposed trawl survey encompasses inshore waters near ME and NH where Atlantic sturgeon from any of the five DPSs may be present. Commercial trawl fishing is regularly practiced in the action area and occurs on an annual basis. Although trawl gear may pose a potential risk to ESA-listed Atlantic sturgeon, this survey is of short duration and relatively limited scope. As discussed, the proposed study using trawl gear will consist of short tows, with a total of 120 fishing stations each season. Thus, fishing effort will be a maximum of approximately 40 hours during the proposed trawl survey period, which is several orders of magnitude smaller than associated commercial trawl fisheries each year (100,000 + trawl hours). Therefore, the risk associated with this survey is negligible in comparison. The short durations of the tows and careful handling of any sturgeon once on deck is expected to result in low potential for mortality. All Atlantic sturgeon encountered thus far have been reported to have been released alive and in good condition.

An ESA formal section 7 consultation (also known as a Biological Opinion (BO)) describing the impacts of this survey and other related research (through the Fish and Wildlife Service Dingell-Johnson Sport Fish Restoration Program) on Atlantic sturgeon and other species protected under the ESA was signed on January 23, 2013. It determined that the research programs, including the ME-NH survey, may adversely affect but are not likely to jeopardize the continued existence of Atlantic sturgeon. An incidental take statement (ITS) was prepared as part of the section 7 consultation that exempts up to 10 Atlantic sturgeon takes from 2013-2017 in the ME-NH survey, and up to 140 takes for all of the Dingell-Johnson Sport Fish Restoration Program projects.

There have been 52 Atlantic sturgeon taken over the 12 years of the ME-NH survey. This averages a little more than 4 sturgeon per year. Using this metric, it is possible that 12 Atlantic sturgeon could be taken over the next three years (2014-2016) as part of this survey activity. However, a majority of the takes (35 of 52) occurred during the first 3 years of the surveys from 2000-2002. More recently (*i.e.*, from 2003-2012), annual takes in the surveys have averaged about 2 per year, which is what is currently covered under the ITS described in the paragraph above. As stated in section 4.4.2.1.1 all reported sturgeon take were released alive and in good healthy condition. Thus, we expect, a small number of possible future interactions and these will all be released alive and in good contition. Therefore, no significant species impacts such as injury or mortality to individuals, decreases in reproductive output, or alterations to foraging habitat are expected. This conclusion is further supported through the ESA consultation process that these levels of Atlantic sturgeon take would not result in jeopardy to this species.

ME-NH survey participants will abide by the reasonable and prudent measures set forth in the BO completed for this action to further alleviate any negative impacts that may occur to Atlantic sturgeon. These include resuscitation of any injured Atlantic sturgeon, reporting takes, documentation, and other measures (NMFS 2013).

5.4.2 Impacts of the No Action Alternative

The no action alternative, that the ME-NH survey would not be conducted. As such, there would not be in any additional impacts to protected resources within the survey area. The impact of ongoing commercial fishing activities to marine mammals and ESA-listed species are evaluated through the fishery management process for both state and Federally managed species. Negative impacts associated with vessel strikes, climate change, chemical and metal bioaccumulation will continue to occur. The NMFS works to mitigate threats to protected species through take reduction plans, outreach and education.

5.5 Impacts on Social and Economic Environment

The impacts of the two alternatives on the social and economic environment consist of direct physical (and subsequent financial) impacts and the important, indirect science and management support, or information impacts.

5.5.1 Impacts on Social and Economic Environment of Alternative 1 - Conduct the ME-NH survey

As discussed in section 4.5 of this document, the direct impact of these surveys would have negligible impact on the fish stocks, habitat and protected species within the survey area.

The ME-NH survey is designed to improve the quality of fish, shellfish, invertebrate and benthic resource data that are ultimately used for assessment, habitat designation and management/regulatory purposes. Continuation of the ME-NH survey would have a positive impact by supporting the contribution of key information that is not available from another source. In general, more information provides for greater confidence in parameter estimates of future stock assessments.

Specifically, the ME-NH survey would continue to provide indirect, downstream positive impacts to individuals and the fishing communities that rely upon commercial fisheries and the marine environment by allowing managers and scientists to collect data on and monitor the following resource characteristics:

- **Monitor recruitment** in order to predict future landings and stock sizes. Depending on the species, research vessel surveys can allow extrapolation of the strength of incoming age groups up to several years before they are allowed to be landed.

- **Monitor abundance and survival of harvestable sizes:** Although recruitment prediction is one important element of fishery forecasts, it is equally important to calculate the survival rate of the portion of the stock already subjected to fishing. The catch-at-age data collected from the surveys are one important source of information used to estimate survival rates from one year to the next. In practice, fishery scientists usually combine catch-at-age data from the surveys with similar data from the commercial fishery catch to improve estimates of fishing mortality and stock sizes. These combined estimates allow calculation of the population that must have existed to yield the catch levels observed during the recent history of the fishery. Sampling the abundance of harvestable sizes from research vessel surveys may be the only source of data available for species that have never been fished in the past, or are only fished at very low levels.

- **Monitor the geographic distribution of species:** Some species lead sedentary lives while others are highly migratory. Research vessel surveys over multiple seasons per year are a major source of data on the movement patterns and geographic extent of stocks. Distribution maps can be drawn from reports of fishermen, but these may give a biased picture of the stock, emphasizing only where high density fishable concentrations exist. Distribution data are important not only for fishery management, but also for evaluating the population level effects of pollution and environmental change.

- **Monitor ecosystem changes:** Bottom trawl surveys are not directed at one species, but rather generate data on over 150 species of fish and invertebrates in nearshore Gulf of Maine waters (Appendix A). Many of these species are relatively rare, and have little or no commercial or recreational value. However, when we evaluate the effect of intensive harvesting on selected species, we can observe the response of the entire animal community. This provides an important research opportunity in the emerging field of ecosystem-based management.

- **Monitor biological rates of the stocks:** Apart from basic information on the abundance and distribution of species, research vessel survey data are collected on a range of biological rates for stocks. These processes include growth, sexual maturity, and feeding. Changes in growth and maturity parameters directly influence assessment calculations related to spawning stock biomass, yield per recruit and percent of maximum spawning potential.

- **Collect environmental data and support other research:** Environmental information (temperature, salinity, pollution levels, etc.) is used to identify non-biological factors that may be affecting abundance.

Positive relationships between scientists, managers, the fishing community and other interested public has been a valuable outcome of the survey, including increased interest, cooperation, strict and strong working partnerships. The survey was initiated through NMFS's Cooperative Research Program, and has included commercial fishermen in virtually all parts of its design, implementation and problem solving. Furthermore, data collected by the ME-NH survey has been used not only by federal and state fishery scientists and managers, but also by research institutions and students as a platform for their investigations into such varied topics as toxic contaminants and invasive species.

5.5.2 Impacts on the Social and Economic Environment of the No Action Alternative

Under the No Action alternative the data generated by the ME-NH survey would not be collected. NOAA research vessels would not be able to collect this data because federal research vessels cannot sample the nearshore areas; they are simply too large to access these areas. The time series of data created by the ME-NH survey, with its specific methodology and procedures, would be lost.

Fishery-dependent data are vital to our ability to monitor stocks, and for some species are often the only reliable source of data. However, use of fishery-dependent data alone may severely limit our ability to evaluate and make predictions about the status of some stocks. For example, in fisheries heavily dependent on the yearly incoming age group (the new recruits), fishery data alone cannot be used to forecast catches because very small fish are generally not taken with standard fishing gear. Likewise, CPUE may not be a reliable measure of abundance for schooling species, or when the increase in fishing technology cannot be factored into the relationship between catch and fishing effort. Consequently, fishery scientists throughout the world are conducting research vessel sampling programs to gather fishery-independent information (Clark 1981).

Absent key fishery independent research survey data from the inshore Gulf of Maine, under the No Action alternative the statistical confidence surrounding advice to management is greatly reduced for given measures. More sophisticated assessment techniques may have to be abandoned. This, in turn, could require use of ever more precautionary advice through the fishery management process.

If a precautionary approach is necessary, reductions in fishing opportunities and allowable catches would have a direct impact on vessel crew and their families as well as on owners, their families and the support industries. The impacts of reduced fishing income and opportunities have been thoroughly described in many of the regional FMPs. For many of the stocks, recognition of overfished condition and of overfishing activity sooner rather than later (when conditions would likely have been worse) was attributable to improved stock assessment techniques supported by survey data. Corrective measures for all but a few important regional species were enacted earlier given this information. The enhanced information has allowed for sophisticated programs which meet rebuilding requirements while attempting to make the most of rebuilt components of the stocks. All of these impacts would have been exacerbated had management decisions been based on information which lacked the contribution of survey activities. Cessation of survey data collection and information development for the next five years would gradually undermine the statistical basis for use of more sophisticated models leading to a reliance on more blunt management instruments.

