DRAFT
Framework Adjustment 4
To the
Northeast Skate Complex FMP

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Prepared by the
New England Fishery Management Council
in cooperation with the
National Marine Fisheries Service

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1.0 Executive Summary

In New England, the New England Fishery Management Council (NEFMC) is charged with developing management plans that meet the requirements of the Magnuson-Stevens Act (M-S Act). The Northeast Skate Complex Fishery Management Plan (FMP) specifies the management measures for seven skate species (barndoor, clearnose, little, rosette, smooth, thorny and winter skates) off the New England and Mid-Atlantic coasts. The FMP has been updated through a series of amendments, framework adjustments and specification packages. Amendment 3 to the FMP established a control rule for setting the Skate Allowable Biological Catch (ABC) based on survey biomass indices and median exploitation ratios; the ABC was set to equal the Annual Catch Limit (ACL).

This framework action and specifications would implement changes to specifications based on updated data and research and would add a new seasonal allocation of the skate wing fishery TAL.

The *need* for this action is to set the annual catch limit specifications (ABC, ACL, ACT, and TALs) for FY 2016 and FY 2017 to maintain the skate fisheries while adequately minimizing the risk of overfishing the seven skate stocks. This action also proposes to change the skate wing seasonal management by apportioning a percentage of the wing TAL to each season. There are several *purposes*: to adopt specifications, to adopt possession limits and to modify the seasonal management of the wing fishery.

Proposed Action

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

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

The Preferred Alternatives include:

- *Modifications to Bait Skate Fishery Effort Controls*
    - .

Summary of Environmental Consequences

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

Biological Impacts

Essential Fish Habitat (EFH) Impacts

Impacts on Endangered and Other Protected Species

Economic Impacts

Social Impacts

Alternatives to the Proposed Action

If the Proposed Action is based on the Preferred Alternatives there are a number of alternatives that would not be adopted. These alternatives are briefly described below.

- *Modifications to the Bait Skate Fishery Effort Controls*

Impacts of Alternatives to the Proposed Action

Biological Impacts

Essential Fish Habitat (EFH) Impacts

Impacts on Endangered and Other Protected Species

Economic Impacts

Social Impacts

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2.4 List of Acronyms

ABC	Allowable biological catch
ACL	Annual Catch Limit
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
APA	Administrative Procedures Act
ASMFC	Atlantic States Marine Fisheries Commission
CAI	Closed Area I
CAII	Closed Area II
CPUE	catch per unit of effort
DAM	Dynamic Area Management
DAS	days-at-sea
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DPWG	Data Poor Working Group
DSEIS	Draft Supplemental Environmental Impact Statement
EA	Environmental Assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
F	Fishing mortality rate
FEIS	Final Environmental Impact Statement
FMP	fishery management plan
FW	framework
FY	fishing year
GARFO	Greater Atlantic Regional Fisheries Office
GARM	Groundfish Assessment Review Meeting
GB	Georges Bank
GIS	Geographic Information System
GOM	Gulf of Maine
GRT	gross registered tons/tonnage
HAPC	habitat area of particular concern
HPTRP	Harbor Porpoise Take Reduction Plan
IFQ	individual fishing quota
ITQ	individual transferable quota
IVR	interactive voice response reporting system
IWC	International Whaling Commission
LOA	letter of authorization

LPUE	landings per unit of effort
MA	Mid-Atlantic
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MPA	marine protected area
MRFSS	Marine Recreational Fishery Statistics Survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSMC	Multispecies Monitoring Committee
MSY	maximum sustainable yield
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NLSA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NT	net tonnage
OBDBS	Observer database system
OLE	Office for Law Enforcement (NMFS)
OY	optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area
SAFE	Stock Assessment and Fishery Evaluation
SAP	Special Access Program
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
SIA	Social Impact Assessment
SNE	Southern New England
SNE/MA	Southern New England-Mid-Atlantic
SSB	spawning stock biomass
SSC	Social Science Committee
TAC	Total allowable catch
TAL	Total allowable landings
TED	Turtle excluder device

TEWG	Turtle Expert Working Group
TMS	ten minute square
TRAC	Trans-boundary Resources Assessment Committee
TSB	total stock biomass
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	vessel monitoring system
VPA	virtual population analysis
VTR	Vessel trip report
WGOM	Western Gulf of Maine
YPR	Yield per recruit

3.0 INTRODUCTION AND BACKGROUND

3.1 Management Background

The Northeast Skate Complex Fishery Management Plan (FMP) specifies the management measures for seven skate species (barndoor, clearnose, little, rosette, smooth, thorny and winter skate) off the New England and Mid-Atlantic coasts. The seven species are managed as a stock complex. The FMP, first implemented in 2003, has been updated through a series of amendments and framework adjustments.

Amendment 3 to the FMP implemented a new ACL management framework that capped catches at levels determined from survey biomass indices and median exploitation ratios, and addressed the rebuilding of smooth and thorny skates. Framework Adjustment 3 set specifications for FY 2016 and FY 2017, which decreased the ACL for the complex, set possession limits for the wing and bait fisheries, and established seasonal management for the wing fishery.

Skates are harvested in two very different fisheries, one for lobster bait and one for wings for food. Fishery specific Total Allowable Landings (TALs) and possession limits are set as part of specifications. Both fisheries have independent seasonal management structures. Both fisheries are subject to effort controls and Accountability Measures. In FY2016, the incidental possession limit was implemented twice for the bait fishery. The bait fishery incidental possession limit is defined as the whole weight equivalent of the wing possession limit in place at that time. In Season 3 of FY2016, both the wing and bait fisheries had incidental possession limits in place, which effectively closed the bait fishery. This framework is intended to adjust effort controls in the bait fishery.

3.2 Purpose and Need for the Action (EA, RFA)

The purpose of this action is to prevent seasonal closures of the skate bait fishery. A lengthy closure of the skate bait fishery in fishing year 2016 had a substantial impact on the skate bait fishery and the lobster industry.

This action is needed to adjust the Season 3 bait fishery effort controls in a manner that would minimize the risk of implemented a seasonal closure of the bait skate fishery.

3.3 Brief History of the Northeast Skate Bait Fishery

Table 1 describes the seven species in the Northeast Region’s skate complex, including each species common name(s), scientific name, size at maturity, and general distribution.

Table 1 - Species description for skates in the management unit.

SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	GENERAL DISTRIBUTION	SIZE AT MATURITY cm (TL)	OTHER COMMON NAMES
Winter Skate	*Leucoraja ocellata*	Inshore and offshore Georges Bank (GB) and Southern New England (SNE) with lesser amounts in Gulf of Maine (GOM) or Mid Atlantic (MA)	Females: 76 cm Males: 73 cm 85 cm	Big Skate Spotted Skate Eyed Skate
Barndoor Skate	*Dipturus laevis*	Offshore GOM (Canadian waters), offshore GB and SNE (very few inshore or in MA region)	Males (GB): 108cm Females (GB): 116 cm	
Thorny Skate	*Amblyraja radiata*	Inshore and offshore GOM, along the 100 fm edge of GB (very few in SNE or MA)	Males (GOM): 87 cm Females (GOM): 88 cm 84 cm	Starry Skate
Smooth Skate	*Malacoraja senta*	Inshore and offshore GOM, along the 100 fm edge of GB (very few in SNE or MA)	56 cm	Smooth-tailed Skate Prickly Skate
Little Skate	*Leucoraja erinacea*	Inshore and offshore GB, SNE and MA (very few in GOM)	40-50 cm	Common Skate Summer Skate Hedgehog Skate Tobacco Box Skate
Clearnose Skate	*Raja eglanteria*	Inshore and offshore MA	61 cm	Brier Skate
Rosette Skate	*Leucoraja garmani*	Offshore MA	34 – 44 cm; 46 cm	Leopard Skate

Abbreviations are for Gulf of Maine (GOM), Georges Bank (GB), Southern New England (SNE), and the Mid-Atlantic (MA) regions.

The fishery for lobster bait is a more historical and directed skate fishery, involving vessels primarily from Southern New England ports that target a combination of little skates (>90%) and, to a much lesser extent, juvenile winter skates (<10%). The catch of juvenile winter skates mixed with little skates is difficult to differentiate due to their nearly identical appearance. A description of available information about this fishery can be found in Section 6.5.1.

The Northeast skate complex was assessed in November 1999 at the 30th Stock Assessment Workshop (SAW 30) in Woods Hole, Massachusetts. The work completed at SAW 30 indicated that four of the seven species of skates were in an overfished condition: winter, barndoor, thorny and smooth. In addition, overfishing was thought to be occurring on winter skate (NEFSC, 2000). The FMP initially set limits on fishing related to the amount of groundfish, scallop, and monkfish DAS and measures in these and other FMPs to control the catch of skates. Initially, it was thought that barndoor, smooth, rosette, and thorny skates were overfished and that overfishing of winter skate was occurring.

Amendment 3 became effective on July 16, 2010, implementing a new ACL management framework that capped catches at specific levels determined from survey biomass indices and median exploitation ratios. In addition to the ACL framework and accountability measures, the amendment also included technical measures that reduced the skate wing possession limit from 20,000 (45,400 whole weight) to 5,000 (11,350 whole weight) lbs. of skate wings, established a 20,000 lbs. whole skate bait limit for vessels with skate bait letters of authorization, and allocated the skate bait quotas into three seasons proportionally to historic landings.

During the end of the 2010 fishing year (Jan – Apr), the Skate PDT developed the analyses needed to update the ACL with new data, including calibrations of the survey tow data collected by the new FSV Bigelow in 2009-2011 and recent discard mortality research for little and winter skates captured by vessels using trawls.

In June 2011, the Council requested that the Regional Administrator (RA) initiate an Emergency Action to adjust the 2011 ACL specifications, based on the new analysis and calibrated survey data through spring 2011. A proposed rule was published on August 30, 2011 (FR 76(168) p53872; http://www.nero.noaa.gov/nero/regs/frdoc/11/11SkatePR.pdf) to raise the ACL specifications accordingly.

Specifications for FY 2012 and FY 2013 were set following the Amendment 3 ACL methodology; the assumed discard rate was updated using the 2008-2010 dead discards. The re-estimated discard rate also incorporates new discard mortality estimates for little (20%) and winter (12%) skates captured by trawls.

Framework Adjustment 2 (NEFMC, 2014) set specifications for FY 2014 and FY 2015 also following the Amendment 3 ACL methodology. It also incorporated final discard mortality rate estimates for little (22%), winter (9%), smooth (60%), and thorny (23%) skate for trawl gear. Framework Adjustment 2 also modified the VTR and dealer reporting codes for the skate wing and bait fisheries.

Framework Adjustment 3 (NEFMC, 2016) set specifications for FY 2016 and FY2017 consistent with Amendment 3. It also set wing and bait skate possession limits and a seasonal management structure for the wing fishery.

4.0 Alternatives Under Consideration

4.1 Modifications to Bait Skate Fishery Effort Controls

4.1.1 Option 1: No Action

This alternative would maintain the existing possession limit, incidental possession limit, and trigger for the bait skate fishery, as outlined below.

This alternative would maintain the skate bait possession limit at 25,000 lbs. Vessels that obtain a Skate Bait Letter of Authorization from the NMFS Regional Office would be able to retain up to 25,000 lbs. of whole skates provided that they comply with related rules and size limits.

This alternative would not modify the structure of the in-season adjustment of skate bait possession limits, which implements the incidental skate bait possession limit when 90% of the seasonal quotas have been reached in Seasons 1 or 2, or when 90% of the annual skate bait TAL has been landed, unless the annual TAL was not expected to be achieved. The incidental skate bait possession limit is the whole weight equivalent of the skate wing trip limit.

Rationale: The No Action alternative would not modify existing skate bait possession limits. Based on recent trends in skate bait landings and the existing bait TAL, this may result in a higher probability of the incidental possession limit being implemented in order to prevent the TAL from being exceeded.

4.1.2 Option 2: Revised Skate Bait Possession Limit and Closure

This alternative would reduce the Season 3 skate bait possession limit from 25,000 lb to **12,000** lb. Vessels that obtain a Skate Bait Letter of Authorization from the NMFS Regional Office would be able to retain up to 25,000 lb in Seasons 1 and 2 and 12,000 lb of whole skates in Season 3 provided that they comply with related rules and size limits.

This alternative would not modify the structure of the in-season adjustment of skate bait possession limits, which implements the incidental skate bait possession limit when 90% of the seasonal quotas have been reached in Seasons 1 or 2, or when 90% of the annual skate bait TAL has been landed, unless the annual TAL was not expected to be achieved. The incidental skate bait possession limit is the whole weight equivalent of the skate wing trip limit.

This alternative would also close the skate bait fishery once 100% of the TAL was projected to be achieved. All skate bait letters of authorization (LOAs) would be considered void and all vessels would be prohibited from landing skates in bait form. All skate landing would be attributed to the skate wing fishery.

Rationale: In FY2016, the bait skate fishery was subject to an effective closure when the incidental possession limit was implemented. A lower possession limit in the final trimester of the fishing year would allow the fishery to remain operational longer. An analysis of fishing patterns in recent fishing years estimated 12,000 lb to be an appropriate possession limit for the fishery to likely remain open for the entire fishing year. The possession limit would minimize the likelihood of the bait skate TAL being exceeded, while allowing the fishery to be prosecuted. The closure of the bait fishery at 100% of the TAL would serve as a hard backstop. It would allow fishing to occur while also preventing the TAL from being exceeded.

4.1.3 Option 3: Revised Skate Bait Trigger and Incidental Possession Limit, and Closure

This alternative would maintain the skate bait possession limit at 25,000 lbs. Vessels that obtain a Skate Bait Letter of Authorization from the NMFS Regional Office would be able to retain up to 25,000 lbs. of whole skates provided that they comply with related rules and size limits.

This alternative would modify the structure of the in-season adjustment of skate bait possession limits. The incidental skate bait possession limit would be implemented when 75-80% of the seasonal quotas have been reached in Seasons 1 or 2, or when 75-80% of the annual skate bait TAL has been landed, unless the annual TAL was not expected to be achieved.

The incidental skate bait possession limit would be set at 9,307 lb, the whole weight equivalent of the skate wing possession limit.

This alternative would also close the skate bait fishery once 100% of the TAL was projected to be achieved.

Rationale: In FY2016, the bait skate fishery was subject to an effective closure when the incidental possession limit was implemented. It is difficult to forecast fishing behavior, maintaining a higher possession limit would increase the likelihood of the TAL being achieved. The reduction of the trigger would help limit the risk of the higher possession limit, by allowing the incidental possession limit to be implemented earlier in the fishing year, if needed. The incidental possession limit was selected because it would allow the bait fishery to continue at a lower effort level and not result in a potentially premature, effective closure. The closure of the bait fishery at 100% of the TAL would serve as a hard backstop, which is necessary because this option decouples the skate wing and bait incidental possession limits. It would allow fishing to occur at higher possession limits while also preventing the TAL from being exceeded.

5.0 Considered but Rejected Alternatives

No management issues arose during the development of this specifications package that were not adopted as alternatives by the Council.

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6.0 AFFECTED ENVIRONMENT (SAFE report /EA)

This document serves two purposes: an update of the Stock Assessment and Fishery Evaluation Report (SAFE) and a Description of the Affected Environment (Section 7) for the Environmental Assessment (EA) for the 2012-2013. Since the document serves as Section 7 of the EA in Amendment 3, it is numbered beginning with Section 7 in this stand-alone SAFE Report to reduce confusion. There are therefore no Sections 1-6 in the stand-alone SAFE Report.

This section is intended to provide background information for assessing the impacts, to the extent possible, of the proposed management measures on related physical, biological, and human environments. It includes a description of the stocks and the physical environment of the fishery as well as life history information, habitat requirements, and stock assessments for relevant stocks and a discussion of additional biological elements such as endangered species and marine mammals. This descriptive section also describes the human component of the ecosystem, including socioeconomic and cultural aspects of the commercial and recreational fisheries and the impacts of other human activities on the fisheries in question. Much of the information contained in this section is a compilation of information used to make choices from a range of alternatives during the development of the proposed management action.

This Stock Assessment and Fishery Evaluation (SAFE) Report was prepared by the New England Fishery Management Council's Skate Plan Development Team (PDT). It presents available biological, physical, and socioeconomic information for the Northeast's region skate complex and its associated fisheries. It also serves as the Affected Environment description for the Environmental Assessment associated with FW 2.

Table 1 presents the seven species in the northeast region's skate complex, including each species common name(s), scientific name, size at maturity (total length, TL), and general distribution.

6.1 Biological Environment

6.1.1 Species Distribution

In general, barndoor skate are found along the deeper portions of the Southern New England continental shelf and the southern portion of Georges Bank, extending into Canadian waters. They are also caught by the survey as far south as NJ during the spring. Clearnose skates are caught by the NMFS surveys in shallower water along the Mid-Atlantic coastline, but are known to extend into unsurveyed shallower areas and into the estuaries, particularly in Chesapeake and Delaware Bays. These inshore areas are surveyed by state surveys and the Mid-Atlantic NEAMap Survey (http://www.vims.edu/research/departments/fisheries/programs/multispecies_fisheries_research/neamap/index.php).

Little skate are found along the Mid-Atlantic, Southern New England, and Gulf of Maine coastline, in shallower waters than barndoor, rosette, smooth, thorny, and winter skates. Rosette, smooth, and thorny are typically deep-water species. The survey catches rosette skate along the shelf edge in the Mid-Atlantic region, while smooth and thorny are found in the Gulf of Maine and along the northern edge of Georges Bank. Winter skate are found on the continental shelf of the Mid-Atlantic and Southern New England regions, as well as Georges Bank and into Canadian waters. Winter skate are typically caught in deeper waters than little skate, but partially overlap the distributions of little and barndoor skates.

6.1.2 Stock status

The stock status relies entirely on the annual NMFS trawl survey. The fishing mortality reference points are based on changes in survey biomass indices. If the three-year moving average of the survey biomass index for a skate species declines by more than the average CV of the survey time series, then fishing mortality is assumed to be greater than F_{MSY} and it is concluded that overfishing is occurring for that species (NEFSC 2007a). The average CVs of the indices are given by species in Table 2. Except for little skates, the abundance and biomass trends are best represented by the fall survey, which has been updated through 2014 (Table 2). Little skate abundance and biomass trends are best represented by the spring survey, which has been updated through 2015 (Table 2). Details about long term trends in abundance and biomass are given in the SAW 44 Report (NEFSC 2007a) and in the Amendment 3 FEIS (Section 7.1.2).

Based on survey data updated through fall 2014/spring 2015, only thorny skate remained in an overfished condition (Table 2).

For barndoor skate, the 2012-2014 NEFSC average of the fall survey biomass index of 1.41 kg/tow was above the biomass threshold reference point; the species is not overfished but is not yet rebuilt (Table 2). The most recent 3 year moving average is above the 2011-2013 index by 16.5%; overfishing is not occurring.

For clearnose skate, the 2012-2014 NEFSC average of the fall survey biomass index of 0.77 kg/tow was above the biomass threshold reference point and the biomass target; the species is not overfished (Table 2). The most recent 3 year moving average is below the 2011-2013 index by 23.3%; overfishing is not occurring.

For little skate, the 2013-2015 NEFSC average of the spring survey biomass index of 6.75 kg/tow was above the biomass threshold reference point and the biomass target; the species is not overfished (Table 2). The most recent 3 year moving average is below the 2012-2014 index by 3.4%; overfishing is not occurring.

For rosette skate, the 2012-2014 NEFSC average of the fall survey biomass index of 0.048 kg/tow was above the biomass threshold reference point; the species is not overfished (Table 2). The most recent 3 year moving average is above the 2011-2013 index by 14.6%; overfishing is not occurring.

For smooth skate, the 2012-2014 NEFSC average of the fall survey biomass index of 0.19 kg/tow was above the biomass threshold reference point; the species is not overfished but not yet rebuilt (Table 2). The most recent 3 year moving average is below the 2011-2013 index by 12.5%; overfishing is not occurring.

For thorny skate, the 2012-2014 NEFSC average of the fall survey biomass index of 0.13 kg/tow was well below the biomass threshold reference point; the species is overfished (Table 2). The most recent 3 year moving average is above the 2011-2013 index by 8.7%; overfishing is not occurring.

For winter skate, the 2012-2014 NEFSC average of the fall survey biomass index of 5.06 kg/tow was above the biomass threshold reference point; the species is not overfished (Table 2). The most recent 3 year moving average is above the 2011-2013 index by 2%; overfishing is not occurring.

Table 2 - Summary by species of recent survey indices, survey strata used and biomass reference points.

