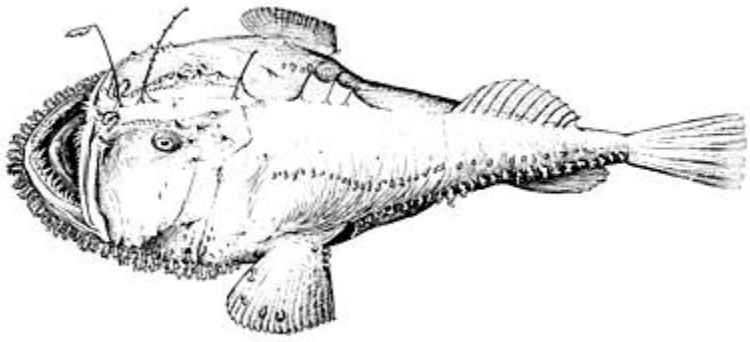
DRAFT

Monkfish Fishery Management Plan
Framework 10 including
Specifications for Fishing Years 2017 - 2019

Incorporating Stock Assessment and Fishery Evaluation (SAFE) Report
For the 2015 Fishing Year
and the Environmental Assessment



Prepared by
New England Fishery Management Council
and Mid-Atlantic Fishery Management Council

in consultation with
National Marine Fisheries Service

November 28, 2016

Initial Framework Meeting: September 21, 2016
Final Framework Meeting:
Preliminary Submission:
Final Submission:

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1.0 Executive Summary – To Be Updated

The monkfish fishery in the EEZ is jointly managed under the Monkfish Fishery Management Plan (FMP) by the New England Fishery Management Council (NEFMC) and the Mid-Atlantic Fishery Management Council (MAFMC), with the NEFMC having the administrative lead. The fishery extends from Maine to North Carolina out to the continental margin. The Councils manage the fishery as two stocks; with the Northern Fishery Management Area (NFMA) covering the Gulf of Maine (GOM) and northern part of Georges Bank (GB), and the Southern Fishery Management Area (SFMA) extending from the southern flank of GB through the Mid-Atlantic Bight to North Carolina (Figure 1.1). The monkfish fishery is primarily managed by landing limits in conjunction with a yearly allocation of days-at-sea (DAS) calculated to enable vessels participating in the fishery to catch, but not exceed, the total allowable landings (TAL) and annual catch target (ACT; landings plus discards) specified for the NFMA and SFMA for each fishing year (FY).

This specifications action would reduce the management uncertainty buffer between the ABC and ACT in both management areas and would modify the DAS allocations and/or trip limits in both management areas.

The primary purpose for this action is to set specifications for 2017 – 2019 and modify the DAS allocations and/or trip limits in both management areas. This action is needed to reduce operational discards and provide flexibility to vessels fishing in the monkfish fishery to better achieve the TAL.

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:

- *Updates to Annual Catch Limits*
    - *Revised Annual Catch limits.* The preferred alternative would

- *Modifications to DAS Allocations and Monkfish Possession Limits*
    - *Northern Fishery Management Area DAS Allocation and Monkfish Possession Limit*. The preferred alternative would.

    - *Southern Fishery Management Area DAS Allocations and Monkfish Possession Limits* The preferred alternative would.

Summary of Environmental Consequences

The environmental impacts of all of the alternatives under consideration are described in Section 7.0. Biological impacts are described in Section 7.1, impacts on essential fish habitat are described in Section 7.2, impacts on endangered and other protected species are described in Section 7.3, the economic

impacts are described in Section 7.4, and social impacts are described in Section 7.5. 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.

- *Updates to Annual Catch Limits*
    - *Revised Annual Catch limits.* The preferred alternative would

- *Modifications to DAS Allocations and Monkfish Possession Limits*
    - *Northern Fishery Management Area DAS Allocation and Monkfish Possession Limit*. The preferred alternative would.

    - *Southern Fishery Management Area DAS Allocations and Monkfish Possession Limits* The preferred alternative would.

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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2.0 Contents

2.1 Table of Contents

2.2 List of Tables

2.3 List of Figures

2.4 List of Appendices

No appendices are included with this action.

2.5 List of Acronyms

ABC	Acceptable 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
CPUE	catch per unit of effort
DAM	Dynamic Area Management
DAS	days-at-sea
DPS	Distinct Population Segments
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
GB	Georges Bank
GOM	Gulf of Maine
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
LOA	letter of authorization
MA	Mid-Atlantic
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MPA	Marine Protected Area
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSRA	Magnuson-Stevens Reauthorization Act of 2007
MSY	maximum sustainable yield
NEFMC	New England Fishery Management Council

NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
GARFO	Greater Atlantic Regional Fisheries Office
NFMA	Northern Fishery Management Area (Monkfish)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OLE	Office for Law Enforcement (NMFS)
OY	optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
PREE	Preliminary Regulatory Economic Evaluation
RFA	Regulatory Flexibility Act
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area
SAFE	Stock Assessment and Fishery Evaluation
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
SFMA	Southern Fishery Management Area (monkfish)
SNE	southern New England
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
TAC	total allowable catch
TED	turtle excluder device
TTAC	Target Total Allowable Catch
TTAL	Target Total Allowable Landings
VEC	Valued Ecosystem Component
VMS	vessel monitoring system
VPA	virtual population analysis
VTR	vessel trip report
WGOM	Western Gulf of Maine
YPR	yield per recruit

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3.0 Background, Purpose and Need

3.1 Background and Introduction

3.1.1 History of the Fishery Management Plan

The Monkfish FMP was initially implemented in 1999, and has been modified several times, most recently in 2011 with the implementation of Amendment 5 and FW 8 in 2014. The documents pertaining to previous management actions are available on the NEFMC website, www.nefmc.org. Below is a summary of recent management actions beginning with FW 4.

For management purposes, the monkfish fishery is divided into two areas; the Northern Fishery Management Area (NFMA) and the Southern Fishery Management Area (SFMA; see Figure 1). While scientific evidence for two biological stocks is uncertain, and additional research, including archival tagging, is ongoing, fisheries in the two areas are clearly distinct. As a result, stock assessments are completed for the two areas separately to be able to support the management plan. The NFMA monkfish fishery is closely integrated with the multispecies fishery, and is primarily a trawl fishery, while the SFMA fishery is primarily a gillnet fishery targeting monkfish almost exclusively. These differences have resulted in some differences in management measures, such as landing limits and DAS allocations, between the two areas.

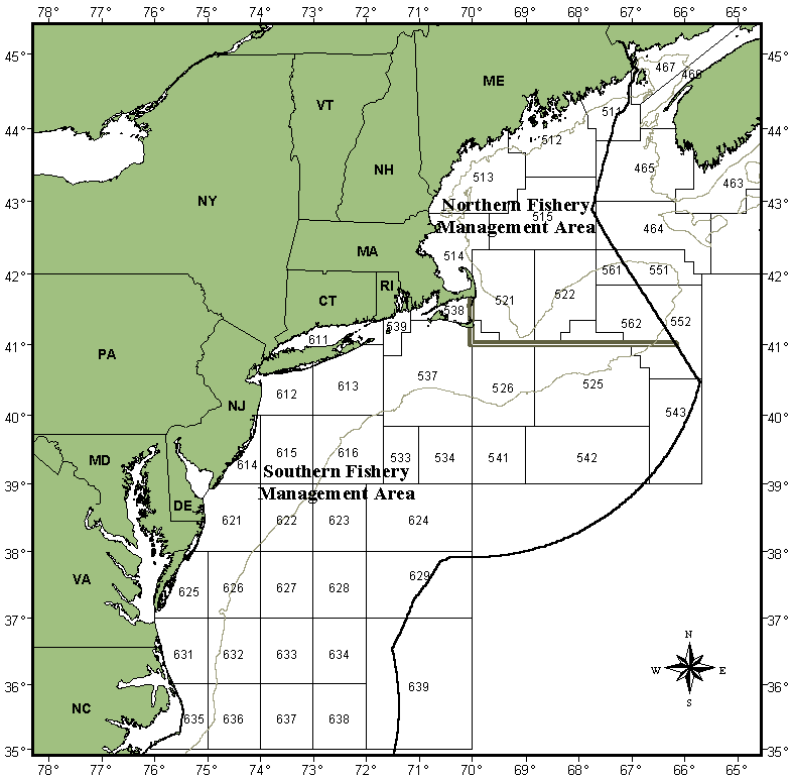


Figure 1 – Monkfish fishery management areas and statistical areas.

FW4 was implemented on October 22, 2007 and set target total allowable catch levels (TTACs) at 5,000 mt and 5,100 mt for the NFMA and SFMA, respectively. FW 4 also established the requirement that vessels that exceeded the monkfish incidental catch limit while fishing in the NFMA on a multispecies

DAS, must declare they were using a monkfish DAS, which could be done by Vessel Monitoring Systems (VMS) any time prior to returning to port. Vessels in the SFMA were already required to declare a monkfish DAS when exceeding the incidental limit. FW 4 also reduced the monkfish incidental limit in the NFMA from 400 lb tail weight/DAS or 50% of the weight of fish on board, whichever is less, to 300 lb tail weight/DAS or 25% of the total weight of fish on board, whichever is less.

FW 4 retained the 550 lb and 450 lb tail weight/DAS SFMA monkfish landing limit for permit categories A, C, G and B, D, H, respectively. Vessels were allocated 31 monkfish DAS, but vessels were limited to an allowance of 23 DAS in the SFMA out of the total allocation. In the NFMA, landing limits were set at 1,250 lb and 470 lb tail weight/DAS for permit category A and C and B and D, respectively. FW 4 established that the DAS allocations would remain in effect through FY 2009, with extension into FY 2010 in absence of any regulatory change, unless the TTAC was exceeded in an area during the 2007 fishing year. In that case, the TTAC overage backstop provision established in FW 4 would have taken effect and would have resulted in a recalculation of the DAS allocations based on catch and effort data from the 2007 fishing year to keep landings below the TTAC. The backstop provision would have made no adjustment if the TTAC overage was 10% or less, and would have closed the directed fishery in a management area if the overage exceeded 30%, resulting in zero monkfish DAS being allocated, and the application of monkfish incidental limits to all vessels. Other measures adopted under FW 4 included a change in the northern boundary of the Category H fishery from 38°20'N Latitude to 38°40'N Latitude, and a change to the monkfish incidental limit on limited access scallop vessels fishing in the closed area access programs.

FW 5, which was implemented prior to the start of the 2008 fishing year (73 *Federal Register* 22831, April 28, 2008; NEFMC, 2008a), reduced the number of unused DAS that could be carried over to the next fishing year from 10 to 4; revised the DAS accounting method for gillnet vessels such that all trips less than 15 hours would be counted as 15 hours, eliminating the provision that trips less than 3 hours would be counted as time used; and, revised the monkfish incidental catch allowance applicable to vessels in the Southern New England Regulated Mesh Area (SNE RMA) fishing with large mesh but not on a monkfish, scallop or multispecies DAS, from 5% of the total weight of fish on board (with no landings cap) to 5% of total weight of fish on board not to exceed 50 lb per day, up to 150 lb maximum, and also applied this revision to all vessels fishing under a Skate Bait Letter of Authorization (LOA) east of 74°00'W. In addition, FW 5 modified the Monkfish LOA requirement for vessels fishing under the less restrictive measures for the NFMA such that vessels using a VMS would no longer be required to obtain the LOA, but could make the declaration via the VMS.

With the adoption of new biological reference points and revised stock status as a result of the DPWG assessment, as well as the measures adopted in FW 5 designed to reduce the likelihood of TTAC overages, the Councils concluded that the backstop provision, established in FW4, was no longer necessary. They submitted the regulatory change in FW 6 in April 2008, and the final rule become effective on October 10, 2008, approximately seven months before the start of FY 2009 (73 *Federal Register* 52635, September 10, 2008; NEFMC, 2008b). This was the only action taken in FW 6.

Amendment 5 was also developed to bring the Monkfish FMP into compliance with recently revised National Standard 1 (NS1) Guidelines (74 FR 3178; January 16, 2009), which not only established a process for setting ACLs and guidance for establishing AMs, but also provided updated guidelines for establishing reference points and control rules (i.e., maximum sustainable yield (MSY), optimum yield (OY), OFL, ABC, ACLs, and ACTs) and clarified the relationship between them. Amendment 5 implemented two different types of AMs to ensure that overfishing does not occur (NEFMC, 2011a). First, ACTs were set sufficiently below the ACL for each area to account for management uncertainty (ability of management measures to control catch). Management measures were then developed to

achieve this lower level of catch. Amendment 5 also implemented reactive AMs that deduct any overages of the ACL on a pound for pound basis from the ACT specified for the year following the overage. Management measures must then be revised to achieve, but not exceed the revised ACT for that area. In doing so, these measures were implemented to ensure that sufficient protections are in place to prevent overfishing. Amendment 5 also established biological and management reference points consistent with NS1 guidelines using the most recent scientific information available at the time it was developed, from the 2007 DPWG assessment.

Given the timing of SAW 50 (July 2010) and the Councils' final action on Amendment 5 in June 2010, Amendment 5 provided new biomass reference points, recalculated the fishing mortality rate (F) corresponding to the overfishing threshold, F_{max}, and concluded that the stock status would not change, even under the new reference points. Furthermore, the Councils addressed two primary purposes regarding Amendment 5: 1) to implement the MSA mandated ACLs and accountability measures (AMs), and 2) to set the specifications of DAS, landing limits and other management measures to replace those adopted in FW 4. The Councils also proposed modifications to the FMP to improve the Research Set Aside (RSA) Program, to minimize bycatch resulting from trip limit overages, and to allow the landing of monkfish heads.

In 2011, FW 7 proposed a reduction in the ACT for the NFMA below the proposed ACL (NEFMC, 2011b). This change also required a revision to the specifications for DAS and trip limits based on the ACT. The ACT for the NFMA proposed in Amendment 5 was above the ACL based on SSC recommendations following SAW 50 and was updated as a result of revised scientific information and recommendations of the SSC. As a result, FW 7 addressed the inconsistency seen in Amendment 5, since NS1 Guidelines state that an ACT cannot exceed the ACL established for a stock.

Framework 8 became effective on July 18, 2014 (79 *Federal Register* 41918; NEFMC, 2014a). It increased monkfish day-at-sea allocations and landing limits, allowed vessels issued a limited access monkfish Category H permit to fish throughout the SFMA, enabled vessels to use an allocated monkfish-only day-at-sea time throughout the fishing year and revised biological reference points for the monkfish stocks in the Northern and Southern Fishery Management Areas.

3.1.1.1 Monkfish Exemption Areas

Exempted fisheries allow fishing vessels to fish for specific species without being subject to certain NE multispecies regulations including DAS, provided the bycatch of regulated species is minimized. The GOM/GB monkfish gillnet exemption area restricts vessels fishing under the exemption to gillnets with minimum mesh size of 10 inches (diamond) throughout the net between July 1 through September 14; only monkfish and lobster can be landed. The SNE monkfish and skate trawl exemption restricts vessels fishing under the exemption to a minimum mesh size of 10 inch square or 12 inch diamond mesh. Landings are restricted to monkfish, incidentally caught species allowed in the SNE Regulated Mesh Area, and skates. Currently, the SNE monkfish and skate gillnet exempted fishery restricts vessels fishing under the exemption to gillnet gear with a minimum mesh size of 10 inches with only monkfish, some incidentally caught species, and skate allowed to be retained. Currently the Mid-Atlantic Exemption Area exempts vessels fishing in the exemption area from the 5-percent bycatch criteria specifications and may, therefore, fish in a fishery outside of a NE multispecies DAS, provided that the vessel does not possess or land regulated multispecies finfish. Further information on possession limit restrictions can be found at https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/large_mesh_exemption.pdf.

3.1.1.2 2013 Emergency Action

On May 1, 2013, NMFS implemented an emergency rule that temporarily suspended existing monkfish landing limits for vessels issued both a Federal limited access Northeast Multispecies permit and a limited access monkfish Category C or D permit that are fishing under a monkfish DAS in the NFMA. This emergency action was continued through the end of the 2013 fishing year, with the suspension of monkfish landing limits expanded to apply to Category C or D permits fishing exclusively on a NE multispecies DAS in the NFMA. This action was necessary to help mitigate expected adverse economic and social harm resulting from substantial reductions to the 2013 ACLs for several stocks managed under the Northeast Multispecies FMP. The intent was to provide additional fishing opportunities to vessels affected by reductions to groundfish catch limits, without resulting in overfishing monkfish within the NFMA or SFMA.

3.1.1.3 Standardized Bycatch Reporting Methodology (SBRM) Omnibus Amendment (Amendment 3)

On September 15, 2011, upon the order of the U.S. Court of Appeals for the District of Columbia Circuit, the U.S. District Court for the District of Columbia, in the case of Oceana, Inc. v. Locke (Civil Action No. 08-318), vacated the Northeast Region Standardized Bycatch Reporting Methodology (SBRM) Omnibus Amendment and remanded the case to NMFS for further proceedings consistent with the D.C. Circuit Court's decision.

To comply with the ruling, NMFS announced on December 29, 2011 (76 FR 81844) that the Northeast Region SBRM Omnibus Amendment was vacated and all regulations implemented by the SBRM Omnibus Amendment final rule (73 FR 4736, January 28, 2008) are removed. This action removed the SBRM section at § 648.18 and removes SBRM-related items from the lists of measures that can be changed through the FMP framework adjustment and/or annual specification process for the Atlantic mackerel, squid, and butterfish; Atlantic surfclam and ocean quahog; Northeast multispecies, monkfish; summer flounder; scup; black sea bass; bluefish; Atlantic herring; spiny dogfish; deep-sea red crab; and tilefish fisheries. This action also makes changes to the regulations regarding observer service provider approval and responsibilities and observer certification. The SBRM Omnibus Amendment had authorized the development of an industry-funded observer program in any fishery, and the final rule modified regulatory language in these sections to apply broadly to any such program. This action revises that regulatory language to refer specifically to the industry-funded observer program in the scallop fishery, which existed prior to the adoption of the SBRM Omnibus Amendment.

NMFS, NEFMC and MAFMC are developed a new omnibus amendment to bring Northeast fishery management plans into compliance with Magnuson-Stevens Act requirements for a standardized bycatch reporting methodology. The amendment became effective July 30, 2015. It implemented a new prioritization process for allocation of observers if agency funding was insufficient to achieve target levels, bycatch reporting and monitoring mechanisms, analytical techniques and allocation of at-sea fisheries observers, a precision-based performance standard for discard estimates, a review and reporting process, framework adjustment and annual specifications provisions, and provisions for industry-funded observers and observer set-aside programs.

3.1.1.4 Essential Fish Habitat Omnibus Amendment 2 (Monkfish Amendment 4)

The NEFMC began development of Phase 1 of the Essential Fish Habitat (EFH) Omnibus Amendment in 2004, which includes Amendment 4 to the Monkfish FMP. The primary purpose of Phase 1 was to review EFH designations, consider Habitat Areas of Particular Concern (HAPC) alternatives, describe prey species, and evaluate non-fishing impacts. This action is an amendment to all FMPs in this region. The NEFMC approved the DSEIS for Phase 1 at the February 2007 NEFMC meeting, which then was

submitted to NMFS in March 2007. The NEFMC made final decisions on Phase 1 topics at their June 2007 meeting. Phase 2 of the EFH Amendment began in September 2007 to consider the effects of fishing gear on EFH and move to minimize, mitigate or avoid those impacts that are more than minimal and temporary in nature. The NEFMC took final action on the Omnibus Habitat Amendment 2 at the June 2015 Council meeting.

Omnibus Habitat Amendment 2 Environmental Impact Statement is currently being finalized and likely to be implemented in the foreseeable future. This amendment could affect monkfish via increased protection of benthic habitats used by the species from the adverse effects of various regional fisheries. The biological and fishery impacts on monkfish are expected to be mixed based on the analysis for the DEIS (NEFMC, 2015a). However, the overall impacts on monkfish may differ in the final document as some of the preferred alternatives were modified during the Council process.

3.1.2 **Other Fishery Management Plans Affecting the Monkfish Fishery**

A majority of monkfish limited access vessels also hold limited access permits in either the Northeast Multispecies or Atlantic Sea Scallop fisheries. Both of those fisheries continue to undergo changes in their respective management programs, which have direct and indirect effects on the monkfish fishery. In large part due to the success of the Scallop FMP and the profitability of the fishery, scallop vessels that also have monkfish limited access permits use their allocated effort to target scallops rather than monkfish; they would be required to use a scallop DAS to target monkfish, and be prohibited from using a dredge on those trips. As a result, a substantial portion of the allocated monkfish effort (DAS) is not used. In contrast, while some multispecies stocks have responded positively to management actions (e.g., haddock and redfish) others remain overfished and in need of rebuilding. Consequently, the Multispecies FMP continues to constrain fishing effort and recently underwent major changes, most notably the adoption of catch shares through the allocation of quota to sectors.

3.1.2.1 Multispecies FMP

Amendment 16 implemented major changes to the NE Multispecies FMP (NEFMC, 2009a). Notably, it greatly expanded the sector program and implemented ACLs and AMs in compliance with 2006 revisions to the MSA. The amendment also included a host of mortality reduction measures for “common pool” (i.e. non-sector) vessels and the recreational component of the fishery. Amendment 16 became effective on May 1, 2010. In 2011, the NEFMC approved Amendment 17, which allowed for NOAA-sponsored state-operated permit banks to function within the structure of Amendment 16.

FW 48 was implemented in May 2013, and continued to modify management measures and ensure that overfishing does not occur (NEFMC, 2013a). That action eliminated dockside monitoring requirements, reduced minimum fish sizes for several stocks, adjusted the allocation of Georges Bank yellowtail flounder to the scallop fishery, established ACLs for several groundfish stocks caught in other fisheries, and revised existing AMs for other stocks. FW 50 was also implemented in May 2013, and included a range of measures designed to achieve mortality targets and net benefits from the fishery, including setting catch levels for FY 2013-2015, revising the rebuilding program for Southern New England/Mid-Atlantic winter flounder, and revising sector carry-over provisions (NEFMC, 2013b).

FW 51 was implemented during FY 2014 (NEFMC, 2014b). This action would update catch levels for several stocks, revise management measures for Georges Bank yellowtail flounder, establish a quota trading mechanism for transboundary Georges Bank stocks that are jointly managed with Canada (cod, haddock, and yellowtail flounder), and revise common pool and recreational measures. That action is scheduled to become effective May 1, 2014. Amendment 18 is under development, and is focused on

addressing concerns over excessive shares and improving the efficiency of sector and Handgear A measures. The Draft Environmental Impact Statement was submitted in 2015 (NEFMC, 2015b).

Framework Adjustment 52 was implemented on January 14, 2015 and revised the accountability measures (AMs) for the groundfish fishery for the northern and southern windowpane flounder stocks (NEFMC, 2014c). The size of the AM gear-restricted areas could be reduced if it was determined that improvements in windowpane flounder stock health occurred despite the catch limits being exceeded. The duration of the AM could also be shorted if it was determined ta tan overage of the catch limit did not occur in the year following the overage.

On November 12, 2014, NMFS issued a temporary rule that revised the stock status determination criteria for Gulf of Maine haddock and increased the Gulf of Maine haddock catch limits for the remainder of FY2014.

On November 13, 2014, NMFS issued a temporary rule that changed commercial and recreational fishery management measures in order to protect Gulf of Maine cod in response to a recent updated assessment of the status of this stock. The interim measures implemented time and area closures to commercial and recreational vessels using gear capable of catching Gulf of Maine cod, a 200 lb. Gulf of Maine cod trip limit for common pool and sector vessels, changes to commercial fishing declarations, prohibition of the possession of recreationally caught Gulf of Maine cod and revocation of a previously authorized Gulf of Maine exemption that allowed sector vessels that had declared into the gillnet fishery to use more gillnets. The measures were effective until May 12, 2015.

Framework Adjustment 53, which was implemented on May 1, 2015, included a range of measures designed to achieve mortality targets and net benefits from the fishery, including setting catch levels for FY 2015-2017, revising Gulf of Maine cod spawning protection measures, establishing a provision for the rollover of specifications and modifying sector ACE carryover (NEFMC, 2015c).

The NEFMC has begun work on Framework Adjustment 55, which would include a range of measures designed to achieve mortality targets and net benefits from the fishery, including status determination criteria, setting catch levels for FY 2016-2018, implementing an additional sector, modifying the definition of the haddock separator trawl, modifying the groundfish monitoring program, measures for US/CA TACs, and modifying GOM cod protection measures. FW55 has not been submitted yet and the implementation date is currently unknown.

3.1.2.2 Atlantic Sea Scallop FMP

Other scallop actions that could have affected the monkfish fishery include Amendment 15 (NEFMC, 2010), FW 21 (effective on June 28, 2010; NEFMC, 2010), and FW 22 (NEFMC, 2011e). Frameworks 21 and 22 set specifications for FY 2010-2012. Amendment 15 brought the scallop FMP in compliance with the new requirements of the MSA (namely ACLs and AMs); permit stacking and leasing alternatives for limited access vessels were considered but not selected; overall, Amendment 15 considered measures to adjust several aspects of the overall program to make the scallop management plan more effective. FW 21 set specifications and area access programs for FY 2010. FW 22 was implemented in 2011 and proposed a specific ABC level as required by the MSA, 31,279 mt in 2011, 33,234 mt in 2012, and 32,935 mt in 2013 (the values include estimated discard mortality). This action also included specific measures to comply with reasonable and prudent measures developed by NMFS in the 2012 BO on this fishery regarding impacts on sea turtles.

The most recent scallop actions include FW 23 (NEFMC, 2011f), FW 24 (NEFMC, 2013d), FW 25 (NEFMC, 2014d), and FW 26 (NEFMC, 2015d). FW 23 developed measures to minimize impacts on sea turtles through the requirement of a turtle deflector dredge starting in 2013 in the Mid-Atlantic in the summer and fall. FW 23 also has provisions to improve the effectiveness of the accountability measure adopted under Amendment 15 for the yellowtail flounder sub-ACL, to consider specific changes to the general category Northern GOM management program to address potential inconsistencies, and to consider modifications to the vessel monitoring system to improve fleet operations. FW 24 set specifications for FY2013 and default measures for FY2014. FW 24 also adjusted the Georges Bank scallop access area seasonal closure schedules and continued the closures of the Delmarva and Elephant Trunk scallop access areas, refined the management of yellowtail flounder AMs in the scallop fishery and made adjustments to the industry-funded observer program and provided more flexibility in the management of the individual fishing quota program. FW 25 set specifications to adjust the DAS allocations and an area rotation schedule for FY 2014, default measures for FY 2015, inclusion of accountability measures for SNE/MA windowpane flounder, and measures to reduce mortality of juvenile scallops. FW 26 set specifications for FY2015 and closed a portion of the Elephant Trunk Access Area and extended the boundaries of the Nantucket Lightship Access Area, adjusted the State Waters Exemption Program, allowed for Vessel Monitoring System declaration changes, implemented a proactive AM to protect windowpane and yellowtail flounder, aligned two gear measures, and implemented other measures. FW 27 is currently under development and includes specifications for FY2016 and default measures for FY2017.

3.1.2.3 Northeast Skate Complex FMP

The final rule for Amendment 3 to the Northeast Skate Complex FMP was published on June 16, 2010 (NEFMC, 2009b). This amendment establishes ACLs, AMs, seasonal bait fishery quotas, and skate wing, bait, and incidental skate landing limits to address the following issues:

- Overfished status of thorny skate
- Overfishing of thorny skate
- Implementation of ACLs and AMs, as mandated by the reauthorized MSA, and
- A baseline review process that has become obsolete and less meaningful.

The final action established an incidental skate landing limit of 500 lb of wing weight (1,135 lb whole weight), established a 20,000 lb whole weight landing limit for vessels with a Skate Bait Letter of Authorization, reduced the skate wing landing limit to 5,000 lb wing weight (11,350 lb whole weight), and adopted a three-season annual quota system for the skate bait fishery. In-season AMs will reduce allowable skate landing landings to the incidental limit (500 lb of skate wing weight, 1,135 lb whole weight) when landings approach 80-90% of allowable levels.

An annual monitoring report and a bi-annual specification process replaced the obsolete baseline review procedures. The report describes the expected impacts of recent regulations and pending management alternatives in other fisheries that impact the skate resource. The first annual monitoring report was published in June 2010 and is available at:
http://www.nefmc.org/skates/annual_reviews/2010%20Annual%20Monitoring%20Report%20Final.pdf.

FW 1 was published by NMFS on May 17, 2011 (NEFMC, 2011g). This framework established the need to extend the length of the targeted skate wing fishery and to improve the economic benefits derived from the skate fishery. The facilitation measure for this action was to implement seasonal trip limits for the skate wing fishery to prolong the fishery because the limits implemented in Amendment 3 were caught in less than 3 months (Amendment 3 was implemented on July 16, 2010).

The 2012-2013 Northeast Skate Complex Specifications were implemented in May 2012 (NEFMC, 2012). This action set the annual catch limit specifications (ABC, ACL, ACT, and TALs) to maintain the skate fisheries while adequately minimizing the risk of overfishing the seven skate stocks. The skate specifications also include an adjustment to the skate wing landing limits to be consistent with the updated ACL and with new estimates of daily landings rates under current fishery conditions (through July 2011). Lastly, because skates are primarily used as bait they are considered the largest component of at-sea transfers and are reported in VTRs, but not reported by shoreside dealers, and the at-sea transfers of skates are a significant component of total skate catch. Thus, it is proposed that these at-sea transfers on VTR reports will count against the skate bait TAL.

FW 2 to the Skate FMP was implemented on September 29, 2014 and set skate fishery specifications for FYs 2014-2015 (NEFMC, 2014e). This action also modified skate reporting requirements for vessels and dealers. The ACL and TAL for the skate complex would decline by 30%. However, skate possession limits would remain unchanged from current levels. FW3 to the Skate FMP is currently under development and proposes fishery specifications for FY2016 and 2017. This action also proposes a seasonal structure for the wing fishery that splits the wing TAL into two seasons based on a three year moving average of landings. Skate possession limits would remain unchanged. This action, if approved, would become effective in early summer 2016.

3.1.2.4 Spiny Dogfish FMP

Amendment 3 to the Spiny Dogfish FMP was implemented on August 14, 2014 to address four issues in the management of the spiny dogfish fishery (MAFMC, 2014). This action implemented a research set-aside funding program for spiny dogfish, updated spiny dogfish essential fish habitat definitions, allowed rollover of management measures from one year to the next until replaced via rulemaking, and eliminated the seasonal allocation of the commercial quota to improve alignment of management measures with those of the Atlantic States Marine Fisheries Commission's (ASMFC) interstate management plan for spiny dogfish.

In 2013, NOAA Fisheries implemented specifications for the spiny dogfish fishery for FY 2013-2015. However, based on an updated review of stock status, the Councils adopted revised specifications for FY 2014-2015, which became effective on September 8, 2015. Specifications would increase the FY 2014 ACL and commercial quota to 60.695 million lb (+10 percent) and 49.037 million lb (+17 percent), respectively. For FY 2015, the ACL and commercial quota would be increased to 62.269 million lb (+13 percent) and 50.612 million lb (+22 percent), respectively. The federal spiny dogfish trip limit was raised to 5,000 lb (2,268 kg).

Specifications for FY2016-2018 are currently under development. Proposed specifications would decrease the ABC to 23,617 mt in 2016, 23,045 mt in 2017 and 22,635 mt in 2018. For FY2016, the commercial quota was reduced to 18,307 mt. The federal spiny dogfish trip limit was maintained at 5,000 lb.

3.2 Purpose and Need

The need for this action is to revise existing management measures to achieve, but not exceed, catch limits specified based on the most recent monkfish stock assessment update and more effectively harvest OY, as required by the M-S Act.

The primary purpose for this action is to establish specifications for the monkfish fishery, including DAS and landing limits for the NFMA and SFMA for FYs 2017 – 2019. These specifications were most

recently established in Framework 8 (2014) for both management areas. This action is needed to update these allotments consistent with the most recent scientific advice and the need to achieve OY in the fishery. No action is currently being taken to change the ABC in the fishery based on the advice of the NEFMC's SSC following the 2016 monkfish operational assessment.

3.3 Goals and Objectives

The original FMP specified the following management objectives:

1. To end and prevent overfishing; rebuilding and maintaining a healthy spawning stock;
2. To optimize yield and maximize economic benefits to the various fishing sectors;
3. To prevent increased fishing on immature fish;
4. To allow the traditional incidental catch of monkfish to occur.

The goals and objectives for this framework supplement the basic FMP objectives. As discussed in the Purpose and Need Section above, this framework is intended to address identified needs consistent with these FMP objectives.

4.0 Alternatives under Consideration

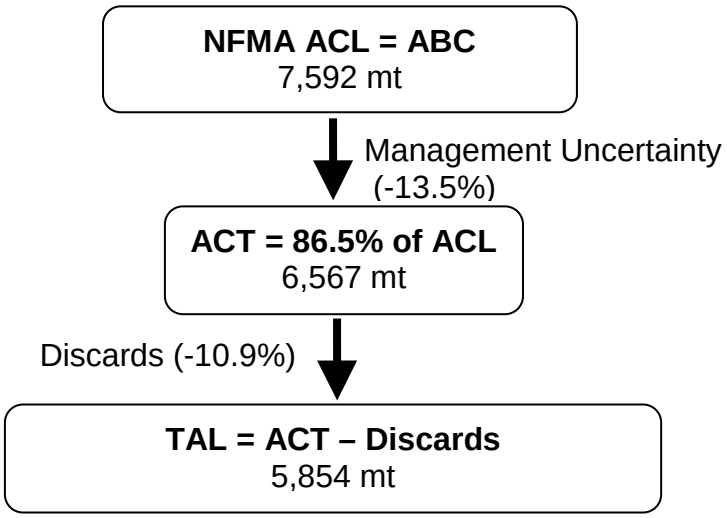
4.1 Updates to Annual Catch Limits

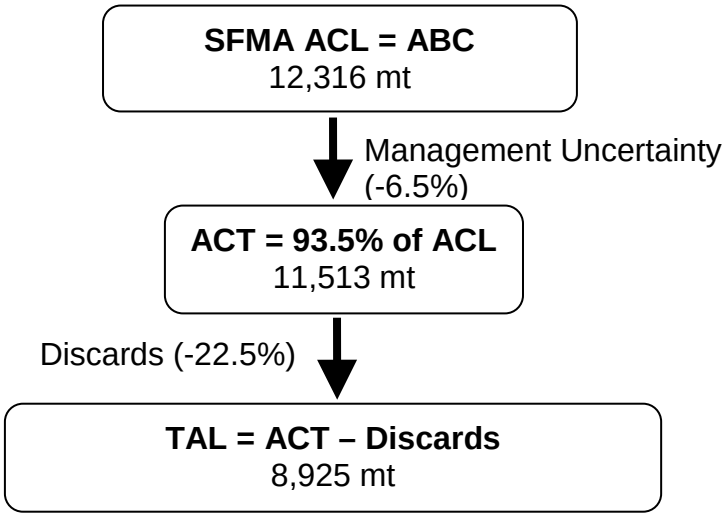
4.1.1 **Revised Annual Catch Limits**

The 2016 operational assessment did not include an update to the population model (SCALE) used in previous assessments because new information revealed problems with methods used to estimate monkfish age and growth. Therefore the 2016 assessment updated indicators including commercial fishery statistics, fishery-independent survey indices, and fishery performance indices, but did not update the SCALE population model. Based on the observed trends, the SSC recommended status quo OFLs and ABCs for both management areas for FYs 2017 - 2019.

4.1.1.1 Option 1: No Action

This option would maintain the specifications (ABC, ACT, and TAL) for both the NFMA and SFMA as set in Framework 8 (NEFMC, 2014). This option would not take into account the updated discard rate information from the 2016 operational assessment. The overfishing limit (OFL) would be maintained as 17,805 mt and 23,204 mt for the NFMA and SFMA, respectively, and the ABC, ACT and TAL calculated as in FW8:

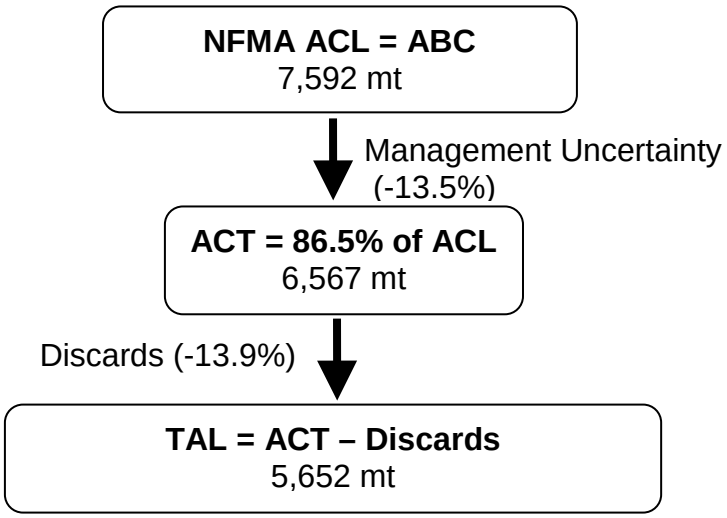


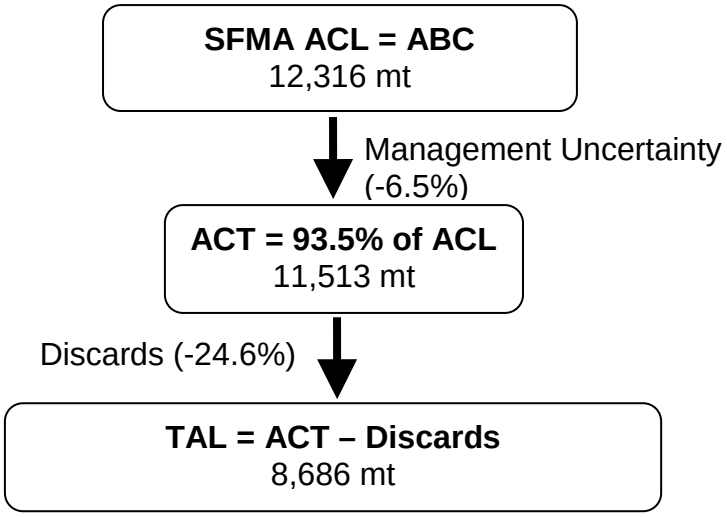


Rationale: The 2016 operational assessment provided a plan for setting catch advice. The SCALE model could not be updated because of uncertainty about the ageing methodology currently used to estimate monkfish growth. The OFL is defined as the product of $F_{threshold}$ and current exploitable biomass ($B_{current}$) and was last calculated using the SCALE model updated in the 2013 operational assessment (NEFSC, 2013). The 2016 operational assessment did not vacate the benchmark assessment, however, and since the SCALE model was not updated, the OFL was not updated. The status quo TAL would continue to use the 2007 Data Poor Working Group Assessment discard estimates that do not include updates in data and estimation methodology. The discard rate is calculated as the ratio of discards to catch, and under status quo, the years used to calculate the discard rate would be 2004-2006.

4.1.1.2 Option 2: Updated Discard Rate for Northern and Southern Fishery Management Areas

This option would maintain the specifications (ACL and ACT) for both the NFMA and SFMA as set in Framework 8 (NEFMC, 2014) but would update the discard rate for both management areas based on the 2016 operational assessment.