5.6 Cumulative Effects

According to CEQ NEPA regulations, cumulative effects are effects that result from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (Federal or nonfederal) or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions that take place over a period of time. In general, a cumulative effects assessment should address:

- The area in which the effects of the proposed action will occur;
- the impacts that are expected in that area from the proposed action;
- other past, present, and reasonably foreseeable actions that have or are expected to have impacts in the area;
- the impacts or expected impacts from other action, and
- the overall impact that can be expected if the individual impacts are allowed to accumulate.

Although predictions of synergistic effects from multiple sources are inherently less certain than predicted effects of individual actions, cumulative effects analyses are intended to alert decision makers to potential “hidden” consequences of the proposed actions. The analysis is generally qualitative in nature because of the limitations of determining effects over the large geographic areas under consideration.

The information presented in Sections 2.0 and 4.0 (Purpose and Need for Action and Affected Environment) describes the relevant history, natural history and current status of the environmental components that helps characterize the environmental baseline against which to evaluate cumulative effects and serve as a starting point for the cumulative effects analysis. The baseline does not represent a static ‘snapshot’ of the resource. Instead, it represents the trend of the resource, incorporating the past history of influences on the resources. The cumulative past effects of fish conservation measures in the NEFSC survey area, as well as effects external to federal management actions such as state fishery impacts, human-induced impacts, and climatic events influencing the resource, all contribute to the state of the baseline condition.

Valued Ecosystem Components

The cumulative effects analysis focuses on valued ecosystem components (VECs) identified as important to this is action and described in the Affected Environment section.

1. Physical Environment
2. Habitat and EFH
3. Fishery Resources
4. Protected Resources
5. Social and Economic Environment

Temporal and Geographic Scope of Cumulative Impacts Analysis

This analysis is limited to the geographical area, defined in Sections 3.0 and 4.0, within which the ME-NH survey operates. In all instances, the analysis attempts to take into account both present and reasonably foreseeable future action that are occurring or may occur in the next five years that could affect the affected VECs. The discussion of past actions and events reflects underlying differences in the availability of historical information as well as differences in the period of time that must be considered to provide adequate context for understand the current circumstances. In all cases, the information presented and analysis conducted is commensurate with the overall impacts associated with this action. The analysis of impacts considers information primarily focused on the last decade. Recovery plans for sea turtles were completed in the early 1990s; however, the collection of more detailed information did not begin until the mid-1990s. The analysis of impacts related to the other resources components is primarily focused on the last five years. All analyses are projected for three years into the future, taking into account the duration of the ME-NH survey grant award.

5.6.1 Summary of Impacts of Proposed Action

5.6.1.1 Physical Environment

The proposed action will likely impact the physical environment due to increased disturbance of bottom sediments from the modified shrimp trawl. However, this impact is expected to be minimal and temporary because of the minimal effort of the survey as a whole, including only 40 hours of tow time per year (Section 5.1), and primarily witin resilient substrates. As the survey is unlikely to substantially affect the physical environment, it will not contribute or result in cumulative effects on this ecosystem component.

5.6.1.2 Habitat and EFH

Operation of the ME-NH survey is expected to have negligible impacts on habitat and EFH based upon the information and analysis presented in Sections 5.1 and 5.2. Current and future operation of the survey activities is likely to have a negligible impact on the habitat of living marine resources, physical environmental features, as discussed in Section 5.1, or on biotic components of habitat.

5.6.1.3 Fishery Resources

The direct impacts of the ME-NH survey on local and regional fisheries is negligible when compared to the size and scope of associated commercial and recreational fisheries as described in Section 5.3. The magnitude of the surveyed populations and the limited scope of surveying activities, including overall annual survey tow duration, results in a trivial impact to fish stocks. In fact, the survey fish take amounts to less than one hundredth of one percent of the ACL or commercial catch for species discussed in this EA. This impact is not expected to change over the next three years.
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5.6.1.4 Protected Resources

The preferred alternative is not expected to result in negative impacts on marine mammal stocks. Potential impacts on Atlantic sturgeon are summarized in Section 5.4 and are further described in the 2013 BO. The ME-NH survey is not likely to result in jeopardy to any ESA-listed species under NMFS jurisdiction, though takes of Atlantic sturgeon may occur.

5.6.1.5 Social and Economic Environment

Operation of the ME-NH survey would not result in direct impacts to the social and economic environment (Section 5.5), such as imposing or resulting in any changes to fishing operations, fishing behavior, fishing gears used, or areas fished that would impact those directly affected by the resources within the survey area. Each year the survey data is fed into the assessment cycles to provide updates of the progress being made and to recommend changes in regulations as appropriate. As such, the data produced by the surveys would indirectly benefit communities that depend upon or value the marine environment by providing the best available scientific information to support management measures designed toward continued rebuilding of overfished stocks reaching, ultimately, long-term potential yield.

5.6.2 Past, Present, and Reasonably Foreseeable Future Actions

5.6.2.1 Physical Environment

Activities that adversely effect or otherwise modify the physical marine environment within the ME-NH survey area have occurred and are expected to continue to occur in the future. The greatest cause of impact to the physical environment is commercial and recreational fishing operations. Also of concern are non-fishing related activities that occur in the survey area and generally are the same as those described below in Section 5.6.2.2.

5.6.2.2 Habitat and EFH

5.6.2.2.1 Fishing Impacts

Commercial and recreational fishing is a leading cause of negative impacts to marine habitat and EFH. Fishing operations are expected to continue over the next five years and beyond and continue to contribute to adverse impacts to habitat and EFH, though the intensity and degree of these impacts cannot be predicted. Management measures implemented through federal and state management of fisheries have mitigated some of the negative impacts of fishing.

The effects of mobile bottom-tending gear (trawls and dredges) on fish habitat have been reviewed by the National Research Council (NRC 2002). This study determined that repeated use of trawls/dredges reduces the bottom habitat complexity by the loss of erect and sessile epifauna, smoothing sedimentary bedforms and bottom roughness. This activity, when repeated over a long term also results in discernable changes in benthic communities, which involve a shift from larger bodied long-lived benthic organisms for smaller shorter-lived ones. This shift also can result in loss of benthic productivity and thus biomass available for fish predators. Thus, such changes in bottom structure and loss of productivity can reduce the value of the bottom habitat for demersal fish, such as haddock and cod.

5.6.2.2.2 Non-Fishing Impacts

The fishing impact described above can interact with non-fishing impacts to cause cumulative effects as well. The most likely non-fishing activities that have occurred and are occurring in the area covered by the ME-NH survey are: changes in ocean climate; effects of nutrient enrichment (eutrophication) in outwelling from large estuaries/rivers; invasive species; physical structure modification (i.e renewable energy infrastructure within the US EEZ); chemical spills (oil and hazardous wastes); sand and gravel extraction; and marine debris. These human non-fishing threats are discussed in section 5.0 of the NEFMC Habitat Amendment (1998) and in a more recent review of information relevant to the northeastern U.S. (Johnson et al. 2008). This report also includes a qualitative ranking of potential impacts (high, medium, low) to six different habitat types from a variety of human activities in the region, as determined by experts at a workshop held in 2005.

One of the challenges in evaluating cumulative effects is the shifting environmental baseline (due primarily to fishing and climate change) in the marine environment which makes it hard to evaluate the magnitude of any cumulative impacts and/or the direction of change in space and time (since the ocean ecosystem is dynamic and can undergo regime shifts from natural causes or as a consequence of human stressors). In the coastal ocean the human stressors can include: pollution; habitat loss/change; nutrient enrichment; invasive species; sand/gravel removal; renewable energy infrastructure; etc. The seasonal and interannual changes in the water column is more variable than that in the offshore ocean and some of this variability is transmitted at a lower dynamic range to the benthic environment. Some inshore EFH is adapted to this variable physical/chemical environment and thus exhibits greater resilience to the cumulative effects resulting from the interaction of fishing and non-fishing impacts.

Though largely unquantifiable, it is likely that the non-fishing activities noted above could have negative impacts on habitat quality from disturbance and construction activities in portions of the affected area. These may be localized to project sites, representing a small percentage of the total area in which the survey operates. Any impacts to inshore water quality from permitted projects and other non-fishing activities, including impacts to planktonic, juvenile, and adult life stages, are unknown but likely to be negative in the immediate vicinity of the activity.

