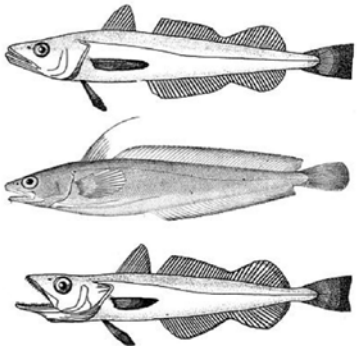
Northeast Multispecies Fishery Management Plan

Fishing Years 2021-2023 Small-Mesh Fishery Specifications

Including an Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Analysis,



Final Submission

October 13, 2021

Prepared by the

New England Fishery Management Council

In consultation with the

National Marine Fisheries Service

Document history

Final Meeting:	January 26-28, 2021
Preliminary Submission:	April 9, 2021
Final Submission:	June 29, 2021
Final resubmitted:	October 13, 2021

FISHING YEARS 2021-2023 SMALL-MESH FISHERY SPECIFICATIONS FOR THE NORTHEAST MULTISPECIES FISHERY MANAGEMENT PLAN

Proposed Action: Updated fishery specifications for FY 2021 - FY 2023 with corresponding management measures

Responsible Agencies:

New England Fishery Management Council
50 Water Street, Mill #2
Newburyport, MA 01950

National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
Washington, D.C. 20235

For Further Information:

Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill #2
Newburyport, Massachusetts 01950
Phone: (978) 465-0492
Fax: (978) 465-3116

Abstract:

The New England Fishery Management Council, in consultation with NOAA's National Marine Fisheries Service, has prepared a Specifications Document for the Multispecies Fishery Management Plan (Small-Mesh), which includes an environmental assessment that presents the range of alternatives to achieve the goals and objectives of the action. The proposed action focuses on adjustments to annual specifications, accountability measures, and possession limits. The document describes the affected environment and valued ecosystem components and analyzes the impacts of the alternatives on both. It addresses the requirements of the Magnuson Stevens Fishery Conservation and Management Act, the National Environmental Policy Act, the Regulatory Flexibility Act, and other applicable laws.

1.0 EXECUTIVE SUMMARY

Purpose and Need

The purpose of the 2021 to 2023 Specifications Document is to set or adjust fishing year specifications for four small-mesh multispecies stocks. This document and the recommended specifications incorporate the results of new September 2020 stock assessments that analyzed stock trends through 2019. The need for this action is to prevent overfishing, ensure rebuilding of southern red hake, and help achieve optimum yield in the small-mesh multispecies fishery, consistent with the status of stocks and the requirements of the Magnuson-Stevens Fishery Conservation and Management Act, and the Northeast Multispecies Fishery Management Plan (FMP).

This Environmental Assessment (EA) also contains information and supporting analyses required under other applicable law, including the National Environmental Policy Act (NEPA) and Regulatory Flexibility Act (RFA). This EA updates the previously approved Amendment 19 to the Northeast Multispecies FMP Environmental Impact Statement (NEFMC 2013) which established the catch management framework and overfishing definitions for the four stocks in the fishery.

This EA is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated before the effective date of the 2020 CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. This review began before the effective date and the agency has decided to proceed under the 1978 regulations.

Preferred Alternative

The New England Fishery Management Council (Council) recommends three preferred alternatives to the National Marine Fisheries Service (NMFS) under this Proposed Action. If approved by NOAA fisheries, the preferred alternatives would adjust three types of specifications, as follows:

A. Annual Catch Specifications for four stocks, including an Overfishing Limit (OFL), an Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL), a Total Allowable Landings (TAL), and a TAL trigger (Section 4.1.2).

   The proposed action would set these specifications as shown in the following table. Option B (Section 4.1.2.2) would reduce the southern red hake specifications to 75% of the SSC's recommendation to enhance rebuilding prospects and be consistent with Framework 62 measures. The specification table below also includes the effect of the preferred TAL trigger adjustment for northern red hake (Section 4.2.2), as well as Option B southern red hake specifications.

Table 1. Updated specifications for fishing years 2021-2023.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)
Northern silver hake	39,930	20,410	19,387	17,457	15,711	90%
Southern whiting[1]	72,160	40,990	38,941	28,742	25,868	90%
Northern red hake	NA	3,452	3,278	1,405	1,265	90%
Southern red hake	NA	1,505	1,429	422	173	41%

B. Resetting the northern red hake TAL trigger to the original 90% of the TAL.
After the large 2014 year-class entered the fishery, catches of northern red hake have been well below specifications. Catch has not exceeded the ACL since 2016, the low TAL trigger (in-season AM) appears to be unnecessary at present to prevent overfishing. This measure would reset the TAL trigger to its original 90% value (Section 4.2.2). The post-season AM that would be triggered when the catch exceeds 105% of the ACL would remain in effect. This measure is intended to reduce northern red hake discarding and allow the fishery to land more of its northern red hake catch, increasing revenue.

C. An adjustment to whiting possession limits for trips fishing with less than 3-inch mesh trawls.
This preferred alternative (Section 4.3.3) would increase the northern silver hake and southern whiting possession limit to 15,000 lbs. on trips fishing with smaller than 3-inch mesh trawls. Nets with mesh less than 3-inches are often used to target other species such as squid and herring, thus this measure is intended to reduce regulatory discards of whiting which are otherwise caught as bycatch. The measure is not intended to increase fishing that targets silver hake and whiting with smaller than 3-inch mesh, which would otherwise reduce yield-per-recruit and potentially reduce recruitment potential.

Summary of Impacts of the Proposed Action

The direct and indirect impacts on the five Valuable Environmental Components (VECs) (described in Section 5.0) are assessed in Section 6.0 and summarized in Table 2. A brief summary of these potential impacts is given below.

Target species

The status of northern silver hake and southern whiting is that the stocks are not overfished and overfishing is not occurring. The status of red hake stocks is unknown but fishing at current low exploitation rates is an unlikely driver of changes in biomass, according to the management track assessment. However, the Council submitted Framework 62 to rebuild the southern red hake biomass because the stock was deemed to be overfished according to the last assessment when status was determined. Although the southern red hake Annual Catch Limit is higher for Alternative 2, Option B would be consistent with Framework 62 and limit catch near the 2019 level. Nothing in the specifications document would change the two management measures that the Council approved for Framework 62:

- Reducing the OFL by 25% to set ABC, and

[1] Whiting includes southern silver hake and offshore hake (a minor component of catch often landed together with silver hake). Following previously accepted scientific recommendations, the southern whiting specifications include a 4% increase to account for these mixed catches of offshore hake.

- Reducing the southern red hake possession limit to 1,000 lbs. for selective small-mesh and all large-mesh trawls and 600 lbs. for standard small-mesh trawls.

The alternatives in Action 1 (Section 4.1) are intended to respond to changes in biomass and recent assessment information. Preferred Alternative 2 would prevent overfishing of all four small-mesh multispecies stocks and could give more opportunity to achieve optimum yield, although external factors such as the groundfish large-mesh regulations, low price relative to other fish, and the marketability of the catch keep fishing below the ACL for several years. Because the Alternative 2 specifications have a low risk of overfishing, it also has a high probability of preventing the stocks from becoming overfished. Thus, Alternative 2 has slightly positive impacts on target species. The exception is southern red hake, where overfishing has been occurring according to previous assessments. The new management track assessment indicates that the southern red hake status is unknown and that for red hake stocks fishing is an unlikely driver to changes in biomass. No Action would allow for a higher northern silver hake ACL than is associated with MSY-proxy. Thus, No Action has a negative impact on the northern silver hake stock.

Action 2 (Section 4.2) could allow some increase in fishing for northern red hake if the 3,000 lbs. possession limit continues into the late season. But this potential change is expected to be small and discards would be lower. Preferred Alternative 2 would have slightly positive impacts on target stocks.

Preferred Alternative 3 and non-preferred Alternative 4 in Action 3 (Section 4.3) would raise the whiting possession limit for trips fishing with less than 3-inch mesh to 15,000 and 30,000 lbs., respectively. They also have the potential to reduce regulatory discards by 50 and 57%, respectively. These alternatives have the potential to have a slightly negative impact on target species compared to No Action and Alternative 2, because it could invite more fishing effort particularly by Atlantic herring bottom trawl vessels.

Preferred Alternative 3 is not expected to substantially increase targeting of whiting on trips fishing with less than 3-inch mesh because revenue from other target species (herring and squid) are considerably more than the revenue from a trip landing 15,000 lbs. of whiting. Nonetheless, vessels facing tighter restrictions in these fisheries may target whiting on short trips, particularly for smaller vessels that typically fish inshore.

Non-preferred Alternative 4 could cause a reduction in selectivity by existing whiting vessels switching to less selective smaller mesh with the same possession limit as they have using mesh larger than 3-inches. Alternative 2 would decrease regulatory discards of whiting by an estimated 24%, but would have less potential for increasing fishing effort as Alternatives 3 and 4.

Non-target species

The top three species that are discarded in the small-mesh multispecies fishery were silver hake, red hake, and spiny dogfish, representing 38.6% of the estimated total discards and 25.8% of total kept, or 4,549 mt (Table 14). Bycatch of overfished groundfish stocks (Table 15) that were estimated include winter flounder, ocean pout, yellowtail flounder, witch flounder, windowpane flounder, cod and white hake, which contributed to only 4.7% of the estimated total discards and 3.1% of total kept, or 554 mt. Atlantic herring is also overfished and accounted for 3.2% of estimated bycatch and 2.2% of total kept, or 383 mt during fishing years 2017-2019

Action 1 is expected to have slightly positive, negligible, or slightly negative impacts on non-target species (depending on the degree to which non-target species overlap with the small-mesh multispecies fishery and alternative fisheries for vessels in the small-mesh multispecies fishery), but are not expected to cause overfishing or a non-target stock to become overfished. Action 2 is expected to have a slightly negative to negligible impact on non-target stocks. Impacts would be slightly negative for non-target species that co-occur with red hake. Action 3 is expected to have a slightly negative impact on non-target species due to the potential increase in fishing with less selective mesh, but have a slightly positive impact

on Atlantic herring due to the potential for effort to shift from targeting Atlantic herring to targeting whiting.

Impacts on Protected Species

The preferred alternatives (rebuilding plan and dual possession limit) would likely have slightly negative to slightly positive impacts on protected species (MMPA-protected species range from slightly negative to slightly positive impacts; ESA-listed species with slightly negative impacts) for all three Actions. Bottom trawl gear is used to target whiting. Interactions, resulting in the injury or mortality to ESA-listed and/or MMPA protected species have been observed or documented (Section 5.4). Despite increases in annual catch limits for southern whiting and both red hake stocks, fishing behavior and levels of fishing effort are generally expected to remain similar to current levels. Specifically, the amount of gear in the water, tow times, and overlap between protected species and fishing gear are expected to be approximately the same as currently exist.

Physical Environment & Essential Fish Habitat (EFH)

The preferred alternatives (annual catch limits, TAL trigger adjustment, and whiting possession limits) would likely have slightly negative impacts on the physical environment and EFH because the interactions of trawl gear would continue to degrade the quality of habitat in similar areas (Section 5.5).

Fishing activity would likely remain similar to previous years and would continue to degrade habitat quality. Generally, all alternatives have a slightly negative impact on the physical environment and on EFH. This assessment of the small-mesh fishery effect is due to the use of raised footrope and other light trawls over muddy, silt, and sand bottom which is less vulnerable to alteration. Major changes in fishing effort are not expected because the fishery has not been constrained by existing catch limits, except for southern red hake. The preferred alternative for Action 1 may allow more fishing for southern red hake or less avoidance, but this will be constrained by the 1,000/600 lbs. possession limit that was implemented by Framework 62. The preferred alternative for Action 2 could allow some increase in targeting red hake in the northern management area, but this potential increase is small and minor. The preferred alternative for Action 3 could cause a minor increase in whiting fishing by fishermen using less than 3-inch mesh trawls. Any increase in whiting fishing effort would however be associated with an effort shift from similar fisheries, i.e. the Atlantic herring fishery using bottom trawls or from existing whiting fishermen using smaller mesh. Any changes in impacts for both outcomes would be negligible.

Human Communities

Under the Preferred Alternatives for Actions 1, 2, and 3, annual catch limits, the northern red hake TAL trigger, and whiting possession limits for trips fishing with less than 3-inch mesh trawls would all increase. The sole exception is that the annual catch limit for northern silver hake would decrease to respond to decreasing biomass (but still above the target biomass associated with MSY-proxy). The northern red hake TAL trigger adjustment and the whiting possession limit increase also have the potential for reducing regulatory discards, turning them into landings and revenue for the fishery and fishing communities. The ACL framework that the annual catch limits would be set is intended to prevent overfishing and reduce the risk that small-mesh multispecies stocks could become overfished.

As such, the short- and long-term economic and social impacts are expected to be slightly to moderately positive. The one exception is that if the whiting possession limits are raised too high (Action 3, Alternative 4 for example), potentially equivalent to the whiting possession limit for trips fishing with greater than 3-inch mesh trawls, the long-term economic and social impacts could be negative if it reduces size selectivity of the fishery and hence total yield from whiting and possibly other stocks. This potential long-term increase in negative impact is much less likely for Preferred Alternative 3.

Alternatives to the Proposed Action

No Action would retain the existing specifications, including the 2019-2020 annual catch limits, a 37.9% TAL trigger for northern red hake, and a 3,500 lbs. and 7,500 lbs. whiting possession limit for trips using less than 2.5-inch and 2.5- to 3-inch mesh trawls, respectively.

Table 2. Summary of direct and indirect impacts on Valued Environmental Components (VECs), alternatives relative to No Action. Preferred alternatives are shaded.

Proposed Action	Alternative	Target Species	Non-target Species	Protected Species	Physical Environment & Essential Fish Habitat	Human Communities
2021-2023 Annual Catch Limits	**Alternative 2 Option A**	Slightly positive for all stocks overall; but slightly negative for southern red hake.	Slightly negative to slightly positive impacts	Negligible to moderately negative impacts relative to No Action for ESA-listed and MMPA-protected species in poor condition, negligible to slightly negative impacts to MMPA-protected species in good condition. Negligible impacts relative to Option B and No Action.	Slightly negative impact, but negligible change relative to other alternatives	Slightly positive; moderately to high long-term negative for southern red hake
	Alternative 2 Option B	Slightly positive for all stocks overall; and moderately positive for southern red hake relative to Option A	Slightly negative to slightly positive impacts	Negligible to moderately negative impacts relative to No Action for ESA-listed and MMPA-protected species in poor condition, negligible to slightly negative impacts to MMPA-protected species in good condition. Negligible impacts relative to Option A and No Action.	Slightly negative impact, but negligible change relative to other alternatives	Slightly negative; but moderate to high long-term positive for southern red hake

Proposed Action	Alternative	Target Species	Non-target Species	Protected Species	Physical Environment & Essential Fish Habitat	Human Communities
	No Action	Slightly positive for southern whiting and both red hake stocks; slightly negative for northern silver hake	Slightly negative to slightl positive impacts.	MMPA-protected species: Slightly negative to slightly positive ESA-listed species: Slightly negative Negligible impacts relative to Alternative 2	Slightly negative impact, but negligible change relative to other alternatives	Slightly negative
Northern red hake TAL Trigger	**Alternative 2**	Slightly negative impact on northern red hake and negligible impact on other stocks.	Slightly negative to negligible impact.	Negligible impacts relative to No Action	Slightly negative impact, but negligible change relative to other alternatives, but slightly potential increase in negative impacts.	Slightly positive
	No Action	Slightly positive impact on northern red hake and on other small-mesh multispecies stocks	Slightly positive to negligible impact.	MMPA-protected species: Slightly negative to slightly positive ESA-listed species: Negligible to slightly negative Negligible impacts relative to Alternative 2	Slightly negative impact	Slightly negative
Whiting Possession Limit	**6,000/12,000 lbs.**	Slightly negative impact on whiting and red hake stocks and a negligible impact on northern silver hake.	Slightly positive impact, but slightly negative impact on herring.	Negligible impacts relative to No Action and Alternatives 3 and 4.	Slightly negative impact, but negligible impact relative to No Action.	Slightly positive

Proposed Action	Alternative	Target Species	Non-target Species	Protected Species	Physical Environment & Essential Fish Habitat	Human Communities
	15,000 lbs.	Slightly negative impact on whiting stocks, a slightly positive impact on red hake, and a negligible impact on northern silver hake.	Slightly negative impact, but slightly positive impact on herring.	Negligible impacts relative to No Action and Alternatives 2 and 4.	Slightly negative impact, but negligible impact relative to other alternatives due to offsetting effects.	Slightly or moderately positive, but moderately long-term negative
	30,000 lbs.	Moderately negative impact on whiting stocks, slightly positive impact on red hake, and a negligible impact on northern silver hake.	Slightly negative impact, but slightly positive impact on herring.	Negligible impacts relative to No Action and Alternatives 2 and 3.	Slightly negative impact, but negligible impact relative to other alternatives due to offsetting effects.	Moderately short-term positive, but highly long-term negative
	No Action	Moderately positive impact on whiting stock and slightly positive impact on red hake stocks	Slightly positive impact, but slightly negative impact on herring.	MMPA-protected species: Slightly negative to slightly positive ESA-listed species: Slightly negative Negligible impacts relative to Alternatives 2, 3, and 4.	Slightly negative impact	Moderately long-term positive

2.0 TABLE OF CONTENTS

2.1 TABLES

2.2 FIGURES

2.3 Maps

2.4 ACRONYMS

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
AIM	An Index Method of Analysis
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
ANPR	Advanced Notice of Proposed Rulemaking
AP	Advisory Panel
APA	Administrative Procedures Act
ASMFC	Atlantic States Marine Fisheries Commission
B_{MSY}	Biomass that would allow for catches equal to Maximum Sustainable Yield when fished at the overfishing threshold (F_{MSY})
BiOp, BO	Biological Opinion, a result of a review of potential effects of a fishery on Protected Resource species
CAI	Closed Area I
CAII	Closed Area II
CEQ	Council on Environmental Quality
CPUE	Catch per unit of effort
DAM	Dynamic Area Management
DAS	Day(s)-at-sea
d/K	Ratio of discarded fish to kept catch in weight
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DPWG	Data Poor Working Group
EA	Environmental Assessment
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
F	Fishing mortality rate
FEIS	Final Environmental Impact Statement
FMP	Fishery management plan
FW	Framework
FY	Fishing year
GARFO	Greater Atlantic Regional Fisheries Office
GARM	Groundfish Assessment Review Meeting
GB	Georges Bank
GIS	Geographic Information System
GOM	Gulf of Maine
GRT	Gross registered tons/tonnage
HAPC	Habitat area of particular concern

HPTRP	Harbor Porpoise Take Reduction Plan
IFM	Industry-funded monitoring
IFQ	Individual fishing quota
ITQ	Individual transferable quota
IVR	Interactive voice response reporting system
IWC	International Whaling Commission
MA	Mid-Atlantic
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MPA	Marine protected area
MRI	Moratorium Right Identifier
MRIP	Marine Recreational Information Program
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
NEAMAP	Northeast Area Monitoring and Assessment Program
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fisheries Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NLSA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OBDBS	Observer database system
OLE	Office for Law Enforcement (NMFS)
OY	Optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area
SAFE	Stock Assessment and Fishery Evaluation
SAP	Special Access Program
SARC	Stock Assessment Review Committee
SAS	Stock Assessment Subcommittee
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SIA	Social Impact Assessment
SNE	Southern New England
SNE/MA	Southern New England-Mid-Atlantic
SSB	Spawning stock biomass
SSC	Scientific and Statistical Committee
TAL	Total allowable landings
TED	Turtle excluder device
TEWG	Technical Expert Working Group
TMS	Ten-minute square
TRAC	Trans boundary Resources Assessment Committee
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service

VMS	Vessel monitoring system
VEC	Valued ecosystem component
VPA	Virtual population analysis
VTR	Vessel trip report
WGOM	Western Gulf of Maine
YPR	Yield-per-recruit

3.0 BACKGROUND AND PURPOSE

3.1 BACKGROUND

This EA is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the 2020 CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. The review for this Specifications Document began before the effective date and the agency has decided to proceed under the 1978 regulations.

3.1.1 Management background

The Small-Mesh Multispecies FMP specifies the management measures for the northern and southern stocks of silver hake (Merluccius bilinearis), the northern and southern stocks of red hake (*Urophycis chuss*), and a single stock of offshore hake (*Merluccius albidus*), which primarily co-occurs with the southern stock of silver hake. Catches of silver hake and offshore hake are generally not differentiated in the market and are therefore collectively referred to as "whiting" with the fishery that harvests these species referred to as the "whiting" fishery. Silver hake and red hake are both managed as two distinct stocks, a northern and a southern, based on geographic delineations. Because the vessels in these fisheries are using small mesh, they are regulated by a series of exemptions that have evolved over time through various amendments and framework adjustments to the Northeast (NE) Multispecies, or Groundfish FMP.

The small mesh multispecies fishery is managed by a collection of exemptions to the NE Multispecies FMP. These exemptions allow a fishery to be exempt from the minimum mesh size provided they catch less than 5% of regulated multispecies. There are currently five exemption areas (Map 1) in the northern management area that are open seasonally (Table 4) with possession limits dependent upon the species and mesh size (Table 5). In the southern management area, small-mesh multispecies fishing is open year-round in the Southern New England and Georges Bank regulated mesh area.

Amendment 19 (NEFMC 2013) established an Annual Catch Limit Framework (see Figure 1) to comply with new provisions of the Magnuson-Stevens Act. This framework establishes limits on catch and landings for each of the four stocks in the fishery, as well as in-season and post-season accountability measures to compensate for prior catch overages. The framework also established a 3-year specification cycle, beginning in 2012, which has been revised in 2015 and 2018 to account for new information about stock condition and changes in biomass. An irregular adjustment to the northern red hake specifications was also made in 2019. During this time, there were three adjustments to a TAL trigger, to account for ACL overages in the previous fishing year. Landings reached the TAL trigger in 2016 and 2017 for northern red hake and in 2020 for southern red hake, which triggered a reduction in the possession limit to 400 lbs (see Table 22for dates when the 400 lbs possession limit became effective).

Table 3. ACL overages and post-season AM actions.

Fishery/Stock	Year of ACL overage	Percent of ACL	Post-season AM adjustment	Effectiveness
Northern Red Hake	2012	127.5	62.5%[1]	May 28, 2015
Northern Red Hake	2015	124.6	37.9%[2]	May 9, 2017
Southern Red Hake	2018	149.6	40.4%[1]	August 25, 2020

[1]Reduced from 90 percent
[2]Reduced from 62.5 percent

Map 1. Small-mesh exemption areas in the Gulf of Maine and on Georges Bank.

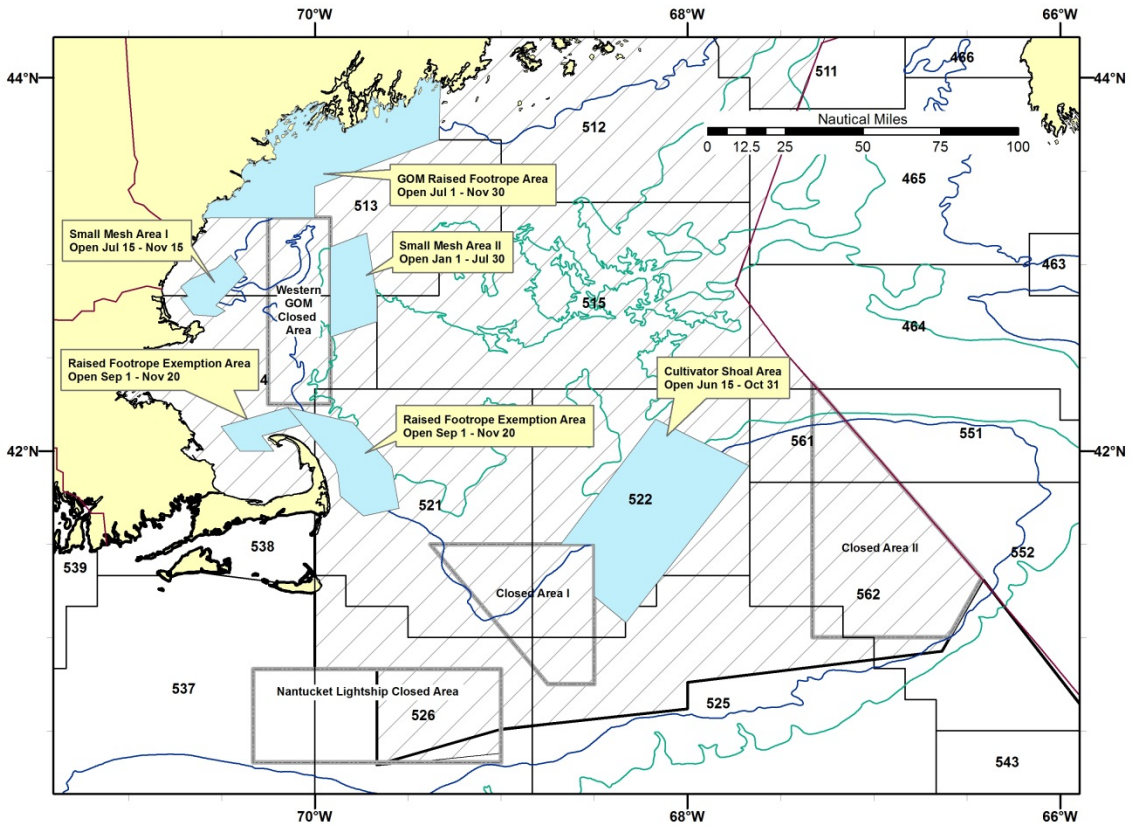


Table 4. Northern area exemption program seasons

	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Cultivator			June 15 – October 31									
GOM* Grate			July 1 – November 30									
Small I				July 15 – November 15								
Small II	– June 30								January 1 –			
Cape Cod RFT†					Sept 1 – Nov 20							
					September 1 – December 31							

* GOM = Gulf of Maine

† RFT = Raised Footrope Trawl

The Gulf of Maine Grate Raised Footrope area is open from July 1 through November 30 of each year and requires the use of an excluder grate on a raised footrope trawl with a minimum mesh size of 2.5 inches. Small Mesh Areas I and II are open from July 15 through November 15, and January 1 through June 30, respectively. A raised footrope trawl is required in Small Mesh Areas I and II, and the trip limits are mesh size dependent. Cultivator Shoal Exemption Area is open from June 15 – October 31, and requires a minimum mesh size of 3 inches. The Raised Footrope Trawl Exemption Areas are open from September 1 through November 20, with the eastern portion remaining open until December 31. A raised footrope trawl, with a minimum mesh size of 2.5-inch square or diamond mesh, is required. The Southern New England and Mid-Atlantic Regulated Mesh Areas are open year-round and have mesh size dependent possession limits for the small-mesh multispecies.

The mesh size dependent possession limits for all the areas where small-mesh trawl fishing is allowed by exemption are:

Table 5. Mesh size dependent possession limits, subject to in-season accountability measures (triggered when landings exceed the TAL trigger) that would reduce the silver hake and whiting possession limit to 2,000 lb. and the red hake possession limit to 400 lb.

Codend Mesh Size	Silver and offshore hake, combined, possession limit	Northern red hake	Southern Red Hake
Smaller than 2.5”	3,500 lb	3,000 lb	5,000 lb
Larger than 2.5”, but smaller than 3.0”	7,500 lb	3,000 lb	5,000 lb
Equal to or greater than 3.0”	30,000 lb (40,000 lb in Southern Management Area)	3,000 lb	5,000 lb

Exemptions for using small-mesh trawls to target whiting and red hake were established in through a series of framework actions (for example, Framework 9 – NEFMC 1995; Framework 32 - NEFMC 1999; Framework 35 NEFMC 2000; and Framework 38 - NEFMC 2003) after the Council adopted large-mesh regulations in New England waters to conserve groundfish stocks. But during the late 1990s, a fishery targeting and landing large amounts of juvenile whiting with less than 3-inch mesh developed to supply a foreign market for small whiting. At the time, the whiting stocks were not in healthy condition and there was concern that high juvenile whiting catches could jeopardize the stock. Excessive catches of juvenile

whiting could reduce recruitment and yield. As a result, the Council established a 3,500 lbs. whiting possession limit for vessels fishing with less than 2.5-inch mesh trawls and a 7,500 lbs. whiting possession limit for vessels fishing with 2.5- to 3-inch mesh trawls.

Although this foreign demand for small whiting has abated, the whiting possession limits of 3,500 lbs. for trips fishing with less than 2.5-inch mesh and 7,500 lbs. for trips fishing with 2.5 to 3-inch mesh are still on the books. As the whiting stocks recovered and stock biomass increased, trips targeting squid and herring began catching greater amounts of whiting as a non-target species. This action could increase these possession limits to reduce whiting discards in the squid and herring fisheries.