	Barndoor	Clearnose	Little	Rosette	Smooth	Thorny	Winter
Survey (kg/tow) Time Series Basis Strata Set	Autumn 1963-1966 Offshore 1-3-, 34-40	Autumn 1975-2007 Offshore 61-76, Inshore 17, 20, 23, 26, 29, 32, 35, 38, 41, 44	Spring 1982-2008 Offshore 1-30, 34-40, 61-76, Inshore 2,5,8,11,14,17,20, 23,26,29,32,35,38, 41,44-46,56,59-61,64-66	Autumn 1967-2007 Offshore 61-76	Autumn 1963-2007 Offshore 1-30, 34-40	Autumn 1963-2007 Offshore 1-30, 34-40	Autumn 1967-2007 Offshore 1-30, 34-40, 61-76
2006	1.17	0.48	3.33	0.059	0.21	0.74	2.52
2007	0.76	0.90	4.01	0.068	0.09	0.32	3.74
2008	1.11	1.23	6.29	0.029	0.10	0.20	9.62
2009	1.13	0.89	6.62	0.064	0.21	0.25	11.33
2010	1.10	0.68	10.63	0.028	0.18	0.28	8.09
2011	1.02	1.32	6.88	0.034	0.30	0.18	6.65
2012	1.54	0.93	7.54	0.040	0.21	0.08	5.29
2013	1.07	0.77	6.90	0.056	0.14	0.11	2.95
2014	1.62	0.61	6.54[a]	0.053	0.22	0.21	6.95
2015			6.82				
2008-2010 3-yr average	1.11	0.93	7.85	0.040	0.16	0.24	9.68
2009-2011 3-yr average	1.08	0.96	8.04	0.042	0.23	0.24	8.69
2010-2012 3-yr average	1.22	0.97	8.35	0.033	0.23	0.18	6.68
2011-2013 3-yr average	1.21	1.01	7.11	0.042	0.22	0.12	4.96
2012-2013 3-yr average	1.41	0.77	6.99[a]	0.048	0.19	0.13	5.06
2013-2015 3-yr average			6.75[a]				
Percent change 2010-12 compared to 2009-11	+12.6	+1.3	+3.8	-21.7	+0.8	-24.1	-23.2
Percent change 2011-13 compared to 2010-12	-1.0	+3.1	-14.9	+28.8	-5.0	-31.9	-25.7
Percent change 2012-14 compared to 2011-13	+16.5	-23.3	-1.6	+14.6	-12.5	+8.7	+2.0
Percent change 2013-15 compared to 2012-14			-3.4				
Percent change for overfishing status determination in FMP	-30	-40	-20	-60	-30	-20	-20
Biomass Target	1.57	0.66	6.15	0.048	0.27	4.13	5.66
Biomass Threshold	0.78	0.33	3.07	0.024	0.13	2.06	2.83
Current Status	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring	Overfished Overfishing is Not Occurring	Not Overfished Overfishing is Not Occurring

[a] No survey tows completed south of Delaware in spring 2014. Values for 2014 were adjusted for missing strata (i.e., Offshore 61-68, Inshore 32,35, 38, 41, 44) but may not be fully comparable to other surveys which sampled all strata.

6.1.3 Biological and Life History Characteristics

The Essential Fish Habitat Source Documents prepared by the Northeast Fisheries Science Center (NEFSC) of the National Marine Fisheries Service for each of the seven skate species provide most available biological and habitat information on skates. Any updated information will be provided below. These technical documents are available at http://www.nefsc.noaa.gov/nefsc/habitat/efh/ and contain the following information for each skate species in the northeast complex:

- Life history, including a description of the eggs and reproductive habits
- Average size, maximum size and size at maturity
- Feeding habits
- Predators and species associations
- Geographical distribution for each life history stage
- Habitat characteristics for each life history stage
- Status of the stock (in general terms, based on the Massachusetts inshore and NEFSC trawl surveys)
- A description of research needs for the stock
- Graphical representations of stock abundance from NEFSC trawl survey and Massachusetts inshore trawl survey data
- Graphical representations of percent occurrence of prey from NEFSC trawl survey data

Please refer to the source documents (http://www.nefsc.noaa.gov/nefsc/habitat/efh/) for more detailed information on the above topics. All additional biological information is presented below.

The seven species of the northeast skate complex follow a similar life history strategy but differ in their biological characteristics. This section describes any information made available after the publication of the EFH documents for the two skate species most frequently encountered in the skate bait fishery. Framework 3 contains detailed information for the seven skate species (NEFMC, 2016). A detailed summary of the biological and life history characteristics was included in the FEIS for Amendment 3 (NEFMC 2009).

Little Skate

Frisk and Miller (2006) examined vertebral samples of little skate to identify any latitudinal patterns in the northwestern Atlantic. Maximum observed age was 12.5 years. The oldest aged little skate from the mid-Atlantic was 11 years. The oldest individuals from the Gulf of Maine and Southern New England – Georges Bank were 11 years or older. Von Bertalanffy curves were fit for the northwestern Atlantic ($k = 0.19$, $L_\infty = 56.1$ cm TL, $t_o = -1.77$, $p < 0.0001$, $n = 236$) and for individual regions (GOM: $k = 0.18$, $L_\infty = 59.31$ cm TL, $t_o = -1.15$, $p < 0.0001$; SNE-GB: $k = 0.20$, $L_\infty = 54.34$ cm TL, $t_o = -1.22$, $p < 0.0001$; mid-Atlantic: $k = 0.22$, $L_\infty = 53.26$ cm, $t_o = -1.04$, $p < 0.0001$).

Sosebee (2005) used body morphometry to determine size at maturity (male – 39 cm TL; females – 40 – 48 cm TL) on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras. Fecundity was estimated to be 30 eggs per year (Packer et al. 2003 c). Palm et al. (2011) estimated an average fecundity of 46 eggs per captive female over the course of one year; the highest number of eggs was laid in June; the minimum occurred in March. Egg viability was 74.1%. Size at hatching varied with month; spring hatchlings were larger than other times of the year. Little skate are capable of reproducing year round but no reproductive peaks were observed (Williams et al. 2013).

Cicia et al. (2012) showed temperature influences survivability in little skate when exposed to air; little skates in summer exhibited higher mortality rates for air exposure times compared to winter.

Little skates are benthivorous which was reflected by the large portion of the diet that benthic macrofauna (polychaetes and amphipods) and benthic megafauna (crabs and bivalves) comprised. Overall, the diet of little skates was dominated by benthic invertebrates. Up to 8,000 mt of a particular prey item can be removed by this skate in any given year. This diet may overlap but not necessarily compete directly with flounders.

The amount of food consumed was related to the size of the skate. Small skates (<= 30 cm TL) consumed approximately 500 g per year of prey items, while large skates (>30 cm TL) consumed approximately 2.5 kg per year (Link and Sosebee, 2008). The total consumptive demand for this species is estimated to range between 100,000 and 350,000 mt per year, with total consumption dominated by mature skates.

Winter Skate

Sulikowski et al. (2003) aged winter skate in western Gulf of Maine and determined the oldest age estimated to be 18 and 19 years for females and males, respectively (corresponding length – 94.0 cm and 93.2 cm). Verification of the periodicity of the vertebral bands was determined to be annual with the opaque band being formed in June - July using marginal increment analysis. Von Bertalanffy Growth parameters for male winter skates were calculated to be $k = 0.074$, $L_\infty = 121.8$ cm TL, $t_o = -1.418$; calculated estimates for female winter skates were: $k = 0.059$, $L_\infty = 137.4$ cm, $t_o = -1.609$ (Sulikowski et al. 2003). Growth curves fit to data from this study were found to overestimate maximum total length compared to observed lengths. This may result from a low representation of maximum sized individuals. The maximum reported length is 150 cm TL. Maximum sizes examined in the Gulf of Maine were 93.2 cm total length and 94.0 cm total length for males and females, respectively (Sulikowski et al. 2003).

Frisk and Miller (2006) examined vertebral samples of winter skate from the northwestern Atlantic. Maximum observed age was 20.5 years (a male winter skate of 74 cm TL); the oldest female was estimated to be 19.5 years (76 cm TL). Von Bertalanffy curves were fit for the northwestern Atlantic ($k = 0.07$, $L_\infty = 122.1$ cm TL, $t_o = -2.07$, $p < 0.0001$, $n = 229$) and for the GOM region ($k = 0.064$, $L_\infty = 131.40$ cm TL, $t_o = -1.53$).

In the southern Gulf of St Lawrence, winter skate reached a maximum size of 68 cm total length; males and females were mature between 40 and 41 cm TL or around 5 years (Kelly and Hanson, 2013).

Winter skates are capable of reproducing year-round but exhibit one peak in the annual cycle (Sulikowski et al. 2004). Peak reproductive activity occurs during June – August. Size at maturity has been shown to vary with latitude. Size at maturity is 76cm for females and 73 cm for males (Sulikowski et al. 2005b). Sosebee (2005) used body morphometry to determine size at maturity to be approximately 65 - 73 cm TL for females and 49 - 60 cm TL for males on samples obtained from the NEFSC trawl survey ranging from Gulf of Maine to Cape Hatteras. Fecundity in the southern Gulf of St Lawrence was estimated to be low (Kelly and Hanson, 2013).

Swain et al. (2013) modeled the mortality rate of small and large winter skate and showed decreased mortality for small skate and an increase for larger skates (adults only) between the 1970s and 2000s in 4T and 4VW areas. The changes in mortality rates differed with area examined; an increase in natural mortality was hypothesized in the 4T and 4VW areas for large skates. Benoit et al. (2011) attribute the increase in natural mortality on winter skate to be due to grey seal predation.

Frisk et al (2010) investigated the increase in winter skate abundance in the 1980s and concluded that it was likely due to an increase in recruitment combined with adult migration. A stock assessment model was developed for the stock, however, the five parameter base model did not fit the observed data well.

Winter skate tend to inhabit warmer waters, when possible (Kelly and Hanson, 2013) and may migrate to deeper waters in winter to avoid colder temperatures in the southern Gulf of St. Laurence.

Winter skates are benthivorous and piscivorous, a large portion of the diet formed by forage fishes. Overall, the diet of winter skates was dominated by forage fish, squid and benthic macrofauna. Up to 80,000 mt of a particular prey item can be removed by this skate in any given year. The amount of food consumed was related to the size of the skate. Medium sized (31-60 cm TL) skates consumed approximately 2 kg per year of prey items, while large skates (>60 cm TL) consumed approximately 9 kg per year (Link and Sosebee, 2008). The total consumptive demand for this species is estimated to range between 20,000 and 180,000 mt per year. In the southern Gulf of St Lawrence, winter skate less than 40 cm TL ate mainly shrimp and gammarid amphipods; larger skates ate more fishes and Atlantic rock crab (Kelly and Hanson, 2013).

6.1.4 Discards and discard mortality

Since skate discards are high across many fisheries, the estimates of total skate catch are sensitive to the discard mortality rate assumption, and have direct implications for allowable landings in the skate fisheries. Data on immediate- and delayed (i.e. post-release) mortality rates of discarded skates and rays is extremely limited. Only six published studies have estimated discard mortality rates in these species; for an outline of these studies see the literature review in the 2012-2013 specifications package (NEFMC 2012). Benoit (2006) estimated acute discard mortality rates of winter skates caught in Canadian bottom trawl surveys, the SSC in 2009 decided to use a 50% discard mortality rate assumption for all skates and gears for the purposes of setting the Skate ACL, based on this paper.

Since the Council adopted a 50% discard mortality assumption for setting the ACL in Amendment 3, based on a literature review by the Skate PDT and advice from the Council's SSC, more relevant research data and analysis has been collected on skate mortality by scallop dredge vessels. When Amendment 3 was developed, this discard mortality assumption was largely derived from published studies, most of which were for species and locations different from those covered in the FMP because no other data existed.

The 2012 specifications package revised the assumed discard mortality rate for little and winter skate based on an experiment in progress examining discard mortality for these species in trawl gear. While the data were preliminary, the Council's SSC reviewed the methodology and the preliminary results of the new discard mortality research and determined the new discard mortality values for little skate (0.20) and winter skate (0.12) to be the best scientific information available compared to the literature review; the new values were applied to little and winter skates captured by trawls and discarded under normal commercial practices. These new data were applied to estimate total discard mortality by gear and species and the last three years of data were used to project a 36.3% dead discard mortality rate (dead discards divided by total catch) for the 2012-2013 specification cycle.

Mandelman et al. (2013) examined the immediate and short-term discard mortality rate of little, smooth, thorny and winter skates in the Gulf of Maine. Tow durations lasted 15-20 min (control), 2 h (moderate) and 4 h (extended). The PDT recommended using the pooled moderate and extended tow times as they most closely reflected commercial practices. Full details of the study can be found in the paper by Mandelman et al. (2013) and were presented to the SSC. The SSC approved revising the discard mortality rate estimates for little (22%), smooth (60%), thorny (23%) and winter (9%) skates for otter trawl, consistent with their previous recommendation to use the preliminary estimates from this study. The SSC did not support using this study to revise the assumed 50% discard mortality rate for gillnet gear.

Knotek (2015) examined the immediate and short-term discard mortality rate of little, winter, and barndoor skates in scallop dredge gear by evaluating reflex impairment and injury indexes. A total of 295 tows were conducted on 6 research cruises; tow duration ranged from 10-90 minutes. On deck exposure time ranged from 0-30 minutes. The PDT recommended using the discard mortality rate estimates for little and winter skate only, as the researchers considered the sample size was insufficient for an accurate estimate for barndoor skate. The SSC approved revising the discard mortality rate estimates for little (48%) and winter skate (34%) for scallop dredge gear based on this study.

6.1.5 Estimated discards by gear

Another way to evaluate the potential interactions between skate fishing and barndoor, smooth, and thorny skate distributions is to examine estimated discards. Discards were estimated through calendar year 2014 by gear (Table 3). Discards are estimated for a calendar year, rather than the fishing year, because they rely on the NMFS area allocation landings tables to expand observed discard/kept-all ratios to total based on landings by gear, area and quarter. The observed D/K-all ratios were derived from the Sea Sampling Observer and the At Sea Monitoring programs and included both sector and non-sector vessels, but were not stratified on that basis. The projected discard rate is calculated using a three-year average of the discards of skates/landings of all species.

Total estimated discards for 2014 were 42,732 mt (Table 3). Discards increase by just 0.04% over the 2013 estimates. The assumed discard rate for 2014 is 43%. Projected dead discards are estimated to be 10,095 mt. Total live and dead discards for the Northeast Skate Complex for all gear types are contrasted in Table 4. Based upon SSC recommendations in 2008, an assumed discard mortality rate of 50% is applied for all gears and species, except for otter trawl gear, which has been updated based on Mandelman et al. 2013, and scallop dredge gear, which has been updated based on Knotek (2015).

Table 3 – Estimated discards (mt) of skates (all species) by gear type, 1968 - 2014

Year	Longline	Otter Trawl	Sink Gillnet	Scallop Dredge	Total
1968	597	88739	46	7930	97313
1969	797	83466	38	4966	89268
1970	779	70101	29	3969	74878
1971	1175	55085	29	4059	60348
1972	1230	51538	45	4175	56988
1973	1320	54758	46	3872	59996
1974	1330	54082	82	4129	59624
1975	1421	42753	87	6439	50699
1976	888	42854	135	10921	54798
1977	684	48657	216	15206	64764
1978	1317	58447	255	20025	80045
1979	1623	66408	223	20148	88402
1980	1347	69345	285	19096	90072
1981	799	69384	350	19850	90383
1982	601	81269	175	17869	99913
1983	578	82378	185	18725	101867
1984	462	79784	217	17031	97494
1985	458	64137	196	14680	79471
1986	570	63677	257	17565	82069
1987	914	60170	225	28442	89752
1988	873	58234	252	30640	89999
1989	747	58017	140	35986	94890
1990	600	86464	421	38151	125636
1991	1497	53025	212	34358	89091
1992	2751	33009	376	32646	68783
1993	97	29822	321	22037	52277
1994	48	81814	492	11155	93509
1995	58	34704	793	28578	64133
1996	55	41433	550	19828	61866
1997	60	13455	484	17396	31394
1998	59	46867	469	15263	62658
1999	47	13440	847	15149	29483
2000	40	23962	973	9918	34893
2001	42	29584	608	7016	37250
2002	128	21840	2856	13785	38609
2003	48	35985	965	15982	52981
2004	20	36113	948	9310	46390

2005	145	33385	1596	10691	45817
2006	212	22912	1222	10663	35009
2007	73	31527	1812	13019	46432
2008	176	23373	2028	10012	35589
2009	307	25610	1988	7290	35196
2010	478	21302	2402	13366	37548
2011	147	26528	3181	9640	39496
2012	100	24483	2596	9097	36277
2013	720	31417	1896	8684	42716
2014	26	27135	2556	13014	42732

Table 4 - Total Live and Dead Discards (mt) of Skates (all species) for all gear types from 1968 - 2014

Year	Live Discards	Dead Discards
1968	97,313	21,839
1969	89,268	18,543
1970	74,878	16,009
1971	60,348	13,862
1972	56,988	12,594
1973	59,996	13,318
1974	59,624	13,250
1975	50,699	11,967
1976	54,798	14,563
1977	64,764	16,948
1978	80,045	21,207
1979	88,402	22,709
1980	90,072	21,795
1981	90,383	21,519
1982	99,913	22,247
1983	101,867	22,794
1984	97,494	21,897
1985	79,471	17,649
1986	82,069	20,236
1987	89,752	25,446
1988	89,999	25,431
1989	94,890	28,444
1990	125,636	35,770
1991	89,091	31,543
1992	68,783	25,250
1993	52,277	16,968
1994	93,509	23,223
1995	64,133	21,880
1996	61,866	19,365
1997	31,394	11,417
1998	62,658	16,745
1999	29,483	10,655
2000	34,893	10,425
2001	37,250	9,621
2002	38,609	12,603
2003	52,981	15,474
2004	46,390	11,828
2005	45,817	13,460
2006	35,009	11,035
2007	46,432	14,207
2008	35,589	11,495
2009	35,196	9,327
2010	37,548	12,019
2011	39,496	14,161
2012	36,277	10,857
2013	42716	12538
2014	42732	13556

6.1.6 Evaluation of Fishing Mortality and Stock Abundance

Benchmark assessment results from SAW 44 are given in NEFSC (2007a; 2007b). Because the analytic models that were attempted did not produce reliable results, the status of skate overfishing is determined based on a rate of change in the three year moving average for survey biomass. These thresholds vary by species due to normal inter-annual survey variability. Details about the overfishing reference points and how they were chosen are given in NEFSC (2000).

The latest results for 2014 (2015 spring survey for little skate) are given in Table 2. At this time, overfishing occurring on thorny and winter skate species.

6.1.7 Non-Target Species

The skate wing fishery is largely an incidental fishery; fishing effort is expended targeting more profitable species managed under separate FMPs, e.g. NE multispecies and monkfish FMPs. These fisheries have ACLs, effort controls (DAS), possession limits, gear restrictions, and other measures that constrain overall effort on skates. For a full description of the fishing impacts on trips targeting NE multispecies and monkfish please refer to Framework 55 to the NE Multispecies FMP and Framework 9 of the Monkfish FMP (www.nefmc.org). A small number of trips could be described as targeting skates; bycatch on these trips are limited. Monkfish and dogfish comprise the majority of this bycatch and are described below.

NE Multispecies

The Northeast Multispecies FMP manages twenty stocks under a dual management system which breaks the fishery into two components: sectors and the common pool. For stocks that permit fishing, each sector is allotted a share of the each stock’s ACL that consists of the sum of individual sector member’s potential sector contribution based on their annual catch entitlements. Sector allocations are strictly controlled as hard total allowable catch limits and retention is required for all stocks managed under an ACL. Overages are subject to accountability measures including payback from the sector’s allocation for the following year. Common pool vessels are allocated a number of days at sea (DAS) and their effort further is controlled by a variety of measures including trip limits, closed areas, minimum fish size and gear restrictions varying between stocks. Only a very small portion of the ACL is allotted to the common pool. For more detail regarding control of fishing effort on NE Multispecies, please see Framework 55 of the NE Multispecies FMP.

6.1.7.1 Monkfish

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

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

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

- Limiting the number of vessels with access to the fishery and allocating DAS to those vessels;
- Setting trip limits for vessels fishing for monkfish; minimum fish size limits;
- Gear restrictions;
- Mandatory time out of the fishery during the spawning season; and
- A framework adjustment process.

The Monkfish FMP defines two management areas for monkfish (northern and southern), divided roughly by an east-west line bisecting Georges Bank. Monkfish in both management regions are not overfished and overfishing is not occurring. In recent years the monkfish fishery has fallen fall short of reaching its TAL, despite a healthy stock status. In 2014, limited access monkfish vessels were allocated 45.2 DAS, of which 32 could be used in the southern management area. Additional information on monkfish management can be found on the NEFMC website (http://www.nefmc.org/monk/index.html).

6.1.7.2 Dogfish

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

Population Management and Status: The NEFMC and MAFMC jointly develop the spiny dogfish FMP for federal waters. The Atlantic States Marine Fisheries Commission (ASMFC) also developed a plan for state waters. Spawning stock biomass of spiny dogfish declined rapidly in response to a directed fishery during the 1990's. NFMS initially implemented management measures for spiny dogfish in 2001. These measures have been effective in reducing landings and fishing mortality. NMFS declared the spiny dogfish stock rebuilt for the purposes of U.S. management in May 2010.Based upon the 2015 updated stock assessment performed by the Northeast Fisheries Science Center, the spiny dogfish stock is not presently overfished and overfishing is not occurring. The spiny dogfish fishery is managed with an ACL, commercial quota, and possession limits (currently 4,000 lb per trip). Similar to skates, there is a large degree of overlap between spiny dogfish and NE Multispecies trips where dogfish are landed incidentally to groundfish.