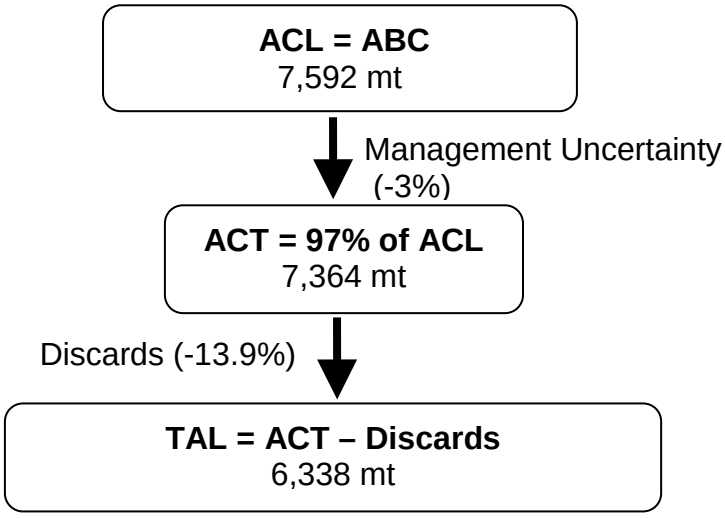




Rationale: The 2016 operational assessment provided a plan for setting catch advice. It did not update the reference points derived from the SCALE model. The SCALE model could not be updated because of uncertainty about the ageing methodology currently used to estimate monkfish growth. The PDT recommended that the ACL should always be set below the OFL due to the extent and magnitude of scientific uncertainty in the assessment. Sources of scientific uncertainty include fishery data (landings, discards, observer/port sampling), biological parameters (growth, longevity, natural mortality), the SCALE model, survey data, and lag time between updated assessment results. The OFL is defined as the product of $F_{threshold}$ and current exploitable biomass ($B_{current}$) and was last calculated using the SCALE model updated in the 2013 operational assessment (NEFSC, 2013). The 2016 operational assessment did not vacate the benchmark assessment, however, since the SCALE model was not updated, the OFL also was not updated. The discard rate is calculated from the ratio between the same 3 years of discards and catch. Under Option 2, the years used to calculate the discard rate were 2013-2015.

4.1.1.3 Option 3: Reduce the Management Uncertainty Buffer to 3% in the Northern Fishery Management Area (***Preferred Alternative***)

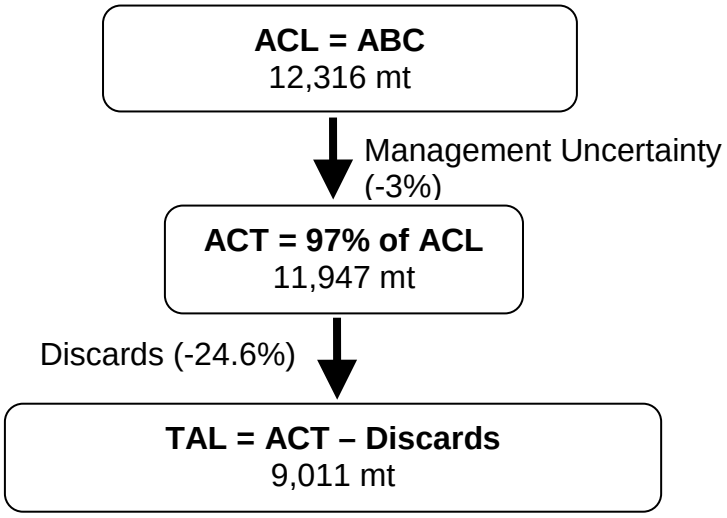
Option 3 would reduce the management uncertainty buffer in the NFMA to 3%. The ACL would not be affected by that reduction but the ACT would increase. The revised specifications would also update the years used to calculate the discard rate from 2004-2006 to 2013-2015 (as outlined in Option 2 [Section 1.1.1.2] above). The overfishing limit (OFL) would be maintained as 17,805 mt.



Rationale: The methodology used to calculate discards has performed well by setting aside an adequate amount of poundage to reduce the likelihood of the ACL being exceeded. This could justify reducing the management uncertainty buffer. The SCALE model could not be updated because of uncertainty about the ageing methodology currently used to estimate monkfish growth. The OFL is defined as the product of $F_{threshold}$ and current exploitable biomass ($B_{current}$) and was last calculated using the SCALE model updated in the 2013 operational assessment (NEFSC, 2013). The 2016 operational assessment did not vacate the benchmark assessment, however, since the SCALE model was not updated, the OFL also was not updated. The ACT was established as a proactive Accountability Measure (AM) that was set sufficiently below the ACL to prevent the ACL from being exceeded in consideration of all sources of management uncertainty. Sources of management uncertainty included number of permits (active limited access permits, open access permits), DAS/trip limits (DAS usage rate, DAS usage pattern, catch rates), incidental catch fisheries (participants, catch rates), annual participation in each management area, gear used, enforcement, and regulations in other FMPs. Less than 62% of the ACL was achieved in FY2015, indicating that the risk of exceeding the ACL is low. The discard rate is calculated from the ratio between the same 3 years of discards and catch. Under Option 3, the years used to calculate the discard rate were 2013-2015. The

4.1.1.4 Option 4: Reduce the Management Uncertainty Buffer to 3% in the Southern Fishery Management Area (***Preferred Alternative***)

Option 4 would reduce the management uncertainty buffer in the SFMA to 3%. The ACL would not be affected by that reduction but the ACT would increase. The OFL would be maintained as 23,304 mt. The revised specifications would also update the years used to calculate the discard rate from 2004-2006 to 2013-2015 (as outlined in Option 2 [Section 1.1.1.2] above).



Rationale: The performance of the methodology used to calculate discards has performed well by setting aside an adequate amount of poundage to reduce the likelihood of the ACL being exceeded. This could justify reducing the management uncertainty buffer. The SCALE model could not be updated because of uncertainty about the ageing methodology currently used to estimate monkfish growth. The OFL is defined as the product of $F_{threshold}$ and current exploitable biomass ($B_{current}$) and was last calculated using the SCALE model updated in the 2013 operational assessment (NEFSC, 2013). The 2016 operational assessment did not vacate the benchmark assessment, however, since the SCALE model was not updated, the OFL also was not updated. The ACT was established as a proactive Accountability Measure (AM) that was set sufficiently below the ACL to prevent the ACL from being exceeded in consideration of all sources of management uncertainty. Sources of management uncertainty included number of permits (active limited access permits, open access permits), DAS/trip limits (DAS usage rate, DAS usage pattern, catch rates), incidental catch fisheries (participants, catch rates), annual participation in each management area, gear used, enforcement, and regulations in other FMPs. Less than 48% of the ACL was achieved in FY2015, indicating that the risk of exceeding the ACL is low. The discard rate is calculated from the ratio between the same 3 years of discards and catch. Under Option 4, the years used to calculate the discard rate were 2013-2015.

4.2 Modifications to Current Monkfish Days-at-Sea and Trip Limits

In order to land more than incidental amounts of monkfish, vessels must be fishing under one or a combination of the following: a monkfish DAS, a Northeast (NE) multispecies day-at-sea (DAS), an Atlantic sea scallop DAS. Monkfish Permit Category C and D vessels (i.e., those also issued a limited access NE multispecies DAS permit) can declare a monkfish DAS while at sea in the NFMA if they are fishing on a NE multispecies DAS and declare the "monkfish option" prior to leaving port at the start of its trip. Permit Category C and D vessels fishing in the NFMA on both a NE multispecies and monkfish DAS do not have a monkfish trip limit.

4.2.1 **Modify the DAS allocation and/or trip limits in the NFMA**

4.2.1.1 Option 1: No Action

No action would maintain the existing DAS allocations and trip limits in the NFMA. Trip limits would remain as outlined in Table 2 when fishing on a monkfish DAS. DAS allocations would be kept at 45 DAS.

Table 1 - Landing limits while on a monkfish DAS in the NFMA

NFMA				
Permit Category	A	B	C	D
Landing limit (tail weight per DAS)	1,250 lb	600 lb	Unlimited (when also on a NE multispecies DAS)	Unlimited (when also on a NE multispecies DAS)

Rationale: The no action alternative would continue the stability and consistency that allows participants to maintain their business plans and reduce the likelihood of overfishing. The NFMA fishery is not limited by DAS allocations or the daily landing limit. The number of DAS used in the NFMA is low (Hermsen, 2016). The number of permit holders using their full allocation is low in the NFMA.

4.2.1.2 Option 2: Increase the incidental trip limits in the NFMA (***Preferred Alternative***)

Option 2 would maintain the status quo DAS allocations and the status quo trip limits when fishing on a monkfish DAS in the NFMA, but would increase the incidental landing limits when on a NE multispecies DAS. The incidental landing limits would increase to 900 lb tail weight/DAS for category C vessels and 750 lb tail weight/DAS for category D vessels. Incidental landing limits would remain at 25% of landings onboard, not to exceed 300 lb for permit category E, F, or H, when fishing on a NE multispecies DAS.

Rationale: This alternative increases incidental trip limits on a NE multispecies, which will help decrease the administrative burden on vessels in the NFMA and may help reduce regulatory discards of monkfish in the event that the incidental limit has been limiting in the past.

4.2.2 Modify the DAS allocation and trip limits in the SFMA

4.2.2.1 Option 1: No Action

No action would maintain the existing DAS allocations and trip limits in the SFMA. Trip limits would remain as outlined in Table 3 when fishing on a monkfish DAS. DAS allocations would be kept at 32 DAS.

Table 2 - Trip limits in the SFMA when on a monkfish DAS

SFMA			
Permit Category	A, C, or G	B, D, or H	F
Landing limit (tail weight per DAS)	610 lb	500 lb	1,600 lb

Rationale: The no action alternative would continue the stability and consistency that allows participants to maintain their business plans. This would also maintain fishing effort at a level not shown to result in overfishing in previous assessments. However, the 2016 operational assessment indicated a decrease in exploitable biomass.

4.2.2.2 Option 2: Increase the DAS Allocation and Trip Limits in the SFMA (***Preferred Alternative***)

Option 2 would increase the DAS allocation in the SFMA by 15%. DAS would increase from 32 to 37. It would also increase the SFMA DAS trip limits by 15%. Trip limits for permit categories A and C would increase to 700 lb tail weight per DAS, for permit category B and D vessels and 575 lb tail weight per DAS.

Incidental landing limits would remain 50 lb for category E or H permits and non-trawl category C, D, or F permits, and at 300 lb for trawl category C, D, or F permits. Incidental landing limits would remain at 50 lb for category E or H permits and non-trawl category C, D, or F permits, and at 300 lb for trawl category C, D, or F permits.

Rationale: Because the SFMA TAL was not achieved in FYs 2014 and 2015, this alternative increases DAS allocation and trip limits in order to increase landings in the directed fishery. The majority of landings in the SFMA come from directed trips. Because more directed trips occur in the south, the southern fishery is restricted by DAS allocations and trip limits. Some vessels in the SFMA are using their entire DAS allocations (Figure 2, Hermsen, 2016). Therefore we would expect to see a larger impact on landings in the SFMA rather than the NFMA if the DAS allocations or daily landings limits were increased.

5.0 Considered but Rejected

5.1.1 Modify the DAS allocation and/or trip limits in the NFMA

5.1.1.1 Option 1: Increase the DAS allocation in the Northern Fishery Management Area

Option 1 would have increased the NFMA DAS allocation from 45 to up to 74 or 87 DAS depending on the management uncertainty buffer. Incidental landing limits would remain at 25% of landings onboard, not to exceed 300 lb for permit category E, F, or H, 600 lb for category C permits, and 500 lb for category D permits when fishing on a NE multispecies DAS.

This option was not pursued because it would not meet the need to increase landings or flexibility in the NFMA.

5.1.1.2 Option 2: Increase the DAS allocation in the SFMA

Option 2 would maintain the status quo possession limits in the SFMA (Table 3) but would increase the SFMA DAS allocation by 15%. DAS would increase from 32 to *37*. Incidental landing limits would remain 50 lb for category E or H permits and non-trawl category C, D, or F permits, and at 300 lb for trawl category C, D, or F permits.

This option was not pursued because the Council intended to increase both DAS allocations and trip limits in the SFMA. This option only increased DAS allocation.

5.1.1.3 Option 3: Increase the trip limits in the SFMA

Option 3 would maintain the status quo DAS allocations in the SFMA, but would increase the SFMA DAS trip limits by 15%. Trip limits for permit categories A and C would increase to 700 lb tail weight per DAS, for permit category B and D vessels and 575 lb tail weight per DAS. Incidental landing limits would remain at 50 lb for category E or H permits and non-trawl category C, D, or F permits, and at 300 lb for trawl category C, D, or F permits.

This option was not pursued because the Council intended to increase both DAS allocations and trip limits in the SFMA. This option only increased trip limits.

6.0 Affected Environment (SAFE Report for 2014)

6.1 Biological Environment and Stock Status

6.1.1 Monkfish Life History

Information about monkfish life history is incomplete, although ongoing cooperative research projects continue to improve the understanding of the species biology and population dynamics. Richards et al. (2008) examined data from resource surveys spanning the period 1948-2007, and noted that "monkfish exhibited seasonal onshore-offshore shifts in distribution, migrated out of the southern MAB in mid-spring, and re-appeared there in autumn". This observation is reflected in the seasonal pattern of fishing activity, particularly in the SFMA. The authors also observed that "sex ratios at length for fish 40-65 cm long were skewed toward males in the southern Mid-Atlantic Bight (MAB), but approximated unity elsewhere, suggesting that a portion of the population resides outside sampled areas. Growth was linear at 9.9 cm per year, and did not differ by region or sex. Maximum observed size was 138 cm for females and 85 cm for males. Length at 50% maturity for males was 35.6 cm (4.1 yrs. old) in the north and 37.9 cm (4.3 yrs. old) in the south. Length at 50% maturity for females was 38.8 cm (4.6 yrs. old) in the north and 43.8 cm (4.9 yrs. old) in the south. Ripe females were found in shallow (<50 m) and deep (>200 m) water in the south, and in shallow (<50 m) water in the north." However, recent research has called the validity of the growth curves used in the assessment into question. The current method used in the U.S. estimates the age of monkfish by counting rings in the vertebrae, each ring is assumed to represent one year. An age validation study indicated that the vertebra does not provide a consistent estimate of the presumed annual rings (Bank, 2016).

6.1.2 Monkfish Stock Status

NMFS conducted an operational assessment for monkfish in 2016 (Richards, 2016) but because of the uncertainty of the growth rates the SCALE model not updated in this assessment. An alternative method to advise catch limits was developed that was based on calculating the proportional rate of change in smoothed survey indices over the most recent 3 years and using those rates to revise catch limits. The survey trend adjustment factor suggested an increase in the NFMA of 2% and a decrease in the SFMA of 13%. Because the SCALE model was not used in the 2016 operational assessment the reference points and stock status could not be updated from the 2013 operational assessment numbers (Table 9). The 2013 assessment indicates that monkfish are not overfished in the NFMA or the SFMA (Figure 4 and Figure 5), however there are high levels of uncertainty regarding Biological Reference Points (BRPs) due to gaps in the input data and a persistent retrospective pattern that underestimates F and overestimates B in each area.

Table 3- Monkfish reference points and stock status from the 2013 Monkfish Operational Assessment

	North	South	Comment
$F_{threshold}$	0.44	0.37	F_{MSY} proxy based on F_{max}
$F_{current}$ (2011)	0.08	0.11	Overfishing Not Occurring
B_{target}	46,074 mt	71,667 mt	B_{msy} proxy
$B_{threshold}$	23,037 mt	35,834 mt	$0.5*B_{target}$
$B_{current}$ (2011)	60,500 mt	111,100 mt	Not Overfished

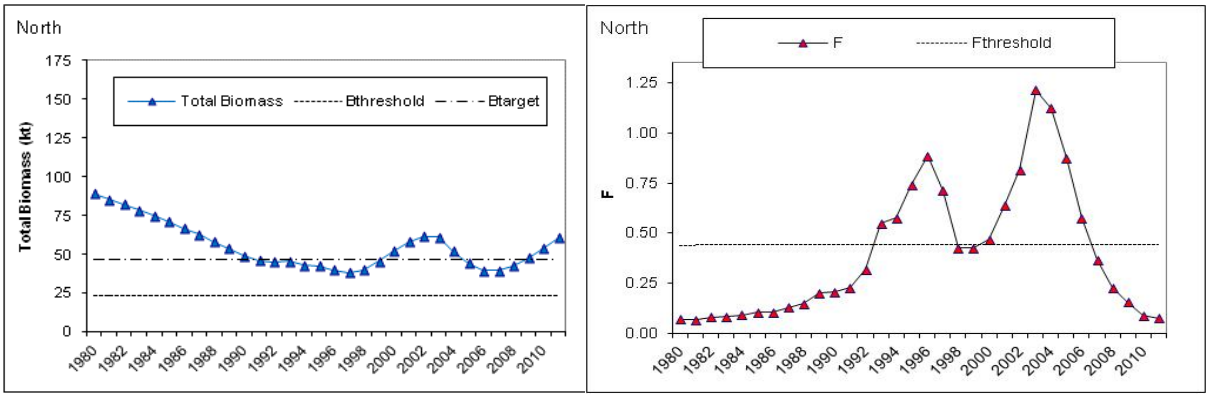


Figure 2 - Northern monkfish biomass and fishing mortality estimated from the 2013 Monkfish Operational Assessment

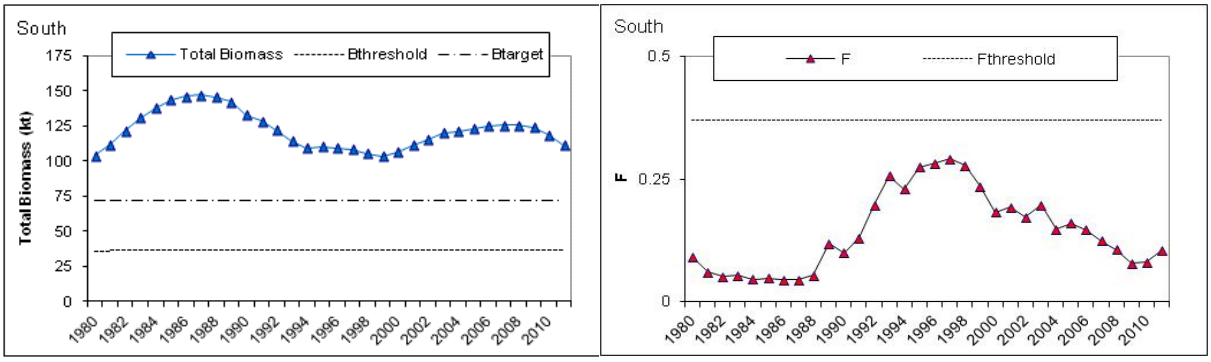


Figure 3 - Southern monkfish biomass and fishing mortality estimated from the 2013 Monkfish Operational Assessment

6.1.3 Bycatch of Non-target Species in the Fishery – To be Updated

The monkfish fishery is closely associated with the catch of several species managed by other FMPs, specifically groundfish, skate, and spiny dogfish fisheries. Particularly in the NFMA, monkfish can be targeted or caught as incidental bycatch during trips in which groundfish are also caught, depending on the focus of a trip. Further, skates and spiny dogfish are often caught when targeting monkfish in both areas, particularly in the SFMA.

The status of all managed groundfish stocks were most recently updated in 2015. Updated assessments occurred in 2015. These assessments are summarized in recent management actions under the Northeast Multispecies FMP, including FW 48 (NEFMC 2013a), FW 50 (NEFMC 2013b), FW 51 (NEFMC 2014b), FW 53 (NEFMC, 2015c), and FW55. Several groundfish stocks are overfished, while others are subject to overfishing (Table 10).

Table 4 - Current status of groundfish stocks for fishing year 2014 managed under the Northeast Multispecies FMP (GB = Georges Bank

Stock	2015 Assessments	
	Overfishing?	Overfished?
Georges Bank Cod	Unknown	Yes
Gulf of Maine Cod	Yes	Yes
Georges Bank Haddock	No	No
Gulf of Maine Haddock	No	No
Georges Bank Yellowtail Flounder	Unknown	Unknown
Southern New England/Mid-Atlantic Yellowtail Flounder	Yes	Yes
Cape Cod/Gulf of Maine Yellowtail Flounder	Yes	Yes
American Plaice	No	No
Witch Flounder	Yes	Yes
Georges Bank Winter Flounder	Yes	Yes
Gulf of Maine Winter Flounder	No	Unknown
Southern New England/Mid-Atlantic Winter Flounder	No	Yes
Acadian Redfish	No	No
White Hake	No	No
Pollock	No	No
Northern Windowpane Flounder	No	Yes
Southern Windowpane Flounder	No	No
Ocean Pout	No	Yes
Atlantic Halibut	Unknown	Yes
Atlantic Wolffish	No	Yes

Source: NEFSC 2015

6.2 Protected Resources (ESA Listed Species and MMPA Protected Species) – TO BE UPDATED

6.2.1 Species Present in the Area

Numerous protected species inhabit the environment within the monkfish FMP (Table 13). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act of 1973 (ESA) and/or the Marine Mammal Protection Act of 1972 (MMPA).

Table 5 - Species Protected under the Endangered Species Act and/or Marine Mammal Protection Act that may occur in the operations area of the monkfish fishery

Species	Status	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (*Eubalaena glacialis*)	Endangered	Yes
Humpback whale (*Megaptera novaeangliae*)	Endangered	Yes
Fin whale (*Balaenoptera physalus*)	Endangered	Yes
Sei whale (*Balaenoptera borealis*)	Endangered	Yes
Blue whale (*Balaenoptera musculus*)	Endangered	No
Sperm whale (*Physeter macrocephalus*	Endangered	No
Minke whale (*Balaenoptera acutorostrata*)	Protected	Yes
Pilot whale (*Globicephala spp.*)[1]	Protected	Yes
Risso's dolphin (*Grampus griseus*)	Protected	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected	Yes
Short Beaked Common dolphin (*Delphinus delphis*)[2]	Protected	Yes
Spotted dolphin (*Stenella frontalis*)	Protected	No
Bottlenose dolphin (*Tursiops truncatus*)[3]	Protected	Yes
Harbor porpoise (*Phocoena phocoena*)	Protected	Yes
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle (*Chelonia mydas*)[4]	Endangered[4]	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic 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
Thorny skate (*Amblyraja radiata*)	Candidate	Yes

Species	Status	Potentially affected by this action?
Porbeagle shark (*Lamna nasus*)	Candidate	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected	Yes
Gray seal (*Halichoerus grypus*)	Protected	Yes
Harp seal (*Phoca groenlandicus*)	Protected	Yes
Hooded seal (*Cystophora cristata*)	Protected	Yes
Critical Habitat		
North Atlantic Right Whale[5]	ESA-listed	No
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA-listed	No

Notes:
[1] 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*.
[2] Prior to 2008, this species was called "common dolphin."
[3] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.
[4] Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters. On March 23, 2015, a proposed rule was issued to remove the current range-wide listing and, in its place, list eight DPSs as threatened and three as endangered (80 FR 15272).
[5] Originally designated June 3, 1994 (59 FR 28805); Expanded and revised on January 27, 2016 (81 FR 4837).

Cusk, porbeagle shark, and thorny skate, a NMFS "candidate species" under the ESA, occurs in the affected environment of the monkfish fishery. Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA and also include those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. Once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, cusk, porbeagle shark, and thorny skate, will not be discussed further in this, and the following sections. However, for additional information on these species, please visit: http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm

6.2.2 Species Not Likely to be Affected

Based on available information, it has been determined that this action is not likely to affect blue whales, sperm whales, Atlantic spotted dolphins, shortnose sturgeon, or hawksbill sea turtles. Further, this action is not likely to adversely affect any critical habitat provided in Table 13. This determination has been made because either the occurrence of the species is not known to overlap with the monkfish fishery and/or there have never been documented interactions between the species and the monkfish fishery (http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; Waring *et al*. 2014, 2015; NMFS 2013; NMFS NEFSC FSB 2015). In the case of critical habitat, this determination has been made because the monkfish fishery will not affect the primary constituent elements of the critical habitat, and therefore, will not result in the destruction or adverse modification of critical habitat (See: http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm; NMFS 2013).

6.2.3 **Species Potentially Affected**

The monkfish fishery may affect multiple protected species of cetacean, sea turtles, pinnipeds, and fish (Table 13). 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) records of protected species interaction with particular fishing gear types. Information on species occurrence in the affected environment of the monkfish fishery is presented in this section, while information on protected species interactions with fishery gear is presented in Section 6.2.4.

6.2.3.1 Sea Turtles

Below is a summary of the occurrence and distribution of sea turtles in the affected environment of the monkfish fishery. Additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant *et al*. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS *et al*. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Hard-shelled sea turtles

Distribution. In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (Braun-McNeill et al. 2008; Braun & Epperly 1996; Epperly, Braun & Chester 1995; Epperly, Braun, Chester, et al. 1995; Mitchell et al. 2003; Shoop & Kenney 1992; 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 (Epperly, Braun, Chester, et al. 1995; Shoop & Kenney 1992). 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 (Blumenthal et al. 2006; Braun-McNeill & Epperly 2004; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 2009; McClellan & Read 2007; Mitchell, et al. 2003; Morreale & Standora 2005).

Seasonality. Hard-shelled sea turtles occur year-round in waters off Cape Hatteras, North Carolina 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 (Braun-McNeill & Epperly 2004; Epperly, Braun & Chester 1995; Epperly, Braun, Chester, et al. 1995; Epperly, Braun & Veishlow 1995; Griffin, et al. 2013; Morreale & Standora 2005), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the GOM in June (Shoop & 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 (i.e., November). By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further (Epperly, Braun, Chester, et al. 1995; Griffin, et al. 2013; Hawkes, et al. 2011; Shoop & Kenney 1992).

Leatherback sea turtles

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

6.2.3.2 Large Cetaceans

Species of large whales occurring in the affected environment of the monkfish fishery are provided in Table 14. For additional information on the biology, status, and distribution of each species, refer to: Waring et al. (2014), Waring et al. (2015), and NMFS (1991; 2005; 2010a; 2011; 2012).

Right, humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean. In general, these species follow an annual pattern of migration between low latitude wintering/calving grounds (south of 35^{o}N) and high latitude spring/summer foraging grounds (primarily north of 41^{o}N) (NMFS 1991; 2005; 2010a; 2011; 2012; Waring, et al. 2014, Waring, et al. 2015). 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 (Brown et al. 2002; Clapham et al. 1993; Cole et al. 2013; Khan et al. 2010; 2011; 2012; Khan et al. 2009; NOAA 2008; Swingle et al. 1993; Vu et al. 2012; Waring, et al. 2014; Waring, et al. 2015). 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 (Baumgartner et al. 2003; Baumgartner & Mate 2003; Brown, et al. 2002; Kenney 2001; Kenney et al. 1986; Kenney et al. 1995; Mayo & Marx 1990; Payne et al. 1986; Payne et al. 1990; Schilling et al. 1992). These foraging areas are consistently returned to annually, and therefore, can be considered important, high use areas for whales.

Table 6 - Species of large whales occurring in the affected area of the monkfish fishery

Species	Listed Under the ESA	Protected Under the MMPA	Minimum Population Size	Population Trend	MMPA Strategic Stock[1]
North Atlantic Right Whale	Yes-Endangered	Yes	465	positive and slowly accelerating	Yes
Humpback Whale	Yes-Endangered	Yes	823	positive	Yes
Fin Whale	Yes-Endangered	Yes	1,234	unknown	Yes
Sei Whale	Yes-Endangered	Yes	236	unknown	Yes
Minke Whale	No	Yes	16,199	unknown	No

[1]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 future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA.
Source: Waring, et al. (2015).

As the affected area of the monkfish fishery occurs in waters north of 35°N, and whales may be present in these waters throughout the year, the monkfish fishery and large whales are likely to co-occur in the affected area. To further assist in understanding how the monkfish fishery overlaps in time and space with the occurrence of large whales, Table 15gives an overview of species occurrence and distribution in the affected environment of the monkfish fishery. For additional information on the biology, status, and range wide distribution of each whale species, refer to: Waring et al. (2014), Waring et al. (2015), and NMFS (1991; 2005; 2010a; 2011; 2012).

Table 7 - Large cetacean occurrence in the GOM, GB, SNE, and Mid-Atlantic sub-regions of the monkfish fishery

Species	Prevalence and Approximate Months of Occurrence
North Atlantic Right Whale	• Distributed throughout all continental shelf waters of the GOM, GB, and Mid-Atlantic (SNE included) throughout the year. • New England waters (GOM and GB regions): **Foraging Grounds**. Important foraging grounds include: › Cape Cod Bay (January-April); › Great South Channel (April-June) › western GOM (April-May and July-October); › northern edge of GB (May-July); › Jordan Basin (August-October); and › Wilkinson Basin (April-July)

Species	Prevalence and Approximate Months of Occurrence
	• Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern calving grounds (primarily November-April). • 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** (approximately March-November). • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern (West Indies) calving grounds. • 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 sub-regions throughout the year. • Mid-Atlantic waters: › Migratory pathway to/from northern (high latitude) foraging and southern (low latitude) calving grounds; › Possible offshore calving area (October-January) • New England/SNE waters (GOM, GB, and SNE regions): **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) > western GOM (esp. Jeffrey's Ledge) > Eastern perimeter of GB > Mid-shelf area off the east end of Long Island. • Evidence of wintering areas in mid-shelf areas east of New Jersey, Stellwagen Bank; and eastern perimeter of GB.

Species	Prevalence and Approximate Months of Occurrence
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 (eastern margin into the Northeast Channel area; along the southwestern edge in the area of Hydrographer Canyon).
Minke	• Widely distributed throughout continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB during the spring, summer and fall; however, spring through summer found in greatest densities in the GOM and GB.

***Sources*:** NMFS 1991, 2005, 2010b, 2011, 2012; Hain *et al.* 1992; Payne 1984; Good 2008; McClellan 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*. 2014; Waring et al. 2015; 81 FR 4837.

6.2.3.3 Small Cetaceans

Table 16 provides the species of small cetaceans that occur in the affected environment of the monkfish fishery. For additional information on the biology, status, and range wide distribution of each small cetacean species please refer to Waring *et al*. 2014 and Waring et al. (2015).

Table 8 - Small cetacean species that occur in the affected environment of the monkfish fishery

Species	Listed Under the ESA	Protected Under the MMPA	Minimum Population Size	Population Trend	MMPA Strategic Stock
Atlantic White Sided Dolphin	No	Yes	30,403	unknown	No
Short-Finned Pilot Whale	No	Yes	15,913	unknown	No
Long-Finned Pilot Whale	No	Yes	19,930	unknown	No
Rissos Dolphin	No	Yes	12,619	unknown	No
Short Beaked Common Dolphin	No	Yes	112,531	unknown	No
Harbor Porpoise	**No**	**Yes**	**61,415**	**unknown**	**Yes[1]**
Bottlenose Dolphin (*Western North Atlantic Offshore Stock*)	No	Yes	56,053	unknown	No
Bottlenose Dolphin (*Western North Atlantic Northern Migratory Coastal Stock*)	**No**	**Yes**	**8,620**	**unknown**	**Yes[2]**
Bottlenose Dolphin (*Western North Atlantic Southern Migratory Coastal Stock*)	**No**	**Yes**	**6,326**	**unknown**	**Yes[3]**

Notes: [1] Harbor porpoise are considered a strategic stock under the MMPA as the level of direct human-caused mortality has exceeded the PBR level for this species.

[2,3] Both northern and southern migratory coastal stocks of bottlenose dolphins are considered a strategic stock under the MMPA as both stocks are designated as depleted under the Act.

Source: Waring *et al*. 2014, Waring et al. 2015

Small cetaceans are found throughout the waters of the Northwest Atlantic Ocean. In the affected area, they can be found throughout the year from Cape Hatteras, North Carolina (35°N), to the Canadian border (Waring *et al*. 2014; Waring *et al*. 2015). Within this range; however, there are seasonal shifts in species distribution and abundance. As the affected area of the multi-species fishery occurs in waters north of 35°N, and small cetaceans may be present in these waters throughout the year, the monkfish fishery and small cetaceans are likely to co-occur in the affected area. To further assist in understanding how the monkfish fishery overlaps in time and space with the occurrence of small cetaceans, a general overview of species occurrence and distribution in the continental shelf waters of the affected environment of the monkfish fishery is provided in Table 17. For additional information on the biology, status, and range wide distribution of each species please refer to Waring *et al*. 2014 and Waring *et al*. 2015.

Table 9 - Small cetacean occurrence in the Gulf of Maine (GOM), Georges Bank (GB), Southern New England (SNE), and Mid-Atlantic sub-regions of the monkfish fishery[1]

Species	Prevalence and Approximate Months of Occurrence (if known)
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 sub-regions; however, most common in the SNE, GB, and GOM sub-regions (i.e., shelf waters from Hudson Canyon (~ 39°N) and into GB, Massachusetts Bay, and the GOM). • Seasonal shifts in distribution: *__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 sub- regions), low densities found year round, with waters off Virginia and North Carolina 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-Atlanitc, SNE, and GB sub-regions (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons). • Occasionally found in the GOM. • Seasonal shift in distribution: *__January-May__: occur from Cape Hatteras, NC, to GB * __Mid-summer-autumn__: moves onto GB; *Peak abundance* found on GB in the autumn.
Risso's Dolphin	• Common in the continental shelf edge waters of the Mid-Atlantic, SNE, and GB sub-regions; rare in the GOM sub-region. • From approximately March-November: distributed along continental shelf edge from Cape Hatteras, NC, to GB. • From approximately December-February: distributed in continental shelf edge of the Mid-Atlantic (SNE and Mid-Atl. sub-regions).
Harbor Porpoise	• Distributed throughout the continental shelf waters (primarily in waters less than 150 meters) of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM sub-regions. • Seasonal shifts in distribution: *__July-September__: Concentrated in the northern GOM; low numbers can be found on GB. *__October-December__: widely dispersed in waters from New Jersey to Maine. *__January-March__: intermediate densities in waters off New Jersey to North Carolina (SNE and Mid-Atl sub-regions); low densities

Species	Prevalence and Approximate Months of Occurrence (if known)
	found in waters off New York to GOM. *__April-June__: widely dispersed from New Jersey to Maine
Bottlenose Dolphin:	**Western North Atlantic Offshore Stock** • Spring-Summer: Primarily distributed along the outer continental shelf/edge-slope of the Mid-Atlantic, SNE, and GB sub-regions • Winter: Distributed in waters south of 35°N **Western North Atlantic Northern Migratory Stock** • Summer (July-August): distributed from the coastal waters from the shoreline to approximately the 25-m isobaths between the Chesapeake Bay mouth and Long Island, New York (Mid-Atl and SNE sub-regions). • Winter (January-March): Distributed in coastal waters south of 35°N. **Western North Atlantic Southern Migratory Stock** • Spring and Summer (April-August): distributed along coastal waters from North Carolina to Virginia (Mid-Atl and SNE sub- regions). • Fall and Winter (October-March): Distributed in coastal waters south of 35°N.
Pilot Whales: *Short- and Long-Finned*	**Short- Finned Pilot Whales** • Primarily occur south of 40°N (Mid-Atl and SNE sub-regions); although low numbers have been found along the southern flank of GB, but no further than 41°N. • Distributed primarily in the continental shelf edge-slope waters of Mid-Atlantic and SNE sub-regions from approximately May through December, with individuals moving to more southern waters (i.e., 35°N and south) beginning in the fall. **Long-Finned Pilot Whales** • Range from 35°N to 44°N • Winter to early spring (approximately November through April): primarily distributed along the continental shelf edge-slope of the Mid-Atlantic, SNE, and GB sub-regions. • Late spring through fall (approximately May through October): movements and distribution shift onto/within GB, the Great South Channel, and the GOM. **Area of Species Overlap:** between 38°N and 40°N (Mid-Atl and SNE sub-regions)

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**,** 2014, 2015**;** Payne and Heinemann 1993; Payne 1984; Jefferson *et al*. 2009.

6.2.3.4 Pinnipeds

Table 18 provides the species of pinnipeds that occur in the affected environment of the monkfish fishery. For additional information on the biology, status, and range wide distribution of each pinniped species please refer to Waring *et al*. 2014 and Waring et al. (2015).

Table 10 - Pinniped species that occur in the affected environment of the monkfish fishery

Species	Listed Under the ESA	Protected Under the MMPA	Minimum Population Size	Population Trend	MMPA Strategic Stock
Harbor Seal	No	Yes	66,884	unknown	No
Gray Seal	No	Yes	Unknown for U.S. waters; total Canadian population=331,000	positive	No
Harp Seal	No	Yes	Unknown for U.S. waters; total western North Atlantic stock=7.1 million	positive	No
Hooded Seal	No	Yes	Unknown for U.S. waters; minimum population size for the North Atlantic stock≥512,000	unknown	No
Source: Waring *et al*. 2014 and Waring et al. (2015).					

Pinnipeds are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. In the affected area, 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 (35ºN) (Waring *et al*. 2007, 2014, 2015). As the affected area of the monkfish fishery occurs in waters north of 35ºN, and pinnipeds may be present in these waters throughout the year, monkfish fishery and pinnipeds are likely to co-occur in the affected area. To further assist in understanding how the monkfish fishery overlaps in time and space with the occurrence of pinnipeds, a general overview of species occurrence and distribution in the affected environment of the monkfish fishery is provided in Table 19. For additional information on the biology, status, and range wide distribution of each species of pinniped please refer to Waring *et al*. 2007, 2014, 2015.

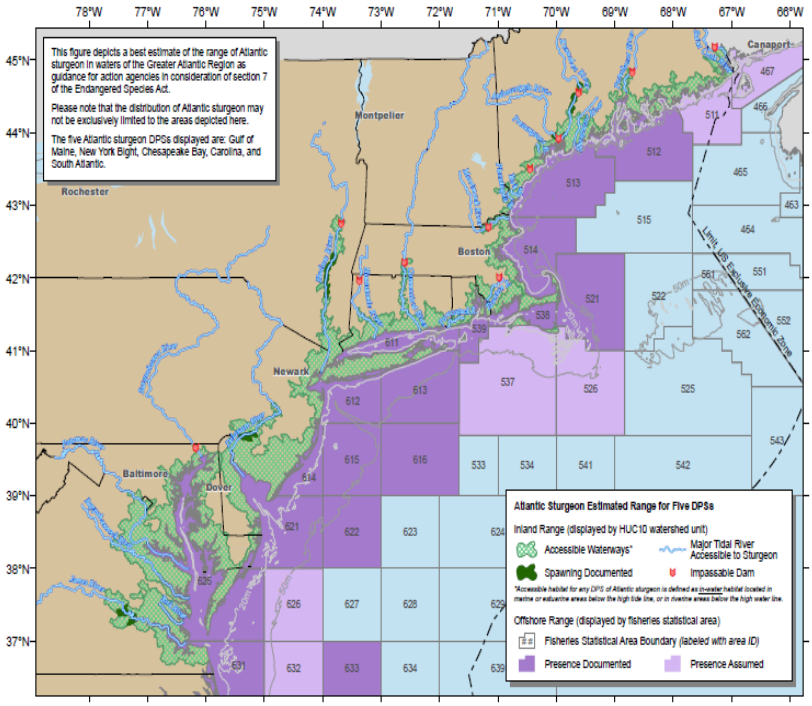
Table 11 - Pinniped occurrence in the Gulf of Maine (GOM), Georges Bank (GB), Southern New England (SNE), and Mid-Atlantic sub-regions of the monkfish fishery

Species	Prevalence and Approximate Months of Occurrence (if known)
Harbor Seal	• Primarily distributed in waters from New Jersey to Maine; however, increasing evidence indicates that their range is extending into waters as far south as Cape Hatteras, North Carolina (35ºN). • Seasonal distribution: *__Year Round__: Waters of Maine *__September-May__: Waters from New England to New Jersey; potential for some animals to extend range into waters as far south as Cape Hatteras, NC.
Gray Seal	• Distributed in waters from New Jersey to Maine • Seasonal distribution: *__Year Round__: Waters from Maine to Massachusetts *__September-May__: Waters from Rhode Island to New Jersey
Harp Seal	• Winter-Spring (approximately January-May): Waters from Maine to New Jersey.
Hooded Seal	• Winter-Spring (approximately January-May): Waters of New England.
Sources: Waring *et al*. 2007 (for hooded seals); Waring *et al*. 2014, 2015.	

6.2.3.5 Atlantic Sturgeon DPSs

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs (Gulf of Maine, New York Bight, Chesapeake Bay, Carolina, and South Atlantic) of Atlantic sturgeon have the potential to be located anywhere in this marine range (Figure 6) (ASSRT 2007; Dadswell 2006; Dadswell et al. 1984; Dovel & Berggren 1983; Dunton et al. 2010; Erickson et al. 2011; Kynard et al. 2000; Laney et al. 2007; O'Leary et al. 2014; Stein et al. 2004b; Waldman et al. 2013; Wirgin et al. 2012b).