An EFH Omnibus Amendment is currently under development, initiated in 2003, for all of the NEFMC's FMPs. This omnibus amendment will fulfill the five year EFH review and revision requirement specified in 50 CFR Section 600.815(a)(10). The purpose of the amendment is to review and revise EFH components of the FMPs and to develop a comprehensive EFH management plan that will successfully minimize adverse effects of fishing on EFH through actions that will apply to all NEFMC-managed FMPs. The amendment will include a review and update of the following: (1) Description and identification of EFH; (2) Identification of non-fishing activities that may adversely impact EFH; (3) Identification of new Habitat Areas of Particular Concern; and (4) Integration of alternatives to minimize any adverse effects of fishing on EFH for all fisheries managed by the NEFMC.

Although it is not known at this time how the EFH Omnibus Amendment might change fisheries or fisheries management, the intention is to provide additional habitat and species protection where it is needed. Phase 1 of the EFH Omnibus has been completed by the NEFMC and includes new EFH designations for all species and life stages under management by the NEFMC, designation (but no management restrictions) of several HAPCs, an evaluation of the major prey species for species in the NEFMC fishery management units and an evaluation of the potential impacts of nonfishing activities on EFH. Although the NEFMC has completed Phase 1, the remainder of the document and corresponding actions may not be implemented until 2015. The potential exists for changes to the management measures designed to minimize adverse impacts on EFH and/or for additional measures to be implemented.

Some of the sampling stations for the 2013 Maine-New Hampshire survey that are identified in Figure 2 would fall within areas that are proposed, as part of the EFH Omnibus Amendment, to be special habitat management areas where certain types of fishing gear could be prohibited beginning in 2015. These areas are identified as being vulnerable to adverse impacts of fishing on EFH. Sampling stations for the 2014-2016 research surveys may also fall within areas that the NEFMC has identified as preferred and non-preferred habitat management areas in the amendment. While survey tows have a similar effect on bottom habitats, the bigger concern within these management areas is commercial fishing operations. The minimal and small-scale nature of this research as compared to commercial fishing operations, particularly in terms of bottom contact, would not likely preclude survey activities from continuing in any such identified habitat management areas that may be established through the completion of the EFH Omnibus Amendment.

5.6.2.3 Fishery Resources

Historic state and federal fishery management practices have generally resulted in overall positive impacts on the health of the commercial and recreational stocks present in the ME-NH survey area. The cumulative impacts of past, present, and reasonably foreseeable future fishery management actions on the fish stocks evaluated in this EA should generally be, and are developed to be, associated with minor positive or neutral long-term outcomes, resulting in fish populations that are either increasing or remaining stable. Constraining fishing effort through regulatory actions is often necessary to bring about long-term sustainability of a given resource, and as such, should, in the long-term, promote positive effects on fish stocks. However, nearly of the non-fishing impacts described in Section 5.6.2.2 have also resulted in some adverse impacts to fish stocks, such as climate change, marine pollution, coastal development, habitat loss/change, nutrient enrichment, invasive species, sand/gravel removal, and renewable energy infrastructure.

5.6.2.4 Protected Resources

Several actions have impacted and will likely continue to impact protected resources found within the geographic area of the ME-NH surves. Fishing activities have and are expected to continue operations in the future and protected species in the survey area would continue to be impacted by fishing gear, though to an unknown degree. Bycatch of MMPA species will be included in annual stock assessment reports and the affect of removals will be evaluated under the potential biological removal (PBR) process (Wade and Angliss 1997). Bycatch or take of species listed under the ESA are evaluated through the ESA Section 7 process.

Natural mortality of sea turtles and marine mammals, including disease (parasites), predation, and cold-stunning (turtles), occurs in the affected area. ESA listed sea turtles, fish, birds, and marine mammal species have and currently are negatively impacted by a variety of anthropogenic activities including: fishery bycatch, vessel strikes, gear entanglement, ingestion of marine debris, power plant entrainment, and effects related to accumulation of synthetic chemicals and heavy metals (NRC 1990; Simmonds and Lopez-Jurado 1991; Reijnders et al. 1999; Lewison and Crowder 2006; Nelson et al. 2007; Waring et al. 2007; Sea turtle recovery plans: http://www.nmfs.noaa.gov/pr/recovery/plans.htm). Sea turtles are also affected by direct harvest of adults and eggs and by commercial dredging; deliberate shooting is an additional source of seal mortality. These activities are reasonably certain to occur over the next five years, though NMFS does not have information indicating the degree and extent of the expected impact to protected species.

Impacts to Atlantic Sturgeon through a number of causes, including commercial fisheries and research activities, are and have been evaluated through the ESA section 7 process. A biological opinion was most recently completed for project years 2013-2017 of the ME-NH survey. It analyzed Atlantic sturgeon capture data that had been recorded over the course of the survey program from 2000-2011 in order to predict future take levels during the surveys. A copy of the biological opinion, which assesses this action, as well as a number of other USFWS funded fisheries research activities, can be found at: http://www.nero.noaa.gov/protected/section7/bo/actbiops/usfws_state_fisheries_surveys_2013.pdf. This biological opinion concluded that despite the threats faced by Atlantic sturgeon, the evaluated research activities would not increase the vulnerability of individual sturgeon in the context of cumulative effects, including climate change. The current and future research activities (mentioned above) are not expected to result in jeopardy to Atlantic sturgeon populations.

A number of actions are being undertaken by NMFS to mitigate negative impacts and reduce threats to protected species. These actions include the Atlantic Large Whale Take Reduction Plan, the Harbor Porpoise Take Reduction Plan, Atlantic Pelagic Longline Take Reduction Plan, the Atlantic Trawl Gear Take Reduction Plan, and the Bottlenose Dolphin Take Reduction Plan.

Other activities include education and outreach, research, and the Sea Turtle Stranding and Salvage Network. These plans and activities are designed to prevent or alleviate negative impacts to protected species now and in the future.

The non-fishing impacts to habitat are are described in section 5.6.2.2.2 also would have negative impacts to protected species that occur within the survey area and elsewhere. Climate change, marine pollution, nutrient enrichment, energy development and other activities are all expected to continue in the future.

5.6.2.5 Social and Economic Environment

Other state and federal survey activites occur within the Gulf of Maine and east coast waters that complement the ME-NH survey. For example, surveys that occur as part of the NEFSC survey program have been conducted since 1963. All of these complementary survey programs work together to produce valuable information for both scientific and natural resource management purposes.

State and federal fishery and other natural resource management activities have resulted in overall positive impacts on the health of the commercial and recreational stocks present in the survey area. Often, however, regulations taken to protect fish stocks, such as effort reductions, result in concomitant negative economic and social impacts to the individuals, businesses and communities that rely upon these stocks. The cumulative impacts of past, present and reasonably foreseeable future fishery management actions on the communities that rely upon commercial and recreational fisheries should generally be associated with positive long-term outcomes, despite short-term economic hardship or losses. The 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 federally and state managed stocks.

5.6.3 Cumulative Impacts

5.6.3.1 Physical Environment

Over the next five years, the ME-NH survey activities are likely to have a negligible impact on physical habitat characteristics when combined with the effects of other past, present and reasonably foreseeable future actions. Survey activities do include deployment of sampling gear that makes physical contact with the bottom. Impact made by the modified shrimp trawl is usually ephemeral and small in scale. Since most sampling programs involve randomized rather than fixed sampling designs, sampled areas are rarely subjected to repeated impacts over a short period of time. Long term modification of the physical environment would continue to occur as a result of fishing operations and other anthropogenic activities in the survey area, however, because of the minimal direct impact of the surveys, this action would not contribute to cumulative impacts to the physical environment.

5.6.3.2 Habitat and EFH

While reductions in overall fishing effort as a result of past and current fishery management actions is thought to have had a positive impact on habitat and EFH, the repeated use of trawls and dredges reduces bottom habitat complexity, ultimately decreasing the value of habitat for demersal fish. Identification of additional areas for restricted habitat interactions though the EFH Omnibus Amendment would have a positive effect, as would decreased interactions brought about by decreased effort and gear engineering. The ME-NH survey would not contribute to these cumulative impacts because survey tows are minimal (40 hours total per year) to the degree that they virtually indistinguishable from current fishing operations.

The proposed action is likely to have negligible effects on physical environmental features when combined with the effects of other past, present and reasonably foreseeable future actions. In the future, the ME-NH survey is likely to have a neglibible contribution to cumulative changes in water column temperature patterns, ocean chemistry or local or global water circulation patterns.