Framework adjustment 62 for Whiting, Red Hake, & Offshore Hake was submitted in August 2020 to establish a rebuilding plan and management measures for the southern red hake stock. To achieve rebuilding, Framework adjustment 62 included a preferred alternative that would reduce the ABC to 75% of the overfishing limit or F_{MSY} proxy for the duration of the rebuilding period (5-10 years) or until the southern red hake biomass reaches the B_{MSY} target (currently estimated to be 1.01 kg/tow), whichever happens first. To restrict landings of southern red hake, Framework adjustment 62 included a preferred alternative for reducing the year-round possession limit of southern red hake for all gear and fisheries. The possession limit would be 1,000 lbs. for selective small-mesh trawls and large-mesh trawls, and 600 lbs. for standard small-mesh trawls. Final action and an implementation date for Framework adjustment 62 is expected early in fishing year 2021.

3.1.2 Stock status

A research track assessment for the red hake stocks (NEFSC 2020a) was conducted in March 2020 by the NEFSC which examined stock structure and survey catchability. Previous assessment methodology was also evaluated during the research track but was rejected due to a lack of relationship between the trends in the relative population index and exploitation rate. Given the low levels of exploitation rates, it is believed that factors other than fishing are likely driving factors of red hake abundance. In September 2020, the NEFSC conducted a management track assessment (NEFSC 2020b) on all small-mesh multispecies stocks.

This assessment found that northern silver hake and southern whiting stocks were not experiencing overfishing and were not overfished. Biological reference points for the red hake stocks were not available, thus the status of the northern and southern red hake stocks is unknown, but low exploitation rates were estimated and the assessment review panel determined that it is unlikely that fishing is the primary driver of changes in stock biomass. More details on stock status can be found in the latest SAFE Report (NEFMC 2020c) and in Section 5.2.

3.2 Purpose and Need

The purpose for this action is to set specifications including: OFL, ABC, ACLs and TALs including associated TAL triggers, and possession limits. The need for these specification adjustments is to respond to new assessment information, be consistent with the OFL and ABC recommendations of the Council's Scientific and Statistical Committee, allow more opportunity for the fishery to achieve optimum yield, while at the same time potentially reducing regulatory discards. The purpose and need for the three actions are summarized in Table 6.

Table 6. Purpose and need for this action to change specifications.

Action	Purpose	Need
1. Section 4.1 To set specifications including: OFL, ABC, ACL, TAL, and TAL triggers	To adjust catch specifications to be consistent with stock status and changes in biomass.	The action is needed achieve the objectives of the NE Multispecies FMP, prevent overfishing, and achieve optimum yield.
2. Section 4.2 To reset the TAL trigger for northern red hake to 90% of the TAL	To set the TAL percentage that, when reached, triggers a lower northern red hake possession limit.	The action is needed to reduce unnecessary regulatory waste and allow the fishery to land more of target and non-target catches of red hake, increasing benefits to the fishery and the nation.
3. Section 4.3 To increase whiting possession limits for vessels using less than 3-inch mesh trawls.	To appropriate possession limits for vessels using less than 3-inch mesh trawls, with consideration for immature whiting.	The action is needed to reduce unnecessary regulatory waste on trips fishing with less than 3-inch trawl mesh while targeting other species, thereby increasing benefits to the fishery and the nation.

4.0 ALTERNATIVES UNDER CONSIDERATION

The Council considered the alternatives described below in Sections 4.1 to 4.3. It did not consider any others because these provide a reasonable range of alternatives to address the purpose and need for action described in Section 3.2. For Action 1, there are only two alternatives because they represent a reasonable range of alternatives for purposes of NEPA analysis given the status of the silver, offshore and red hake stocks and the requirements of the MSA.

4.1 ACTION 1 – SPECIFICATIONS

The alternatives in Action 1 would set specifications that determine when overfishing is occurring after accounting for scientific and management uncertainty. These specifications include the Overfishing Limit (OFL), the Acceptable Biological Catch (ABC; a limit to account for scientific uncertainty); the Annual Catch Limit (ACL; a limit to account for management uncertainty), Total Allowable Landings (TAL; a Federal-waters landings limit to account for discards and state-water landings), and a TAL trigger (to trigger a reduction in the possession limit to reduce the risk that catches will exceed the ACL). Specifications are identified for four stocks that are targeted by the small-mesh multispecies fishery: northern silver hake, southern whiting (southern silver and offshore hakes), northern red hake, and southern red hake.

4.1.1 Alternative 1 - No Action

Alternative 1 would continue the existing catch specifications shown in the table below. If there is no action taken, the regulations specify that existing catch specifications will continue (i.e. roll over) for subsequent fishing years until an action is taken to change them. Thus, No Action would continue the status quo, subject to any changes in the TAL trigger due to current year or future catch overages.

Table 7. Small-mesh multispecies fishery specifications that existed in fishing years 2019-2020. Under No Action, these specifications would continue, subject to changes in the TAL trigger due to current year or future overages.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)
Northern silver hake	58,350	31,030	29,475	26,604	23,944	90%
Southern whiting	37,110	20,170	19,162	15,043	13,539	90%
Northern red hake	807	720	684	273	104	38%
Southern red hake	1,120	1,060	1,007	305	124	40.6%

Rationale: These specifications were consistent with the stock biomass indices for 2015-2017, which were generally lower than more recent years. These limits prevented overfishing (except for southern red hake when catches exceeded these limits) and are more conservative than the proposed adjustments in Alternative 2. Except for southern red hake, landings and catches were below these limits and the ACL for northern silver hake, southern whiting, and northern red hake did not constrain the fishery.

4.1.2 Alternative 2 – 2021-2023 Specifications Adjustment (Preferred but with Option B for southern red hake specifications)

Alternative 2 would modify the specifications to be consistent with updated assessments from the September 2020 Management Track Assessment. The OFL and ABC specifications were recommended by the Council's Scientific and Statistical Committee (SSC) (NEFMC 2020b) based on the assessment and recommendations by the Whiting Plan Development Team. The specifications (Table 6) account for updated estimates of scientific uncertainty (silver hake and whiting only), management uncertainty, discards, and state-water landings. These specifications are consistent with the framework (Figure 1) that the Council adopted in Amendment 19 (NEFMC 2013).

Table 8. Updated specifications for fishing years 2021-2023.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)
Northern silver hake	39,930	20,410	19,387	17,457	15,711	90%
Southern whiting[2]	72,160	40,990	38,941	28,742	25,868	90%
Northern red hake	NA	3,452	3,278	1,405	533	38%
Southern red hake	NA	2,006	1,906	573	235	41%

Table 9. Change in specifications relative to No Action.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)
Northern silver hake	-32%	-34%	-34%	-34%	-34%
Southern whiting	94%	103%	103%	91%	91%
Northern red hake	NA	379%	379%	414%	414%
Southern red hake	NA	89%	89%	88%	89%

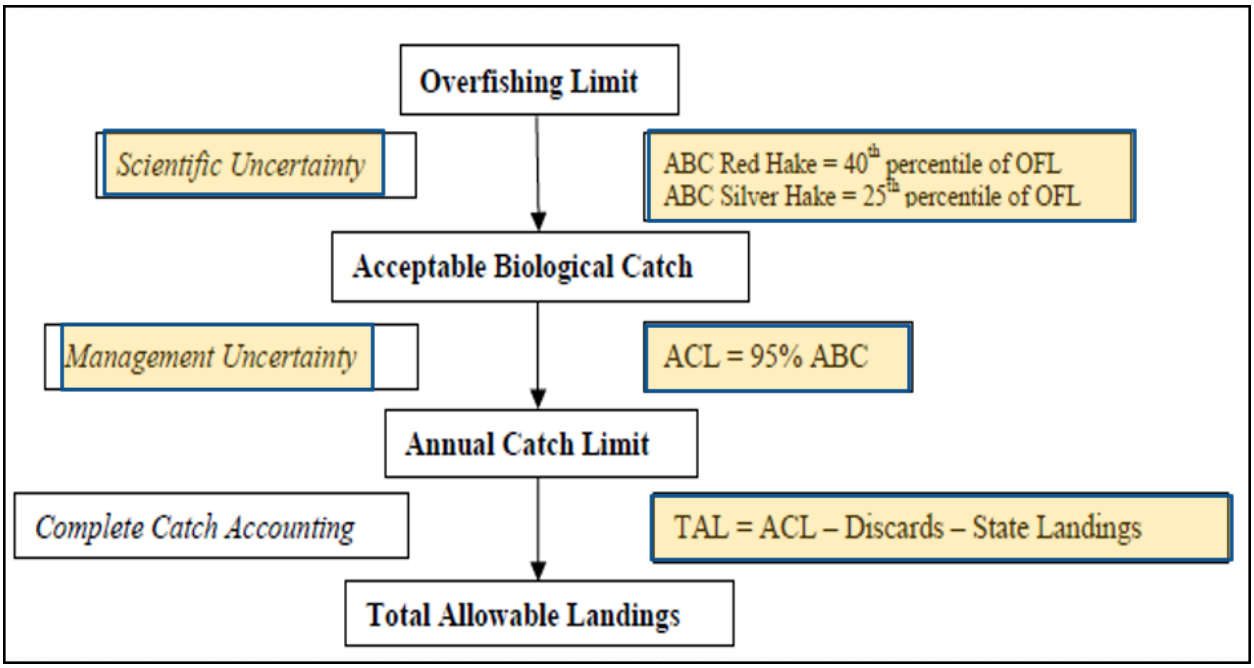
This alternative could be implemented with either Option A or B which would apply to southern red hake catch limits, both described below. The following table shows how Options A and B compare.

[2] Whiting includes southern silver hake and offshore hake (a minor component of catch often landed together with silver hake. Following previously accepted scientific recommendations, the southern whiting specifications include a 4% increase to account for these mixed catches of offshore hake.

Table 10. Comparison of southern red hake specification alternatives for fishing years 2021-2023.

Option	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)
Option A (Section 4.1.2.1)	NA	2,006	1,906	573	235	41%
Change from No Action	NA	89%	89%	88%	89%	
Option B (Section 4.1.2.2)	NA	1,505	1,429	422	173	41%
Change from No Action	NA	42%	42%	38%	-37%	

Figure 1. Specification framework for small-mesh multispecies stocks.



Rationale: Biomass of all stocks have changed since the 2016 update assessment. In addition, the assessment model formerly used for the red hake stocks has been rejected and replaced with an empirical assessment model. The basis for MSY-proxy remains the 1972-1983 period for silver hake, while the SSC recommended using a different period for the red hake stocks: 1981-1994 (1.5% exploitation) for the northern stock and 2001-2019 (3.1% exploitation) for the southern stock (NEFMC 2020b). Inputs for these specifications include an update to the 3-year (2017-2019) moving average survey biomass indices (fall only for silver hake[3]; mean of spring and fall index for red hake), exploitation associated with MSY-proxy for silver hake, the SSC's recommended exploitation rate for red hake, estimated scientific uncertainty for silver hake, and a 5% buffer for management uncertainty.

[3] The southern whiting fall survey indices were averaged only for 2018-2019, due to incomplete sampling in fall 2017.

4.1.2.1 Option A – SSC recommendation for southern red hake ABC

For Option A, the specifications for southern red hake would be those shown in Table 8, applying an exploitation rate of 3.1% to determine the ABC. The ABC would increase by 89% and the TAL would increase by 88% (Table 9) compared to No Action.

Rationale: The Council's Scientific and Statistical Committee recommended the exploitation rate and ABC to prevent overfishing and to allow stock rebuilding (NEFMC 2020b). They agreed with the management track assessment that at this exploitation rate fishing was not the major driver of changes in southern red hake stock biomass.

4.1.2.2 Option B – Southern red hake ABC reduced by 25% to increase stock rebuilding potential (Preferred)

For Option B, the ABC would be lower than Option A by 25%, or applying an exploitation rate of 2.3%. Compared to No Action, the ABC would increase by 42% and the TAL would increase by 38%, compared to No Action.

Table 11. Updated southern red hake specifications for fishing years 2021-2023.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)
Southern red hake	NA	1,505	1,429	422	173	41%

Table 12. Change in specifications relative to No Action.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)
Southern red hake	NA	42%	42%	38%	-37%

Rationale: This option would enhance the rebuilding potential for southern red hake, which is considered to be overfished, although the September 2020 management track assessment found the status to be unknown. The ACL would be 2.6% above current catch levels, not allowing a substantial increase in catch despite an increase in the survey biomass index. This reduction in the ABC would be consistent with the Council's rebuilding plan for southern red hake, Framework Adjustment 62 (NEFMC 2020a) submitted in August 2020.

4.2 Action 2 – Northern Red Hake TAL Trigger (Accountability Measure, AM) Adjustment

Amendment 19 established post-season accountability measures (AMs) to compensate for prior Annual Catch Limit overages. These AMs were intended to reduce the risk of future overfishing by reducing the possession limit when landings reach a certain fraction of the Total Allowable Landings (TAL) and were initiated at 90% of the TAL. Since then, northern and southern red hake overages occurred which caused an automatic reduction in the TAL trigger. For northern red hake, the TAL trigger was most recently

reduced in 2016 to account for catches exceeding the ACL in fishing year 2015 (overage was 24.5%). Southern red hake catch overages have occurred as recently as fishing year 2019.

4.2.1 Alternative 1 – No Action

This alternative would retain the existing TAL trigger (in-season AM) at 37.9%

Rationale: Catch has not exceeded the northern red hake ACL since 2015. A very large 2014 year-class entered the fishery in 2016 and the increasing stock biomass allowed the Council to consequently raise the specifications. The current TAL trigger could be needed to keep catches from exceeding the ACL, particularly if small-mesh multispecies fishing effort substantially increases or stock biomass substantially declines.

4.2.2 Alternative 2 – Restore the Northern Red Hake TAL trigger to 90% (Preferred)

This alternative would restore the TAL trigger (in-season accountability measure) to 90%, of the TAL, or 380 mt (Table 13). The TAL trigger percent is the original value the Council adopted in Amendment 19 (NEFMC 2013), which also is the proportion of the TAL that currently applies to northern silver hake and southern whiting.

Table 13. Updated northern red hake specifications for fishing years 2021-2023.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)
Northern red hake	NA	3,452	3,278	1,405	1,265	90%

Rationale: Northern red hake catches in 2017-2019 have averaged 43% of the ACL and the low in-season TAL trigger should be raised to reduce discards and improve the ability for the fishery to achieve optimum yield.

4.3 Action 3 – Whiting Possession Limits

The following alternative would adjust the whiting possession limits for vessels using less than 3-inch mesh trawls and are intended to reduce whiting bycatch in the herring and squid fishery, without encouraging fishermen to target whiting with less than 3-inch mesh trawls.

4.3.1 Alternative 1 – No Action

This alternative would retain the existing whiting possession limits for vessels using less than 3-inch mesh trawls. The current possession limits are 3,500 lbs. for vessels fishing with trawls having less than 2.5-inch mesh and 7,500 lbs. for vessels fishing with trawls having 2.5 to 3-inch mesh

Rationale: These possession limits were originally implemented about 15 years ago to reduce the targeting of small whiting for a juvenile whiting foreign market. Retaining the limits would make it unlikely that this market demand would reemerge.

4.3.2 Alternative 2 – Increase the Possession Limit to 6,000 lbs. for vessels using trawls with less than 2.5-inch mesh and to 12,000 lbs. for vessels using trawls with 2.5-inch to 3-inch mesh

Whiting possession limits would increase to 6,000 lbs. for vessels fishing with trawls having less than 2.5-inch mesh and to 12,000 lbs. for vessels fishing with trawls having 2.5 to 3-inch mesh

Rationale: The intent is to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield, without causing vessels to begin targeting small whiting with less selective fishing gear (i.e. smaller mesh size). The alternative would retain the graduated possession limit by mesh size. Based on observed trip data, this measure is expected to reduce regulatory discards by 24% on trips using mesh less than 3-inches.

4.3.3 Alternative 3 – Increase the Possession Limit to 15,000 lbs. for vessels using trawls with less than 3-inch mesh (Preferred)

Whiting possession limits would increase to 15,000 lbs. for vessels fishing with trawls having less than 3-inch mesh

Rationale: The intent is to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield, without causing vessels to begin targeting small whiting with less selective fishing gear (i.e. smaller mesh size). This alternative would retain a lower possession limit for vessels using less than 3-iinches (which are often targeting other stocks such as loligo squid and herring) than the 30,000 to 40,000 lbs. possession limit for vessels using mesh greater than 3-inches (including trips targeting whiting). Based on observed trip data, this measure is expected to reduce regulatory discards by 50% on trips using less than 3-inches.

4.3.4 Alternative 4 – Increase the Possession Limit to 30,000 lbs. for vessels using trawls with less than 3-inch mesh

Whiting possession limits would increase to 30,000 lbs. for vessels fishing with trawls having less than 3-inch mesh

Rationale: The intent is to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield, without causing vessels to begin targeting small whiting with less selective fishing gear (i.e. smaller mesh size). Although this is the same possession limit that applies to directed whiting fishing trips, industry advisors report that much of the former juvenile whiting market demand is being met by other countries and is not likely to redevelop in the US. Based on observed trip data, this measure is expected to reduce regulatory discards by 57% on trips using less than 3-inches. The remainder of observed trips using less than 3-inch mesh caught more than 30,000 lbs. of whiting while targeting other stocks, such as loligo squid.

5.0 AFFECTED ENVIRONMENT

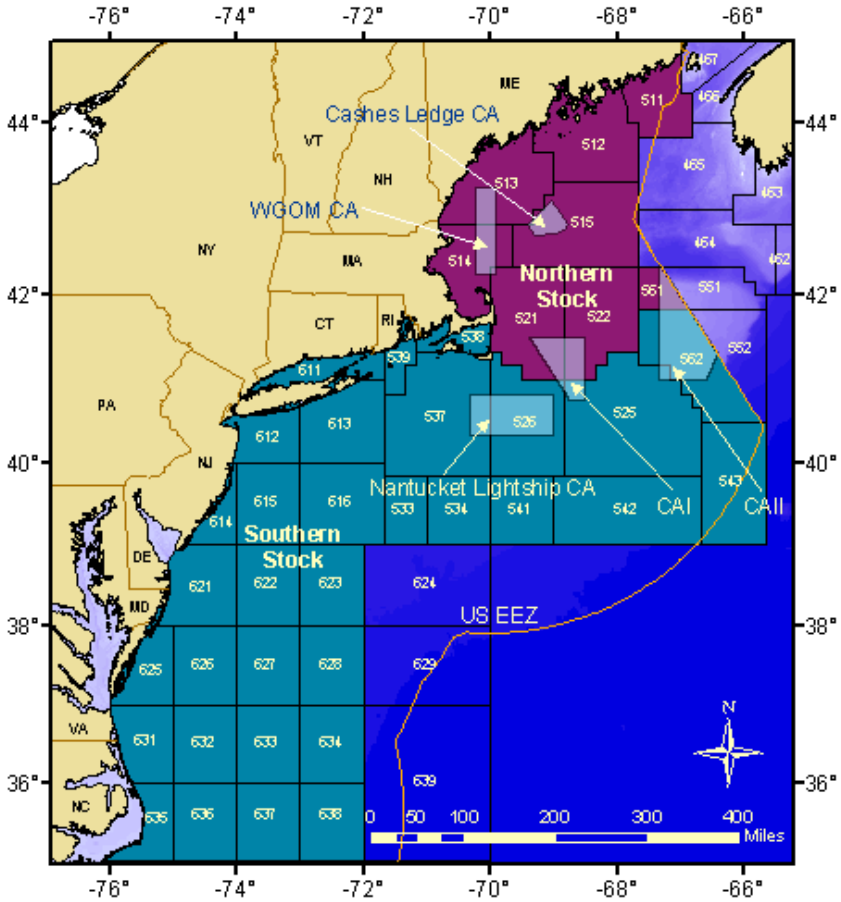
5.1 INTRODUCTION

The Affected Environment is described in this action based on valued ecosystem components (VECs), including: target species, non-target species, predator species, physical environment and Essential Fish Habitat (EFH), protected resources, and human communities. VECs represent the resources, areas and human communities that may be affected by the alternatives under consideration in this amendment. VECs are the focus, since they are the "place" where the impacts of management actions occur.

5.2 TARGET SPECIES (SILVER, RED, AND OFFSHORE HAKES)

The target species for this action are silver hake (Merluccius bilinearis), red hake (*Urophycis chuss*), and offshore hake (*Merluccius albidus*). Silver and red hakes are separated into northern and southern stocks for management purpose (Map 2) and assessed as semi-independent stocks. Offshore hake are a minor component in the fishery and is often mixed in commercial fishery catches with southern silver hake, together landed as "whiting".

Map 2. Statistical area used to define red and silver hake in the northern and southern management areas. Offshore hake statistical areas are restricted to the southern management region only.

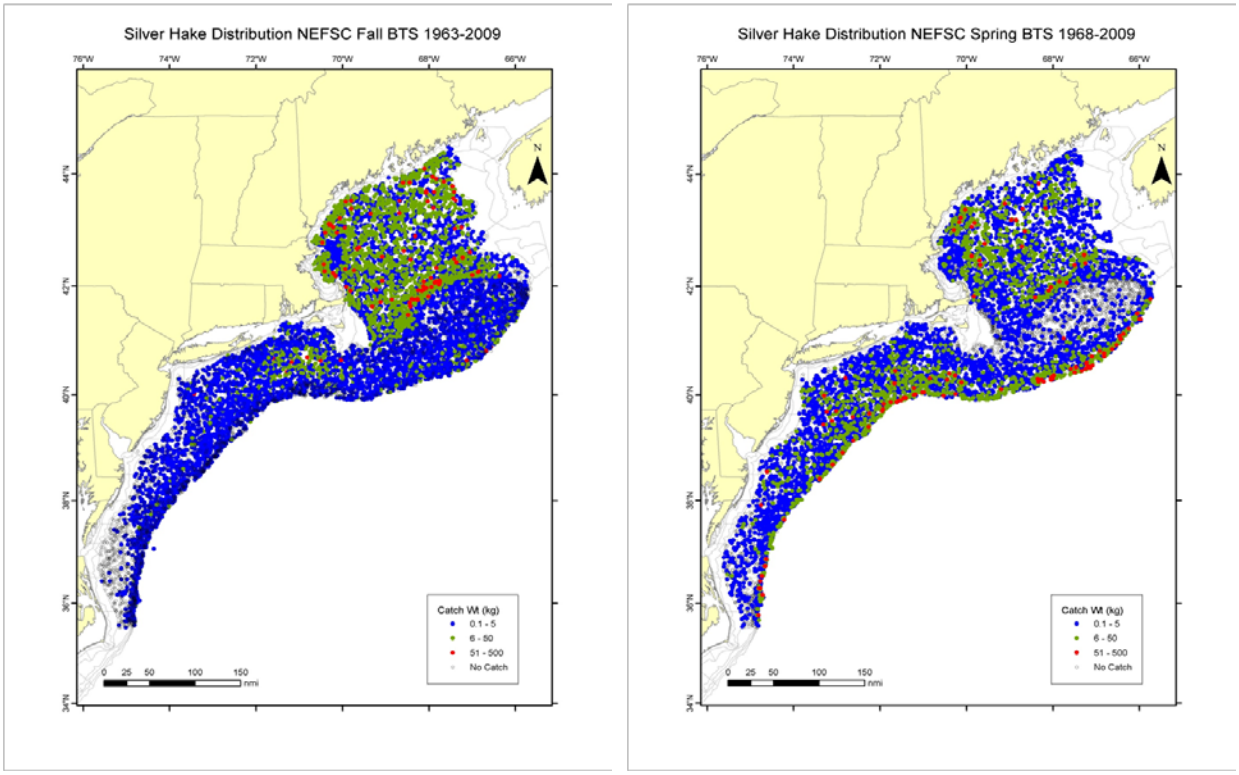


These fish are primarily targeted by commercial fishermen using small-mesh trawls in large-mesh exemption areas and seasons. Silver hake is the primary target for the small-mesh multispecies, but trips occasional target red hake particularly in the northern management area and offshore hake in the southern management area. Offshore and red hakes are mostly landed as non-target species when fishermen target silver hake.

Silver hake population (distribution indexed by the NMFS Bottom Trawl Survey - Map 3) constitutes an important link in the food web dynamics due to their high prey consumption capacity and as food source for major predators in the northwest Atlantic ecosystem. Consumptive estimates of silver hake indicate that predatory consumption represents a major source of silver hake removals from the system and primarily includes goosefish, bluefish, windowpane, four spot flounder, red hake, cod, silver hake, thorny skate, winter skate, little skate, Pollock and spiny dogfish (Garrison and Link 2000, NEFSC, 2010). Silver hake are generally cannibalistic but their diet varies by region, size, sex, season, migration, spawning and age (Garrison and Link 2000, Lock and Packer 2004, Link et al. 2011).

Over 50 percent of age-2 fish (20 to 30 cm, 8 to 12 in) and virtually all age-3 fish (25 to 35 cm, 10 to 14 in) are sexually mature (O'Brien et al. 1993). Silver hake grow to a maximum length of over 70 cm (28 in) and ages up to 14 years have been observed in U.S. waters, although few fish older than age 6 have been observed in recent years (Brodziak et al. 2001, NEFSC 2010). Silver hake are nocturnal, semi-pelagic predators, moving up in the water column to feed at night, primarily between dusk and midnight and returning to rest on the bottom during the day, preferring sandy, muddy or pebble substrate (Collette and Klein-MacPhee eds. 2002).

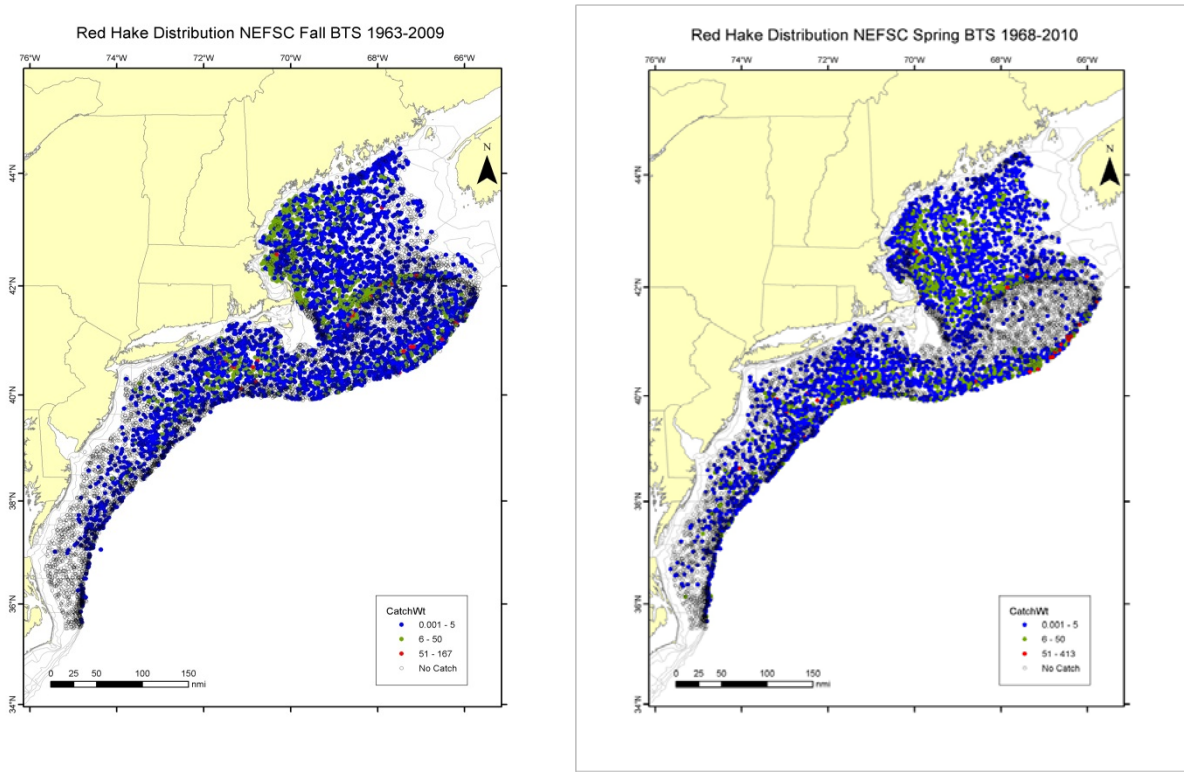
Map 3. Fall (left) and spring (right) survey distribution of silver hake from the NEFSC bottom trawl surveys, 1963-2009.