Figure 4- Estimated range of Atlantic sturgeon distinct population segments



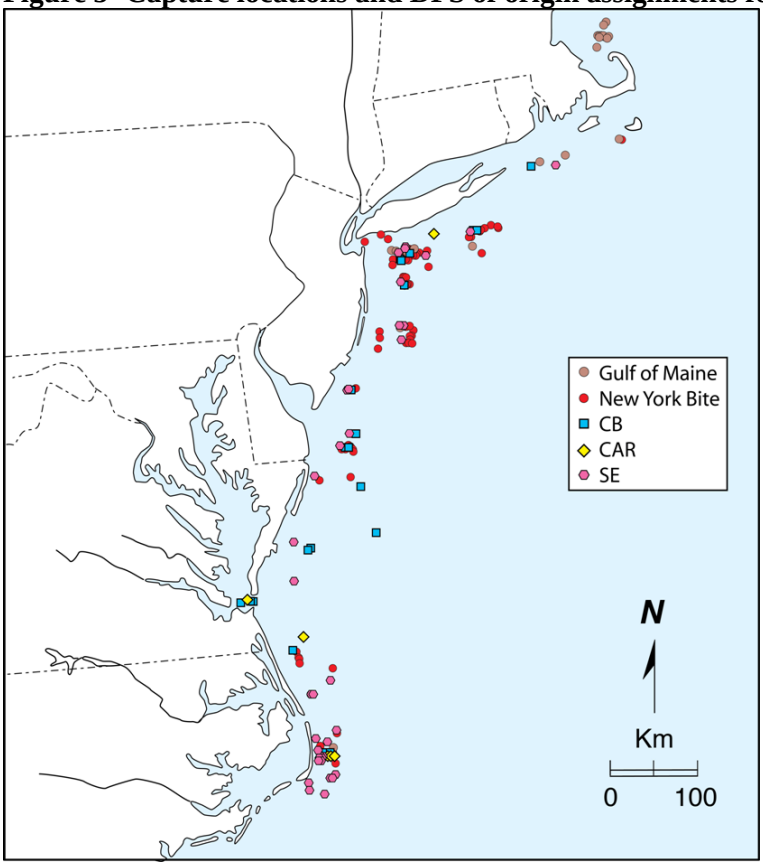
Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 m depth contour (Dunton, et al. 2010; Erickson, et al. 2011; Stein et al. 2004a; Stein, et al. 2004b). However, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Collins & Smith 1997; Dunton, et al. 2010; Erickson, et al. 2011; Stein, et al. 2004a; b; Timoshkin 1968). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon undertake seasonal movements along the coast. 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 >20 m, 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 <20 m (Erickson, et al. 2011). A similar seasonal trend was found by Dunton et al. (2010); analysis of fishery-independent survey data indicated a coastwide distribution of Atlantic sturgeon during the spring and fall; a southerly (e.g., North Carolina, Virginia) distribution during the winters; and a centrally located (e.g., Long Island to Delaware) distribution during the summer. Although studies such as Erickson et al. (2011) and Dunton et al. (2010) provide some indication that Atlantic sturgeon are undertaking seasonal movements horizontally and vertically along the U.S. eastern coastline, there is no evidence to date that all Atlantic sturgeon make these seasonal movements. For instance, during inshore surveys conducted by the NEFSC in the GOM, Atlantic sturgeon have been caught in the fall, winter, and spring between the Saco and Kennebec Rivers (Dunton, et al. 2010).

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; depths in these areas are generally ≤25 m (Dunton, et al. 2010; Erickson, et al. 2011; Laney, et al. 2007; Stein, et al. 2004b). 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 (Dunton, et al. 2010; Erickson, et al. 2011; Stein, et al. 2004b). The following are the currently known marine aggregation sites located within the range of the monkfish fishery:

- Waters off North Carolina, including Virginia/North Carolina border (Laney, et al. 2007);
- Waters off the Chesapeake and Delaware Bays (Dunton, et al. 2010; Erickson, et al. 2011; Oliver et al. 2013; Stein, et al. 2004b);
- New York Bight (e.g., waters off Sandy Hook, New Jersey, and Rockaway Peninsula, New York; Dunton, et al. 2010; Erickson, et al. 2011; O'Leary, et al. 2014; Stein, et al. 2004b);
- Massachusetts Bay (Stein, et al. 2004b);
- Long Island Sound (Bain et al. 2000; Savoy & Pacileo 2003; Waldman, et al. 2013);
- Connecticut River Estuary (Waldman, et al. 2013);
- Kennebec River Estuary (termed a "hot spot" for Atlantic sturgeon by Dunton, et al. 2010).

In addition, since listing of the five Atlantic sturgeon DPSs, several genetic studies have occurred to address DPS distribution and composition in marine waters. Genetic analysis has been conducted on Atlantic sturgeon captured (fishery-independent) from aggregations in Long Island Sound and the Connecticut River (summer aggregations; Waldman, et al. 2013), as well as the New York Bight, specifically the coastal waters off the Rockaway Peninsula (spring and fall aggregations; O'Leary, et al. 2014). Results from these studies showed that these aggregations, regardless of location, were comprised of all five DPSs, with the NYB DPS consistently identified as the main contributor of the mixed aggregations, followed by the GOM, CB, SA, and Carolina DPSs. In a similar assessment, genetic analysis was conducted on Atlantic sturgeon captured (fishery-dependent) during the Northeast Fisheries Observer Program and At Sea Monitoring Program, which ranges from Maine to North Carolina. Results from this assessment affirmed that in waters of the Mid-Atlantic, all five DPSs co-occur (Figure 7), with the percentage of each DPS estimated to be as follows: 51% NYB DPS; 22% SA DPS; 13% CB DPS; 11% GOM DPS; 2% Carolina DPS; and 1% Canadian stock (Damon-Randall et al. 2013). However, these results have not been examined relative to the amount of observed fishing effort throughout the area. In a study by Wirgin et al. (2012b), genetic analysis revealed that the summer assemblage of Atlantic sturgeon in Minas Basin, Inner Bay of Fundy, Canada, was comprised not only of Canadian origin Atlantic sturgeon, but also Atlantic sturgeon from the GOM DPS (34-64% contribution to the mixed assemblage) and NYB DPS (1-2% contribution to the mixed assemblage). Although additional studies are needed to further clarify the DPS distribution and composition in non-natal estuaries and coastal locations, these studies provide some initial insight on DPS distribution and co-occurrence in particular areas along the U.S. eastern sea board.

Figure 5- Capture locations and DPS of origin assignments for observer program specimens



Source: Map by Dr. Isaac Wirgin (Damon-Randall, et al. 2013).
Note: N=173

Based on the above studies and available information, as the affected area of the monkfish fishery occurs in waters north of 35ºN, and Atlantic sturgeon from any of the 5 DPSs may be present in these waters throughout the year, the monkfish fishery and Atlantic sturgeon of the 5 DPSs are likely to co-occur in the affected area.

6.2.3.6 Atlantic Salmon

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). 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; 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); 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 described in Section 6.2.3 are all known to be vulnerable to interactions with various types of fishing gear. In the following sections, available information on gear interactions with a given species (or species group) will be provided. Please note, 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 those gear types that are known to pose the greatest risk to the species under consideration.

6.2.4.1 Marine Mammals

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.[1]The categorization in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA such as registration, observer coverage, and take reduction plan requirements. Individuals fishing in Category I or II fisheries must comply with requirements of any applicable take reduction plan.

Categorization of fisheries is based on the following two-tiered, stock-specific approach:

- **Tier 1**- considers the cumulative fishery mortality and serious injury for a particular stock. If the total annual mortality and serious injury rates within a stock resulting from all fisheries are less than or equal to ten percent of the stock's potential biological removal rate (PBR), all fisheries associated with this stock fall into Category III.[2] If mortality and serious injury rates are greater than ten percent of PBR, the following Tier 2, analysis occurs.

- **Tier 2** -considers fishery-specific mortality and serious injury for a particular stock. Specifically, this analysis compares fishery-specific annual mortality and serious injury rates to a stock's PBR to designate the fishery as a Category I, II, or III fishery (see Table 20).

Table 12 - Descriptions of the Tier 2 Fishery Classification Categories (50 CFR 229.2)

Category	Level of incidental mortality or serious injury of marine mammals	Annual mortality and serious injury of a stock in a given fishery is…
Category I	frequent	≥50% of the PBR level
Category II	occasional	between 1% and 50% of the PBR level
Category III	remote likelihood, or no known	≤1% of the PBR level

[1] The most recent LOF was issued December 29, 2014; 79 FR 77919.

[2] PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

Please note, in this EA, the following discussion on fishery interactions with marine mammals (large cetaceans, and small cetaceans and pinnipeds) are in reference to the Tier 2 classifications of fisheries in Table 20.

6.2.4.2 Large Cetaceans

Atlantic large whales are at risk of becoming entangled in fishing gear because the whales feed, travel, and breed in many of the same ocean areas utilized for fishing. Below we provide the best available information on large whale interaction risks with gear types primarily used in the monkfish fishery (i.e., sink gillnet and bottom trawl).

6.2.4.2.1 Bottom Trawl Gear

Aside from minke whales, large whale interactions with bottom trawl gear are have never been observed and therefore, this gear type is not expected to pose a serious injury or mortality risk to these species. In regards to minke whales, interactions with bottom trawl gear have been observed (strictly northeast bottom trawl fishery to date); however, the frequency of bottom trawl interactions have declined since 2008 (estimated annual mortality=7.8 whales), with an estimated annual mortality of zero minke whales from 2009-2012 and no serious injuries reported during this time as well (Henry *et al*. 2015; Waring *et al*. 2014a; Waring *et al*. 2015a; Lyssikatos 2015). Based on this information, although minke whales have the potential to interact with this gear type, the likelihood of an interaction in the monkfish fishery is likely to be low.

6.2.4.2.1 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 2014; Kenney and Hartley 2001; Hartley *et al*. 2003; Whittingham *et al*. 2005a, b; Waring *et al*. 2014; Waring et al. 2015). 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).[3] 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 2014; Johnson *et al*. 2005; Angliss and Demaster 1998; Moore and Van der Hoop 2012). "When… [whales] become fouled in gear, normal breathing and movement may be impaired or stopped completely. If the animal does manage to struggle free, portions of gear may remain attached to the body. This trailing gear, often made

[3] 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.

of durable synthetic material, may create excess drag, snag onto objects in the environment and impede normal behavior like breathing, feeding, movement, or breeding. Other effects include infections and deformations" (quote from Center for Coastal Studies, May 14, 2003, in NMFS 2014; Moore and Van der Hoop 2012). Considering these factors, 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 2014). 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 does indicate that the entanglement in fishing gear is a significant source of serious injury or mortality for Atlantic large whales (Table 21; Waring *et al*. 2014; Waring et al. 2015; Henry et al. 2015).

Table 21 summarizes confirmed human-caused serious 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 2009 to 2013 (Henry et al. 2015); the data provided in Table 21 is specific to confirmed serious 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 21 likely underestimates the rate of large whale serious injury and mortality due to entanglement. Further, scarring data suggests that entanglements may be occurring more frequently than the observed incidences indicate (i.e., Table 21; NMFS 2014). For instance, a study conducted by Robbins *et al.* (2009) analyzed entanglement scars observed in photographs taken during 2003-2006. This analysis suggests high rates of entanglements of GOM humpback whales in fishing gear. In an analysis of the scarification of right whales, 519 of 626 (82.9%) whales examined during 1980-2009 were scarred at least once by fishing gear (Knowlton *et al*. 2012). Further research using the North Atlantic Right Whale Catalogue has indicated that, annually, between 8.6% and 33.6% of right whales have been involved in entanglements (Knowlton *et al*. 2012). Based on this information, care should be taken when interpreting entanglement data as it is likely more incidences of entanglement are occurring than observation alone indicates.

Table 13- Summary of confirmed serious injury or mortality to fin, minke, humpback, sei, and North Atlantic right whales from 2009-2013 due to fisheries entanglements.[1]

Species	Total Confirmed Entanglement: Serious Injury	Total Confirmed Entanglement: Mortality	Entanglement Events: Total Annual Injury and Mortality Rate
North Atlantic Right Whale	12	6	3.4
Humpback Whale	33	8	8.4
Fin Whale	7	3	1.75
Sei Whale	0	0	0
Minke Whale	23	13	6.5

Notes:
[1]Information presented in Table 27 is based on confirmed serious 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.

***Sources*:** Henry *et al.* 2015; Waring *et al*. 2015.

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 humpback, fin, and North Atlantic right whales are listed as endangered under the ESA, these species are considered strategic stocks under the MMPA (see Section 6.2.3). 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.[4] In 1997, the ALWTRP was implemented; however, since 1997, the Plan has been modified as NMFS and the ALWTRT learn more about why whales become entangled and how fishing practices might be modified to reduce the risk of entanglement. In fact, two recent adjustments include the Sinking Groundline Rule (72 FR 57104, October 5, 2007;), and the Vertical Line Rule (79 FR 36586, June 27, 2014; 79 FR 73848, December 12, 2014; 80 FR 14345, March 19, 2015; 80 FR 30367, May 28, 2015).[5]

[4] 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.

[5] The most recent Vertical Line Rule focused on trap/pot vertical line reduction as the ALWTRT determined that gillnets represent <1% of the total vertical lines on the east coast and that the impacts from this gear on large whales

The ALWTRP 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). Specifically, the Plan identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in the Northeast, Mid-Atlantic, and Southeast regions of the U.S.; these fisheries must comply with all regulations of the Plan.[6]

Table 22 provides a brief summary of the specified gear modification requirements and restrictions under the ALWTRP for gillnet fisheries in the Northeast and Mid-Atlantic region of the U.S, and Table 23 and Figure 8 provide the Gillnert Management Areas recognized by the ALWTRP in the Northeast and Mid-Atlantic; as the monkfish fishery is not prosecuted with trap/pot gear, gear modification requirements and restrictions for trap/pot fisheries under the Plan will not be provided here. As the affected environment of the monkfish fishery will not extend into the Southeast region, those provisions of the Plan will also not be discussed further. For further details on the gear modification requirements and restrictions under the ALWTRP please see: http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/

Table 14 - Summary of gear modification requirements and restrictions for the Northeast and Mid-Atlantic Gillnet Fisheries under the Atlantic Large Whale Take Reduction Plan

Fishery	Gear Modification Requirement and Restrictions
Gillnet	**Northeast and Mid-Atlantic** • Gillnet Universal Requirements (including sinking groundline) • Gillnet Gear Marking Requirements • Gillnet Weak Link Requirements • Seasonal Closure Areas • Anchored Gillnet Anchoring Requirements • Drift Gillnet Night Fishing & Storage Restrictions

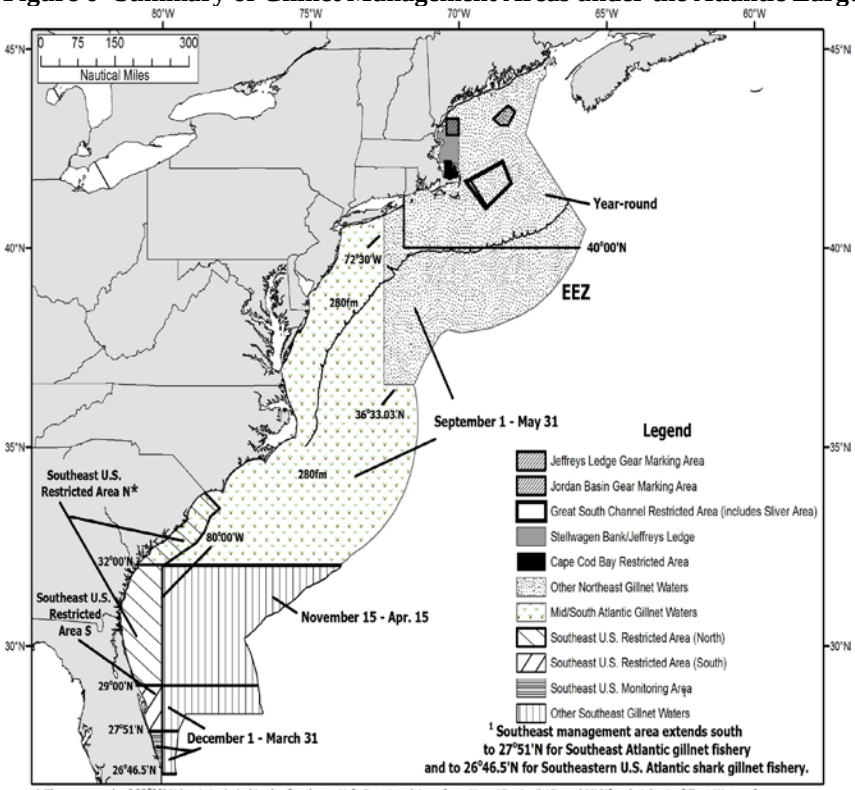
is minimal (Appendix 3A, NMFS 2014a); however, even with the new Rule, gear will still be subject to existing restrictions under the ALWTRP for gillnet gear.

[6] 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 2014).

Table 15 - Northeast and Mid-Atlantic Gillnet Management Areas under the Atlantic Large Whale Take Reduction Plan

Fishery	Management Areas
Northeast Gillnet	• Cape Cod Bay Restricted Area • Stellwagen Bank/Jeffreys Ledge Restricted Area • Great South Channel Restricted Gillnet Area • Other Northeast Gillnet Waters (Northeast)
Mid-Atlantic Gillnet	• Other Northeast Gillnet Waters (Mid-Atlantic) • Mid/South Atlantic Gillnet Waters

Figure 6- Summary of Gillnet Management Areas under the Atlantic Large Whale Take Reduction Plan



6.2.4.2.1 Small Cetaceans and Pinnipeds

6.2.4.2.1.1 Sink Gillnet and Bottom Trawl Gear

Northeast and Mid-Atlantic sink 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 (Table 24; Figure 9). Based on available observer data from

2008-2012 (see Table 24), approximately 84.0% of the total mean annual mortality to marine mammals (small cetaceans + seals, large whales excluded) is attributed to gillnet fisheries, followed by bottom trawl fisheries (16.0%).

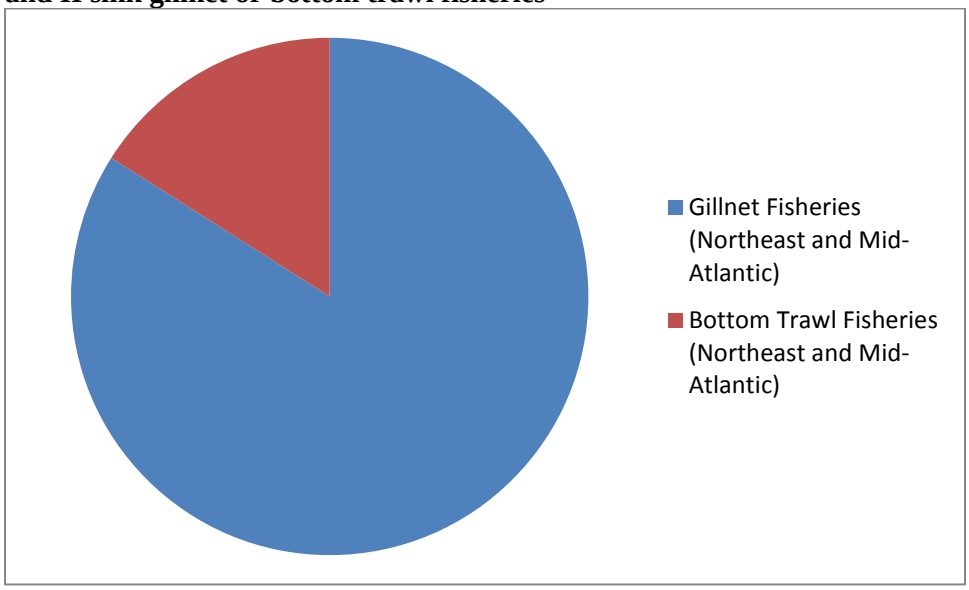
As the monkfish fishery is prosecuted with both gear types, this fishery does pose interaction risks to small cetaceans and pinnipeds. Based on observer data since 2010, numerous species of small cetaceans and pinnipeds, such as those provided in Table 24, have been observed taken in sink gillnet gear on trips targeting monkfish (http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; http://www.nefsc.noaa.gov/fsb/take_reports/asm.html). Specifically, harbor porpoise, common dolphin, gray seals, harbor seals, and to a lesser extent white sided dolphins, Risso's dolphins, and harp seals, have been observed in sink gillnet gear where the trip target species is monkfish (see North East Fisheries Observer Program (NEFOP) and At-Sea Monitoring Program (ASM) take report sites above). In fact, Hatch and Orphanides (2014) and Hatch and Orphanides (2015), reported that the majority of small cetacean and pinniped bycatch occurred on hauls targeting monkfish, with 7-12 inch mesh sizes. In terms of bottom trawl gear, few interactions with small cetacean and pinnipeds have been observed on trips targeting monkfish (see NEFOP and ASM take report sites above); however, this could be an artifact of observer coverage rate in the affected areas of the monkfish fishery. In spite of the limited observer data for trips targeting monkfish with bottom trawl gear, interaction risks to the species provided in Table 24 exists, and in fact, based on Lyssikatos (2015), the highest annual bycatch mortality in bottom trawl gear (considers all FMPs;Northeast and Mid-Atlantic combined) was observed for short beaked common dolphins, followed by Atlantic white-sided dolphins, gray seals, risso's dolphins, long-finned pilot whales, bottlenose dolphins, harbor seals, harbor porpoise, and harp seals.[7]

[7] Lyssikatos (2015) defines 'bycatch mortality' as any observed interaction where the animal's condition was recorded as either fresh dead or alive with a serious injury.

Table 16 - Small cetacean and pinniped species observed from 2008-2012 seriously injured and/or killed by Category I or II sink gillnet or bottom trawl fisheries in the affected environment of the monkfish fishery

Fishery	Species Observed Injured/Killed	Mean Annual Mortality
Category I		
Northeast Sink Gillnet	Harbor porpoise	439
	Atlantic white sided dolphin	35
	Short-beaked common dolphin	56
	Long-finned pilot whale	0.6
	Risso's dolphin	1.2
	Harbor seal	378
	Gray seal	974
Mid-Atlantic Gillnet	Bottlenose dolphin (offshore)	14.1
	Harbor porpoise	199
	Short-beaked common dolphin	15
	Harbor seal	49
	Harp seal	N/A
	Gray seal	60
	Risso's dolphin	11
	Short-finned pilot whale[2]	140
	Short-beaked common dolphin	1.7
Category II		
Northeast Bottom Trawl	Harp seal	N/A
	Harbor seal	2.4
	Gray seal	33
	Long -finned pilot whales	31
	Short-beaked common dolphin	55
	White-sided dolphin	77
	Harbor porpoise	2.3
	Bottlenose dolphin (offshore)	10
	Risso's dolphin	2.0
Mid-Atlantic Bottom Trawl	Short-beaked common dolphin	161
	Risso's dolphin2	37
	Bottlenose dolphin (offshore)	21
	Gray seal	19
	Harbor seal	11.6
Sources: Waring et al. (2015); December 29, 2014, List of Fisheries (79 FR 77919).		

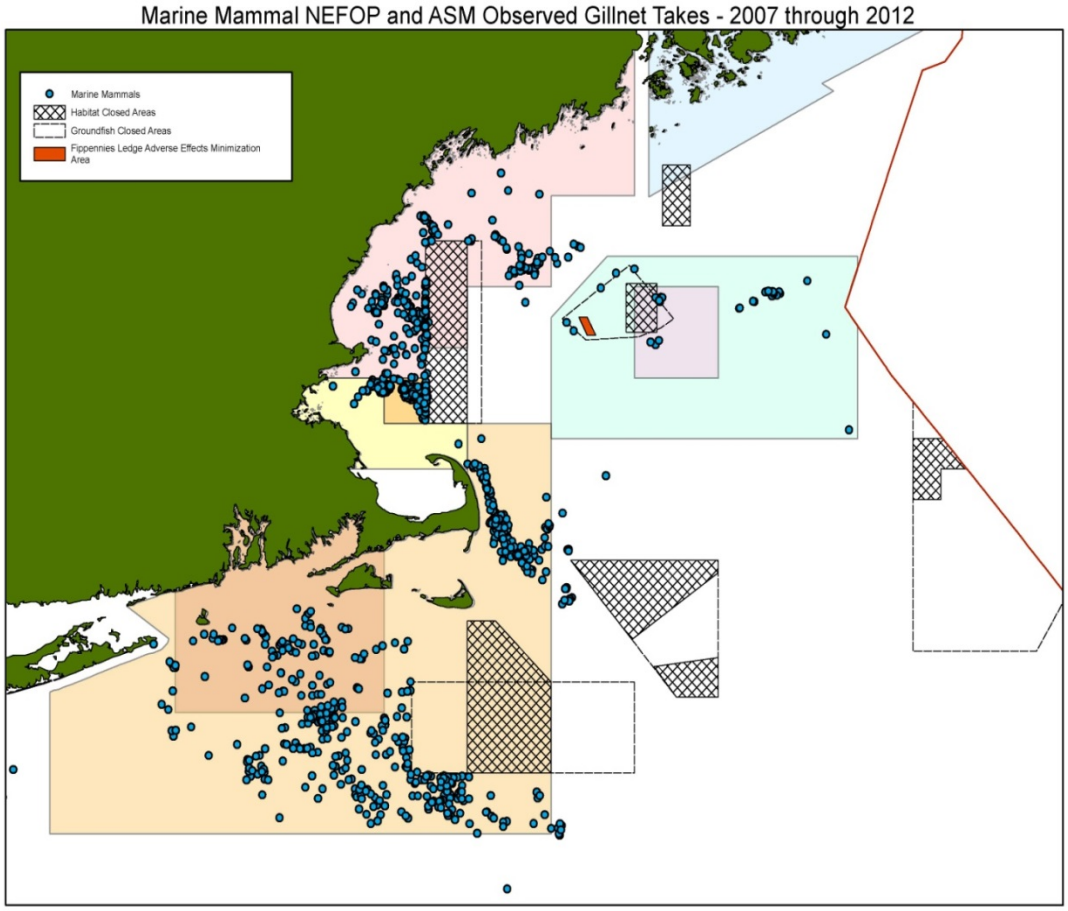
Figure 7- 2008-2012 total mean annual mortality of small cetaceans and pinnipeds by Category I and II sink gillnet or bottom trawl fisheries



The risk of an interaction with a specific fishery, such as the monkfish 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 10 and Figure 11) depict observed marine mammal takes (large whales excluded) in gillnet and trawl gear in the Gulf of Maine, Georges Bank, and Southern New England sub-regions of the multispecies fisheries from 2007-2011.[8] As depicted in Figure 10 and Figure 11, over the last 5 years, there appears to be particular areas of the Gulf of Maine, Georges Bank, and Southern New England sub-regions 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 10 and Figure 11, 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.

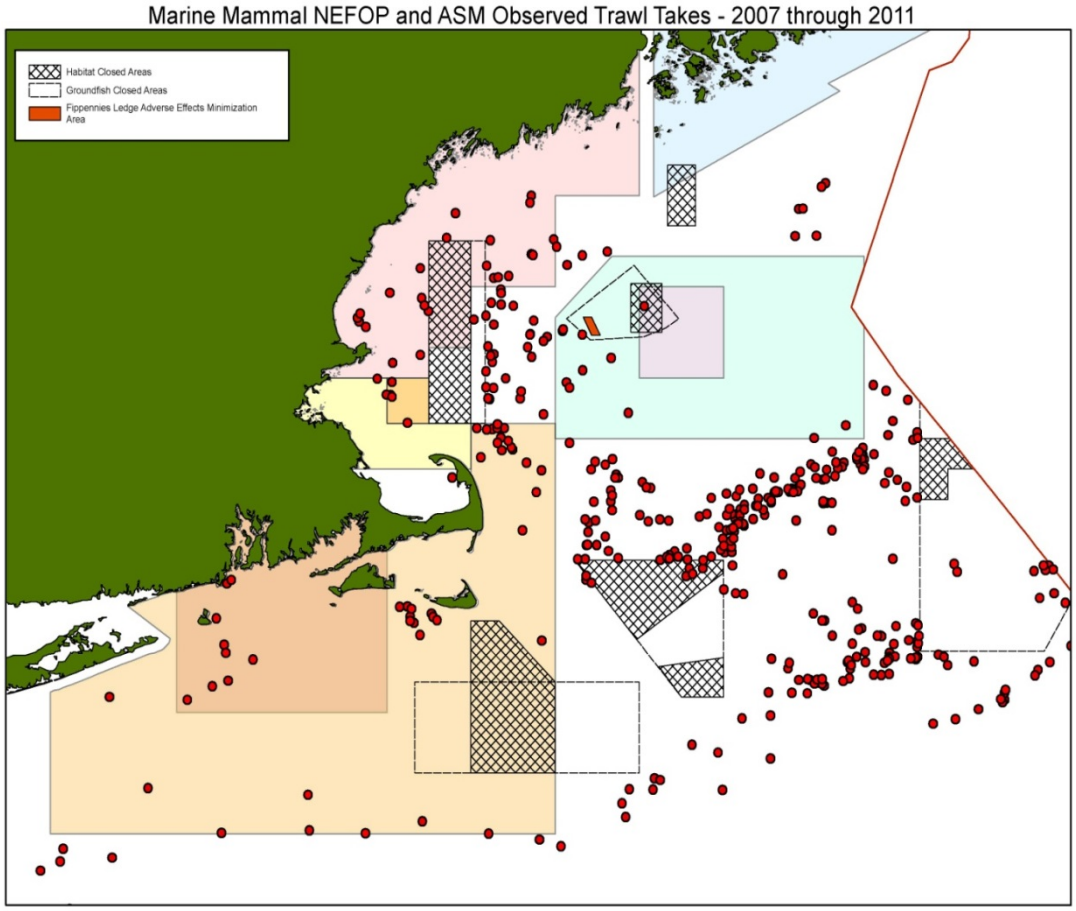
[8] Additional maps of marine mammal takes in various fishing gear can be found in Waring *et al*. 2014.

Figure 8 - Map of marine mammals bycatch in gillnet gear in the New England region (excluding large whales) observed by traditional fishery observers and at-sea monitors between 2007 and 2011



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 NLCA (Groundfish closed area): Harbor porpoise, short- beaked common dolphin, gray seals, harp seals, and harbor seals; and (4) waters off southern Massachusetts and Rhode Island: Gray seals and harbor seals, and some harbor porpoise and short-beaked common dolphin.

Figure 9 - Map of marine mammal bycatch in trawl gear in the New England region (excluding large whales) observed by traditional fishery observers and at-sea monitors 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 provided in Table 24, numerous species of small cetaceans and pinnipeds interact with Category I and II fisheries in the Northwest Atlantic Ocean; however, several species in Table 24 have experienced such great losses to their populations as a result of interactions with Category I and II fisheries that they are now considered strategic stocks under the MMPA.[9] These species are the harbor porpoise, the Western North Atlantic Northern Migratory Coastal Stock of bottlenose dolphin and the Western North Atlantic Southern Migratory Coastal Stock of bottlenose dolphin. Section 118(f)(1) of the MMPA requires the preparation and implementation of a TRP for any strategic marine mammal stock that interacts with

[9] Harbor porpoise are considered a strategic stock under the MMPA as the level of direct human-caused mortality has exceeded the PBR level for this species. Both northern and southern migratory coastal stocks of bottlenose dolphins are considered a strategic stock under the MMPA as both stocks are designated as depleted under the Act.

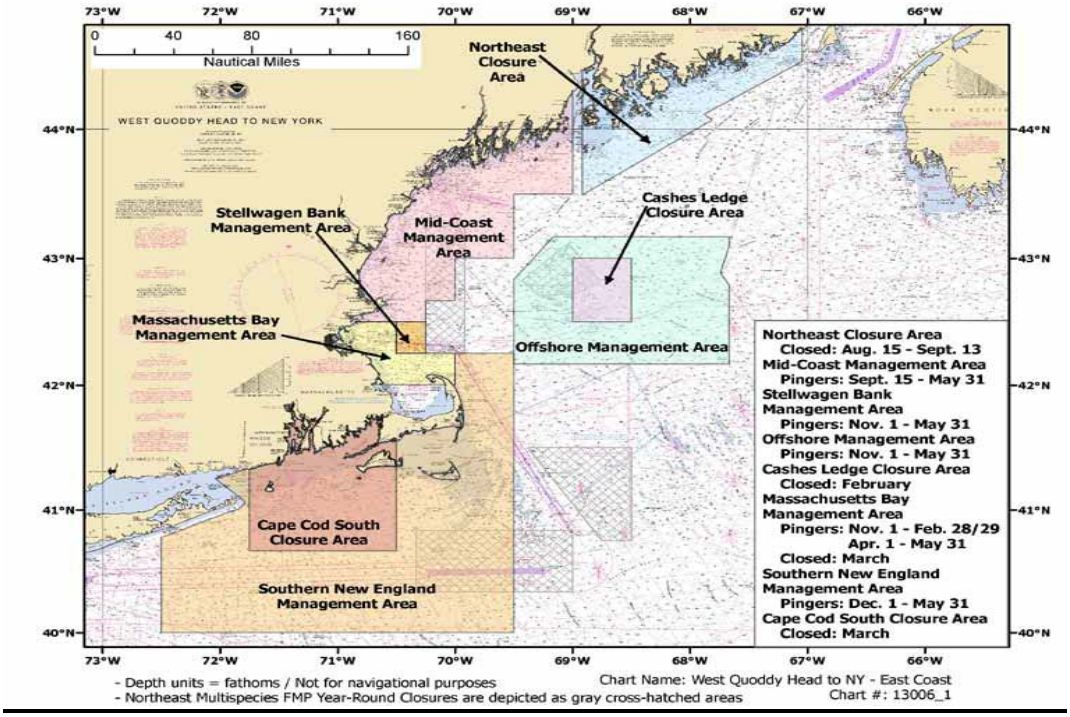
Category I or II fisheries. As a result, the Harbor Porpoise TRP (HPTRP or Plan) and the Bottlenose Dolphin TRP (BDTRP or Plan) were developed and implemented for these species. The following provides a brief overview and summary for each TRP; however, additional information on each TRP can be found at: http://www.greateratlantic.fisheries.noaa.gov/protected/porptrp/ or http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm. In addition to the HPTRP and BDTRP, an Atlantic Trawl Gear Take Reduction Strategy (ATGTRS) was established in 2006 to address small cetacean and pinniped interactions in trawl gear. Although voluntary, the ATGTRS does provide means and measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals. For additional details on the ATGTRS, please visit: 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, 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:

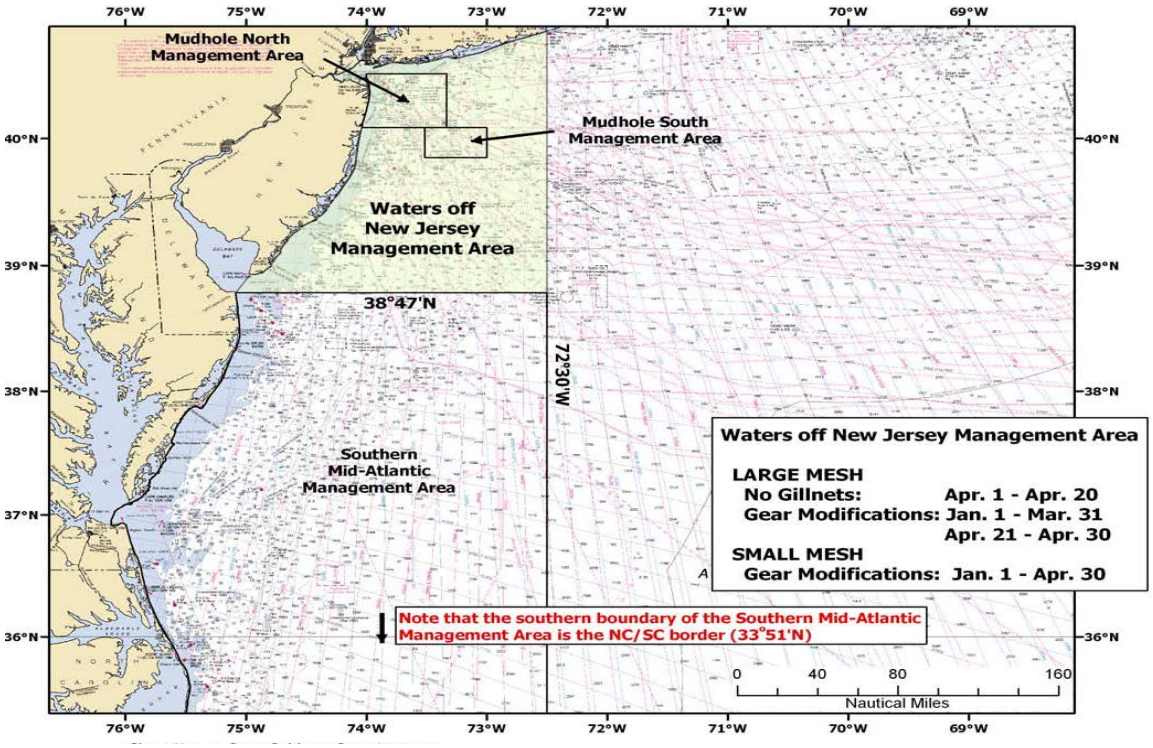
- **New England Region**: The New England component of the HPTRP pertains to all fishing with sink gillnets and other gillnets capable of catching multispecies in New England waters from Maine through Rhode Island. This portion of the Plan includes time and area closures, as well as closures to multispecies gillnet fishing unless pingers are used in the manner prescribed in the TRP regulations (Figure 12). For additional details see 50 CFR 229.33 and the outreach guide at http://www.greateratlantic.fisheries.noaa.gov/prot_res/porptrp/doc/HPTRPNewEnglandGuide.pdf

Figure 10- HPTRP Management Areas for New England



- **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 (Waters off New Jersey, Mudhole North (located in Waters off New Jersey Management Area), Mudhole South (located in Waters off New Jersey Management Area), and Southern Mid-Atlantic), each with time and area closures to gillnet fishing unless the gear meets certain specifications. Additionally, during regulated periods, 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 gillnet fishing is prohibited regardless of the gear specifications. Figure 13 and Figure 14 provide a depiction of the Mid-Atlantic Management Areas. For additional details see 50 CFR 229.34 and the outreach guide at http://www.greateratlantic.fisheries.noaa.gov/prot_res/porptrp/doc/HPTRPMidAtlanticGuide_Feb%202010.pdf

Figure 11 - HPTRP waters off New Jersey management area



Notes:

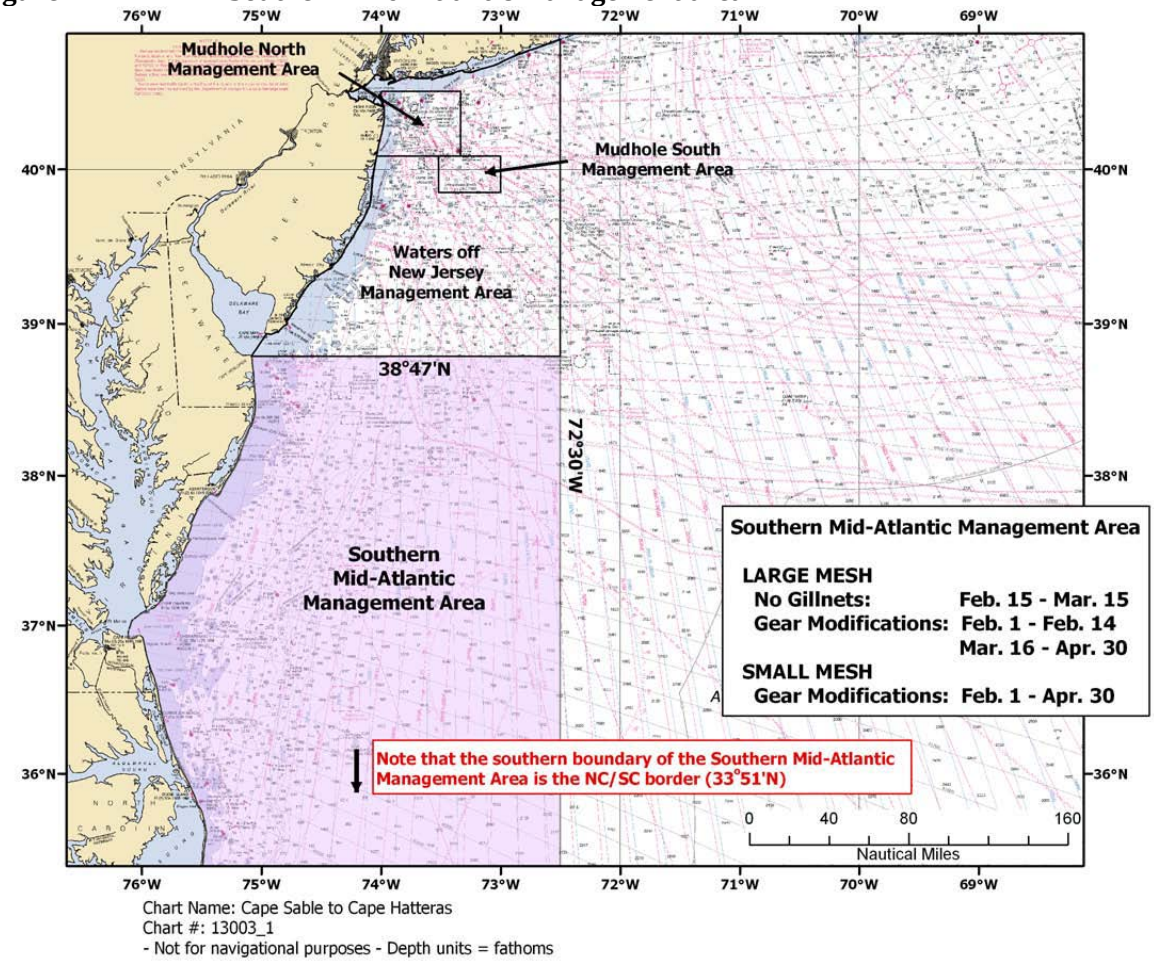
Mudhole North Management Area Small Mesh
Gear Modification: Jan. 1- Apr. 30
No Gillnet: Feb. 15-Mar. 15

Mudhole North Management Area Large Mesh
Gear Modification: Jan. 1- Apr. 30
No Gillnet: Feb. 15-Mar. 15; Apr. 1-Apr. 20

Mudhole South Management Area Small Mesh
Gear Modification: Jan. 1- Jan.31; Mar. 16-Apr.30
No Gillnet: Feb. 1-Mar.15

Mudhole South Management Area Large Mesh
Gear Modification: Jan. 1- Jan.31; Mar. 16-Mar. 31; Apr. 21- Apr. 30
No Gillnet: Feb. 1-Mar.15; Apr. 1- Apr. 20

Figure 12 - HPTRP Southern Mid-Atlantic management area



Bottlenose Take Reduction Plan

In April 2006, NMFS published a final rule to implement the TRP 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. The other Atlantic coastal fisheries include the North Carolina inshore gillnet fishery, Southeast Atlantic gillnet fishery, Atlantic blue crab trap/pot fishery, Mid-Atlantic haul/beach seine fishery, North Carolina long haul seine fishery, North Carolina roe mullet stop net fishery, Southeastern U.S. Atlantic shark gillnet fishery, and the Virginia pound net fishery (NMFS 2002). The final rule 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. The BDTRP was amended on July 31, 2012 (77 FR 45268) to permanently continue nighttime fishing restrictions of medium mesh gillnets operating in North Carolina coastal state waters. The measures contained in the Plan 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. For additional details on the BDTRP please visit: **http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm.**

6.2.4.2.2 Sea Turtles

6.2.4.2.2.1 Bottom Trawl Gear

Sea turtles are known to interact with bottom trawl gear. Most of the observed sea turtle interactions with bottom trawl gear have occurred in the Mid-Atlantic, although there have been some sea turtle interactions with trawl gear observed on Georges Bank. As few sea turtle interactions have been observed outside the Mid-Atlantic, there is insufficient data available to conduct a robust model-based analysis on sea turtle interactions with trawl gear in these regions and therefore, produce a bycatch estimate for these regions. As a result, the following bycatch estimates are based on observed sea turtle interactions in trawl gear in the Mid-Atlantic.