6.2 Protected Resources

6.2.1 Species Present in the Area

Numerous protected species inhabit the environment within the monkfish FMP management unit (Table 5). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Table 5 - Species protected under the ESA and/or MMPA that may occur in the affected environment of the monkfish fishery. Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks.

Species	Status[2]	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***Yes***
Humpback whale, West Indies DPS (Megaptera novaeangliae)[3]	***Protected (MMPA)***	***Yes***
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter microcephalus)	***Endangered***	***No***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (*Globicephala spp.*)[4]	Protected (MMPA)	Yes
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)[5]	Protected (MMPA)	Yes
Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[6]	***Protected (MMPA)***	***Yes***
Harbor porpoise (Phocoena phocoena)	***Protected (MMPA)***	***Yes***
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)[7]	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk (*Brosme brosme)*	Candidate	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes

Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	Yes
Critical Habitat		
North Atlantic Right Whale[8]	ESA (Protected)	No
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA (Protected)	No

Notes:
[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3 of the MMPA of 1972).
[2] The status of the species is defined by whether the species is listed under the ESA as endangered (species are at risk of extinction) or threatened (species at risk of endangerment), or protected under the MMPA. Note, marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species in which ESA listing may be warranted.
[3] On September 8, 2016, a final rule was issued revising the ESA listing status of humpback whales (81 FR 62259). Fourteen DPSs were designated: one as threatened, four as endangered, and nine as not warranting listing. The DPS found in U.S. Atlantic waters, the West Indies DPS, is delisted under the ESA; however, this DPS is still protected under the MMPA.
[4] There are two species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.
[5] Prior to 2008, this species was called "common dolphin."
[6] This includes the following Stocks of Bottlenose Dolphins: Western North Atlantic Offshore, Northern Migratory Coastal (strategic stock), and Southern Migratory Coastal (strategic stock).
[7] On April 6, 2016, a final rule was issued removing the current range-wide listing of green sea turtles and, in its place, listing eight green sea turtle DPSs as threatened and three DPSs as endangered (81 FR 20057). The green sea turtle DPS located in the Northwest Atlantic is the North Atlantic DPS of green sea turtles; this DPS is considered threatened under the ESA.
[8] Originally designated June 3, 1994 (59 FR 28805); Expanded on January 27, 2016 (81 FR 4837).

Cusk are a NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. If a species is proposed for listing the conference provisions under Section 7 of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result this species will not be discussed further in this and the following sections; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed action. Additional information on cusk can be found at http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm.

6.2.2 Species and Critical Habitat Not Likely Affected by the Proposed Action

Based on available information, it has been determined that this action is not likely to affect multiple ESA listed and/or marine mammal protected species or any designated critical habitat (see Table 5). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or there have never been documented interactions between the species and the primary gear type (i.e., gillnet and bottom trawl) used to prosecute the monkfish fishery (see Waring *et al*. 2014a, 2015, 2016; NMFS NEFSC FSB 2015, 2016; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; NMFS 2013). In the case of critical habitat, this determination has been made because the action will not affect the essential physical and biological features of North Atlantic right whale or loggerhead (NWA DPS) critical habitat and therefore, will not result in the destruction or adverse modification of any species critical habitat (NMFS 2013; NMFS 2014a; NMFS 2015a,b).

6.2.3 Species Potentially Affected by the Proposed Action

Table 5 provides a list of sea turtle, marine mammal, and fish species present in the affected environment of the monkfish fishery, and that may also be affected by the operation of this fishery. Of primary concern is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species. To understand the potential risk of an interaction, it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) data and observed records of protected species interaction with particular fishing gear types. Information on species occurrence in the affected environment of the monkfish fishery is provided in this section, while information on protected species interactions with specific fishery gear is provided in Section 6.2.4.

6.2.3.1 Sea Turtles

Green (North Atlantic DPS), Kemp's ridley, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtle are the four ESA listed species of sea turtles that occur in the area of operation for the 13 GAR fisheries (see Table 5). Three of the four species are considered hard-shelled turtles (i.e., green, loggerhead, and Kemp's ridley). Additional background information on the range-wide status of the other four species, as well as a description and life history of the species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; Conant *et al*. 2009; NMFS and USFWS 2013; NMFS and USFWS 2015; Seminoff *et al*. 2015), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992), Kemp's ridley sea turtle (NMFS *et al.* 2011), and green sea turtle (NMFS and USFWS 1991).

Hard-shelled sea turtles

Distribution

In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida (FL) to Cape Cod, Massachusetts (MA), although their presence varies with the seasons due to changes in water temperature (Shoop and Kenney 1992; Epperly *et al.* 1995a, 1995b; Braun and Epperly 1996; Mitchell *et al.* 2003; Braun-McNeill *et al.* 2008; TEWG 2009). While hard-shelled turtles are most common south of Cape Cod, MA, they are known to occur in the Gulf of Maine (GOM). Loggerheads, the most common hard-shelled sea turtle in the GAR, feed as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7 °C to 30 °C, but water temperatures ≥11 °C are most favorable (Shoop and Kenney 1992; Epperly *et al.* 1995b). Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Mitchell *et al.* 2003; Braun-McNeill and Epperly 2002; Morreale and Standora 2005; Blumenthal *et al.* 2006; Hawkes *et al.* 2006; McClellan and Read 2007; Mansfield *et al.* 2009; Hawkes *et al.* 2011; Griffin *et al.* 2013).

Seasonality

Hard-shelled sea turtles occur year-round in waters off Cape Hatteras, North Carolina (NC) and south. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Epperly *et al.* 1995a, 1995b, 1995c; Braun-McNeill and Epperly 2002; Morreale and Standora 2005; Griffin *et al.* 2013), occurring in Virginia (VA) foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop and Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the GOM by September, but some remain in Mid-Atlantic and Northeast areas until late fall. By December, sea turtles have migrated south to waters offshore of NC, particularly south of Cape Hatteras, and further south (Shoop and Kenney 1992; Epperly *et al.* 1995b; Hawkes *et al.* 2011; Griffin *et al.* 2013).

Leatherback sea turtles

Leatherback sea turtles also engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992; James *et al*. 2005; James *et al*. 2006; Dodge *et al*. 2014). Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf (James *et al*. 2005; Eckert *et al*. 2006; Murphy *et al*. 2006; Dodge *et al*. 2014). They have a greater tolerance for colder water than hard-shelled sea turtles (NMFS and USFWS 2013). They are also found in more northern waters later in the year, with most leaving the Northwest Atlantic shelves by mid-November (James *et al*. 2005; James *et al*. 2006; Dodge *et al*. 2014).

6.2.3.2 Marine Mammals

6.2.3.2.1 Large Whales

As provided in Table 5, as North Atlantic right, humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean, these species will occur in the affected environment of the monkfish fishery. In general, these species follow an annual pattern of migration between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41°N; Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016; NMFS 1991, 2005, 2010, 2011, 2012). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016; Khan *et al*. 2009, 2010, 2011, 2012; Brown *et al*. 2002; NOAA 2008; Cole *et al*. 2013; Clapham *et al*. 1993; Swingle *et al*. 1993; Vu *et al*. 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. As a result, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Mayo and Marx 1990; Kenney *et al*. 1986, 1995; Baumgartner *et al*. 2003; Baumgartner and Mate 2003; Payne *et al*.1986, 1990; Brown *et al.* 2002; Kenney and Hartley 2001; Schilling *et al.* 1992). For additional information on the biology, status, and range wide distribution of each whale species please refer to: Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016; NMFS 1991, 2005, 2010, 2011, 2012.

To further assist in understanding how the skate fishery may overlaps in time and space with the occurrence of large whales, a general overview on species occurrence and distribution in the area of operation for the skate fishery is provided in the following table (Table 6).

Table 6 - Large whale occurrence in the area of operation for the skate fishery.

Species	Prevalence and Approximate Months of Occurrence
North Atlantic Right Whale	• Distributed throughout all continental shelf waters from the GOM to the South Atlantic Bight (SAB) throughout the year; however, increasing evidence of year round presence in the GOM. • New England waters (GOM and GB regions) = **Foraging Grounds (January through October)**. Seasonally important foraging grounds include, but not limited to: ›Cape Cod Bay (January-April); › Great South Channel (April-June); › western Gulf of Maine (April-May, and July-October); › Jordan Basin (August-October); › Wilkinson Basin (April-July); and › northern edge of GB (May-July); • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern calving grounds. • Increasing evidence of wintering areas (approximately November – January) in: › Cape Cod Bay; › Jeffreys and Cashes Ledges; › Jordan Basin; and › Massachusetts Bay (e.g., Stellwagen Bank).
Humpback	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • New England waters (GOM and GB regions) = **Foraging Grounds** (March-November). • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern (West Indies) calving grounds. • Increasing evidence of whales remaining in mid- and high-latitudes throughout the winter. Specifically, increasing evidence of wintering areas (for juveniles) in Mid-Atlantic (e.g., waters in the vicinity of Chesapeake and Delaware Bays; peak presence approximately January through March) and Southeastern coastal waters.
Fin	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • Mid-Atlantic waters:

Species	Prevalence and Approximate Months of Occurrence
	› Migratory pathway to/from northern (high latitude) foraging and southern (low latitude) calving grounds; and › Possible offshore calving area (October-January). • New England (GOM and GB)/SNE waters = **Foraging Grounds** (greatest densities March-August; lower densities September-November).Important foraging grounds include: > Massachusetts Bay (esp. Stellwagen Bank); > Great South Channel; > Waters off Cape Cod (~40-50 meter contour); > GOM; > Perimeter (primarily eastern) of GB; and > Mid-shelf area off the east end of Long Island. • Evidence of wintering areas in mid-shelf areas east of New Jersey (NJ), Stellwagen Bank; and eastern perimeter of GB.
Sei	• Uncommon in shallow, inshore waters of the Mid-Atlantic (SNE included), GB, and GOM; however, occasional incursions during peak prey availability and abundance. • Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks. • Spring through summer, found in greatest densities in offshore waters of the GOM and GB; sightings concentrated along the northern, eastern (into Northeast Channel) and southwestern (in the area of Hydrographer Canyon) edge of GB.
Minke	• Widely distributed throughout continental shelf waters (<100m deep) of the Mid-Atlantic (SNE included), GOM, and GB. • Most common in the EEZ from spring through fall, with greatest abundance found in New England waters.
***Sources*: NMFS 1991, 2005, 2010, 2011, 2012; Hain *et al.* 1992; Payne *et al*. 1984; Good 2008; Pace and Merrick 2008; McLellan *et al*. 2004; Hamilton and Mayo 1990; Schevill *et al*. 1986; Watkins and Schevill 1982; Payne *et al*.1990; Winn *et al.* 1986; Kenney et al. 1986, 1995; Khan *et al*. 2009, 2010, 2011, 2012; Brown *et al*. 2002; NOAA 2008; 50 CFR 224.105; CETAP 1982; Clapham *et al*. 1993; Swingle *et al*. 1993; Vu *et al*. 2012; Baumgartner *et al*. 2011; Cole *et al*. 2013; Risch *et al*. 2013; Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016; 81 FR 4837(January 27, 2016); NMFS 2015b, Bort et al. 2015.	

6.2.3.2.2 Small Cetacean

As provided in Table 5, as Atlantic white sided dolphins, short and long finned pilot whales, Risso's dolphins, short beaked common dolphins, harbor porpoise, and several stocks of bottlenose dolphins are found throughout the year in the Northwest Atlantic Ocean, these species will occur in the affected environment of the monkfish fishery (Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016). Within this range; however, there are seasonal shifts in species distribution and abundance. To further assist in understanding how fisheries may overlap in time and space with the occurrence of small cetaceans, a general overview of species occurrence and distribution in the area of operation for the monkfish fishery is provided in the following table (Table 7). For additional information on the biology, status, and range wide distribution of each species please refer to Waring *et al*. (2014a), Waring *et al.* (2015), and Waring *et al*. (2016).

Table 7 - Small cetacean occurrence in the area of operation of the monkfish fishery

Species	Prevalence and Approximate Months of Occurrence
Atlantic White Sided Dolphin	• Distributed throughout the continental shelf waters (primarily to 100 meter isobath) of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM ; however, most common in continental shelf waters from Hudson Canyon (~ 39°N) to GB, and into the GOM. • **January-May**: low densities found from GB to Jeffreys Ledge. • **June-September**: Large densities found from GB, through the GOM. • **October-December**: intermediate densities found from southern GB to southern GOM. • South of GB (SNE and Mid-Atlantic), low densities found year round, with waters off Virginia (VA) and NC representing southern extent of species range during winter months.
Short Beaked Common Dolphin	• Regularly found throughout the continental shelf-edge-slope waters (primarily between the 100-2,000 meter isobaths) of the Mid-Atlantic, SNE, and GB (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons). • Less common south of Cape Hatteras, NC, although schools have been reported as far south as the Georgia (GA)/South Carolina (SC) border. • **January-May**: occur from waters off Cape Hatteras, NC, to GB (35° to 42°N). • **Mid-summer-autumn**: Occur primarily on GB with small numbers present in the GOM; *Peak abundance* found on GB in the autumn.

Species	Prevalence and Approximate Months of Occurrence
Risso's Dolphin	• **Spring through fall**: Distributed along the continental shelf edge from Cape Hatteras, NC, to GB. • **Winter**: distributed in the Mid-Atlantic Bight, extending into oceanic waters. • Rarely seen in the GOM; primarily a Mid-Atlantic continental shelf edge species (can be found year round).
Harbor Porpoise	• Distributed throughout the continental shelf waters of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM. • **July-September**: Concentrated in the northern GOM (waters < 150 meters); low numbers can be found on GB. • **October-December**: widely dispersed in waters from NJ to Maine (ME); seen from the coastline to deep waters (>1,800 meters). • **January-March**: intermediate densities in waters off NJ to NC; low densities found in waters off New York (NY) to GOM. • **April-June**: widely dispersed from NJ to ME; seen from the coastline to deep waters (>1,800 meters).
Bottlenose Dolphin	**Western North Atlantic Offshore Stock** • Distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic from GB to FL. • Depths of occurrence: ≥40 meters **Western North Atlantic Northern Migratory Coastal Stock** • Warm water months (e.g., July-August): distributed from the coastal waters from the shoreline to approximately the 25-meter isobaths between the Chesapeake Bay mouth and Long Island, NY. • Cold water months (e.g., January-March): stock occupies coastal waters from Cape Lookout, NC, to the NC/VA border. **Western North Atlantic Southern Migratory Coastal Stock** • **October-December**: stock occupies waters of southern NC (south of Cape Lookout) • **January-March**: stock moves as far south as northern FL.

Species	Prevalence and Approximate Months of Occurrence
	• **April-June**: stock moves north to waters of NC. • **July-August**: stock is presumed to occupy coastal waters north of Cape Lookout, NC, to the eastern shore of VA.
Pilot Whales: *Short- and Long-Finned*	**<u>Short- Finned Pilot Whales</u>** • Except for area of overlap (see below), primarily occur south of 40^{o}N (Mid-Atl and SNE waters); although low numbers have been found along the southern flank of GB, but no further than 41^{o}N. • May through December (approximately): distributed primarily near the continental shelf break of the Mid-Atlantic and SNE; individuals begin shifting to southern waters (i.e., 35^{o}N and south) beginning in the fall. **<u>Long-Finned Pilot Whales</u>** • Except for area of overlap (see below), primarily occur north of 42^{o}N. • Winter to early spring (November through April): primarily distributed along the continental shelf edge-slope of the Mid-Atlantic, SNE, and GB. • Late spring through fall (May through October): movements and distribution shift onto/within GB, the Great South Channel, and the GOM. **<u>Area of Species Overlap:</u>** between approximately 38^{o}N and 41^{o}N.

Notes : [1]

Information presented in table is representative of small cetacean occurrence in the Northwest Atlantic continental shelf waters out to the 2,000 meter isobath.

***Sources*:** Waring *et al*. 1992, 2007**,** 2014a, 2015, 2016**;** Payne and Heinemann 1993; Payne *et al.* 1984; Jefferson *et al*. 2009.

6.2.3.2.3 Pinnipeds

As provided in Table 5, harbor, gray, harp, and hooded seals will occur in the affected environment of the monkfish fishery. Specifically, pinnipeds are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. They are primarily found throughout the year or seasonally from New Jersey to Maine;

however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35^{o}N) (Waring *et al*. 2007, 2014a, 2015, 2016). To further assist in understanding how the monkfish fishery may overlap in time and space with the occurrence of pinnipeds, a general overview of species occurrence and distribution in the area of operation of the monkfish fishery is provided in the following table (Table 8). For additional information on the biology, status, and range wide distribution of each species of pinniped please refer to Waring *et al*. (2007), Waring *et al*. (2014a), Waring *et al*. (2015), Waring *et al*. (2016).

Table 8 - Pinniped occurrence in the area of operation of the monkfish fishery.

Species	Prevalence
Harbor Seal	• Primarily distributed in waters from NJ to ME; however, increasing evidence indicates that their range is extending into waters as far south as Cape Hatteras, NC (35^{o}N). • **Year Round**: Waters of ME • **September-May**: Waters from New England to NJ.
Gray Seal	• Distributed in waters from NJ to ME. • **Year Round**: Waters from ME to MA. • **September-May**: Waters from Rhode Island to NJ.
Harp Seal	• Winter-Spring (approximately January-May): Waters from ME to NJ.
Hooded Seal	• Winter-Spring (approximately January-May): Waters of New England.
***Sources*:** Waring *et al*. 2007 (for hooded seals); Waring *et al*. 2014a; Waring *et al*. 2015;Waring *et al*. 2016.	

6.2.3.3 Atlantic Sturgeon

Table 5 lists the 5 DPSs of Atlantic sturgeon that occur in the affected environment of the monkfish fishery and that may be affected by the operation of this fishery. The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range; in fact, results from genetic studies show that, regardless of location, multiple DPSs can be found at any one location along the Northwest Atlantic coast (ASSRT 2007; Dovel and Berggren 1983; Dadswell *et al.* 1984; Kynard *et al*. 2000; Stein *et al*. 2004a; Dadswell 2006; Laney *et al*. 2007; Dunton *et al*. 2010; Dunton *et al*. 2012; Dunton *et al*. 2015; Erickson *et al*. 2011; Wirgin *et al*. 2012; O'Leary *et al*. 2014; Waldman *et al.* 2013; Wirgin *et al*. 2015).

Based on fishery- independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein *et al*. 2004 a,b; Erickson *et al*. 2011; Dunton *et al*. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein *et al*. 2004a,b; Dunton *et al*. 2010; Erickson *et al*. 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that some Atlantic sturgeon may undertake seasonal movements along the coast (Erickson *et al.* 2011; Dunton *et al*. 2010; Wipplehauser 2012). For instance, tagging and tracking studies found that satellite-tagged adult sturgeon from the Hudson River concentrated in the southern part of the Mid-Atlantic Bight, at depths greater than 20 meters, during winter and spring, while in the summer and fall, Atlantic sturgeon concentrations shifted to the northern portion of the Mid-Atlantic Bight at depths less than 20 meters (Erickson *et al.* 2011).

Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard (i.e., waters off North Carolina, Chesapeake Bay, and Delaware Bay; New York Bight; Massachusetts Bay; Long Island Sound; and Connecticut and Kennebec River Estuaries); depths in these areas are generally no greater than 25 meters (Bain *et al.* 2000; Savoy and Pacileo 2003; Stein *et al.* 2004a; Laney *et al*. 2007; Dunton *et al*. 2010; Erickson *et al*. 2011; Oliver *et al*. 2013; Waldman *et al.* 2013; O'Leary *et al*. 2014). Although additional studies are still needed to clarify why these particular sites are chosen by Atlantic sturgeon, there is some indication that they may serve as thermal refuge, wintering sites, or marine foraging areas (Stein *et al*. 2004a; Dunton *et al*. 2010; Erickson *et al*. 2011).

6.2.3.4 Atlantic Salmon (Gulf of Maine DPS)

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the GOM DPS extends from the GOM (primarily northern portion of the GOM), to the coast of Greenland (Fay *et al*. 2006; NMFS & USFWS 2005, 2016). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay *et al*. 2006; Hyvarinen *et al*. 2006; Lacroix & Knox 2005; Lacroix & McCurdy 1996; Lacroix *et al*. 2004; NMFS & USFWS 2005, 2016; Reddin 1985; Reddin & Friedland 1993; Reddin & Short 1991). For additional information on the on the biology, status, and range wide distribution of the GOM DPS of Atlantic salmon, refer to NMFS and USFWS (2005; 2016); and Fay et al. (2006). Based on the above information, as the monkfish fishery operates throughout the year, and is known to operate in the GOM, it is possible that the fishery will overlap in time and space with Atlantic salmon migrating northeasterly between U.S. and Canadian waters.

6.2.4 Interactions Between Gear and Protected Resources

Protected species are vulnerable to interactions with various types of fishing gear, with interaction risks associated with gear type, quantity, and soak or tow time. Available information on gear interactions with a given species (or species group) is provided in the sections below. These sections are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used to prosecute the monkfish fishery (i.e., sink gillnet and bottom trawl gear).