Red hake (distribution indexed by the NMFS Bottom Trawl Survey - Map 4) prefer soft sand or muddy bottom, and feed primarily on crustaceans such as euphausiids, decapods, and rock crabs as well as fish

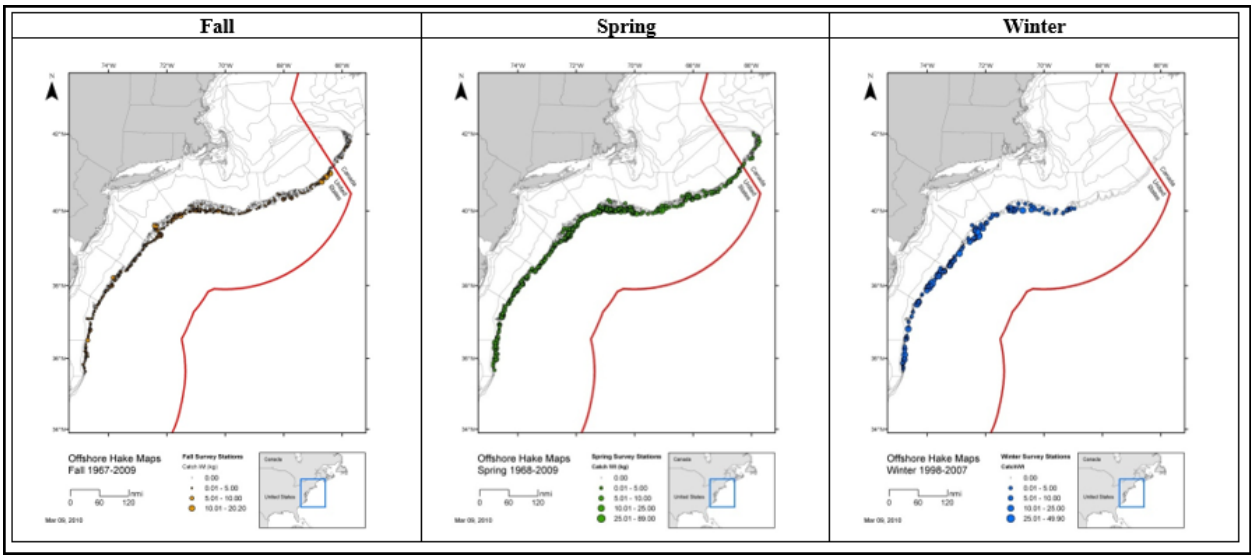
such as haddock, silver hake, sea robins, sand lance, mackerel and small red hake (Bowman et al. 2000). Primary predators of red hake include spiny dogfish, cod, goosefish, and silver hake (Rountree 1999). As juveniles, red hake seek shelter from predators in scallop beds, and are commonly found in the mantle cavities of (or underneath) sea scallops. In the fall, red hake likely leave the safety of the scallop beds due to their increasing size and to seek warmer temperatures in offshore waters (Steiner et al. 1982).

Map 4. Fall (left) and spring (right) survey distribution of red hake from the NEFSC bottom trawl surveys, 1963-2009.



Offshore hake are located primarily on the continental shelf and presumably beyond the NEFSC survey area (Map 5). Offshore hake tend to be concentrated in the southern Georges Bank region in the fall, whereas in the spring, they are found further south in the Mid-Atlantic Bight. However, offshore hake appear to be more abundant during the winter months.

Map 5. Fall (left), Spring (middle) and winter (right) survey distribution of offshore hake from the NEFSC bottom trawl surveys, 1967-2009.



5.2.1 Silver hake stock status and life history

Stock status

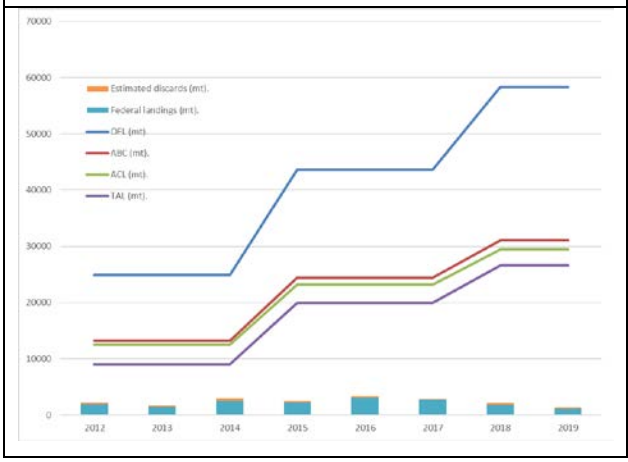
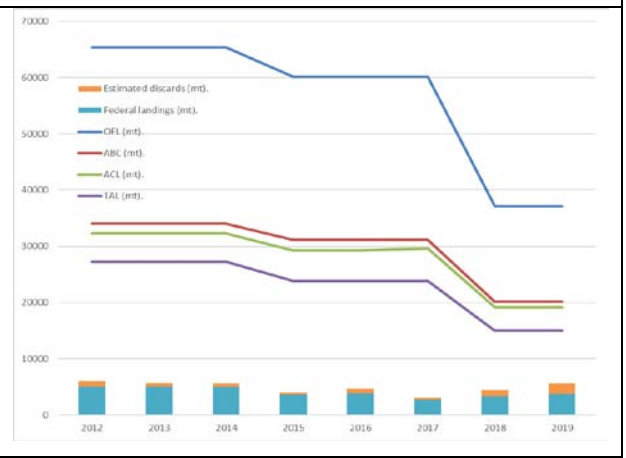
A management track assessment was performed in September 2020 (NEFSC 2020b) and the results were presented to the Council's Whiting Plan Development Team and its Scientific and Statistical Committee. In the absence of an analytical approach for assessing silver hake, this assessment follows the accepted empirical index-based method from the previous benchmark assessment (NEFSC 2010). The index-based approach is based on the three-year moving average of the NEFSC fall bottom-trawl survey and exploitation index for stock status determination. The assessment results are summarized below, but more details about the northern silver hake assessment are available in (NEFSC 2020b). More information about the analysis used by the Council to derive catch advice and the catch limit recommendations by the SSC are available on the Council's web site. More detail is provided in Appendix II of the SAFE Report (NEFMC 2020c).

As of 2019, both stocks of silver hake are not overfished and overfishing is not occurring. In fact, the fall survey biomass indices are well above the 1972-1983 MSY-proxy (biomass target). Exploitation is well below the overfishing threshold and catches since 2012 have been well below the annual specifications (Figure 2).

Since the implementation of catch limit specifications in Amendment 19, the northern silver hake and southern whiting stocks have remained healthy and the fishery has experienced some decline in trips, landings, and revenue (NEFMC 2020c). Northern silver hake and southern whiting catches in 2018-2019[4] have been a small proportion of the ACL, averaging 6 and 26 percent of the ACL respectively. More details about the annual silver hake and whiting catch estimates are in Section 5.1 of the SAFE Report (NEFMC 2020c)

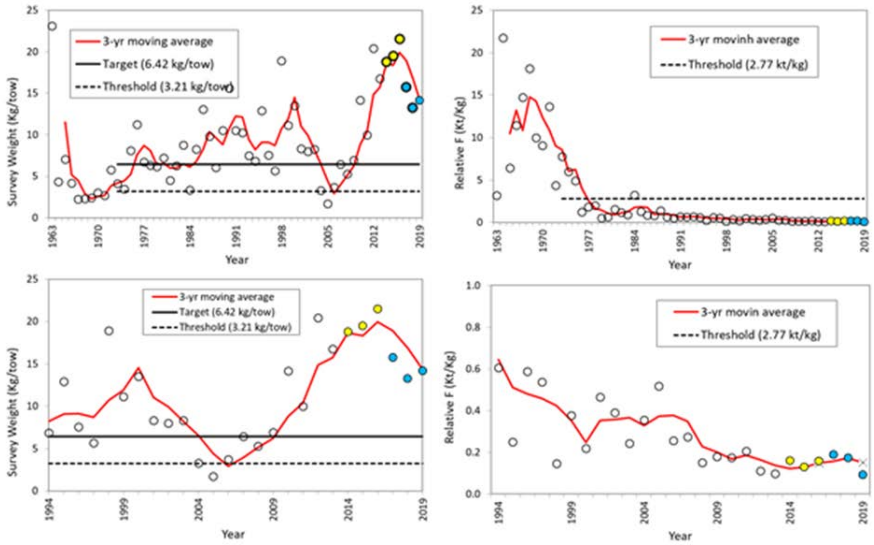
[4] The 2020 fishing year concludes on May 1, 2021 and thus 2020 fishing year performance is not yet available.

Figure 2. Discards and landings of northern silver hake and southern whiting as a proportion of the ACL since Amendment 19.

Northern silver hake	Southern Whiting
	

For northern silver hake (see figure below), the NEFSC fall index (kg/tow) in 2019 (defined as the 3-yr arithmetic average for years 2017-2019), was estimated to be 14.39 kg/tow) which is 224% of the proxy biomass target (B_{MSY} proxy = 6.42 kg/tow). The 2019 exploitation rate (also defined as the 3-yr arithmetic average for years 2017-2019) was estimated to be 0.15 which is 5% of the overfishing proxy threshold (F_{MSY} proxy = 2.77 kt/kg).

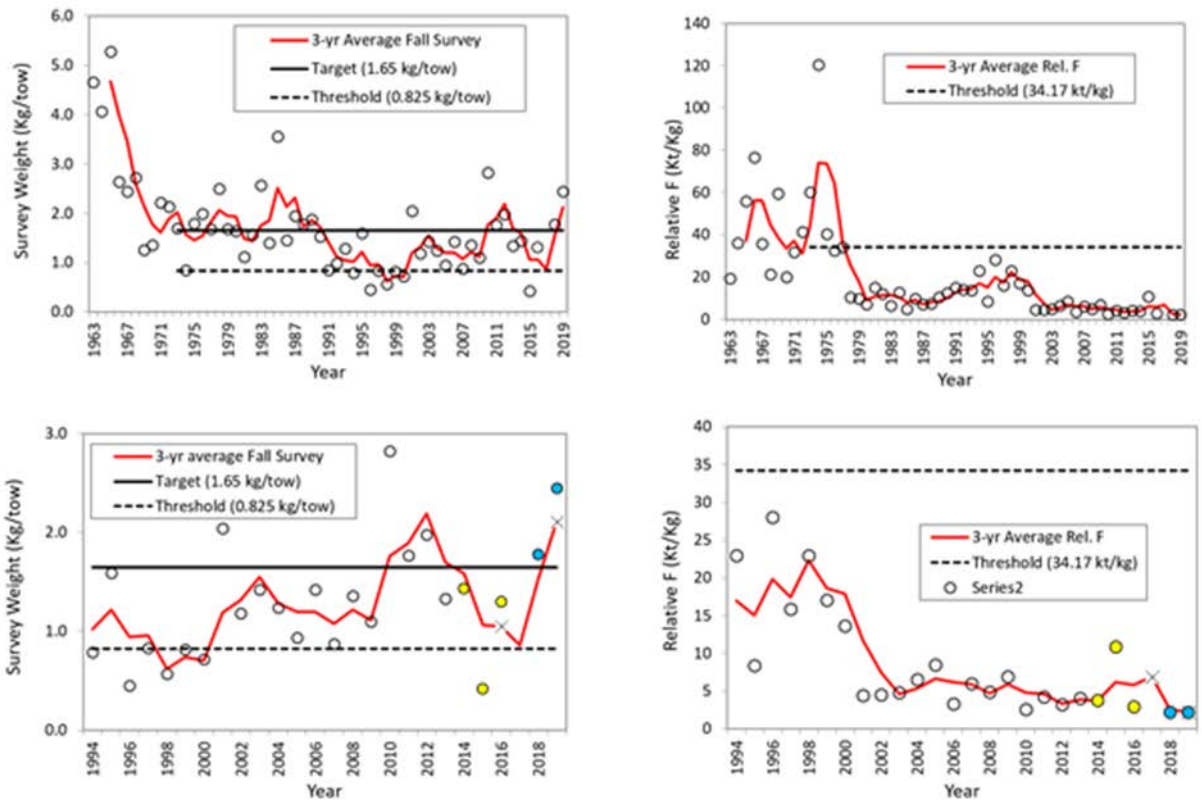
Figure 3. Northern silver hake fall survey biomass in kg/tow (LEFT) and relative exploitation ratios (RIGHT) of the total catch to the NEFSC fall survey index in kt/kg and associated 3-yr moving averages (solid red lines). The horizontal dash lines represent the biomass and overfishing thresholds and the solid horizontal line is the target. The LOWER panel plots reflect the most recent 27 years of the entire time series.



For southern silver hake (see figure below), the NEFSC fall index (kg/tow) in 2019 (defined as the 2-yr arithmetic average for years 2018-2019), was estimated to be 2.151 kg/tow which is 130% of the proxy biomass target (B_{MSY} proxy = 1.65 kg/tow). The 2019 exploitation rate (also defined as the 2-yr arithmetic

average for years 2018-2019) was estimated to be 1.907 which is 6% of the overfishing proxy threshold (F_{MSY} proxy = 34.17 kt/kg).

Figure 4. Southern silver hake fall survey biomass in kg/tow (LEFT) and relative exploitation ratios (RIGHT) of the total catch to the NEFSC fall survey index in kt/kg and associated 3-yr moving averages (solid red lines). The horizontal dash lines represent the biomass and overfishing thresholds and the solid horizontal line is the target. The LOWER panel plots reflect the most recent 27 years of the entire time series.



Life history

A summary of silver hake life history is provided in Hare et al. (2016). Silver hake is a fast swimming, mostly benthic, marine finfish species that occurs from the Gulf of St. Lawrence to South Carolina, but is most abundant from Nova Scotia to New Jersey (Lock and Packer, 2004). The species reaches maturity between 2 and 3 years of age (NEFSC, 2011). Spawning occurs in inshore areas of the Gulf of Maine, southern Georges Bank, Nantucket Shoals, and south of Martha's Vineyard to Cape Hatteras (Klein-MacPhee, 2002). Spawning begins in January in the southern portion of the range with a peak in spring, and continues to the north with a northern US peak in summer and a Canadian peak in late summer (Lock and Packer, 2004). Silver hake are serial spawners with up to three spawning events per season (Klein-MacPhee, 2002). Eggs are pelagic and hatch after about 2 days (Klein-MacPhee, 2002). Larvae are pelagic in the upper 40 m of water for approximately 1 month in the southern part of their range to up to 5 months in Canadian waters (Klein-MacPhee, 2002; Lock and Packer, 2004).

Calanoid copepods are the main prey of larval silver hake (Klein-MacPhee, 2002). Larvae first mature into pelagic juveniles that associate with jellyfish, then settle to the benthos at 12-20mm fork length (Klein-MacPhee, 2002; Lock and Packer, 2004). Benthic juveniles prefer silt or sand bottom with amphipod tubes for cover (Klein-MacPhee, 2002). Copepods, amphipods, mysids, euphausiids, and small decapod shrimp are the main prey of juveniles (Klein-MacPhee, 2002). Adult silver hake prefer cool

waters (3-17°C) at a variety of depths over sand or silt bottom from shallow inshore areas out to 400 m and possibly deeper (Klein-MacPhee, 2002). Silver hake are more active and hunt at night for crustaceans, a large variety of small fish, and squid (Klein-MacPhee, 2002). An ontogenetic shift from mostly crustaceans to mostly fish and squid prey occurs at 20-25cm, and cannibalism is also quite common in the species (Klein-MacPhee, 2002). Some of the many predators of silver hake include: spiny dogfish, little skate, monkfish (goosefish), pollock, Atlantic cod, haddock, hakes, Acadian redfish, sea raven, bluefish, Atlantic mackerel, swordfish, flounders, silver hake, and harbor porpoise (Klein-MacPhee, 2002).

Seasonal migrations from inshore summer and autumn habitat to offshore winter and spring habitat are influenced by temperature (Klein-MacPhee, 2002). Silver hake also undergo along-shore migrations and the northern and southern stocks mix on Georges Bank in summer (Lock and Packer, 2004). Based on a variety of metrics, the Gulf of Maine and Mid-Atlantic stocks are distinct, but the degree of mixing and the location of the boundary between stocks are not well understood (Lock and Packer, 2004).

5.2.2 Red hake stock status and life history

Stock status

A management track assessment was performed in September 2020 (NEFSC 2020b) and the results were presented to the Council's Whiting Plan Development Team and its Scientific and Statistical Committee. The overfished and overfishing status of both red hake stocks is considered unknown after the management track assessment yielded no accepted method to develop biological reference points. However, both the Research track (NEFSC 2020a) and the Management Track review panels agreed that based on the swept-area biomass analyses (Figure 6) there is little evidence of overfishing for either stock.

Catches of northern red hake exceeded the ACL in 2012, 2013, and 2015, but the combination of the AMs and high recruitment have allowed the stock to recover and in 2018-2019 the northern red hake catch has averaged only 40 percent of the ACL. Biomass of southern red hake declined while catches (primarily discards in the whiting and squid fisheries) increased in 2018-2019. This resulted in triggering AMs in 2018 and 2019 and the stock was assessed as being overfished. At the time, the average survey biomass during 1980-2010 was deemed to be an acceptable proxy for MSY conditions (NEFMC 2020a) but the most recent assessment (NEFMC 2020b) considered the stock status to be unknown, without MSY reference points. During 2018-2019, catches averaged 147% percent of the ACL, which was based on the former assessment and B_{msy}-proxy reference point.

Figure 5. Discards and landings of red hake as a proportion of the ACL since Amendment 19. Recreational catches are minor and not shown here because the catch specifications apply only to the commercial fishery.

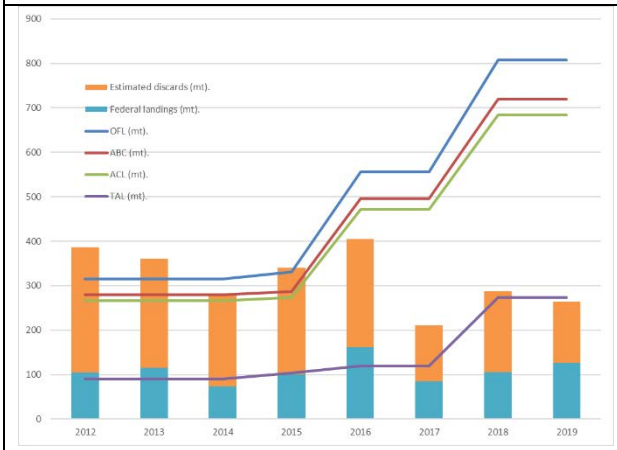
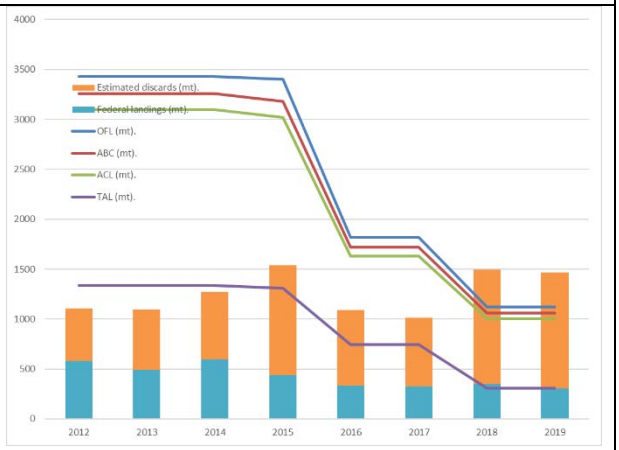
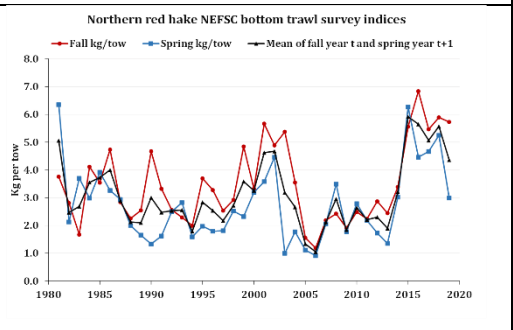
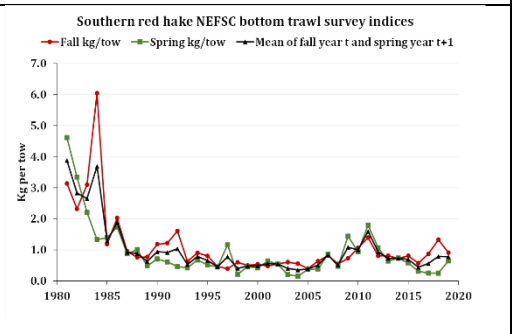
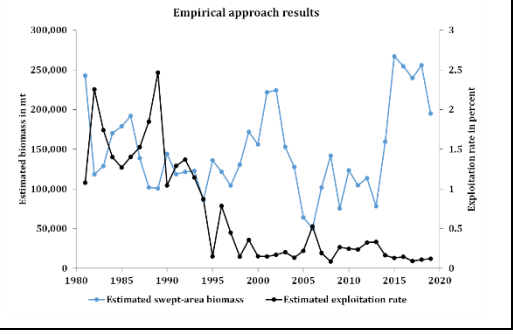
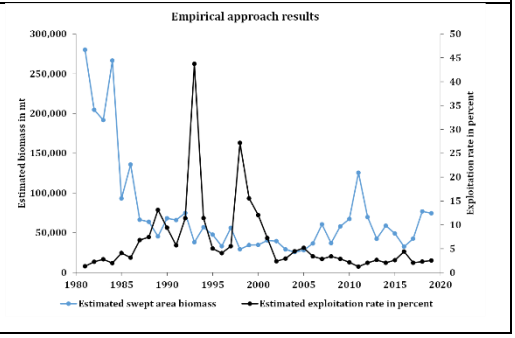
Northern red hake	Southern red hake
	

Figure 6. Trends in red hake biomass and exploitation (NEFSC 2020).

	Northern red hake	Southern red hake
Survey biomass (kg/tow)		
Exploitation rate and swept-area biomass		

For catch advice, the PDT put forth several options, most of which use the results of the original alternative strategy based on applications of a Plan B Smooth Approach. This method has been used before for providing catch advice of other stocks with empirical assessments. The method was originally created and programmed by Dr. Chris Legault at the NEFSC. The method works by taking a time series of survey indices in Albatross units and applying Loess smoothing to these points. The original method for Georges Bank cod was used, but with a time series of 38 years and a span of 0.3. To evaluate performance of the approach with respect to the red hake stocks, the Loess smoothed data are then fit with

a log-linear model to estimate the coefficient to be applied to a moving three-year average. The slope of these points, whether positive indicating an upward trend in survey indices or negative indicating a downward trend, is used as a multiplier to scale catch advice relative to a baseline period up or down to match the apparent trajectory of the stock. More information about the analysis used by the Council to derive catch advice and the catch limit recommendations by the SSC are available on the Council's web site.

Life history

A summary of offshore hake life history is provided in Hare et al. (2016). Red hake is a marine, demersal species found from the Gulf of St. Lawrence to North Carolina, but is most abundant from the western Gulf of Maine through southern New England (NEFSC, 2011). Red hake reach maturity around 1.4 (males) and 1.8 years (females; NEFSC, 2011), with females generally older and larger than males (Steimle et al., 1999). Spawning occurs from April through November (July to November in the Gulf of Maine) on the continental shelf and in coastal embayments (Steimle et al., 1999). Spawning in the Mid-Atlantic Bight may produce the majority of recruits (Steimle et al., 1999). Within a week from spawning, buoyant eggs hatch into small pelagic larvae that prey on copepods and other small planktonic crustaceans (Steimle et al., 1999). Larvae transition into pelagic juveniles at approximately 20-30 mm standard length (Fahay, 2007) and remain pelagic for approximately 2 months relying on floating debris, sargassum, and jellyfish tentacles for shelter (Steimle et al., 1999). By 35-40 mm total length, red hake begin a gradual descent to the benthos. They settle on fine-sand sediment on the shelf, and in larger estuaries in areas such as Sea Scallop beds, depressions in open seabeds, Atlantic surfclam shells, Moon Snail egg-case collars, anemone and polychaete tubes, debris, and artificial reefs (Steimle et al., 1999). Settlement occurs in September to December, but a strong thermocline may delay descent (Steimle et al., 1999). Throughout the juvenile stage, red hake prey on small crustaceans including larval and small decapod shrimp and crabs, mysids, euphausiids, and amphipods (Steimle et al., 1999).

Red hake are mostly demersal, but can be found in the water column. They tolerate a large range of temperatures, but may be sensitive to low dissolved oxygen levels (Steimle et al., 1999). Like juveniles, adult hake prefer soft sediments and use depressions in the sediment, shell beds, and inshore reefs (natural and artificial) for shelter, and are rarely found in open sandy bottom (Steimle et al., 1999). Red hake make seasonal migrations influenced by temperature, preferring inshore habitat during warm months, and offshore habitats during colder months (Steimle et al., 1999).

Adult hake prey upon crustaceans, demersal and pelagic fish, and squid (Steimle et al., 1999). Predators on adult and juvenile hake include many large piscivores such as striped bass, spiny dogfish, monkfish (goosefish), other hake species, sea raven, harbor porpoise, and larger red hake (Steimle et al., 1999).

5.2.3 Offshore hake stock status and life history

Offshore hake are not assessed and the status of the stock is unknown. Offshore hake occur primarily in deep water off the edge of the Continental Shelf and occasionally appear in survey and commercial fishery catches. Because offshore hake are landed with silver hake as "whiting", their catches are accommodated by a 4% increase in the southern whiting catch specifications that are derived from the southern silver hake biomass indices.

A summary of offshore hake life history is provided in Hare et al. (2016). Offshore hake is a marine species found along the outer continental shelf and upper slope from the southern edge of the Grand Banks to the Caribbean and Gulf of Mexico (KleinMacPhee, 2002). The mean length at maturity for this sexually dimorphic species is 23 cm for males and 28 cm for females, who tend to grow faster and live longer than males (NEFSC, 2011). The spawning season is long, peaking between April and July, but may continue year round (Chang et al., 1999; NEFSC, 2011). Spawning occurs on the outer continental shelf and presumably also on the slope at or near the sea floor, but produces pelagic eggs (Chang et al.,

1999). After 6-8 days, pelagic larvae hatch out of the eggs (Chang et al., 1999). Larvae transform at approximately 20 mm total length, but juveniles may not settle to benthic habitats until 30 mm TL (Chang et al., 1999). Juveniles and adults are demersal, occurring between 80 – 1170 m, but primarily occur around 200 m (Chang et al., 1999). Juveniles consume small fish, shrimp, and crustaceans (Chang et al., 1999). Monkfish (Goosefish), larger hakes, and likely other fishes prey on juvenile Offshore hake (Chang et al., 1999). Adult offshore hake may make vertical migrations at night and mature females may congregate on deeper parts of the slope than the males and juveniles (Chang et al., 1999; Klein-MacPhee, 2002). Adult hakes consume mostly fish, such as Lanternfish, sardines, anchovies, and juvenile conspecifics, but occasionally also include crustaceans and squids in their diet (Chang et al., 1999). The only documented predator of adult offshore hake is Monkfish (Goosefish); however other predators likely consume the species but are not identified due to difficulty separating offshore hake from silver hake (Klein-MacPhee, 2002).

5.3 Non-target Species (Bycatch)

In the 2019 SAFE Report (NEFMC 2020c), the Council's Whiting PDT estimated the bycatch of 21 species that are frequently caught by fishermen targeting whiting and red hake. The analysis included estimates for species in the large-mesh multispecies fishery, some of which are overfished and in a rebuilding program. This analysis focused only on trips fishing with trawl mesh less than 5.5 inches and landing more than 2,000 lbs of whiting or 400 lbs. of red hake, i.e. trips targeting small-mesh multispecies with small-mesh trawls.

The top three species that are discarded in the small-mesh multispecies fishery were silver hake, red hake, and spiny dogfish, representing 38.6% of the estimated total discards and 25.8% of total kept, or 4,549 mt (Table 14). Bycatch of overfished groundfish stocks (Table 15) that were estimated include winter flounder, ocean pout, yellowtail flounder, witch flounder , windowpane flounder, cod and white hake, which contributed to only 4.7% of the estimated total discards and 3.1% of total kept, or 554 mt. Atlantic herring is also overfished and accounted for 3.2% of estimated bycatch and 2.2% of total kept, or 383 mt during fishing years 2017-2019.

Table 14. Estimated small-mesh multispecies fishery discards by area and fishing year, 2017-2019. Only trips landing 2000 or more lbs. whiting or 400 or more lbs. red hake or greatest landed revenue was from whiting or red hake are included.