5.6.3.3 Fishery Resources

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on the managed resources. It is anticipated that future management actions would result in additional indirect positive effects on the managed species through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services. The specifications of annual catch limits for managed resources supports the long-term sustainability of fishery stocks and is consistent with the guidance of the Magnuson-Stevens Act. Because the additional mortality to fish species resulting from the ME-NH survey would not adversely impact the stock of any species, the ME-NH survey not expected to contribute to cumulative impacts or to have any significant effect on any managed or non-managed resources in the survey area, either individually or in conjunction with other anthropogenic activities.

The operation of the ME-NH survey activity in the future is likely to have a negligible impact on living marine resources when considered together with other past, present, and reasonably forseeable future action. The survey activity has been conducted for a decade without significant impacts on fish and invertebrate populations, even when considered together with other survey activities in the region. Future impacts on living marine resources would be remedied much more effectively by restrictions on fishing effort and resource exploitation than by modifications to survey work.

5.6.3.4 Protected Resources

Several actions have impacted and will likely continue to impact protected resources found within the geographic area of the ME-NH survey, including vessel operations, hopper dredging, fisheries, and marine pollution. Overall, these actions and anthropogenic activities have had some adverse impact on sea turtles, marine mammals and other protected species.

Past survey operations have not resulted in negative impacts to protected species populations. No impacts are expected on ESA listed marine mammal stocks. Potential impacts on sea turtles are summarized in Section 5.4. Both ESA listed sea turtles and marine mammal and MMPA species have and continue to be negatively impacted by a variety of anthropogenic activities including: fishery bycatch, vessel strikes, gear entanglement, ingestion of marine debris, power plant entrainment, and effects related to accumulation of synthetic chemicals and heavy metals (NRC 1990; Simmonds and Lopez-Jurado 1991; Reijnders et al. 1999; Lewison and Crowder 2006; Waring et al. 2007; Sea turtle recovery plans: http://www.nmfs.noaa.gov/pr/recovery/plans.htm). Sea turtles are also affected by direct harvest of adults and eggs and by commercial dredging; deliberate shooting is an additional source of seal mortality. The operation of ME-NH survey activities would have a negligible impact on Atlantic sturgeon but would not jeopardize any listed species (2013 BO). As such, the survey is not expected to result in a measurable contribution to cumulative impacts in the survey area.

Table 8. Cumulative impacts including the preferred alternative and past, present and reasonably foreseeable future actions

Action	Impact on Physical Environment	Impact on Habitat/EFH	Impact on Fish	Impact on Social and Economic Environment	Impact on Protected Resources
ME-NH Survey 2014-2016 – Preferred Alternative	**Negligible**	**Negligible** – avoid sensitive habitat; **Minimal and temporary** – in other substrates	**Low indirect positive** impacts on regulated fish stocks. **Negligible** impacts on non-regulated fish stocks	**Low positive** – support continued rebuilding of healthy resources	**Negligible** on non-ESA species. **Negligible - low negative** impact Atlantic sturgeon.
NEFSC and other Research Surveys [P, PR, RFFA]	**Negligible**	**Negligible** – avoid sensitive habitat; **Minimal and temporary** – in other substrates	**Low indirect positive** impacts on regulated fish stocks. **Negligible** impacts on non-regulated fish stocks	**Low positive** - supported complex management programs which focused on specific problems and allowed for sophisticated assessment models.	**Negligible** on non-ESA species. **Negligible - low negative** impact on turtles.
Federal and State Managed Fisheries [P, Pr, RFFA]	**Low negative (P); Low negative (Pr); Negligible (RFFA)**	**Low negative (P); Low negative (Pr); Negligible (RFFA)**	Likely to be **low negative** impact to fish populations; **Positive** (RFFA)	**Positive (P); Low negative (Pr); Positive (RFFA)**	**Negative (P, Pr and RFFA)** PBR is exceeded for some species in some fisheries and entanglement is a serious issue for ESA listed large whales. **Negative** impacts on sea turtles in several fisheries. **Negligible** impact on listed fish stocks.
Other Fishing Operations [P, Pr, RFFA]	**Negligible (P, Pr, RFFA)**	**Negligible (P, Pr, RFFA)**	**Negligible** - provides some background data for management	**Negligible**	**Unknown impact** (not monitored) (P, Pr and RFFA)
Non-Fishing Activities [P, Pr, RFFA]	**Low negative (P); Low negative (Pr); Negative (RFFA)**	**Low negative (P); Low negative (Pr); Negative (RFFA)**	**Low negative (P); Low negative (Pr); Negative (RFFA)**	**Negligible** - can exacerbate resource recovery and assessments, but activities provide direct benefit	**Negative (P, Pr and RFFA)**
Sea Turtle Conservation Measures [Pr, RFFA]	**Negligible (Pr, RFFA)**	**Negligible (Pr, RFFA)**	**Low (Pr, RFFA) positive or negligible** – could change management measures	**Low negative** economic – may be cost for gear; **Positive** - social	**Positive** impacts on sea turtles (Pr and RFFA); **Negligible** (Pr, RFFA)
Atlantic Large Whale Take Reduction Plan [Pr, RFFA]	**Negligible (Pr, RFFA)**	**Negligible (Pr, RFFA)**	**Negligible** – no changes to fishing operations	**Negative** economic – new gear requirements; **Positive** social	**Positive** impacts on large whales (Pr and RFFA)small (Pr, RFFA)
Harbor Porpoise Take Reduction Plan [Pr, RFFA]	**Negligible (Pr, RFFA)**	**Negligible (Pr, RFFA)**	**Negligible** – no changes to fishing operations	**Negative** economic – new gear requirements; **Positive** social	**Positive** impacts on harbor porpoises (Pr and RFFA)
Habitat Omnibus Amendment [Pr, RFFA]	**Positive (Pr, RFFA)**	**Positive (Pr, RFFA)**	**Negligible** – may result in changes to fishing areas, to the benefit of fish stocks	**Negligibl**e – potential benefit for life stages of important species and may improve stocks in the future	**Positive** (Pr and RFFA)
CUMULATIVE IMPACTS	**Low Negative**	**Low Negative**	**Low Positive**	**Low Positive**	**Low Positive**

P, Pr, RFFA indicates Past, Present and/or Reasonably Foreseeable Future Action, an action that has occurred (P), is currently occurring (Pr) and/or is expected to continue occurring in the future (RFFA)

Impact Definitions used in Table 8:

Fish and Protected Species: Positive - actions that increase stock/population size; Negative - actions that decrease stock/population size

Physical Environment and EFH/Habitat: Positive -actions that improve the quality or reduce disturbance of habitat; Negative -actions that degrade the quality or increase disturbance of habitat

Social and Economic Environment: Positive - actions that increase revenue and well being of fishermen and/or associated businesses; Negative - actions that decrease revenue and well being of fishermen and/or associated businesses

Impact Qualifiers used in the Table 8:

Low (as in *low* positive or *low* negative): to a lesser degree

High (as in *high* positive or *high* negative): to a greater degree

Negligible: a degree of impact immeasurably small

Potentially: some of degree uncertainty associated with the impact

5.6.3.5 Social and Economic Environment

Each year the survey data is fed into the assessment cycles to provide updates of the progress being made and to recommend changes in regulations as appropriate. The principle tools include closed areas, effort controls, trip limits and TACs. The VTR program provides a census of fishing effort and landings which is reinforced with detailed dealer reports. This collection of information has provided for significant complexity in fishery regulation design. The complexity is designed to focus regulations as tightly as possible on specific resource problems while at the same time allowing exploitation of healthy components as fully as possible. The benefits of the survey, including providing the best scientific information available to marine resource scientists and managers, are expected to continue in the future. One may view this complexity in the FMPs resident on either federal fishery management Council website (www.NEFMC.org, and www.MAFMC.org). The target of better scientific information coupled with maturing management is an increase in available resources for harvest as compared to today, continued rebuilding of overfished stocks reaching, ultimately, long term potential yield.

Past fishery management actions taken by state and federal agencies have had both positive and negative cumulative effects on fishery resources by benefiting domestic stocks through sustainable fishery management practices while at the same time potentially reducing the availability of the resource to all participants. Sustainable management practices are, however, expected to yield broad positive impacts to fishermen, their communities, businesses, and the nation as a whole. It is anticipated that future fishery management actions would result in positive effects for human communities due to sustainable management practices, although additional indirect negative effects on the human communities could occur through management actions that will incur costs for the fishermen. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to human communities have had an overall positive cumulative effect. Operation of the ME-NH survey, together with other research and survey activities in the region, contributes to direct positive cumulative impacts by supporting a program that provides important fisheries and ecosystem data.