6.2.4.1 Marine Mammals

Depending on species, marine mammals have been observed seriously injured or killed in bottom trawl and/or sink gillnet gear. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, the 2017 LOF (82 FR 3655 (January 12, 2017)) categorizes commercial gillnet fisheries (Northeast or Mid-Atlantic) as Category I fisheries and commercial bottom trawl fisheries (Northeast or Mid-Atlantic) as Category II fisheries.

6.2.4.1.1 Large Cetaceans

Bottom Trawl Gear

With the exception of minke whales, there have been no observed interactions with large whales and bottom trawl gear. In bottom trawl gear, to date, interactions have only been observed in the northeast bottom trawl fisheries. From the period of 2008-2012, the estimated annual mortality attributed to this fishery was 7.8 minke whales for 2008, and zero minke whales from 2009-2012; no serious injuries were reported during this time (Waring *et al*. 2015). Based on this information, from 2008-2012, the estimated annual average minke whale mortality and serious injury attributed to the northeast bottom trawl fishery was 1.6 (CV=0.69) whales (Waring *et al*. 2015). Lyssikatos (2015) estimated that from 2008-2013, mean annual serious injuries and mortalities from the northeast bottom trawl fishery were 1.40 (CV=0.58) minke whales. Based on this information, bottom trawl gear is likely to pose a low interaction risk to any large whale species. However, should an interaction occur, serious injury or mortality to any large whale is possible; however, relative to other gear types discussed below (i.e., fixed gear), trawl gear represents a low source serious injury or mortality to any large whale.

Fixed Fishing Gear (e.g., Sink Gillnet Gear)

The greatest entanglement risk to large whales is posed by fixed fishing gear (e.g., sink gillnet and trap/pot gear) comprised of lines (vertical or ground) that rise into the water column. Any line can become entangled in the mouth (baleen), flippers, and/or tail of the whale when the animal is transiting or foraging through the water column (Johnson *et al*. 2005; NMFS 2014b; Kenney and Hartley 2001; Hartley *et al*. 2003; Whittingham *et al*. 2005a,b). For instance, in a study of right and humpback whale entanglements, Johnson *et al*. (2005) attributed: (1) 89% of entanglement cases, where gear could be identified, to fixed gear consisting of pot and gillnets and (2) entanglement of one or more body parts of large whales (e.g., mouth and/or tail regions) to four different types of line associated with fixed gear (the buoy line, groundline, floatline, and surface system lines).[1] Although available data, such as Johnson *et al*. (2005), provides insight into large whale entanglement risks with fixed fishing gear, to date, due to uncertainties surrounding the nature of the entanglement event, as well as unknown biases associated with reporting effort and the lack of information about the types and amounts of gear being used, determining which part of fixed gear creates the most entanglement risk for large whales is difficult (Johnson *et al.* 2005). As a result, any type or part of fixed gear is considered to create an entanglement risk to large whales and should be considered potentially dangerous to large whale species (Johnson *et al.* 2005).

The effects of entanglement to large whales range from no injury to death (NMFS 2014b; Johnson *et al*. 2005; Angliss and Demaster 1998; Moore and Van der Hoop 2012). The risk of injury or death in the event of an entanglement may depend on the characteristics of the whale involved (species, size, age, health, etc.), the nature of the gear (e.g., whether the gear incorporates weak links designed to help a whale free itself), human intervention (e.g., the feasibility or success of disentanglement efforts), or other variables (NMFS 2014b). Although the interrelationships among these factors are not fully understood, and the data needed to provide a more complete characterization of risk are not available, to date, available data indicates that entanglement in fishing gear is a significant source of serious injury or mortality for Atlantic large whales (Table 9; Henry *et al*. 2016; Waring *et al*. 2016).

[1] Buoy line connects the gear at the bottom to the surface system. Groundline in trap/pot gear connects traps/pots to each other to form trawls; in gillnet gear, groundline connects a gillnet, or gillnet bridle to an anchor or buoy line. Floatline is the portion of gillnet gear from which the mesh portion of the net is hung. The surface system includes buoys and high-flyers, as well as the lines that connect these components to the buoy line.

Table 9 summarizes confirmed human-caused injury and mortality to humpback, fin, sei, minke, and North Atlantic right whales along the Gulf of Mexico Coast, U.S. East Coast, and Atlantic Canadian Provinces from 2010 to 2014 (Henry *et al.* 2016); the data provided in Table 9 is specific to confirmed injury or mortality to whales from entanglement in fishing gear. As many entanglement events go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, it is important to recognize that the information presented in Table 9 likely underestimates the rate of large whale serious injury and mortality due to entanglement. Further studies looking at scar rates for right whales and humpbacks suggests that entanglements may be occurring more frequently than the observed incidences indicate (NMFS 2014b; Robbins 2009; Knowlton *et al.* 2012).

Table 9 - Summary of confirmed human-caused injury or mortality to fin, minke, humpback, sei, and North Atlantic right whales from 2010-2014 due to entanglement in fishing gear.[1]

Species	Total Confirmed Entanglement: Serious Injury[2]	Total Confirmed Entanglement: Non-Serious Injury	Total Confirmed Entanglement: Mortality	Entanglement Events: Total Average Annual Injury and Mortality Rate (US waters/Canadian waters/unassigned waters)
North Atlantic Right Whale	16	31	8	4.65 (0.4/0/4.25)
Humpback Whale	30	53	8	6.85 (1.55/0/5.3)
Fin Whale	6	1	4	1.8 (0.2/0.8/0.8)
Sei Whale	0	0	0	0
Minke Whale	20	11	16	6.4 (1.7/2.45/2.25)

Notes:
[1]Information presented in Table 9 is based on confirmed human-caused injury and mortality events along the Gulf of Mexico Coast, US East Coast, and Atlantic Canadian Provinces; it is not specific to US waters only.
[2] NMFS defines a serious injury as an injury that is more likely than not to result in mortality (for additional details see: http://www.nmfs.noaa.gov/pr/pdfs/serious_injury_procedure.pdf)

***Source*:** Henry *et al.* 2016

As noted in section 6.2.4.1, pursuant to the MMPA, NMFS publishes a LOF annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injurious and mortalities of marine mammals in each fishery. Large whales, in particular, humpback, fin, minke, and North Atlantic right whales, are known to interact with Category I and II fisheries in the (Northwest) Atlantic Ocean. As fin and North Atlantic right whales are listed as endangered under the ESA, these species are considered strategic stocks under the MMPA (see Table 5). Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan (TRP) for any strategic marine mammal stock that interacts with Category I or II fisheries. In response to its obligations under the MMPA, in 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to develop a plan (Atlantic Large Whale Take Reduction Plan (ALWTRP or Plan)) to reduce serious injury to, or mortality of large whales, specifically, humpback, fin, and North Atlantic right whales, due to incidental entanglement in U.S. commercial fishing gear.[2] In 1997, the ALWTRP was implemented; however, since 1997, the Plan has been modified; recent adjustments include the Sinking Groundline Rule and Vertical Line Rules (72 FR 57104, October 5, 2007; 79 FR 36586, June 27, 2014; 79 FR 73848, December 12, 2014; 80 FR 14345, March 19, 2015; 80 FR 30367, May 28, 2015).

The Plan consists of regulatory (e.g., universal gear requirements, modifications, and requirements; area- and season- specific gear modification requirements and restrictions; time/area closures) and non-regulatory measures (e.g., gear research and development, disentanglement, education and outreach) that, in combination, seek to assist in the recovery of North Atlantic right, humpback, and fin whales by addressing and mitigating the risk of entanglement in gear employed by commercial fisheries, specifically trap/pot and gillnet fisheries (http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/; 73 FR 51228; 79 FR 36586; 79 FR 73848; 80 FR 14345; 80 FR 30367). The Plan recognizes trap/pot and gillnet Management Areas in Northeast, Mid-Atlantic, and Southeast regions of the U.S, and identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in these regions; these Category I and II fisheries must comply with all regulations of the Plan.[3] For further details on the ALWTRP please see: http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/.

6.2.4.1.2 Small Cetaceans and Pinnipeds

Sink Gillnet and Bottom Trawl Gear

Small cetaceans and pinnipeds are vulnerable to interactions with sink gillnet and bottom trawl gear. Species that have been observed incidentally injured and/or killed by MMPA LOF Category I (frequent interactions) and/or II (occasional interactions) gillnet or trawl fisheries that operate in the affected environment of Greater Atlantic Region (GAR) fisheries are provided in Table 10 (Waring *et al*. 2014a,b; Waring *et al*. 2015; Waring *et al*. 2016; 82 FR 3655 (January 12, 2017)).[4] Of the species provided in Table 10, gray seals, followed by harbor seals, harbor porpoises, short beaked common dolphins, harps seals, and Atlantic white sided dolphins are the most frequently bycaught small cetacean and pinnipeds in sink gillnet gear in the GAR (Hatch and Orphanides 2014, 2015, 2016). In terms of bottom trawl gear, short-beaked common dolphins and Atlantic white-sided dolphins are the most frequently observed bycaught marine mammal species in the GAR, followed by gray seals, long-finned pilot whales, and risso's dolphins, bottlenose dolphin (offshore), harbor porpoise, and harp seals (Lyssikatos 2015). Incidental bycatch of these latter species, as well as those provided in Table 10, have been observed in the skate fishery (Hatch and Orphanides 2014, 2015, 2016; Lyssikatos 2015; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html), which is comprised of Category I Northeast and Mid-Atlantic sink gillnet and Category II Northeast and Mid-Atlantic bottom trawl fisheries (82 FR 3655 (January 12, 2017)). Specifically, observed bycatch in sink gillnet hauls primarily targeting monkfish, and also landing skates, has shown that interactions primarily occur in sink gillnet gear with mesh sizes >11

[2] The measures identified in the ALWTRP are also beneficial to the survival of the minke whale, which are also known to be incidentally taken in commercial fishing gear.

[3] The fisheries currently regulated under the ALWTRP include: Northeast/Mid-Atlantic American lobster trap/pot; Atlantic blue crab trap/pot; Atlantic mixed species trap/pot; Northeast sink gillnet; Northeast anchored float gillnet; Northeast drift gillnet; Mid-Atlantic gillnet; Southeastern U.S. Atlantic shark gillnet; and Southeast Atlantic gillnet (NMFS 2014c).

[4] "GAR Fisheries" are in reference to the 13 fisheries in the Greater Atlantic Region (GAR) (i.e., Northeast multispecies (including the whiting/small mesh multispecies complex); monkfish; spiny dogfish; Atlantic bluefish; northeast skate complex; mackerel/squid/butterfish; summer flounder/scup/black sea bass; American lobster; Atlantic herring; Atlantic sea scallop; red crab; surfclam/ocean quahog; and golden tilefish) in which fishery management plans (FMPs) have been developed and authorized; the NMFS-Greater Atlantic Regional Fisheries Office, in association with the New England and Mid-Atlantic Fisheries Management Councils (FMCs), is charged with conserving and managing these FMPs.

inches, and with soak duration ≥ 50 hours (Hatch and Orphanides 2014, 2015). In regards to bottom trawl hauls, regardless of target fish species, general tow time and net mesh size associated with observed bycatch of small cetaceans and pinnipeds are not available (Lyssikatos 2015; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html).

Based on the best available information provided in Table 10, Waring *et al*. (2014a,b), Waring *et al*. (2015), Waring *et al*. (2016), and the January 12, 2017, LOF (82 FR 3655), of the gear types primarily used to prosecute fisheries in the GAR (i.e., bottom trawl; mid-water trawl; gillnets (sink); scallop dredge; trap/pot; bottom longline; hydraulic clam dredge; purse seine; and hook and line), Northeast and Mid-Atlantic gillnet fisheries, followed by the Northeast and Mid-Atlantic bottom trawl fisheries (Category I and II fisheries, respectively) pose the greatest risks of serious injury and mortality to small cetaceans and pinnipeds (i.e., approximately 80.6% of the estimated total mean annual mortality to marine mammals [small cetaceans + seals, large whales excluded] is attributed to gillnet fisheries, 18.9% attributed to bottom trawl, 0.14% attributed to mid-water trawl; 0.16% attributed to pot/trap (bottlenose dolphin stocks only); and 0.12% attributed to hook and line (bottlenose dolphin stocks only); Figure 1).[5]

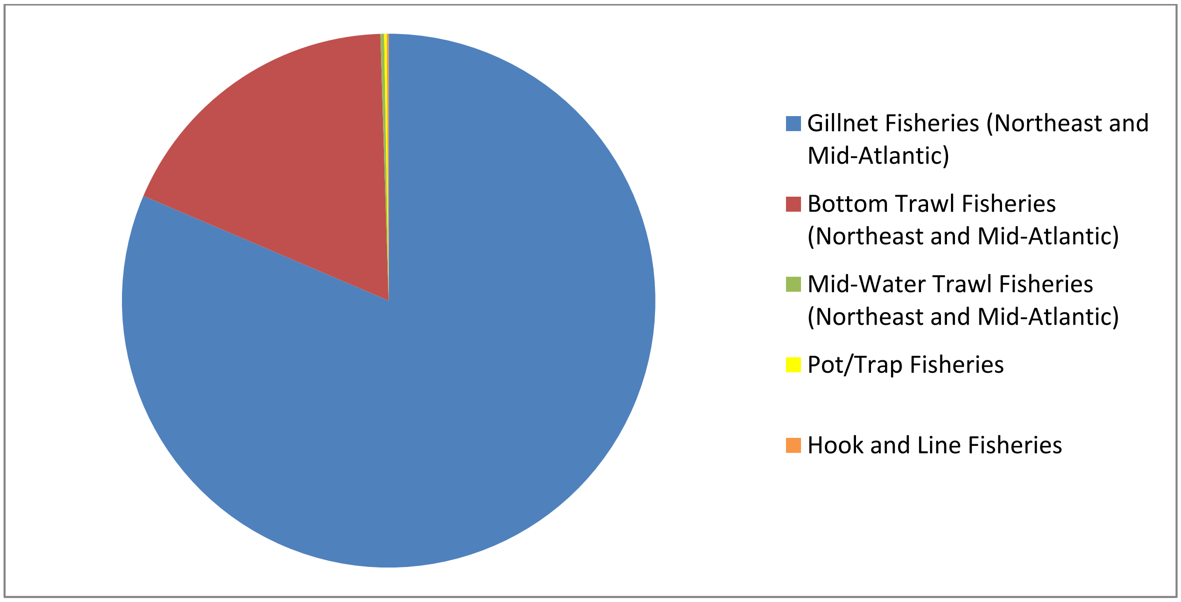
Table 10 - Small cetacean and pinniped species observed seriously injured and/or killed by Category I and II gillnet or trawl fisheries in the affected environment of GAR fisheries.

Fishery	Category	Species Observed or reported Injured/Killed
Northeast Sink Gillnet	I	Bottlenose dolphin (offshore)
		Harbor porpoise
		Atlantic white sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Pilot whales (spp)
		Harbor seal
		Hooded seal
		Gray seal
		Harp seal
Mid-Atlantic Gillnet		Bottlenose dolphin (Northern Migratory coastal)
		Bottlenose dolphin (Southern Migratory coastal)
		Bottlenose dolphin (offshore)
		White-sided dolphin
		Harbor porpoise

[5] Data used in the assessment was from 2009-2013 (Waring *et al*. 2016; MMPA LOF 82 FR 3655). Northeast anchored float gillnet, Southeast Atlantic gillnet, and Southeastern U.S. Atlantic shark gillnet fisheries were not included in the analysis as mean annual mortality estimates have not been provided for the species affected by these fisheries (Waring *et al*. 2016). As there are no known small cetaceans or pinniped interactions with bottom longlines, hydraulic clam dredges, or sea scallop dredges, these fishing gear types were also not included in the assessment. In addition, for harp seals, the assessment used data from Waring *et al.* (2014a) as serious injury and mortality estimates for harp seals have not been updated since Waring *et al*. (2014a).

		Short-beaked common dolphin
		Risso's dolphin
		Harbor seal
		Harp seal
		Gray seal
Mid-Atlantic Mid-Water Trawl-Including Pair Trawl	II	Risso's dolphin
		White-sided dolphin
		Harbor seal
		Pilot whales (spp)
		Gray seal
Northeast Mid-Water Trawl-Including Pair Trawl	II	Short-beaked common dolphin
		Pilot whales (spp)
		Gray seal
		Harbor seal
Northeast Bottom Trawl	II	Harp seal
		Harbor seal
		Gray seal
		Long-finned pilot whales
		Short-beaked common dolphin
		White-sided dolphin
		Harbor porpoise
		Bottlenose dolphin (offshore)
		Risso's dolphin
Mid-Atlantic Bottom Trawl	II	White-sided dolphin
		Pilot whales (spp)
		Short-beaked common dolphin
		Risso's dolphin
		Bottlenose dolphin (offshore)
		Gray seal
		Harbor seal
Northeast Anchored Float Gillnet	II	Harbor seal
		White-sided dolphin
Sources: Waring *et al*. 2014a,b; Waring *et al*. 2015; Waring *et al*. 2016; LOF 82 FR 3655 (January 12, 2017).		

Figure 1 - Estimated total mean annual mortality of small cetaceans and pinnipeds by GAR fisheries from 2009-2013 (*source* Waring *et al*. 2014a, b; Waring *et al*. 2015; Waring *et al*. 2016).



Although there are multiple Category I and II fisheries that have the potential to result in the serious injury and morality of small cetaceans and pinnipeds in the GAR, the risk of an interaction with a specific fishery is affected by multiple factors, including where and when fishing effort is focused, the type of gear being used, and how effort overlaps in time and space with specific species in the affected area. For instance, the following figures (Figure 2 and Figure 3) depict observed marine mammal takes (large whales excluded) in gillnet and trawl gear in waters of the GOM, GB, and SNE from 2007-2012 or 2007-2011, respectively.[6] As depicted in Figure 2 and Figure 3, over the last 5 years, there appears to be particular areas in the GOM, GB, and SNE where fishing effort is overlapping in time and space with small cetacean or pinniped occurrence. Although uncertainties, such as shifting fishing effort patterns and data on true density (or even presence/absence) for some species remain, the available observer data, as depicted in Figure 2 and Figure 3, does provide some insight into areas in the ocean where the likelihood of interacting with a particular species is high and therefore, provides a means to consider potential impacts of future shifts or changes in fishing effort on small cetaceans and pinnipeds. For additional maps depicting observed small cetacean and pinniped interactions with Northeast or Mid-Atlantic bottom trawl or gillnet gear, please see Appendix III in Waring *et al*. (2014a,b), Waring *et al*. (2015), and Waring *et al*. (2016).

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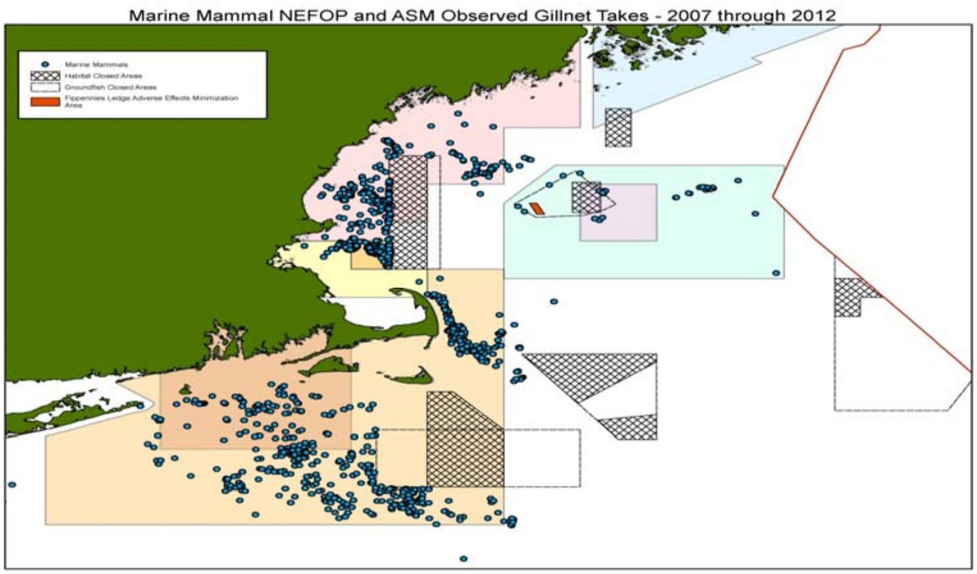
[7] For harp seals, mean annual mortality estimates from 2007-2011 were considered as serious injury and mortality estimates have not been updated since Waring *et al.* (2014a).