Area	Northern management area			Georges_SNE			Mid_Atlantic			Grand Total
Values	2017	2018	2019	2017	2018	2019	2017	2018	2019	
Total trips, VTR	504	391	271	506	696	899	138	242	347	3994
Observed trips, NEFOP & ASM	201	307	50	102	122	145	22	63	103	1115
Total kept, mt	3,484	2,222	1,654	2,441	2,969	2,791	453	599	990	17,602
Kept whiting, mt	2,993	1,847	1,379	1,510	2,089	1,918	153	219	503	12,611
Kept red hake, mt	168	212	221	61	70	73	8	41	93	947
Discards, mt	1,416	880	469	1,379	2,555	2,990	475	508	1,107	11,779
CV	100%	118%	56%	64%	64%	82%	43%	59%	57%	75%
Silver hake	**28**	**127**	**29**	**109**	**648**	**627**	**7**	**23**	**93**	**1,692**
Silver hake CV.	292%	149%	159%	149%	112%	107%	133%	120%	141%	121%
Red hake, mt	**107**	**84**	**54**	**207**	**549**	**628**	**13**	**152**	**173**	**1,967**
Red hake CV	186%	195%	101%	98%	111%	76%	82%	114%	118%	107%
Spiny dogfish, mt	**189**	**46**	**10**	**46**	**201**	**202**	**80**	**38**	**79**	**890**
Spiny dogfish CV.	213%	211%	145%	117%	97%	153%	121%	100%	98%	144%
Butterfish, mt	**5**	**1**	**1**	**136**	**260**	**197**	**52**	**28**	**94**	**774**
Butterfish CV.	272%	233%	236%	123%	135%	141%	77%	113%	83%	125%
Little skate, mt	**21**	**13**	**11**	**104**	**103**	**196**	**2**	**20**	**96**	**568**
Little skate CV.	294%	197%	55%	103%	91%	101%	101%	127%	109%	110%
Atlantic herring, mt	**172**	**74**	**72**	**16**	**7**	**27**	**10**	**3**	**2**	**383**
Atlantic herring CV.	128%	225%	187%	217%	262%	140%	13%	248%	201%	163%
Winter skate, mt	**21**	**129**	**7**	**44**	**38**	**41**	**5**	**4**	**21**	**311**
Winter skate CV.	309%	407%	101%	142%	179%	162%	188%	194%	154%	272%
Haddock, mt	**209**	**44**	**18**	**6**	**2**	**2**	**0**	**1**	**0**	**282**
Haddock CV.	151%	187%	136%	179%	227%	275%		140%		158%
Winter flounder, mt	**17**	**14**	**2**	**38**	**57**	**51**	**0**	**6**	**24**	**209**
Winter flounder CV.	141%	194%	158%	158%	138%	113%	133%	108%	101%	134%
Summer flounder, mt	**6**	**0**	**1**	**33**	**54**	**31**	**40**	**17**	**5**	**187**
Summer flounder CV.	346%	141%	245%	156%	138%	178%	181%	126%	148%	163%
Barndoor skate, mt	**4**	**3**	**4**	**46**	**35**	**25**	**20**	**11**	**0**	**148**
Barndoor skate CV.	274%	323%	138%	142%	113%	182%	83%	153%	137%	141%
Monkfish, mt	**13**	**17**	**7**	**8**	**20**	**28**	**6**	**12**	**18**	**129**
Monkfish CV.	143%	171%	34%	179%	180%	172%	74%	148%	96%	145%
Ocean pout, mt	**2**	**5**	**2**	**5**	**17**	**19**	**0**	**39**	**25**	**113**
Ocean pout CV.	177%	241%	97%	203%	155%	209%		104%	172%	155%
Yellowtail flounder, mt	**21**	**34**	**33**	**1**	**1**	**2**	**0**	**0**	**0**	**92**
Yellowtail flounder CV.	187%	221%	87%	161%	161%	283%		227%		164%
Witch flounder, mt	**10**	**19**	**5**	**1**	**11**	**1**	**10**	**4**	**5**	**66**
Witch flounder CV.	181%	151%	62%	136%	128%	344%	84%	173%	223%	144%
Windowpane flounder, mt	**2**	**0**	**4**	**12**	**13**	**12**	**1**	**3**	**5**	**51**
Windowpane flounder CV.	224%		0%	187%	148%	151%	78%	99%	89%	142%
American plaice, mt	**10**	**25**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**46**
American plaice CV.	128%	158%	49%		0%	0%		141%		127%
Thorny skate, mt	**3**	**2**	**12**	**0**	**0**	**0**	**1**	**0**	**1**	**18**
Thorny skate CV.	194%	302%	0%		0%		24%		173%	64%
Cod, mt	**5**	**0**	**4**	**0**	**2**	**1**	**0**	**0**	**0**	**13**
Cod CV.	186%		27%		186%	110%	0%		173%	128%
White hake, mt	**1**	**4**	**2**	**0**	**2**	**1**	**0**	**0**	**0**	**10**
White hake CV.	149%	371%	200%	172%	283%	313%	141%		173%	276%
Smooth skate, mt	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Smooth skate CV.		0%	0%		0%	0%				0%

Table 15. Current status of groundfish stocks, determined by NOAA Fisheries Source (Framework 59, NEMFC 2020a).

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

5.4 PROTECTED SPECIES

Section 5.4 of the Framework 62 EA (NEFMC 2020a, see Table 17 in Framework 62) provides a description of protected species, (i.e., Endangered Species Act (ESA)-listed and/or Marine Mammal Protected Act (MMPA)-protected species), found within the area where the small-mesh multispecies fishery occurs. Section 5.4.2 and Table 17 in Framework 62 provide information on protected species and critical habitat not likely to be impacted by the operation of the small-mesh multispecies fishery, while Section 5.4.3 and Table 17 provide information on those protected species that may impacted by the operation of the fishery. Species that may be impacted by the operation of the fishery include minke whales (no documented or observed interactions between bottom trawl gear and other large whale species)[5]; small cetaceans and pinnipeds; sea turtles (Kemp's ridley, loggerhead, leatherback, and green sea turtles); Atlantic sturgeon, Atlantic salmon, and Giant manta ray.

Table 17 of the Framework 62 EA provides a more detailed list of Small cetacean and pinniped species observed seriously injured and/or killed by Category II bottom trawl fisheries in the affected environment of the small-mesh multispecies fishery. Due to the incidental mortality and serious injury of small

[5] See Marine Mammal Stock Assessment Reports: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; MMPA List of Fisheries (LOF): https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries;; NMFS Observer Program, unpublished data; Sea Turtle Disentanglement Network (STDN) (unpublished data); NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://nefsc.noaa.gov/publications/crd/.

cetaceans, incidental to bottom and midwater trawl fisheries operating in both the Northeast and Mid-Atlantic regions, the Atlantic Trawl Gear Take Reduction Strategy (ATGTRS) was implemented. Additional information on the Strategy is at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-trawl-take-reduction-team.

To help identify ESA listed species potentially impacted by the action, we queried the Northeast Fisheries Observer Program (2010-2019), Sea Turtle Disentanglement Network (2010-2019), and the Marine Animal Incident (2010-2018) databases for interactions, and reviewed the May 27, 2021, Biological Opinion (Opinion)[6] issued by NMFS. The 2021 Opinion considered the effects of the NMFS' authorization of ten fishery management plans (FMP)[7], NMFS' North Atlantic Right Whale Conservation Framework, and the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2, on ESA-listed species and designated critical habitat.

The Opinion determined that the proposed action may adversely affect, but is not likely to jeopardize, the continued existence of North Atlantic right, fin, sei, or sperm whales; the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, or North Atlantic DPS of green sea turtles; any of the five DPSs of Atlantic sturgeon; Gulf of Maine DPS Atlantic salmon; or giant manta rays. The Opinion also concluded that the proposed action is not likely to adversely affect designated critical habitat for North Atlantic right whales, the Northwest Atlantic Ocean DPS of loggerhead sea turtles, U.S. DPS of smalltooth sawfish, Johnson's seagrass, or elkhorn and staghorn corals. An Incidental Take Statement (ITS) was issued in the Opinion. The ITS includes reasonable and prudent measures and their implementing terms and conditions, which NMFS determined are necessary or appropriate to minimize impacts of the incidental take in the fisheries assessed in this Opinion.

5.4.1 Interactions Between Gear and Protected Species

Protected species are at risk of interacting with various types of fishing gear, with interaction risks associated with gear type, quantity, soak or tow duration, and degree of overlap between gear and protected species. Information on observed or documented interactions between gear and protected species is available from as early as 1989 (Marine Mammal Stock Assessment Reports: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; NMFS Observer Program, unpublished data). As the distribution and occurrence of protected species and the operation of fisheries (and, thus, risk to protected species) have changed over the last 30 years, we use the most recent 10 years of available information to best capture the current risk to protected species from fishing gear. For marine mammals protected under the MMPA, this primarily covers the period from 2008-2017[8]; however, the Greater Atlantic Region (GAR) Marine Animal Incident Database (unpublished data) contains large whale entanglement reports through 2018. For ESA-listed species, the most recent 10 years of data on observed or documented interactions is available from

[6] NMFS' May 27, 2021, Biological Opinion on the 10 FMPs is found at: https://www.fisheries.noaa.gov/resource/document/biological-opinion-10-fishery-management-plans

[7] The ten FMPs considered in the May 27, 2021, Biological Opinion include the: (1) American lobster; (2) Atlantic bluefish; (3) Atlantic deep-sea red crab; (4) mackerel/squid/butterfish; (5) monkfish; (6) Northeast multispecies; (7) Northeast skate complex; (8) spiny dogfish; (9) summer flounder/scup/black sea bass; and (10) Jonah crab FMPs.

[8] Waring et al. 2015a; Waring et al. 2016; Hayes et al. 2017; Hayes et al. 2018; Hayes et al. 2019; Hayes et al. 2020; MMPA List of Fisheries (LOF): https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; NMFS NEFSC reference documents (marine mammal serious injury and mortality reports): https://nefsc.noaa.gov/publications/crd/.

2010-2019 (ASMFC 2017; GAR Marine Animal Incident Database, unpublished data; Kocik et al. 2014; Miller and Shepard 2011; Murray 2015; Murray 2020; NMFS Observer Program, unpublished data). The sections to follow are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used to prosecute the small-mesh multispecies fishery (i.e., small-mesh bottom trawl gear).

5.4.1.1 Marine Mammals

Depending on species, marine mammals have been observed seriously injured or killed in bottom trawl gear. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, MMPA LOF's have categorized bottom trawl fisheries (Northeast or Mid-Atlantic) as Category II fisheries (see: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries).

5.4.1.1.1 Large Whales

With the exception of minke whales, there have been no observed interactions with large whales and bottom trawl gear (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; https://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries; https://www.nefsc.noaa.gov/publications/crd/). In 2008, several minke whales were observed dead in bottom trawl gear attributed to the northeast bottom trawl fishery; estimated annual mortality attributed to this fishery in 2008 was 7.8 minke whales (Waring et al. 2015a). Since 2008, serious injury and mortality records for minke whales in U.S. waters have shown zero interactions with bottom trawl (northeast or Mid-Atlantic) gear. Based on this information, large whale interactions with bottom trawl gear are expected to be rare to nonexistent.

5.4.1.1.2 Small Cetaceans and Pinnipeds

Small cetaceans and pinnipeds are vulnerable to interactions with bottom trawl gear. Lyssikatos et al. 2020 estimated the bycatch of small cetaceans and pinnipeds in New England and Mid-Atlantic bottom trawl fisheries. Trends in bycatch since 2014 are stable, but the estimates are not broken out for small-mesh fisheries. Reviewing marine mammal stock assessment and serious injury reports that cover the most recent 10 years data (i.e., 2008-2017), as well as the MMPA LOF's covering this time frame (i.e., issued between 2016 and 2020), Table 16 provides a list of species that have been observed (incidentally) seriously injured and/or killed by MMPA LOF Category II (occasional interactions) bottom trawl fisheries that operate in the affected environment of the small-mesh multispecies fishery.[9]

[9] For MMPA LOFs issued between 2016 and 2020, see https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

Table 16. Small cetacean and pinniped species observed seriously injured and/or killed by Category II bottom trawl fisheries in the affected environment of the small-mesh multispecies fishery. Source: https://www.fisheries.noaa.gov/national/marine-mammal-protection/list-fisheries-summary-tables#table-2-category-ii

Fishery	Category	Species Observed or reported Injured/Killed
Northeast Bottom Trawl		Bottlenose dolphin, WNA offshore Common dolphin, WNA Gray seal, WNA Harbor porpoise, GME/BF Harbor seal, WNA Harp seal, WNA Long-finned pilot whale, WNA Risso's dolphin, WNA1 White-sided dolphin, WNA[1]
Mid-Atlantic Bottom Trawl		Bottlenose dolphin, WNA offshore Common dolphin, WNA[1] Gray seal, WNA1 Harbor seal, WNA Risso's dolphin, WNA[1] White-sided dolphin, WNA

Due to the incidental mortality and serious injury of small cetaceans, incidental to bottom and midwater trawl fisheries operating in both the Northeast and Mid- Atlantic regions, the Atlantic Trawl Gear Take Reduction Strategy (ATGTRS) was implemented. Additional information on the Strategy is at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-trawl-take-reduction-team.

5.4.1.2 Sea Turtles

Bottom trawl gear poses an injury and mortality risk to sea turtles (Sasso and Epperly 2006; NMFS Observer Program, unpublished data). Sea turtle interactions with trawl gear have been observed in the Gulf of Maine, Georges Bank, and/or the Mid-Atlantic; however, most of the observed interactions have been observed south of the Gulf of Maine (Murray 2015; Murray 2020; NMFS Observer Program, unpublished data). As few sea turtle interactions have been observed in the Gulf of Maine, there is insufficient data available to conduct a robust model-based analysis and bycatch estimate of sea turtle interactions with trawl gear in this region. As a result, the bycatch estimates and discussion below are for trawl gear in the Mid-Atlantic and Georges Bank.

Murray (2020) provided information on sea turtle interaction rates from 2014-2018. Interaction rates were stratified by region, latitude zone, season, and depth. The highest loggerhead interaction rate (0.43 turtles/day fished) was in waters south of 37º N during November to June in waters greater than 50 meters deep. The greatest number of estimated interactions occurred in the Mid-Atlantic region north of 39º N, during July to October in waters less than 50 meters deep, due to a greater amount of commercial effort in this stratum compared to those farther south. Within each stratum, interaction rates for non-loggerhead species were lower than rates for loggerheads.

Based on Murray (2020)[10], from 2014-2018 (the most recent five-year period that has been statistically analyzed for trawls), 571 loggerheads (CV=0.29, 95% CI=318-997) were estimated to have interacted with bottom trawl gear in the U.S. Mid-Atlantic, while 12 loggerheads (CV=0.70, 95% CI=0-31) were estimated to have interacted with bottom trawls on Georges Bank. Of these interactions, Murray (2020) estimated 272 loggerhead sea turtles died from these interactions. In the Mid-Atlantic, 38 loggerheads were estimated to have been excluded by Turtle Excluder Devices (TEDs). In regard to non-loggerhead species, from 2014-2018, Murray (2020) estimated that a total of 46 Kemp's ridley (CV=0.45, 95% CI=10-88) and 16 green (CV=0.73, 95% CI=0-44) sea turtles interacted with bottom trawl gear in the Mid-Atlantic, of which 23 and eight resulted in mortality, respectively. Murray (2020) also estimated that 20 (CV=0.72, 95% CI = 0-50) and six (CV=1.0, 95% CI=0-20) leatherback interactions with bottom trawl gear occurred in the Mid-Atlantic and on Georges Bank, respectively; these interactions resulted in 13 total leatherback mortalities. No Kemp's ridley, green, and leatherback sea turtles were estimated to have been excluded by TEDs.

5.4.1.3 Atlantic Sturgeon

Atlantic sturgeon interactions (i.e., bycatch) with bottom trawl gear have been observed throughout the Northwest Atlantic Ocean, with interactions often resulting in injury or mortality to the animal (ASMFC 2017; Miller and Shepard 2011; NMFS Observer Program, unpublished data). Atlantic sturgeon have been observed bycaught in trawl gear with small (< 5.5 inches) and large (≥ 5.5 inches) mesh sizes (Miller and Shepard 2011), with most sturgeon captured falling within the 100-200 cm total length range, although both larger and smaller individuals have been observed captured (ASMFC 2017; NMFS Observer Program, unpublished data). In addition, for otter trawl fisheries, the highest incidence of Atlantic sturgeon bycatch was associated with depths less than 30 meters (ASMFC 2007).

The ASMFC (2017) Atlantic sturgeon benchmark stock assessment represents the most accurate predictor of annual Atlantic sturgeon interactions in fishing gear (e.g., otter trawl, gillnet). The stock assessment analyzes fishery observer and VTR data to estimate Atlantic sturgeon interactions in fishing gear in the Mid-Atlantic and New England regions from 2000-2015, the timeframe which included the most recent, complete data at the time of the report. Focusing on the most recent five-year period of data provided in the stock assessment report[11], the estimated average annual bycatch of Atlantic sturgeon in bottom otter trawl gear during 2011-2015 is 777.4 individuals.

5.4.1.4 Atlantic Salmon

Adult Atlantic salmon may be present throughout the water column and could interact with bottom trawl gear. All observed takes of Atlantic salmon that have been recorded by the NEFOP and ASM programs since 1989 have occurred in bottom trawls (or gillnets). Review of NEFOP and ASM observer records over the most recent ten-year timeframe of 2010-2019[12], reveals that there were no reported takes in

---

[10] Murray (2020) estimated interaction rates for each sea turtle species with stratified ratio estimators. This method differs from previous approaches (Murray 2008; Murray 2015; Warden 2011a,b), where rates were estimated using generalized additive models (GAMs). Ratio estimator results may be similar to those using GAM or generalized linear models (GLM) if ratio estimators are stratified based on the same explanatory variables in a GAM or GLM model (Murray 2007, Murray and Orphanides 2013, Orphanides 2010).

[11] The period of 2011-2015 was chosen as it is the period within the stock assessment that most accurately resembles the current trawl fisheries in the region.

[12] The timeframe of 2010-2019 was chosen as those years most accurately reflect current effort trends and gear use in the fisheries operating in the Greater Atlantic Region, the current biological environment in the affected

bottom trawl gear. However, prior to 2010 there were four incidental takes that occurred in bottom trawl gear (one in 1992, one in 2004, and two in 2005).

Given the very low number of observed Atlantic salmon interactions in bottom trawl gear as reported in the NEFOP database (which includes ASM data) suggests that interactions with this gear type are rare events in the Greater Atlantic Region.

5.4.1.5 Giant Manta Ray

Review of the most recent 10 years of NEFOP data showed that between 2010-2019, two Giant Manta Rays were captured in bottom trawl gear (NMFS Observer Program, unpublished data). Available records of all observed captures in U.S fisheries indicate that the vast majority of giant manta rays are released alive (C. Horn, pers. comm. December 3, 2018). However, details about specific conditions such as injuries, damage, time out of water, how the animal was moved or released, or behavior on release was not always recorded. As a result, currently there is no information available on post-release survival. Based on the best available information, interactions between Giant Manta Rays and bottom trawl gear are likely rare events.

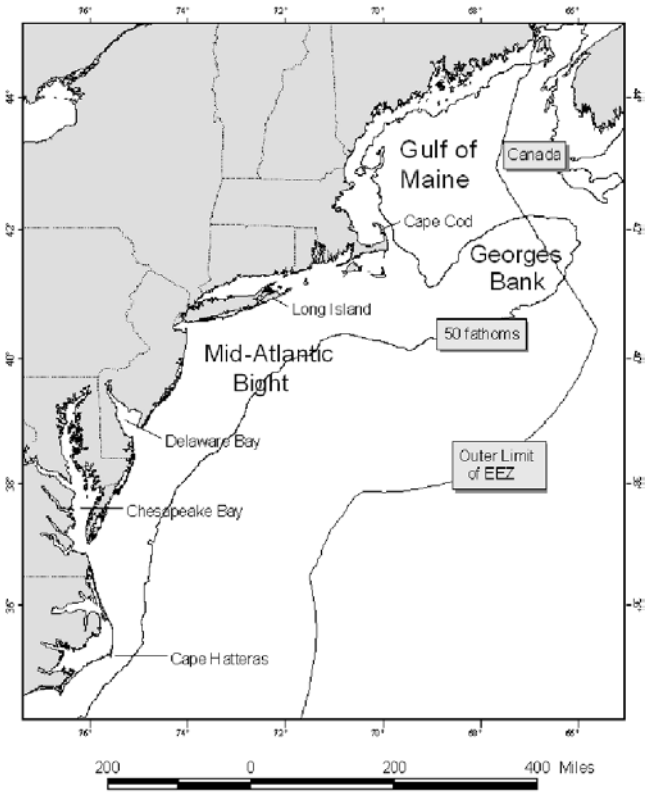
5.5 Physical Environment and Essential Fish Habitat

5.5.1 Physical Environment

The small-mesh multispecies fishery is prosecuted in the coastal waters out to the Continental Shelf edge in the Gulf of Maine, Georges Bank, and the Mid-Atlantic Bight (including Southern New England). A brief summary of the physical characteristics of these areas (Map 6) is given below, but more detail is available in Section 5.5 of the Framework 62 EA (NEFMC 2020a).

environment, and encompass years following the "regime shift" of low marine survival for Atlantic salmon that began in the early 1990s and has persisted to date.

Map 6. Northeast shelf ecosystem.



Gulf of Maine

The Gulf of Maine (GOM) is bounded on the east by Browns Bank, on the north by the Nova Scotian (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank. The GOM was glacially derived, and is characterized by a system of deep basins, moraines and rocky protrusions with limited access to the open ocean. This geomorphology influences complex oceanographic processes that result in a rich biological community.

Georges Bank

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

Mid-Atlantic Bight

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

5.5.2 Essential Fish Habitat

An update to the EFH Amendment, Omnibus EFH Amendment 2 (OHA2, NEFMC 2016), was approved by the Council in June 2015. OHA2 revised EFH designations for all the species managed by the Council, assessed fishing and non-fishing impacts for all the gears used in NEFMC-managed fisheries, and updated management measures to conserve EFH. The new EFH designations and management measures were implemented in April 2018. Hake EFH includes both inshore and offshore areas, typically with soft sediments and some sort of structure such as biogenic depressions or sand waves. Depending on the life stage, hakes may occur on the seabed, or in the water column. The new EFH maps for silver and red hake are based on state and NEFSC trawl survey data through 2005 and data inventories for fourteen estuaries, with juvenile distributions used as a proxy for the egg and larval life stages. Offshore hake EFH for eggs and larvae are based on egg and larval survey data, and the combined juvenile and adult designation map includes areas with high catch rates in the trawl survey. Hake EFH designations also include the continental slope to a depth of 400 m (juvenile and adult silver hake) or 750 m (adult red hake, juvenile and adult offshore hake), beyond the depth covered by the trawl survey.

The area that may potentially be affected by the preferred alternative has been identified as EFH for various species that are managed under the Fishery Management Plans for Northeast Multispecies; Atlantic Sea Scallop; Monkfish; Deep-Sea Red Crab[13]; Northeast Skate Complex; Atlantic Herring; Summer Flounder, Scup, and Black Sea Bass; Tilefish; Atlantic Mackerel, Squid, and Butterfish; Bluefish; Spiny Dogfish; and Atlantic Surfclam and Ocean Quahog. EFH for many of the species managed under these FMPs includes a wide variety of benthic habitats in state and federal waters throughout the Northeast U.S. Shelf Ecosystem. For more information on the geographic area, depth, and EFH description for each applicable life stage of these species, the reader is referred to OHA2 for New England-managed species, and various Mid-Atlantic FMPs for summer flounder/scup/black sea bass, tilefish, mackerel/squid/butterfish, spiny dogfish, and clams.[14]

5.5.3 Gear Impacts from the Small-Mesh Multispecies Fishery

The small-mesh multispecies fishery is primarily a trawl fishery. Omnibus EFH Amendment 2 (OHA2, NEFMC 2017) and previous Council actions have found that bottom trawls can cause adverse, i.e., more than minimal and not temporary, impacts to EFH.

The Swept Area Seabed Impact (SASI) approach was the primary framework used in OHA2 to evaluate the impacts of fishing on the physical and biological environment (NEFMC 2011). SASI combined a literature-based vulnerability assessment with a spatially explicit modeling framework that linked fishing effort data with seabed habitat distributions and vulnerability indices. The SASI model estimated the distribution of the adverse effects of fishing on EFH in space and time. The Northeast Fishing Effects Model (NEFMC 2020) is currently used by the Council as the basis for adverse effects determinations. Fishing Effects is built largely on the SASI approach, with some revisions to the modeling methods and additional recent fishing effort and seabed data. Habitat type in both SASI and Fishing Effects is a combination of substrate grain size, degree of natural disturbance, and the biological and geological seabed features likely to occur at a location.

---

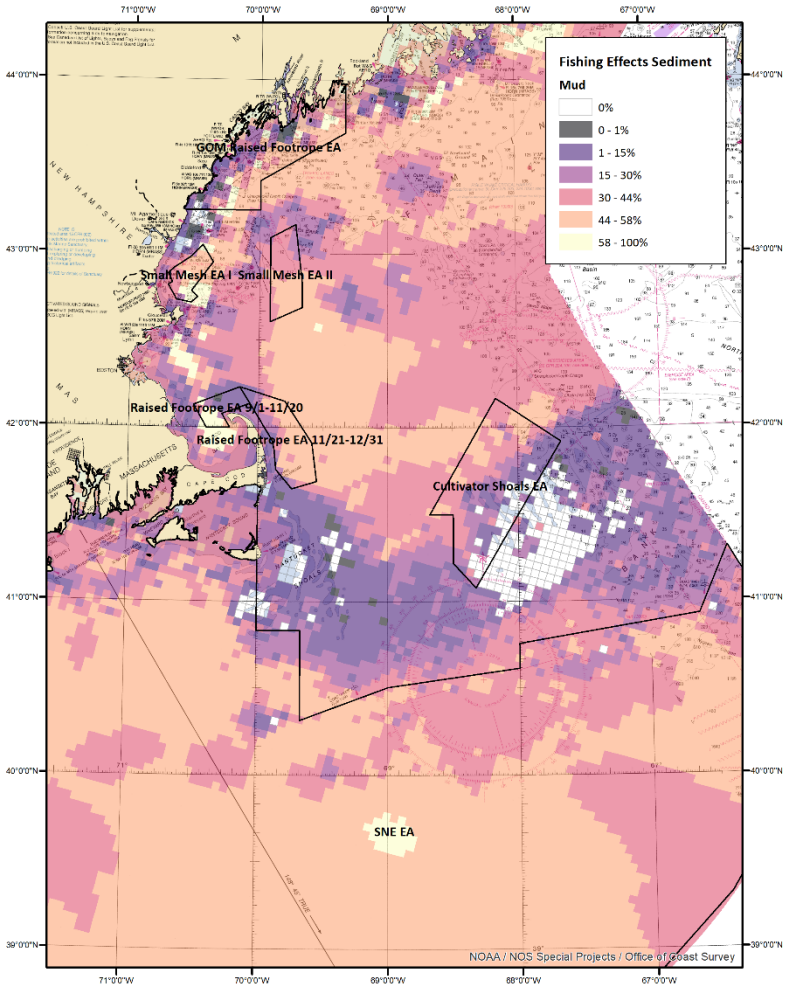
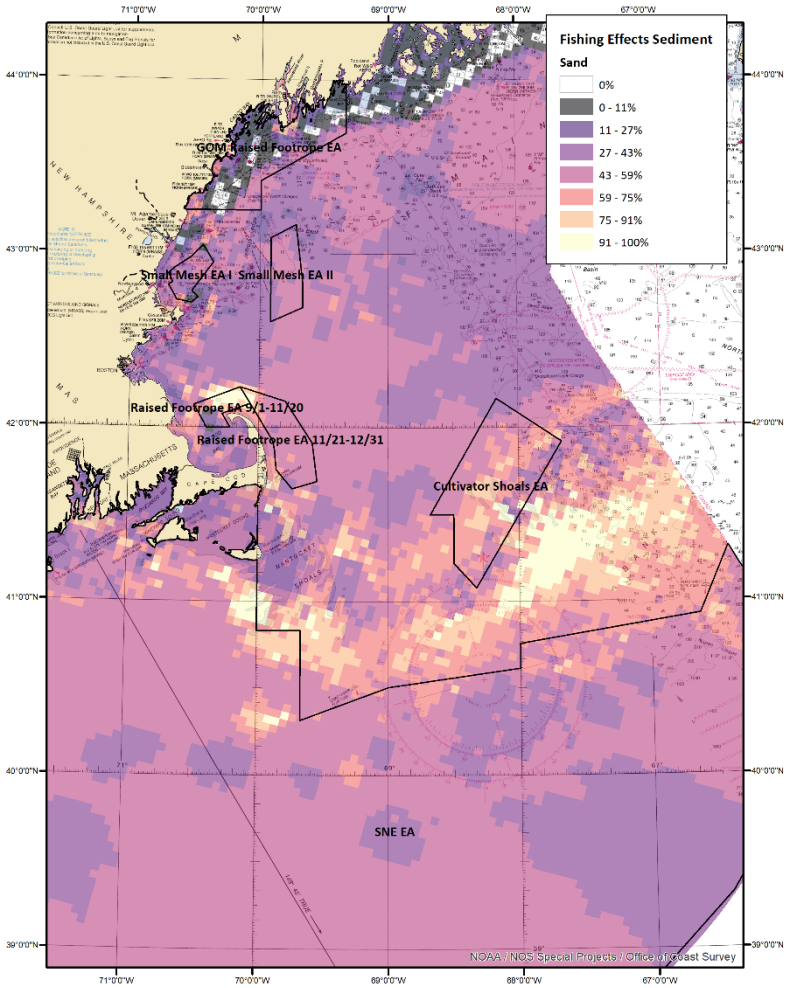
[13] The OHA2 designations for red crab have a minimum depth of 320 m, such that red crab EFH is outside the depths typically targeted by the whiting fishery.