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) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic (i.e., south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border) 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; see below for details on TEDs). Of the 292 average annual observable loggerhead interactions, approximately 44 of those were adult equivalents (Warden 2011a).[10] Most recently, Murray (2015) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic (i.e., defined by the boundaries of the Mid-Atlantic Ecological Production; roughly waters west of 71ºW to the North Carolina/South Carolina border) was 231 (CV=0.13, 95% CI=182-298). Of the 231 total average annual loggerhead interactions, approximately 33 of those were adult equivalents (Murray 2015). Bycatch estimates provided in Warden (2011a) and Murray (2015) 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). Most recently, Murray (2015) estimated total loggerhead interactions (with bottom otter trawl gear) attributable to managed species from from 2009-2013. Specifically, an estimated average annual take of one loggerhead (95% CI=1-1) was attributed to the monkfish fishery.

6.2.4.2.2.2 Sink Gillnet Gear

Similar to trawl gear, although sea turtle interactions with gillnet gear have been observed in waters from the Gulf og Maine to the Mid-Atlantic, most of the observed interactions have occurred in Southern New England and the Mid-Atlantic (i.e., observers have documented one take of a loggerhead in the Gulf of Maine). As few sea turtle interactions have been observed outside the Mid-Atlantic, there is insufficient data available to conduct a robust model-based analysis on sea turtle interactions with gillnet gear outside the Mid-Atlantic as defined by Murray (2013) and therefore, produce a bycatch estimate for these regions. As a result, the following bycatch estimates are based on observed sea turtle interactions in sink gillnet gear in the Mid-Atlantic

Observers have documented green, Kemp's ridley, leatherback, loggerhead, and unidentified sea turtles in 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 turtles (loggerheads plus

[10] Adult equivalence considers the reproductive value (i.e., expected reproductive output) of the animal (Warden 2011, Murray 2013, Wallace et al. 2008).

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). 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 sea turtle interactions by managed species landed in gillnet gear from 2007-2011. On average, approximately 27 loggerhead (95% CI=16-41) and two (95% CI=1-2) hard shelled (non-loggerhead) interactions were attributed to the monkfish fishery

6.2.4.2.2.3 Factors Affecting Sea Turtle Interactions

Although sea turtles have the potential to interact with multiple gear types, such as trawl or gillnet gear, the risk of an interaction is affected by multiple factors, including where and when fishing effort is focused, the type of gear being used, environmental conditions, and sea turtle occurrence and distribution. Murray and Orphanides (2013) recently evaluated fishery-independent and dependent data to identify environmental conditions associated with turtle presence and the subsequent risk of a bycatch encounter if fishing effort is present; It was concluded that fishery independent encounter rates were a function of latitude, sea surface temperature (SST), depth, and salinity. When the model was fit to fishery dependent data (gillnet, bottom trawl, and scallop dredge), Murray and Orphanides (2013) found a decreasing trend in encounter rates as latitude increases; an increasing trend as SST increases; a bimodal relationship between encounter rates and salinity; and higher encounter rates in depths between 25 and 50 m. Similarly, Murray (2013) concluded, based on 2007-2011 data obtained on loggerhead interactions in gillnet gear, that bycatch rates were associated with latitude, SST, and mesh size, with highest interaction rates in the southern mid-Atlantic in warm surface waters and in large (>7 inch mesh). Based on the above 2005-2008 data obtained on loggerhead interactions in bottom trawl gear, Warden (2011a) also found that latitude, depth and SST were associated with the interaction rate, with the rates being highest south of 37° N in waters < 50 meters deep and SST > 15°C (Table 25).

Table 17 - Mid-Atlantic trawl bycatch rates (Warden 2011a)

Latitude Zone	Depth, SST	Loggerheads/Day Fished
<37 °N	<=50 m, <=15° C	0.4
	<=50 m, >=15° C	2.06
	>50 m, <= 15° C	0.07
	>50 m, >15° C	0.09
37 - 39 °N	<=50 m, <=15° C	0.04
	<=50 m, >=15° C	0.18
	>50 m, <= 15° C	0.01
	>50 m, >15° C	0.07
>39 °N	<=50 m, <=15° C	<0.01
	<=50 m, >=15° C	0.03
	>50 m, <= 15° C	<0.01
	>50 m, >15° C	0.01

6.2.4.2.3 Atlantic Sturgeon

6.2.4.2.3.1 Bottom Trawl Gear

Atlantic sturgeon are known to interact with bottom trawl gear and in fact, have been observed over the last 10 or more years (NEFOP and ASM) in bottom otter trawl gear where the primary species being targeted was monkfish (NMFS NEFSC FSB 2015). To understand the interaction risk between bottom

otter trawls and Atlantic sturgeon, there are three documents that use data collected by the NEFOP to describe bycatch of Atlantic sturgeon: Stein *et al*. (2004b); ASMFC (2007); and Miller and Shepard (2011); None of these provide estimates of Atlantic sturgeon bycatch by DPS. Information provided in all three documents indicate that sturgeon bycatch occurs in bottom otter trawl gear, with Miller and Shepard (2011) estimating, based on fishery observer data and VTR data from 2006-2010, that annual bycatch of Atlantic sturgeon was 1,239 animals. Specifically, Miller and Shepard (2011) observed Atlantic sturgeon interactions in trawl gear with small (< 5.5 inches) and large (≥ 5.5 inches) mesh sizes.[11] Although Atlantic sturgeon were observed to interact with trawl gear with various mesh sizes, based on observer data, Miller and Shepard (2011) concluded that of the possible fishing gear types, in general, trawl gear posed less of a mortality risk to Atlantic sturgeon than gillnet gear (i.e., estimated mortality rates in gillnet gear were 20.0%, while those in otter trawl gear were 5.0%); similar conclusions were reached in Stein *et al*. 2004b and ASMFC 2007. However, although Atlantic sturgeon deaths have rarely been reported in otter trawl gear (ASMFC 2007; Dunton et al. 2015; NMFS NEFSC FSB 2015), it is important to recognize that effects of an interaction may occur long after the interaction (Davis 2002; Broadhurst et al. 2006; Beardsall et al. 2013). Based on physiological data obtained from Atlantic sturgeon captured in otter trawls, Beardsall *et al*. (2013) suggests that factors such as longer tow times (i.e., > 60 minutes), prolonged handling of sturgeon (> 10 minutes on deck), and the type of trawl gear/equipment used, may increase the risk of physiological disruption or impairment (e.g., elevated cortisol levels, immune suppression, impaired osmoregulation, exhaustion) to Atlantic sturgeon captured in otter trawls and therefore, may result in an increased risk of post-release mortality. The authors also note that post-release exhaustion, even after a 60 minute trawl capture, results in behavioral disruption to Atlantic sturgeon and caution that repeated bycatch events may compound post-release behavioral effects to Atlantic sturgeon which in turn, may effect essential life functions of Atlantic sturgeon (e.g., predator avoidance, foraging, migration to foraging or spawning sites) and therefore, Atlantic sturgeon survival (Beardsall *et al*. 2013). Although the study conducted by Beardsall *et al*. (2013) provides some initial insight into the post-release effects to Atlantic sturgeon captured in trawl gear, additional studies are needed to clearly identify the "after" effects of a trawl interaction. As it is remains uncertain what the overall impacts to Atlantic sturgeon survival are from trawl interactions, trawls should not be completely discounted as a form of gear that poses a mortality risk to Atlantic sturgeon.

6.2.4.2.3.2 Sink Gillnet Gear

Based on observer (NEFOP and ASM) data over the last 10 or more years, the gear type that results in the greatest bycatch and subsequent mortality to Atlantic sturgeon is sink gillnet gear (Stein et al. 2004b; ASMFC 2007; ASSRT 2007; Miller and Shepard 2011; Dunton et al. 2015, He and Jones 2013). The greatest observed Atlantic sturgeon mortality has been observed in sink gillnets utilized for the monkfish fishery and where the primary species being targeted was monkfish. In fact, examination of just NEFOP data indicating that from 1989-2013, 62% of the observed sink gillnet bycatch is attributed to the monkfish fishery (Dunton et al. 2015).

To understand the interaction risk between bottom otter trawls and Atlantic sturgeon, there are three documents that use data collected by the NEFOP to describe bycatch of Atlantic sturgeon: Stein *et al*. (2004b) for 1989-2000; ASMFC (2007) for 2001-2006; and Miller and Shepard (2011) for 2006-2010; None of these provide estimates of Atlantic sturgeon bycatch by DPS. Information provided in all three documents indicate that sturgeon bycatch occurs in sink gillnet gear, with Miller and Shepard (2011) estimating, based on fishery observer data and VTR data from 2006-2010, that annual bycatch of Atlantic sturgeon is 1,342 animals. Specifically, Miller and Shepard (2011) observed Atlantic sturgeon interactions in gillnet gear with small (< 5.5 inches), large (5.5 to 8 inches), and extra-large mesh (>8 inches) sizes, with mortality rates in gillnet gear estimated to be much higher than those in bottom trawl

[11] The regulatory bottom otter trawl mesh size for summer flounder, scup and black sea bass is 5.5", 5.0", and 4.5" respectively.

gear (sink gillnet estimated mortality rate= 20.0% ; bottom trawl gear estimated mortality rate=5.0%).. Similar conclusions were reached in Stein *et al*. 2004b and ASMFC 2007 reports, in which both studies also concluded, after review of observer data from 1989-2000 and 2001-2006, that observed mortality is much higher in gillnet gear than in trawl gear. Based on the information presented in these three documents, factors thought to increase the risk of Atlantic sturgeon bycatch, and therefore death, in gillnet gear include:

- Setting gillnet gear at depths <40 meters;
- Using gillnet gear with mesh sizes >10 inches;
- Setting gillnet gear during spring, fall, and winter months;
- Long soak times (i.e., >24 hours); and
- Setting gear during warmer water temperatures

6.2.4.3 Atlantic Salmon

NEFOP and At-Sea Monitoring Programs documented a total of15 individual salmon incidentally caught on over 60,000 observed commercial fishing trips from 1989 through August 2013 (NMFS 2013;Kocik *et al*. 2014). Specifically, Atlantic salmon were observed bycaught in gillnet (11/15) 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 GOM Distinct Population Segment, although some may have originated from the Connecticut River restocking program (i.e., those caught south of Cape Cod, Massachusetts).

The above information, specifically the very low number of observed Atlantic salmon interactions in gillnet and trawl gear reported in the Northeast Fisheries Observer Program's database (which includes At-Sea Monitoring data), suggests that interactions with Atlantic salmon are rare events (NMFS 2013; Kocik *et al*. 2014); however, it is important to recognize that observer program coverage is not 100 percent. As a result, it is likely that some interactions with Atlantic salmon have occurred, but have not been observed or reported.

6.3 Physical and Biological Environment

The Northeast U.S. Shelf Ecosystem has been described as including the area from the GOM 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 (Sherman et al. 1996). The continental slope includes the area east of the shelf, out to a depth of 2,000 m. Four distinct sub-regions comprise the NOAA Fisheries Greater Atlantic Region: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. Occasionally another sub-region, Southern New England, is described; however, we incorporated discussions of any distinctive features of this area into the sections describing Georges Bank and the Mid-Atlantic Bight.

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 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 and biological characteristics of each of these sub-regions are described in the Physical and Biological Environment section of Amendment 5 (Section 4.2), along with a short description of the physical features of coastal environments. Monkfish habitats are described in Section 4.4.1 of Amendment 5 and summarized below. Information on the affected physical and biological environments included in Amendment 5 was extracted from Stevenson et al. (2004).

6.3.1 **Fishing Effects on EFH**

A detailed discussion of monkfish fishing on EFH is contained in the Affected Environment Section of Amendment 5. Since monkfish EFH has been determined to not be vulnerable to any fishing gear (Stevenson, et al. 2004), the discussion focuses on gears used in the directed monkfish fishery (trawls and gillnets) that potentially could impact EFH of other fisheries. The discussion in Amendment 5 cites several important peer-reviewed studies in describing the potential biological and physical effects of fishing on various substrates (mud, sand, gravel and rocky substrates). With regard to the gears used in the monkfish fishery, the discussion focuses on trawling, since gillnets are stationary or static, and have been determined to not have an adverse effect on EFH. Since vessels are prohibited from using a dredge while on a monkfish DAS, discussion of the effects of dredges is not pertinent. Generally, trawling reduces habitat complexity and productivity by removing or altering physical (boulders, sand waves or cobble piles) and biological (structure forming invertebrates) habitat components and mixing sediments (ICES 2000). These impacts are more discernable with repeated trawl use and in low energy environments (NRC 2002).

6.3.2 **Essential Fish Habitat**

Section 4.4 of Amendment 5 contains a detailed description of monkfish EFH, EFH of other species vulnerable to bottom trawl gear, the effect of the monkfish fishery on EFH (monkfish and other species, all life stages), and measures to minimize adverse effects of the monkfish fishery on EFH. The document describes habitat protection measures taken in the monkfish FMP, as well as the Atlantic Sea Scallop and NE Multispecies FMPs (namely habitat closed areas).

In summary, the discussion notes that monkfish EFH has been determined to only be minimally vulnerable to bottom-tending mobile gear (bottom trawls and dredges) and bottom gillnets. Therefore, the effects of the monkfish fishery and other fisheries on monkfish EFH do not require any management action. However, the monkfish trawl fishery does have more than a minimal and temporary impact on EFH for a number of other demersal species in the region. Adverse impacts that were more than minimal and not temporary in nature were identified for the following species and life stages, based on an evaluation of species life history and habitat requirements and the spatial distributions and impacts of bottom otter trawls in the region (Stevenson et al., 2004):

Species and life stages with EFH more than minimally vulnerable to otter trawl gear:

> American plaice (Juvenile (J), Adult (A)), Atlantic cod (J, A), Atlantic halibut (J, A), haddock (J, A), pollock (A), ocean pout (Egg (E), J, A), red hake (J, A), redfish (J, A), white hake (J), silver hake (J), winter flounder (A), witch flounder (J, A), yellowtail flounder (J, A), black sea bass (J, A), scup (J), tilefish (J, A), barndoor skate (J, A), clearnose skate (J, A), little skate (J, A), rosette skate (J, A), smooth skate (J, A), thorny skate (J, A), and winter skate (J, A).

There are no species or life stages for which EFH is more than minimally vulnerable to bottom gillnets (Stevenson et al., 2004). Table 26 identifies the species, life stages and geographic area of their EFH, for those species whose EFH is vulnerable to bottom trawling.

Table 18 - EFH descriptions for all benthic life stages of federally-managed species in the U.S. Northeast Shelf Ecosystem with EFH vulnerable to bottom tending gear (Stevenson *et al*. 2004) [GOM = Gulf of Maine, GB = Georges Bank, SNE = Southern New England]

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
American plaice	juvenile	GOM and estuaries from Passamaquoddy Bay to Saco Bay, ME and from Mass. Bay to Cape Cod Bay, MA	45 - 150	Bottom habitats with fine grained sediments or a substrate of sand or gravel
American plaice	adult	GOM and estuaries from Passamaquoddy Bay to Saco Bay, ME and from Mass. Bay to Cape Cod Bay, MA	45 - 175	Bottom habitats with fine grained sediments or a substrate of sand or gravel
Atlantic cod	juvenile	GOM, GB, eastern portion of continental shelf off SNE and following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	25 - 75	Bottom habitats with a substrate of cobble or gravel
Atlantic cod	adult	GOM, GB, eastern portion of continental shelf off SNE and following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, Cape Cod Bay, Buzzards Bay	10 - 150	Bottom habitats with a substrate of rocks, pebbles, or gravel
Atlantic halibut	juvenile	GOM, GB	20 - 60	Bottom habitats with a substrate of sand, gravel, or clay
Atlantic halibut	adult	GOM, GB	100 - 700	Bottom habitats with a substrate of sand, gravel, or clay
Atlantic herring	eggs	GOM, GB and following estuaries: Englishman/Machias Bay, Casco Bay, and Cape Cod Bay	20 – 80	Bottom habitats attached to gravel, sand, cobble or shell fragments, also on macrophytes
Atlantic sea scallop	juvenile	GOM, GB, SNE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	18 - 110	Bottom habitats with a substrate of cobble, shells, and silt
Atlantic sea scallop	adult	GOM, GB, SNE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	18 - 110	Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand
Haddock	juvenile	GB, GOM, middle Atlantic south to Delaware Bay	35 - 100	Bottom habitats with a substrate of pebble and gravel
Haddock	adult	GB and eastern side of Nantucket Shoals, throughout GOME, *additional area of Nantucket Shoals, and Great South Channel	40 - 150	Bottom habitats with a substrate of broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Monkfish	juvenile	Outer continental shelf in the middle Atlantic, mid-shelf off southern NE, all areas of GOME	25 - 200	Bottom habitats with substrates of a sandshell mix, algae covered rocks, hard sand, pebbly gravel, or mud
Monkfish	adult	Outer continental shelf in the middle Atlantic, mid-shelf off southern NE, outer perimeter of GB, all areas of GOME	25 - 200	Bottom habitats with substrates of a sandshell mix, algae covered rocks, hard sand, pebbly gravel, or mud
Ocean pout	eggs	GOM, GB, SNE, and middle Atlantic south to Delaware Bay, and the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts and Cape Cod Bay	<50	Bottom habitats, generally in hard bottom sheltered nests, holes, or crevices
Ocean pout	juvenile	GOM, GB, SNE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, and Cape Cod Bay	< 50	Bottom habitats in close proximity to hard bottom nesting areas
Ocean pout	adult	GOM, GB, SNE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, and Cape Cod Bay	< 80	Bottom habitats, often smooth bottom near rocks or algae
Offshore hake	juvenile	Outer continental shelf of GB and SNE south to Cape Hatteras, NC	170 - 350	Bottom habitats
Offshore hake	adult	Outer continental shelf of GB and SNE south to Cape Hatteras, NC	150 - 380	Bottom habitats
Pollock	juvenile	GOM, GB, and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay to Waquoit Bay; Long Island Sound, Great South Bay	0 – 250	Bottom habitats with aquatic vegetation or a substrate of sand, mud, or rocks
Pollock	adult	GOM, GB, SNE, and middle Atlantic south to New Jersey and the following estuaries: Passamaquoddy Bay, Damariscotta R., Mass Bay, Cape Cod Bay, Long Island Sound	15 – 365	Hard bottom habitats including artificial reefs
Red hake	juvenile	GOM, GB, continental shelf off SNE, and middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay, Mass. Bay to Cape Cod Bay; Buzzards Bay to Conn. R.; Hudson R./ Raritan Bay, and Chesapeake Bay	< 100	Bottom habitats with substrate of shell fragments, including areas with an abundance of live scallops
Red hake	adult	GOM, GB, continental shelf off SNE, and middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay, Mass. Bay to Cape Cod Bay; Buzzards Bay to Conn. R.; Hudson R./ Raritan Bay, Delaware Bay, and Chesapeake Bay	10 - 130	Bottom habitats in depressions with a substrate of sand and mud
Redfish	juvenile	GOM, southern edge of GB	25 - 400	Bottom habitats with a substrate of silt, mud, or hard bottom
Redfish	adult	GOM, southern edge of GB	50 - 350	Bottom habitats with a substrate of silt, mud, or hard bottom

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Silver hake	juvenile	GOM, GB, continental shelf off SNE, middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Casco Bay, Mass. Bay to Cape Cod Bay	20 – 270	Bottom habitats of all substrate types
Winter flounder	adult	GB, inshore areas of GOME, SNE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Chincoteague Bay	1 - 100	Bottom habitats including estuaries with substrates of mud, sand and gravel
Witch flounder	juvenile	GOM, outer continental shelf from GB south to Cape Hatteras	50 - 450 to 1500	Bottom habitats with fine grained substrate
Witch flounder	adult	GOM, outer continental shelf from GB south to Chesapeake Bay	25 - 300	Bottom habitats with fine grained substrate
Yellowtail flounder	adult	GB, GOM, SNE continental shelf south to Delaware Bay and the following estuaries: Sheepscot R., Casco Bay, Mass. Bay to Cape Cod Bay	20 - 50	Bottom habitats with substrate of sand or sand and mud
Black sea bass	juvenile	Demersal waters over continental shelf from GOM to Cape Hatteras, NC, also includes estuaries from Buzzards Bay to Long Island Sound; Gardiners Bay, Barnegat Bay to Chesapeake Bay; Tangier/ Pocomoke Sound, and James River	1 - 38	Rough bottom, shellfish and eelgrass beds, manmade structures in sandy-shelly areas, offshore clam beds, and shell patches may be used during wintering
Black sea bass	adult	Demersal waters over continental shelf from GOM to Cape Hatteras, NC, also includes estuaries: Buzzards Bay, Narragansett Bay, Gardiners Bay, Great South Bay, Barnegat Bay to Chesapeake Bay; Tangier/ Pocomoke Sound, and James River	20 - 50	Structured habitats (natural and manmade), sand and shell substrates preferred
Scup	juvenile	Continental shelf from GOM to Cape Hatteras, NC includes the following estuaries: Mass. Bay, Cape Cod Bay to Long Island Sound; Gardiners Bay to Delaware Inland Bays; and Chesapeake Bay	(0 - 38)	Demersal waters north of Cape Hatteras and inshore on various sands, mud, mussel, and eelgrass bed type substrates
Tilefish	juvenile	US/Canadian boundary to VA/NC boundary (shelf break, submarine canyon walls, and flanks: GB to Cape Hatteras)	76 - 365	Rough bottom, small burrows, and sheltered areas; substrate rocky, stiff clay, human debris
Tilefish	adult	US/Canadian boundary to VA/NC boundary (shelf break, submarine canyon walls, and flanks: GB to Cape Hatteras)	76 - 365	Rough bottom, small burrows, and sheltered areas; substrate rocky, stiff clay, human debris
Barndoor skate	juvenile	Eastern GOM, GB, SNE, Mid-Atlantic Bight to Hudson Canyon	l0 - 750, mostly < 150	Bottom habitats with mud, gravel, and sand substrates
Barndoor skate	adult	Eastern GOM, GB, SNE, Mid-Atlantic Bight to Hudson Canyon	l0 - 750, mostly < 150	Bottom habitats with mud, gravel, and sand substrates
Clearnose skate	juvenile	GOM, along shelf to Cape Hatteras, NC; includes the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem	0 – 500, mostly < 111	Bottom habitats with substrate of soft bottom along continental shelf and rocky or gravelly bottom

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Clearnose skate	adult	GOM, along shelf to Cape Hatteras, NC; includes the estuaries from Hudson River/Raritan Bay south to the Chesapeake Bay mainstem	0 – 500, mostly < 111	Bottom habitats with substrate of soft bottom along continental shelf and rocky or gravelly bottom
Little skate	juvenile	GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 137, mostly 73 - 91	Bottom habitats with sandy or gravelly substrate or mud
Little skate	adult	GB through Mid-Atlantic Bight to Cape Hatteras, NC; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 137, mostly 73 - 91	Bottom habitats with sandy or gravelly substrate or mud
Rosette skate	juvenile	Nantucket shoals and southern edge of GB to Cape Hatteras, NC	33 - 530, mostly 74 - 274	Bottom habitats with soft substrate, including sand/mud bottoms, mud with echinoid and ophiuroid fragments, and shell and pteropod ooze
Rosette skate	adult	Nantucket shoals and southern edge of GB to Cape Hatteras, NC	33 - 530, mostly 74 - 274	Bottom habitats with soft substrate, including sand/mud bottoms, mud with echinoid and ophiuroid fragments, and shell and pteropod ooze
Smooth skate	juvenile	Offshore banks of GOM	31 – 874, mostly 110 - 457	Bottom habitats with a substrate of soft mud (silt and clay), sand, broken shells, gravel and pebbles
Smooth skate	adult	Offshore banks of GOM	31 – 874, mostly 110 - 457	Bottom habitats with a substrate of soft mud (silt and clay), sand, broken shells, gravel and pebbles
Thorny skate	juvenile	GOM and GB	18 - 2000, mostly 111 - 366	Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud
Thorny skate	adult	GOM and GB	18 - 2000, mostly 111 - 366	Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud
Winter skate	juvenile	Cape Cod Bay, GB, SNE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 371, mostly < 111	Bottom habitats with substrate of sand and gravel or mud
Winter skate	adult	Cape Cod Bay, GB, SNE shelf through Mid-Atlantic Bight to North Carolina; includes the estuaries from Buzzards Bay south to the Chesapeake Bay mainstem	0 - 371, mostly < 111	Bottom habitats with substrate of sand and gravel or mud

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
White hake	juvenile	GOM, southern edge of GB, SNE to middle Atlantic and the following estuaries: Passamaquoddy Bay to Great Bay; Mass. Bay to Cape Cod Bay	5 - 225	Pelagic stage - pelagic waters; demersal stage - bottom habitat with seagrass beds or substrate of mud or fine grained sand

6.4 Human Environment, Vessels, Ports and Communities

This section updates information provided in the annual SAFE Report for the Monkfish FMP, adding data for FY2015.

6.4.1 **Vessels and Fishery Sectors**

The following sections show the distribution of effort and landings by permit category, area and gear type.

6.4.1.1 Permits

In 2015, there were 600 monkfish limited access permits, of which 268 were Category C permits holding limited access permits in either the multispecies (51%) or scallop (55%) fisheries, and 242 were Category D permits, primarily (98%) holding limited access multispecies permits (Table 27). Overall, 65.5% of monkfish limited access permit holders also hold multispecies limited access permits. Vessels in all monkfish permit categories also hold limited access permits in a number of New England and Mid-Atlantic fisheries. The number and percent of monkfish vessels has decreased slightly from the 2014 SAFE Report (NEFMC, 2015). There were eight Category H limited access permits for vessels fishing within the SFMA (Table 27).

Table 19 - Number and percent of monkfish limited access vessels also issued a limited access permit in other fisheries in 2015, by permit category

MONKFISH PERMIT CATEGORY	NUMBER OF MONKFISH PERMITS	NUMBER OF MONKFISH VESSELS ALSO ISSUED A LIMITED ACCESS PERMIT FOR:										
		BLACK SEA BASS	SUMMER FLOUNDER	HERRING	LAGC IFQ SCALLOP	LOBSTER	MULTI-SPECIES	OCEAN QUAHOG	RED CRAB	SCALLOP	SCUP	SQUID/ MACKEREL/ BUTTERFISH
A	22	13	10		4	14	2				12	1
B	43	19	8		4	22	3				10	4
C	268	97	211	15	147	218	136			161	103	88
D	242	94	150	22	111	217	237			19	116	78
F	17	16	17	8	9	17	15			2	17	17
H	8	2	1		1							
TOTAL	600	241	397	45	276	488	393	0	0	182	258	188

MONKFISH PERMIT CATEGORY	NUMBER OF MONKFISH PERMITS	PERCENT OF MONKFISH VESSELS ALSO ISSUED A LIMITED ACCESS PERMIT FOR:										
		BLACK SEA BASS	SUMMER FLOUNDER	HERRING	LAGC IFQ SCALLOP	LOBSTER	MULTI-SPECIES	OCEAN QUAHOG	RED CRAB	SCALLOP	SCUP	SQUID/ MACKEREL/ BUTTERFISH
A	22	59%	45%	0%	18%	64%	9%	0%	0%	0%	55%	5%
B	43	44%	19%	0%	9%	51%	7%	0%	0%	0%	23%	9%
C	268	36%	79%	6%	55%	81%	51%	0%	0%	60%	38%	33%
D	242	39%	62%	9%	46%	90%	98%	0%	0%	8%	48%	32%
F	17	94%	100%	47%	53%	100%	88%	0%	0%	12%	100%	100%
H	8	25%	13%	0%	13%	0%	0%	0%	0%	0%	0%	0%
TOTAL	600	40%	66%	8%	46%	81%	66%	0%	0%	30%	43%	31%

Source: NMFS-GARFO Analysis and Program Support Division, vessel permit database, accessed July, 2016.

The FMP also provides an open-access permit (Category E) for vessels that did not qualify for a limited access permit so those vessels can land monkfish caught incidentally in other fisheries. Table 28 shows an increase in the number of category E permits during the first few years of the FMP, followed by a decline since the peak in 2005, from 2,379 permits to 1,595 permits in 2015.

Table 20 - Monkfish open-access (Category E) permits issued each year since implementation of the FMP since 1999.

Fishing Year	Number of permits
1999	1,466
2000	1,882
2001	1,991
2002	2,142
2003	2,120
2004	2,256
2005	2,379
2006	2,310
2007	2,265
2008	2,163
2009	2,066
2010	1,998
2011	1,827
2012	1,763
2013	1,713
2014	1,644
2015	1,595

Source: NMFS-GARFO Analysis and Program Support Division, vessel permit database, accessed July, 2016.

6.4.1.2 Landings and Revenues

Table 29 shows monthly landings for FY2015 by area and gear, as well as total monthly landings for the fishing year. Landings in both areas combined peaked in FY 2003 but have since declined to reach a relatively stable level between FY2011 – 2014 (Table 30). FY 2015 landings showed a slight increase in landings in the NFMA and a slight decrease in the SFMA, however, it is not clear yet whether this represents a new trend. Monkfish landings increased between FY 2002 and FY 2003, principally due to the increased trip limits in the SFMA, then declined in FY 2004 as trip limits and DAS allocations were reduced in that area. In FY 2005 total landings increased by 1,272 mt, ~ 7%, due to an increase in SFMA landings as a result of increased trip limits and DAS allocations, despite a decline of 20% in NFMA landings from the previous year (Figure 15). NFMA landings declined between FY 2001 and FY2010, although trip limits were only established in FY 2007, and in FY 2008 were about 24% of what they were at the peak. The 2013 Emergency Action removed the NFMA possession limit but did not appear to significantly increase landings on previous fishing years. The NFMA harvest was below the target TAL for FY 2015 (30%); the SFMA harvest was also below the target TAL for FY 2014 (47%).

Table 31 shows monthly landings by gear from the dealer reports for FY 2015, both as reported (landed weight) and converted to live weight. The lower landed weights reflect the fact that monkfish are landed as tails only, and as whole, gutted fish. The lower ratio of landed weight to live weight for otter trawls (0.35), compared to gillnets (0.80), is the result of a greater proportion of tails being landed by otter trawls, while gillnet vessels land mostly whole fish. Table 31 includes all landings in the dealer database,

while other tables reporting landed weights are filtered by permit category, and, therefore, may not include some dealer landings for which there is no permit number associated.

Table 32 is based on fishing year and landed weights, and indicates that the trend in revenues and landings has stabilized in recent years. Figure 16 shows the long-term trend in landings and revenues based on a fishing year. While landings have declined since the pre-FMP peak in 1997, nominal revenues have declined to a lesser degree since that time. According to Table 32, the monkfish market fluctuates annually with periods of increasing and decreasing landings leading to both revenue increases and decreases.

Table 21 - Monkfish landings by area, gear and month for FY2014 (converted to live weight)

	May 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2015 - Apr 2016		2015*	
															May - Apr FY '15 as a % of Target TAL	Target TAL
													Metric Tons	Percent of Area		Metric Tons
Northern	**226**	**215**	**258**	**332**	**325**	**284**	**322**	**379**	**299**	**501**	**548**	**391**	**4,808**	**46%**	**70%**	**5,854**
Otter Trawl	181	156	150	154	192	173	251	350	295	499	545	384	3,330	38%	57%	
Gillnet	39	38	86	148	126	104	64	29	4	2	1	6	647	7%	11%	
Dredge	6	17	20	29	6	7	7	0		0	0	1	93	1%	2%	
Other Gears	0	4	2	1	1	0	0	0			2	0	10	0%	0%	
Southern	**1,030**	**748**	**332**	**99**	**64**	**198**	**256**	**469**	**295**	**254**	**444**	**544**	**4,733**	**54%**	**53%**	**8,925**
Otter Trawl	53	15	20	15	19	97	33	99	46	88	111	87	683	8%	8%	
Gillnet	811	582	189	9	10	81	209	356	238	153	308	403	3,349	38%	38%	
Dredge	142	117	95	68	32	10	9	11	10	12	15	29	550	6%	6%	
Other Gears	24	34	28	7	3	10	5	3	1	1	10	25	151	2%	2%	
All Areas	**1,256**	**963**	**590**	**431**	**389**	**482**	**578**	**848**	**594**	**755**	**992**	**935**	**8,813**	**100%**		
Otter Trawl	234	171	170	169	211	270	284	449	341	587	656	471	4,013	46%		
Gillnet	850	620	275	157	136	185	273	385	242	155	309	409	3,996	45%		
Dredge	148	134	115	97	38	17	16	11	10	12	15	30	643	7%		
Other Gears	24	38	30	8	4	10	5	3	1	1	12	25	161	2%		

Table 22- Monkfish landings by management area FY1999 - 2015

Year	NFMA (metric tons)	SFMA (metric tons)
1999	9,720	14,311
2000	11,859	7,960
2001	14,853	11,069
2002	14,491	7,478
2003	14,155	12,198
2004	11,750	6,193
2005	9,533	9,656
2006	6,677	5,909
2007	5,050	7,180
2008	3,528	6,751
2009	3,344	4,800
2010	2,834	4,484
2011	3,699	5,801
2012	3,920	5,184
2013	3,596	5,088
2014	3,403	5,415
2015	4,080	4,733

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout and vessel trip report databases.

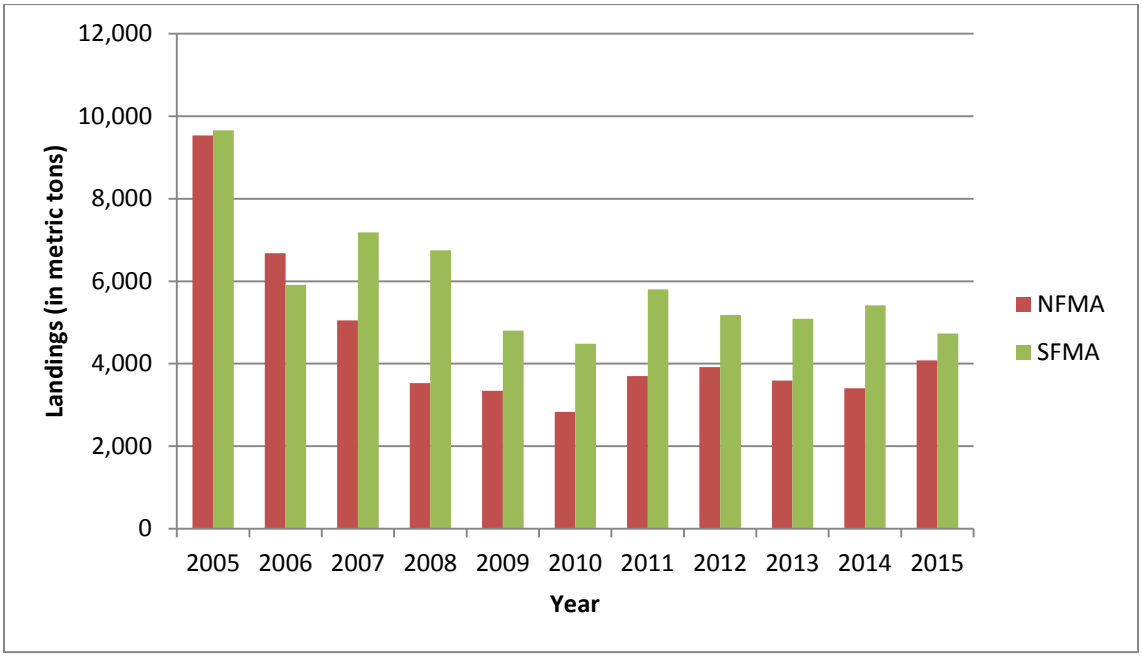


Figure 13 - NFMA and SFMA monkfish landings, FY 2004-2014

Table 23 - FY2014 monkfish landings from dealer reports, showing live weight (top) and landed weights (bottom)

Live Weight for FY 2014

Month	Otter Trawl	Scallop Dredge	Gillnet	Hook	Other	Total Pounds
May	443,818	123,599	1,713,867	1,318	386,286	2,668,888
June	291,482	100,856	1,251,977	103	379,418	2,023,836
July	261,786	95,033	537,999	277	319,356	1,214,451
August	243,864	45,982	301,761	955	312,853	905,415
September	261,490	29,053	287,767	15	257,375	835,700
October	359,718	10,106	370,008	173	281,707	1,021,712
November	352,958	10,890	527,983	3	351,385	1,243,219
December	538,518	5,377	760,759		555,093	1,859,747
January	612,785	4,648	497,712		148,173	1,263,318
February	1,047,768	4,926	284,518	312	325,250	1,662,774
March	1,222,555	4,128	575,796	50	330,178	2,132,707
April	913,456	12,196	817,689	1,481	251,576	1,996,398
TOTAL	**6,550,198**	**446,794**	**7,927,836**	**4,687**	**3,898,650**	**18,828,165**

Landed Weight for FY2014

Month	Otter Trawl	Scallop Dredge	Gillnet	Hook	Other	Total Pounds
May	173,735	37,597	1,373,708	1,150	136,729	1,722,919
June	99,181	30,380	1,003,355	68	134,309	1,267,293
July	84,992	28,627	391,199	104	114,181	619,103
August	84,904	13,886	153,553	526	98,897	351,766
September	85,073	8,948	152,077	13	79,436	325,547
October	121,735	3,084	227,164	52	95,189	447,224
November	121,237	3,409	388,660	1	124,696	638,003
December	194,408	1,631	629,609		205,393	1,031,041
January	219,320	1,442	418,752		49,702	689,216
February	352,072	1,485	233,619	94	115,042	702,312
March	436,397	1,242	478,143	15	123,265	1,039,062
April	362,890	3,673	652,699	1,356	94,766	1,115,384
TOTAL	**2,335,944**	**135,404**	**6,102,538**	**3,379**	**1,371,605**	**9,948,870**

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2015.