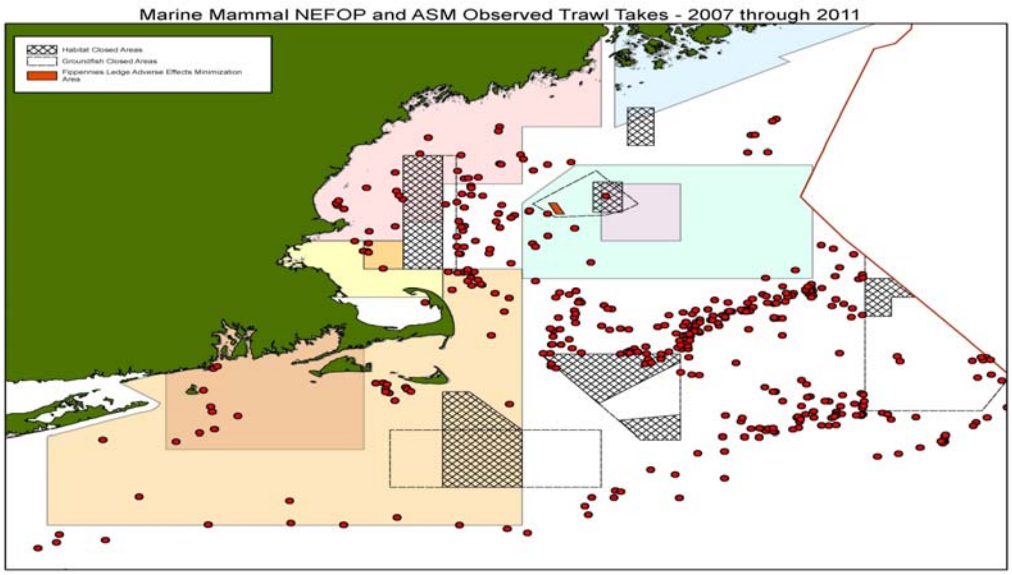
[8] Additional maps of marine mammal takes in various fishing gear can be found in Waring *et al*. 2014a, Waring *et al*. 2015, and Waring *et al*. 2016.

Figure 2 - Map of marine mammal bycatch in gillnet gear in the New England region (excluding large whales) observed by Northeast Fisheries Observer Program (NEFOP) and At Sea Monitoring (ASM) program between 2007 and 2012.



Notes: Small cetacean and pinnipeds have been observed taken primarily in: (1) the waters west of the GOM Habitat/Groundfish closed area: Harbor seals, harp seals, and harbor porpoise; (2) off of Cape Cod, MA: Gray seals, harbor seals, and harbor porpoise; (3) west of the Nantucket Lightship Closed Area: Harbor porpoise, short-beaked common dolphin, gray seals, harp seals, and harbor seals; and (4) waters off southern MA and RI: Gray seals and harbor seals, and some harbor porpoise and short-beaked common dolphin.

Figure 3 - Map of marine mammal bycatch in trawl gear in the New England region (excluding large whales) observed by the Northeast Fisheries Observer Program (NEFOP) and At Sea Monitoring (ASM) program between 2007 and 2011.



***Notes*:** Small cetacean and pinnipeds observed taken primarily in: (1) the waters between and around CA I and CA II (Groundfish closed areas): Short-beaked common dolphin, pilot whales, white-sided dolphins, gray seals, and some risso's dolphins and harbor porpoise; and (2) eastern side of the GOM Habitat/Groundfish closed area: White-sided dolphins, and some pilot whales and harbor seals.

As noted above, numerous species of small cetaceans and pinnipeds interact with Category I and II fisheries in the GAR; however, several species in Table 10 have experienced such great losses to their populations as a result of interactions with Category I and/or II fisheries that they are now considered strategic stocks under the MMPA (see Table 5). These species include several stocks of bottlenose dolphins, and until recently, the harbor porpoise.[7] Section 118(f)(1) of the MMPA requires the preparation and implementation of a TRP for any strategic marine mammal stock that interacts with Category I or II fisheries. As a result, the Harbor Porpoise TRP (HPTRP) and the Bottlenose Dolphin TRP (BDTRP) were developed and implemented for these species.[8] In addition, due to the incidental mortality and serious injury of small cetaceans incidental to bottom and mid-water trawl fisheries operating in both the Northeast and Mid-Atlantic regions, the Atlantic Trawl Gear Take Reduction Strategy (ATGTRS) was implemented. The following provides a brief overview and summary for each HPTRP, BDTRP, and ATGTRS; however, additional information on each TRP can be found at: http://www.greateratlantic.fisheries.noaa.gov/protected/porptrp/ or
http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm
http://www.greateratlantic.fisheries.noaa.gov/Protected/mmp/atgtrp/

Harbor Porpoise Take Reduction Plan (HPTRP)

To address the high levels of incidental take of harbor porpoise in the groundfish sink gillnet fishery, a Take Reduction Team was formed in 1996. A rule (63 FR 66464) to implement the Harbor Porpoise Take Reduction Plan, and therefore, to reduce harbor porpoise bycatch in U.S. Atlantic gillnets was published on December 2, 1998, and became effective on January 1, 1999; the Plan was amended on February 19,

[7] In the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment (Waring *et al*. 2016); harbor porpoise are no longer designated as a strategic stock.
[8] Although the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment (Waring *et al.* 2016) no longer designates harbor porpoise as a strategic stock, HPTRP regulations are still in place per the mandates provided in Section 118(f)(1).

2010 (75 FR 7383), and October 4, 2013 (78 FR 61821). Since gillnet operations differ between the New England and Mid-Atlantic regions, the follow sets of measures were devised for each region:

- **New England Region**: The New England component of the HPTRP pertains to all fishing with sink gillnets and other gillnets capable of catching multispecies in New England waters from Maine through Rhode Island. It includes five management areas and three closure areas. Per specified periods of time, fishing with sink gillnets is restricted in closed areas. In management areas, depending on location, seasonal restrictions include complete closure to sink gillnet fishing to closures to sink gillnet fishing unless pingers are used in the manner prescribed in the TRP regulations.

- **Mid-Atlantic Region:** The Mid-Atlantic portion of the HPTRP pertains to the Mid-Atlantic shoreline from the southern shoreline of Long Island, New York to the North Carolina/South Carolina border. It includes four management areas, each with time and area closures to sink gillnet fishing unless the gear meets certain specifications (e.g., floatline length, twine size, tie downs, net size, net number, nets in a string). Additionally, during regulated periods, sink gillnet fishing in each management area of the Mid-Atlantic is regulated differently for small mesh (> 5 inches to < 7 inches) and large (7-18 inches) mesh gear. The Plan also includes some time and area closures in which sink gillnet fishing is prohibited regardless of the gear specifications.

Bottlenose Take Reduction Plan (BDTRP)

In April 2006, NMFS published a final rule to implement the BDTRP for the WNA coastal stock of bottlenose dolphin (April 26, 2006, 71 FR 24776) to reduce the incidental mortality and serious injury in the Mid-Atlantic gillnet fishery and eight other coastal fisheries operating within the dolphin's distributional range.[9] The measures contained in the BDTRP include gillnet effort reduction, gear proximity requirements, gear or gear deployment modifications, and outreach and educational measures to reduce dolphin bycatch below the marine mammals stock's PBR. On July 31, 2012 (77 FR 45268), the BDTRP was amended to permanently continue nighttime fishing restrictions of medium mesh gillnets operating in North Carolina coastal state waters. The Bottlenose Dolphin TRP was most recently amended on February 9, 2015 (80 FR 6925) to reduce the incidental serious injury and mortality of strategic stocks of bottlenose dolphins in Virginia pound net fishing gear, and to provide consistent state and federal regulations for Virginia pound net fishing gear.

Atlantic Trawl Gear Take Reduction Strategy (ATGTRS)

In addition to the HPTRP and the BDTRP, in 2006, the Atlantic Trawl Gear Take Reduction Team (ATGTRT) was convened to address the incidental mortality and serious injury of long-finned pilot whales (*Globicephala melas*), short-finned pilot whales (*Globicephala macrorhynchus*), common dolphins (*Delphinus delphis*), and white sided dolphins (*Lagenorhynchus acutus*) incidental to bottom and mid-water trawl fisheries operating in both the Northeast and Mid-Atlantic regions. Because none of the marine mammal stocks of concern to the ATGTRT are classified as a "strategic stock," nor do they currently interact with a Category I fishery, it was determined at the time that development of a take reduction plan was not necessary.[10]

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[9] The final rule issued on April 26, 2006, for the BDTRP also revised the large mesh size restriction under the Mid-Atlantic large mesh gillnet rule for conservation of endangered and threatened sea turtles to provide consistency among Federal and state management measures.

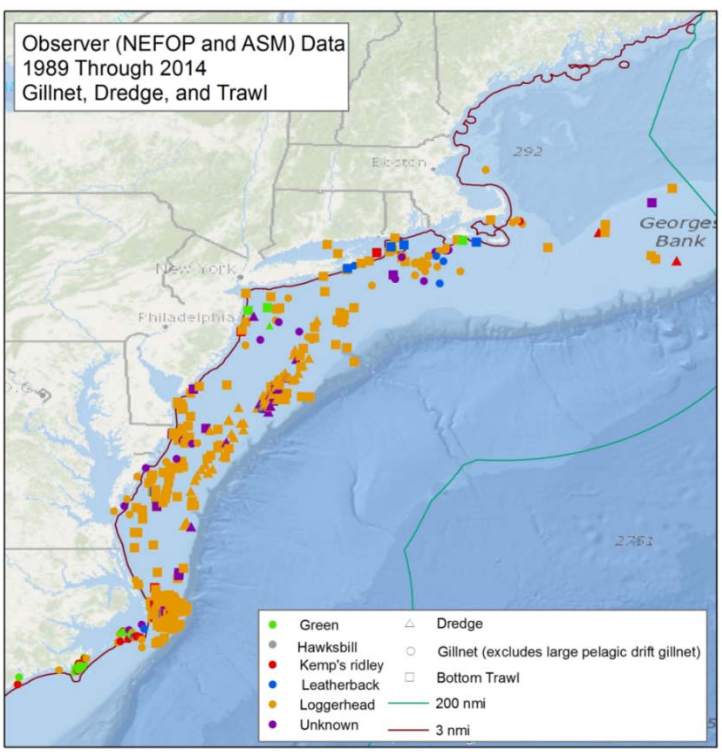
[10] A strategic stock is defined under the MMPA as a marine mammal stock: for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable

In lieu of a take reduction plan, the ATGTRT agreed to develop an ATGTRS. The ATGTRS identifies informational and research tasks, as well as education and outreach needs the ATGTRT believes are necessary, to provide the basis for decreasing mortalities and serious injuries of marine mammals to insignificant levels approaching zero mortality and serious injury rates. The ATGTRS also identifies several potential voluntary measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals.

6.2.4.2 Sea Turtles

As provided in Figure 4, sea turtle interactions with gillnet, bottom trawl, and other bottom tending gear have been observed in the GOM, GB, and the Mid-Atlantic; however, most of the observed interactions have occurred in the Mid-Atlantic (see Warden 2011a,b; Murray 2013; Murray 2015). As few sea turtle interactions have been observed in the GOM and GB regions of the Northwest Atlantic, there is insufficient data available to conduct a robust model-based analysis on sea turtle interactions with gillnet or bottom trawl gear in these regions and therefore, produce a bycatch estimate for these regions. As a result, the bycatch estimates and the discussion below are based on observed sea turtle interactions in gillnet or bottom trawl gear in the Mid-Atlantic.

Figure 4 - Observed locations of turtle interactions in bottom tending gears in the GAR from 1989-2014.



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future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA.

Bottom Trawl Gear

Green, Kemp's ridley, leatherback, loggerhead, and unidentified sea turtles have been documented interacting with bottom trawl gear. However, estimates are available only for loggerhead sea turtles. Warden (2011a,b) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic was 292 (CV=0.13, 95% CI=221-369), with an additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but released through a Turtle Excluder Device (TED).[11] The 292 average annual observable loggerhead interactions equates to approximately 44 adult equivalents (Warden 2011a,b). Most recently, Murray (2015) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic was 231 (CV=0.13, 95% CI=182-298); this equates to approximately 33 adult equivalents (Murray 2015). Bycatch estimates provided in Warden (2011a) and Murray (2015b) are a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated at 616 sea turtles (CV=0.23, 95% CI over the nine-year period: 367-890). This decrease is likely due to decreased fishing effort in high-interaction areas (Warden 2011a,b).

Sink Gillnet Gear

Murray (2013) conducted an assessment of loggerhead and unidentified hard-shell turtle interactions in Mid-Atlantic gillnet gear from 2007-2011. Based on Northeast Fisheries Observer Program data from 2007-2011, interactions between loggerhead and hard-shelled sea turtles (loggerheads plus unidentified hard-shelled) and commercial gillnet gear in the Mid-Atlantic averaged 95 hard-shelled turtles and 89 loggerheads (equivalent to 9 adults) annually (Murray 2013).[12] However, average estimated interactions in large mesh gear in warm, southern Mid-Atlantic waters have declined relative to those from 1996-2006 (Murray 2009), as did the total commercial effort (Murray 2013). Murray (2013) also estimated interactions by managed species landed in (Mid-Atlantic) gillnet gear from 2007-2011. For instance, an estimated average annual bycatch of loggerhead and non-loggerhead hard shelled sea turtles for trips primarily landing skate was 16 loggerheads (95% CI =9-23) and one non-loggerhead hard shelled sea turtles (95% CI=1-2).

6.2.4.3 Atlantic Sturgeon

Sink Gillnet and Bottom Trawl Gear

Atlantic sturgeon interactions (i.e., bycatch) with sink gillnet and bottom trawl gear have been observed since 1989; these interactions have the potential to result in the injury or mortality of Atlantic sturgeon (NMFS NEFSC FSB 2015, 2016). Three documents, covering three time periods, that use data collected by the Northeast Fisheries Observer Program to describe bycatch of Atlantic sturgeon in gillnet and bottom trawl gear: Stein et al. (2004b) for 1989-2000; ASMFC (2007) for 2001-2006; and Miller and Shepard (2011) for 2006-2010; none of these documents provide estimates of Atlantic sturgeon bycatch by Distinct Population Segment. Miller and Shepard (2011), the most of the three documents, analyzed fishery observer data and VTR data in order to estimate the average annual number of Atlantic sturgeon interactions in gillnet and otter trawl in the Northeast Atlantic that occurred from 2006 to 2010. This timeframe included the most recent, complete data and as a result, Miller and Shepard (2011) is

[11] TEDs allow sea turtles to escape the trawl net, reducing injury and mortality resulting from capture in the net. Approved TEDs are required in the shrimp and summer trawl fishery. For further information on TEDs see 50 CFR 223.206 and 68 FR 8456 (February 21, 2003).

[12] At Sea Monitoring (ASM) data was also considered in Murray (2013); however, as the ASM program began 1 May 2010, trips (1,085 hauls), trips observed by at-sea monitors from May 2010 – December 2011 were pooled with the NEFOP data. Further, as most of the ASM trips occur in the Gulf of Maine, only a small portion (9%) of ASM data was used in the Murray (2013) analysis.

considered to represent the most accurate predictor of annual Atlantic sturgeon interactions in the Northeast gillnet and bottom trawl fisheries (NMFS 2013).

Based on the findings of Miller and Shepard (2011), NMFS (2013) estimated that the annual bycatch of Atlantic sturgeon in gillnets to be 1,239 sturgeon and 1,342 sturgeon in bottom otter trawl gear. Miller and Shepard (2011) observed Atlantic sturgeon interactions in trawl gear with small (< 5.5 inches) and large (≥ 5.5 inches) mesh sizes, as well as gillnet gear with small (< 5.5 inches), large (5.5 to 8 inches), and extra-large mesh (>8 inches) sizes. Although Atlantic sturgeon were observed to interact with trawl and gillnet gear with various mesh sizes, Miller and Shepard (2011) concluded that, based on NEFOP observed sturgeon mortalities, gillnet gear, in general, posed a greater risk of mortality to Atlantic sturgeon than did trawl gear. Estimated mortality rates in gillnet gear were 20.0%, while those in otter trawl gear were 5.0% (Miller and Shepard 2011; NMFS 2013). Similar conclusions were reached in Stein et al. (2004b) and ASMFC (2007) reports; after review of observer data from 1989-2000 and 2001-2006, both studies concluded that observed mortality is much higher in gillnet gear than in trawl gear. However, an important consideration to these findings is that observed mortality is considered a minimum of what actually occurs and therefore, the conclusions reached by Stein et al. (2004b), ASMFC (2007), and Miller and Shepard (2011) are not reflective of the total mortality associated with either gear type. To date, total Atlantic sturgeon mortality associated with gillnet or trawl gear remains uncertain.

6.2.4.4 Atlantic Salmon

Sink Gillnet and Bottom Trawl Gear

Atlantic salmon interactions (i.e., bycatch) with gillnet and bottom trawl have been observed since 1989; in many instances, these interactions have resulted in the injury and mortality of Atlantic salmon (NMFS NEFSC FSB 2015, 2016). According to the Biological Opinion issued by NMFS Greater Atlantic Regional Fisheries Office on December 16, 2013, NMFS Northeast Fisheries Science Center's (NEFSC) Northeast Fisheries Observer and At-Sea Monitoring Programs documented a total of 15 individual salmon incidentally caught on more than 60,000 observed commercial fishing trips from 1989 through August 2013 (NMFS 2013; Kocik *et al*. 2014). Atlantic salmon were observed caught in gillnet (11/15)[13] and bottom otter trawl gear (4/15), with 10 of the incidentally caught salmon listed as "discarded" and five reported as mortalities (Kocik (NEFSC), pers. comm (February 11, 2013) in NMFS 2013).The genetic identity of these captured salmon is unknown; however, the NMFS 2013 Biological Opinion considers all 15 fish to be part of the Gulf of Maine Distinct Population Segment, although some may have originated from the Connecticut River restocking program (i.e., those caught south of Cape Cod, Massachusetts). Since 2013, no additional Atlantic salmon have been observed in gillnet or bottom trawl (NMFS NEFSC FSB 2015, 2016). Based on the above information, interactions with Atlantic salmon are likely rare (NMFS 2013; Kocik *et al*. 2014).

[13] Of the 11 observed Atlantic salmon in gillnet gear, 10/11 Atlantic salmon were observed in sink gillnet gear; only one Atlantic salmon was observed in drift gillnet gear (NMFS NEFSC FSB 2015, 2016).

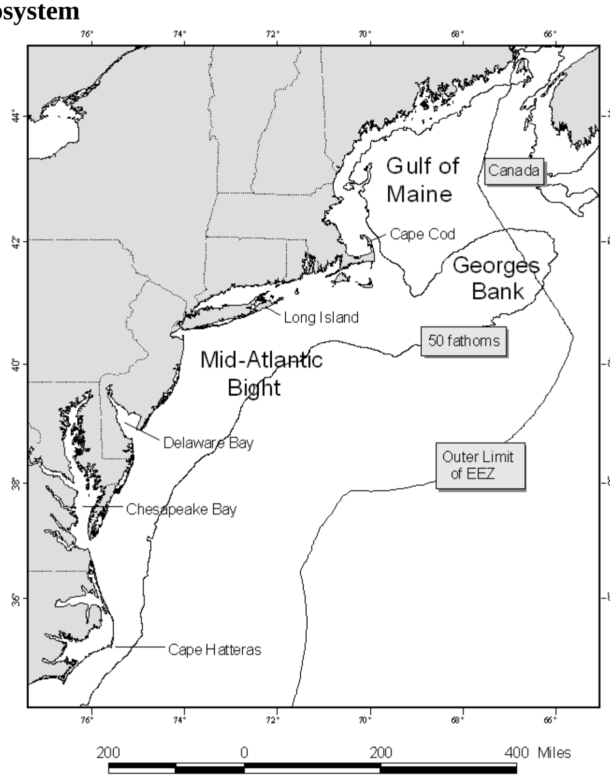
6.3 Physical Environment

The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. The continental slope includes the area east of the shelf, out to a depth of 2000 m. Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope (see Map 1 and Map 2).

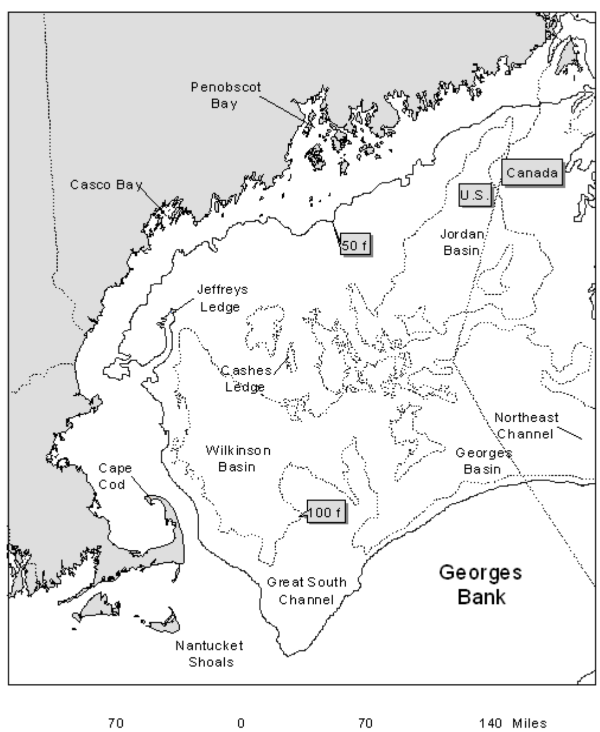
The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

Pertinent physical characteristics of the sub-regions that could potentially be affected by this action are described in this section. Information included in this document was extracted from Stevenson et al. (2004).

Map 1 - Northeast shelf ecosystem



Map 2 - Gulf of Maine.