[14] Summer Flounder, Scup, and Black Seabass Amendment 12 (MAFMC 1998a), Golden Tilefish Amendment 1 (MAFMC 2008), Atlantic Mackerel, Squid and Butterfish Amendment 11 (MAFMC 2011), Atlantic Surfclam and Ocean Quahog Amendment 12 (MAFMC 1998b), Spiny Dogfish Amendment 3 (MAFMC 2014); Bluefish Amendment 1 (MAFMC 1998c).

With minor modifications, the SASI vulnerability assessment (published as Grabowski et al 2014) continues to serve as the foundation for Fishing Effects. The vulnerability assessment found that there are differences between habitat types in terms of their relative vulnerability to gear impacts. Aggregating across the suite of seabed features present in each habitat type, soft bottom, high-energy habitats are estimated to be less vulnerable to the effects of fishing gear (see Figure 2 in Grabowski et al. 2014). The estimated effects of different gear types on seabed features are detailed in Tables 8 through 18 in the Fishing Effects report (NEFMC 2020). This habitat- and gear-specific vulnerability, combined with the magnitude of fishing effort, influences the habitat disturbance occurring at a particular location over time. Model inputs and results can be viewed on the Northeast Ocean Data Portal, under 'Fishing Effects – Sediment' and 'Fishing Effects – Seabed Habitat Disturbance'.

The small-mesh multispecies fishery is not the only one to rely on bottom trawl gears. Thus, the adverse effects associated with the small-mesh fishery are a subset of those estimated for bottom trawl gear in aggregate. The small-mesh multispecies fishery is spatially and seasonally restricted seven exemption areas and year-round in the Southern New England and Mid-Atlantic regulated mesh areas (Map 7). Many of these exemption areas are dominated by sand or mud habitats which are less vulnerable to fishing gears. Exceptions are the Gulf of Maine Raised Footrope Exemption Area, which includes areas of gravel and rock habitat, and the eastern edge of the Cultivator Shoals Exemption Area, which has sand/gravel habitats. In addition, all but the Cultivator Shoals Area and the Southern New England and Mid-Atlantic regulated mesh areas require a raised footrope trawl, which reduces contact of that portion of the gear with the seabed, thus reducing impacts somewhat as compared to other trawl configurations. In combination, these two factors mitigate to some extent the adverse effects of the small-mesh fishery on EFH.

Map 7. Fishing effects sediment classification within and surrounding small-mesh exemption areas. Mud, sand, pebble, cobble, boulder, and deep/rocky) sum to 1 for each grid cell.

Percent mud	Percent sand
	

5.6 HUMAN COMMUNITIES

Section 5.6 of the Framework 62 EA (NEFMC 2020a) provides a detailed description of trends in price, revenue, permitting, and community participation and dependence. Updated information on landings, price, revenue, and permitting were published in the SAFE Report for fishing year 2019 (NEFMC 2020c). Brief summaries of these analyses are provided here, but for more detailed information the above documents should be consulted.

5.6.1 Commercial Whiting Fishery

Silver Hake

Some 60% of northern silver hake catches occurred on squid/whiting trips and another approximately 13% were caught on squid trips. Almost all of the catch for both kinds of trips were landings. Groundfish trips were the third highest group, catching 11.8% of whiting catch, mostly discards. The discard rate for silver hake is typically lower than it is for red hake, presumably because of more market demand and better tolerance of shipping and handling. Nominal discards in the northern stock area were variable, peaking at 750 mt in 2007, and have been steadily declining but variable and currently estimated at 132 mt in 2019 (Table 17). Much of this variability in discards appears to be related to market demand. These peaks in discards resulted in the discard rate spiking to 43% in 2008 and 32% in 2010 (Section 5.2.1). The discard rate for 2017-2019 averaged 8.4% and state landings averaged 1.6% of total catch.

Over 80% of the southern whiting catches were from squid and squid/whiting trips, with squid trip catch about double the squid/whiting catch. About 60% of the squid trip catch was from landings while almost all of the squid/whiting trip catch was from landings. From FY17 to FY18, southern whiting estimated discards increased by about 1.54 million lb. (185%) from about 830,000 lb. to about 2.37 M lb. 90% of that increase was due to increased discards in the southern small mesh trawl strata. Total commercial landings in those strata increased 14.7%, thus the remaining ~170% increase was due to increases in discard rates. The silver hake discard rate in the southern stock area is typically even lower than it is for northern silver hake, under 20% throughout the time series. The proportion discard in the southern area was varying without trend, but have recently increased. Discards were estimated to be only 150 mt in 2007, but increased to 1800 mt in 2011, before declining to 290 mt in 2015. In 2018 and 2019, southern whiting discard increased considerably from 377 mt in 2017 to 1,076 mt in 2018 and to 1,892 mt in 2019 (Table 17). The discard rate for 2017-2019 averaged 25.1%% and state landings averaged 1.1% of total catch

Table 17. Fishing year 2019 whiting (silver and offshore hake) landings and discards by stock area.

	Pounds	Metric tons	Percent of ACL (29,475 mt)	Percent of total catch
Northern silver hake commercial landings	2,664,917	1,209	4.1%	83.6%
Northern silver hake state-permitted only vessel landings	43,297	20	0%	1%
Northern silver hake research catch outside of Magnuson	169	0	0%	0%
Northern silver hake estimated discard	291,140	132	0.4%	9.1%
Northern silver hake recreational catch (MRIP)	187,977	85	0.3%	5.9%
Northern silver hake catch	2,999,523	1,361	4.6%	100.0%

	Pounds	Metric tons	Percent of ACL (18,425 mt)	Percent of total catch
Southern whiting commercial landings	8,295,610	3,763	20.4%	65.6%
Southern whiting state-permitted only vessel landings	164,194	74	0.4%	1.3%
Southern whiting research catch outside of Magnuson	6,719	3	0.0%	0.1%
Southern whiting estimated discard	4,171,051	1,892	10.3%	33.0%
Southern whiting hake recreational catch (MRIP)	4,908	2	0.0%	0.0%
Southern whiting catch	12,637,573	5,732	31.1%	100.0%

Red Hake

Over 80% of southern red hake was caught on squid, scallop, and squid/whiting trips. More than 90% of the squid fishery catch was discards, all of the scallop fishery catch was discards and most of the squid/whiting catch was landings. Red hake is part of the Bycatch Reduction Program (http://www.squidtrawlnetwork.com/red-hake-latest-high-avoidan/) which is a Cornell Cooperative Extension Marine Program funded by NOAA Fisheries and National Fish and Wildlife Foundation designed to develop innovative solutions to reduce bycatch through bycatch reduction devices and modifications to gear.

The three-year moving average of red hake discard rates has been variable over time; however, the most recent fishing years show the discard rates have generally been increasing. The time series of Federal landings and estimated discards is summarized in Section 5.2.2. From FY17 to FY18, northern red hake discards increased from 59.4% to 63.2% and for southern red hake, discards increased from 67.1% to 76.4%. In FY2018, discards accounted for 2.5 million lb. Most of this bycatch is associated with the small-mesh fishery that targets whiting and squid, and the scallop fishery. The discard rate for 2017-2019 averaged 57.1% for northern red hake and 68.9% for southern red hake. State-water landings averaged 1.6% and 1.1% of total catch, respectively.

Table 18. Fishing year 2019 red hake landings and discards by stock area.

	Pounds	Metric tons	Percent of ACL (685 mt)	Percent of total catch
Northern red hake commercial landings	278,105	126	18.4%	44.9%
Northern red hake state-permitted only vessel landings	-	-	0%	0%
Northern red hake research catch outside of Magnuson	47	0	0%	0%
Northern red hake estimated discard	304,638	138	20.2%	49.2%
Northern red hake recreational catch (MRIP)	36,566	16.6	2.4%	5.9%
Northern red hake catch	582,790	264	38.6%	100.0%
	Pounds	Metric tons	Percent of ACL (1,007 mt)	Percent of total catch
Southern red hake commercial landings	665,123	302	30.0%	16.5%
Southern red hake state-permitted only vessel landings	51,600	23	2.3%	1.3%
Southern red hake research catch outside of Magnuson	141	0	0.0%	0.0%
Southern red hake estimated discard	2,568,183	1,165	115.7%	63.9%
Southern red hake recreational catch (MRIP)	735,591	334	33.1%	18.3%
Southern red hake catch	3,285,047	1,490	148.0%	100.0%

5.6.1.1 Commercial Small-Mesh Multispecies Permits and Vessels

Vessels fishing for small-mesh multispecies in an exemption program must possess either an open access (Category K) or limited access (Categories A-F) NE multispecies permit. Small-mesh multispecies fishermen hold a range of other federal permits. A K-permit or groundfish permit (A-F) is required to land small-mesh multispecies.

The number of such permits issued in a year reflects the number of vessels potentially landing small-mesh multispecies. Since 2007, the number of open access (Category K) permits issued each year has ranged between 589 and 774, with 632 K permits issued in 2018. The number of groundfish permits (A to F) issued during the same time period ranged between 1,230 to 1,761 permits, with 1,238 groundfish permits issued in 2018.

During 2012-2019, the number of vessels that landed one or more pounds of small-mesh multispecies (i.e., anyone (or combination) of silver hake, offshore hake or red hake) ranged between 304 and 357. The number of boats engaged in small-mesh multispecies landing are on decline with its lowest level in 2019 (see Table 15 in the SAFE Report, NEFMC 2020c). Averaged during 2012-19, there were about 280 vessels that landed whiting and 188 vessels that landed red hakes7F . In 2018, there were 274 vessels (with 6,903 trips) that landed whiting and about 179 vessels (with 3,898 trips) that landed red hake8F . In 2019, there were 257 vessels (with 7,482 trips) that landed whiting and 180 vessels (with 3,847 trips) that landed red hake (see Table 14 in the SAFE Report, NEFMC 2020c).

5.6.1.2 Landings, Revenues, and Prices

Table 19 summarizes the commercial fishery characteristics for the small-mesh multispecies during fishing years 2012 to 2019.

Landings. Small-mesh multispecies landings consist of whiting (silver and offshore hakes) and red hake, the majority being silver hake.

> **Whiting landings**. Whiting landings have been declining since 2014. It averaged 12.12 mil pounds in recent past three years (2016-2018). The landings were about 11.47 mil and 10.99 mil pounds in 2017 and 2018, respectively. The 2019 landings slightly decreased by about 0.29 percent to 10.97 mil pounds from 2018 landings and it declined by about 9.51% from 2016-2018 averages (Figure 7).
>
> **Red hake landings**. Red hake landing averaged to 0.99 mil pounds during 2016-2018. The landings were about 1.02 mil and 0.9 mil pounds in 2018 and 2019, respectively. The landing in 2019 decreased by about 11.63 percent compared to 2018 (Figure 7).

Revenues. Real revenues (in 2019 dollar) from small-mesh multispecies landings were $10.1 mil and $9.0 mil in 2018 and 2019, respectively. They were lower than 2016-2018 averages at $10.53 mil (Table 13). It decreased by 10.9 percent in 2019 compared to 2018 (Table 14). The 2016-2018 average revenue for whiting and red hake were $9.94 mil and $0.47 mil, respectively. Revenues declined to $8.49 mil for whiting and $0.39 mil for red hake in 2019 from their recent past averages. In 2018, whiting and red hake revenues were at $9.54 mil and $0.402 mil, respectively.

Prices. In 2018, real prices for whiting and red hake were $0.85 and $0.38 per pound (in 2019 dollar), respectively. In 2019, the price decreased to $0.76 for whiting but increased to $0.43 for red hake.

Figure 7. Landings, revenues, and prices for whiting and red hakes on landings ≥1 pounds

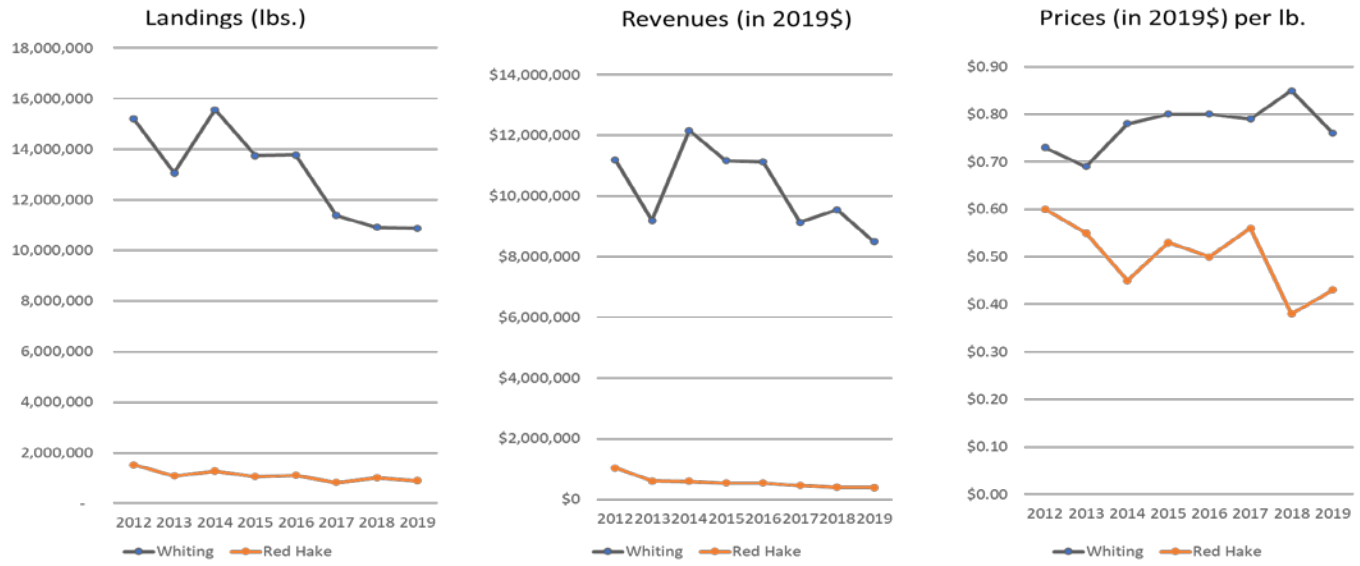


Table 19. Small-mesh multispecies effort, landings, revenue, and price by species and management area for vessels landing at least 1 lb. of small-mesh multispecies.

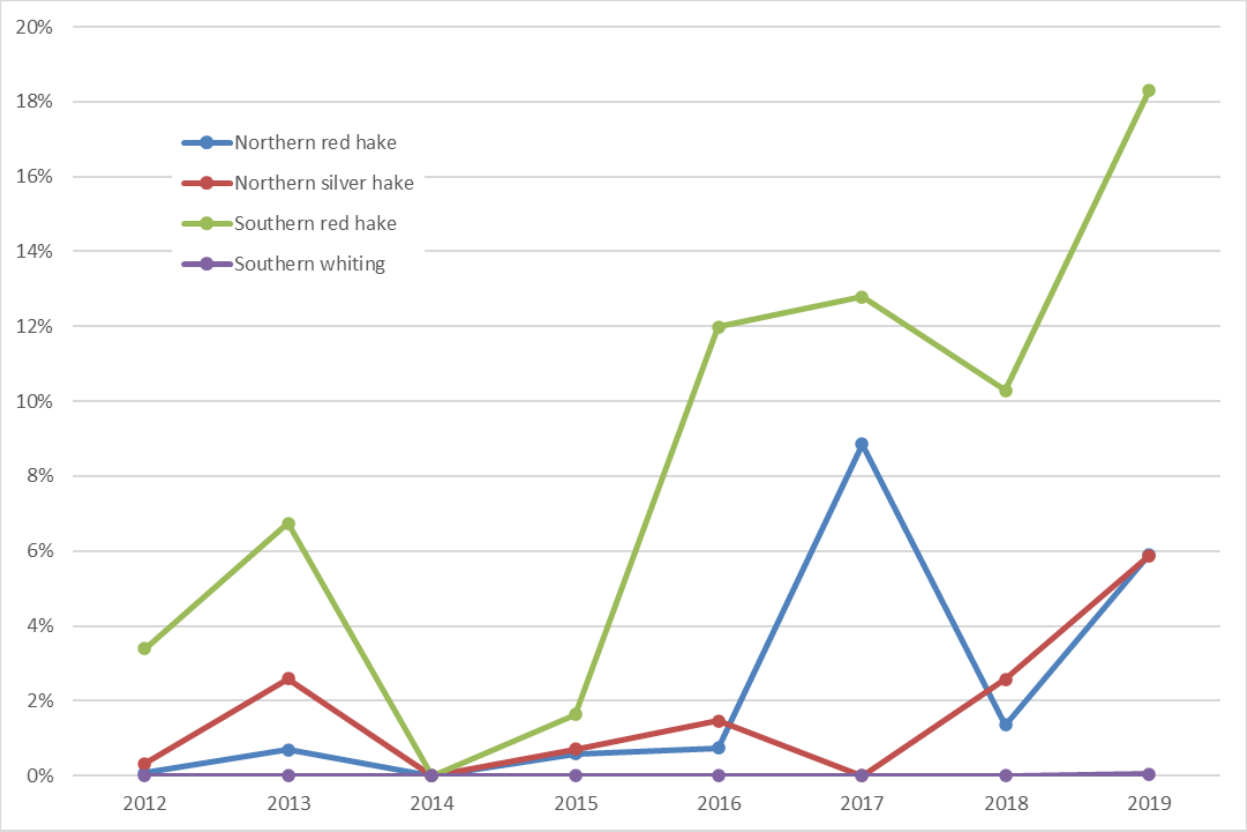
		Whiting			Red hake		
Year	Variables	North	South	Unknown	North	South	Unknown
2012	No. of trips	5294	5281	4	540	4540	3
	No. of boats*	177	214	4	57	220	3
	Landing lbs.	3,533,050	11,764,718	30,245	201,414	1,326,292	1,007
	Revenue $	$2,211,959	$8,089,801	$11,552	$64,784	$907,113	$42
	Revenue19$	$2,457,591	$8,988,546	$12,836	$71,978	$1,007,807	$46
	Price/lb N$	$0.63	$0.69	$0.38	$0.32	$0.68	$0.04
	Price19 R$	$0.70	$0.76	$0.42	$0.36	$0.76	$0.05
2013	No. of trips	4005	5535	11	457	4675	1
	No. of boats*	172	209	6	47	222	1
	Landing lbs.	2,899,085	10,274,853	40	234,793	852,623	-
	Revenue $	$1,890,719	$6,757,653	$482	$63,103	$524,740	$14
	Revenue19$	$2,066,230	$7,385,187	$525	$68,967	$573,286	$15
	Price/lb N$	$0.65	$0.66	$12.05	$0.27	$0.62	
	Price19 R$	$0.71	$0.72	$13.13	$0.29	$0.67	
2014	No. of trips	4316	4640	9	445	4452	3
	No. of boats*	162	208	7	44	226	2
	Landing lbs.	5,232,444	10,366,273	89,017	143,483	1,136,719	1,580
	Revenue $	$3,533,760	$7,787,815	$96,102	$54,525	$517,917	$2,397
	Revenue19$	$3,857,689	$8,501,837	$104,914	$59,536	$565,230	$2,617
	Price/lb N$	$0.68	$0.75	$1.08	$0.38	$0.46	$1.52
	Price19 R$	$0.74	$0.82	$1.18	$0.41	$0.50	$1.66
2015	No. of trips	3401	4391	18	475	3776	1
	No. of boats*	160	191	11	42	192	1
	Landing lbs.	4,507,826	9,352,677	6,064	211,244	851,366	520
	Revenue $	$3,630,759	$6,826,005	$7,584	$67,452	$451,264	$702
	Revenue19$	$3,916,568	$7,363,382	$8,179	$72,768	$486,612	$757
	Price/lb N$	$0.81	$0.73	$1.25	$0.32	$0.53	$1.35
	Price19 R$	$0.87	$0.79	$1.35	$0.34	$0.57	$1.46
2016	No. of trips	3012	4390	24	514	3931	2
	No. of boats*	143	206	10	42	201	2
	Landing lbs.	6,605,878	7,273,688	4,486	324,208	791,002	3
	Revenue $	$4,583,593	$6,060,741	$7,168	$84,972	$442,973	$90
	Revenue19$	$4,840,062	$6,399,828	$7,568	$89,713	$467,587	$95
	Price/lb N$	$0.69	$0.83	$1.60	$0.26	$0.56	$30.00
	Price19 R$	$0.73	$0.88	$1.69	$0.28	$0.59	$31.67
2017	No. of trips	3169	5069	24	467	4372	3
	No. of boats*	154	205	13	38	212	2
	Landing lbs.	5,827,037	5,637,418	9,757	168,658	656,568	1,800
	Revenue $	$4,544,710	$4,417,770	$7,191	$78,472	$383,418	$924
	Revenue19$	$4,685,186	$4,554,164	$7,414	$80,897	$395,004	$952
	Price/lb N$	$0.78	$0.78	$0.74	$0.47	$0.58	$0.51
	Price19 R$	$0.80	$0.81	$0.76	$0.48	$0.60	$0.53
2018	No. of trips	2946	5770	10	413	4911	2
	No. of boats*	136	202	5	36	210	1
	Landing lbs.	4,457,303	6,538,329	1,230	221,483	800,995	-
	Revenue $	$3,878,024	$5,708,517	$1,604	$94,612	$319,631	$14
	Revenue19$	$3,925,126	$5,777,851	$1,623	$95,761	$323,513	$14
	Price/lb N$	$0.87	$0.87	$1.30	$0.43	$0.40	
	Price19 R$	$0.88	$0.88	$1.32	$0.43	$0.40	
2019	No. of trips	2610	6808	9	304	4864	2
	No. of boats*	130	197	4	27	198	2
	Landing lbs.	2,642,676	8,322,656	79	237,951	665,559	6
	Revenue $	$2,183,092	$6,422,447	$219	$113,272	$298,092	$6
	Revenue19$	$2,183,092	$6,422,447	$219	$113,272	$298,092	$6
	Price/lb N$	$0.83	$0.77	$2.77	$0.48	$0.45	$1.00
	Price19 R$	$0.83	$0.77	$2.77	$0.48	$0.45	$1.00

Note: * No. of boats by mgmt area are not uniqe since same boat may be operating in different zones. However, no. of trips or other variables are.

5.6.2 Recreational Catch and Other Landings

Recreational catch of southern red hake by recreational fishermen (18.3% of total catch) and by commercial vessels fishing in state waters (1.3% of total catch), generally within 3 miles of shore, has been minor portion of the total catch but the recreational catch estimates have increase (Figure 8). At least some of this increase in recreational catch estimates is due to changes in the Marine Recreational Information Program (MRIP).

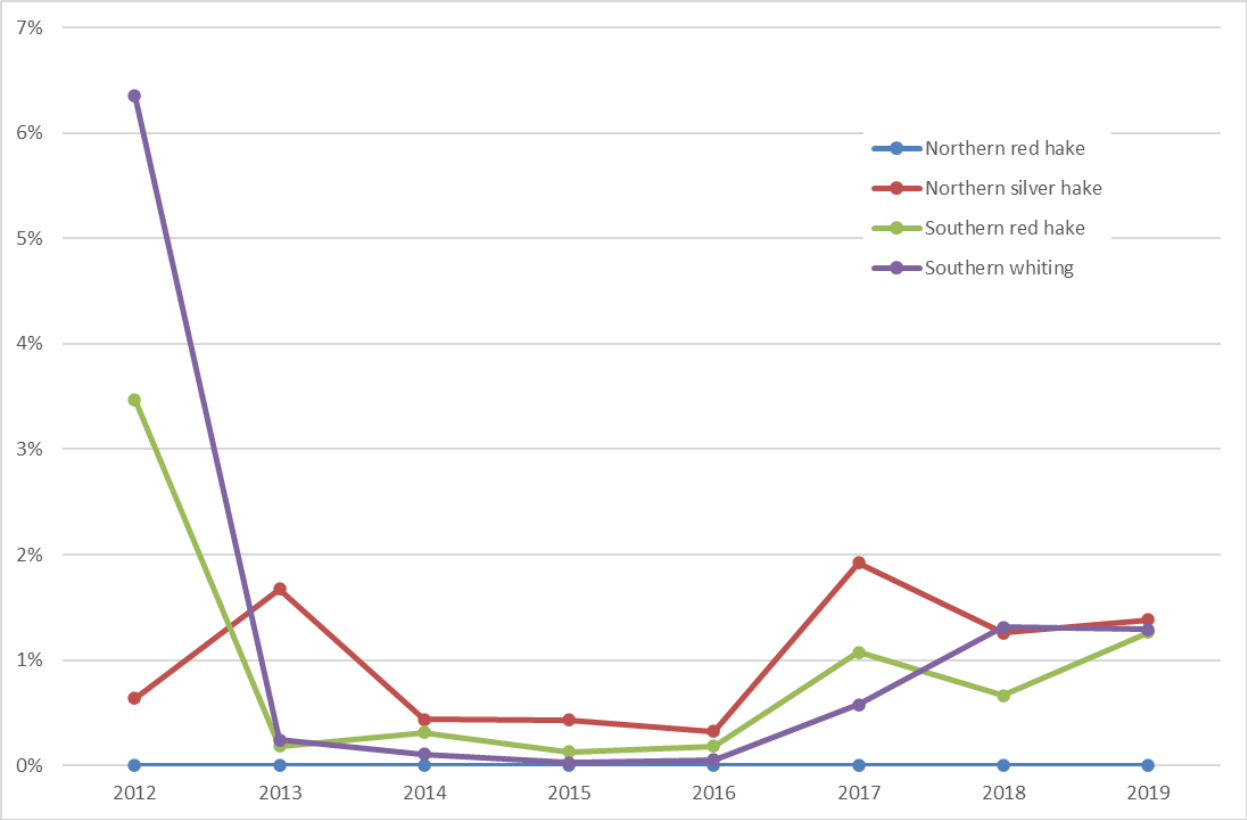
Figure 8. Estimated recreational landings (reported by MRIP) of small-mesh multispecies stocks as a percent of estimated total catch by calendar year (commercial catches are estimated by fishing year).



Recreational fishing aboard party boats target southern red hake and whiting in parts of the Mid-Atlantic region, but the catches from this fishery are relatively low in the past 20 or so years due to changes in distribution and availability. Some party boats in Southern New England and the Gulf of Maine catch and land silver hake when they target other species. Charter fishing does not target small-mesh multispecies, but these boats and other that commercially target bluefin tuna rely on catches of whiting and red hake for bait. Some boats receive small-mesh multispecies catch from commercial trawlers at sea through an allowance to the small-mesh multispecies possession limits. These catches must be reported on VTRs by the catching vessel. Other boats targeting bluefin tuna use small gill-nets to catch small-mesh multispecies for bait, requiring a permit and catch reports. Recreational fishermen that target bluefin tuna, cod, and other piscivorous species recognize the importance of silver hake in the ecosystem as a source of forage for species that these boats target.

State-permitted only vessel landings account for minor northern and southern silver hake landings (1.4 and 1.3%, respectively) relative to total whiting catch in FY2019 (Figure 9). Northern red hake landings by state-permitted only vessels account for a negligible amount of total catch. More details are available in Tables 7 and 8 in the 2019 SAFE Report (NEFMC 2020c).

Figure 9. Reported landings by vessels with only state permits of small-mesh multispecies stocks as a percent of estimated total catch by fishing year.



5.6.3 Fishing Communities

Consideration of the economic and social impacts on fishing communities from proposed fishery regulations is required under the National Environmental Policy Act (NEPA) and the Magnuson Stevens Fishery Conservation and Management Act, particularly, National Standard 8 which defines a "fishing community" as "a community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community"

National Standard 8 requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. "Sustained participation" is interpreted as continued access to the fishery within the constraints of the condition of the resource.

5.6.3.1 Small-Mesh Multispecies Fishery

There have been over 238 port communities that have been a homeport or landing port to one or more active small-mesh multispecies vessels since 1996. These ports primarily occur from Maine to New Jersey. The level of activity in the small-mesh multispecies fishery has varied across time. This section identifies the communities for which whiting and red hake are particularly important. Clay et al. (2007) has a detailed profile of each port, including important social and demographic information. While these data describe a community's dependence on the small-mesh multispecies fishery, it is important to remember that at least some of the individual vessels therein are even more dependent on the fishery. In some cases, groups of communities identified above have been disaggregated so that information specific to certain communities can be provided and so that important details about individual communities are not lost.

Community of Interest Criteria. There are 19 Communities of Interest for the small-mesh multispecies fishery, which meet at least one of the following criteria:

- Cumulative whiting and red hake landings of at least 5M pounds (2,300 mt) between 1996-2016.
- Whiting and red hake landings of at least 200,000 pounds (91 mt) in 2016.