Note: Table does not include landings in the dealer database for which there is no permit number associated, while other tables reporting landed weights are not filtered by permit category, and, therefore, include all dealer landings.

Table 24 - Total monkfish landings (landed weight) and revenues, 1995-2014

Fishing Year	Landings*	Revenues*
(May 1 - April 30)	**(1,000 lbs. landed wt.)**	**($1,000)**
1995	18,416	$24,759
1996	20,733	$26,188
1997	21,774	$30,127
1998	24,156	$34,682
1999	26,077	$48,714
2000	23,423	$46,123
2001	30,520	$42,354
2002	25,312	$35,256
2003	29,321	$37,471
2004	18,377	$30,945
2005	22,818	$42,640
2006	14,747	$28,548
2007	14,225	$29,145
2008	11,714	$23,307
2009	9,652	$18,599
2010	8,728	$20,375
2011	11,350	$28,856
2012	9,937	$21,409
2013	9,489	$18,209
2014	10,189	$19,483
2015	9,949	$19,046

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016

Figure 14 - Monkfish landings and revenue, 2005 - 2015

Figure 17 illustrates the seasonal pattern of monkfish landings in FY 2015 by month and gear type. The predominant gears are gillnet, landing approximately 1.7 million lb in May, and otter trawl landing approximately 1.2 million lb in March. A small proportion of landings occur during the winter months, but a much larger proportion during the spring/early summer months when fish are migrating from deeper water.

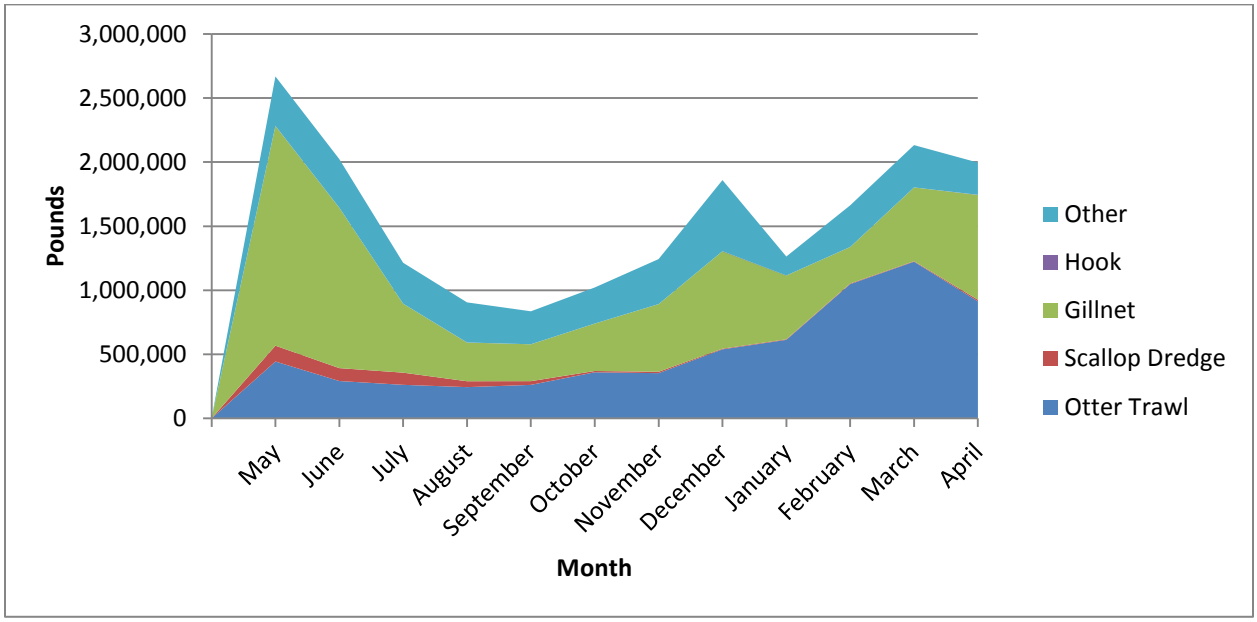


Figure 15 - Monkfish landings by gear and month (FY2015) in pounds (live weight)

While Massachusetts continues to account for the greatest proportion of all monkfish landings, all states have seen an overall decline in monkfish landings (Table 33) in recent years. FY2015 remains an outlier with some states seeing an increase in landings, however, it is not clear whether this constitutes a new trend.

Table 34 and Table 35 show monkfish landings and revenues as a percentage of total landings and revenues by permit categories for FY 2006-2014 (data for earlier years are available in the FW7 document). Data for Connecticut is shown separately to facilitate comparison with earlier landings data summarized in previous monkfish management actions that account for different ways that Connecticut reported state landings to NMFS.

Table 25 - Total monkfish landings (landed weight), 2009-2015, by state

STATE	Thousands of Pounds of Monkfish									
	′ 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
CT	318	406	244	253	305	457	547	724	380	464
MA	7,254	6,134	4,850	4,181	3,812	4,972	4,303	4,227	4,581	5,067
MD	106	158	132	48	83	98	69	86	78	36
ME	987	526	303	178	115	257	345	243	178	219

NC		112	58	31	27	10	3	38	47	56
	99									
NH		200	157	125	86	74	38	50	68	123
	442									
NJ		3,021	2,670	1,637	1,418	1,676	1,389	1,351	1,740	1,250
	2,524									
NY		1,150	841	807	766	1,059	1,183	773	748	827
	739									
RI		2,100	1,891	1,732	1,598	2,122	1,495	1,488	1,819	1,648
	1,830									
VA		560	524	502	402	638	567	413	352	259
	464									
TOTAL		**14,367**	**11,672**	**9,494**	**8,612**	**11,365**	**9,940**	**9,394**	**9,992**	**9,949**
	14,764									

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016.

* CT data may include landings from vessels without a 2006-2012 Monkfish permit

Category A and B vessels continue to show a proportionally higher dependence on monkfish than Category C and D vessels, which also hold limited access permits in either scallops or multispecies. Category C vessels, of which 59% also hold scallop limited access permits, have seen their dependence on monkfish revenues decline steadily as revenues from scallops have increased.

Table 26 - Monkfish landings, 2006-2015, as a percentage of total landings by permit category

Monkfish Permit Category	1,000 pounds, landed weight									
	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
A	629	932	993	730	773	957	932	871	906	831
% of Total A Landings	9.8%	8.3%	8.7%	9.1%	10.1%	7.3%	14.7%	31.4%	25.5%	31.5%
B	1,206	1,628	1,558	1,117	1,210	1,579	1,429	1,251	1,446	1,154
% of Total B Landings	37.4%	42.3%	46.8%	27.0%	27.3%	28.3%	29.1%	28.5%	30.9%	21.1%
C	5,563	5,000	3,787	3,273	2,984	3,804	3,275	3,020	3,313	3,461
% of Total C Landings	6.1%	5.2%	3.8%	3.3%	3.0%	3.9%	3.9%	4.0%	4.9%	4.9%
D	5,842	5,384	4,503	3,734	3,199	4,288	3,531	3,509	3,674	3,901
% of Total D Landings	7.9%	7.1%	5.6%	4.3%	4.6%	4.7%	4.2%	4.3%	5.2%	6.0%
H	242	223	228	217	142	297	231	161	177	159
% of Total H Landings	19.4%	17.2%	14.8%	21.8%	12.0%	19.7%	18.7%	14.9%	15.5%	13.4%
E (Open Access)	987	937	605	424	282	342	417	526	378	344
% of Total E Landings	0.3%	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%
F					23	98	125	58	98	100
% of Total F Landings					0.7%	0.8%	0.8%	0.2%	0.3%	0.3%
CT	294	263								

% of Total CT Landings	2.8%	2.9%								
TOTAL MONK LANDED	14,764	14,367	11,672	9,494	8,612	11,365	9,940	9,395	9,992	9,949

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016.
** CT data may include landings from vessels without a 2006-2007 Monkfish permit*
If necessary, Category F landings have been allocated to prior permit categories to protect confidentiality

Table 27 - Monkfish revenues, 2006-2015, as a percentage of total revenues by permit category

Monkfish Permit Category	**$1,000, nominal (not discounted)**									
	FY 2006	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
A	$1,002	$1,296	$1,406	$993	$1,341	$1,915	$1,637	$1,297	$1,407	$1,276
% of Total A Revenues	36.6%	40.6%	33.2%	35.0%	27.6%	31.2%	34.1%	31.2%	30.2%	30.9%
B	$1,788	$2,278	$2,091	$1,564	$2,191	$3,237	$2,593	$1,794	$2,176	$1,839
% of Total B Revenues	41.8%	44.9%	50.6%	35.4%	38.0%	40.3%	34.6%	30.7%	34.6%	30.3%
C	$11,769	$12,360	$9,012	$7,678	$8,462	$11,270	$7,908	$6,618	$7,146	$7,309
% of Total C Revenues	4.6%	4.8%	3.7%	3.2%	2.6%	3.1%	2.4%	2.3%	2.9%	2.6%
D	$11,265	$10,404	$8,859	$6,855	$7,091	$10,640	$7,475	$6,762	$6,947	$7,286
% of Total D Revenues	12.1%	11.4%	9.4%	7.9%	8.0%	9.3%	7.4%	7.8%	8.3%	8.3%
H	$338	$270	$251	$228	$181	$515	$401	$268	$305	$273
% of Total H Revenues	38.1%	27.1%	20.8%	32.9%	22.1%	36.5%	39.7%	35.5%	33.8%	41.5%
E (Open Access)	$2,101	$2,393	$1,610	$1,045	$833	$1,061	$1,141	$1,186	$951	$811
% of Total E Revenues	0.7%	0.7%	0.5%	0.3%	0.2%	0.2%	0.3%	0.3%	0.3%	0.2%
F					$73	$248	$246	$140	$279	$252
% of Total F Revenues					2.4%	2.6%	1.7%	0.8%	1.4%	1.1%
CT	$334	$425								
% of Total CT Revenues	0.9%	1.1%								19.6%
TOTAL MONK REVENUE	$28,598	$29,426	$23,228	$18,364	$20,173	$28,885	$21,400	$18,065	$19,210	$19,046

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016.
** CT data may include landings from vessels without a 2006-2007 Monkfish permit*
If necessary, Category F landings have been allocated to prior permit categories to protect confidentiality

Vessel length category data (Table 36 and Table 37) indicate a decreased reliance on monkfish for all size classes except for 30-49 ft vessels, which shows consistent reliance on monkfish (data for earlier years are available in the FW7 document).

Table 28 - Monkfish landings, 2006-2015, as a percentage of total landings by vessel length

Vessel Length Category	1,000 pounds, landed weight									
	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
0-29 Feet	1	2	7	3	1	1	0	0	0	1
% of Total 0-29 Landings	0.1%	0.4%	1.3%	0.5%	0.2%	0.1%	0.1%	0.1%	0.0%	0.1%
30-49 Feet	7,562	8,366	7,166	5,869	5,160	6,730	5,657	5,451	6,020	5,840
% of Total 30-49 Landings	14.3%	14.3%	10.9%	8.7%	7.6%	10.0%	9.1%	10.6%	10.7%	8.7%
50-69 Feet	2,255	2,092	1,674	1,439	1,414	1,849	1,438	1,288	1,367	1,383
% of Total 50-69 Landings	3.7%	3.5%	2.5%	1.9%	2.0%	2.4%	1.4%	1.6%	1.6%	1.7%
70-89 Feet	4,256	3,139	2,502	1,925	1,838	2,508	2,539	2,557	2,497	2,626
% of Total 70-89 Landings	2.2%	1.6%	1.3%	1.1%	1.0%	1.2%	1.4%	1.5%	1.5%	1.6%
90+ Feet	396	505	324	259	198	278	306	99	109	99
% of Total 90+ Landings	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%
CT	294	263								
% of Total CT Landings	2.8%	2.9%								
TOTAL MONK LANDED	14,764	14,367	11,672	9,494	8,612	11,365	9,940	9,395	9,992	9,949

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016.
** CT data may include landings from vessels without a 2006-2007 Monkfish permit*

Table 29 - Monkfish revenues, 2006-2015, as a percentage of total revenues by vessel length

Vessel Length Category	$1,000, nominal (not discounted)									
	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
0-29 Feet	$2	$6	$18	$8	$2	$2	$1	$1	$0	$2
% of Total 0-29 Revenues	0.1%	0.4%	1.4%	0.7%	0.2%	0.1%	0.1%	0.1%	0.0%	0.1%
30-49 Feet	$12,082	$12,489	$11,026	$8,794	$9,354	$13,740	$10,554	$8,296	$9,556	$9,456
% of Total 30-49 Revenues	14.1%	13.6%	11.3%	10.1%	10.2%	12.7%	11.1%	9.8%	10.3%	10.2%
50-69 Feet	$5,143	$5,446	$4,080	$3,482	$3,878	$5,439	$3,336	$2,833	$2,872	$2,902

% of Total 50-69 Revenues	5.2%	5.5%	4.0%	3.7%	3.5%	4.1%	2.8%	2.7%	2.8%	2.6%
70-89 Feet	$10,022	$9,538	$7,214	$5,408	$6,297	$8,762	$6,733	$6,706	$6,522	$6,451
% of Total 70-89 Revenues	2.7%	2.4%	2.0%	1.5%	1.4%	1.6%	1.4%	1.5%	1.6%	1.3%
90+ Feet	$1,015	$1,521	$891	$673	$643	$943	$775	$229	$260	$235
% of Total 90+ Revenues	1.0%	1.4%	0.8%	0.6%	0.5%	0.6%	0.5%	0.2%	0.2%	0.2%
CT	$334	$425								
% of Total CT Revenues	0.9%	1.1%								
TOTAL MONK REVENUE	$28,598	$29,426	$23,228	$18,364	$20,173	$28,885	$21,400	$18,065	$19,210	$19,046

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016.
** CT data may include landings from vessels without a 2006-2007 Monkfish permit*

When viewed in aggregate, vessels that hold a monkfish permit are not significantly reliant on monkfish, as monkfish has accounted for less than 3% of total landings since FY 2006 (Table 38) and less than 4.1% of total revenues in the same time period (Table 39). The proportion of monkfish in both landings and revenue has decreased between FY2006 and FY2015, the slight increase seen in FY2014 did not continue in FY2015.

Table 30 - Landings of monkfish and other species, 2006-2015, as a percent of total landings

Species Category	1,000 pounds, landed weight									
	FY 2006	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Dogfish	4,482	3,171	4,689	9,166	10,495	13,967	17,868	10,529	16,213	16,288
Dogfish % of Total Landings	0.9%	0.6%	0.8%	1.7%	2.1%	2.4%	3.3%	2.1%	3.3%	3.7%
Fluke	10,481	9,297	8,385	9,865	13,967	12,298	11,613	9,805	9,323	8,231
Fluke % of Total Landings	2.0%	1.7%	1.5%	1.8%	2.8%	2.1%	2.2%	2.0%	1.9%	1.9%
Monkfish	14,764	14,367	11,672	9,494	8,612	11,365	9,940	9,395	9,992	9,949
Monkfish % of Total Landings	2.9%	2.7%	2.0%	1.7%	1.7%	2.0%	1.9%	1.9%	2.0%	2.3%
Multispecies	48,711	59,165	66,647	64,420	57,683	61,758	48,874	44,832	45,267	42,146
Multispecies % of Total Landings	9.4%	11.1%	11.7%	11.8%	11.6%	10.8%	9.1%	9.0%	9.2%	9.7%
Scallops	59,644	59,792	51,774	54,247	54,524	57,743	51,989	37,434	29,839	36,228

Scallops % of Total Landings	11.5%	11.2%	9.1%	9.9%	11.0%	10.1%	9.7%	7.5%	6.1%	8.3%
Skates	15,874	21,042	19,576	19,832	13,102	15,765	15,751	16,566	11,715	10,478
Skates % of Total Landings	3.1%	4.0%	3.4%	3.6%	2.6%	2.8%	2.9%	3.3%	2.4%	2.4%
Other	363,654	365,809	408,763	380,806	338,531	399,535	380,679	368,401	368,703	312,950
Other % of Total Landings	70.3%	68.7%	71.5%	69.5%	68.1%	69.8%	70.9%	74.1%	75.1%	71.7%
TOTAL LBS. LANDED	517,610	532,644	571,508	547,830	496,914	572,432	536,716	496,963	491,052	436,269

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016.
** CT data may include landings from vessels without a 2006-2007 Monkfish permit*

Table 31 - Revenues of monkfish and other species, 2006-2015, as a percent of total revenues

Species Category	$1,000, nominal (not discounted)									
	FY 2006	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**
Dogfish	$ 1,172	$ 1,122	$ 1,500	$ 2,552	$ 2,902	$ 3,564	$ 4,313	$ 2,187	$ 3,564	$ 3,215
Dogfish % of Total Revenues	0.2%	0.2%	0.2%	0.4%	0.4%	0.4%	0.5%	0.3%	0.5%	0.4%
Fluke	$ 22,658	$ 21,790	$ 16,214	$ 18,571	$ 24,077	$ 25,862	$ 26,374	$ 24,282	$ 26,384	$ 25,242
Fluke % of Total Revenues	3.2%	3.0%	2.4%	2.9%	3.0%	2.7%	3.1%	3.2%	3.7%	3.2%
Monkfish	$ 28,598	$ 29,426	$ 23,228	$ 18,364	$ 20,173	$ 28,885	$ 21,400	$ 18,065	$ 19,210	$ 19,046
Monkfish % of Total Revenues	4.1%	4.0%	3.4%	2.8%	2.5%	3.1%	2.5%	2.4%	2.7%	2.4%
Multispecies	$ 74,579	$ 81,679	$ 82,625	$ 77,246	$ 81,948	$ 89,964	$ 72,149	$ 60,465	$ 60,971	$ 55,679
Multispecies % of Total Revenues	10.7%	11.1%	12.2%	12.0%	10.4%	9.5%	8.4%	7.9%	8.5%	7.0%
Scallops	$ 381,478	$ 394,486	$ 354,265	$ 355,337	$ 470,980	$ 576,076	$ 521,292	$ 437,760	$ 372,015	$ 445,872
Scallops % of Total Revenues	54.5%	53.7%	52.4%	55.1%	59.5%	60.9%	60.7%	57.5%	51.8%	56.4%
Skates	$ 5,466	$ 6,516	$ 5,206	$ 5,577	$ 3,137	$ 4,624	$ 4,563	$ 5,213	$ 2,697	$ 1,351
Skates % of Total Revenues	0.8%	0.9%	0.8%	0.9%	0.4%	0.5%	0.5%	0.7%	0.4%	0.2%
Other	$ 186,254	$ 200,207	$ 193,383	$ 167,415	$ 187,953	$ 216,500	$ 208,978	$ 213,464	$ 233,809	$ 239,492

Other % of Total Revenues	26.6 %	27.2 %	28.6 %	26.0 %	23.8 %	22.9 %	24.3 %	28.0 %	32.5 %	30.3 %
TOTAL REVENUE	$700, 204	$735, 227	$676, 421	$645, 064	$791, 170	$945, 476	$859, 068	$761, 437	$718, 649	$789, 897

Source: NMFS-GARFO Analysis and Program Support Division, cfders dealer weighout database, accessed July, 2016.
** CT data may include landings from vessels without a 2006-2007 Monkfish permit*

6.4.1.3 Days-at-Sea (DAS)

Starting in Year 2 of the FMP (May, 2000-April, 2001) limited access monkfish vessels (Categories A, B, C, and D) were allocated 40 monkfish DAS. By definition, Category A and B vessels do not qualify for limited access multispecies or scallop permits, and Category C and D vessels must use either a multispecies or scallop DAS while on a monkfish DAS. Beginning in FY 2005 seven vessels qualified for a permit Category H fishery under the provisions adopted in Amendment 2, for vessels fishing exclusively in the southernmost area of the fishery.

Until FW 4 which took effect in FY 2007, vessels were not required to use a monkfish DAS in the NFMA, as there were no monkfish landing limits when a limited access vessel was on a multispecies DAS. Therefore, DAS usage was well below the total DAS allocated, and primarily reflected monkfish fishing activity in the SFMA. Starting in FY 2007, vessels in both areas were required to use a monkfish DAS when exceeding the applicable incidental limit. The effect of this requirement shows the total DAS has remained reasonably the same from FY 2009-2015, with FY 2015 indicating a slight decrease in DAS used compared to FY2014. DAS used by permit category since 2009 is shown in Figure 18.

As shown in Table 40, only a portion of the limited access vessels used at least one monkfish DAS in FY 2015, and the total DAS used by limited access (permit category C and D) vessels was only about 10% of the total allocated. This represents a substantial amount of latent effort in the fishery. Even among active vessels (those that used at least one monkfish DAS), not all allocated DAS are used. Only about 43% of allocated DAS were used by active vessels across all permit categories, this is a decrease on FY2014. Part of this latent effort can be explained by the fact that nearly one-half of the permit category C vessels, 161 vessels, are limited access scallop vessels who choose not to use a scallop DAS to target monkfish under the monkfish DAS usage requirements because of the greater profitability of using scallop DAS to target scallops (Table 27 and Table 41).

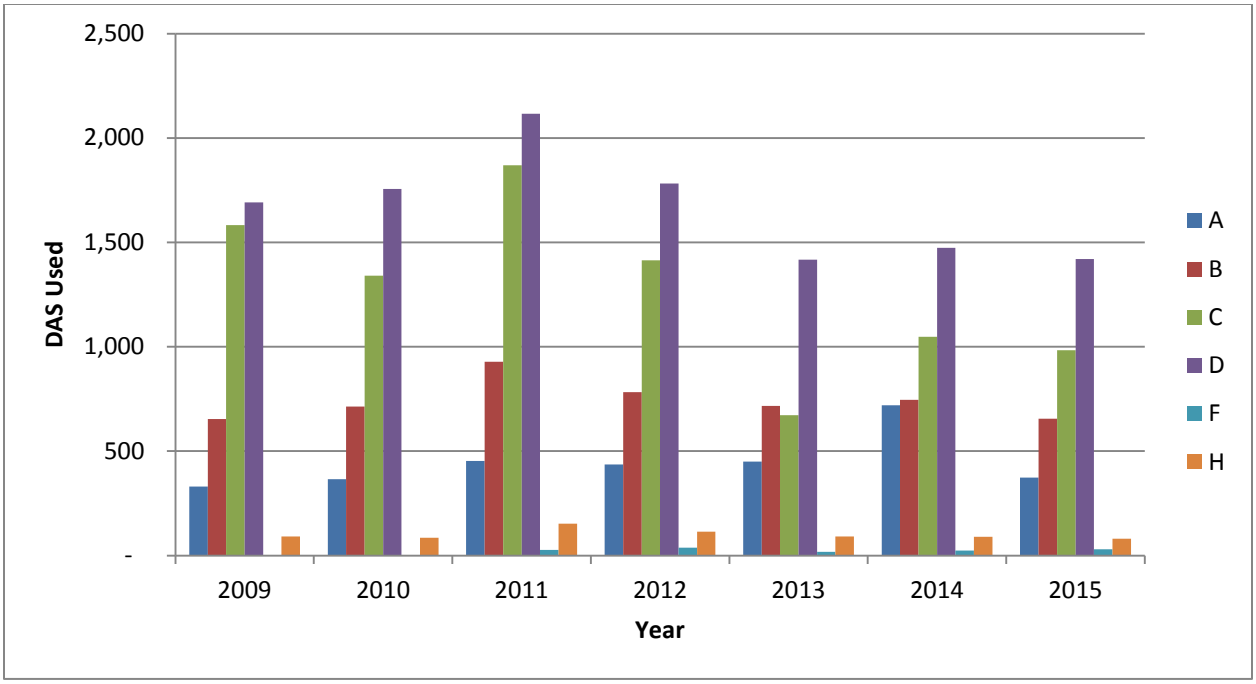


Figure 16 - DAS used by permit category, FY 2009-2012

A second reason for the unused DAS, even among active vessels, appears to be the result of the low monkfish DAS usage rate by vessels fishing in the NFMA. For active vessels, (i.e., those that used at least one DAS) in FY 2014, the DAS usage rate is distinctly different between the two management areas. Of the 49 active vessels in the NFMA, most were not constrained by the allocation of 40 DAS, plus four carryover DAS, and the average number of DAS used in the NFMA was 15 DAS (Table 41). In contrast, among the 132 active vessels in the SFMA the average number of DAS used was 21.3 of their 32 available DAS, (28 plus four carryover) (Table 41). The usage rate decreased in the SFMA from an average of 24 DAS during FY 2014. The usage rate for the NFMA also increased from an average number of DAS used of 12 in the previous year.

Table 32 - Monkfish DAS usage, FY 2015

Permit Category	All Vessels			Active Vessels*		
	Total Number of Permits	DAS Allocated	DAS Used	Number of Active Vessels	DAS Allocated	DAS Used
A	22	1,082	374	14	689	374
B	43	2,116	655	28	1,378	655
C	268	13,186	984	46	2,263	984
D	242	11,906	1,421	71	3,493	1421
F	17	249	30	3	34	30
H	8	394	81	7	344	81

TOTAL	**600**	**28,933**	**3,545**	**169**	**8,201**	**3,545**

Source: NMFS Vessel Permits and Allocation Management System (AMS) databases, accessed July, 2016.

** Active = vessels that used >0 monkfish DAS*

Permit Category A active vessel NMA DAS used not included due to confidentiality.

Table 33 - Monkfish-only, monkfish/multispecies and monkfish/scallop DAS usage by active vessels by area, FY 2015

Permit Category	Area	Number of Active Vessels	Monkfish	Monkfish/ Multispecies	Monkfish / Scallop	DAS Used	Average DAS Usage
A	NMA	0	0	0	0	0	0.0
B	NMA	1	2	0	0	2	2.0
C	NMA	23	0	377	0	377	16.4
D	NMA	25	0	349	0	349	14.0
Total		**49**	**2**	**726**	**0**	**728**	**15**
A	SMA	14	374	0	0	374	26.7
B	SMA	28	653	0	0	653	23.3
C	SMA	29	0	606	0	606	20.9
D	SMA	51	0	1,071	0	1,071	21.0
F	SMA	3	0	30	0	30	10.0
H	SMA	7	0	81	0	81	11.6
Total		**132**	**1,027**	**1,788**	**0**	**2,815**	**21.3**

Source: NMFS Vessel Permits and Allocation Management System (AMS) databases, accessed July, 2016.

** Active = vessels that used >0 monkfish DAS*

6.4.2 **Ports and communities – To be Updated**

This section updates information contained in the EA for Framework 8. The Monkfish FMP references Amendments 5 and 7 to the Northeast Multispecies FMP and Amendment 4 to the Sea Scallop FMP for social and cultural information about monkfish ports, including port profiles. Because of the nature of the monkfish fishery, there is significant overlap between the vessels and communities involved with the monkfish fishery and those involved with the multispecies (groundfish) and scallop fisheries. Many of the same boats that target monkfish or catch them incidentally also target groundfish or scallops. Only about six percent of the limited access monkfish permit holders do not also hold limited access permits in either the multispecies or scallop fisheries. Since 1994, Primary and Secondary monkfish ports have been defined based on data from 1994-1997. "Primary monkfish ports" have been defined as those averaging more than $1,000,000 in monkfish revenues from 1994-1997, while "Secondary monkfish ports" have been defined as those averaging more than $50,000 in monkfish revenues from 1994-1997.

Here we supply both: 1) updated primary and secondary ports based on $1M and $50k cut-offs but data from 2009-2013 and 2) primary and secondary ports based on the broader measure of monkfish

engagement, based on the NMFS Community Vulnerability Indicators (sometimes called the social indicators). This approach is a more comprehensive measure of involvement in the monkfish fishery than simply landed dollars or pounds

The measure of monkfish engagement is based on multiple sources of information, averaged over five years, 2009-2013, including:

- the absolute values of pounds and value of monkfish,
- The number of monkfish permits with that community as the owner's home, and
- The number of dealers buying monkfish in that community.

Using a principal component and single solution factor analysis, each community receives a factor score for monkfish engagement to compare to other communities (Colburn and Jepson 2012; Jacob et al. 2012). A score of 1.0 or more places the community at 1 standard deviation above the mean (or average) and is considered high engagement. Communities with scores of 0.5 to 0.99 are rated as having moderate engagement and communities with 0.0-0.49 have low engagement (Figure 19). All communities with high engagement were included as either primary or secondary ports for monkfish. A community with a score of 1 to 4.99 is listed as a secondary port, while a community with a score of 5 to 20 is considered a primary port. See text boxes, below, for a comparison of primary and secondary ports as based on the old revenue data, the new revenue data, and the engagement scores.

Primary monkfish ports based on 1994-1997 revenue data:

- Portland, ME
- Boston, MA
- Gloucester, MA
- New Bedford, MA
- Barnegat Light/Long Beach, NJ
- Point Judith/Narragansett, RI

Secondary monkfish ports based on 1994-1997 revenue data:

- Rockland, ME
- Port Clyde, ME
- South Bristol, ME
- Ocean City, MD
- Chatham, MA
- Provincetown, MA
- Scituate, MA
- Plymouth, MA
- Westport, MA
- Portsmouth, NH
- Point Pleasant, NJ
- Cape May, NJ
- Greenport, NY
- Montauk, NY
- Hampton Bays, NY
- Newport, RI
- Hampton, VA
- Newport News, VA

Primary monkfish ports based on 2009-2013 engagement data:

- New Bedford, MA
- Gloucester, MA
- Narragansett/Point Judith, RI
- Montauk, NY
- Barnegat Light/Long Beach, NJ

Secondary monkfish ports based on 2009-2013 engagement data:

- Hampton Bays/Shinnecock, NY*
- Point Pleasant, NJ
- Chatham, MA
- Boston, MA
- Cape May, NJ
- New London, CT
- Little Compton, RI
- Portland, ME
- Newport, RI
- Chincoteague, VA
- Westport, MA
- Scituate, MA
- Portsmouth, NH
- Wanchese, NC
- Ocean City, MD
- Newport News, VA

Primary monkfish ports based on 2009-2013 revenue data:

- New Bedford, MA
- Gloucester, MA
- Barnegat Light,/Long Beach, NJ
- Point Judith/Narragansett, RI
- Boston, MA

Secondary monkfish ports based on 2009-2013 revenue data:

- Montauk, NY
- Chatham, MA
- Little Compton, RI
- Hampton Bays/Shinnecock, NY*
- Chincoteague, VA
- New London, CT
- Portland, ME
- Point Pleasant, NJ
- Newport, RI
- Westport, MA
- Portsmouth, NH
- Ocean City, MD
- Waretown, NJ
- Cape May, NJ
- Tiverton, RI
- Scituate, MA
- Stonington, CT
- Port Clyde, ME
- Greenbackville, VA
- Belford, NJ
- Hampton, VA
- Barnegat, NJ
- New Shoreham, RI
- Newport News, VA

* Shinnecock is an additional port within the town of Hampton Bays.

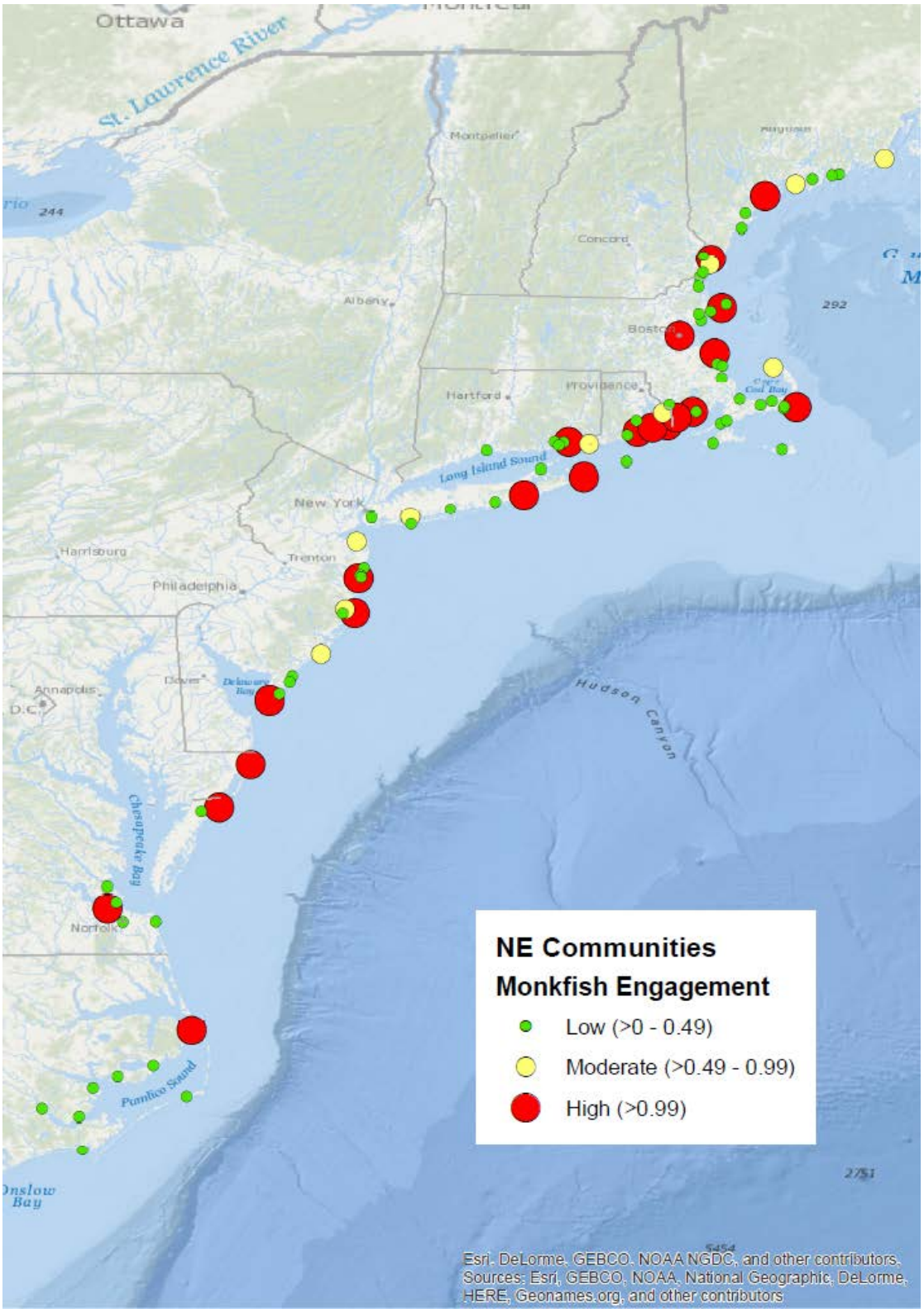


Figure 17 - Monkfish engagement level by community

An interesting additional index is fishing reliance, a per capita measure using similar data to the engagement index but divided by total population in the community. In Figure 20, all high engagement communities (here, both primary and secondary monkfish ports) are shown along with their reliance. Barnegat Light/Long Beach, NJ, for instance, is very highly reliant on monkfish while New Bedford has very low reliance on monkfish, even though New Bedford, MA has much higher engagement.

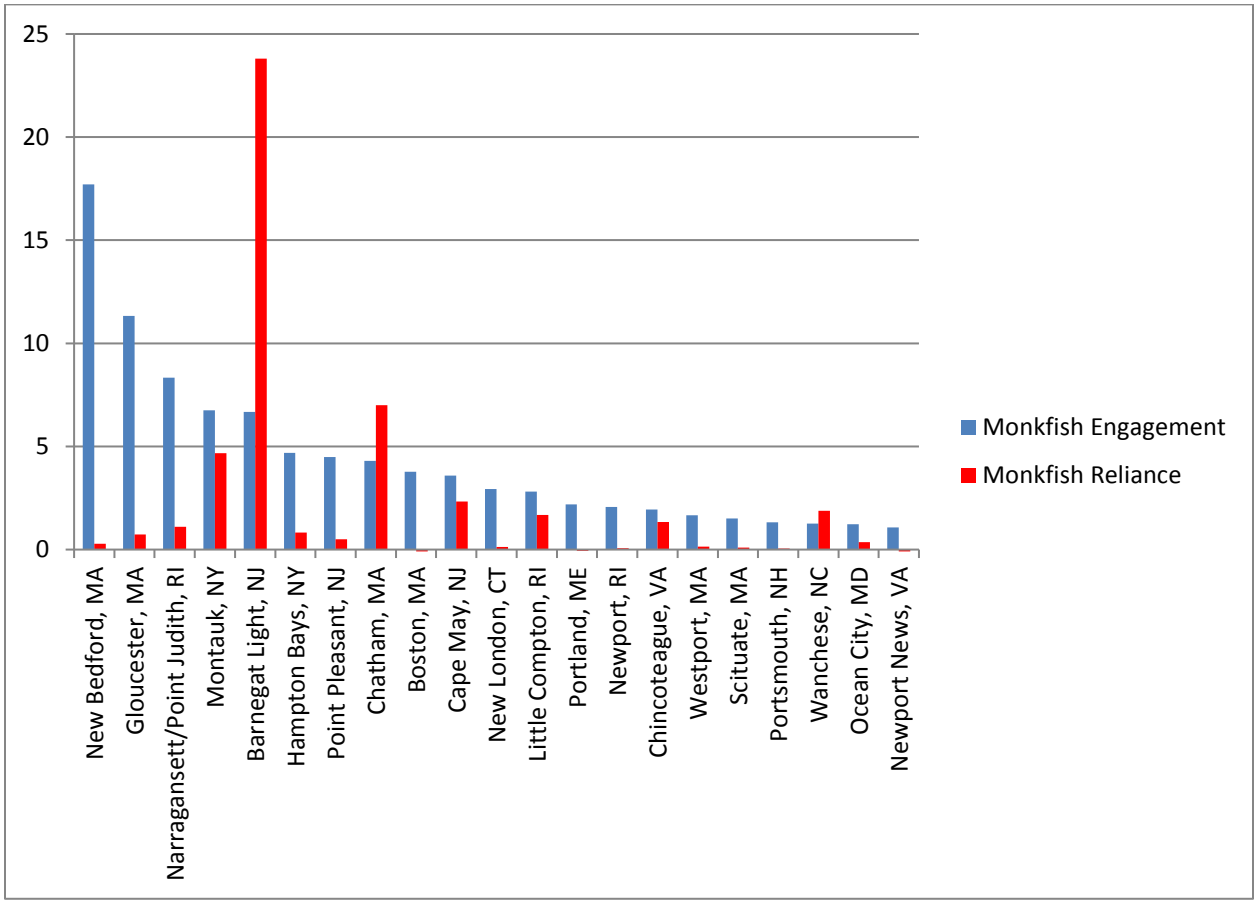


Figure 18 - All high monkfish engagement communities with both engagement and reliance scores

Further, each community with high monkfish engagement can be assessed with regard to its social vulnerability, using indices of *poverty* (percent receiving assistance, percent of families below poverty level, percent over 65 in poverty, percent under 18 in poverty), *personal disruption* (percent unemployed, crime index, percent with no diploma, percent in poverty, percent females separated) and *population composition* (percent white alone, percent female single headed households, percent population age 0-5, percent that speak English less than well). We can see in Figure 21 that several communities are at or above 0.5 or even 1.0 standard deviations above the mean (average) for all monkfish communities: New Bedford, MA; New London, CT; Newport News, VA; and Boston, MA. A few others are at or close to 0.5 for two of the three indices: Chincoteague, VA; Westport, MA; and Ocean City, MD.