Gulf of Maine

Although not obvious in appearance, the Gulf of Maine (GOM) is actually an enclosed coastal sea, bounded on the east by Browns Bank, on the north by the Nova Scotian (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank. The GOM was glacially derived, and is characterized by a system of deep basins, moraines and rocky protrusions with limited access to the open ocean. This geomorphology influences complex oceanographic processes that result in a rich biological community.

The GOM is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The GOM's geologic features, when coupled with the vertical variation in water properties, result in a great diversity of habitat types. It contains twenty-one distinct basins separated by ridges, banks, and swells. The three largest basins are Wilkinson, Georges, and Jordan. Depths in the basins exceed 250 meters (m), with a maximum depth of 350 m in Georges Basin, just north of Georges Bank. The Northeast Channel between Georges Bank and Browns Bank leads into Georges Basin, and is one of the primary avenues for exchange of water between the GOM and the North Atlantic Ocean.

High points within the Gulf include irregular ridges, such as Cashes Ledge, which peaks at 9 m below the surface, as well as lower flat topped banks and gentle swells. Some of these rises are remnants of the sedimentary shelf that was left after most of it was removed by the glaciers. Others are glacial moraines and a few, like Cashes Ledge, are outcroppings of bedrock. Very fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the GOM, particularly in its deep basins. These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains. Some shallower basins are covered with mud as well, including some in coastal waters. In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, as on Sewell Ridge to the north of Georges Basin and on Truxton Swell to the south of Jordan Basin. Sand predominates on some high areas and gravel, sometimes with boulders, predominates on others.

Coastal sediments exhibit a high degree of small-scale variability. Bedrock is the predominant substrate along the western edge of the GOM north of Cape Cod in a narrow band out to a depth of about 60 m. Rocky areas become less common with increasing depth, but some rock outcrops poke through the mud covering the deeper sea floor. Mud is the second most common substrate on the inner continental shelf. 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, 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. Bottom currents are stronger in eastern Maine where the mean tidal range exceeds 5 m. Sandy areas are relatively rare along the inner shelf of the western GOM, but are more common south of Casco Bay, especially offshore of sandy beaches.

Georges Bank

Georges Bank is a shallow (3 - 150 m depth), elongate (161 km wide by 322 km long) extension of the continental shelf that was formed by the Wisconsinian glacial episode. It is characterized by a steep slope on its northern edge and a broad, flat, gently sloping southern flank. The Great South Channel lies to the west. Natural processes continue to erode and rework the sediments on Georges Bank. It is anticipated that erosion and reworking of sediments will reduce the amount of sand available to the sand sheets, and cause an overall coarsening of the bottom sediments (Valentine and Lough 1991).

Glacial retreat during the late Pleistocene deposited the bottom sediments currently observed on the eastern section of Georges Bank, and the sediments have been continuously reworked and redistributed by the action of rising sea level, and by tidal, storm and other currents. The strong, erosive currents affect the character of the biological community. Bottom topography on eastern Georges Bank is characterized by linear ridges in the western shoal areas; a relatively smooth, gently dipping sea floor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 m high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin.

The central region of the Bank is shallow, and the bottom is characterized by shoals and troughs, with sand dunes superimposed upon them. The two most prominent elevations on the ridge and trough area are Cultivator and Georges Shoals. This shoal and trough area is a region of strong currents, with average flood and ebb tidal currents greater than 4 km/h, and as high as 7 km/h. The dunes migrate at variable rates, and the ridges may also move. In an area that lies between the central part and Northeast Peak, Almeida *et al.* (2000) identified high-energy areas as between 35 - 65 m deep, where sand is transported on a daily basis by tidal currents, and a low-energy area at depths > 65 m that is affected only by storm currents.

The area west of the Great South Channel, known as Nantucket Shoals, is similar in nature to the central region of the Bank. Currents in these areas are strongest where water depth is shallower than 50 m. This type of traveling dune and swale morphology is also found in the Mid-Atlantic Bight, and further described in that section of the document. The Great South Channel separates the main part of Georges Bank from Nantucket Shoals. Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm generated ripples, and scattered shell and mussel beds. Tidal and storm currents range from moderate to strong, depending upon location and storm activity (Valentine, pers. comm.).

<u>Mid-Atlantic Bight</u>
The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank south to Cape Hatteras, and east to the Gulf Stream. Like the rest of the continental shelf, the topography of the Mid-Atlantic Bight was shaped largely by sea level fluctuations caused by past ice ages. The shelf's basic morphology and sediments derive from the retreat of the last ice sheet, and the subsequent rise in sea level. Since that time, currents and waves have modified this basic structure.

Shelf and slope waters of the Mid-Atlantic Bight have a slow southwestward flow that is occasionally interrupted by warm core rings or meanders from the Gulf Stream. On average, shelf water moves parallel to bathymetry isobars at speeds of 5 - 10 cm/s at the surface and 2 cm/s or less at the bottom. Storm events can cause much more energetic variations in flow. Tidal currents on the inner shelf have a higher flow rate of 20 cm/s that increases to 100 cm/s near inlets.

The shelf slopes gently from shore out to between 100 and 200 km offshore where it transforms to the slope (100 - 200 m water depth) at the shelf break. In both the Mid-Atlantic and on Georges Bank, numerous canyons incise the slope, and some cut up onto the shelf itself. The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales. Most of these structures are relic except for some sand ridges and smaller sand-formed features. Shelf valleys and slope canyons were formed by rivers of glacier outwash that deposited sediments on the outer shelf edge as they entered the ocean. Most valleys cut about 10 m into the shelf, with the exception of the Hudson Shelf Valley that is about 35 m deep. The valleys were partially filled as the glacier melted and retreated across the shelf. The glacier also left behind a lengthy scarp near the shelf break from Chesapeake Bay north to the eastern end of Long Island. Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

Some sand ridges are more modern in origin than the shelf's glaciated morphology. Their formation is not well understood; however, they appear to develop from the sediments that erode from the shore face. They maintain their shape, so it is assumed that they are in equilibrium with modern current and storm regimes. They are usually grouped, with heights of about 10 m, lengths of 10 - 50 km and spacing of 2 km. Ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. The seaward face usually has the steepest slope. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Swales occur between sand ridges. Since ridges are higher than the adjacent swales, they are exposed to more energy from water currents, and experience more sediment mobility than swales. Ridges tend to contain less fine sand, silt and clay while relatively sheltered swales contain more of the finer particles. Swales have greater benthic macrofaunal density, species richness and biomass, due in part to the increased abundance of detrital food and the physically less rigorous conditions.

Sand waves are usually found in patches of 5 - 10 with heights of about 2 m, lengths of 50 - 100 m and 1 - 2 km between patches. Sand waves are primarily found on the inner shelf, and often observed on sides of sand ridges. They may remain intact over several seasons. Megaripples occur on sand waves or separately on the inner or central shelf. During the winter storm season, they may cover as much as 15% of the inner shelf. They tend to form in large patches and usually have lengths of 3 - 5 m with heights of 0.5 - 1 m. Megaripples tend to survive for less than a season. They can form during a storm and reshape the upper 50 - 100 cm of the sediments within a few hours. Ripples are also found everywhere on the shelf, and appear or disappear within hours or days, depending upon storms and currents. Ripples usually have lengths of about 1 - 150 cm and heights of a few centimeters.

Sediments are uniformly distributed over the shelf in this region. A sheet of sand and gravel varying in thickness from 0 - 10 m covers most of the shelf. The mean bottom flow from the constant southwesterly current is not fast enough to move sand, so sediment transport must be episodic. Net sediment movement is in the same southwesterly direction as the current. The sands are mostly medium to coarse grains, with finer sand in the Hudson Shelf Valley and on the outer shelf. Mud is rare over most of the shelf, but is common in the Hudson Shelf Valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges. Fine sediment content increases rapidly at the shelf break, which is sometimes called the "mud line," and sediments are 70 - 100% fines on the slope. On the slope, silty sand, silt, and clay predominate.

The northern portion of the Mid-Atlantic Bight is sometimes referred to as southern New England. Most of this area was discussed under Georges Bank; however, one other formation of this region deserves note. The mud patch is located just southwest of Nantucket Shoals and southeast of Long Island and Rhode Island. Tidal currents in this area slow significantly, which allows silts and clays to settle out. The mud is mixed with sand, and is occasionally resuspended by large storms. This habitat is an anomaly of the outer continental shelf.

Artificial reefs are another significant Mid-Atlantic habitat, formed much more recently on the geologic time scale than other regional habitat types. These localized areas of hard structure have been formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle and Zetlin 2000). While some of materials have been deposited specifically for use as fish habitat, most have an alternative primary purpose; however, they have all become an integral part of the coastal and shelf ecosystem. It is expected that the increase in these materials has had an impact on living marine resources and fisheries, but these effects are not well known.

In general, reefs are important for attachment sites, shelter, and food for many species, and fish predators such as tunas may be attracted by prey aggregations, or may be behaviorally attracted to the reef structure.

6.4 Essential Fish Habitat

EFH descriptions and maps for the skate species can be found in the FMP for the Skate Complex and for the other NEFMC-managed species in the NEFMC's 1998 Omnibus EFH amendment. Skate EFH maps are also available for viewing via the Essential Fish Habitat Mapper: http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx. The current EFH text descriptions are linked from this location.

A more detailed discussion of habitat types, as well as biological and physical effects of fishing by various gears in the skate fishery is provided in the 2008 SAFE Report, or Section 7.4.6 of Skate Amendment 3 (NEFMC 2009). An up-dated summary of gear effects research studies that are relevant to the NE region will be included in the revised gear effects section of the NEFMC Omnibus EFH Amendment 2 (Phase 2), which is currently being developed.

6.5 Human Communities/Socio-Economic Environment – TO BE UPDATED

The purpose of this section is to describe and characterize the bait fishery in which skates are caught. Descriptive information on the fishery is included, and where possible, quantitative commercial fishery and economic information is presented.

6.5.1 Overview of the Skate Fishery

The seven species in the Northeast Region skate complex (Maine to North Carolina) are distributed along the coast of the northeast United States from near the tide line to depths exceeding 700 m (383 fathoms). Skates are not known to undertake large-scale migrations, but they do move seasonally in response to changes in water temperature, moving offshore in summer and early autumn and returning inshore during winter and spring. Members of the skate family lay eggs that are enclosed in a hard, leathery case commonly called a mermaid's purse. Incubation time is six to twelve months, with the young having the adult form at the time of hatching (Bigelow and Schroeder 1953). A description of the available biological information about these species can be found in Section 6.1.

Skates are harvested in two very different fisheries, one for lobster bait and one for wings for food. Small, whole skates are among the preferred baits for the regional American lobster (*Homarus americanus*) fishery. The fishery for lobster bait is a more historical and directed skate fishery, involving vessels primarily from Southern New England ports that target a combination of little skates (>90%) and, to a much lesser extent, juvenile winter skates (<10%). The catch of juvenile winter skates mixed with little skates is difficult to differentiate due to their nearly identical appearance.

The bait fishery is largely based out of Rhode Island with other ports (New Bedford, Martha's Vineyard, Block Island, Long Island, Stonington, Chatham and Provincetown) also identified as participants in the directed bait fishery. There is also a seasonal gillnet incidental catch fishery as part of the directed monkfish gillnet fishery, in which skates (mostly winter skates) are sold both for lobster bait and as cut wings for processing. Fishermen have indicated that the market for skates as lobster bait has been relatively consistent. The directed skate fishery by Rhode Island vessels occurs primarily in federal waters less than 40 fathoms from the Rhode Island/Connecticut/New York state waters boundary east to the waters south of Martha's Vineyard and Nantucket out to approximately 69 degrees. The vast majority of the landings are caught south of Block Island in federal waters. Effort on skates increases in state waters seasonally to accommodate the amplified effort in the spring through fall lobster fishery. Skates caught for lobster bait are landed whole by otter trawlers and either sold 1) fresh, 2) fresh salted, or 3) salted and strung or bagged for bait by the barrel. Inshore lobster boats usually use 2 – 3 skates per string, while offshore boats may use 3 – 5 per string. Offshore boats may actually "double bait" the pots during the winter months when anticipated weather conditions prevent the gear from being regularly tended. The presence of sand fleas and parasites, water temperature, and anticipated soak time between trips are determining factors when factoring in the amount of bait per pot.

Size is a factor that drives the dockside price for bait skates. For the lobster bait market, a "dinner plate" is the preferable size to be strung and placed inside lobster pots. Little and winter skates are rarely sorted prior to landing, as fishermen acknowledge that species identification between little skates and small winter skates is very difficult. Quality and cleanliness of the skate are also factors in determining the price paid by the dealer, rather than just supply and demand. The quantity of skates landed on a particular day has little effect on price because there has been ready supply of skates available for bait from the major dealers, and the demand for lobster bait has been relatively consistent. Numerous draggers and lobster vessels have historically worked out seasonal cooperative business arrangements with a stable pricing agreement for skates.

Due to direct, independent contracts between draggers and lobster vessels landings of skates are estimated to be under-documented. While bait skates are always landed (rather than transferred at sea) they are not always reported because they can be sold directly to lobster vessels by non-federally permitted vessels, which are not required to report as dealers.

Lobster bait usage varies regionally and from port to port, based upon preference and availability. Some lobstermen in the northern area (north of Cape Cod) prefer herring, mackerel, menhaden and hakes (whiting and red hake) for bait, which hold up in colder water temperatures; however, the larger offshore lobster vessels still indicate a preference for skates and Acadian redfish in their pots. Some offshore boats have indicated they will use soft bait during the summer months when their soak time is shorter. Skates used by the Gulf of Maine vessels are caught by vessels fishing in the southern New England area.

6.5.1.1 Catch

The skate fishery caught 105% of the overall ACL in FY 2016 (Table 12); this was an increase on FY 2015 landings (Table 11). No AMs were triggered in FY 2015 as there was no overage. The bait fishery caught 100.9% of the bait TAL. State landings in FY 2014 were 329 mt. Total live discards in 2014 were 42,732 mt and dead discards were 12,098.

Table 11 - FY 2015 Catch and Landings of Skates Compared to Management Specifications

Management Specification	Specification Amount	Catch/Landings (mt)	Percent Landed or Caught
ABC/ACL	35,479	28,111	79.2%
ACT (75% of ABC)	26,609	28,111	106%
Assumed Discards + State Landings	10,224	11,781	NA
TAL Bait	5,489	5,541	100.9%
TAL Wings	10,896	8,911	81.8%

Table 12 – Skate catch and landings (mt) in FY 2014

Management Specification	Specification Amount	Catch/Landings (mt)	Percent Landed or Caught
ABC/ACL	35,479	28,032	79%
ACT (75% of ABC)	26,609	28,032	105%
Assumed Discards + State Landings	10,224	11,781	NA
TAL Bait	5,849	4,499	82%
TAL Wings	10,896	10,605	97.3%

6.5.1.2 Recreational skate catches

In general, skates have little to no recreational value and are not intentionally pursued in any recreational fisheries. For the most recent available catch information (2010-2014) for Atlantic coast skates from MRIP refer to Framework 3 (NEFMC, 2016).

6.5.1.3 Landings by fishery and DAS declaration

Note that NMFS estimates commercial skate landings from the dealer weighout database and reports total skate landings according to *live weight* (i.e., the weight of the whole skate). This means that a conversion factor is applied to all wing landings so that the estimated weight of the entire skate is reported and not just the wings. While *live weight* is necessary to consider from a biological and stock assessment perspective, it is important to remember that vessels' revenues associated with skate landings are for *landed weight* (vessels in the wing fishery only make money for the weight of wings they sell, not the weight of the entire skate from which the wings came).

Due to the relative absence of recreational skate fisheries, virtually all skate landings are derived from regional commercial fisheries. Skates have been reported in New England fishery landings since the late 1800s. However, commercial fishery landings never exceeded several hundred metric tons until the advent of distant-water fleets during the 1960s (for a full description of historic landings please refer to Amendment 3, NEFMC, 2009). Total skate landings have fluctuated between two levels between FY 2009 and 2012 (Table 13). The fluctuations in landings are largely attributable to the wing fishery as landings in the bait fishery have remained relatively stable (Table 14).

Table 13 – Total Landings in the Skate Fisheries

Fishing Year	Landings (in lbs)
2009	41,634,696
2010	32,347,014
2011	41,103,304
2012	33,084,082
2013	29,931,854
2014	34,419,687
Grand Total	212,520,637

Table 14 – Landings by Skate Fishery Type

FY	Disposition	Landings (in lbs)
2009	Bait	9,049,822
	Wing	32,584,874
2010	Bait	10,020,271
	Wing	22,326,743
2011	Bait	10,861,122
	Wing	30,242,182
2012	Bait	10,789,031
	Wing	22,295,051
2013	Bait	11,245,043
	Wing	19,232,756
2014	Bait	9,386,666
	Wing	24,642,900
Grand Total		212,676,461

Total fishing revenue from all species on active skate vessels increased slightly in 2014 (Table 15).

Table 15 - Total fishing revenue (all species) from active skate vessels

Year	Total Revenue
2009	1,260,423,620
2010	697,188,765
2011	714,315,861
2012	705,152,600
2013	567,234,143
2014	578,739,701
Grand Total	4,523,054,690

Landings by DAS declaration indicate that a large portion of bait is landed while on a multispecies (sector and common pool) trip (Table 16). Landings under a monkfish declaration may be underestimated because of reporting. A large amount of total skate landings have no associated declaration. The majority of the wing landings are associated with multispecies trips, however, those associated with monkfish trips closely followed. The skate wing fishery is predominantly an incidental fishery, where skate wings are harvested on trawl and gillnet trips primarily targeting more valuable NE multispecies (cod, haddock, flounders, etc.) and/or monkfish. Therefore, the fishing effort associated with the skate wing fishery can be directly tied to effort patterns and constraints in these other fisheries. Fishing effort for skate wings will tend to only increase when DAS allocations and usage increase (and vice versa), which may occur independently of skate quotas. Similarly, the rate and magnitude of skates discarded by these fisheries are directly proportional to DAS usage.

Table 16 - Total skate landings (lbs live weight) by DAS program, FY2014

VMS Declaration	Bait	Wing
Mults Sector	3,104,650	10,640,649
Mults Common	303,450	332,955
Monkfish	29,864	9,811,186
Scallop	NA	42,082

Unmatched/No Declaration	4,212,412	2,293,265
DOF	1,736,170	988,655
Total	9,386,546	24,108,792

Source: NMFS, Fisheries Statistics Office

6.5.1.4 Trends in number of vessels

The number of skate permits has declined between FY 2009 and 2014. On a broader time scale, between FY2003 and 2014, there was an increase in skate permits with a high occurring in 2007 (Table 17).

Table 17 - Number of Skate Permits issued

AP_Year	Number of skate permits issued
2003	1,968
2004	2,391
2005	2,632
2006	2,675
2007	2,685
2008	2,633
2009	2,574
2010	2,503
2011	2,326
2012	2,265
2013	2,202
2014	2,147

The number of active permits has decreased between 2009 and 2014 (Table 18). This decrease may contribute to the observed trend in wing landings shown in Table 14, with fewer active permits in years with lower landings.

Table 18 - Number of Active Permits between 2009 and 2014

FY	Number of active permits
2009	578
2010	551
2011	569
2012	527
2013	455
2014	450

6.5.1.5 Trends in revenue

Skate revenue increased in FY2014, which was likely driven by the high percentage of the wing TAL being achieved (Table 19). The increase in revenue is largely attributable to changes in wing revenue and landings (Table 20).

Table 19 – Total Skate Revenue

FY	Revenue

2009	$ 7,380,043
2010	$ 7,786,423
2011	$ 8,419,911
2012	$ 6,645,435
2013	$ 7,450,280
2014	$ 9,292,251
Grand Total	$ 46,974,343

Table 20 - Total Skate Revenue by Fishery (Bait and Wing)

FY	Disposition	Revenue
2009	Bait	$ 872,669
	Wing	$ 6,507,374
2010	Bait	$ 2,624,844
	Wing	$ 5,161,579
2011	Bait	$ 1,128,278
	Wing	$ 7,291,633
2012	Bait	$ 1,113,427
	Wing	$ 5,532,008
2013	Bait	$ 1,206,310
	Wing	$ 5,955,972
2014	Bait	$ 1,149,535
	Wing	$ 7,861,515
Grand Total		$ 46,405,144

6.5.2 Fishing Communities

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

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

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

6.5.2.1 Overview of Ports

There were a total of 75 ports where skate were landed in 2014. They include ports from all states in the Northeast Skate Complex management area (ME to VA). Skate bait was landed in 17 ports in 2014. The bait fishery decreased in terms of landings and number of ports (18 ports in 2013). Point Judith dominates skate bait landings.

Only 30 ports received at least $10,000 in FY 2012 from skate; 14 ports received at least $100,000 per year. New Bedford, MA, Point Judith, RI, and Chatham, MA were the highest grossing ports. There are 43 ports that landed at least 10,000 lbs of skate. As expected the top ports in landings were Point Judith, Chatham and New Bedford.