5.6.4 Summary of Cumulative Impacts

Past, present and future NEFSC survey activities likely have had a negligible impact on physical habitat, essential fish habitat, fish, social and economic environments and protected resources (Table 8). The contributions of the ME-NH survey to cumulative overall effects, taking into consideration the past, present and reasonably foreseeable future actions that affect the resources within the survey area, have also been negligible. Proposed actions are likely to have a low negative impact on Atlantic sturgeon (Table 8), where individuals are infrequently captured and rarely killed due to the survey effort and short duration of survey tows. Continuation of the survey would result in similar impacts in the future.

6.0 Applicable Law

6.1 Endangered Species Act (ESA)

Section 7 of the ESA requires Federal agencies conducting, authorizing, or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. For further information on the potential impact of the surveys, see Section 5.0 of this document. NMFS has determined that the surveys conducted by the NEFSC are not likely to result in jeopardy to any ESA-listed species under NMFS jurisdiction, or alter or modify any critical habitat, based on the analysis in this document and in the Section 7 Consultation Biological Opinion dated January 23, 2013. For further information on the potential impact of the ME-NH survey see Section 5.0 of this document.

6.2 Information Quality Act

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

Utility

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

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 NMFS to propose this action are the result of a multi-stage public process.

This document is available in several formats, including printed publication and CD-ROM, upon request.

Integrity

Prior to dissemination, information associated with this action, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information. All electronic information disseminated by NMFS 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 US Code (confidentiality of census, business, and financial information); the Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity

For purposes of the Pre-Dissemination Review, this document is considered to be a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act.

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Stock status (including estimates of biomass and fishing mortality) reported in this product are based on either assessments subject to peer-review through the Stock Assessment Review Committee or on updates of those assessments prepared by scientists of the Northeast Fisheries Science Center. In addition to these sources, additional information is presented that has been accepted and published in peer-reviewed journals or by scientific organizations.

The measures proposed for this action were selected based upon the best scientific information available. The analyses conducted in support of the proposed action were conducted using information from the most recent complete calendar years, from 2000 through 2012. The data used in the analyses provide the best available information on the landings of the relevant species in the Northeast Region and in the ME-NH survey.

The policy choices are clearly articulated, in sections of this document, as the management alternatives considered in this action. The supporting science and analyses, upon which the policy choices are based have been documented. 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 involved staff from the NMFS Greater Atlantic Regional Fisheries Office. Review by staff at the Regional Office was 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 was conducted by staff at NMFS Headquarters, the Department of Commerce, and the US Office of Management and Budget.

6.3 Magnuson-Stevens Conservation and Management Act

The proposed action meets the definition of scientific research activity conducted by a scientific research vessel and is therefore exempt from the requirements of the Magnuson-Stevens Act. Section 404 of the Magnuson-Stevens Act requires the Secretary of Commerce to initiate and maintain, in cooperation with the Councils, a comprehensive program of fishery research to carry out and further the purposes, policy, and provisions of the Act. The proposed action is part of a comprehensive program to address this requirement.

6.4 Marine Mammal Protection Act

NMFS has reviewed the impacts of the various ME-NH on marine mammals and concluded that the surveys are conducted and consistent with the provisions of the MMPA and would not alter existing measures to protect the species likely to inhabit the survey area. For further information on the potential impacts on marine mammals, see Section 5.0.

6.5 National Environmental Policy Act

Finding of No Significant Impact

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

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

> Response:
> The proposed action is not reasonably expected to jeopardize the sustainability of any target species that may be affected. Removal and mortality of target organisms by the ME-NH survey are small, and are insignificant relative to allowable catch limits and removals by managed commercial and recreational fisheries (Section 5.0). This action will not contribute to overfishing or any population level impacts.

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

> Response:
> The proposed action is not reasonably expected to jeopardize the sustainability of any non-target species that may be affected. Removal and mortality of non-target organisms by the ME-NH survey are insignificant relative to removals by managed commercial and recreational fisheries (Section 5.0).

3*) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?*

Response:
Conduct of surveying activities does cause damage to ocean habitats and essential fish habitat through the operation of the modified shrimp trawl, but such activity is negligible and temporary relative to total available habitat. Furthermore, because of likely recovery times and avoidance of sensitive substrate, the impact of the research cruises will be negligible (Section 5.0).

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

Response:
The research activities conducted by the ME-NH survey are not expected to have any impact on public health or safety because there are not any elements of the survey that either include the public or relate to public health or safety.

5*) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?*

Response:
The proposed action is not reasonably expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat. The proposed surveys occasionally intercept or take threatened or endangered species, specifically Atlantic sturgeon (Section 5.0). The ME-NH survey is not likely to result in jeopardy to any ESA-listed species under NMFS jurisdiction, though takes of Atlantic sturgeon are expected to occur. Often, scientific staff are able to collect valuable data from these specimens and return them to their environments alive. No mortality of any endangered or threatened species or marine mammal is expected. Occasionally, other non-target organisms are inadvertently killed and in these cases, we ensure that the organisms are transferred to the most appropriate scientific institution to maximize the opportunity for scientific data collection. Interactions of this type are relatively infrequent and insignificant relative to population level impacts.

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

Response:
The ME-NH survey is expected to have a negligible impact on biodiversity and ecosystem function. The proposed survey activities have negligible direct and indirect impacts on habitat, fish stocks and protected species (Section 5.0), and as such, do not contribute to impacts to the function of the natural resource communities and relationships within the affected area. Instead, the overall purpose of the surveys is to produce important information required to both understand and monitor biodiversity and ecosystem function within the affected area.

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

Response:
The proposed actions cannot be reasonably expected to have significant negative social or economic impacts, and as such would not result in significant negative social or economic impacts that are interrelated with natural or physical environmental effects (Section 5.0). However, the ME-NH survey can reasonably be expected to result in insignificant indirect positive social or economic impacts. Much of what we know about the status of fisheries and invertebrate resources and their habitats has resulted from the collection of biological and habitat data during scientific resource surveys. The survey has the potential to result in positive social and economic benefits to society because it supports the management of living marine resources and their habitats that is based upon the best scientific information available.

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

Response:
The proposed action is not expected to result in impacts on the human environment that are highly controversial. The impacts of the ME-NH survey are well documented and have been on-going for 10 years. As such, the interaction of the survey with elements of the human environment, including protected species, fish, and the physical environment and habitat are known and described in Section 5.0. The effects on the quality of the human environment are likely to be negligible and not controversial.

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

Response:
The proposed actions are expected to have negligible impacts on unique areas or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas as the ME-NH survey does not operate in these areas. Negligible and temporary negative impacts to EFH are expected, and are described in Section 5.0. 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 proposed actions cannot be reasonably expected to result in substantial impacts on human environments or involve unique or unknown risks. This survey has been conducted for a decade and the effects on human habitat are both known and negligible. We are not aware of any unique or unknown risks.

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

The proposed actions cannot be reasonably expected to contribute to cumulatively significant impacts. The proposed action is similar to commercial fishing activities and research activities permitted in the survey area. Because of the very small scope and duration of the ME-NH survey, it does contribute to the cumulative impacts of these activities (Section 5.0).

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

Response:
The proposed actions are not likely to affect objects listed in the National Register of Historic Places or cause significant impact to scientific, cultural, or historical resources because the ME-NH survey does not operate in these areas. It is not expected to contribute in any way to the loss or destruction of any scientific, cultural or historic resource (Section 4.0).

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

Response:
The ME-NH survey activities proposed cannot reasonably be expected to result in the introduction or spread of non-indigeneous species. Organisms are sampled from the environment and no new organisms are introduced through these activities. Live organisms are not transported to other marine environments (Section 4.0).

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

Response:
There is some probability that the proposed actions will establish a precedent or represent a decision in principle about the future consideration of research activities. Evaluation of the proposed ME-NH survey may set a precedent for future consideration of long-term, broad scale scientific monitoring of living marine resources and their habitats. However, it would be reasonable to consider that the impacts of scientific surveys similar to the surveys conducted by the ME-NH survey would likely have negligible impacts on the human environment, as demonstrated by the impact assessment of this action. As such, the issuance of a grant to support the ME-NH survey would not set a precedent for consideration of an action with *significant* impacts. Furthermore, the research conducted by the ME-NH survey provides a unique platform specifically designed to meet a number of unique objectives; NMFS would consider future actions that may be similar in the same way.

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

Response:
To our knowledge, the proposed actions cannot be reasonably expected to threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment.