These criteria were chosen for analysis in draft Amendment 22, an action that proposed implementing limited access in the small-mesh multispecies fishery. Ports meeting these criteria were considered to be the most potentially impacted by the proposed Amendment 22 alternatives which could have affected the most active vessels and ports. Because the alternatives for this specifications document also affect the most active small-mesh multispecies vessels and the ports landing the majority of small-mesh multispecies, these same criteria are appropriate for this action as well.

There were nine top ports that land small-mesh multispecies in 2016. The characteristics and reliance on the small-mesh multispecies fishery is described in more detail in Section 5.6.3 of the Framework 62 EA (NEFMC 2020a) and in Amendment 22 (NEFMC 2018a)

Although the aggregate economic data has been updated annually, most recently in the 2019 SAFE Report (NEFMC 2020b) that preceded this action, the detailed port data has not been updated since 2016 and thus it is the most recent information on human communities that depend on whiting and red hake. Top ports landing and dependent on small-mesh multispecies have however remained largely the same as those listed in Table 20.

Table 20. Characteristics of top ports for small-mesh multispecies fishery landings in 2016, derived from Table 39 in the Framework 62 EA (NEFMC 2020a).

Port	Seafood dealers	Directed small-mesh multispecies fishery trips	% of landings revenue from small-mesh multispecies
New Bedford, MA[15]	86	125	1.1%
Point Judith, RI	50	117	4.0%
Gloucester, MA	74	339	3.9%
Montauk, NY	42	122	7.6%
New London<, CT	19	115	15.0%
New York City, NY[16]	6	36	90.6%
Seabrook, NH	4	118	9.6%
Provincetown, MA	22	39	1.0%
Boston, MA	18	18	1.0%

[15] New Bedford is a major port for sea scallop landings, a valuable species.

[16] Most whiting landings in NYC are transported by truck directly from some landing vessels.

6.0 ENVIRONMENTAL IMPACTS OF ALTERNATIVES

The impacts of the alternatives under consideration are evaluated herein relative to the valued ecosystem components (VECs) described in the Affected Environment (Section 5.0) and to each other.

6.1 INTRODUCTION

This action evaluates the potential impacts using the criteria in Table 21.

Table 21. General definitions for impacts and qualifiers relative to resource condition (i.e., baseline).

VEC	Resource Condition	Impact of Action		
		Positive (+)	Negative (-)	No Impact (0)
Target and Non-target Species	Overfished status defined by the MSA	Alternatives that would maintain or are projected to result in a stock status above an overfished condition*	Alternatives that would maintain or are projected to result in a stock status below an overfished condition*	Alternatives that do not impact stock / populations
ESA-listed Protected Species (endangered or threatened)	Populations at risk of extinction (endangered) or endangerment (threatened)	Alternatives that contain specific measures to ensure no interactions with protected species (e.g., no take)	Alternatives that result in interactions/take of listed resources, including actions that reduce interactions	Alternatives that do not impact ESA-listed species
MMPA Protected Species (not also ESA-listed)	Stock health may vary but populations remain impacted	Alternatives that will maintain takes below PBR and approaching the Zero Mortality Rate Goal	Alternatives that result in interactions with/take of marine mammal species that could result in takes above PBR	Alternatives that do not impact MMPA Protected Species
Physical Environment / Habitat / EFH	Many habitats degraded from historical effort (see condition of the resources table for details)	Alternatives that improve the quality or quantity of habitat	Alternatives that degrade the quality, quantity or increase disturbance of habitat	Alternatives that do not impact habitat quality
Human Communities (Socioeconomic)	Highly variable but generally stable in recent years (see condition of the resources table for details)	Alternatives that increase revenue and social well-being of fishermen and/or communities	Alternatives that decrease revenue and social well-being of fishermen and/or communities	Alternatives that do not impact revenue and social well-being of fishermen and/or communities

Impact Qualifiers		
A range of impact qualifiers is used to indicate any existing uncertainty	Negligible	To such a small degree to be indistinguishable from no impact
	Slight (sl) as in slightly positive or slightly negative	To a lesser degree / minor
	Moderately (M) positive or negative	To an average degree (i.e., more than “slight”, but not “high”)
	High (H), as in high positive or high negative	To a substantial degree (not significant unless stated)
	Significant (in the case of an EIS)	Affecting the resource condition to a great degree, see 40 CFR 1508.27.
	Likely	Some degree of uncertainty associated with the impact

*Actions that will substantially increase or decrease stock size, but do not change a stock status may have different impacts depending on the particular action and stock. Meaningful differences between alternatives may be illustrated by using another resource attribute aside from the MSA status, but this must be justified within the impact analysis.

6.1.1 Approach to Impacts Analysis

6.1.1.1 Impacts on target species and non-target species

Because stock assessments for red and silver hakes are empirical (i.e. not based on an analytic model), the Council is unable to estimate how catch specifications and other measures could affect future stock biomass and yield. In general, alternatives that are expected to increase catch would be expected to result in less biomass than for other alternatives associated with lower catch limits. Higher catch limits for stocks that are near or higher than B_{msy} improve the potential for the fishing industry to increase catches and achieve optimum yield, although external factors may limit the industry's ability to increase catch (see discussion below). Hence most of the following analyses are qualitative rather than precise and quantitative.

Except for southern red hake, catches have been below (and in the case of northern silver hake and whiting well below) previous specifications. Due to the actions below, this situation is unlikely to change unless there are unexpected changes in external factors. These factors include demand for whiting, fishing costs (fuel, labor, ice, etc.), prices for alternative target species, availability of alternative target species (herring, squid, etc.), and changes in regulations that restrict small-mesh fishing.

Prices for whiting have remained relatively low and have not been increasing compared to other goods and services (see Section 5.6.1). In fact, whiting prices generally declined in 2019 (NEFMC 2020b), unrelated to recent effects due to the Covid virus restrictions. There is no apparent reason that this demand will substantially change during the specification period to attract new fishing effort. Likewise, there is no reason to expect that fishing costs will substantially change in the specification period, relative to other goods and services.

Three alternative species compete for fishing time on many whiting fishery boats. Many of the whiting boats have limited access permits in these alternative fisheries, including large-mesh groundfish, herring, and loligo squid. Groundfish regulations are not expected to become substantially more restrictive than they are now, since many groundfish stocks are already subject to rebuilding programs. The 2021 squid specifications are expected to be about the same, thus the 2021 quota level is not expected to change the among of squid fishing effort (J. Didden, pers. comm.; MAFMC 2020). Quotas for Atlantic herring, however, have been reduced due to declining stock biomass. Some vessels from the mid-water trawl fishery can be expected to adapt to the new reduced quotas and modify their gear and vessel to target whiting (or other species for which they have permits to catch). How many vessels would make a change from targeting herring to target whiting has not been estimated.

Regulations to protect regulated groundfish stocks from capture by small-mesh trawls restrict fishing for whiting to specific areas and seasons (see Section 3.1.1). Climate change has affected the seasonal distribution of both regulated groundfish and whiting. Advisors report that whiting are arriving earlier in the spring in the northern management area exemptions, but the open season dates prevent vessels from targeting whiting early in the season. MA Division of Marine Fisheries conducted a two-season experimental fishery that evaluated the bycatch of groundfish before the season for Small-Mesh Area I opened. They found that the total groundfish catch was generally less than a 5% standard, but catches of small haddock were high and there was no a reduction in groundfish catch relative to whiting catch in an early season. At the present time, the Council does not anticipate changing the area and season restrictions that apply to the whiting fishery.

The impacts analysis for Actions 2 and 3 rely on sea sampling data (a semi-random selection of trips to have Federal observes aboard) to evaluate the effects of higher possession limits on landings and discards. When possession limits are higher, it implies that landings could increase up to the possession limit or the amount the vessel catches, whichever is less. As a rough approximation of the total effect, we can calculate the potential increase in landings and corresponding decrease in discards for these observed trips

and apply that fraction as a percent of actual landings on observed trips to the total landings for the fishery.

There are two caveats to this analysis of sea sampling data, however. One caveat is that a more accurate estimate of the increase in total landings and decrease in total discards would require knowing how much is caught on unobserved trips, or assuming that the ratio between discards and landings are the same on observed or unobserved trips. To address the latter condition, analysts often subset or bin or stratify both sources of data according to fishery, gear, season, etc, like the bycatch estimates provided in the 2020 SAFE Report (NEFMC 2020b). Doing this only for trips that their catches exceeded the possession limit is beyond the possible scope of analysis at this time. A second caveat for Action 2 is that the TAL trigger to reduce the red hake possession limit to 400 lbs., has occurred at different times during previous fishing years (Table 22). For this analysis, we applied an approximate average date of September 1 to the 2017-2020 sea sampled trips.

Table 22. 400 lb. red hake in-season accountability measure effective dates.

Stock	Effective date	TAL trigger	Federal landings (mt)	Proportion of ACL caught
Northern red hake	Aug 16, 2016	45%	162	72%
Northern red hake	Aug 17, 2017	38%	85	42%
Southern red hake	Aug 25, 2020	90%	NA	NA

Action 3 could also decrease selectivity of the fishery, i.e. by allowing more targeting of silver hake and whiting by vessels using smaller mesh trawls, particularly if demand for juvenile whiting reappears. How much this potential (but currently unlikely) change in targeting affects the resource depends on the differences in size frequency of small-mesh multispecies for vessels using trawls with mesh less than 3-inches vs. larger meshes (i.e. > 3-inches) in trawls currently used to target small-mesh multispecies. The analysis for Action 3 includes a comparison of these size frequencies on observed trips. Estimation of how many trips would begin targeting small-mesh multispecies with mesh less than 3-inches is beyond the scope of the current analysis because the response by the fishery would depend on the redevelopment of a juvenile whiting market and the price relative to other alternative species targeted with mesh less than 3-inches (such as herring and loligo squid).

6.1.1.2 Impacts on Essential Fish Habitat

Impacts on EFH are primarily assessed based on the estimated relative effects of gears from the Swept Area Seabed Impact (SASI) model (NEFMC 2011). Trawls are the primary fishing gears used in the small-mesh multispecies and associated fisheries, which have differential impacts on the seabed depending on the trawl configuration. Vessels using raised footrope trawls in the small-mesh multispecies fishery appear to have somewhat less seabed impact overall due to the lower impact of the sweep in the raised footrope trawl, compared to the squid trawl (Table 23). This differential impact was considered in this EA, particularly for Action 3 where particularly for Alternative 4, there is a potential for effort shifts from the squid and herring fishery to the whiting fishery using mesh less than 3-inches. It should also be noted that the raised footrope trawl is not required in the Cultivator Shoals Area or in the Southern New England and Mid-Atlantic regulated mesh areas, where small-mesh multispecies fishery trawls are more like the ‘Generic otter trawls’ shown in the table below.

Another associated fishery in the impacts analysis for this document is the herring mid-water trawl fishery, due to the potential for fishing effort to shift due to increasingly restrictive herring regulations to

decreasingly restrictive small-mesh multispecies regulations. Relative seabed impacts from mid-water trawls were not however quantified in this study.

Table 23. Contact indices for trawl gear components

Gear type	*Component*	*Contact index*
Generic otter trawl	Doors	1.00
Generic otter trawl	Ground cable	0.95
Generic otter trawl	Sweep	0.90
Squid trawl	Doors	1.00
Squid trawl	Ground cable	0.95
Squid trawl	Sweep	0.50
Shrimp trawl	Doors	1.00
Shrimp trawl	Ground cable	0.90
Shrimp trawl	Sweep	0.95
Raised footrope trawl	Doors	1.00
Raised footrope trawl	Ground cable	0.95
Raised footrope trawl	Sweep	0.05

6.1.1.3 Protected and ESA-listed species

Potential interaction risks between a fishery and protected species (ESA-listed and MMPA protected species) are largely determined by expected fishing behavior and effort. Specifically, the type of fishing gear, amount of gear in the water, soak time, tow time, and the area of overlap between fishing and protected species are strongly related with the potential interaction risks expected to occur to protected resources. Taking this into account, as well as the expected fishing behavior/effort, impacts on protected resources discussed in Section 5.4 and listed in Table 16 are listed below.

MMPA (Non-ESA-listed) Protected Species Impacts

The potential impacts of No Action on non-ESA-listed MMPA protected species have not been analyzed quantitatively. This is largely due to the fact that these potential impacts are dependent upon fishing behavior and effort, which although expected to remain similar to current conditions, are not possible to predict for quantitative analysis. In order to best classify the potential impacts, we have reviewed marine mammal serious injury and mortality reports, as well as the US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments that cover that most recent 10 years of data [see Section 5.4 of this document and Section 5.4 of the EA for Framework 62 (NEFMC 2020a)].

Of the non-ESA-listed marine mammal species that have the potential to be affected by the proposed action, only several stocks of bottlenose dolphin stocks are considered strategic stocks (i.e., stocks in which the level of take has resulted in the exceedance of the stocks PBR level). Aside from these stocks of bottlenose dolphins, there has been no indication that takes of non-ESA-listed marine mammals in commercial fisheries have gone beyond levels which would result in the inability of the populations to sustain themselves; that is, PBR levels have not been exceeded for any of these non-ESA-listed marine mammal species (see Section 5.4 and Table 13 of the EA for Framework 62). Although several stocks of bottlenose dolphin have experienced levels of take that resulted in the exceedance of their PBR level, a take reduction strategy has been implemented to reduce bycatch in the fisheries affecting this species (i.e.,

Atlantic Trawl Take Reduction Strategy; see section 5.4.4.1.2 of the EA for Framework 62).

ESA-listed Species Impacts

As identified in Section 5.4 and the Affected Environment – Protected Species section of the EA for Framework 62 (NEFMC 2020a), several ESA-listed species are expected to occur where small mesh multispecies fisheries operate. The commercial small-mesh fishery gears are exclusively trawl, with a minor amount of hook and line and gillnet fishing for bait in the recreational/commercial bluefin tuna fishery. The amount of hook and line and gillnet fishing for whiting and red hake for bait in the recreational/commercial bluefin tuna fishery is a very minor component of the whiting and red hake catch, so impacts on protected and ESA-listed species by this fishery component is negligible and not considered further in Section 6.4.

The ESA-listed species discussed in Section 5.4 are at risk for interacting with these gear types and therefore may be susceptible to serious injury and/or mortality. Interaction risks with protected species are strongly associated with fishing behavior and effort, specifically the type of fishing gear, amount of gear in the water, soak time, tow time, and the area of overlap between fishing and protected species, with risk

6.1.1.3.1 Mid-water trawl analysis

The potential for changes in fishing effort, particularly for changes in gear, location, and the amount of fishing effort can affect impacts on MMPA protected and ESA-listed species. Action 3 (Section 4.3), which proposes to raise the whiting possession limit to up to 30,000 lb. for vessels using less than 3-inch mesh trawls poses some concern about an effort shift from mid-water trawl (MWT) fishing for herring and mackerel, depending on the number of vessels and trips that begin targeting whiting. Small-mesh bottom trawl (SBT) fishing tends to have higher rates of observed takes for some protected species than the MWT fishery (see Section 5.4.1).

Raising the whiting trip limit to 15,000 lb. (preferred alternative in Section 4.3.3) for vessels using trawls with less than 3-inch mesh could entice some vessels to target whiting with small-mesh multispecies bottom trawls. Most of the potential effort shift would come from vessels that use the same type of trawl to target other stocks, such as herring or squid. While this has implications for increasing small-mesh multispecies bottom trawl effort and reducing size selectivity, it would have a negligible change of impact on protected species through increases in incidental takes because the same gear would be used in substantially similar ways.

Here we analyze this potential effort shift from MWT to SBT by comparing the revenue per trip for herring and mackerel using MWT to the potential revenue from landing 15,000 lb. of whiting. While the same incentive to shift effort may occur for the mid-water trawl (MWT) fishery, the costs of switching would be higher, particularly for the larger vessels in the herring and mackerel MWT fisheries. Nearly all of the large vessels in these fisheries have refrigerated seawater (aka RSW) systems that are not very suitable for storing whiting (Megan Lapp, pers comm). Estimates of the cost of shifting from MWT fishing to small-mesh bottom trawl (SBT) fishing are greater than $100,000 (Amendment 8, NEFMC 2018), which makes it less likely that a MWT vessel would begin targeting 15,000 lb. of whiting valued at approximately $12,000.

On the other hand, smaller vessels in the MWT vessels that typically land Atlantic herring, Atlantic mackerel, and other species valued at $12,000 lbs. or less might switch gear to target whiting in the face of increasingly restrictive herring (inshore MWT prohibition area implemented in Amendment 8). Furthermore, mackerel has recently been declared overfished and a rebuilding plan is being developed that may reduce catch limits in that fishery as well. Reconfiguring a small MWT net on a smaller boat to fish as a SBT without changing the net's mesh could be less expensive than the above estimate.

To evaluate the propensity of shifting effort, we examined MWT trips (including single and pair trawls) targeting herring or mackerel during calendar year 2018 to 2021 (year to date), whose landings and trip

characteristics are reported on vessel trip reports (VTR). Vessel size data were derived from matching permit data and prices were derived from matching dealer reports on a trip-by-trip basis. Trips that had no matching dealer prices were assigned prices based on the year, month, gear, and species that were reported on VTR as landings.

MWT trips having less than $12,000 of total revenue (approximately equivalent to the revenue from landing 15,000 lbs. of whiting at current prices) were flagged as potential candidates to switch to SBT fishing to target whiting. This potential of course ignores the cost of switching gear, which can be a significant barrier to switching, particularly for larger vessels that are more costly to operate and may not be well-suited to fishing for whiting with SBT. Also, despite the proposed higher whiting possession limit, some of these vessels that are facing more restrictive herring and mackerel regulations may switch to fishing for squid instead.

Among trips reported by the VTR system from 2018 to August 2021, there were 549 MWT trips made by 11 vessels that targeted herring (herring revenue > 50% of trip landed value) (Table 24). Of these trips, 355 of them had total revenue that exceeded $12,000 and 194 of them were below this threshold. The 194 lower value herring trips averaged $7,075 of total revenue ($7,039 from herring landings). Most of the herring trips occurred from September to March in the northern whiting management area (Figure 10). Herring trips with total revenue less than $12,000 exhibit a similar seasonal pattern, but with proportionally fewer trips in March, October, and November (Figure 11).

Vessels reporting MWT trips on VTRs ranged from 72 to 146 feet in length (Table 25). Most vessels are between 100 and 125 feet. The smaller vessels between 72 and 100 feet (less likely to have RSW systems) totaled 12% of total MWT trips. Average herring or Atlantic mackerel landed revenue is positively correlated with vessel size, with vessels less than 100 feet having average total revenue of $35,280 ($20,601 from herring landings and $11,312 from mackerel landings).

Table 24. Trip revenue for small mesh stocks for vessels using mid-water trawl fishing gear to target herring. Trips with less than $12,000 of total revenue in 2020-2021 were combined to protect confidential data.

Total trip revenue > $12,000?	Values	2018	2019	2020	2021 YTD	Total
No	Trips	132	35	27		194
	Ave whiting revenue	$4	$0	$18		$5
	Ave herring revenue	$7,020	$7,267	$6,835		$7,039
	Ave mackerel revenue	$34	$40	$2		$31
	Ave squid revenue	$0	$0	$0		$0
	Ave total revenue	$7,059	$7,307	$6,856		$7,075
Yes	Trips	155	89	90	21	355
	Ave whiting revenue	$12	$0	$0	$0	$5
	Ave herring revenue	$53,593	$54,982	$48,531	$37,087	$51,682
	Ave mackerel revenue	$1,875	$1,571	$4,866	$6,156	$2,810
	Ave squid revenue	$0	$0	$0	$0	$0
	Ave total revenue	$55,530	$56,553	$53,397	$43,243	$54,519

Table 25. Number of MWT fishing trips by vessel size.

Vessel length (ft)	2018	2019	2020	2021	Total	Ave herring revenue	Ave mackerel revenue	Ave Total trip revenue
72-100	46	14	26	8	94	$20,601	$11,312	$35,280
100-125	205	95	130	46	476	$95,159	$48,386	$169,768
125-146	82	46	41	16	185	$114,974	$173,199	$303,883

Figure 10. Herring MWT trips by month and management area, 2018 to 2020 and 2021 YTD.

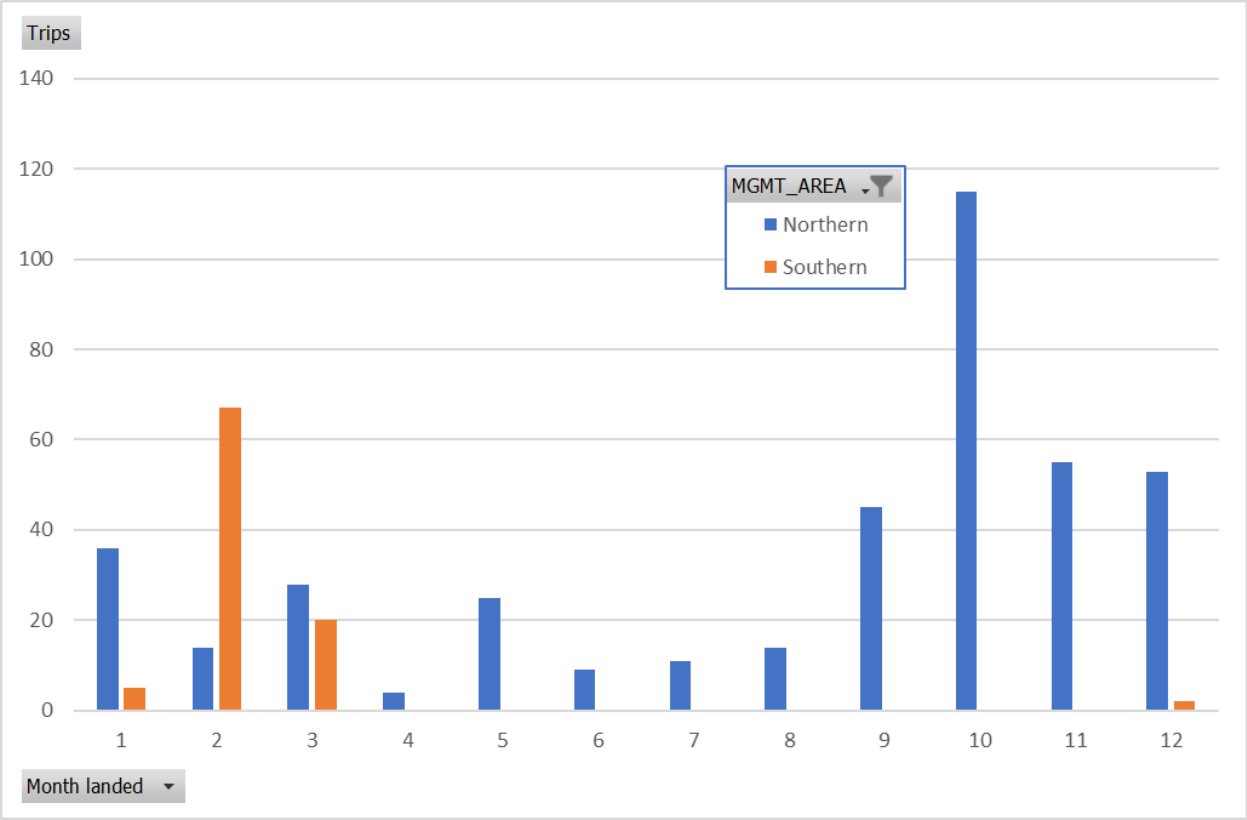
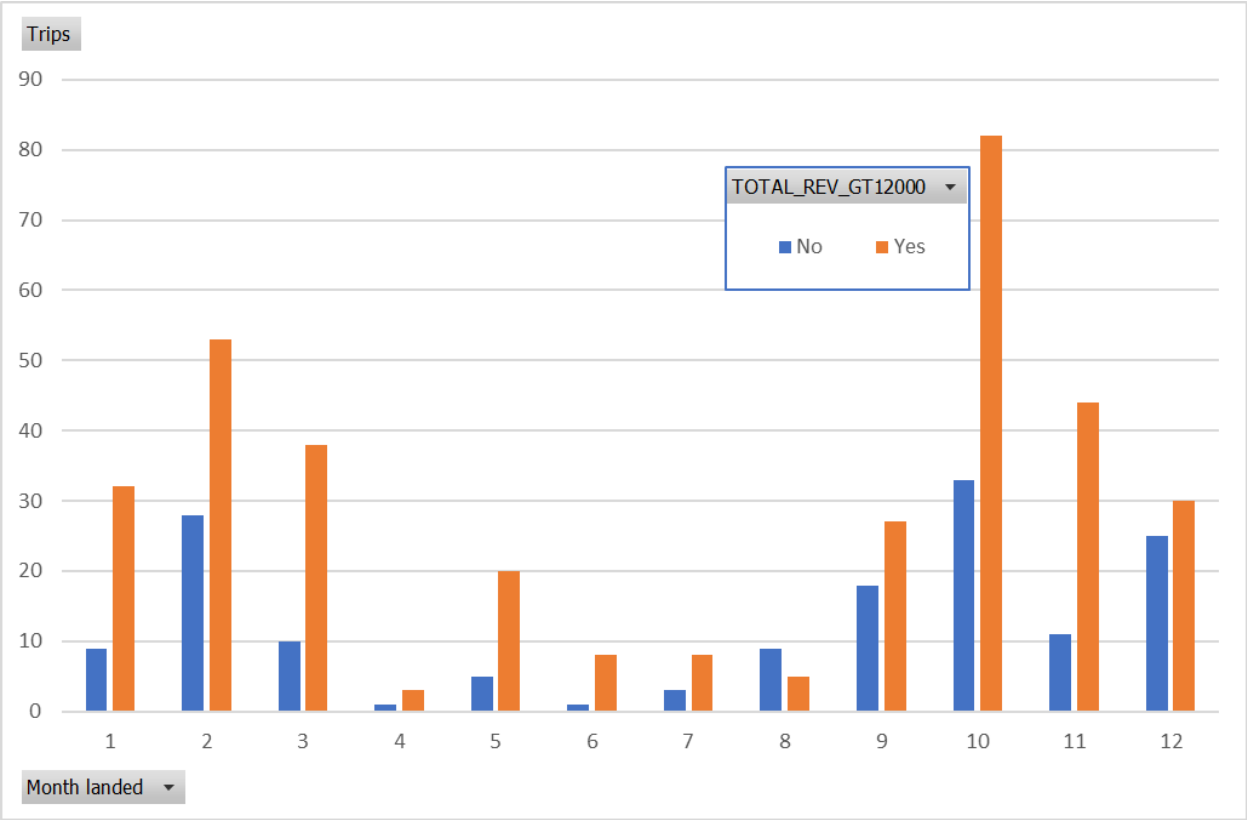


Figure 11. Herring MWT trips by total revenue threshold, 2018 to 2020 and 2021 YTD.



There were also 160 MWT trips during the period that targeted Atlantic mackerel (Table 26). Of these trips, 135 had total revenue above $12,000 (averaging $140,260 per trip; $130,535 from mackerel and $9,470 from herring) and 25 trips made by 7 vessels below the $12,000 threshold (averaging $4,343 of total revenue; $4,343 from mackerel landings and $414 from herring landings). All but one of the seven vessels with MWT mackerel trips below the total revenue threshold also had MST herring trips below the total revenue threshold.

Table 26. Trip revenue for small mesh stocks for vessels using mid-water trawl fishing gear to target Atlantic mackerel.