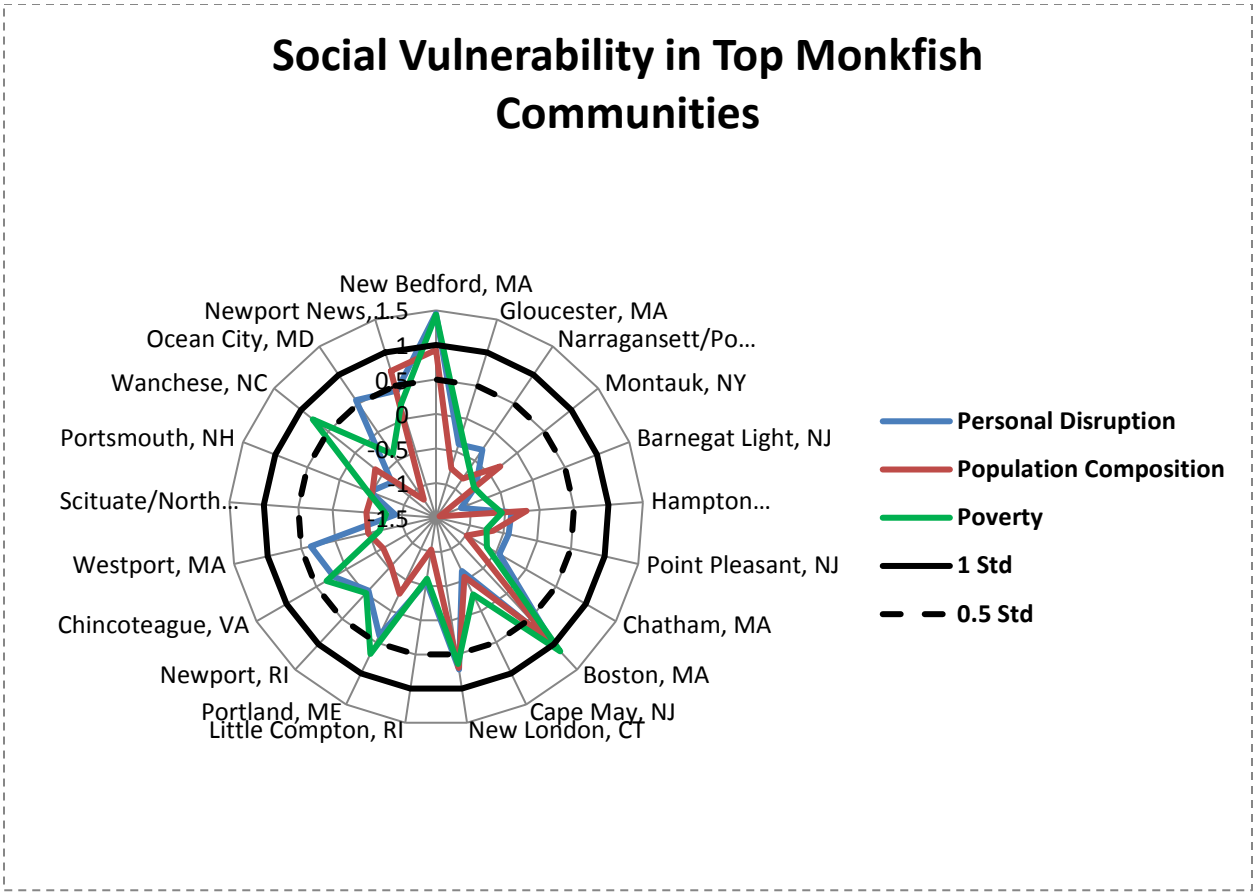


Figure 19 - Social vulnerability of communities with high monkfish engagement

Table 42 shows the distribution of monkfish permit holders by homeport and monkfish permit category for the six primary, 18 secondary, and "other" monkfish ports for FY 2006 and FY 2012. Table 43 shows monkfish landings for five of the six major ports (as reported by NMFS in their regular "Northeast Preliminary Fisheries Statistics" Report, not including Long Beach/Barnegat Light, NJ) and states, broken down by management area from which landings were reported, as well as by gear type. Virtually all of the monkfish landed in Portland, Gloucester and Boston come from the NFMA, while the proportion of NFMA landings in New Bedford has declined from previous years. Nearly all of Pt. Judith landings are from the SFMA.

Portland and Boston landings are almost entirely from otter trawls. Otter trawls make up about 63% New Bedford landings, with the remainder split nearly even between gillnets and "other gear" (scallop dredge). New Hampshire, New York and New Jersey landings are predominately (>79%) caught by gillnet gear, while Rhode Island and Connecticut landings are about 60% and 77%, respectively, gillnets. This is similar to the distribution by gear for each port in previous fishing years, as reported in earlier SAFE reports, except that in FY 2003 New Bedford monkfish landings by scallop dredge (included in "other gear" in the table) were 18% of the port's monkfish landings, while in FY 2004 those declined to 12% and in FY 2005 to 9%, before returning to 2003 levels in FY 2006 and increasing to current levels beginning in FY 2007.

Port landings and revenue data based on the May-April fishing year is presented in Table 44 and Table 45, for primary and secondary ports (as identified in the original FMP), respectively, for FY 2010-2012.

Data is based on the vessel's homeport, but for FY 2012, on the vessel's principal port of landing as indicated on the permit application. Vessels home ported in New Bedford recorded the highest monkfish landings and revenues from 1995-1999, and, although its share has declined in recent years, it remained the top port in 2012. In FY 2010, the port of Boston, MA, emerged as the homeport with the highest landings, but declined below New Bedford in 2011 and 2012. Portland, ME, which averaged nearly 1.8 million lb from 1995-2003 has declined steadily, and since 2009 has remained between 400-500 lb, with 494 lb being landed in FY 2012.

There has been an overall decline in landings and revenues from FY 2006-2012 that is reflected in the port data. In nearly all cases, the revenues from monkfish as a percentage of total revenues by port also declined, which is prominently observed in Portsmouth, NH and Boston, MA. However, Port Clyde, ME has had an increase from 3.8% in FY 2006 to 18.9% in FY 2012 (Table 46). While some of these effects could be due to increases in revenues from other fisheries (such as scallops in New Bedford), in most cases it can be attributed to declines in monkfish landings.

Table 34 - Monkfish permits by port, FY 2014

HOMEPORT		FY 2014 by Category							
		A	B	C	D	E	F	H	TOTAL
PRIMARY PORTS		11	25	153	99	318	10	0	616
NEW BEDFORD	MA	3	0	106	41	68	0	0	218
GLOUCESTER	MA	0	0	22	31	109	0	0	162
NARRAGANSETT/POINT JUDITH	RI	2	0	14	16	49	5	0	86
MONTAUK	NY	0	4	2	7	74	5	0	92
BARNEGAT LIGHT/LONG BEACH	NJ	6	21	9	4	18	0	0	58
SECONDARY PORTS		3	6	86	86	364	5	3	553
HAMPTON BAYS/SHINNECOCK	NY	0	1	1	2	24	0	0	28
POINT PLEASANT	NJ	0	3	4	4	46	0	0	57
CHATHAM	MA	0	0	0	18	51	0	0	69
BOSTON	MA	1	0	26	11	29	1	0	68
CAPE MAY	NJ	0	0	26	8	91	3	0	128
NEW LONDON	CT	0	1	4	6	6	1	0	18
LITTLE COMPTON	RI	1	1	2	0	0	0	0	4
PORTLAND	ME	0	0	9	17	17	0	0	43
CHINCOTEAGUE	VA	0	0	0	0	8	0	1	9
WESTPORT	MA	1	0	1	2	11	0	0	15
SCITUATE	MA	0	0	2	5	17	0	0	24
PORTSMOUTH	NH	0	0	0	4	17	0	0	21
WANCHESE	NC	0	0	4	6	18	0	2	30
OCEAN CITY	MD	0	0	0	1	16	0	0	17
NEWPORT NEWS	VA	0	0	7	2	13	0	0	22
OTHER PORTS		10	14	43	79	953	0	4	1,103
TOTAL		**24**	**45**	**282**	**264**	**1,635**	**15**	**7**	**2,272**

Table 35 - FY 2012 monkfish landings by primary port (excluding Barnegat Light, NJ) and state, by gear

PORT/ STATE	MAY - APRIL FY'12	STOCK AREAS				GEAR							
		NORTHERN		SOUTHERN		OTTER TRAWL		GILLNET		HOOK		OTHER GEARS	
	Metric Tons	Metric Tons	Percent	Metric Tons	Percent	Metric Tons	Percent	Metric Tons	Percent	Metric Tons	Percent	Metric Tons	Percent
Portland, ME	387	387	100%	0	0%	347	90%	38	10%	0	0%	3	1%
Gloucester, MA	1,247	1,242	100%	6	0%	1,049	84%	195	16%	0	0%	3	0%
Boston, MA	740	732	99%	8	1%	739	100%	0	0%	0	0%	0	0%
New Bedford, MA	2,202	1,276	58%	925	42%	1,394	63%	424	19%	0	0%	383	17%
Point Judith, RI	687	7	1%	679	99%	430	63%	241	35%	0	0%	15	2%
MAINE	489	489	100%	0	0%	443	91%	43	9%	0	0%	3	1%
NEW HAMPSHIRE	57	57	100%	0	0%	6	11%	51	89%	0	0%	0	0%
MASSACHUSETTS	4,663	3,352	72%	1,311	28%	3,214	69%	1,059	23%	0	0%	390	8%
RHODE ISLAND	1,155	10	1%	1,145	99%	434	38%	688	60%	0	0%	33	3%
CONNECTICUT	606	6	1%	600	99%	79	13%	469	77%	0	0%	59	10%
NEW YORK	796	2	0%	794	100%	96	12%	695	87%	0	0%	5	1%
NEW JERSEY	918	0	0%	918	100%	50	5%	729	79%	0	0%	139	15%
OTHER NORTHEAST	420	3	1%	416	99%	110	26%	291	69%	0	0%	18	4%
TOTAL	**9,104**	**3,920**	**43%**	**5,184**	**57%**	**4,433**	**49%**	**4,025**	**44%**	**0**	**0%**	**646**	**7%**

1. The three digit statistical areas defined below are for statistical and management purposes and may not be consistent with stock area delineation used for biological assessment (see the attached statistical chart).

Monkfish stock areas: Northern: 464-465, 467, 511-515, 521-522, 561-562
Southern: 525-526, 533-534, 537-539, 541-543, 611-639

2. Landings in live weight.
3. Gear data are based on vessel trip reports.

Table 36 - Monkfish landing and revenues for monkfish primary ports, in FY 2010-2012

HOME PORT	Monkfish Landings and Revenue			
		FY2010	**FY2011**	**FY2012**
Portland, ME	**1,000 Lbs.**	398.4	469.6	494.6
	$1,000	$1,461.1	$1,816.0	$1,448.8
Boston, MA	**1,000 Lbs.**	987.1	1,194.6	1,015.9
	$1,000	$2,661.0	$3,359.5	$2,527.0
Gloucester, MA	**1,000 Lbs.**	527.5	859.2	923.7
	$1,000	$1,599.3	$2,407.4	$2,064.7
New Bedford, MA	**1,000 Lbs.**	888.3	1,275.0	1,180.8
	$1,000	$2,667.0	$4,214.8	$2,933.8
Long Beach/Barnegat Light, NJ	**1,000 Lbs.**	905.1	1,059.3	912.4
	$1,000	$2,010.7	$2,483.5	$1,797.9
Point Judith, RI	**1,000 Lbs.**	308.2	437.5	297.3
	$1,000	$999.7	$1,571.8	$714.8

Table 37 – Monkfish landing and revenues for monkfish secondary ports in FY 2010-2012

HOME PORT	Monkfish Landings and Revenue			
		FY2010	**FY2011**	**FY2012**
Rockland, ME	**1,000 Lbs.**	0.0	0.0	0.0
	$1,000	$0.0	$0.0	$0.0
Port Clyde, ME	**1,000 Lbs.**	20.4	42.8	38.4
	$1,000	$59.7	$144.0	$101.9
South Bristol, ME	**1,000 Lbs.**	67.9	95.8	68.4
	$1,000	$229.7	$330.8	$181.1
Ocean City, MD	**1,000 Lbs.**	0.8	0.5	1.3
	$1,000	$2.2	$1.7	$3.7
Chatham, MA	**1,000 Lbs.**	449.7	577.3	438.0
	$1,000	$725.3	$1,211.4	$729.0
Provincetown, MA	**1,000 Lbs.**	1.8	0.9	0.3
	$1,000	$5.8	$3.5	$0.8
Scituate, MA	**1,000 Lbs.**	87.6	102.2	81.4
	$1,000	$163.5	$228.0	$181.6
Plymouth, MA	**1,000 Lbs.**	30.6	23.4	36.5
	$1,000	$56.8	$39.6	$71.2
Westport, MA	**1,000 Lbs.**	152.1	297.9	136.9
	$1,000	$238.3	$539.2	$199.1
Portsmouth, NH	**1,000 Lbs.**	29.1	74.0	71.4
	$1,000	$67.3	$165.8	$143.1
Point Pleasant, NJ	**1,000 Lbs.**	77.9	118.2	83.8
	$1,000	$172.6	$274.5	$181.5
Cape May, NJ	**1,000 Lbs.**	63.1	72.2	104.5
	$1,000	$131.6	$182.8	$221.7
Greenport, NY	**1,000 Lbs.**	10.0	19.3	17.3
	$1,000	$31.3	$71.2	$44.3
Montauk, NY	**1,000 Lbs.**	420.7	623.6	713.5
	$1,000	$671.8	$1,216.7	$1,392.3
Hampton Bays, NY	**1,000 Lbs.**	72.0	102.7	121.5
	$1,000	$222.3	$244.1	$251.5
Newport, RI	**1,000 Lbs.**	408.1	522.4	337.6
	$1,000	$670.9	$1,040.6	$587.1
Hampton, VA	**1,000 Lbs.**	2.7	2.9	4.2
	$1,000	$5.9	$7.2	$11.8
Newport News, VA	**1,000 Lbs.**	7.0	2.9	7.1
	$1,000	$16.9	$7.5	$14.7

Table 38 - Monkfish revenues, FY 2006-2012, as a percentage of total revenues by port

HOME PORT		Number of Vessels (FY2012)	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012
1	Westport, MA	15	8.9%	8.7%	13.4%	23.7%	28.0%	37.1%	13.1%
2	Port Clyde, ME	18	3.8%	7.5%	3.3%	4.4%	12.9%	20.5%	18.9%
3	Plymouth, MA	10	13.6%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%
4	South Bristol, ME	10	0.9%	0.0%	0.0%	0.0%	0.0%	5.6%	2.1%
5	Portsmouth, NH	38	16.5%	8.7%	9.5%	6.8%	4.5%	4.9%	3.7%
6	Scituate, MA	33	6.5%	7.2%	9.1%	5.5%	7.2%	7.1%	3.4%
7	Boston, MA	41	24.1%	18.6%	14.7%	14.2%	12.5%	14.0%	12.1%
8	Portland, ME	76	19.2%	14.0%	9.2%	4.9%	3.9%	6.5%	6.6%
9	Rockland, ME	11	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10	Long Beach/Barnegat Light, NJ	69	11.2%	12.8%	11.6%	8.3%	7.1%	7.7%	7.4%
11	Gloucester, MA	219	11.1%	10.5%	7.5%	6.5%	7.4%	8.0%	6.7%
12	Point Judith, RI	126	5.2%	8.4%	7.4%	6.8%	6.4%	8.2%	4.0%
13	Newport, RI	39	3.4%	6.6%	6.3%	7.7%	7.5%	8.9%	4.7%
14	Chatham, MA	101	14.6%	11.2%	9.7%	8.8%	9.6%	13.3%	9.3%
15	Point Pleasant, NJ	128	3.3%	3.3%	3.5%	2.9%	2.5%	2.6%	1.8%
16	New Bedford, MA	403	2.6%	2.8%	2.5%	1.8%	1.4%	1.6%	1.2%
17	Hampton Bays, NY	52	8.4%	14.9%	7.4%	11.1%	11.6%	11.6%	8.9%
18	Ocean City, MD	61	1.4%	1.9%	1.2%	0.9%	1.7%	2.7%	2.9%
19	Provincetown, MA	24	2.4%	2.1%	0.8%	0.6%	0.4%	0.4%	0.1%
20	Montauk, NY	101	3.4%	5.7%	4.9%	4.5%	4.3%	5.7%	7.8%
21	Cape May, NJ	190	0.8%	0.7%	0.3%	0.2%	0.2%	0.2%	0.2%
22	Greenport, NY	3	0.4%	1.4%	0.2%	4.1%	0.7%	0.1%	1.5%
23	Hampton, VA	46	0.3%	0.6%	0.3%	0.3%	0.5%	0.4%	0.7%
24	Newport News, VA	80	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%

7.0 Environmental Consequences of the Alternatives
7.1 Biological Impacts of Alternatives on Monkfish and Non-Target Species

Both scientific and management uncertainty are accounted for in the structure established for specifications that includes a large buffer between the overfishing limit and the ACL, and a management uncertainty buffer between the ACL and the ACT. Therefore the risk of negative biological impacts has been minimized. Moreover, accountability measures (AMs) would be triggered if the ACL is exceeded, further reducing the risk of overfishing and adverse impacts to the stock.

7.1.1 Updates to Annual Catch Limits

7.1.1.1 Revised Annual Catch Limits

7.1.1.1.1 Option 1: No Action

Impacts on monkfish

Under Option 1, the specifications (ABC, ACT, and TAL) for both the NFMA and SFMA would stay as set in Framework 8. Option 1 would not incorporate the results of the 2016 operational assessment, primarily the revised calculated discard rate.

Monkfish landings in the NFMA have fluctuated between FY 2005 and 2015 but had stabilized between FYs 2011 – 2014 (Table 42). An increase in landings occurred in FW2015 but it is not clear yet whether this upward trend will continue in FY 2016. FW 8 increased monkfish DAS allocations from 40 to 45 in the NFMA beginning in FY 2014. This did not have an apparent effect on landings in FY 2014. Monthly landings in FY2015 were higher than those in FY2014 for most months (Table 43 and Figure 22).

Table 39 - NFMA target monkfish TALs, trip limits, DAS allocations, and landings (FY 2005 - 2015)

		Trip Limits (lb)*				
Fishing Year	**Target TAL (mt)**	**Cat. A & C**	**Cat. B & D**	**DAS Restrictions****	**Landings (mt)**	**Percent of TAL**
2005	13,160	n/a	n/a	40	9,533	72%
2006	7,737	n/a	n/a	40	6,677	86%
2007	5,000	1,250	470	31	5,050	101%
2008	5,000	1,250	470	31	3,528	71%
2009	5,000	1,250	470	31	3,344	67%
2010	5,000	1,250	470	31	2,834	57%
2011	5,854	1,250	600	40	3,699	63%
2012	5,854	1,250	600	40	3,920	67%
2013	5,854	1,250	600	40	3,596	61%
2014	5,854	1,250	600	45	3,444	59%
2015	5,854	1,250	600	45	4,138	71%

* Trip limits in pounds tail weight per DAS
** Excluding up to 10 DAS carryover, became 4 DAS carryover in FY 2007

Table 40 - NFMA monkfish total landings in FY 2015 (May - March 2015) – to be corrected

NFMA Landings	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Through Apr
2015	226	215	258	332	325	284	322	379	299	501	548	391	4,138
2014	187	206	186	220	253	232	170	294	330	244	556	561	3,444
% increase/decrease compared to 2014	~~19%~~	~~4%~~	~~32%~~	~~41%~~	~~25%~~	~~20%~~	~~62%~~	~~25%~~	~~-10%~~	~~105%~~	~~-1%~~	~~-36%~~	~~18%~~

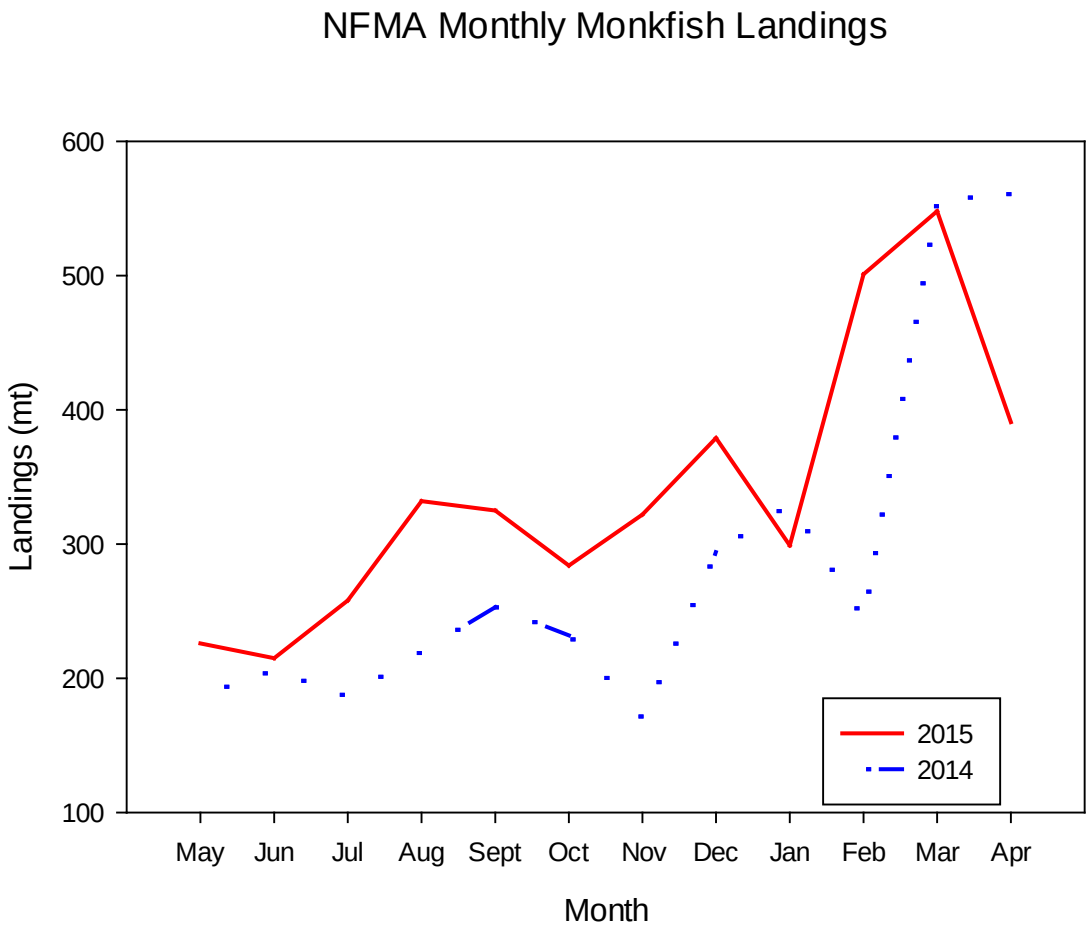


Figure 20 - NFMA monthly monkfish landings for FY 2014 and 2015

Recent DAS usage patterns suggest that monkfish vessels operating in the NFMA have not used many of their allocated DAS in this region (Table 44). The 2013 Emergency Action temporarily removed the NFMA possession limit and may have reduced the number of DAS used in this region in FY2013. However, the Emergency Action did not appear to significantly increase landings on previous fishing years (Table 43). FW9 permanently removed the NFMA possession limit for category C and D permits when fishing on both a monkfish and NE multispecies DAS. The effect, if any, the removal of the NFMA possession limit has on landings won't be known until FY2016 is complete.

Table 41 - NFMA DAS usage between FY2009 and FY 2014

Fishing year	NFMA DAS Used	% Total DAS Used in NFMA	% Total DAS allocated Used in NFMA
2009	1097	25%	4%
2010	1109	26%	5%
2011	1157	21%	4%
2012	1164	26%	4%
2013	360	11%	1%
2014	651	16%	2%
2015	728		
Average 2009 - 2014	923	21%	3%

Option 1 would have neutral to low negative impacts on the monkfish stock because it would not incorporate the updated calculated discard rate from the 2016 operational assessment. This very slightly increases the likelihood that an insufficient amount of discards would be accounted for in the specifications. However, considering the low difference in percentage between the old rates and new calculated discard rates the likelihood of this is very low. If catch remains below the NFMA TAL, it is likely that biomass will continue to increase above Biomass target (B_{target}). The NFMA stock is not overfished, and overfishing is not occurring. Option 1 would have similar neutral to slightly low negative impacts on monkfish when compared to Options 2, 3, and 4.

Monkfish landings in the SFMA have fluctuated between FY 2004 and 2015 but have stabilized over the last 4 fishing years (Table 45). FW 8 increased monkfish DAS allocations from 28 to 32 in the SFMA for FY 2014. Data for FY 2015 shows that landings in the SFMA decreased slightly to achieve 53% of the SFMA TAL (down from 61% in FY2013; Table 45). Monthly monkfish landings in the SFMA in FY 2015 have followed similar patterns to those in FY2014, despite total SFMA monkfish landings down 12% in FY2015 compared to FY2014 (Table 46 and Figure 27).

Table 42 - SFMA target monkfish TALs, trip limits, DAS allocations and landings (FY 2000-2015)

Fishing Year	Target TAL (mt)	Trip Limits (lb)*		DAS Restrictions **	Landings (mt)	Percent of SFMA TAL
		Cat. A & C	Cat. B & D			
2004	6,772	550	450	28	6,223	92%
2005	9,673	700	600	39.3	9,656	100%
2006	3,667	550	450	12	5,909	161%
2007	5,100	550	450	23	7,180	141%
2008	5,100	550	450	23	6,751	132%
2009	5,100	550	450	23	4,800	94%
2010	5,100	550	450	23	4,484	88%
2011	8,925	550	450	28	5,801	65%
2012	8,925	550	450	28	5,184	58%

2013	8,925	550	450	28	5,088	59%
2014	8,925	610	500	32	5,478	61%
2015	8,925	610	500	32	4,739	53%

* Trip limits in pounds tail weight per DAS
** Excluding up to 10 DAS carryover, became 4 DAS carryover in FY 2007

Table 43 – Monthly SFMA monkfish total landings in FY 2015 compared to FY2014

NFMA Landings	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Through Apr
2015	1,030	748	332	99	64	198	256	469	295	254	444	544	4,733
2014	1082	893	260	190	104	211	469	580	500	166	233	622	5,314
% Difference compared to 2014	-5	-17	24	-63	-48	-6	-59	-21	-52	42	62	13	12

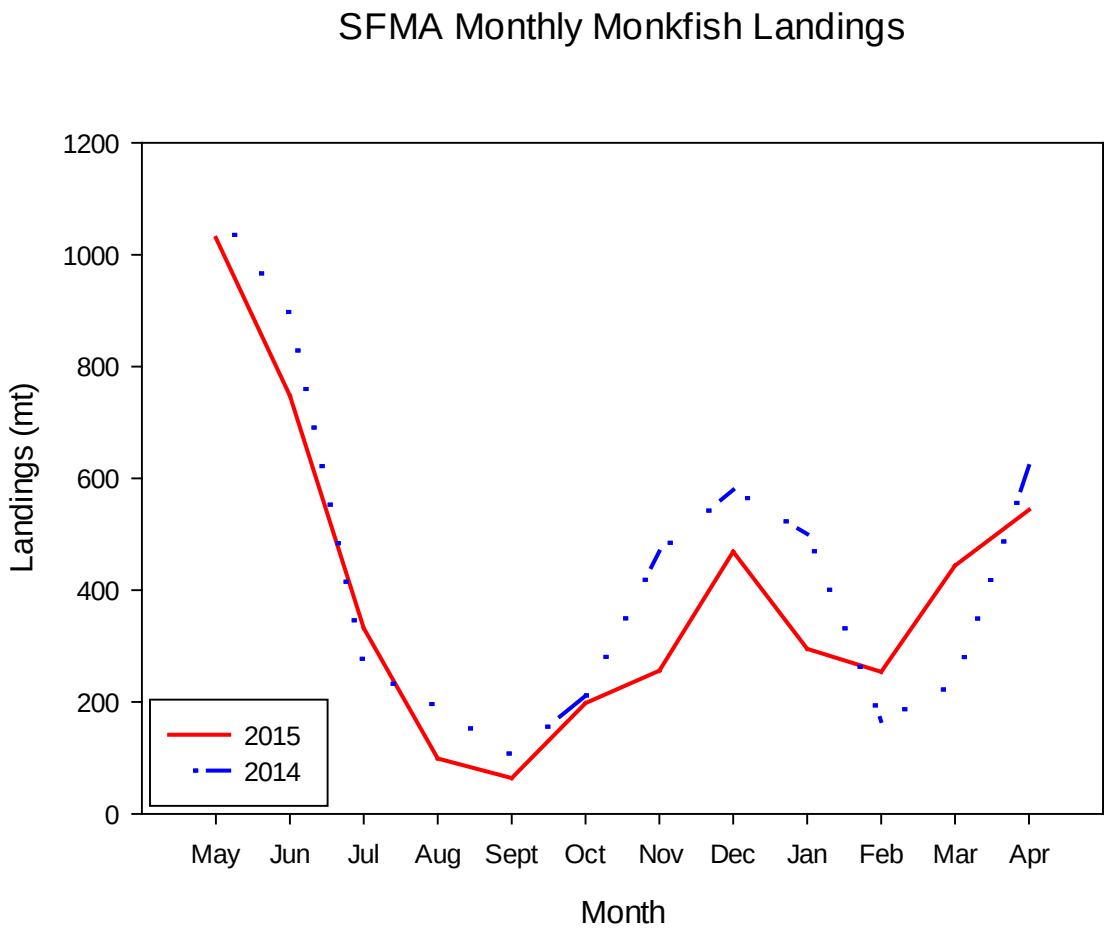


Figure 21 - Comparison of FY 2014 and FY2015 SFMA monthly monkfish landings

Recent DAS usage patterns suggest that monkfish vessels operating in the SFMA used 10% of total allocated DAS in this region (Table 47). The FY2013 emergency action reduced the need to use a monkfish DAS in the NFMA. This increased the potential for these unused NFMA monkfish DAS to be used in the SFMA. The total number of DAS used in the SFMA decreased in FY2015 when compared to

FY2014 (Table 52). The percentage of total DAS used in the SFMA has decreased since FY2013, which suggests that an effort shift from the NFMA to the SFMA has not been taking place in recent years. An increased number of DAS used in the NFMA in FY2015 was not sufficient to balance out the decrease in SFMA DAS used. The total number of DAS used in the SFMA was still higher than those used in the NFMA. There was a decrease of approximately 4% in DAS used in the SFMA in FY2015 when compared to FY2014 (Table 47). It is not possible to distinguish between the effect of FW8, or FW9, and any shift in effort from the NFMA to the SFMA.

Table 44 - SFMA Monkfish DAS usage between FY 2009 and FY 2014

Fishing year	SFMA DAS Used	% Total DAS Used in SFMA	% Total DAS allocated Used in SFMA
2009	3252	75%	13%
2010	3151	74%	13%
2011	4389	79%	14%
2012	3284	74%	10%
2013	3038	89%	10%
2014	3463	84%	10%
2015	2,815	80%	10%

To further prevent and mitigate overages, an Accountability Measure (AM) was implemented in Amendment 5. While an overage of the TAL under Option 1 would be unlikely, the AM is an adequate measure to mitigate the impacts of any potential overage and to prevent future overages from occurring.

Impacts on non-target species

FW3 to the NE Skate Complex FMP reduced the skate ABC reflecting the recent decrease in skate survey indices. This decrease in survey indices implies a decrease in skate biomass which may reduce interactions and therefore discards from the monkfish fishery. FW3 also modified the seasonal management of the wing fishery by apportioning a percentage of the TAL between the two seasons (May 1 – Aug 31 and Sept 1 – Apr 30). An incidental skate wing possession limit may be implemented if the in-season trigger is reached, which may reduce fishing for other species if high interactions with skate impede operations. Option 1 would have neutral to low negative impacts on the NE skate complex because no change in the current trend in skate landings and discards would be expected, unless modifications are made under the NE Skate Complex FMP.

The spiny dogfish stock is not overfished, overfishing is not occurring, and stock size has been above the biomass target since 2007 (MAFMC, 2014). The MAFMC recently implemented specifications for FY2016-2018, which reduced the ABC based on updated survey indices and the application of a Kalman filter. The trip limit was increased from 5,000 lb to 6,000 lb. Option 1 would have neutral impacts on the dogfish stock because no change in effort would be expected and biomass remains relatively high, resulting in no change in the current trend in dogfish landings and discards.

Because groundfish landings and discards are tightly controlled under the Northeast Multispecies FMP, Option 1 is likely to have neutral impacts on groundfish stocks. Existing groundfish measures, including ACLs and AMs established for each stock, along with sector and common pool effort controls are expected to ensure that overfishing does not occur and overfished stocks are rebuilt. The number of active NE multispecies vessels further declined in FY2014 (https://www.greateratlantic.fisheries.noaa.gov/aps/monitoring/nemultispecies.html; Figure 23). Accordingly, effort on NE multispecies trips also declined in FY2014 (Figure 23). The number of active

monkfish vessels has also decreased over the same time period, although the number of monkfish DAS used in FY2014 showed a slight increase (Figure 24). This could suggest that monkfish effort is linked to groundfish effort, which would further indicate that impacts on groundfish would be neutral as directed monkfish effort is unlikely to increase under decreasing groundfish effort. Option 1 would have similar neutral impacts on non-target species when compared to Options 2 and 3.

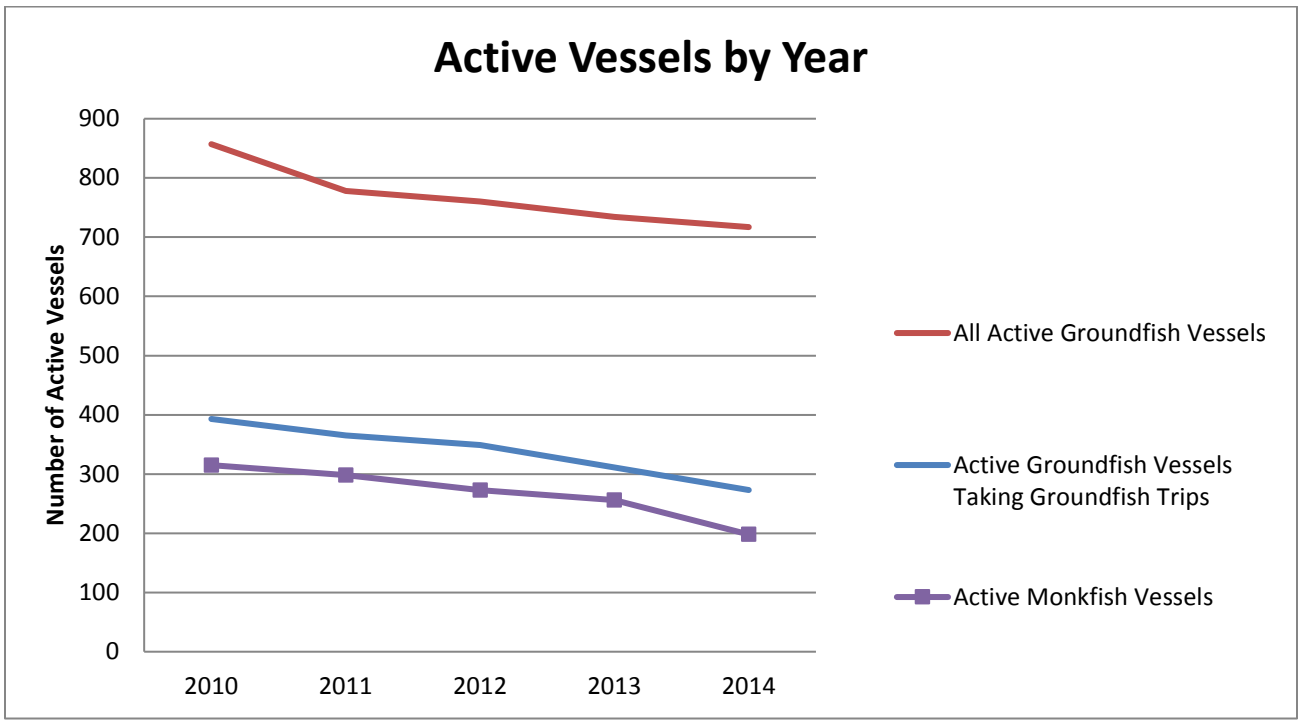


Figure 22 - Active groundfish vessels between Fishing Years 2010 and 2014

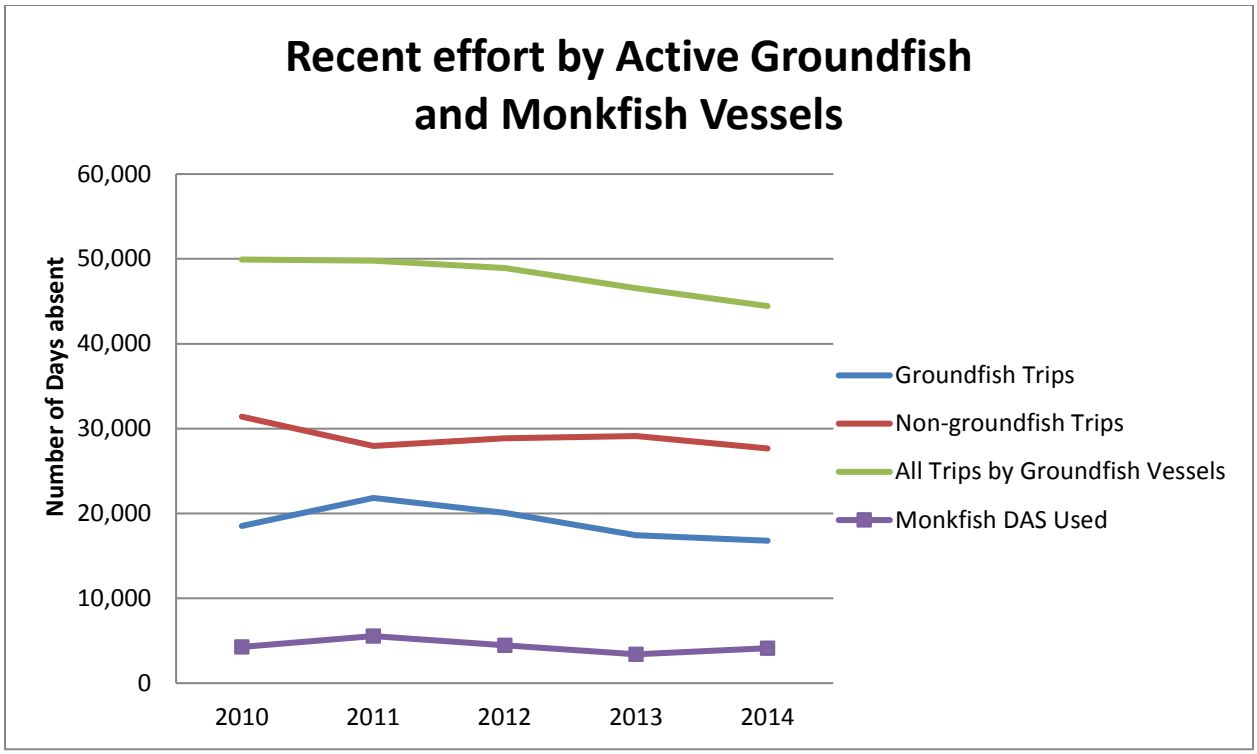


Figure 23 - Recent effort by active NE multispecies and monkfish vessels between Fishing Years 2010 and 2014

7.1.1.1.2 Option 2: Modified Discard Rate for Northern and Southern Fishery Management Areas

Option 2 would maintain the ACL and ACT for monkfish as set in FW8 but would modify the calculated discard rate applied to the ACT. The calculated discard rate would be updated based on the 2016 operational assessment, using the 2013-2015 time period. Option 2 would be expected to have low positive impacts because there is a small difference in the TAL between Options 1, 3, and 4.