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

Response:
The proposed actions are expected to have a negligible cumulative effect that could result in a substantial effect on target and non-target species (Section 5.0). The proposed actions produce important information required to both understand and evaluate cumulative mortality and population status of both target and non-target species. The direct impact of survey activity is negligible on target and non-target species (Section 5.0). As such, this survey does not contribute to or result in the cumulative adverse impact of other past, present and reasonably foreseeable future activities occurring within the survey area.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for the issuance of a grant to support the Maine-New Hampshire Inshore Trawl Survey research activities, it is hereby determined that the survey will not significantly impact the quality of the human environment as described above and in the Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

Russell W. Brown for

Bill Karp

4-8-2014

Date

Science Center Director
National Marine Fisheries Service

7.0 List of Preparers and Persons/Agencies Consulted

This document was prepared by staff at the National Marine Fiseries Service, Greater Atlantic Regional Fisheries Office, Gloucester, MA.

Point of Contact Sarah Gurtman
National Marine Fisheries Service
Gloucester, MA 01930

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Appendix A. Total catch by season of all state, regional, and federally managed species in the Maine-New Hampshire Inshore Trawl Survey since it's inception in 2000.*

	MENH SPRING SURVEY											
	Total Number											
COMMON_NAME	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
alewife	22601	13816	11998	9221	13914	15449	28258	10876	22284	12785	20562	16646
bass striped						1						
butterfish	6	3				14	19	4	1	39	36	83
clam northern quahog / hard				16	3		23	5		2	4	63
clam ocean quahog	55		81	41	8	2	91	19	134	4	2	
cod atlantic	197	518	155	813	496	154	231	396	237	212	174	204
crab atlantic rock	995	108	486	340	357	172	309	472	259	295	172	292
crab jonah	489	379	453	609	1650	808	550	458	369	242	231	195
crab red			3	1	5		2	2	3			5
cucumber sea	735	247	206	1555	303	296	2161	192	237	204	27	140
cusk			1			1						
dogfish spiny		9	17			30	3	20	1	28	15	94
flounder atlantic summer (fluke)	1											
flounder atlantic windowpane	543	230	771	417	346	242	616	654	530	357	658	749
flounder atlantic witch (gray sole)	485	188	219	159	720	462	348	464	456	564	527	625
flounder fourspot	8	8	10	12	5	6	12	8	18	27	27	28
flounder winter	3232	2189	1765	4253	2661	1850	2744	2948	5179	3133	4361	3911
flounder yellowtail	292	326	208	196	158	117	531	301	332	480	195	132
haddock	1	440	72	156	67	122	66	52	64	84	631	559
hagfish atlantic	4	1	2		1	1		1	1	4		
hake atlantic red	556	989	925	549	540	279	940	1204	2367	622	670	672
hake silver (whiting)	10606	27483	43631	15872	4702	4287	19439	14521	28081	88607	27214	92520
hake white	111	213	193	278	414	606	358	752	1715	286	404	340
halibut atlantic	5	31	20	21	29	30	31	53	60	64	63	61
herring atlantic	84997	112128	235813	249599	121786	123413	74117	58557	159755	221374	105494	67995
herring blueback	5970	879	2530	875	759	4015	2366	544	473	1051	4783	916
lobster american	4804	8675	4406	3565	7432	8586	7953	6932	13573	13107	21426	23986
mackerel atlantic		2	42					1		139	109	778
menhaden atlantic						3		2				
monkfish	673	227	104	163	112	40	109	145	94	61	35	38
plaice american (dab)	1889	3468	4496	5144	5441	5336	7069	7735	9224	6554	3694	2906
pollock	46	105	76	166	36	87	36	82	34	41	32	35
pout ocean	56	39	30	62	57	26	51	60	136	43	21	20
redfish acadian ocean perch	185	165	698	245	278	222	220	1758	1849	722	1454	342
scallop sea	3381	1611	387	127	59	34	216	757	499	1609	297	229
shad american	113	268	151	50	265	881	263	113	120	145	388	358
shrimp northern	16289	15761	56180	68126	139193	259399	217105	226258	167216	341877	349391	121263
skate barndoor											3	1
skate little	82	45	57	67	40	52	46	32	67	32	42	21
skate smooth	24	10	7	32	22	10	21	32	9	17	50	35
skate thorny	45	9	42	47	30	19	16	40	25	28	27	21
skate winter	2	1	7	9	7	11	2	5	15	3	8	1
smelt rainbow	926	63	104	746	283	1256	3441	4009	289	561	544	354
squid long finned	7	17	13	4	2	8	83	7	13	11	69	832
squid short-finned	2	2				1		6	4	13	2	
sturgeon atlantic		2	2		1	2	2		1		1	2
wolffish atlantic					2	3	2	4				

	MENH SPRING SURVEY											
	TOTAL WEIGHT											
COMMON_NAME	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
alewife	315.29	348.62	313.36	243.81	266.41	337.63	538.68	428.50	387.02	303.40	350.23	557.77
bass striped						0.24						
butterfish	0.35	0.15				0.14	0.47	0.17	0.00	1.14	1.50	2.29
clam northern quahog / hard				0.44	0.03		2.51	0.52		0.05	0.08	0.12
clam ocean quahog	1.73		2.91	2.00	0.32	0.11	5.27	1.52	6.17	0.26	0.12	
cod atlantic	28.68	245.89	105.45	135.40	195.11	71.36	91.42	164.36	194.75	134.33	64.17	72.15
crab atlantic rock	166.13	18.28	69.36	42.50	46.73	19.74	36.24	60.91	34.99	29.08	20.12	23.70
crab jonah	104.30	77.75	89.40	105.11	293.21	128.42	119.23	94.83	89.04	57.53	53.59	42.84
crab red			6.56	0.05	0.80		0.29	0.28	0.26			0.80
cucumber sea	461.15	175.26	97.05	638.75	145.32	145.97	993.90	75.89	125.93	34.42	18.99	52.48
cusk			1.08			1.55						
dogfish spiny		21.50	21.48			8.67	3.10	23.85	0.42	19.52	13.92	54.46
flounder atlantic summer (fluke)	0.15											
flounder atlantic windowpane	10.80	10.18	14.51	18.84	14.61	11.60	14.30	21.97	19.77	13.85	11.66	26.06
flounder atlantic witch (gray sole)	8.33	18.65	22.84	13.06	23.14	19.63	21.55	35.04	21.11	31.83	25.89	33.89
flounder fourspot	2.35	1.62	9.92	1.84	1.15	1.31	1.83	1.27	2.62	4.44	4.32	5.06
flounder winter	298.73	230.90	179.82	354.48	214.30	144.92	228.01	254.59	339.04	254.99	272.94	227.24
flounder yellowtail	102.12	94.24	52.91	46.50	35.44	26.78	122.44	68.77	77.57	110.81	41.42	25.92
haddock	0.01	129.14	55.62	24.31	24.53	34.55	45.53	45.65	11.47	17.36	51.30	55.26
hagfish atlantic	0.43	0.18	0.19		0.10	0.06		0.12	0.04	0.38		
hake atlantic red	23.02	117.08	74.67	64.51	47.35	10.74	38.14	56.28	76.07	46.19	39.66	47.59
hake silver (whiting)	372.89	1196.46	1031.45	703.37	220.09	160.02	477.74	465.58	813.60	1927.77	995.10	2744.70
hake white	6.94	27.44	33.85	22.20	51.64	54.36	35.84	79.59	123.78	41.30	46.89	51.52
halibut atlantic	43.04	17.36	16.47	20.19	38.87	81.30	62.55	101.15	79.10	71.25	73.58	91.35
herring atlantic	1758.55	2399.41	4170.12	4936.91	1948.71	2649.51	1211.35	1345.79	2777.20	3828.10	2357.95	1255.40
herring blueback	74.29	21.39	57.27	16.16	17.99	73.41	56.62	7.14	8.10	27.77	58.48	30.25
lobster american	1395.85	2083.52	1268.02	1111.68	2113.43	2101.11	1914.27	1725.87	3052.14	2829.61	4659.35	4989.32
mackerel atlantic		0.40	0.68					0.29		24.15	6.82	57.15
menhaden atlantic						1.31		0.72				
monkfish	131.93	113.64	57.09	54.95	61.02	21.87	32.91	51.50	20.71	21.00	26.31	26.57
plaice american (dab)	173.77	386.53	400.32	367.69	309.62	268.24	430.15	541.57	600.94	450.10	298.77	248.12
pollock	4.55	7.31	7.16	7.78	2.26	6.92	3.65	9.76	8.86	7.03	5.01	2.47
pout ocean	15.23	9.50	6.01	9.40	8.38	5.73	4.41	7.48	9.38	4.95	2.73	2.36
redfish acadian ocean perch	10.33	7.92	44.21	27.10	23.46	12.06	15.97	54.73	53.38	26.74	61.42	22.20
scallop sea	170.07	106.94	19.43	7.28	3.36	2.06	5.92	16.02	10.19	17.91	4.61	11.60
shad american	4.47	12.36	4.83	1.76	8.45	32.11	11.11	3.76	4.04	5.50	16.43	22.92
shrimp northern	110.40	47.70	304.64	401.78	573.68	1309.04	1375.70	1245.12	898.01	1753.22	1857.15	880.80
skate barndoor											2.20	0.97
skate little	62.24	30.67	41.37	52.64	22.76	21.67	31.57	18.68	56.38	25.98	29.28	13.30
skate smooth	23.65	1.82	4.86	15.26	13.04	4.96	7.24	9.86	4.24	4.53	8.50	9.41
skate thorny	18.79	20.10	42.53	95.25	77.95	28.94	36.29	96.32	19.64	61.21	9.38	16.23
skate winter	2.80	1.50	26.64	9.36	4.86	11.48	3.86	2.76	16.38	6.36	8.87	2.20
smelt rainbow	4.66	1.93	2.21	10.09	5.64	20.18	15.94	49.18	7.58	10.56	8.03	5.59
squid long finned	0.92	1.43	0.61	0.89	0.28	1.10	1.34	0.42	0.24	0.53	3.13	42.70
squid short-finned	0.06	0.16				0.03		0.14	0.07	0.42	0.05	
sturgeon atlantic		21.26	27.12		5.42	28.88	23.26		8.54		54.43	18.17
wolffish atlantic					12.30	10.30	7.70	24.15				