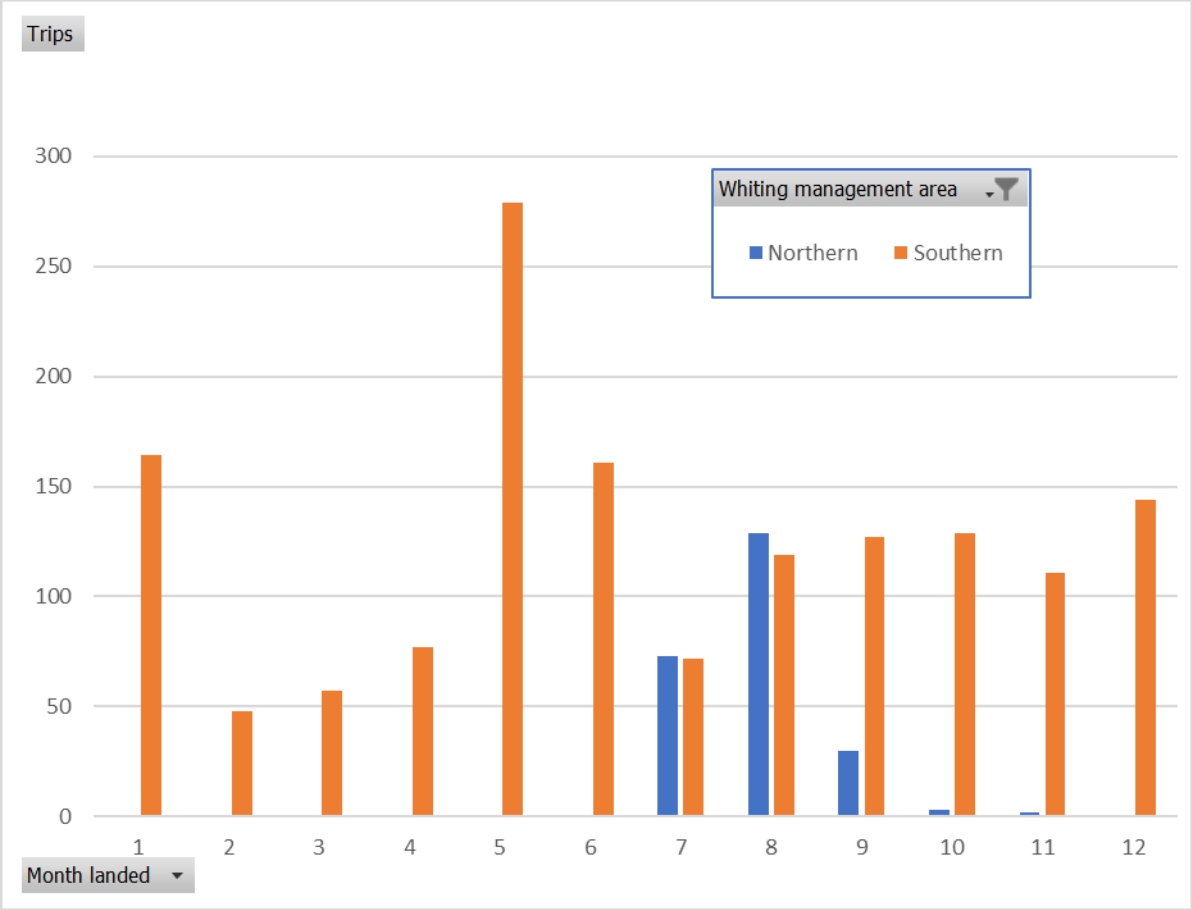
Total trip revenue > $12,000?	Values	2018	2019	2020	2021 YTD	Total
No	Trips	Confidential				25
	Ave whiting revenue					$9
	Ave herring revenue					$414
	Ave mackerel revenue					$4,343
	Ave squid revenue					$0
	Ave total revenue					$4,767
Yes	Trips	31	21	53	30	135
	Ave whiting revenue	$0	$0	$0	$0	$0
	Ave herring revenue	$11,495	$20,605	$3,002	$11,007	$9,470
	Ave mackerel revenue	$68,137	$74,077	$56,241	$365,787	$130,535
	Ave squid revenue	$0	$0	$0	$0	$0
	Ave total revenue	$80,655	$94,681	$59,296	$376,794	$140,260

To put this potential effect into perspective, 1950 trips targeted whiting (whiting revenue > 50% of total landed value) that fished with SBT having less than 3-inch mesh (Table 27), with either a 3,500 or 7,500 lb. whiting possession limit depending on mesh size (these vessels may also land up to 5,000 lb. of red hake, valued at about $0.40/lb.). These 1950 whiting trips (typically by smaller vessels fishing in near-shore exemption areas) averaged $2,065 of whiting revenue per trip under the existing whiting possession limits. SBT trips targeting whiting occur throughout the year in the southern whiting management area (southern Georges Bank and south), with 48% of the trips occurring from May to August (Figure 12). In the northern whiting management area (northern Georges Bank and the Gulf of Maine), mostly in the southern whiting management area. In the northern whiting management area, nearly all of the whiting trips occur from July to September when the exemption areas are open.

Table 27. Trip revenue for small mesh stocks for vessels using bottom trawls with less than 3-inch mesh to target whiting.

Values	2018	2019	2020	2021 YTD	Total
Trips	447	690	558	255	1950
Ave whiting revenue	$2,010	$2,013	$1,968	$2,516	$2,065
Ave herring revenue	$14	$28	$19	$6	$19
Ave mackerel revenue	$22	$31	$6	$13	$20
Ave squid revenue	$139	$184	$219	$209	$187
Ave total revenue	$2,849	$2,751	$2,717	$3,394	$2,849

Figure 12. Whiting SBT trips by month and management area, 2018 to 2020 and 2021 YTD.



An alternative, potentially more lucrative choice for MWT vessels is to use SBT to target squid. This potential effort shift due to increasingly restrictive herring and mackerel regulations is outside the scope of this EA because it affects a different fishery. Nonetheless, because the average revenue per trip is 45% higher than that derived from landing 15,000 lb. of whiting, it is even less likely that MWT vessels would target whiting instead of squid (Table 28).

Table 28. Trip revenue for small mesh stocks for vessels using bottom trawls with less than 3-inch mesh to target squid.

Values	2018	2019	2020	2021 YTD	Total
Trips	3735	3416	2232	1298	10681
Ave whiting revenue	$89	$144	$128	$93	$115
Ave herring revenue	$0	$0	$1	$0	$0
Ave mackerel revenue	$17	$7	$42	$5	$18
Ave squid revenue	$14,650	$18,302	$18,125	$21,899	$17,425
Ave total revenue	$15,154	$18,918	$18,788	$22,162	$18,001

Even if all herring and mackerel MWT trips that formerly landed less than $12,000 of those species (194 + 25 trips, respectively, made by 12 vessels since 2018) began targeting whiting, the small-mesh multispecies SBT effort using mesh less than 3-inches would increase by only 11 percent. The vast majority of trips targeting whiting use trawls with mesh 3-inches or greater and have a 30,000 whiting possession limit in the northern management area and a 40,000 whiting possession limit in the southern management area.

Based on this analysis, the impact on protected species due to this potential effort shift from MWT fishing to whiting SBT fishing is found to be negligible. This finding is made because relatively few vessels are likely to shift effort from MWT herring or mackerel trips to SBT trips targeting whiting due to a possession limit increase to 15,000 lbs. worth approximately $12,000. For those that do shift effort, the whiting effort is likely to be more spread out throughout the year and more frequent in summer months than the MWT effort that mainly occurs from September to March.

6.2 Impacts on Target Species (Silver, Red, and Offshore Hakes)

6.2.1 Action 1 – SPECIFICATIONS (Section 4.1)

6.2.1.1 Alternative 1 – No Action

As described in Section 8.1.2 of the Amendment 19 EIS (NEFMC 2012), the impacts of management actions on the silver, offshore and red hake stocks and the small-mesh multispecies fishery likely have been low positive by maintaining a stable silver and red hake population through implementing a hard Annual Catch Limit (ACL), in-season accountability measures (AMs) that reduce the possession limits to incidental levels when landings approach the TAL, and post-season AMs that reduce the TAL trigger to mitigate prior overages of the ACL. The EIS attributes these positive impacts to keeping catch within scientifically determined limits, particularly in combination with the proactive and reactive AMs, which would substantially curtail the fishery to incidental possession limits if landings are projected to reach the TAL and to pay back any overage the next year, via changes to the TAL trigger.

Catches of northern silver hake and southern whiting have been well below catch specifications since 2012, when Amendment 19 was implemented, averaging 6 and 26 percent of the ACL respectively. See Section 5.2.1 for more details about trends in silver hake and whiting catches and the history of ACL specifications.

Catches of northern red hake exceeded the ACL in 2012, 2013, and 2015, but the combination of the AMs and high recruitment have allowed the stock to recover and in 2018-2019 the northern red hake catch has averaged only 40 percent of the ACL. Biomass of southern red hake declined while catches (primarily discards in the whiting and squid fisheries) increased in 2018-2019. This resulted in triggering AMs in 2018 and 2019 and the stock was assessed as being overfished. See Section 5.2.2 for more details about trends in red hake catches and the history of ACL specifications.

The No Action alternative would maintain the specifications at the same level analyzed in the 2018-2020 specifications document EA (Table 7 in this document), as modified for southern red hake by pending Framework 62 (NEFMC 2020a) regulations. The small-mesh multispecies fishery performance has remained stable in the last 10 years since the specifications were implemented. Despite increases in biomass of silver hake and northern red hake, landings and revenue have declined in recent years which is attributable to changes in market demand and in the restrictions placed on the fishery to minimize the catch of large-mesh groundfish.

Under No Action, the ACLs for southern whiting and both stocks of red hake are less than that recommended by the SSC to prevent overfishing and minimize the risk that they would become overfished. Therefore No Action is expected to have positive impacts on these three stocks.

No Action could have negative impacts on the northern silver hake stock the catch under this limit causes overfishing, but actual catches have been well below the ACL and the stock is above the target biomass. Thus, in the short term, the impacts on the northern silver hake stock are negligible, but could become negative if catches increase and cause overfishing. No Action would therefore have a slightly negative impact on the northern silver hake stock.

Compared to Alternative 2, No Action has lower catch limits for southern whiting and both red hake stocks, but higher catch limits for northern silver hake. Thus, compared of Alternative 2, No Action would have slightly positive impacts on southern whiting and both red hake stocks, and slightly negative impacts on northern silver hake.

6.2.1.2 Alternative 2 - 2021-2023 Specifications Adjustment (Preferred with Option B for southern red hake specifications)

<u>Northern silver hake and southern whiting</u>

Stock biomass is estimated by a stratified, random survey conducted by NMFS. This biomass is based on the fall survey, deemed most representative of stock conditions by the last benchmark assessment (NMFS 2011). Biological reference points are based on the 1973-1982 averages, which were considered to be a suitable proxy for MSY.

During the September 2020 management track assessment (NEFMC 2020b), the stock biomass indices were updated for 2017-2019 for northern silver hake and for 2018-2019 for southern whiting. The fall 2017 survey was not fully completed in the southern management area and was not therefore used in the calculation of survey biomass. The updated survey biomass indices result in a 32% reduction in northern silver hake OFL and a 94% increase in the southern whiting OFL (Table 29)[17]. Scientific uncertainty was re-estimated based on the sampling variance for the recent 3-year period and for the 1972-1983 reference period. Discard rates (percent of total catch) during were also updated to the 2017-2019 period, to set the TAL.

[17] An standard adjustment is made to the OFL to account for the mixed catch of offshore hake in the southern management area, averaging about 4% of the total catches.

The survey biomass for northern silver hake has been declining in recent years, but the survey biomass remains at a high level relative to the reference point and relative exploitation rates are very low. A 34% decline in the ACL is still far above recent catch levels so should of negatively impact the fishery and appropriate given that biomass appears to be declining from historically high levels. This decline does not appear to be driven by fishing given the very low exploitation rate. The survey biomass for southern whiting has been increasing in recent years and the survey biomass is now above the survey-based reference points and the relative exploitation rate is very low.

Even if catch increases to the ACL, there is a very low probability that overfishing would occur or that the stocks would become overfished (NEFMC 2020b). For both stocks, the change in the specifications are consistent with the recent changes in stock biomass and account for recent changes in scientific uncertainty, discards, and state water landings.

Because northern silver hake and southern whiting catches have not exceeded the ACLs and are not projected to do so, low positive impacts to the northern silver hake and southern whiting stocks are expected.

For northern silver hake the proposed specifications are less than those in the No Action alternative. Thus, with a lower exploitation rate, the impact to northern silver hake stock is expected to be slightly positive relative to No Action. The specifications for southern whiting on the other hand are higher than those for No Action but are not expected to cause the stock to become overfished. Thus, the expected impact of Alternative 2 on southern whiting is slightly positive.

<u>Red hake</u>

Red hake stocks were re-assessed using data through 2019 and previous biological reference points were rejected.

For the northern red hake stock, the Council's SSC recommended using the average exploitation rate during 1981-1994 (1.5%) to set ABC. This was justified because the exploitation rate occurred during a period when the stock appears to have responded to management through higher biomass followed by a period of stability. The stock appears to be in good condition and the SSC felt that recent exploitation of the stock at this level would not risk causing overfishing of the stock or cause it to become overfished. The management track assessment found that the very low exploitation rates was not a primary driver of changes in biomass, thus at this low exploitation rate, the recommended specifications are unlikely to cause the stock to become overfished.

Likewise, for the southern red hake stock the Council's SSC recommended using the average exploitation rate during 2001-2019 (3.1%) to set ABC. This was justified due because the exploitation rate occurred when the stock appears to have responded to management through higher biomass followed by a period of stability. The stock appears to be in a stable condition and the exploitation of the stock has recently been very low. Thus, the SSC felt that this ABC would not risk causing overfishing of the stock. Because the management track assessment considered the status to be unknown relative to a biomass benchmark associated with MSY and there is no analytical assessment on which to forecast changes in stock biomass at various exploitation rates, the Council's SSC did not comment on the potential effect on rebuilding. However, higher catches would be expected to dampen increases in biomass that would otherwise occur with lower catches.

Because the northern red hake catches have not exceeded the ACLs and are even less likely to do so with the higher proposed specifications, the proposed specifications are expected to have a slightly positive impact on the stock. The increase in the red hake specifications is the result of increasing stock biomass measured by the survey and from the maximum exploitation rate recommended by the SSC compared to recent low exploitation. It is unlikely that the low red hake exploitation rates would cause overfishing and would not cause the northern red hake stock to become overfished. Thus, Alternative 2 is expected to have a slightly positive impact on the northern red hake stock.

With Option A below, the southern red hake specifications is expected to have a low risk of overfishing, but stock biomass could remain lower than the minimum biomass threshold for longer than with the Option B specifications. Rebuilding could take longer with Option A than with Option B. Thus, Alternative 2 Option A would have a slightly negative impact on southern red hake and Alternative 2 Option B would have a moderately positive impact on southern red hake.

Table 29. Percent change in the proposed specifications for small-mesh multispecies stocks relative to No Action (Section 4.1.1).

Stock	OFL (mt).	ABC (mt).	ACL (mt).	TAL (mt).	TAL trigger (mt)[18].	TAL trigger (%).
Northern silver hake	-32%	-34%	-34%	-34%	-34%	90%
Southern whiting	94%	103%	103%	91%	91%	90%
Northern red hake	NA	379%	379%	414%	414%	38%
Southern red hake	NA	89%	89%	88%	89%	41%

6.2.1.2.1 Option A – SSC recommendation for southern red hake ABC

Options A and B pertain only to the catch limit specifications for southern red hake, which was considered to be overfished and the Council approved a rebuilding plan via Framework 62. In addition to reducing southern red hake possession limits, Framework 62 establishes a larger buffer between ABC and ACL to cap catch at a lower level than otherwise would be specified by the plan's catch limit framework. A lower catch, like that in Option B, would reduce southern red hake fishing mortality and promote rebuilding, also reducing the likelihood that southern red hake would remain overfished. The September 2020 management track assessment (NEFMC 2020b) however determined that the model previously used to determine status was no longer reliable and the overfished status was determined to be unknown.

Option A (see table below) represents the recommendation of the Council's SSC for southern red hake specifications, at levels that are not expected to cause overfishing. There is however no accepted southern red hake stock assessment, no biological reference points, and thus the management track assessment determined that the southern red hake stock status is unknown. However, current management treats the stock as overfished under a previous assessment with a known status and southern red hake is officially in a rebuilding program.

[18] The TAL trigger in this table reflects 2020 implantation, including the reduction in the southern red hake TAL trigger caused by overages in fishing year 2018.

Table 30. Comparison of southern red hake specification alternatives for fishing years 2021-2023.

Option	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)
Option A (Section 4.1.2.1)	NA	2,006	1,906	573	235	41%
Change from No Action	NA	89%	89%	88%	89%	
Option B (Section 4.1.2.2)	NA	1,505	1,429	422	173	41%
Change from No Action	NA	42%	42%	38%	-37%	

Although the expected exploitation rate is low, Option A southern red hake specifications would allow for an increase of catch from our estimates in 2018 and 2019, which triggered an overfished condition and initiated a rebuilding program (NEFMC 2020a). While Option A is expected to prevent overfishing, it would have less potential for promoting stock rebuilding. Because Option A would have a higher probability of biomass remaining below the minimum biomass threshold, it would have a slightly negative impact on the southern red hake stock relative to Option B and moderately negative impact relative to No Action. Southern red hake are rarely the primary target of small-mesh multispecies fishing and thus Option A would not cause a meaningful change in fishing effort and thus it would have negligible impacts on northern silver hake, northern red hake, or southern whiting.

6.2.1.2.2 Option B – Southern red hake ABC reduced by 25% to increase stock rebuilding potential (Preferred)

Option B (see table above) would reduce the ABC to 75% of the amount recommended by the SSC, or an exploitation rate of 2.3%. This option would be consistent with this part of the rebuilding plan in Framework 62. The lower exploitation rate would promote rebuilding and the specification would be about the same level of catch that occurred in 2018 and 2019, while Option A would allow for an increase in catch. Option B would also account for the higher uncertainty associated with the southern red hake stock assessment and unknown status. Swept area biomass (the basis for the recent management track assessment) are qualitative indicators of stock trends, and an increase to the ABC associated with Option A would have unknown impacts to a stock with an already unknown stock status. By having a lower catch limit relative to the ABC, Option B would promote rebuilding and thus reduce the probability that the southern red hake would remain in an overfished condition. Therefore, Option B will have a moderately positive impact on the southern red hake stock.

Having specifications that are lower than Option A, Option B would have a moderate positive short- and long-term impact on the stock by increasing the potential for stock rebuilding. Option B catch specifications are still higher than No Action, tracking the increase in observed biomass since 2018 when specifications were last adjusted. Option B would have a higher probability that stock biomass would increase above the minimum stock biomass, and more quickly than that expected for Option A. Southern red hake are rarely the primary target of small-mesh multispecies fishing and thus Option B would not cause a meaningful change in fishing effort and thus it would have negligible impacts on northern silver hake, northern red hake, or southern whiting.

6.2.2 Action 2 – NORTHERN RED HAKE TAL TRIGGER (ACCOUNTABILITY MEASURE, AM) ADJUSTMENT (Section 4.2)

To analyze the effect of restoring the northern red hake TAL trigger, we can use the same approach as the analysis described for Action 3 (Section 6.2.3), except that the 400 lbs. possession limit would be raised to 3,000 lbs. for the entire year, assuming that the 90% trigger would not be met during the fishing year. Instead of evaluating a higher possession limit for the entire year, here we assume that the possession limit in place from May to July is 3,000 lbs. and the possession limit from September to April is 400 lbs., but under Alternative 2 would be 3,000 lbs. This analysis does not require consideration of mesh size because the possession limit applies to all trips, whether using trawls or other gears.

In this case, 120 trips catching red hake in the northern management area during fishing years 2017-2019 were analyzed. On observed trips in the northern area, red hake landings were 74% of total catch. Regulatory discards (catch exceeding the possession limit) were 13% of total catch. This value may be slightly over- or underestimated, depending on the date that the in-season AM was implemented (i.e. when landings reached the TAL trigger). Non-regulatory discards accounted for 13% of the catch.

Table 31 shows the estimated percent reduction in discards and increase in landings associated with raising the possession limit from 400 to 3,000 lbs. from September to April. The actual effect depends on when the fishery lands the TAL trigger at 37.9% of the TAL vs. 90% of the TAL. The fishery may still reach the 90% TAL trigger later in the season (although this is much less likely with the higher specifications). This analysis would slightly overestimate the effect in that case.

6.2.2.1 Alternative 1 – No Action

No Action would continue the TAL trigger at 37.9% of the TAL reducing the potential for overfishing, even though in recent years the in-season AM has not been triggered and may be unnecessary under current stock and fishery conditions. Alternative 1 is unlikely to increase fishing pressure on other small-mesh multispecies however. This alternative is slightly more conservative and risk adverse than Alternative 2 because catch and mortality would be marginally lower.

Thus No Action is expected to have a slightly positive impact on the northern red hake stock and other small-mesh multispecies stocks because they are unlikely to become overfished from this alternative. Compared to Alternative 2, No Action is expected to have a slightly positive impact on northern red hake and a negligible impact on other small-mesh multispecies stocks.

6.2.2.2 Alternative 2 - Restore the Northern Red Hake TAL trigger to 90% (Preferred)

If the ins-season 400 lbs. AM possession limit begins in September and would not be triggered with a 90% trigger (Alternative 2), the analysis suggests that regulatory discards could be reduced by as much as 23.5%, which is 4.2% of landings, or 28,578 lbs. (see table below) when expanded to fleet landings reported via VTRs.

It is unlikely that allowing additional landings by raising the TAL trigger and delaying the in-season AM will add much fishing effort but it may reduce the incentive to avoid catching red hake that could not be landed. As a result, there may be a minor increase in fishing mortality, but not enough to cause any small-mesh multispecies stock to become overfished. In the northern management area, a small fraction of small-mesh multispecies trips are made to catch northern red hake for the bait market (transfers at sea are allowed). On the other hand, the alternative could substantially reduce northern red hake discarding and trips targeting silver hake could land more of the red hake that they normally catch.

Thus Alternative 2 is expected to have a slightly positive impact on the northern red hake stock and other small-mesh multispecies stocks because they are unlikely to become overfished from this alternative. Compared to No Action, Alternative 2 is expected to have a slightly negative impact on northern red hake and other small-mesh multispecies stocks, but a negligible impact on other small-mesh multispecies stocks.

Table 31. Estimated reduction in regulatory discards (lbs) on FY 2017-2019 observed trips for deferment of the 400 lbs. AM possession limit from September to April, expanded to total fleet by the proportion of discard reduction to landings (lbs whole).

Alternative	Regulatory discard change	% of landings	Estimated total landings increase (lbs)
2	-23.5%	4.2%	39,898

6.2.3 Action 3 – WHITING POSSESSION LIMITS (Section 4.3)

The whiting possession limits of 3,500 lbs. for trips fishing with less than 2.5-inch mesh and 7,500 lbs. for trips fishing with 2.5 to 3-inch mesh, were established at a time when the whiting stocks were not in healthy condition and there was concern that high juvenile whiting catches could jeopardize the stock. As the whiting stocks have recovered and biomass has increased, greater amounts of whiting are being caught as bycatch on trips targeting squid and herring. This action could increase these possession limits to reduce whiting discards in the squid and herring fisheries.

Analysis of changes in discards and landings

To evaluate the potential effects of increasing possession limits for vessels using trawls having less than 3-inch mesh, 2,605 observed trips in fishing years 2017-2019 that caught whiting using less than 3-inch mesh were analyzed to determine the potential reduction of discards that could occur with higher possession limits. For all of these observed trips, landed whiting accounted for 78% of total catch (77% for mesh less than 2.5-inches; 82% for mesh between 2.5 and 3-inches). Regulatory discards (catch exceeding the possession limits) accounted for 8% of the catch (8.5% for mesh less than 2.5-inches; 7.3% for mesh between 2.5 and 3-inches) and non-regulatory discards (catch not exceeding the possession limit) accounted for 14% of the catch (14.6% for mesh less than 2.5-inches; 10.3% for mesh between 2.5 and 3-inches).

By adjusting the regulatory discards and landings on trips to account for catch between the exiting possession limit and the alternative possession limits we can estimate the percent reduction in discards and the potential increase in landings on observed trips (see table below). Furthermore, if we assume that observed trips are randomly chosen from all trips fishing with less than 3-inch mesh trawls, then for each alternative we can apply the change in discards and landings as a proportion of actual landings to the total landings for the fleet derived from vessel trip reports (VTR). For fishing years 2017-2019, trips fishing with less than 2.5-inch mesh trawls landed an average of 461,744 lbs. of whiting (4.8% of total whiting landings) and trips fishing with 2.5 to 3-inch mesh trawls landed an average of 1,332,064 lbs of whiting (13.8% of total whiting landings) (see figure below). Table 32 summarizes these estimates.

Figure 13. Whiting landings by trawl mesh category Source: VTR.

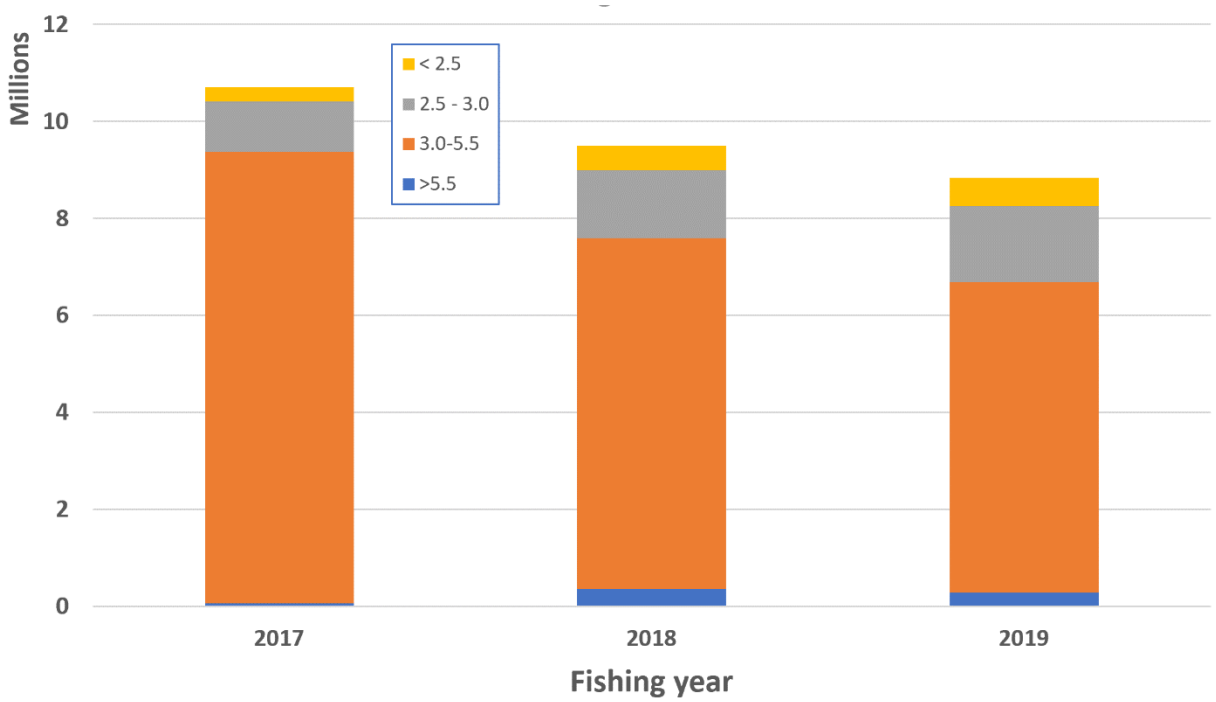


Table 32. Estimated reduction in regulatory discards (lbs) on FY 2017-2019 observed trips at various possession limits, expanded to total fleet by the proportion of discard reduction to landings (lbs whole).

Alternative	2"-2.5"	2.5"-3"	Regulatory discard change	% of landings	Estimated total landings increase (lbs)
	4,000	8,000	-4.6%	0.5%	9,665-14,526
	5,000	10,000	-16.6%	1.8%	35,110-52,770
2	6,000	12,000	-24.2%	2.6%	51,317-77,128
	7,000	15,000	-32.4%	3.4%	68,586-103,082
3	15,000	15,000	-50.1%	5.3%	106,093-159455
4	30,000	30,000	-57.1%	6.1%	121,102-182,013
	40,000	40,000	-63.3%	6.7%	134,134-201,599

Whiting size frequency analysis

It is also possible that vessels using less than 3-inch mesh trawls will begin targeting whiting with the same mesh that they currently use to target other species, like herring and squid. Presently, current regulations (3,500 lbs. whiting possession limit for trips fishing with less than 2.5-inch mesh and 7,500 lbs. for trips fishing with 2.5 to 3-inch mesh) discourage vessels from targeting whiting. To the extent that smaller mesh trawls catch smaller whiting, this measure reduces targeting on small whiting and improves selectivity and yield-per-recruit by the fishery. Similarly, the possession limits can act to cause fishermen to avoid catching whiting while fishing for other species, if they cannot land large amounts of whiting that

they might otherwise catch. Whether targeting or avoiding whiting, fishermen can do this by fishing in different areas, different times of day, and different seasons.

Estimating how much avoidance and targeting occurs at various possession limits is not currently possible. We can however characterize the potential effect and how it can affect the northern silver hake and whiting stocks by analyzing the size frequency of whiting caught by mesh size. If there is no difference in the size of fish captured by mesh size, then there would be minimal effect on selectivity and yield-per-recruit, although the fleet may catch and land a greater proportion of the specifications.