Option 2 would have low positive impacts on the monkfish stock because it would result in a slight decrease in the TAL from the updated calculated discard rate. However, the NFMA and SFMA have not achieved their TAL in a number of years, which may have a larger positive biological impact on the stock, i.e. under-harvesting has acts as an additional positive buffer for the stock.

7.1.1.1.3 Option 3: Reduce the Management Uncertainty Buffer to 3% in the Northern Fishery Management Area (*Preferred Alternative*)

Option 3 would reduce the management uncertainty buffer in the NFMA to 3%. The ACL would not be modified in this alternative. No adjustment in the scientific uncertainty buffer between the OFL and ACL would be made. Considering that a sufficient level of discards are accounted for, and if the under-harvest of the TAL continues, would support a decrease in the management uncertainty buffer. This would have a neutral to low negative biological impacts because it is not expected to increase landings or the ability to catch monkfish. It would increase the amount of monkfish available for the TAL but does not increase the likelihood of exceeding the TAL. However, because the buffer is reduced it could have a low risk of the ACL being exceeded if catch dramatically increased or discards increased, unexpectedly. Option 3 would

have similar neutral to low negative biological impacts to Option 1 but more negative impacts than 2. It is difficult to compare Option 3 to Option 4 because they are different management areas.

7.1.1.1.4 Option 4: Revised Management Uncertainty Buffer for the Southern Fishery Management Area (*Preferred Alternative*)

Option 4 would reduce the management uncertainty buffer in the SFMA to 3%. The ACL would not be modified in this alternative. No adjustment in the scientific uncertainty buffer between the OFL and ACL would be made. Considering that a sufficient level of discards are accounted for, and if the under-harvest of the TAL continues, would support a decrease in the management uncertainty buffer. This would have a neutral biological impact because it is not expected to increase landings or the ability to catch monkfish. It would increase the amount of monkfish available for the TAL but does not increase the likelihood of exceeding the ACL. Option 4 would have similar neutral impacts compared to Options 1 and 2 because it would not increase effort on monkfish. However, it is difficult to compare Option 4 to Option 3 because they are for different management areas.

7.1.1.2 Modify the DAS allocation and/or trip limits in the NFMA

7.1.1.2.1 Option 1: No Action

Impacts on monkfish

The No Action alternative would maintain the existing DAS allocations and trip limits in the NFMA. Option 1 would have neutral to low positive biological impacts on monkfish because it would not increase the ability to land monkfish, reducing the likelihood of the TAL being achieved.

Option 1 would have neutral to low positive impacts on the monkfish stock because it would not increase the ability of the fishery to achieve its TAL, leaving a portion of the TAL unharvested (or potentially discarded). There is a low probability that expected catch under Option 1 would exceed the NFMA TAL. Option 1 would have similar neutral impacts compared to Option 2 because Option 1 would not be expected to achieve the TAL and therefore the ACL could not be exceeded.

Impacts on non-target species

Option 1 would not modify the DAS allocation and trip limits in the NFMA and, therefore, would not be expected to dramatically increase effort in the NFMA. The number of NFMA DAS used in the NFMA did increase in FY2014 and FY 2015 although landings did not increase greatly. FW8 set the current monkfish specifications and concluded no adverse biological impacts on non-target stocks would be expected. As the TAL is not expected to be exceeded it is unlikely that Option 1 would result in any negative biological impacts not already accounted for in existing measures and analyzed by previous actions under their respective FMPs.

The number of active monkfish vessels has fluctuated in both management areas (Figure 29). The number of active vessels in the NFMA area increased briefly in FY 2014 before decreasing in FY 2015, while landings showed the opposite pattern. In recent years, the number of active vessels has decreased in the NFMA despite DAS usage showing a slight increase in FY2015 (Figure 30).

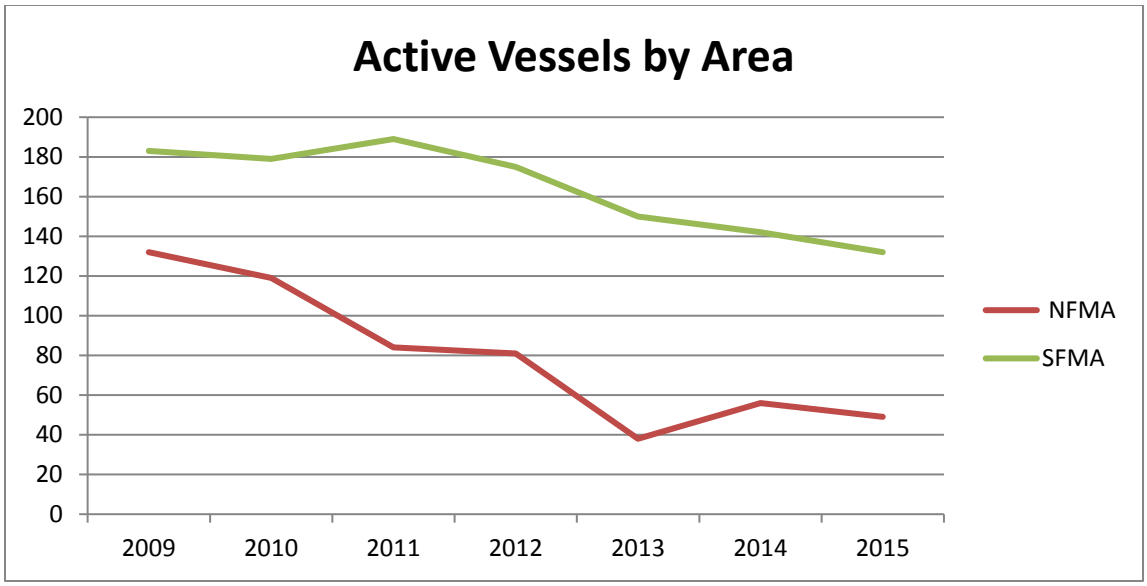


Figure 24 - Active Monkfish Vessels by Area

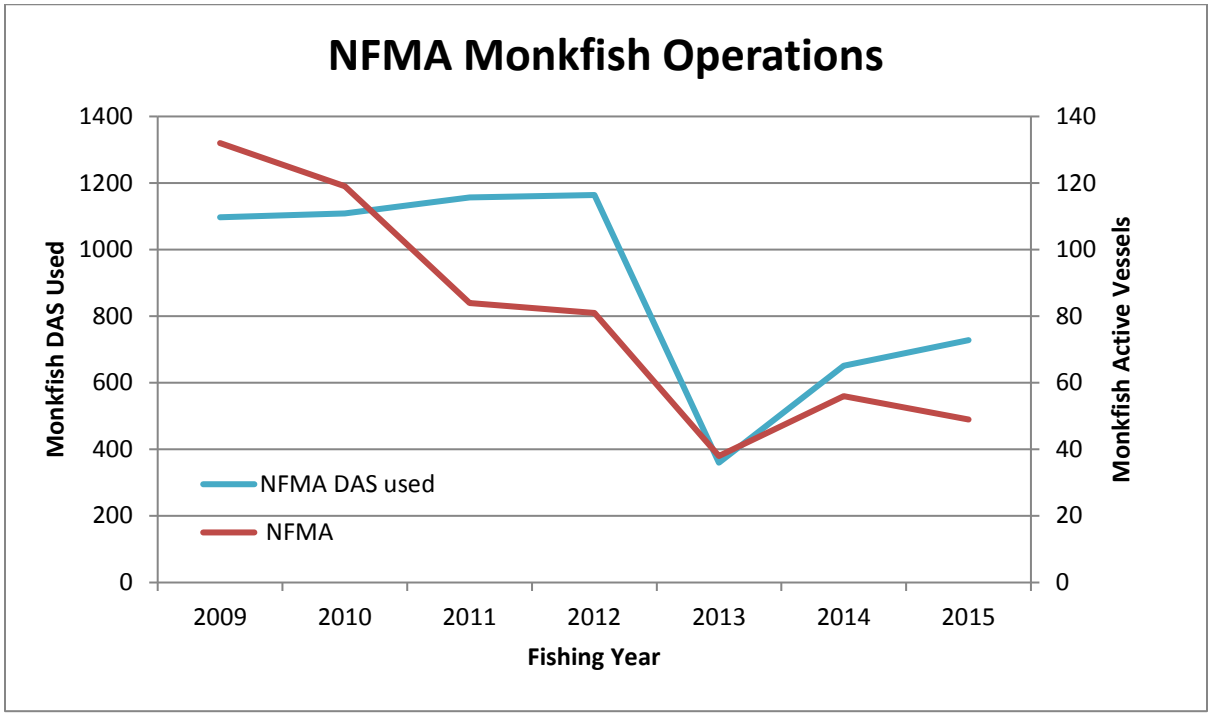


Figure 25 - NFMA monkfish Operations

FW3 to the NE Skate Complex FMP reduced the skate ABC reflecting the recent decrease in skate survey indices. This decrease in survey indices implies a decrease in skate biomass which may reduce interactions and therefore discards from the monkfish fishery. The skate ABC is largely driven by little and winter skate biomass, neither of which are overfished. Overfishing was occurring on winter skate in 2013 and 2014, however, the biomass proxy remained above the biomass target. FW3 also implemented a seasonal quota for the wing fishery. The skate FMP regulates the skate fishery using TALs, seasonal

possession limits, seasonal quotas, and AMs. Option 1 would have neutral impacts on the NE skate complex because no change in the current trend in skate landings and discards would be expected.

The spiny dogfish stock is not overfished, overfishing is not occurring, and stock size has been above the biomass target since 2007 (MAFMC, 2014). Option 1 would have neutral impacts on the dogfish stock because no change in effort would be expected, resulting in no change in the current trend in dogfish landings and discards.

Because groundfish landings and discards are tightly controlled under the Northeast Multispecies FMP, Option 1 is likely to have neutral impacts on groundfish stocks. Existing groundfish measures, including ACLs and AMs established for each stock, along with sector and common pool effort controls are expected to ensure that overfishing does not occur and overfished stocks are rebuilt. The number of active NE multispecies vessels further declined in FY2013 (https://www.greateratlantic.fisheries.noaa.gov/aps/monitoring/nemultispecies.html; Figure 23). Accordingly, effort on NE multispecies trips also declined in FY2013 (Figure 23). The number of monkfish DAS used has also decreased over the same time period. This could suggest that monkfish effort is linked to groundfish effort, which would further indicate that impacts on groundfish would be neutral as directed monkfish effort is unlikely to increase under decreasing groundfish effort. Option 1 would have similar neutral impacts on non-target species when compared to Option 2.

7.1.1.2.2 Option 2: Increase the incidental trip limit in the NFMA (*Preferred Alternative*)

Incidental trip limits on a NE multispecies DAS would increase to 900 and 750 lb tail weight/DAS for Category C and D vessels respectively.

Option 2 would have neutral impacts on the monkfish stock because it would not be expected to help the fishery better achieve, the TAL, which has been under-harvested in recent years. The TAL, specified in this document for FYs 2017 - 2019, would account for both scientific and management uncertainty, thus minimizing the risk of negative biological impacts. There is a very low probability that expected catch under Option 2 would exceed the NFMA TAL. Considering how the NFMA fishery operates, on a few trips where the incidental limit was limiting, this alternative could convert regulatory discards to landings.

The 2016 operational assessment (Richards, 2016) identified a strong 2015 year class in the survey data. It is unclear at this time what impact this year class could have on landings or fishing behavior. If the 2015 recruits to the fishery in FY2016 it may increase the availability of monkfish, which could increase landings. However, as Options 2 and 3 are not expected to significantly increase landings on their own then the 2015 year class would not be expected to result in the TAL being exceeded. However, given the lack of growth data for monkfish, it is not possible to predict when or if this year class will recruit to the fishery.

To further prevent and mitigate overages, an Accountability Measure (AM) was implemented in Amendment 5. While an overage of the TAL under Option 2 would be unlikely, the AM is an adequate measure to mitigate the impacts of any potential overage and to prevent future overages from occurring. Option 2 would have similar neutral impacts on monkfish when compared to Option 1.

Impacts on non-target species

Option 2 would not be expected to increase overall fishing effort because it would not be expected to increase directed fishing in the NFMA. DAS usage in the NFMA is currently low. The majority of trips landing monkfish in the NFMA are fishing on a NE multispecies DAS as the number of DAS used in the

NFMA remains low. However, if permit category C and D vessels want to have no monkfish possession limit they can fish on both a NE multispecies and monkfish DAS, this may increase the number of monkfish DAS used in the NFMA if the incidental possession limits are not changed under Option 3. Therefore, interactions with and discards of non-target species would not be expected to change.

Even though these trips might be targeting monkfish they are also interacting with dogfish or skate, which are restricted by ABCs and TALs. If an overage occurs in the skate fishery during the fishing year, the possession limit for the wing fishery would be reduced to the incidental limit of 500 lbs. If the overage is greater than 5% in any given year, the in-season possession limit trigger would be reduced 1% for every 1% of TAL overage, also, if the ACL is exceeded the buffer between the ACL and ACT would be increased from the current 25% in 1% increments for each 1% overage in ACL. Existing skate regulations ensure that overfishing does not occur and any overfished stocks continue to rebuild.

The dogfish stock is not overfished nor experiencing overfishing. Similar to the skate complex, the dogfish fishery has an established ABC and commercial quota. If an ACL overage occurs the exact amount in pounds by which the ACL was exceeded would be deducted, as soon as possible, from the subsequent single fishing year ACL.

Option 2 would have neutral impacts on non-target species, similar to Option 1.

7.1.1.3 Modify DAS allocation and/or trip limits in the SFMA

7.1.1.3.1 Option 1: No Action

Option 1 would maintain the current trip limits and DAS allocations in the SFMA. Option 1 would have neutral to low positive biological impacts on monkfish because it would not increase the ability to land monkfish, reducing the likelihood of the TAL being achieved. Effort in the SFMA is largely executed on directed trips. A decrease in the usage of DAS in the SFMA would be expected to decrease landings, as was seen in FY2015 (FIGURE or table comparing DAS usage and landings).

Option 1 would have neutral to low positive impacts on the monkfish stock because it would not increase the ability of the fishery to achieve its TAL, leaving a portion of the TAL unharvested (or potentially discarded). There is a low probability that expected catch under Option 1 would exceed the SFMA TAL. Option 1 would have similar neutral impacts compared to Options 2, 3, and 4 because Option 1 would not be expected to achieve the TAL and therefore the ACL could not be exceeded.

Impacts on non-target species

Option 1 would not be expected to increase overall fishing effort. Therefore, interactions with and discards of non-target species would not be expected to change. As noted above in Section 7.1.1.1 Option 1, the current stock status of the NE skate complex and dogfish combined with no expected increase in effort in the monkfish fishery, Option 1 would not be expected to have any negative impacts on these stocks.

Existing groundfish measures, including ACLs and AMs established for each stock, along with sector and common pool effort controls are expected to ensure that overfishing does not occur and overfished stocks are rebuilt. Based on the analysis provided in Section 7.1.1.1 Option 1, Option 1 is also not expected to result in increased effort over the approved monkfish specifications. Therefore, Option 1 would have neutral impacts on non-target species, similar to Option 2.

7.1.1.3.2 Option 2: Increase the DAS Allocation and Trip Limits in the SFMA (*Preferred Alternative*)

Option 2 would increase the SFMA DAS allocation by 15% to 37 DAS. It would also increase trip limits in the SFMA by 15% to 700 lb and 575 lb tail weight/DAS for Category A and C, and Category B and D permits, respectively. Option 4 would have a neutral biological impact because the moderate increases in DAS allocation and trip limits would be expected to help the fishery better achieve, but not exceed, the TAL, which has been under-harvested in recent years. The TAL, specified in this document for FYs 2017 - 2019, would account for both scientific and management uncertainty, thus minimizing the risk of negative biological impacts. Therefore, Option 3 would also not be expected to result in the ACL being exceeded.

The 2016 operational assessment (Richards, 2016) identified a strong 2015 year class in the survey data. It is unclear at this time what impact this year class could have on landings or fishing behavior. If the 2015 recruits to the fishery in FY2016 it may increase the availability of monkfish, which could increase landings. However, as Options 2 and 3 are expected to moderately increase landings on their own then the 2015 year class would not be expected to result in the TAL being exceeded. However, given the lack of growth data for monkfish, it is not possible to predict when or if this year class will recruit to the fishery.

To further prevent and mitigate overages, an Accountability Measure (AM) was implemented in Amendment 5. While an overage of the TAL under Option 2 would be unlikely, the AM is an adequate measure to mitigate the impacts of any potential overage and to prevent future overages from occurring. Option 2 would have similar neutral impacts on monkfish when compared to Option 1.

Impacts on non-target species

Option 2 would likely result in a moderate increase in fishing effort because the monkfish fishery in the SFMA is a directed fishery. Increasing a DAS allocation in a directed fishery would allow for more landings. Therefore, interactions with and discards of non-target species would not be expected to change.

Even though these trips might be targeting monkfish they are also interacting with dogfish or skate, which are restricted by ABCs and TALs. If an overage occurs in the skate fishery during the fishing year, the possession limit for the wing fishery would be reduced to the incidental limit of 500 lbs. If the overage is greater than 5% in any given year, the in-season possession limit trigger would be reduced 1% for every 1% of TAL overage, also, if the ACL is exceeded the buffer between the ACL and ACT would be increased from the current 25% in 1% increments for each 1% overage in ACL. Existing skate regulations ensure that overfishing does not occur and any overfished stocks continue to rebuild.

The dogfish stock is not overfished nor experiencing overfishing. Similar to the skate complex, the dogfish fishery has an established ABC and commercial quota. If an ACL overage occurs the exact amount in pounds by which the ACL was exceeded would be deducted, as soon as possible, from the subsequent single fishing year ACL.

Option 2 would have neutral impacts on non-target species, similar to Option 1.

7.2 Essential Fish Habitat Impacts

7.2.1 Updates to Annual Catch Limits

7.2.1.1 Revised Annual Catch Limits

7.2.1.1.1 Option 1: No Action

Under Option 1, there would be no change in specifications for FYs 2017 - 2019. No change in fishing effort would be expected under Option 1, therefore the current trend of not achieving the monkfish TAL would be expected to continue. Therefore the impacts on EFH would be the same as those identified in the EA developed for FW8, which set the current specifications. The analysis concluded that under these specifications there would not be an adverse impact to EFH because the monkfish and NE multispecies DAS catch limits were not revised, which serve as a restraint on fishing effort in the monkfish fishery. In addition, because vessels operating in the NFMA are predominantly groundfish vessels, monkfish fishing effort would likely be largely constrained by NE multispecies DAS or ACE allocations rather than monkfish DAS allocations. The Accountability Measures also account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. Thus the No Action alternative would not modify the expected interactions of monkfish or groundfish gear with EFH. Compared to Options 2, 3, and 4, Option 1 would have similar neutral impacts on EFH.

7.2.1.1.2 Option 2: Updated Discard Rate for Northern and Southern Fishery Management Areas

Option 2 would maintain the same ABC and ACT as in FW8 but would update the discard rate (2013 – 2015) applied to the ACT for both the NFMA and SFMA. This alternative would update the discard rate to ensure that a sufficient amount of discards is accounted for to further reduce the likelihood of the ACL being exceeded. Fishing effort would continue to be restricted by the specifications set in FW8, along with AMs that account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. The analysis of impacts on EFH conducted for FW8, concluded that under these specifications there would not be an adverse impact to EFH because the monkfish and NE multispecies DAS catch limits were not revised, which serve as a restraint on fishing effort in the monkfish fishery. In addition, because vessels operating in the NFMA are predominantly groundfish vessels, monkfish fishing effort would likely be largely constrained by NE multispecies DAS or ACE allocations rather than monkfish DAS allocations. Vessels in the SFMA are restricted by effort controls (DAS and trip limits), which are set conservatively so as to prevent the ACL from being exceeded. Thus Option 2 would not modify the expected interactions of monkfish or groundfish gear with EFH. Compared to Options 1, 3, and 4, Option 2 would have similar neutral impacts on EFH.

7.2.1.1.3 Option 3: Revised Annual Catch Limit for the Northern Fishery Management Area (*Preferred Alternative*)

Option 3 would maintain the same ABC and ACT as in FW8 but would reduce the management uncertainty buffer and update the discard rate (2013 – 2015) applied to the ACT. Neither adjustment would affect the ability of vessels to catch monkfish. Fishing effort would continue to be restricted by the specifications set in FW8, along with AMs that account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. The analysis of impacts on EFH conducted for FW8, concluded that under these specifications there would not be an adverse impact to EFH because the monkfish and NE multispecies DAS catch limits were not revised, which serve as a restraint on fishing effort in the monkfish fishery. In addition, because vessels operating in the NFMA are predominantly groundfish vessels, monkfish fishing effort would likely be largely constrained by NE multispecies DAS or ACE allocations rather than monkfish DAS allocations. Thus Option 3 would

not modify the expected interactions of monkfish or groundfish gear with EFH. Compared to Options 1, 2, and 4, Option 3 would have similar neutral impacts on EFH.

7.2.1.1.4 Option 4: Revised Annual Catch Limit for the Southern Fishery Management Area (*Preferred Alternative*)

Option 4 would maintain the same ABC and ACT as in FW8 but would reduce the management uncertainty buffer and update the discard rate (2013 – 2015) applied to the ACT. Neither adjustment would affect the ability of vessels to catch monkfish. Fishing effort would continue to be restricted by the specifications set in FW8, along with AMs that account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. The analysis of impacts on EFH conducted for FW8, concluded that under these specifications there would not be an adverse impact to EFH because the monkfish and NE multispecies DAS catch limits were not revised, which serve as a restraint on fishing effort in the monkfish fishery. Vessels in the SFMA are restricted by effort controls (DAS and trip limits), which are set conservatively so as to prevent the ACL from being exceeded. Thus Option 4 would not modify the expected interactions of monkfish or groundfish gear with EFH. Compared to Options 1, 2, and 3, Option 4 would have similar neutral impacts on EFH.

7.2.2 Modifications to Current Monkfish Days-at-Sea and Trip Limits

7.2.2.1 Modify the DAS allocation and/or trip limits in the NFMA

7.2.2.1.1 Option 1: No Action

Under Option 1, there would be no change in the DAS allocation or trip limits in the NFMA. No change in fishing effort would be expected under Option 1, therefore the current trend of not achieving the monkfish TAL would be expected to continue. The monkfish fishery in the NFMA is predominantly incidental and therefore effort is mainly restricted by regulations in the groundfish fishery. The Accountability Measures also account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. Compared to Option 2, Option 1 would have similar neutral impacts on EFH.

7.2.2.1.2 Option 2: Increase the trip limit in the NFMA (*Preferred Alternative*)

Option 2 would increase the incidental trip limits when on a NE multispecies DAS. Fishing effort would be restricted by the specifications set in this framework (as approved in FW8), along with AMs that account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. The Accountability Measures also account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. Compared to Option 1, Option 2 would have similar neutral impacts on EFH.

7.2.2.2 Modify the DAS allocation and/or trip limits in the SFMA

7.2.2.2.1 Option 1: No Action

Under Option 1, there would be no change in the DAS allocation or trip limits in the NFMA. No change in fishing effort would be expected under Option 1, therefore the current trend of not achieving the monkfish TAL would be expected to continue. The monkfish fishery in the SFMA is predominantly executed using gillnet gear, which has lower impact on EFH. The Accountability Measures also account

for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. Compared to Option 2, Option 1 would have similar neutral impacts on EFH.

7.2.2.2.2 Option 2: Increase the DAS Allocation and Trip Limits in the SFMA (*Preferred Alternative*)

Option 2 would increase the SFMA DAS allocation and trip limits when on a monkfish DAS in the SFMA. Although, an increase in DAS allocation would be expected to moderately increase effort, the SFMA fishery is mainly executed with gillnet gear which has limited impacts on EFH. Fishing effort would be restricted by the specifications set in this FW (as approved in FW8), along with AMs that account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. The Accountability Measures also account for any overage of ACLs and prevent future fishing operations from compromising the conservation objectives of the fishery. Increasing trip limits could increase efficiency for vessels if they are able to land more poundage in less time. Compared to Option 1, Option 2 would have similar neutral impacts on EFH.

7.3 Impacts on Endangered and Other Protected Species

7.3.1 Updates to Annual Catch Limits

7.3.1.1 Revised Annual Catch Limits

7.3.1.1.1 Option 1: No Action

Under Option 1, specifications set in FW8 for both the NFMA and SMFA including the ABC, ACT, and TAL. The specifications are not limiting to fishing effort in either management area as the TAL has not been achieved over the last five years. This would be expected to maintain the current levels of fishing opportunities for vessels. Therefore a change in effort pattern would not be expected.

Non-ESA Listed Species Impacts

Impacts of the No Action on non-ESA listed species, which consist of species of cetaceans and pinnipeds (marine mammals), 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 monkfish fishery (Waring *et al*. 2014). Aside from harbor porpoise and several stocks of bottlenose dolphin, there has been no indication that takes of non-ESA listed species of marine mammals in commercial fisheries has gone above and beyond levels which would result in the inability of each species population to sustain itself over the last 5 years (Waring *et al*. 2014). Specifically, aside from harbor porpoise and several stocks of bottlenose dolphin, potential biological removal (PBR) has not been exceeded for any of the non-ESA listed marine mammal species identified in section 6.5 (Waring *et al*. 2014). Although harbor porpoise and several stocks of bottlenose dolphin have experienced levels of take that have resulted in the exceedance of each species PBR, take reduction plans have been implemented to reduce bycatch in the fisheries affecting these species (Harbor Porpoise Take Reduction Plan (HPTRP), effective January 1, 1999 (63 FR 71041); Bottlenose Dolphin Take Reduction Plan (BDTRP), effective April 26, 2006 (71 FR 24776)). These plans are still in place and are continuing to assist in decreasing bycatch levels for these species. Although the information presented is a collective representation of commercial fisheries interactions with non-ESA listed species of marine mammals, and does not address the effects of the monkfish FMP specifically, the information does demonstrate that to date, operation of the monkfish FMP, or any other fishery, has not resulted in a collective level of take that threatens the continued existence of non-ESA listed marine mammal populations.

Based on this information, and the fact that the monkfish 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), it is not expected that the No Action, which will maintain status quo conditions, will result in levels of take that will affect the continued existence of non- ESA listed species of marine mammals. For these reasons, the No Action is expected to have low negative to neutral impacts on non- ESA listed species of marine mammals.

ESA Listed Species

Although the impacts to ESA listed species from the No Action are somewhat uncertain, as quantitative analysis has not been performed, we have considered, to the best of our ability, how the fishery has operated in regards to listed species from 2011, when substantial changes to the FMP had been experienced from the recent adoption of Amendment 5 on May 25, 2011, to the present. During this time,

NMFS issued a biological opinion (Opinion) on the monkfish fishery in 2010 (NMFS 2010), with a subsequent replacement of this Opinion in 2013 (NMFS 2013). The Opinion issued on October 29, 2010, concluded that the fishery may affect, but would not jeopardize the continued existence of any ESA listed species of sea turtles or whales. An incidental take statement authorizing the take of specific numbers of ESA listed species of sea turtles was included in the 2010 Opinion. Until December 16, 2013, when NMFS issued a new biological opinion on the operation of seven commercial fisheries, including the monkfish fishery, the monkfish fishery had been covered by the incidental take statement authorized and issued with the 2010 Opinion. It should be noted that the 2010 biological opinion did not authorize the incidental take of ESA listed:

- Atlantic salmon: take of Atlantic salmon in the monkfish fishery was not expected; however, analysis of information since the 2010 Opinion was completed changed this determination and as a result, in NMFS most recent batched biological opinion issued on December 16, 2013, incidental take of Atlantic salmon is authorized (see NMFS 2013);
- Atlantic sturgeon: Atlantic sturgeon was not listed at the time the 2010 biological opinion was written. As a result, this species was not considered in the 2010 Opinion; however, since this species listing in 2012 (77 FR 5880 and 77 FR 5914, February 6, 2012), it has been included in the 2013 Opinion; and
- North Atlantic right, humpback, fin, and sei whales: NMFS could not include an incidental take authorization for large whales because (1) an incidental take statement cannot be lawfully issued under the ESA for a marine mammal unless incidental take authorization exists for that marine mammal under the MMPA (see 16 U.S.C. § 1536(b)(4)(C)), and (2) the incidental take of ESA-listed whales by the monkfish fishery has not been authorized under section 101(a)(5) of the MMPA. Because no ITS was included in either the 2010 Opinion, no incidental take by the monkfish fishery is authorized under the ESA.

As noted above, NMFS issued a new Opinion on the operation of seven commercial fisheries, including the monkfish FMP on December 16, 2013 (NMFS 2013). The 2013 Opinion concluded that the seven fisheries, including the monkfish fishery, may affect, but would not jeopardize the continued existence of any ESA listed species of sea turtles, whales, or fish (NMFS 2013). An incidental take statement authorizing the take of specific numbers of ESA listed species of sea turtles, Atlantic salmon, and Atlantic sturgeon was included in the 2013 Opinion; for reasons described above, take of ESA listed species of whales is not authorized. To date, the monkfish FMP is covered by the incidental take statement authorized in NMFS 2013 Opinion.

The No Action would retain status quo operating conditions in the monkfish FMP and therefore, changes in fishing effort or behavior above and beyond that which has been considered since 2010 would not be expected. As a result, the No Action is not expected to result in the introduction of any new risks or additional takes to ESA listed species that have not already been considered and authorized by NMFS to date (NMFS 2013). Further, the monkfish FMP has not resulted in the exceedance of NMFS authorized take of any ESA listed species from 2010 to the present. The No Action Alternative, therefore, is not, as concluded in the NMFS 2013 Opinion, expected to result in levels of take that would jeopardize the continued existence of ESA listed species. For these reasons, and due to the fact that this alternative would still require compliance with the ALWTRP and sea turtle resuscitation guidelines, the No Action is expected to have low negative to neutral impacts on ESA-listed species.

7.3.1.1.2 Option 2: Updated Discard Rate for Northern and Southern Fishery Management Areas

Option 2 would maintain the ABC and ACT as set in FW8. It would modify the discard rate applied to the ACT to calculate the TAL. The specifications are not limiting to fishing effort in either management area as the TAL has not been achieved over the last five years. This would be expected to maintain the current levels of fishing opportunities for vessels. Therefore a change in effort pattern would not be expected.

As Option 2 is not expected to result in any significant changes in fishing behavior in the NFMA or the SFMA, the potential for protected species interactions with gillnet or trawl gear and therefore, serious injury or mortality, are not expected to go above and beyond that which has been considered in the fishery to date (NMFS 2013, Waring *et al*. 2014). Specifically, since the adoption of Amendment 5 on May 25, 2011, to the present, the monkfish fishery has not introduced any new risks or additional takes to protected species that have not already been considered and/or authorized by NMFS to date (NMFS 2013; Waring et al. 2014). In fact, since the adoption of Amendment 5, the monkfish fishery has not resulted in the exceedance of NMFS authorized take of any ESA listed species, or resulted in levels of take that threaten the continued existence of non-ESA listed marine mammal populations (see exception in section 7.3.1.1.1) and therefore, jeopardize the continued existence of any ESA listed or non-listed species of marine mammal, fish, or sea turtle (NMFS 2013; Waring *et al*. 2014). Based on this information, Option 2 would not be expected to result in a level of ESA-listed species take above that which has been authorized by NMFS (NMFS 2013), or result in levels of take that threatens the continued existence of non-ESA listed marine mammal populations (Waring *et al*. 2014). As a result, the continued existence of any ESA listed or non-listed species of marine mammal, fish, or sea turtle is not expected to be jeopardized by Option 2 (NMFS 2013; Waring *et al*. 2014). In addition, Option 2 will still require compliance with protected species take reduction plans (e.g., ALWTRP, BDTRP, HPTRP). For these reasons, impacts of Option 2 on non-ESA listed species and ESA listed species would be expected to be low negative to neutral. Relative to option 1 and 3, we would expect Option 2 to have similar low negative to neutral impacts to protected species.

7.3.1.1.3 Option 3: Revised Annual Catch Limit for the Northern Fishery Management Area (*Preferred Alternative*)

Option 3 would maintain the ABC as set in FW8. It would reduce the management uncertainty buffer from 13.5% to 3% in the NFMA, which would increase the ACT and TAL. It would also update the discard rate applied to the ACT. The specifications are not limiting to fishing effort in either management area as the TAL has not been achieved over the last five years. This would be expected to maintain the current levels of fishing opportunities for vessels. Therefore a change in effort pattern would not be expected. Fishing behavior and the resultant effects to protected resources are expected to be the same as those described in Option 2 (see Section 7.3.1.1.2). Relative to options 1, 2, and 4, we would expect Option 3 to have similar low negative to neutral impacts to protected species.

7.3.1.1.4 Option 4: Revised Annual Catch Limit for the Southern Fishery Management Area (*Preferred Alternative*)

Option 3 would maintain the ABC as set in FW8. It would reduce the management uncertainty buffer from 6.5% to 3% in the SFMA, which would increase the ACT and TAL. It would also update the discard rate applied to the ACT. The specifications are not limiting to fishing effort in either management area as the TAL has not been achieved over the last five years. This would be expected to maintain the current levels of fishing opportunities for vessels. Therefore a change in effort pattern would not be expected. Fishing behavior and the resultant effects to protected resources are expected to be the same as those described in Option 2 (see Section 7.3.1.1.2. Relative to options 1, 2, and 3, we would expect Option 4 to have similar low negative to neutral impacts to protected species.

7.3.2 **Modifications to Current Monkfish Days-at-Sea and Trip Limits**

7.3.2.1 Modification the DAS allocation and/or trip limits in the NFMA

7.3.2.1.1 Option 1: No Action

Option 1 would maintain status quo conditions and therefore, would not increase the trip limit or the DAS allocation in the NFMA. Therefore, no change in fishing effort would be expected under Option 1. Based on this, we do not expect Option 1 (status quo conditions) to introduce any new risks to protected species that have not already been considered and/or authorized by NMFS to date (NMFS 2013; Waring *et al.* 2014) and expect impacts of Option 1 on non-ESA listed species and ESA listed species to be similar to those described in Section 7.3.1.1.1 (i.e., low negative to neutral impacts). Relative to Option 2, Option 1 would have more of a negative impact on protected species.

7.3.2.1.2 Option 2: Increase the incidental trip limit in the NFMA (*Preferred Alternative*)

Option 2 would increase the incidental possession limit of monkfish on a NE multispecies DAS. This would be expected to convert regulatory discards to landings as opposed to incentivizing increased fishing effort. Option 2 has the opportunity to increase monkfish landings, however, the fishery in the NFMA is predominately an incidental fishery. Analysis in FW9 that removed the possession limit when on a monkfish and NE multispecies DAS that the majority of trips occurring in the NFMA are catching less than 90% of the monkfish incidental possession limit for a NE multispecies DAS. The number of monkfish DAS used in the NFMA remains low. As a result, we do not expect significant changes in fishing behavior or effort in the NFMA under Option 2.

Based on the information above, fishing effort and distribution is not expected to significantly change from how the fishery currently operates. As Option 2 is not expected to result in any significant changes in fishing behavior in the NFMA, the potential for protected species interactions with gillnet or trawl gear and therefore, serious injury or mortality, are not expected to go above and beyond that which has been considered in the fishery to date (NMFS 2013, Waring *et al*. 2014). As a result, we do not expect Option 2 to result in a level of ESA-listed species take above that which has been authorized by NMFS, or result in levels of take that threatens the continued existence of non-ESA listed marine mammal populations and therefore, we do not expect the continued existence of any ESA listed or non-listed species of marine mammal, fish, or sea turtle is not expected to be jeopardized by Option 2 (NMFS 2013; Waring *et al*. 2014). In addition, Option 2 will still require compliance with protected species take reduction plans (i.e., ALWTRP, HPTRP), as well as MSA fishery regulations to restrain fishing effort (e.g., catch limits, DAS allocations, AMs). For these reasons, we expect impacts of Option 2 on non-ESA listed species and ESA listed species to be low negative to neutral. Relative to Option 1, Option 2 could afford slightly more negative impacts to protected species if the full potential of Option 2 is recognized (e.g., increased lands=increased effort=increased protected species interactions).

7.3.2.2 Modification the DAS allocation and/or trip limits in the SFMA

7.3.2.2.1 Option 1: No Action

Option 1 would maintain status quo conditions and therefore, would not increase the trip limit or the DAS allocation in the NFMA. Therefore, no change in fishing effort would be expected under Option 1. Based on this, we do not expect Option 1 (status quo conditions) to introduce

any new risks to protected species that have not already been considered and/or authorized by NMFS to date (NMFS 2013; Waring *et al.* 2014) and expect impacts of Option 1 on non-ESA listed species and ESA listed species to be similar to those described in Section 7.3.1.1.1 (i.e., low negative to neutral impacts). Compared to Option 2, Option 1 would have low negative impacts on protected resources.

7.3.2.2.2 Option 2: Increase DAS Allocation and Trip Limits in the SFMA (*Preferred Alternative*)

Option 2 would increase the DAS allocation and trip limits on a monkfish DAS in the SFMA. Option 2 has the opportunity to increase monkfish landings, however, it is a moderate increase in both effort controls and would not be sufficient to cause a substantial change in fishing behavior or effort in the SFMA.

Based on the information above, fishing effort and distribution is not expected to significantly change from how the fishery currently operates. As Option 2 is not expected to result in any significant changes in fishing behavior in the SFMA, the potential for protected species interactions with (primarily) gillnet or trawl gear and therefore, serious injury or mortality, are not expected to go above and beyond that which has been considered in the fishery to date (NMFS 2013, Waring *et al*. 2014). As a result, we do not expect Option 2 to result in a level of ESA-listed species take above that which has been authorized by NMFS, or result in levels of take that threatens the continued existence of non-ESA listed marine mammal populations and therefore, we do not expect the continued existence of any ESA listed or non-listed species of marine mammal, fish, or sea turtle is not expected to be jeopardized by Option 2 (NMFS 2013; Waring *et al*. 2014). In addition, Option 2 will still require compliance with protected species take reduction plans (i.e., ALWTRP, HPTRP), as well as MSA fishery regulations to restrain fishing effort (e.g., catch limits, DAS allocations, AMs). For these reasons, we expect impacts of Option 2 on non-ESA listed species and ESA listed species to be low negative to neutral. Relative to Option 1, Option 2 could afford slightly more negative impacts to protected species if the full potential of Option 2 is recognized (e.g., increased lands=increased effort=increased protected species interactions).

7.4 Economic Impacts - To be Updated

The realized economic impacts of this action will depend upon, in large part, actual monkfish landings that occur during FY2017-FY2019. Landings of other stocks, including groundfish and skate, along with associated ex-vessel prices, will also factor into realized impacts. The value of monkfish landings realized will depend upon the market category landed, due to price variation among the various market categories, and the volume of monkfish in the market at the time of landing. Table 1.1 presents average ex-vessel prices for monkfish (in terms of both average monkfish price per live pound and average monkfish price per landed pound) across all monkfish market categories during FY2010-FY2015. Average ex-vessel prices across all monkfish market categories are presented in nominal terms (average dollar price during the year the sale took place) and in real terms (using 2015 constant dollars). The GDP Implicit Price Deflator was used to adjust nominal average monkfish prices for inflation, with 2015 as the base time period (US Bureau of Economic Analysis, 2016).