	MENH FALL SURVEY												
	TOTAL NUMBER												
COMMON_NAME	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
alewife	17421	11132	24793	10868	18699	11138	17239	19146	16587	42051	36734	13259	21609
bass striped							2						
bluefish			1		1				1			1	8
butterfish	191	921	3901	1057	3188	1250	4273	1625	8140	26097	5042	14534	12116
clam northern quahog / hard				2							3	4	
clam ocean quahog	22	17	107	4	7	5	1	3	3	19	2		
cod atlantic	401	269	71	332	209	187	319	243	59	112	56	122	31
crab atlantic rock	221	524	162	82	314	235	76	85	219	185	111	362	192
crab jonah	117	1375	492	409	824	285	351	418	466	173	145	188	142
crab red				3			3	5	2		3	2	
cucumber sea	67	376	198	68	89	163	314	11	79	81	15	115	20
dogfish spiny	321	993	1418	1541	5326	1367	1931	4191	1299	5087	592	1648	118
eel american		1	1			1	1		1				1
flounder atlantic windowpane	305	138	914	559	189	282	244	371	348	404	881	844	423
flounder atlantic witch (gray sole)	302	3427	419	631	928	1244	922	1227	1014	903	1414	829	322
flounder fourspot	19	43	8	16	5	33	23	8	15	31	47	24	26
flounder winter	2780	2288	2667	2209	2495	1591	1467	2444	3361	3593	6021	4438	4197
flounder yellowtail	200	121	66	36	78	32	20	164	146	85	81	83	35
haddock	289	519	28	436	303	162	117	33	148	499	755	1213	889
hagfish atlantic					5		1			1	1	5	2
hake atlantic red	2033	3603	1790	2190	1357	654	970	2349	2757	2653	1915	1877	2051
hake silver (whiting)	55610	72387	48080	81000	34778	3049	6328	57597	42542	52086	69131	23935	75436
hake white	947	1643	2066	2419	1487	2560	2675	2786	6913	3158	1934	2845	1124
halibut atlantic	14	17	13	12	16	9	13	56	59	40	23	54	27
herring atlantic	74684	52106	73541	37389	58851	44979	37969	82148	54113	121653	109152	75759	92907
herring blueback			333	460	445	641	306	4060	370	1390	541	410	2507
lobster american	8007	8606	9130	6213	5667	7742	9520	6836	10089	15652	17372	19272	17098
mackerel atlantic	156	908	1144	1198	606	2282	432	536	344	77	3736	339	1794
menhaden atlantic	1519		3398	962	144	2437	37	3414					
monkfish	383	1294	351	284	324	134	292	355	360	212	106	97	82
plaice american (dab)	1821	2558	1448	3823	3967	4242	6630	6410	8416	6335	3383	3097	2477
pollock	155	28	412	52	19	21	7	9	5	5	13	23	15
pout ocean	5	30	1	8	27	3	11	22	10	11	2	4	1
redfish acadian ocean perch	44	752	211	1446	1814	9050	554	2653	3906	2331	5374	4811	425
scallop sea	2741	3100	683	274	229	116	95	973	1110	844	2788	740	553
scup	528		106	66	3870	1	2		2	50	16		1
sea bass black	6		2										
shad american	45	27	88	348	94	136	96	1104	202	297	93	912	241
shrimp northern	7725	5491	3138	21549	27223	50199	61326	70265	122462	64756	188295	47842	31894
skate barndoor					1			1	2		4	8	
skate clearnose							1					1	
skate little	96	163	198	56	78	58	27	69	61	53	64	38	14
skate smooth	13	31	13	20	24	9	16	15	8	1	17	33	18
skate thorny	19	22	32	36	50	19	30	32	31	16	27	6	6
skate winter	19	9	31	7	22		4	21	5	15	18	3	2
smelt rainbow	4212	4636	2401	2773	3316	3202	3123	4469	2497	2103	3717	2109	3688
squid long finned	348	1188	1940	129	976	212	9273	840	3488	4091	2790	3680	13428
squid short-finned	87	127	92	183	171	186	1206	1699	986	2736	233	619	560
sturgeon atlantic	4	15	10		1		1		2	2	2	1	1
wolffish atlantic					1		2						