Table 21 outlines commercial landings of skates by individual states from FY2010 – FY2014. Massachusetts and Rhode Island continue to dominate the skate fishery. Skate landings fluctuate by year in both fisheries. Skate bait was landed primarily in Point Judith, Newport, Fall River, and New Bedford. Point Judith's landings have accounted for 52-69% of bait landings between 2010 and 2014. Point Judith landings have increased somewhat in recent years, while landings in Newport, Fall River, and New Bedford have decreased. Other ports such as Montauk have individual vessels which sell skate directly to lobster and other pot fishermen for bait, though there are no major skate bait dealers here. Bait skate is primarily landed by trawlers, often as a secondary species while targeting monkfish or groundfish. Since 2003, with the implementation of the original Skate FMP, all vessels landing skate must be on a groundfish Day-at-Sea (DAS).

Table 21 - Total Skate landings by fishery and state

FY	Disposition	State	Revenue (in $)	Landings (in lbs)
2010	Bait	CT	1,558,923	324,744
		MA	318,938	1,597,765
		MD	934	8,496
		NJ	67,462	516,887
		RI	757,737	7,241,592
		VA	1,871	9,287
	Bait Total		2,705,865	9,698,771
2011	Bait	CT	5,465	23,990
		MA	299,643	2,478,875
		MD	120	13,270
		NJ	615,259	575,919
		NY	75	227
		RI	796,114	7,766,581
		VA	301	2,300
	Bait Total		1,716,977	10,861,162
2012	Bait	CT	5,394	23,425
		MA	195,430	1,533,632
		MD	104	10,400
		NJ	326,415	752,578
		NY	62	357
		RI	868,893	8,467,734
		VA	91	905
	Bait Total		1,396,389	10,789,031
2013	Bait	CT	13,265	68,572
		MA	217,023	1,856,490
		MD	619	14,591
		NJ	144,415	998,360
		NY	15	68
		RI	836,709	8,306,442
		VA		
	Bait Total		1,212,046	11,244,523
2014	Bait	CT	56,557	557,668
		MA	11,173	91,007
		MD	402	18,660
		NJ	288,027	780,849
		NY	472	9,186
		RI	793,369	7,929,296
		VA		
	Bait Total		1,150,000	9,386,666

6.5.3 Skate Fishing Areas

Vessels landing bait skate generally fish in the inshore waters of SNE, are most often trawlers, and frequently fish in an exempted fishery (Figure 5).

Vessels landing skates for the wing market generally fish on Georges Bank, in the Great South Channel near Cape Cod, or west of the Nantucket Lightship Area in Southern New England (SNE) waters (Figure 6). Gillnet wing vessels often also fish east of Cape Cod.

Vessels that land skate as a bycatch often fish in Massachusetts Bay and on Georges Bank. Scallop dredges with general category permits often catch skate while fishing in the Great South Channel. There is also a mixed monkfish/skate fishery west of the Nantucket Lightship Area and off northern New Jersey, near Point Pleasant.

Figure 5 - Skate bait landings by statistical area for FY 2014

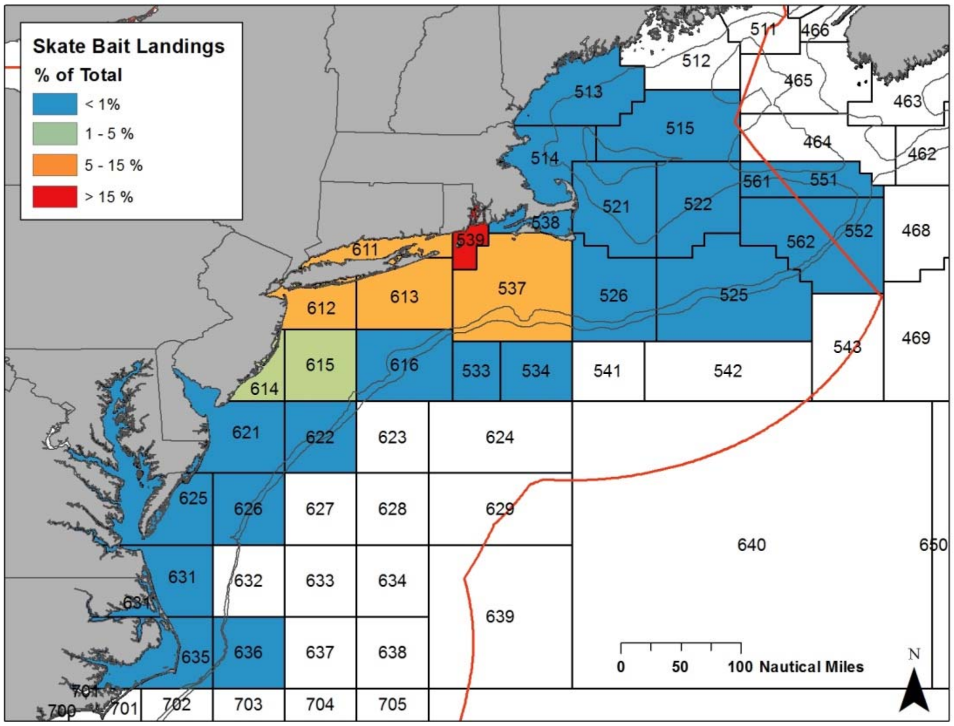
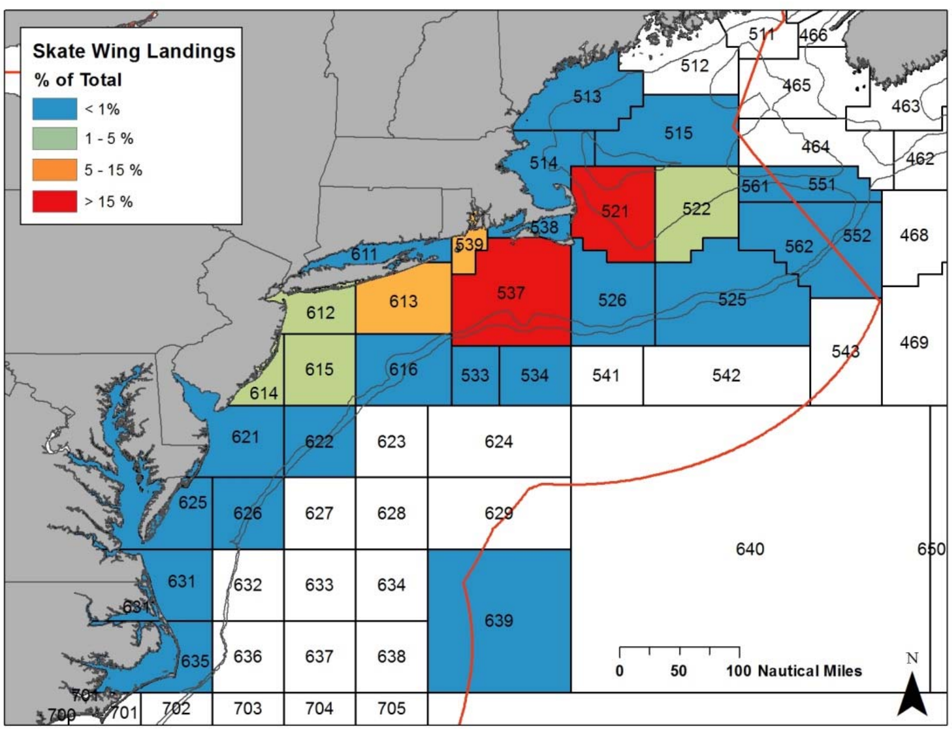


Figure 6 - Skate wing landings by statistical area for FY 2014



7.0 Environmental Consequences of the Alternatives

7.1 Biological Impacts

7.1.1 Modifications to Bait Skate Fishery Effort Controls

7.1.1.1 Option 1: No Action

This alternative would maintain current bait skate effort controls including the incidental possession limit, the skate bait trigger (90%), and the skate bait possession limit at 25,000 lbs, with a Letter of Authorization. An analysis conducted in FW1 indicated that mortality decreased as possession limits decreased. Therefore, the higher possession limits in Options 1 and 3 would be expected to have low negative impacts on the skate complex, however, the incidental possession limit and trigger would be expected to mitigate this effect resulting in overall neutral biological impacts. If the trigger is reached and the fishery was projected to exceed its TAL, the incidental possession limit would reduce directed fishing effort, resulting in positive biological impacts. The incidental possession limit allows fishing to continue, at a lower level. Under Option 1, two different incidental possession limits could occur depending on whether the incidental possession limit was also triggered for the skate wing fishery. If both incidental possession limits are in effect, this would effectively stop fishing in the bait fishery, as observed in FY2016, by reducing the limit to 500 lb (or 1135 lb whole weight). If only the bait incidental possession limit was in place, fishing could continue at 9,307 lb in Season 3, and could potentially allow the bait fishery to exceed its TAL.

Additionally, the skate specifications were designed to prevent overfishing of the complex. The combination of the incidental possession limit and the trigger reduces the likelihood that the TAL would be exceeded. The large buffer between the TAL and the ABC also helps to ensure the ABC is not reached or exceeded. The bait fishery has not exceeded its TAL in recent years (Figure 7). In FY2016, the incidental possession limit was implemented twice in the bait fishery (Hermsen, 2017). However, the skate bait fishery was subject to lower specifications in FY2016.

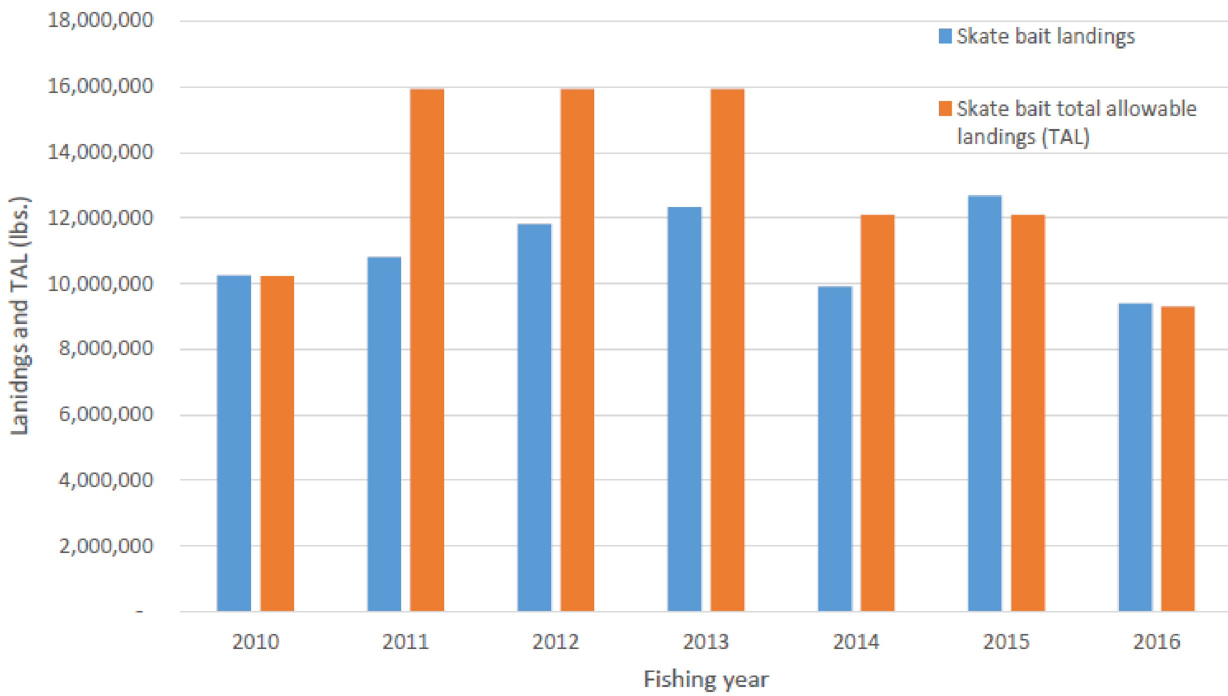


Figure 7 - Skate bait landings and total allowable landings by fishing year, FY2010-2016 (from Hermsen, 2017)

7.1.1.2 Option 2: Revised Skate Bait Possession Limit and Backstop

Option 2 would revise the skate bait possession limit for season 3 from 25,000 lb to 12,000 lb. An analysis conducted in FW1 indicated that mortality decreased as possession limits decreased. Because this alternative would reduce the possession limit a small reduction in mortality would be expected. This alternative therefore is expected to have low positive impacts on the skate complex when compared to Option 1. The revised skate bait possession limit would increase the likelihood that the fishery would fully achieve its TAL, but depending on fishing behavior, it may not necessarily prevent the TAL from being exceeded. The resultant closure from fully achieving the TAL, implemented by this option, would provide positive biological impacts.

The majority of trips that occur land less than 6000 lb (Figure 8). The reduction in possession limit will affect the directed fishery, as evidenced by the reduction in fishing effort in FY2016 when the skate bait and skate wing incidental possession limits were both implemented (Figure 9). The 90% trigger would reduce directed fishing pressure, reducing the likelihood of the TAL being exceeded. The closure of the bait fishery would have a positive biological impact because the TAL could not be greatly exceeded.

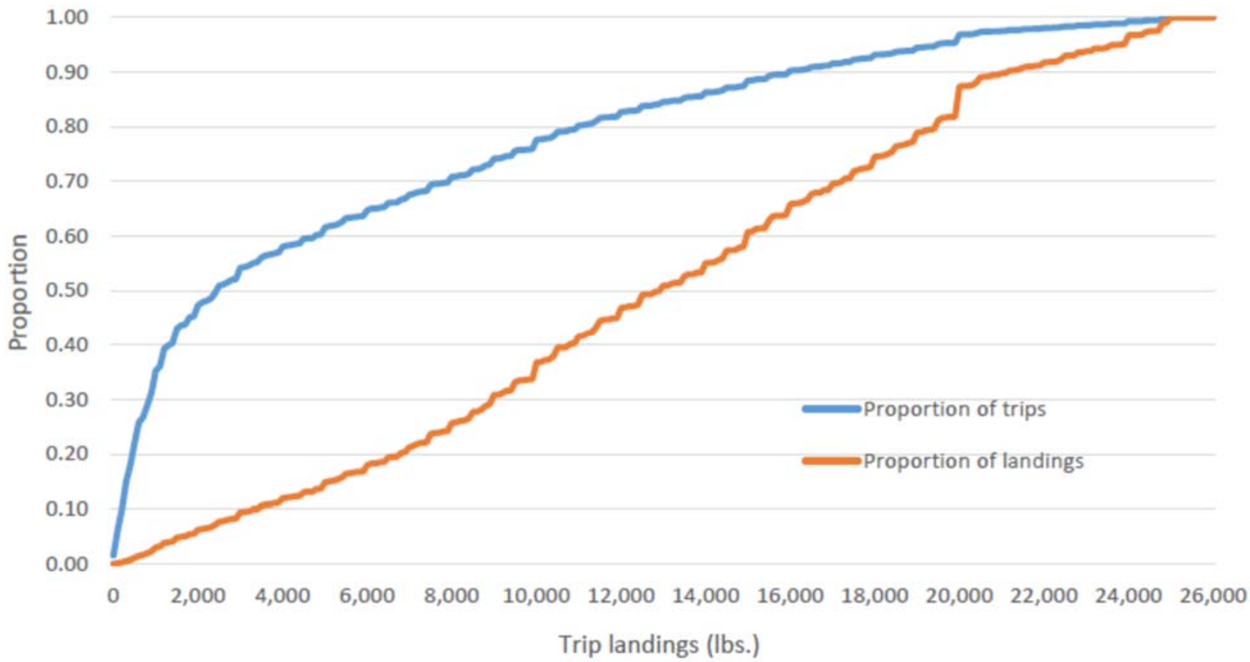


Figure 8 - Empirical cumulative distribution function of the proportion of trips and landings by landed pounds, FY2010-2016, all seasons (from Hermsen, 2017)

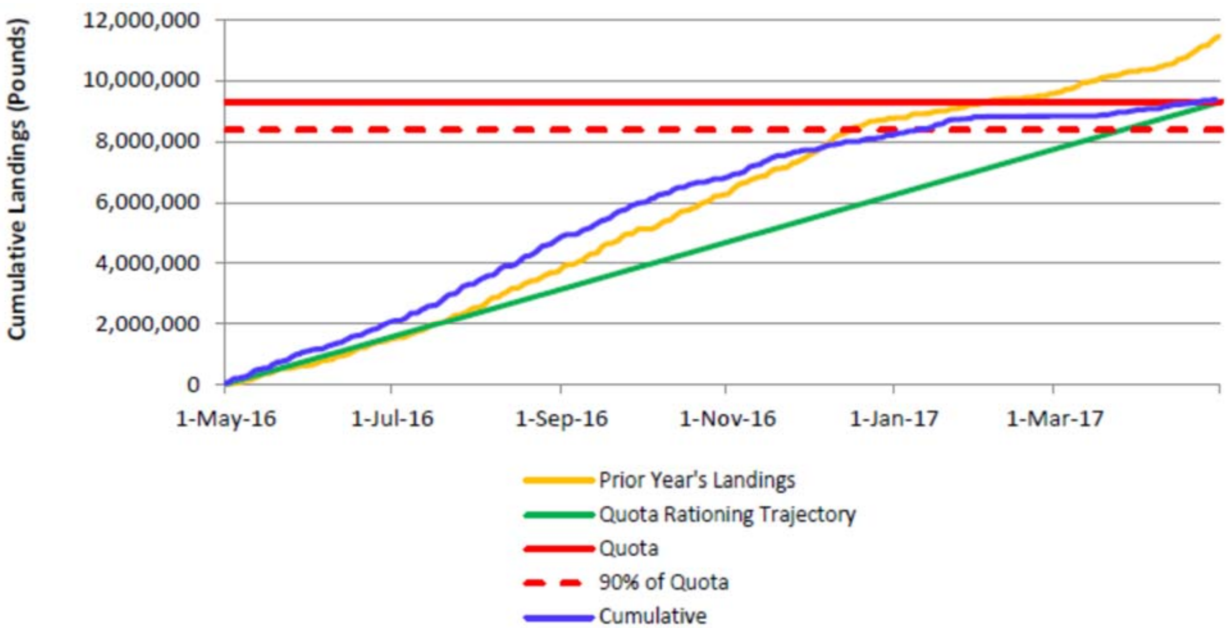


Figure 9 - Northeast Skate Complex Bait Fishery Weekly Report for week ending April 29, 2017

All the measures contained in this option would work together to keep bait skate landings below the TAL, which would have a biological impact. The TAL was analyzed as part of Framework 4 (NEFMC, 2016). Modifications of effort controls that enable full achievement of the TAL would not modify the neutral to low positive impact on the skate resource determined in Framework 3 (NEFMC, 2016).

The bait fishery exceeded its TAL twice (by 1-5%) in the last 7 fishing years (Figure 7). In order to achieve its TAL, the bait fishery may compensate for the reduced possession limit by increasing the number of trips taken, depending on the level of costs associated with extra trips and availability of DAS for more profitable fishing activity.

Overall, this alternative would have neutral to low positive impacts on the complex because the combination of measures would prevent the TAL from being exceeded. Option 2 would have similar neutral to low positive impacts compared Option 3 but more positive impacts compared to Option 1.

7.1.1.3 Option 3: Revised Skate Bait Trigger and Incidental Possession Limit, and Backstop

Option 3 would maintain the current possession limit of 25,000 lb with a Letter of Authorization. It would reduce the trigger to 75-80%, with a closure once 100% of the TAL was achieved, and set the skate bait incidental limit as 9,307 lb.

This option relies on the closure once the bait skate TAL is fully achieved to provide positive biological impacts. The incidental possession limit and reduced trigger act more as mechanisms to prolong the fishery and reduce the likelihood of a closure occurring, providing socio-economic benefits. If the trigger is reached and the fishery was projected to exceed its TAL, the incidental possession limit would reduce directed fishing effort. Additionally, the skate specifications were designed to prevent overfishing of the complex. The large buffer between the TAL and the ABC also helps to ensure the ABC is not reached or exceeded. The closure, by making sure the TAL was not exceeded, would provide low positive biological impacts, similar to Option 2.

Overall, this alternative would have neutral to low positive impacts on the complex because it would prevent the TAL, and therefore the ABC, from being exceeded. Option 3 would have similar neutral to low positive impacts compared Option 2 but more positive impacts compared to Option 1.

7.2 Biological Impact on non-target species and other discarded species

7.2.1 Modifications to Bait Skate Fishery Effort Controls

The Skate FMP requires that all vessels landing whole skates in quantities approaching 25,000 lbs require a Letter of Authorization. Analysis of the frequency of trips landing bait by weight for fishing effort in FYs 2012 - 2016 indicated a wide range of landings occurring (Figure 8). The bait possession limit alternatives are expected to have negligible impacts to non-skate species above those already analyzed for actions in the other FMPs. The addition of the closure once the bait TAL is achieved may have low positive impacts on non-target species if triggered, unless it results in unforeseen shifts to other fisheries.

7.3 Essential Fish Habitat (EFH) Impacts

7.3.1 Modifications to Bait Skate Fishery Effort Controls

7.3.1.1 Option 1: No Action

Option 1 would maintain current bait skate effort controls.

This alternative would maintain the existing possession limit, incidental possession limit, and trigger for the bait skate fishery. This alternative would maintain the skate bait possession limit at 25,000 lbs. Vessels that obtain a Skate Bait Letter of Authorization would be able to retain up to 25,000 lbs. of whole skates. Option 1 may have low negative impacts on EFH compared to Options 2 and 3 as fishing effort would not be reduced under this Option.