Table 1.1 – Revenue, landings and average monkfish price per pound, FY2010-FY2015.

Fishing Year	Revenue (nominal $)	Landings (live lbs.)	Average Nominal Price per live lb.	Average Real Price per live pound ($2015)	Landings (landed lbs.)	Average Real Price per landed lb.	Average Real Price per landed lb. ($2015)
2010	$19,022,755	16,287,912	$1.17	$1.27	8,341,731	$2.28	$2.48
2011	$28,174,654	21,136,204	$1.33	$1.42	10,940,022	$2.58	$2.74
2012	$20,704,503	19,522,544	$1.06	$1.11	9,795,933	$2.11	$2.21
2013	$16,794,581	19,133,321	$0.88	$0.90	8,921,533	$1.88	$1.94
2014	$18,106,583	19,018,714	$0.95	$0.96	9,365,699	$1.93	$1.95
2015	$18,451,604	19,213,089	$0.96	$0.96	9,353,152	$1.97	$1.97

Notes:
[1] Based on dealer data, for date reported through October 27, 2016.
[2] It is assumed the average ex-vessel price for monkfish does not differ between the NMA and SMA.

The economic impacts analysis below presents, where possible, the projected monkfish landings from each alternative (including the No Action Alternatives for each measure) and a range of associated projected monkfish revenues for each alternative. Projected revenues for each alternative are a function of projected ex-vessel prices for monkfish, as well as monkfish landings. Because it is uncertain how ex-vessel prices may change in response to changes in monkfish landings, the analysis presents a range of projected revenues. The analysis explores two possibilities with respect to the degree to which ex-vessel average price for monkfish will change in response to changes in monkfish landings.

The two possibilities explored in this analysis are that 1) changes in aggregate monkfish landings of the magnitude that the alternatives may result in are not substantial enough to affect ex-vessel average price

for monkfish and 2) changes in aggregate monkfish landings may affect average ex-vessel price for monkfish. Ranges for projected monkfish average prices yield lower and upper bound estimates for projected revenues for alternatives under which monkfish landings are expected to change and where the expected change in monkfish landings can be estimated.

In the development of alternatives for the proposed action, monkfish industry advisors expressed preserving the stability of the monkfish market as a primary concern. This concern included ex-vessel price stability, including avoidance of gluts in the market and the ability to maintain, to the extent possible, continuous and predictable supply of monkfish to dealers. Many industry advisors stated that short term excesses in quantity supplied of monkfish occurred during particular times of the year, causing ex-vessel price to fall during those periods. Monkfish industry advisors expressed consensus that the monkfish market can absorb the limited increases in monkfish landings likely to occur from modest increases in daily landings limits and/or DAS allocations, without impacts on ex-vessel price. Therefore, one possibility explored in this economic analysis is that increased landings that may result from the action alternatives will not affect ex-vessel average price for monkfish. The analysis also considers the possibility that changes in aggregate monkfish landings may affect monkfish ex-vessel price. Lee and Thunberg (2013) estimated the price flexibility for monkfish to be -0.41, which means that ex-vessel price declines -0.41% for every 1% increase in monkfish landings. This analysis projects ex-vessel prices for monkish using this price flexibility for monkfish for alternatives where monkfish landings are expected to change and the change in monkfish landings can estimated.

This economic impacts analysis must be viewed with several caveats in mind. Monkfish is sold both domestically and exported, which means that ex-vessel average price in the U.S. Northeast region and, therefore, economic impacts of the proposed action may be affected by monkfish landings outside of the U.S. The analysis assumes that all other factors that could affect demand (e.g. domestic and international consumer preferences, availability and prices of substitute products) remain constant. In addition, it is assumed that factors such as costs, which could affect monkfish supply, regardless of ex-vessel price for monkfish, are constant.

7.4.1 **Updates to Annual Catch Limits**

7.4.1.1 Revised Annual Catch Limits

7.4.1.1.1 Option 1: No Action

The No Action Alternative would revert to the existing monkfish DAS allocations and landing limits in place, as implemented in FW8 (NEFMC, 2014). In the NMA, daily landings limits would continue to be 1,250 pounds tail weight per DAS for monkfish permit Category A and C vessels and 600 pounds tail weight per DAS for Category B and D vessels. Allocated DAS (excluding the 4 DAS carryover) would continue to be 45 DAS, as in FY2014-FY2016. Total monkfish landings in the NMA for FY2015 were 9.1 million live pounds, or approximately 71% of the overall TAL for the NMA. In the SMA, daily landing limits would continue to be 610 pounds tail weight per DAS for monkfish permit Category A and C vessels and 500 pounds tail weight per DAS for Category B and D vessels. Allocated DAS in the SMA would continue to be 32 DAS (excluding the 4 DAS carryover) in FY2017-FY2019, as they were in FY2014-FY2-16. Total monkfish landings in the SMA for FY2015 were approximately 10.4 million live pounds, or 53% of the overall TAL.

Table 1.2 presents estimated monkfish landings and revenues for both management areas for FY2017 under the No Action Alternative. These estimates should be interpreted with caution, as they rest on several assumptions. The first is the effort and landings remained identical to what they were in FY2015. The second is that the average price per live lb. for monkfish, $0.96 per live lb., will remain

constant in FY2017, which implies that both supply and demand for monkfish remain constant. For Option 1, we do not need to account for the possibility that ex-vessel price may change as a result of a change in monkfish landings, since monkfish landings are expected to remain the same during FY2017-FY2019 under the No Action Alternative.

The No Action Alternative is expected to result in about 9.0 million live lb. of monkfish landings from the NMA in FY2017, based on FY2015 NMA landings. Assuming that the average monkfish prices observed in FY2015 continue into FY2017 ($0.96 per pound when converted to live weight), this would result in monkfish revenues of $8,652,610 during FY2017. The projected total revenue from monkfish for the NMA includes revenue from all monkfish landings from all permit categories.

Similarly, assuming that landings and effort levels remained unchanged from FY2015 in the SMA, the No Action Alternative can be expected to result in about 10.0 million live lb. of monkfish landings from the SMA in FY2017, a 23% increase in monkfish landings in the SMA relative to the No Action Alternative. If the average monkfish prices observed in FY2015 continue into FY2017 ($0.96 per pound when converted to live weight), this would result in monkfish revenues of $9,669,496 during FY 2017.

Table 1.2 Projected total monkfish landings and total monkfish revenues for the NMA and SMA for FY2017 under the No Action Alternative, all permit categories, directed and incidental landings.

Management Area	Projected Monkfish Fishery Landings (live lbs.)	Projected Price per Pound ($2015 per live lb.)	Projected Revenue ($2015)
NMA	9,013,135	$0.96	$8,652,610
SMA	10,072,392	$0.96	$9,669,496
Total	**19,085,527**	$0.96	**$18,786,043**

Table 1.3 breaks down the projected landings and revenue for vessels holding a limited access monkfish permit type. The projected revenue estimates are based on the assumption that average ex-vessel price for monkfish remains at $0.96 per live pound. For the No Action Alternative for FY2017, monkfish landings are assumed to be what they were in FY2015 and other factors are held constant.

Table 1.3 Projected Monkfish Landings and Revenues for FY2017 for vessels holding a limited access monkfish permit, by permit category and management area, under No Action.

Management Area	Landings Type	Cat A/C	Cat B /D/ H	All LA MF Permits
NMA	Directed	1,093,479 $1,049,740	657,654 $631,348	1,751,133 $1,681,088
	Incidental	4,009,656 $3,849,270	2,793,127 $2,681,402	6,802,783 $6,530,672
Sub-total NMA	**NMA LA D&I**	**5,103,135** **$4,899,010**	**3,450,781** **$3,312,750**	**8,553,916** **$8,211,759**
SMA	Directed	3,040,534 $2,918,913	4,825,055 $4,632,053	7,865,589 $7,550,965
	Incidental	897,236 $861,347	430,837 $413,604	1,328,073 $1,274,950
Sub-total SMA	**SMA LA D&I**	**3,937,770** **$3,780,259**	**5,255,892** **$5,045,656**	**9,193,662** **$8,825,916**
Total (NMA & SMA)	**Total MF Landings by LA Fleet**	**9,040,905** **$8,679,269**	**8,706,673** **$8,358,406**	**17,747,578** **$17,037,675**

Notes:
[1] Monkfish landings are in live pounds.
[2] Monkfish revenues are in real 2015 dollars.
[3] Projected monkfish revenues are based on a projected average monkfish price of $0.96 per live pound in real 2015 dollars.

Table 1.4 presents projected landings and revenue for vessels that hold either a Category E (open access or incidental catch monkfish permit) or are state-permitted vessels only. Monkfish landings by these vessels are expected to remain what they were in FY2015 for FY2017.

Table 1.4 Projected Monkfish Landings and Monkfish Revenues for FY2017 for vessels with a Cat E monkfish permit and state-permitted only vessels, by management area.

Management Area	Cat E & State
NMA	459,219 $440,850
SMA	878,730 $843,581
Total (NMA & SMA)	**1,337,949** **$1,284,431**

Notes:
[1] Monkfish landings are in live pounds.
[2] Monkfish revenues are in real 2015 dollars.
[3] Projected monkfish revenues are based on a projected average monkfish price of $0.96 per live pound in real 2015 dollars.

Table 1.5 summarizes projected total monkfish revenue from all monkfish landings for the entire FY2017-FY2019 period (the total over 3 years) under the No Action Alternative. Again, these projections assume that monkfish landings in each management area remain what they were in FY2015, and that the average price of monkfish per pound remains what it was in FY2015. Since landings are not expected to change during FY2017-FY2019 under the No Action Alternative and the analysis holds all other factors constant, we do not expect ex-vessel average price for monkfish to change from what it was in FY2015.

Table 1.5 Projected total monkfish landings and total monkfish revenues for the NMA and SMA for FY2017-FY2019 under the No Action Alternative, assuming no price change.

Management Area	Projected Total Monkfish Landings (live lbs.), FY2017-FY2019	Projected Average Price per pound for monkfish ($2015 per live lb.) FY2017-FY2019	Total Projected Monkfish Revenue ($2015) FY2017-FY2019
NMA	27,039,405	$0.96	$25,957,829
SMA	30,217,176	$0.96	$29,008,489
Total	**57,256,581**		**$54,966,318**

The monkfish fishery is not expected to reach its TAL for FY2017-FY2019 under the No Action Alternative. However, to inform understanding of economic impacts *if* the fishery were to approach its TALs in both management areas under No Action, Table 1.6 and Table 1.7 summarize maximum potential monkfish landings and monkfish revenues under the No Action Alternative under two possible scenarios for ex-vessel average price for monkfish. Note that neither Table 1.6 or Table 1.7 takes into account the likely increase in costs that would occur if the fishery reaches its TALs over FY2017-FY2019. Therefore, Table 1.6 and Table 1.7 summarize maximum potential monkfish landings and maximum potential monkfish revenues based on the FY2017-FY2019 TALs under the No Action

Alternative, but provide no information about what the impact of reaching the TAL would be for the profitability of monkfish vessels. Monkfish vessels would not benefit from reaching the fishery's TALs if they could not operate profitably, i.e. if the additional costs associated with landing monkfish beyond a certain level exceed the benefits (increases in monkfish revenue) of doing so.

Table 1.6 summarizes the maximum potential monkfish landings and maximum potential monkfish revenue that could occur for FY2017-FY2019 under the No Action Alternative, i.e. under the existing TALs for the NMA (5,854mt per year) and the SMA (8,925mt per year), assuming that there was no effect on average monkfish price.

Table 1.6 Maximum potential total monkfish landings and total monkfish revenues for the NMA and SMA for FY2017-FY2019 under the No Action Alternative, assuming no price change.

Management Area	Maximum Potential Total Monkfish Landings (live lbs.), FY2017-FY2019	Projected Average Price per pound for monkfish ($2015 per live lb.)	Maximum Potential Monkfish Revenue ($2015), FY2017-FY2019
NMA	38,717,589	$0.96	$37,168,886
SMA	59,028,781	$0.96	$56,667,630
Total	**97,746,370**		**$93,836,515**

Alternatively, the average ex-vessel price for monkfish could decline if the fishery approaches its TALs for each area in FY2017-FY2019. Projected average ex-vessel price for monkfish is estimated using the price flexibility estimate for monkfish of -0.41 (Lee and Thunberg, 2013). If this were to occur, then Table 1.7 represents the maximum potential total monkfish landings and revenues for the NMA and SMA.

Table 1.7 Maximum potential total monkfish landings and total monkfish revenues for NMA and SMA for FY2017-FY2019 under the No Action Alternative, assuming price flexibility = -0.41.

Management Area	Maximum Potential Total Monkfish Landings (live lbs.), FY2017-FY2019	Projected Average Price per pound for monkfish ($2015 per live lb.)	Maximum Potential Monkfish Revenue ($2015), FY2017-FY2019
NMA	38,717,589	$0.79	$30,586,895
SMA	59,028,781	$0.79	$46,632,737
Total	**97,746,370**		**$77,219,632**

Table 1.8 illustrates the difference in maximum potential monkfish revenue for FY2017-FY2019 under the No Action Alternative (assuming the TALs for both areas can be landed and sold) and the projected monkfish revenue assuming no change in landings during FY2017-FY2019 as compared to FY2015. Again, note that Table 1.8 only shows differences in maximum potential monkfish revenue, and does not provide any information on differences in profitability. Note also that the differences in monkfish revenue depend upon what the impacts of increased monkfish landings would be on average ex-vessel price for monkfish.

Table 1.8 Difference between projected total monkfish landings and revenue, and maximum potential total monkfish landings and revenue, for the NMA and SMA, for FY2017-FY2019, under the No Action Alternative, depending upon price effects.

Management Area	Projected - Maximum Monkfish Landings (live lbs.)	Projected Maximum Monkfish Revenue under average price of $0.79/live lb.	Projected Maximum Monkfish Revenue under average price of $0.96/ live lb.
NMA	-11,678,184	-$4,629,067	-$11,211,057
SMA	-28,811,605	-$17,624,248	-$27,659,141
Total	**-40,489,789**	**-$22,253,315**	**-$38,870,197**

As noted earlier, the realized impacts of the No Action Alternative are difficult to predict, and may differ between the various segments of the monkfish fishery. Overall, it is likely that the No Action Alternative itself will not affect fishing operations; other factors including the availability of fishing opportunities in other fisheries will more directly affect fishing operations and, therefore, resulting monkfish landings. In particular, the capacity of groundfish vessels to catch available groundfish without exceeding their groundfish ACE (for sectors) or trimester (for non-sectors) for any stock before the end of the fishing year will most directly affect resulting monkfish landings in the NMA. If groundfish vessels can avoid exceeding their ACE or trimester TACs, then monkfish landings may increase towards the FY2017-FY2019 NMA monkfish TAL, possibly resulting in greater monkfish revenues for vessels that primarily target groundfish. In addition, industry advisors have expressed concerns about the squid fishery's impact on the monkfish fishery. Concerns include possible re-direction of effort from squid to monkfish if the skate fishery were to close down.

7.4.1.1.2 Option 2: Updated Discard Rate for Northern and Southern Fishery Management Areas

Option 2 would maintain the ACL, the management uncertainty buffer and ACT for both management areas as set in FW8 (NEFMC, 2014), but would use the information from the 2016 operational assessment to update the discard rate for both management areas. As a result, the TALs for both the NMA and SMA would decrease under Option 2. In the NMA, Option 2 would change the discard rate from -10.9% to -13.9%. Total allowable landings would decrease from 5,854mt to 5,652mt (-202mt or -445,318 live pounds) for the NMA. In the SMA, Option 2 would change the discard rate from -22.5% to -24.6%. Total allowable landings in the SMA would decrease from 8,925mt to 8,686mt (-239mt or -526,882 live pounds).

The economic impacts of Option 2 relative to the No Action Alternative are possibly low negative, but likely neutral. For both the NMA and the SMA, the decrease in the TAL is modest. TALs for each area under the No Action Alternative to not appear to be constraining landings in either the NMA or SMA; total landings of monkfish are not bumping up against the existing TALs. Over FY2010-2016, the average percent of the NMA TAL landed was 63%. For the same time period, the average percent of the SMA TAL landed was 64%. Therefore, it is unlikely that TAL reductions of 202mt (-445,318 live pounds) for the NMA and 239mt (-526,882 live pounds) for the SMA would adversely affect monkfish revenues relative to the No Action Alternative. If monkfish landings in FY2017-FY2019 differed substantially from FY2014-FY2016, such that the fishery came very close to landing the TALs during FY2017-FY2019, it is possible that Option 2 could result in lower monkfish revenues than the No Action Alternative, since Option 2 lowers the TALs for both management areas relative to the No Action

Alternative. The degree to which monkfish revenues would decrease would depend on whether average monkfish price remained constant. However, this is very unlikely to happen since there is no expectation that the fishery will bump against either the TALs under the No Action Alternative or the slightly lower TALs that would be established by Option 2.

7.4.1.1.3 Option 3: Reduce the Management Uncertainty Buffer to 3% in the Northern Fishery Management Area (*Preferred Alternative*)

Option 3 would reduce the management uncertainty buffer in the NMA to 3%. The ACL and ABC for the NMA would remain at 7,592mt. It should be noted that Option 3 is inclusive of Option 2, which means that the management uncertainty buffer could be reduced relative to the No Action Alternative *and* the estimated discard rate would be changed from -10.9% under the No Action Alternative to -13.9% under Option 2. The TAL for the NMA would increase to 6,338mt (13,972,901 live lbs.) if Options 2 and 3 were both implemented, compared to 5,854mt (12,905,863 live lbs.) under the No Action Alternative (+ 1,067,038 live lbs.).

The economic impacts of Option 3 (assuming implementation with Option 2) relative to the No Action Alternative are likely to be neutral to possibly low positive for those landing monkfish in the NMA. The existing NMA TAL does not appear to be constraining landings in the NMA. Therefore, we would not expect substantial increases in NMA landings from implementation of Option 3 (along with Option 2). Since we do not expect substantial increases in landings, we do not expect any change in average ex-vessel price for monkfish, all else held constant. Therefore, Option 3 is expected to have minimal positive impact, if any, on monkfish revenues for those landing monkfish in the NMA. Any positive impacts on monkfish revenues from the NMA TAL increase of +484mt would occur only if the TAL under the No Action Alternative were constraining to monkfish fishing in the NMA.

In the unlikely event that vessels were able to land and sell the additional the 484mt (1,067,038 live lbs.), at the FY2015 average price of monkfish per live pound ($0.96 per live pound), the increase in monkfish revenue per year would be $1,024,356 in FY2017 or $3,073,068 over FY2017-FY2019. This additional revenue would accrue to vessels landings monkfish in the NMA. Although we would not expect to see a change in average monkfish price from implementation of Option 3 (along with Option 2), if price decreased in response to increased landings, the economic benefit to monkfish vessels would be lower. Any increases in monkfish revenue would not necessarily translate into increased profit to monkfish vessels; realized changes in profit would depend not only on the effect of increased monkfish landings on average ex-vessel price for monkfish, but also on the costs associated with harvesting nearly all of the FY2017-FY2019 TAL for the NMA.

7.4.1.1.4 Option 4: Reduce the Management Uncertainty Buffer to 3% in the Southern Fishery Management Area (*Preferred Alternative*)

Option 4 would reduce the management uncertainty buffer in the SMA to 3%. The ACL and ABC for the SMA would remain at 12,316mt. It should be noted that Option 4 is inclusive of Option 2, which means that the management uncertainty buffer could be reduced relative to the No Action Alternative *and* the estimated discard rate would be changed from -22.5% under the No Action Alternative to -24.6% under Option 2. The TAL for the SMA would increase to 9,011mt (19,865.858 live lbs.) if both Options 2 and 4 were implemented, compared to 8,925mt (19,676,260 live lbs.) under the No Action Alternative (+86mt or +189,598 live lbs.).

The economic impacts of Option 4 (assuming implementation with Option 2) relative to the No Action Alternative are likely to be neutral to possibly slightly low positive for those landing monkfish in the SMA. The existing SMA TAL does not appear to be constraining overall landings in the SMA. Therefore, we would not expect substantial increases in SMA landings from implementation of Option 3 (along with Option 2). Since we do not expect substantial increases in landings, we do not expect any change in average monkfish price, all else held constant. Therefore, Option 4 is expected to have minimal positive impact, if any, on monkfish revenues for those landing monkfish in the SMA. Any positive impacts from the SMA TAL increase of +86mt would occur only if the TAL under the No Action Alternative were constraining monkfish fishing in the SMA.

In the unlikely event that vessels were able to land and sell the additional 84mt (189,598 live lbs.), at the FY2015 average price of monkfish per live lb. ($0.96 per live lb.), the increase in monkfish revenue per year would be $182,014 in FY2017 or $546,041 over FY2017-FY2019. This additional revenue would accrue to vessels landings monkfish in the SMA. Although we would not expect to see a change in average monkfish price from implementation of Option 4 (along with Option 2), if price decreased in response to increased landings, the increases in monkfish revenue would be even lower. In addition, any increases in monkfish revenue would not necessarily translate into increased profit to monkfish vessels fishing in the SMA; realized changes in profit would depend not only on the effect of increased monkfish landings on average ex-vessel price for monkfish, but also on the costs associated with harvesting nearly all of the FY2017-FY2019 TAL for the SMA.

7.4.1.2 Modifications to Current Monkfish Days-at-Sea and Trip Limits

The economic impacts analysis presented below follows from the daily landings limit and days at sea (DAS) allocation analysis presented in X.X (Hermsen, 2016). The objective of this analysis was to examine daily landings limits and DAS allocations under status quo TAL limits for both the NMA and SMA, and under TALs for those alternatives which lower the uncertainty management buffer and adjust the discard rates (these alternatives are discussed above in 1.1.1.1). The daily landings limit (trip limit) and DAS allocation analysis was conducted based on three assumptions, which must be kept in mind when considering the economic impacts analysis of modifications to the DAS allocation and/or daily landings limits. The assumptions are:

- Monkfish landings from monkfish permit category E (open access or incidental catch permit) and state-only permitted vessels will be exactly the same (in terms of live pounds landed) in FY2017-FY2019 as they were in FY2015. In the NMA, FY2015 monkfish landings by permit category and state-permitted vessels were 459,219 live pounds. For the SMA, FY2015 monkfish landings by these vessels totaled 878,730 live pounds.

- Monkfish landings and effort on trips in FY2017-FY2019 by limited access vessels on non-directed (incidental) monkfish trips will be equal to what they were in FY2015.

- Fishing and landings patterns will be similar in FY2017-FY2019 to those observed in FY2015.

The assumption of this approach is that any increases in landings due to changes in daily landings limits and/or DAS allocations will occur proportionately over all vessels that land monkfish in the management area and have a permit to which a given alternative applies. While it is likely that there would heterogeneity in vessels that land monkfish in response to the

proposed alternatives due to factors such as vessel-level preferences, costs and available alternatives to monkfish fishing, we cannot make other assumptions about the distribution of possible increased monkfish landings without conducting a vessel-level analysis.

This action would only revise monkfish DAS allocations and landing limits applicable to vessels that hold a limited access monkfish permit; therefore, the following analysis focuses on those entities (monkfish permit category A, B, C, D and H vessels). Estimated monkfish landings from Category E monkfish and state-only permitted vessels are assumed to remain what they were in FY2015 through FY2017-FY2019. However, because under all alternatives other than the No Action Alternatives, limited access vessels would be able to land more monkfish, changes in revenue for all vessels landing monkfish may occur if changes in directed landings by limited access vessel affect ex-vessel average price for monkfish. Therefore, it is possible that Category E and state-permitted monkfish vessels landing incidental amounts of monkfish may experience changes in their monkfish revenue due to price effects.

7.4.1.2.1 Modify the DAS allocation and/or trip limits in the NFMA

7.4.1.2.1.1 Option 1: No Action

Under the No Action Alternative, existing daily landing limits and DAS allocations would remain unchanged from those specified in FW8. In the NMA, daily landings limits would continue to be 1,250 pounds tail weight per DAS for monkfish permit Category A and C vessels and 600 pounds tail weight per DAS for Category B and D vessels. Allocated DAS (excluding the 4 DAS carryover) would continue to be 45 DAS, as in FY2014-FY2016. Total monkfish landings in the NMA for FY2015 were 9.1 million live pounds, or approximately 71% of the overall TAL for the NMA. If there are no changes to the status quo estimated discard rate and management uncertainty buffer for the NMA, economic impacts from the No Action Alternative would be neutral, as described in Section 1.1.1.1.1.

If the discard rate for the NMA is updated as described in Section 1.1.1.2, without changes to daily landing limits or DAS allocations, economic impacts will be similar to those described in that section. If the management uncertainty buffer is reduced for the NMA to 3.0%, as described in Section 1.1.1.1.3, the economic impacts of the No Action Alternative for modifying daily landings limits and/or DAS allocations will be similar to those described in that section.

For the following two options to the No Action Alternative, it should be noted that more than one option could be selected, i.e. Option 2 and 3 could both be implemented.

7.4.1.2.1.2 Option 2: Increase the incidental trip limit in the NMA (*Preferred Alternative*)

Option 2 would maintain the status quo DAS allocations in the NMA, but would increase the NMA trip limits. Incidental landing limits when on a NE multispecies DAS would increase to 1,500 (or 900) lb. tail weight/DAS for category C vessels and 1,250 (or 750) lb. tail weight/DAS for category D vessels. Incidental landing limits would remain at 25% of landings onboard, not to exceed 300 lb. tail weight for permit category E, F, or H, when fishing on a NE multispecies DAS.

Under Option **2**, several possibilities were analyzed in the DAS allocation and daily landings limits analysis (Hermsen, 2016). These were:

- Alternative 1: Assuming a status quo management uncertainty buffer of 13.5%, increase the NMA daily landing limits of monkfish tail weight per DAS to levels that might provide flexibility

to increase monkfish landings and reduce discards, but at which the directed fishery's FY2017 TAL in the NMA would not be exceeded.

- Alternative 2: Assuming an updated management uncertainty buffer of 3.0%, increase the NMA daily landing limits of monkfish tail weight per DAS to levels that might provide flexibility to increase monkfish landings and reduce discards, but at which the directed fishery's FY2017 TAL in the NMA would not be exceeded.

- Alternative 3: Assuming a status quo management uncertainty buffer of 13.5%, increase the incidental daily landing limits to 900 lbs. t.w. per DAS for monkfish permit category C vessels and to 750 lbs. t.w. per DAS for monkfish permit category D vessels.
- Alternative 4: Assuming an updated management uncertainty buffer of 3.0%, increase the incidental daily landing limits to 900 lbs. t.w. per DAS for monkfish permit category C vessels and to 750 lbs. t.w. per DAS for monkfish permit category D vessels.

- Alternative 5: Assuming a status quo management uncertainty buffer of 13.5%, increase the incidental daily landing limits to 1500 lbs. t.w. per DAS for monkfish permit category C vessels and to 1250 lbs. t.w. per DAS for monkfish permit category D vessels.
- Alternative 6: Assuming an updated management uncertainty buffer of 3.0%, increase the incidental daily landing limits to 1500 lbs. t.w. per DAS for monkfish permit category C vessels and to 1250 lbs. t.w. per DAS for monkfish permit category D vessels.

There is limited evidence that the current daily landing limits are constraining for most vessels engaged in directed monkfishing in the NMA, although a few vessels may benefit from increased daily landing limits. The analysis indicated that monkfish vessels with monkfish permits in Category A and C rarely landed greater than 1,250 lbs. tail weight on a DAS in the NMA during FY2015 (Hermsen, 2016, Figure 3). The total number of DAS in FY2015 where Category A and C vessels exceeded the existing daily landing limit was 21 DAS. There is more evidence to support the possibility that monkfish vessels with monkfish permits in Category B and Category D might find the status quo daily landing limit of 600 lbs. tail weight per DAS constraining (Hermsen, 2016, Figure 4). The total number of DAS in FY2015 where Category A and C vessels exceeded the existing daily landing limit was 31 DAS. In addition, there were 58 DAS during FY2015 where exactly 600 lbs. tail weight of monkfish were landed. For those limited access monkfish vessels that bumped up against or exceeded the daily landing limit for their permit categories, there may be some economic benefit to increases in daily landings limits (Alternatives 1 and 2 above). These benefits would come in the form of possible increases in monkfish revenues for these vessels. The extent to which monkfish revenues will increase would depend on how much the daily limits were increased, how much of the increased landing limit could actually be caught and sold, and what, if any, impact increased landings would have on average monkfish price. In addition, there may be efficiency gains due to decreases in monkfish discards that may be occurring on vessels that are bumping up against the existing daily landings limits.

The status quo incidental trip limits established in FW8 did not appear to be constraining for most vessels with monkfish permits in Categories C and D in FY2015 (Hermsen, 2016, Figure 9). It is expected that any increases in the incidental trip limit would impact whether or not vessels will use directed monkfish DAS in the NMA. The analysis suggests that higher incidental trip limits (900lbs. t.w. per DAS or 1500 lbs. t.w. per DAS) for monkfish permit

Category C vessels would likely mean that the majority of directed landings by Category C vessels would become incidental landings under Option 3 (Hermsen, 2016, Figure 3). The analysis also suggests that for Category D vessels, all of the directed activity by these vessels would become incidental if the incidental trip limit were to increase to 750 lbs. t.w. per DAS or 1250 lbs. t.w. per DAS (Hermsen, 2016, Figure 4). Landings are not expected to change under Alternatives 3-6, which means that there would likely be no change in average monkfish price or monkfish revenues. These alternatives may be attractive in that they would eliminate the need to declare a monkfish DAS for B and D vessels fishing in the NMA. Currently, most allocated monkfish DAS in the NMA go unused, and Alternatives 3-6 would likely reduce allocated DAS usage even further.

Overall economic impacts from Option **2** are expected to be neutral to possibly low positive. Any positive economic impacts from Alternatives 1-2 would likely accrue to those Category B and Category D permitted vessels that currently bump up against or exceed the existing daily landings limits while using a monkfish DAS, assuming no changes in the incidental trip limits for B and D vessels.

7.4.1.2.2 Modify the DAS allocation and/or trip limits in the SFMA

In considering the economic impact analysis for this section, note that more than one option could be selected, i.e. Options 2 and 3 could both be implemented.

1.1.1.2.2.1 Option 1: No Action

Under the No Action Alternative, existing daily landing limits and DAS allocations would remain unchanged from those specified in FW8. In the SMA, daily landing limits would continue to be 610 pounds tail weight per DAS for monkfish permit Category A and C vessels and 500 pounds tail weight per DAS for Category B and D vessels. Allocated DAS would be 32 DAS (excluding the 4 DAS carryover) in FY2017-FY2019, as they were in FY2014-FY2016. The incidental landing limit would continue to be 300 lbs. tail weight per DAS. Total monkfish landings in the SMA for FY2015 were approximately 10.4 million live pounds, or 53% of the overall TAL. Compared to the NMA, a higher percentage of monkfish landings in the SMA come from directed activity.

If there are no changes to the status quo estimated discard rate and management uncertainty buffer, economic impacts from the No Action Alternative would be neutral, as described in Section 1.1.1.1.1.

If the discard rate for the SMA is updated as described in Section 1.1.1.2, the combined economic impacts of the updated discard rates, without changes to daily landing limits or DAS allocations, will be similar to those described in that section. If the management uncertainty buffer is reduced for the SMA as described in Section 1.1.1.1.4, the economic impacts of no action for modifying daily landings limits and/or DAS allocations in the SMA to 3% will be similar to those described in that section.

7.4.1.2.2.1 Option 2: Increase the DAS allocation in the SMA

Option 2 would maintain the status quo daily landings limits in the SMA but would increase the SMA DAS allocation from its existing level of 32 DAS by 15% to 37 DAS (+ 5 DAS). Incidental landing limits would remain at 50 lb. tail weight per DAS for permit Category E, F, or H non-trawl vessels, 300 lb. tail weight for permit Category E, F, or H trawl vessels, 600 lb. tail weight per DAS for Category C permits, and 500 lb. tail weight per DAS for Category D permits when fishing on a NE multispecies DAS.

Allocated monkfish DAS and daily landing limits are more constraining in the SMA than in the NMA. The DAS allocation and daily landings limits for the SMA demonstrates that some vessels in the SMA are using nearly all their allocated DAS in the SMA (Hermsen, 2016, Figure 2).

The objective of increasing DAS allocated in the SMA is to allow increased ability to harvest monkfish (to increase landings up towards the TAL for the SMA), but do so in a modest way to avoid large increases in monkfish landings and possible negative effect on monkfish price. Because of the desire to maintain market stability in terms of price and continuous supply of monkfish, this economic impacts analysis does not include analysis for the impact of increasing allocated DAS to a point where the entire directed fishery FY2017 TAL might be harvested. Monkfish industry advisors expressed consensus that the market could absorb modest increases in allocated DAS and daily landings limits the SMA without a negative effect (decrease) in ex-vessel price for monkfish.

<u>Economic impacts under the assumption that the management uncertainty buffer for the SMA remains at 22.5%</u>

Total monkfish landings are projected to increase in the SMA in FY2017, compared to the No Action Alternative, from 9.1 million live lbs. to **XX** million live lbs., an increase of +**Y** live lbs. or **Z.Z**%. Projected monkfish revenues can be estimated for Option 2 in the SMA. The impacts of an increase in monkfish landings in the SMA will depend upon the effect increased landings have on monkfish price, if any. Upper and lower bounds for projected monkfish revenues for Option 2 are estimated using two assumptions: 1) that increased monkfish landings in the SMA will have no effect on average monkfish price (average monkfish price remains at $0.96 per live lb.) and 2) that increased monkfish landings in the SMA will result in decreases in average monkfish price according to the price flexibility estimate of -0.41.

If the flexibility to take longer trips or more trips allows these vessels to increase net revenue (i.e. if gross revenues exceed the costs associated with the longer or additional trips), these vessels would benefit from increases in profitability, assuming average monkfish price and other market conditions remain stable during FY2017-FY2019. However, it is also possible that if vessels fishing in the SMA opt to take more trips or longer trips because of Option 2, their variable (trip-related) costs could increase. This may result in decreased profitability for a vessel if it cannot offset the increases in cost with increases in revenue from sales of fish, although it seems unlikely that a monkfish vessel would choose to extend a trip or take additional trips if these actions were not expected to be profitable.

<u>Economic impacts under the assumption that the management uncertainty buffer for the SMA is updated to 3.0%</u>

7.4.1.2.2.2 Option 3: Increase the daily landings (trip) limits in the SMA

Option 3 would maintain the status quo DAS allocations in the SFMA, but would increase the SFMA DAS trip limits by 15%. Trip limits for permit categories A and C would increase to 700 lbs. tail weight per DAS, for permit category B and D vessels and 575 lbs. tail weight per DAS, depending on the management uncertainty buffer. Incidental landing limits would remain at 50 lbs. for category E or H permits and non-trawl category C, D, or F permits, and at 300 lbs. for trawl category C, D, or F permits.

Economic impacts under the assumption that the management uncertainty buffer for the SMA remains at 22.5%

Economic impacts under the assumption that the management uncertainty buffer for the SMA is updated to 3.0%

Combined Economic Impacts from Option 2 (15% increase the DAS allocation) and Option 3 15% (increase the daily landings limits) in the SMA

Total monkfish landings in the SMA are expected to be the same in FY2017-FY2019 regardless of whether the management uncertainty buffer for the SMA remains at the status quo level of 6.5% or reduces to 3.0%. Assuming that the modest increase of 15% for both allocated DAS and daily landings limits in the SMA does not impact average ex-vessel price for monkfish, Table 1.X contains the projected monkfish landings and monkfish revenues for FY2017. Estimated monkfish landings in the SMA if Options 2 and 3 are implemented are about 12.3 million live pounds and estimated monkfish revenues are just under $11.8 million. This would represent an upper bound estimate of monkfish revenues for FY2017.

Table 1.X - Projected Monkfish Landings and Monkfish Revenues for FY2017 under Option 2 (15% increase in daily landings limits in the SMA) and Option 3 (15% increase in allocated DAS in the SMA), assuming no price change.

Management Area	**Projected Monkfish Fishery Landings (live lbs.)**	**Projected Price Per Live Lb. ($2015)**	**Projected Revenue ($2015)**
SMA	12,345,092	$0.96	$11,851,288

A lower bound estimate for monkfish revenues in the SMA in FY2017 is obtained by applying the price flexibility estimate for monkfish of -0.41. This information is presented in Table 1.Y.

Table 1.Y - Projected Monkfish Landings and Monkfish Revenues for FY2017 under Option 2 (15% increase in daily landings limits in the SMA) and Option 3 (15% increase in allocated DAS in the SMA), assuming price flexibility = -0.41.

Management Area	Projected Monkfish Fishery Landings (live lbs.)	Projected Price Per Live Lb. ($2015)	Projected Revenue ($2015)
SMA	12,345,092	$0.91	$11,234,034

The range of projected monkfish revenues in the SMA for FY2017 if Option 2 and Option 3 were implemented together is $11,234,034 to $11, 851,288 ($2015). Note that projected monkfish landings in the SMA if Options 2 and 3 were implanted together are expected to remain the same throughout FY2017-FY2019. Table 1.Z summarizes total monkfish landings and total monkfish revenues over the three year period.

Table 1.Z - Projected Total Monkfish Landings and Total Monkfish Revenues for FY2017-FY2019 under Option 2 (15% increase in allocated DAS in the SMA) and Option 3 (15% increase in daily landings limits in the SMA), with no price effect and with a price effect with price flexibility = -0.41.

Management Area	Projected Monkfish Fishery Landings (live lbs.)	Projected Price with Price Effect ($2015 per live lb.)	Projected Price with No Price Effect ($2015 per live lb.)	Lower Bound Projected Monkfish Revenue ($2015)	Upper Bound Projected Monkfish Revenue ($2015)
SMA	37,035,276	$0.91	$0.96	$33,702,101	$35,553,865

Overall, the economic impacts of implementing Options 2 and 3 together, with 15% increases in both daily landings limits and allocated DAS, are expected to be low positive to positive. The expected increase in total monkfish revenue over FY2017-FY2019 under Options 2 and 3, relative to the No Action Alternative, is $4.7 million to nearly $6.6 million (or 16.2% to 22.8%) depending on price effect. If this increase in monkfish landings (approximately +23%) can be attained without significant increases in costs, we would expect increases in economic benefit (increased profitability) for directed monkfish vessels fishing in the SMA relative to the No Action Alternative. Vessels that land monkfish only incidentally in the SMA may be slightly negatively impacted if their landings remain constant into FY2017-FY2019 from FY2015, because it is possible that the increase in directed landings will have a negative effect on average ex-vessel monkfish price. However, these impacts would likely be small and

outweighed by the positive economic impacts that would be expected to occur if Options 2 and 3 were implemented together with the modest 15% increase in daily landings limits and DAS allocations.

7.5 Social Impacts – To be Written

7.5.1 Updates to Annual Catch Limits

7.5.2 Revised Annual Catch Limits

7.5.2.1 Option 1: No Action

7.5.2.2 Option 2: Updated Discard Rate for Northern and Southern Fishery Management Areas

7.5.2.3 Option 3: Reduce the Management Uncertainty Buffer to 3% in the Northern Fishery Management Area (*Preferred Alternative*)

7.5.2.4 Option 4: Reduce the Management Uncertainty Buffer to 3% in the Southern Fishery Management Area (*Preferred Alternative*)

7.5.3 Modifications to Current Monkfish Days-at-Sea and Trip Limits

7.5.3.1 Modify the DAS allocation and/or trip limits in the NFMA

7.5.3.1.1 Option 1: No Action

7.5.3.1.2 Option 2: Increase the trip limits in the NFMA (*Preferred Alternative*)

7.5.4 Modify the DAS allocation and/or trip limits in the SFMA

7.5.4.1 Option 1: No Action

7.5.4.2 Option 2: Increase the DAS Allocation and Trip Limits in the SFMA (*Preferred Alternative*)