	MENH FALL SURVEY												
	TOTAL WEIGHT												
COMMON_NAME	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
alewife	395.91	555.73	453.56	334.64	432.71	318.38	455.28	1274.83	659.37	1277.38	839.70	355.77	746.63
bass striped							1.30						
bluefish			0.02		2.80				0.04			0.06	0.48
butterfish	15.27	49.21	70.07	28.04	72.94	10.40	136.34	52.73	66.75	440.51	82.68	286.27	201.61
clam northern quahog / hard				0.04							0.02	0.06	
clam ocean quahog	1.30	0.49	2.51	0.24	0.69	0.74	0.02	0.10	0.11	0.95	0.00		
cod atlantic	94.89	14.90	32.20	132.97	104.15	125.12	185.31	183.67	35.06	39.18	56.05	48.47	15.99
crab atlantic rock	29.88	65.16	21.29	10.78	42.71	32.02	9.72	10.93	21.49	21.97	11.28	43.40	19.03
crab jonah	29.44	227.50	96.42	67.37	131.08	47.89	56.48	73.24	88.12	34.28	28.43	32.80	24.12
crab red				0.95			0.98	0.68	0.42		0.85	0.25	
cucumber sea	80.90	131.55	81.07	22.83	35.62	82.56	94.23	4.50	15.92	23.33	3.02	31.03	4.62
dogfish spiny	609.35	1219.33	2667.68	2471.01	7427.77	2084.81	3236.82	5605.96	1847.75	3078.98	677.89	2255.54	65.15
eel american		0.20	0.08			0.75	0.08		0.10				0.06
flounder atlantic windowpane	14.72	7.02	19.00	29.91	11.88	11.48	12.51	19.33	17.48	20.93	13.28	32.86	11.79
flounder atlantic witch (gray sole)	16.76	265.97	47.01	92.81	123.40	40.99	56.38	118.59	93.53	48.14	68.02	72.76	19.98
flounder fourspot	6.85	8.99	2.75	4.28	1.68	3.30	3.95	1.48	3.32	4.97	7.07	7.60	4.88
flounder winter	282.01	172.38	235.14	240.83	256.18	100.95	116.52	190.53	150.35	213.75	249.20	205.62	225.42
flounder yellowtail	48.00	30.43	17.04	9.51	19.14	7.00	4.92	39.76	28.10	21.62	17.30	18.90	6.43
haddock	48.65	19.22	3.81	48.51	22.94	40.18	51.18	1.70	3.78	21.43	26.67	43.15	53.55
hagfish atlantic					1.32		0.06			0.08	0.10	0.18	0.12
hake atlantic red	215.38	510.25	250.13	422.57	265.84	78.48	125.08	304.87	337.42	300.53	257.07	311.34	234.33
hake silver (whiting)	2533.75	5512.49	1387.39	3632.79	2092.83	241.54	526.94	3531.52	2760.03	2599.92	3654.33	1735.95	3631.75
hake white	120.78	287.96	227.27	315.76	229.88	141.41	175.08	363.54	398.77	417.93	191.22	345.83	139.42
halibut atlantic	25.30	7.40	6.30	15.20	13.11	10.21	14.64	28.47	53.91	45.41	31.30	88.21	29.18
herring atlantic	1164.50	2283.75	1019.32	895.28	2077.82	879.29	487.23	2401.79	1118.08	1698.95	2498.27	2415.72	1359.44
herring blueback			12.04	27.62	21.53	31.10	10.30	357.62	38.61	133.40	23.91	16.63	149.23
lobster american	2425.55	2290.67	2733.21	2031.80	1933.02	2047.60	2341.37	1715.63	2419.68	3892.78	3729.84	4119.02	3758.28
mackerel atlantic	28.00	109.23	91.33	87.77	43.15	92.82	29.83	28.59	53.02	14.05	249.23	53.15	277.97
menhaden atlantic	13.80		21.64	3.31	1.92	12.20	0.27	13.37					
monkfish	135.60	584.68	271.12	294.72	430.26	149.18	198.22	226.55	269.67	210.55	70.46	111.02	48.33
plaice american (dab)	103.03	215.41	79.99	266.96	270.95	196.62	338.60	438.80	433.86	362.93	234.21	192.10	164.21
pollock	15.95	6.91	54.40	3.06	6.54	2.74	0.63	1.59	1.10	0.94	2.52	1.47	1.45
pout ocean	0.70	7.30	0.03	1.61	2.81	0.76	1.07	1.77	1.07	1.90	0.12	0.45	0.02
redfish acadian ocean perch	2.19	50.71	10.92	125.62	152.03	1754.61	26.85	166.95	76.18	78.53	192.41	260.23	22.69
scallop sea	103.80	139.17	31.50	14.72	8.05	4.02	3.10	11.44	26.90	10.46	31.57	30.87	36.21
scup	43.26		2.41	0.78	61.70	0.02	0.32		0.49	0.97	0.51		0.08
sea bass black	1.30		0.88										
shad american	3.40	3.66	2.23	16.19	8.56	11.78	7.98	56.11	22.03	40.10	6.59	30.79	31.43
shrimp northern	72.15	36.71	17.13	163.55	175.57	221.34	352.53	577.70	1030.60	376.03	1316.34	340.94	223.75
skate barndoor					1.32			0.86	0.99		11.17	19.16	
skate clearnose							0.38					0.06	
skate little	74.40	107.82	100.10	51.62	57.81	36.69	19.45	54.37	41.14	40.85	49.42	28.88	10.11
skate smooth	8.35	9.43	9.30	7.55	16.38	8.24	9.94	11.76	7.28	1.02	8.16	9.69	3.49
skate thorny	23.80	30.21	18.92	68.10	84.90	34.99	44.42	89.02	90.75	9.00	39.84	13.45	4.42
skate winter	37.20	17.85	32.47	8.92	13.88		9.64	17.39	4.38	7.28	7.56	1.10	4.08
smelt rainbow	115.90	75.39	61.28	62.70	73.66	62.98	84.43	96.96	60.74	57.44	90.78	50.45	83.27
squid long finned	31.44	31.89	33.42	5.56	13.93	5.92	109.58	11.42	26.58	50.49	40.03	25.24	152.50
squid short-finned	10.00	14.99	8.71	17.55	12.06	10.77	145.99	216.06	125.41	473.65	33.55	82.08	72.08
sturgeon atlantic	16.50	143.10	81.92		7.16		6.06		38.54	22.28	33.76	13.70	7.85
wolffish atlantic					8.32		11.07						

Appendix B. Total Catch of All Species by Season for 2012.

COMMON_NAME	Fall 2012 Sum of Weight (kg)	Fall 2012 Sum of Quantity	Spring 2012 Sum of Weight (kg)	Spring 2012 Sum of Quantity
alewife	746.63	21609	557.767	16646
alligatorfish	0.113	38	0.541	150
axius serratus	0.003	1		
barnacle	0.42	4	1.82	4
blenny snake	0.041	6	1.061	82
bluefish	0.48	8		
buckler dory	0.1	1		
butterfish	201.613	12116	2.29	83
clam ax-head	0.652	87	0.033	5
clam false quahog	0.18	42		
clam northern quahog / hard			0.12	63
cod atlantic	15.99	31	72.15	204
crab atlantic rock	19.033	192	23.703	292
crab green	2.36	58	3.17	83
crab hermit uncl	0.016	5	0.099	6
crab jonah	24.116	142	42.837	195
crab northern stone	0.36	1		
crab red			0.8	5
crab snow	2.36	67	7.218	124
crab toad	0.441	55	0.343	55
cucumber rat-tail	13.4	49	0.23	13
cucumber sea	4.62	20	52.48	140
cunner	18.04	379	3.747	79
daubed shanny			0.042	9
dogfish spiny	65.15	118	54.46	94
eel american	0.06	1		
flounder atlantic windowpane	11.79	423	26.056	749
flounder atlantic witch (gray sole)	19.98	322	33.89	625
flounder fourspot	4.88	26	5.06	28
flounder gulf stream			0.04	2
flounder winter	225.42	4197	227.24	3911
flounder yellowtail	6.43	35	25.92	132
fourbeard rockling	4.7	102	4.935	118
grubby	0.027	2	0.01	1
haddock	53.55	889	55.261	559

hagfish atlantic	0.12	2		
hake atlantic red	234.33	2051	47.59	672
hake longfin	0.01	1		
hake silver (whiting)	3631.748	75436	2744.695	92520
hake spotted	0.1	1		
hake white	139.42	1124	51.52	340
halibut atlantic	29.18	27	91.347	61
halibut greenland	0.53	3	0.64	1
herring atlantic	1359.44	92907	1255.4	67995
herring blueback	149.23	2507	30.25	916
jack yellow	0.06	1		
kelp snailfish	0.01	1		
krill	0.043	146	13.5612	48991
lanternfish uncl			0.003	1
lobster american	3758.28	17080	4989.32	23986
lumpfish	17.25	32	10.9	21
lumpsucker atlantic spiny			0.004	1
mackerel atlantic	277.97	1794	57.15	778
monkfish	48.33	82	26.57	38
moonfish atlantic	0.024	12		
mussel blue sea	1.89	29	0.39	9
mussel horse	0.25	2	0.06	
mysidacea	0.062	152	0.001	6
northern cyclocardia	0.297	39	0.083	24
northern sea star	2.272	19	17.504	19
octopus uncl	0.2	12	0.253	20
pandalus propinquus	0.0196	4		
pearlsides	0.022	11	0.012	4
plaice american (dab)	164.206	2477	248.121	2906
polar lebbeid			0.006	6
pollock	1.45	15	2.47	35
pout ocean	0.02	1	2.36	20
redfish acadian ocean perch	22.688	425	22.202	342
sand dollar uncl	0.73	10	8.005	39
sand lance american			5.44	655
scad mackerel	0.01	1		
scads rough	0.08	5		
scallop sea	36.21	553	11.604	229
sculpin longhorn	48.21	369	141.72	1283
sculpin moustache	0.037	3		
sculpin shorthorn	0.2	2		
scup	0.08	1		

sea anomonie	6.123	50	15.938	58
sea raven	13.71	23	43.13	75
sea robin armored	0.002	1		
sea sponges	6.504		38.368	
sea urchins green	0.008	3	6.119	81
searobin northern	0.17	2		
shad american	31.43	241	22.92	358
shanny radiated			0.01	1
shrimp crangon	2.6776	1744	0.1304	128
shrimp dichelo	36.5138	12376	39.9229	13991
shrimp montagui	234.1483	77724	258.7879	92372
shrimp northern	224.0646	31913	880.7958	121263
shrimp norwegian			0.007	2
shrimp parrot	0.0084	3		
shrimp pink glass	4.2208	2383	0.42	98
shrimp sculptured			0.058	9
silverside atlantic	0.063	9	0.01	1
skate barndoor			0.97	1
skate little	10.11	14	13.3	21
skate smooth	3.49	18	9.41	35
skate thorny	4.42	6	16.23	21
skate winter	4.08	2	2.2	1
smelt rainbow	83.27	3688	5.587	354
snail moon			0.51	4
spiny lebbeid	0.054	35	0.031	7
spotted tinselfish	0.04	2		
squid bobtail	0.007	1		
squid long finned	152.495	13428	42.698	832
squid short-finned	72.08	560		
stars sea brittle baskets	14.051	13	1.134	33
sturgeon atlantic	7.85	1	18.17	2
tomcod atlantic			0.19	5
trash species	0.003	2	4.555	28
waved astarte	0.928	122	0.6	68
whelk channeled	0.001	1		
whelk stimpsons	0.05	1		
whelk ten-ridged	0.051	2	0.06	1
whelk waved	0.02	1		
wrymouth	1.64	63	1.29	17