7.3.1.2 Option 2: Revised Skate Bait Possession Limit and Backstop

This alternative would reduce the Season 3 skate bait possession limit, maintain the skate bait trigger, and establish a closure for when 100% of the annual bait skate TAL was achieved.

This alternative would reduce the skate bait possession limit from 25,000 lbs. to **12,000** lb in Season 3. The lower bait limit would probably decrease effort in the bait fishery, which is largely conducted on an order by order basis. It is possible that if orders remain high an increased number of trips might be necessary, however, per-trip costs incurred by fishing may limit potential increases. The majority of trips attributed to the bait fishery use a NE Multispecies DAS, which is typically associated with trawl gear. A reduction in the usage of trawl gear, a mobile bottom tending gear, would reduce interactions with habitat. The closure of the fishery once 100% of the bait skate TAL was achieved could continue to reduce interactions with habitat. Under the no action alternative, fishing can continue at incidental amounts, which continues impacts on habitat. Thus, impacts to EFH would likely decline under these lower limits and the backstop relative to No Action limits.

Option 2 would have low positive impacts on EFH compared to Option 1 as fishing effort would likely be reduced under this Option. Option 2 would have similar low positive impacts compared to Option 3.

7.3.1.3 Option 3: Revised Skate Bait Trigger and Incidental Possession Limit, and Backstop

This alternative would maintain the existing skate bait possession limit, reduce the skate bait trigger, redefine the skate bait incidental possession limit, and establish a closure for when 100% of the annual bait skate TAL was achieved.

Option 3 would maintain the 25,000 lb possession limit with a Letter of Authorization. However, the skate bait trigger would be reduced by 10-15%. This allows for the potential for the incidental possession limit to be implemented earlier in the fishing year, therefore reducing directed fishing effort. The reduction in directed fishing effort would have low positive impacts on habitat since it would result from a reduction in the use of mobile bottom tending gear. Option 3 would also establish a backstop, which would stop skate bait fishing once 100% of the TAL was achieved instead of allowing incidental fishing to continue. This would further restrict directed fishing in the event the TAL was projected to be exceeded. If implemented this would reduce fishing effort, which would have low positive impacts on

EFH. Overall impacts would be neutral to low positive because it would not affect EFH if it was not implemented.

Option 3 would have similar neutral to low positive impacts compared to Option 2. This option would have low positive impacts when compared to Option 1.

7.4 Impacts on Endangered and Other Protected Species (ESA, MMPA)

The protected resources that may be impacted by interactions with fishing gear used to catch skates are identified in Section 6.2**Error! Reference source not found.**.

7.4.1 Modifications to Bait Skate Fishery Effort Controls

7.4.1.1 Option 1: No Action

The No Action alternative would maintain the existing bait skate fishery effort controls, i.e. the existing possession limit, incidental possession limit, and trigger for the bait skate fishery, as those established in Framework 3 (NEFMC, 2016). The No Action alternative would also maintain the current trip limit of 25,000 lb with a Letter of Authorization. As a result, fishing effort and behavior would remain similar to current operating conditions (e.g., no spatial or temporal shifts in effort; no changes in gear type, quantity, or relative soak/tow time).

Significant changes in effort (e.g., gear quantity, soak/tow time, area fished) are not expected under Option 1. As a result, fishing behavior is expected to remain similar to current operating conditions. Understanding expected fishing behavior/effort in a fishery informs potential interaction risks with protected species. Specifically, interaction risks with protected species are strongly associated with amount, time, and location of gear in the water; vulnerability of an interaction increases with increases, relative to respective fisheries current operating conditions, of any or all of these factors. Taking into consideration the latter, as well as fishing behavior/effort under the No Action (Option 1), impacts of the No Action to protected species are provided below:

MMPA Protected Species Impacts

Impacts of the No Action on marine mammals (i.e., species of cetaceans and pinnipeds) are somewhat uncertain as quantitative analysis has not been performed. However, we have considered, to the best of our ability, available information on marine mammal interactions with commercial fisheries, including the skate fishery over the last 5 or more years (Waring *et al*. 2014, Waring et al. 2015, Waring et al. 2016; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). Aside from several large whale species (e.g., North Atlantic right, humpback, and fin), harbor porpoise, and several stocks of bottlenose dolphin, there has been no indication that takes of any other marine mammal species in commercial fisheries has exceeded potential biological removal (PBR) thresholds, and therefore, gone above and beyond levels which would result in the inability of each species population to sustain itself (Waring *et al*. 2014, 2015, 2016). Although, as noted above, several species of large whales, harbor porpoise and several stocks of bottlenose dolphin have experienced levels of take that have resulted in the exceedance of each species PBR threshold, take reduction plans have been implemented to reduce bycatch in the fisheries affecting these species(Atlantic Large Whale Take Reduction Plan, Harbor Porpoise Take Reduction Plan, and the Bottlenose Dolphin Take Reduction Plan; see affected environment for details); these plans are still in place and are continuing to assist in decreasing bycatch levels for these species. Although the information presented in Waring *et al*. (2014, 2015, 2016) is a collective representation of commercial fishery interactions with marine mammals, and does not address the effects of any FMP specifically, the information does demonstrate that fishery operations over the last 5 or more years have not resulted in a collective level of take that threatens the continued existence of marine mammal populations (aside from those species noted above).

In conjunction with the above, additional analysis on the impacts of the operation of fisheries in the northeast region have also been conducted by NMFS, pursuant to section 7 of the ESA, for ESA-listed species of marine mammals. Specifically, in a Biological Opinion issued by NMFS in 2013, it was concluded that the operation of the skate fishery, in addition to seven other FMPs, may affect, but will not jeopardize the continued existence of any ESA listed species of marine mammals. Since issuance of this Opinion, there has been no indication that these fisheries have changed in any significant manner (e.g., increases in gear quantity and soak/tow time, new areas fished) such that there are new interactions risks to listed marine mammal species that have not already been considered by NMFS to date. As a result, we do not expect impacts to ESA-listed species of marine mammals under the No Action (i.e., status quo conditions) to be different from those already considered by NMFS (NMFS 2013). Specifically, fishing behavior under the No Action is not expected to introduce any new risks or additional takes to ESA listed species that have not already been considered by NMFS to date. As a result, the No Action is not expected to result in interactions with protected species that are above and beyond levels previously considered by NMFS (NMFS 2013; Waring et al. 2014; Waring et al. 2015; Waring et al. 2016). Based on this, the No Action, and the resultant fishing behavior under this Alternative, is not, as concluded by NMFS, expected to result in levels of take that would jeopardize the continued existence of ESA listed species of marine mammals.

Based on the above information, and the fact that the skate fishery must comply with specific take reduction plans (i.e., HPTRP, the BDTRP, ALWTRP); and that voluntary measures exist that reduce serious injury and mortality to marine mammal species incidentally caught in trawl fisheries (see the Atlantic Trawl Gear Take Reduction Team), the No Action is expected to have low negative impacts on marine mammal species.

ESA Listed Species

Ascertaining the potential impacts of the No Action on ESA-listed species (i.e., certain species of whales, sea turtles, and fish) are difficult and somewhat uncertain, as quantitative analysis has not been performed. However, we have considered, to the best of our ability, how the fishery has operated in regards to listed species since 2013, when NMFS issued a Biological Opinion (Opinion) on the operation of seven commercial fisheries, including the skate FMP, and its impact on ESA listed species (NMFS 2013). The 2013 Opinion concluded that the seven fisheries may affect, but would not jeopardize the continued existence of any ESA listed species. The Opinion included an incidental take statement authorizing the take of specific numbers of ESA listed species of sea turtles, Atlantic salmon, and Atlantic sturgeon [14]. The skate FMP is currently covered by the incidental take statement authorized in NMFS 2013 Opinion.

Since 2013, the specifications for the skate fishery has either increased, decreased, or remained stable; however, fishing behavior over this time period has never resulted in the exceedance of NMFS authorized take of any ESA listed species (NMFS 2013). Therefore, the specifications under *status quo* conditions, and the resultant fishing behavior under these conditions, are not expected to introduce any new risks or additional takes to ESA listed species that have not already been considered and authorized by NMFS to date. As a result, impacts of the No Action on ESA listed species are not expected to be different from those already considered by NMFS (NMFS 2013) and therefore, are not, as concluded by NMFS, expected to

[14] The 2013 Opinion did not authorize take of ESA listed species of whales; however, it assessed interaction risks to these species and based on the best available information, concluded that the summer flounder, scup, and black sea bass fisheries, in addition to the other six FMPs assessed, would not jeopardize the continued existence of any ESA listed species of whales (NMFS 2013).

result in levels of take that would jeopardize the continued existence of ESA listed species. For these reasons, the *status quo* conditions would likely have low negative impacts on ESA listed species.

Overall Impacts to Protected Species
As provided above, effort is not expected to increase to levels above and beyond those that have been experienced in the skate broadstock areas to date. As a result, interaction risks to protected species in these broadstock areas are not expected to change significantly from what has been observed to date in these regions (Waring et al. 2014; Waring et al. 2015; Waring et al. 2016; NMFS 2013; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; www.nefsc.noaa.gov/fsb/take_reports/asm.html; NMFS NEFSC FSB 2015). Specifically, as fishing behavior and effort are not expected to change significantly from status quo conditions, the presence, quantity, or degree of gillnet, bottom trawl or other gear types used in these areas are also not expected to change significantly. As interactions risks with protected species are strongly associated with amount, time, and location of gear in the water, continuation of "status quo" skate fishing behavior/effort is not expected to change any of these operating conditions and therefore, is not expected to introduce any new interaction risks to protected species that would result in elevated levels of interactions above and beyond that which has been observed and considered by NMFS to date (Waring *et al*. 2014; Waring *et al*. 2015; Waring et al. 2016; NMFS 2013; NMFS; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; www.nefsc.noaa.gov/fsb/take_reports/asm.html).

Based on this information, overall impacts of Option 1 on protected species is low negative. Relative to Options 2 and 3, Option 1 may result in more negative impacts to ESA listed species as fewer measures to reduce directed fishing once the TAL has been achieved could result in continued fishing effort, which may equate to increased interactions with ESA listed species.

7.4.1.2 Option 2: Revised Skate Bait Possession Limit and Backstop

Option 2 would reduce the Season 3 skate bait possession limit, maintain the skate bait trigger, and establish a closure for when 100% of the annual bait skate TAL was achieved. The reduction in the possession limits may result in less, or restricted, directed fishing effort. The implementation of the closure when 100% of the TAL was achieved would end fishing for skate bait at that point and reduce interactions with protected resources at that point. Further, since the possession of skates mostly requires vessels to be fishing on a NE Multispecies, Scallop, or Monkfish DAS, fishing effort on skates are largely constrained by other FMPs. As a result, fishing effort would not only be restricted by the specifications, but also by the above nature of the fishery and the associated AMs that account for any overage of ACLs. However, as only a small number of trips land the full bait trip limit in a fishing year, the likelihood that any changes in possession limit, as proposed by Option 2, would result in changes in fishing behavior that differ from status quo conditions is unlikely.

Based on this information, impacts to protected species are not expected to be any greater than those under status quo conditions (see Option 1, Section 7.4.1.17.1.1.1), and in fact, may be less than status quo conditions. Specifically, fishing effort is likely to remain similar to status quo conditions or potentially decrease; the latter potentially equates to less fishing time, and therefore, gear being present in the water for a shorter duration. As protected species (ESA listed and MMPA species) interactions with gear, regardless of listing status, is greatly influenced by the amount of gear, and the duration of time gear is in the water, any decrease in either of these factors will reduce the potential for protected species interactions with gear and therefore, reduce the potential for serious injury or mortality to these species. As a result, Option 2 may have some positive impacts on protected species by incorporating a closure once the TAL is reached. Taking this into consideration, relative to Option 1, impacts of Option 2 could be neutral to low positive impacts. As provided above, as only a small number of trips land the full bait trip limit in a fishing year, the likelihood that any changes in possession limit, as proposed by Option 2, would result in large scale changes in fishing behavior that differ from status quo conditions is unlikely. Instead impacts of the lower possession limit would be felt by the vessels directing on bait skate. If fishing effort decreases as a result of a reduction in directed trips under a lower possession limit, relative to Option 1, Option 2 would have more of a positive impact on protected species. Relative to Option 3, Option 2 would have neutral impacts to protected species as both options would modify skate bait effort controls to reduce the likelihood that the TAL would be exceeded resulting in similar possible changes in fishing behavior/effort.

7.4.1.3 Option 3: Revised Skate Bait Trigger and Incidental Possession Limit, and Backstop

This alternative would maintain the existing skate bait possession limit, reduce the skate bait trigger, redefine the skate bait incidental possession limit, and establish a closure for when 100% of the annual bait skate TAL was achieved.

Option 3 would maintain the 25,000 lb possession limit with a Letter of Authorization. However, the skate bait trigger would be reduced by 10-15%. This allows for the potential for the incidental possession limit to be implemented earlier in the fishing year, therefore reducing directed fishing effort. The reduction in directed fishing effort would have low positive impacts on habitat since it would result from a reduction in the use of mobile bottom tending gear. Option 3 would also establish a backstop, which would stop skate bait fishing once 100% of the TAL was achieved instead of allowing incidental fishing to continue. This would further restrict directed fishing in the event the TAL was projected to be exceeded. If implemented this would reduce fishing effort, which would have low positive impacts on EFH. Overall impacts would be neutral to low positive because it would not affect EFH if it was not implemented.

Option 3 would have similar neutral to low positive impacts compared to Option 2. This option would have low positive impacts when compared to Option 1.

7.5 Economic Impacts

7.5.1 Modifications to Bait Skate Fishery Effort Controls

Alternatives for modifying the bait skate effort controls are described in Section **Error! Reference source not found.**.

7.5.1.1 Option 1: No Action

This action would keep the skate bait possession limit constant at 25,000 lbs. For the bait fishery, 82% and 105% of the TAL was achieved in FY2015 and FY2016, respectively, under status quo possession limits. Total federally-reported skate bait landings in FY2013 and FY2014 were 4,497 mt and 5,749 mt, respectively. The incidental possession limit trigger was reached twice in FY2016, at the end of Season 1 and in Season 3 (in January 2017). The TAL was lower in FY2016 than in FY2015 and appeared to be restricting to fishing effort because the implementation of the incidental possession limit in Season 3 resulted in an effective closure of the bait skate fishery. Between FY2012 and FY2015, less than 5% of total trips landed within 1,000 lb of the possession limit (Figure 8). Approximately 50% of the trips occurring are landing less than 5,000 lb of skate bait. Option 1 would be expected to have low negative impacts because the fishery would be expected to trigger the incidental possession limit early in Season 3, which would reduce directed effort. The negative economic impacts would be increased if the wing fishery had also triggered its incidental limit at the same time as the bait fishery, which was observed to effectively close the skate bait fishery in FY2016.

Compared to Option 2, Option 1 would have more negative economic impacts.

7.5.1.2 Option 2: Revised Skate Bait Possession Limit

This action would reduce the Season 3 skate bait possession limit, maintain the skate bait trigger, and establish a closure for when 100% of the annual bait skate TAL was achieved. These measures would be expected to prolong the skate bait fishing year by allowing participating vessels to continue to direct effort on skate bait but at a reduced level for Season 3. This would have low positive economic impacts as fishing for the entire year could generate more revenue than a partial fishing year because of a closure. The additional trigger, incidental possession limit, and closure measures would ensure that the TAL was not exceeded and would only have an economic impact if they were implemented. The lowest possible incidental possession limit was shown to effectively close the fishery in F2016; the closure once the TAL was reach would have the same effect. This would have a negative economic impact. However, it would only happen once the TAL was fully achieved. The lower seasonal possession limit in intended to reduce the likelihood of closing the fishery, while allowing the TAL to be fully achieved. Overall, low positive impacts would be expected from Option 2 because it would increase the likelihood that the fishery could be prosecuted for the entire fishing year.

Option 2 would have similar low positive impacts compared to Option 2. Option 2 would have more positive impacts compared to Option 1.

7.5.1.3 Option 3: Revised Skate Bait Trigger and Incidental Possession Limit, and Backstop

This action would maintain the existing skate bait possession limit, reduce the skate bait trigger, redefine the skate bait incidental possession limit, and establish a closure for when 100% of the annual bait skate TAL was achieved. The higher seasonal possession limit would allow vessels to continue to optimize revenues while the fishery is open. The combination of this higher seasonal possession limit and the low TAL in FY2017, in the short term this may result in low negative economic impacts if the lower trigger is reached. However, the revised incidental limit would be higher and may not be economically distinct compared to the 122,000 lb possession limit proposed in Option 2. The closure of the fishery once 1000 % of the TAL was achieved would also have similar negative impacts when compared to Option 2. If fishing patterns in FY2017 follow a similar trend to those in FY2016, the incidental possession limit could be expected to be implemented in Season 3. The modified trigger, incidental possession limit, and closure measures would ensure that the TAL was not exceeded and would only have an economic impact if they were implemented. The lowest possible incidental possession limit was shown to effectively close the fishery in F2016; the closure once the TAL was reach would have the same effect. This would have a negative economic impact. However, it would only happen once the TAL was fully achieved. The lower seasonal possession limit in intended to reduce the likelihood of closing the fishery, while allowing the TAL to be fully achieved. Overall, low positive impacts would be expected from Option 2 because it would increase the likelihood that the fishery could be prosecuted for the entire fishing year.

Option 3 would have similar low positive impacts compared to Option 2. Option 3 would have more positive impacts compared to Option 1.

7.6 Social Impacts

7.6.1 Modifications to Bait Skate Fishery Effort Controls

Bait skate effort controls are described in Section 4.1 and include decreases in the possession limit and trigger, and an increase in the incidental possession limit.

7.6.1.1 Option 1: No Action

This action would keep the skate bait possession limit constant at 25,000 lbs. For the bait fishery, 82% and 105% of the TAL was achieved in FY2015 and FY2016, respectively, under status quo possession limits. Total federally-reported skate bait landings in FY2013 and FY2014 were 4,497 mt and 5,749 mt, respectively. The incidental possession limit trigger was reached twice in FY2016, at the end of Season 1 and in Season 3 (in January 2017). The TAL was lower in FY2016 than in FY2015 and appeared to be restricting to fishing effort. The implementation of the incidental possession limit in Season 3 resulted in an effective closure of the bait skate fishery. Between FY2012 and FY2015, less than 5% of total trips landed within 1,000 lb of the possession limit (Figure 8). Approximately 50% of the trips occurring are landing less than 5,000 lb of skate bait. Option 1 would be expected to have low negative social impacts because the fishery would be expected to trigger the incidental possession limit early in Season 3, which would reduce directed effort. The negative impacts would be increased if the wing fishery had also triggered its incidental limit at the same time as the bait fishery, which was observed to effectively close the skate bait fishery in FY2016. Any closures in the bait fishery would be expected to negatively affect Rhode Island because the majority of landings occur in that state.

Compared to Options 2 and 3, Option 1 would have more negative social impacts.

7.6.1.2 Option 2: Revised Skate Bait Possession Limit

This action would reduce the Season 3 skate bait possession limit, maintain the skate bait trigger, and establish a closure for when 100% of the annual bait skate TAL was achieved. These measures would be expected to prolong the skate bait fishing year by allowing participating vessels to continue to direct effort on skate bait but at a reduced level for Season 3. This would have low positive economic impacts and therefore social impacts because this would spread revenues throughout the fishing year as opposed to a partial fishing year because of a closure. The additional trigger, incidental possession limit, and closure measures would ensure that the TAL was not exceeded and would only have an impact if they were implemented. The lowest possible incidental possession limit was shown to effectively close the fishery in F2016; the closure once the TAL was reach would have the same effect. However, it would only happen once the TAL was fully achieved. Overall, low positive impacts would be expected from Option 2 because it would increase the likelihood that the fishery could be prosecuted for the entire fishing year.

Option 2 would have similar low positive impacts compared to Option 3. Option 2 would have more positive impacts compared to Option 1.

7.6.1.3 Option 3: Revised Skate Bait Trigger and Incidental Possession Limit, and Backstop

This action would maintain the existing skate bait possession limit, reduce the skate bait trigger, redefine the skate bait incidental possession limit, and establish a closure for when 100% of the annual bait skate TAL was achieved. The higher seasonal possession limit would allow vessels to continue to optimize revenues while the fishery is open. The combination of this higher seasonal possession limit and the low

TAL in FY2017, in the short term this may result in low negative social impacts if the lower trigger is reached. However, the revised incidental limit would be higher and may not be economically distinct compared to the 12,000 lb possession limit proposed in Option 2. The closure of the fishery once 100% of the TAL was achieved would also have similar negative impacts when compared to Option 2. However, it would only happen once the TAL was fully achieved. The lower seasonal possession limit in intended to reduce the likelihood of closing the fishery, while allowing the TAL to be fully achieved. Overall, low positive impacts would be expected from Option 2 because it would increase the likelihood that the fishery could be prosecuted for the entire fishing year

Option 3 would have similar low positive impacts compared to Option 2. Option 3 would have more positive impacts compared to Option 1.

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