Whiting size frequency during 2017-2019

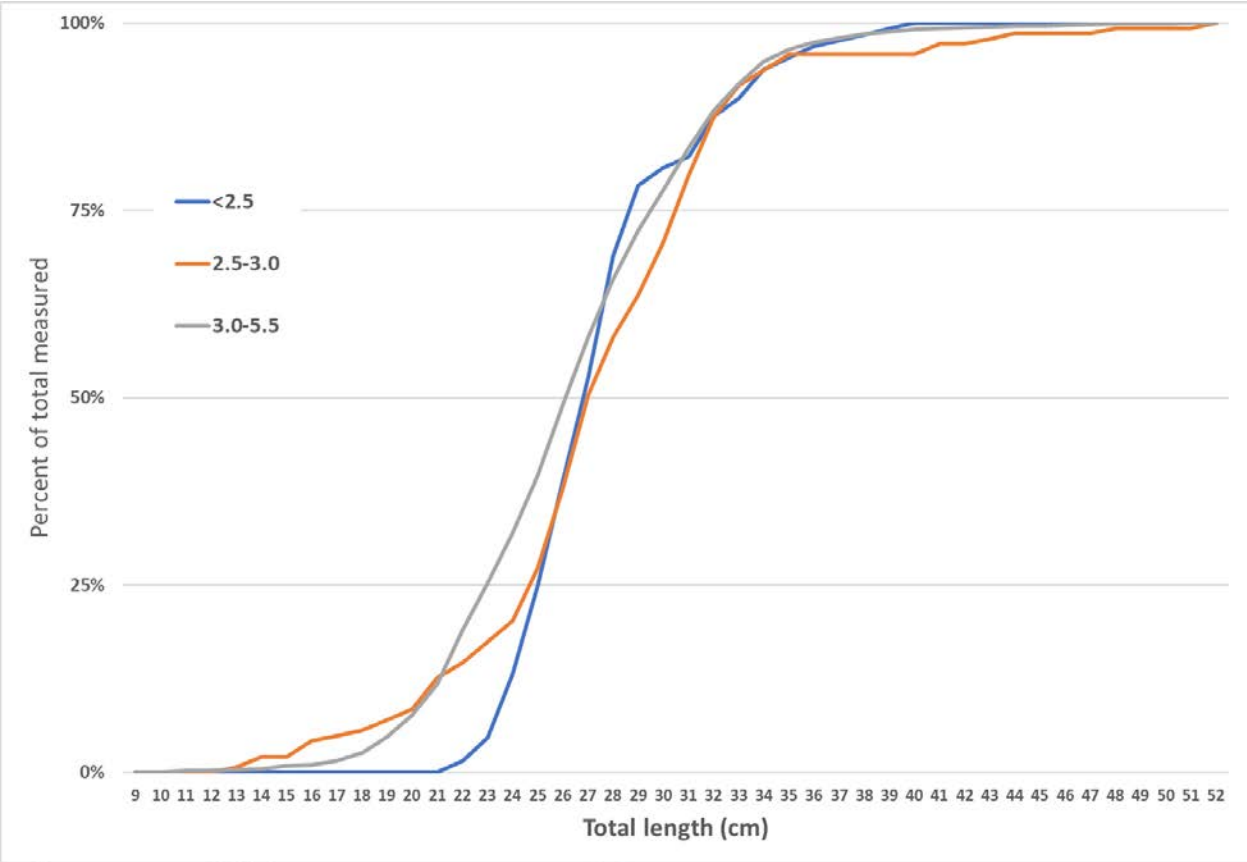
Figure 14 shows the size frequency distribution of whiting on observed trips fishing with less than 3-inch mesh trawls. These data show that during 2017-2019, smaller whiting are not caught on observed hauls fishing with less than 3-inch mesh trawls, compared to the amount of small whiting caught on hauls with greater than 3-inch mesh. In fact, there appears to be more small whiting caught on hauls with the larger mesh size, but this may be an artifact of the small number of observations for hauls with less than 2.5-inch mesh (see Table 33 and the analysis of 2012-2014 length frequency observations described below). Alternatively, hauls with more fish in the cod end may have poorer size selectivity, but we did not test for this factor.

Table 33. Observed trips, hauls, and whiting measured by trawl mesh during fishing years 2017 to 2019.

	Mesh (in)			Total
	<2.5	2.5-3.0	3.0-5.5	
Total Observed trips	4	9	166	179
Total Observed hauls	5	11	356	372
Total Observed lengths	129	151	4962	5242

The median length of whiting caught on trips fishing with less than 2.5-inch mesh is 26.8 cm (see figure below), while the median length of whiting of trips fishing with 2.5 to 3-inch mesh is 27.0 cm. More importantly, the proportion of whiting less than 20 cm is 0% and 8.4% respectively. These data compare with a median length of whiting of 26.1 cm and a proportion less then 20 cm of 7.7%.

Figure 14. Cumulative silver hake total length (cm) frequency by trawl mesh category on fishing year 2017-2019 observed trips. Source: NEFOP data, GARFO NMFS.



Whiting size frequency by mesh during 2012-2014

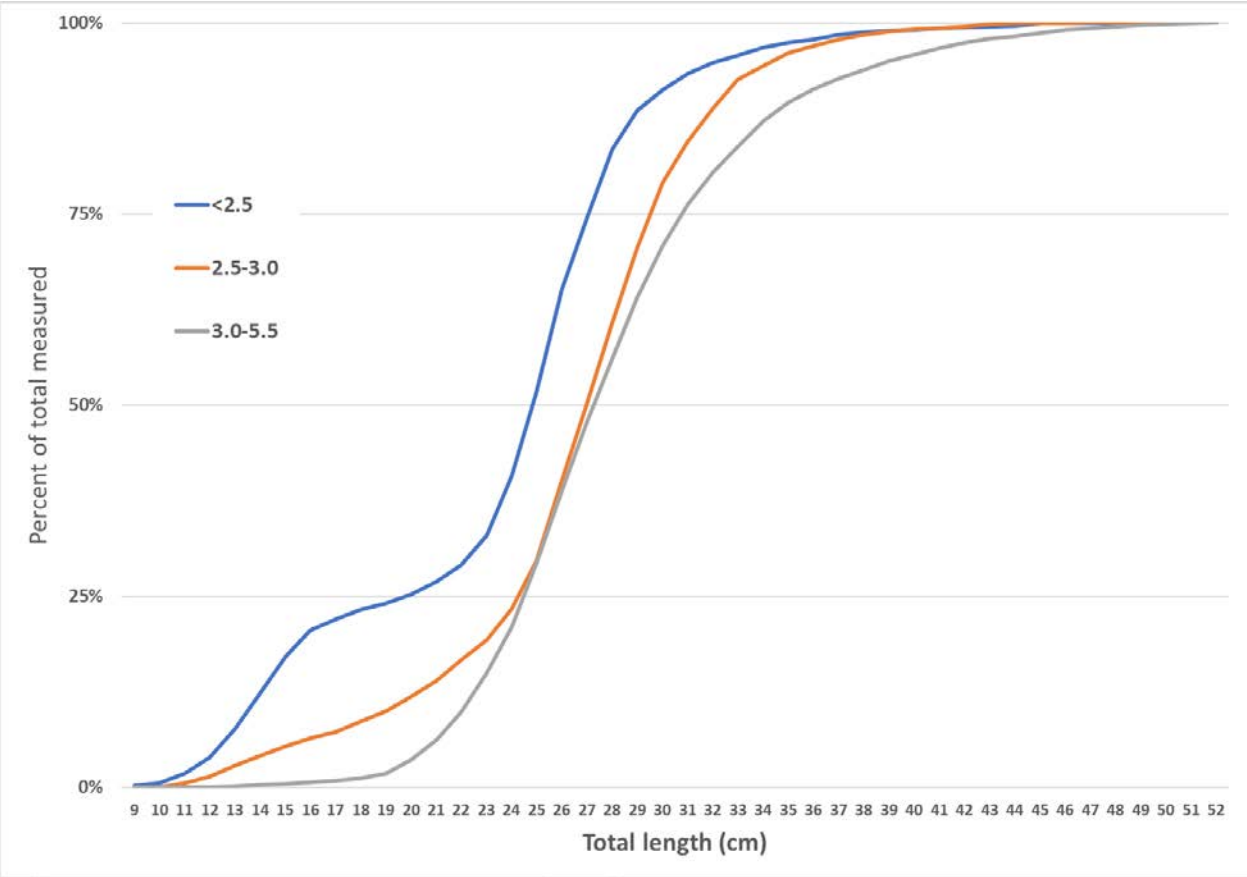
To evaluate whether the observed size distribution by mesh size shown in the 2017-2019 data was an artifact of the low sample numbers for 2017-2019 trips fishing with less than 2.5-inch mesh, we evaluated an earlier period (fishing years 2012-2014) when more trips were sampled (Table 34). Instead of 4 sampled trips fishing with less than 2.5-inch mesh, there were 31 sampled trips during 2012-2014.

Table 34. Observed trips, hauls, and whiting measured by trawl mesh during fishing years 2012 to 2014.

	Mesh (in)			Total
	<2.5	2.5-3.0	3.0-5.5	
Total Observed trips	26	15	56	97
Total Observed hauls	26	18	132	176
Total Observed lengths	2326	1557	6771	10654

During 2012-2014, the median length of whiting caught on trips fishing with less than 2.5-inch mesh is 24.8 cm, while the median length of whiting of trips fishing with 2.5 to 3-inch mesh was 27.0 cm. More importantly, the proportion of whiting less than 20 cm is 25.3% and 3.6% respectively. These data compare with a median length of whiting of 27.3 cm and a proportion of whiting less then 20 cm equal to 9.6%.

Figure 15. Cumulative silver hake total length (cm) frequency by trawl mesh category on fishing year 2012-2014 observed trips. Source: NEFOP data, GARFO NMFS.



Red hake size frequency by mesh

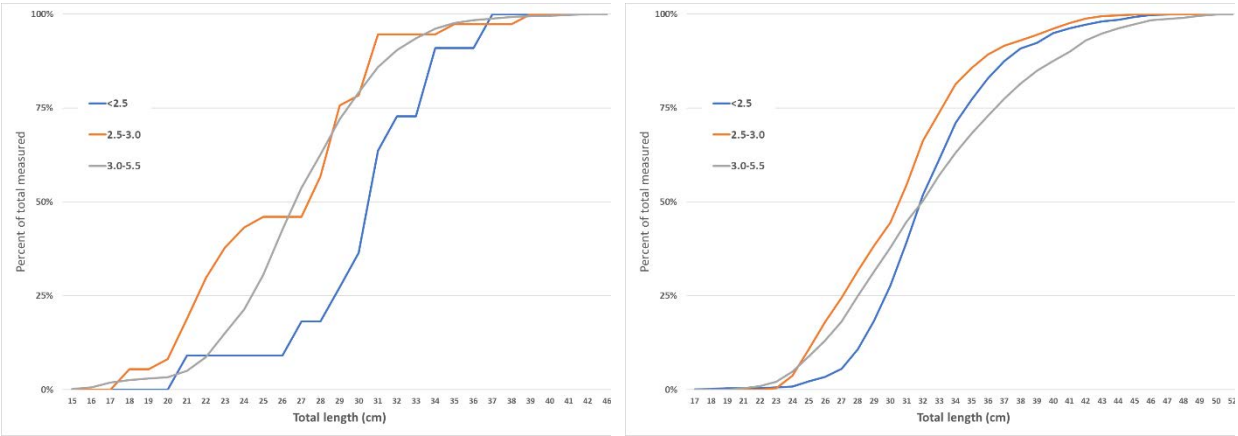
Like the case for silver hake size frequency on observed trips, the interpretation for fishing years 2017-2019 is hampered by low sampling frequency on trips fishing with less than 3-inch mesh. In fact the date for these years indicates that the median size and proportion of red hake less than 26 cm is higher for less than 2.5-inch mesh than it was for the larger mesh trawls (see left panel of the figure below). The median red hake lengths were 30.5 for less than 2.5-inch mesh, 27.4 cm for 2.5- to 3-inch mesh, and 25.7 cm for greater than 3-inch mesh. The proportions of red hake less than 26 cm on observed trips were 9.1%., 46.0% and 42.6% respectively.

Although the size selectivity for silver hake was better for greater than 3-inch mesh than is was for less than 2.5-inch mesh, the observed red hake size frequency for 2012-2014 did not show a difference by mesh size despite the higher sampling frequency. The median red hake lengths in 2012-2014 were 31.8 for less than 2.5-inch mesh, 30.5 cm for 2.5- to 3-inch mesh, and 31.9 cm for greater than 3-inch mesh (see right panel of the figure below). The proportions of red hake less than 26 cm on observed trips were 3.4%, 18.0%, and 13.0%, respectively.

Thus it is not clear that increased fishing for whiting with smaller mesh would result in worse size selection for red hake.

Figure 16. Cumulative red hake total length (cm) frequency by trawl mesh category on observed trips. Source: NEFOP data, GARFO NMFS.

FY 2017 to 2019 **FY 2012 to 2014**



6.2.3.1 Alternative 1 – No Action

No Action would retain the existing whiting possession limits and thus do not affect landings and discards. The existing possession limits have however successfully improved size selectivity of the fishery and greatly reduced targeting juvenile whiting primarily for foreign markets. Thus, No Action has a moderately positive effect on the northern silver hake and southern whiting stocks. No Action is likely to have a slightly positive impact on the red hake stocks, because the measure maintains a healthy fishery and does not increase risk for the stocks to become overfished.

No Action would have a moderately positive impact on whiting compared to Alternatives 2, 3, and 4. No Action could have a slightly negative impact on the red hake stocks due to potential changes in size selectivity between the small-mesh multispecies and other small-mesh fisheries. No action would cause no shift in effort that might benefit red hake stocks due to less fishing in other fisheries (e.g. squid) that have a higher red hake bycatch rate.

6.2.3.2 Alternative 2 - Increase the Possession Limit to 6,000 lbs. for vessels using trawls with less than 2.5-inch mesh and to 12,000 lbs. for vessels using trawls with 2.5-inch to 3-inch mesh

Alternative 2 would retain a differential possession limit for mesh less than 3-inches and would potentially reduce regulatory discards (by an estimated 24%) while fishing for other species, allowing vessels to land some additional whiting (by an estimated 46,102 lbs.) (Table 32). It probably would not encourage vessels to begin targeting whiting, particularly for larger vessels that fish further offshore for herring and squid. Assuming that the measure does not change fishing behavior or increase targeting whiting with less than 3-inch mesh trawls, the alternative would have a negligible impact on whiting or red hake fishing mortality. Small whiting that would be caught by mesh less than 2.5-inches (see Figure 15) would have been caught anyway and would be discarded with the status quo possession limit.

Like No Action, Alternative 2 is not expected to cause the stocks to experience overfishing or become overfished, thus it would have a slightly positive impact on the small-mesh multispecies stocks. Alternative 2 would have a slightly negative impact on whiting compared to No Action and a slightly to moderately positive impact on whiting compared to Alternatives 3 and 4, respectively. Compared to other alternatives, Alternative 2 would have a negligible impact on northern silver hake. Alternative 2 could

have a slightly negative impact on the red hake stocks due to potential changes in size selectivity between the small-mesh multispecies and other small-mesh fisheries.

6.2.3.3 Alternative 3 – Increase the Possession Limit to 15,000 lbs. for vessels using trawls with less than 3-inch mesh (Preferred)

Alternative 3 would establish a single possession limit for mesh less than 3-inches and would potentially reduce regulatory discards (by an estimated 50%) while fishing for other species, allowing vessels to land some additional whiting (by an estimated 95,312 lbs.) (Table 32). Some vessels might be encouraged to target whiting or avoid them less with this higher possession limit, but not as much as if the trip had the same possession limit as vessels using greater than 3-inch mesh. If the possession limit increase promotes more fishing for whiting with less than 3-inch mesh trawls, it could increase the catch of small whiting, particularly by vessels using less than 2.5-inch mesh trawls (see Figure 15).

Like No Action, Alternative 3 is not expected to cause the stocks to experience overfishing or become overfished, thus it would have a slightly positive impact on small-mesh multispecies stocks. Alternative 3 would have a slightly negative impact on whiting compared to No Action and Alternative 2 and a moderately positive impact compared to Alternative 4. Many of the trips fishing with less than 3-inch mesh trawls are in the loligo squid fishery which has a considerable amount of red hake bycatch (NEFMC 2020c) and an effort switch could have a slightly positive impact on red hake because the size selectivity could be better than the red hake catch in the squid fishery.

6.2.3.4 Alternative 4 – Increase the Possession Limit to 30,000 lbs. for vessels using trawls with less than 3-inch mesh

Alternative 4 would establish a single possession limit for mesh less than 3-inches and would potentially reduce regulatory discards (by an estimated 57%) while fishing for other species, allowing vessels to land some additional whiting (by an estimated 108,795 lbs.) (Table 32). This possession limit is the same as the one that applies for northern silver hake and 75% of the possession limit that applies to southern whiting. Thus Alternative 4 is more likely than the other alternatives to encourage targeting whiting instead of other species (e.g. with squid or herring trawls) using less than 3-inch mesh, or reduce the incentive to avoid catching large amounts of whiting. If the possession limit increase promotes more fishing for whiting with less than 3-inch mesh trawls, it could increase the catch of small whiting, particularly by vessels using less than 2.5-inch mesh trawls (see Figure 15), potentially reducing size selectivity of the fishery for whiting and yield-per-recruit.

Like No Action, Alternative 4 is not expected to cause the stocks to experience overfishing or become overfished, thus it would have a slightly positive impact on small-mesh multispecies stocks. On whiting and red hake stocks, Alternative 4 would have a moderately negative impact compared to No Action and Alternatives 2 and 3. Many of the trips fishing with less than 3-inch mesh trawls are in the loligo squid fishery which has a considerable amount of red hake bycatch (NEFMC 2020c) and an effort switch could have a slightly positive impact on red hake because the size selectivity is better in the small-mesh multispecies fishery.

6.3 Impacts on Non-target Species

See Section 5.3 for a summary of trends in bycatch associated with trips targeting whiting and red hake in the small-mesh multispecies fishery.

6.3.1 Action 1 – SPECIFICATIONS (Section 4.1)

6.3.1.1 Alternative 1 – No Action

Alternative 1 would retain current specifications and is not expected to cause small-mesh multispecies fishing effort to increase. Thus, No Action is expected to have a slightly positive impact on non-target species that are not overfished and slightly negative impact to those that are overfished (see Table 15).

6.3.1.2 Alternative 2 - 2021-2023 Specifications Adjustment (Preferred with Option B for southern red hake specifications)

Alternative 2 would reduce northern silver hake specifications and increase the specifications for southern whiting and both red hake stocks. Because the fishery does not catch the ABC for the primary target stocks (northern silver hake and southern whiting), fishing effort is not expected to increase.

Thus Alternative 2 is expected to have a slightly positive impact on non-target species and a negligible impact on non-target species relative to No Action.

6.3.1.2.1 Option A – SSC recommendation for southern red hake ABC

Option A would implement the specifications recommended by the Council's SSC, which is considerable higher than the current specifications. It would not change the possession limits in Framework 62 (NEFMC 2020a) that (pending approval) would deter fishermen from targeting red hake and possibly induce some avoidance or use of gears that catch fewer red hake. For stocks that co-occur with red hake, Option A would have a slightly positive impact on non-target stocks that are not overfished but would have slightly negative impact on non-target stocks that are overfished. Compared to Option B, Option A would have a slightly negative impact non-target stocks.

6.3.1.2.2 Option B – Southern red hake ABC reduced by 25% to increase stock rebuilding potential (Preferred)

Option B would implement specifications that are 75% of Option A, but these specifications still exceed current red hake catch and landings. For stocks that co-occur with red hake, Option B would have a slightly positive impact on non-target stocks that are not overfished but would have slightly negative impact on non-target stocks that are overfished. Compared to Option A, Option B would have a slightly positive impact on non-target stocks by reducing catch of non-target stocks that co-occur with southern red hake.

6.3.2 Action 2 – NORTHERN RED HAKE TAL TRIGGER (ACCOUNTABILITY MEASURE, AM) ADJUSTMENT (Section 4.2)

6.3.2.1 Alternative 1 – No Action

No Action would retain the current 37.9% TAL trigger. When landings reach this accountability measure, the 3,000 lbs. possession limit would be reduced to 400 lbs. The accountability measure is intended to deter targeting red hake and encourage avoidance. For stocks that co-occur with red hake and non-target stocks that are not overfished, Alternative 1 would have a slightly positive impact on the stock but would

have negligible impact on non-target stocks that do not co-occur with red hake and a slightly negative impact on overfished non-target stocks that are overfished.

6.3.2.2 Alternative 2 - Restore the Northern Red Hake TAL trigger to 90% (Preferred)

Alternative 2 would allow more landings of red hake than Alternative 1 would, possibly increasing targeting of red hake and less avoidance. For stocks that co-occur with red hake and non-target stocks that are not overfished, Alternative 2 would have a slightly negative impact on the stock but would have negligible impact on non-target stocks that do not co-occur with red hake and a slightly negative impact on overfished non-target stocks. Compared to No Action, Alternative 2 would have a slightly positive impact on non-target stocks but would have negligible impact on non-target stocks that do not co-occur with red hake and a slightly positive impact on overfished non-target stocks that are overfished.

6.3.3 Action 3 – WHITING POSSESSION LIMITS (Section 4.3)

6.3.3.1 Alternative 1 – No Action

No action would retain the current possession limits for trips fishing with less than 3-inch mesh trawls. This measure substantially reduces the incentive to target whiting instead of alternative small-mesh species, such as herring and loligo squid. As such, it may discourage bottom trawl herring fishermen from using their existing nets to target whiting when the Council develops a rebuilding program for overfished Atlantic herring. It would also prevent vessels in the small-mesh multispecies fishery from targeting whiting with smaller mesh and thereby catching smaller non-target species of fish.

Thus, No Action is expected to have a slightly positive impact on non-target species, except it would have a slightly negative impact on Atlantic herring and non-target overfished stocks. For herring vessels, No Action would inhibit some herring vessels from targeting whiting using existing fishing gear as an alternative.

6.3.3.2 Alternative 2 - Increase the Possession Limit to 6,000 lbs. for vessels using trawls with less than 2.5-inch mesh and to 12,000 lbs. for vessels using trawls with 2.5-inch to 3-inch mesh

Alternative 2 would raise the whiting possession limit for vessels fishing with less than 3-inch mesh trawls, allowing vessels using these gears to target other species (such as herring and loligo squid) to land more of the whiting that they catch. It is not expected to substantially change the equation such that vessels using these gears increase targeting of whiting.

Thus, like No Action, Alternative 2 is expected to have a slightly positive impact on non-target species that are not overfished, except it would have a slightly negative impact on Atlantic herring and non-target overfished stocks. For herring vessels, Alternative 2 would inhibit some herring vessels from targeting whiting as an alternative target using existing fishing gear. Compared to No Action, Alternative 2 would have a negligible impact on non-target species. Compared to Alternatives 3 and 4, Alternative 2 would have a slightly positive impact on non-target species, but it would inhibit some herring vessels from targeting whiting as an alternative and thus would have a slightly negative impact on herring.

6.3.3.3 Alternative 3 – Increase the Possession Limit to 15,000 lbs. for vessels using trawls with less than 3-inch mesh (Preferred)

Alternative 3 would increase the whiting possession limit by a considerable amount for trips fishing with less than 3-inch mesh, particularly for trips fishing with smaller than 2.5-inch mesh. This alternative could induce some fishermen to begin targeting whiting with smaller mesh trawls. As a result, fishing in the whiting fishery would be less size selective for non-target species that co-occur with whiting.

Like No Action, Alternative 3 could have a slightly positive impact on non-target species that are not overfished and a slightly negative impact on overfished non-target species, but also could have a slightly positive impact on herring if vessels in the herring fishery begin targeting whiting during the herring rebuilding period. Like No Action, Alternative 3 would have a slightly negative impact on overfished non-target stocks. Compared to No Action and Alternative 2, Alternative 3 would have a slightly negative impact on overfished and not overfished non-target species but a slightly positive impact on herring. Compared to Alternative 4, Alternative 3 would have a slightly positive impact on overfished and not overfished non-target species. By the same token, it would not encourage whiting vessels from using smaller than 3-inch mesh to target whiting as much as would Alternative 4, maintaining size selectivity for non-target species in the small-mesh multispecies fishery. Alternative 3 would have a slightly negative impact on herring, compared to Alternative 4. Alternative 3 would not offer as much opportunity as Alternative 4 for herring vessels to begin targeting whiting as an alternative during the herring rebuilding period, but more opportunity than would No Action and Alternative 2.

6.3.3.4 Alternative 4 – Increase the Possession Limit to 30,000 lbs. for vessels using trawls with less than 3-inch mesh

Alternative 4 would increase the whiting possession limit by a considerable amount for trips fishing with less than 3-inch mesh, particularly for trips fishing with smaller than 2.5-inch mesh. This alternative could induce some fishermen to begin targeting whiting with smaller mesh trawls. It could also encourage whiting fishermen to begin using less than 3-inch mesh to target smaller whiting, having a similar reduction in size selection of non-target species. As a result, fishing in the whiting fishery would be less size selective for non-target species that co-occur with whiting.

Like No Action, Alternative 4 could have a slightly positive impact on non-target species that are not overfished and a slightly negative impact on overfished non-target species, but also could have a slightly positive impact on herring if vessels in the herring fishery begin targeting whiting during the herring rebuilding period. Compared to Alternatives 2 and 3, Alternative 4 would have a slightly negative impact on all non-target species and a slightly positive impact on herring, because of poorer size selectivity of non-target species by vessels that switch from the herring fishery using less than 3-inch mesh and by vessels that could begin using smaller mesh in the whiting fishery since the possession limit would be uniform across mesh sizes (except for the 40,000 lbs. southern whiting possession limit).

6.4 Impacts on Protected Species

Section 5.4 identifies numerous species under NMFS jurisdiction that are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972, that occur in the affected environment of the small-mesh multispecies fishery (discussed in Section 5.4) and have the potential to be impacted by the proposed action. This analysis evaluates how the small-mesh multispecies fishery could impact these protected species under each of the actions and alternatives for the proposed changes in fishery specifications. The general approach to evaluating impacts on protected and ESA-listed species is described in Section 6.1.1.3.

6.4.1 Action 1 – SPECIFICATIONS (Section 4.1)

6.4.1.1 Alternative 1 – No Action

This alternative would maintain the previously established specifications. As a result, fishing patterns would likely remain similar to present patterns (e.g., no spatial or temporal shifts in effort; no changes in gear type, quantity, or relative soak/tow time). Based on this information, fishing behavior and effort is anticipated to remain similar to current conditions, although some changes in small-mesh multispecies fishing may occur to avoid catching southern red hake due to limits to be established by Framework 62 (NEFMC 2020a; action pending approval by NMFS). Information about how fishermen will respond to the new southern red hake limits and how protected species distribution interact with these potential changes are unclear. Framework 62 encourages fishermen to use more selective trawls that do not capture certain fish species, but these potential gear changes are unlikely to substantially change the vulnerability of protected species to the small-mesh multispecies trawl fishery. The types of gear modifications that fishermen could use to make the gear more selective and avoid catching red hake are described and evaluated in Framework 62.

Taking into consideration the above information, and the fact that there are non ESA-listed marine mammal species (but listed under the MMPA) whose populations may or may not be at optimum sustainable levels, the impacts of No Action on non-ESA-listed species of marine mammals are likely to range from slightly negative to slightly positive, depending on the species/stock. As provided above, some bottlenose dolphin stocks are experiencing levels of interactions that have resulted in exceedance of their PBR levels. As previously noted, the risk of an interaction is strongly associated with the amount of gear in the water, the time the gear is in the water (e.g., tow time), and the presence of protected species in the same area and time as the gear, with risk of an interaction increasing with increases in of any of these factors. As commercial fishing effort under No Action is expected to remain unchanged from current operating conditions, it is not expected to introduce new or elevated interaction risks to these non-ESA-listed marine mammal stocks in poor condition. Specifically, the amount of gear in the water, tow times, and overlap between protected species and fishing gear is expected to remain unchanged relative to current conditions. Given this information, and the information provided in this EA and Section 5.4 of the EA for Framework 62, No Action is likely to result in slightly negative impacts to non-ESA-listed marine mammal stocks/species in poor condition (i.e., bottlenose dolphin stocks).

Alternatively, there are also many non-ESA-listed marine mammals that, even with continued fishery interactions, are maintaining an optimum sustainable level (i.e., PBR levels have not been exceeded) over the last several years. For these stocks/species, it appears that the fishery management measures that have been in place over this timeframe have resulted in levels of effort that result in interaction levels that are not expected to impair the stocks/species ability to remain at an optimum sustainable level. These fishery management measures, therefore, have resulted in indirect slightly positive impacts to these non-ESA-listed marine mammal species/stocks. Should future fishery management actions maintain similar operating condition as they have over the past several years, it is expected that these slightly positive impacts would remain. As provided above, No Action is expected to result in *status quo* commercial fishing effort relative to recent levels.

Given this, the impacts of No Action on these non-ESA-listed species of marine mammals are expected to be slightly positive (i.e., continuation of current operating conditions is not expected to result in exceedance of any of these stocks/species PBR level).

As stated above, No Action would maintain the previously established annual catch limits. As this would be unlikely to result in a significant change in fishing behavior or effort, factors such as the amount of gear in the water (small-mesh otter trawl), tow time, and area fished are expected to be similar to those previously observed in the small-mesh fishery. Considering the information presented above and the fact

that the potential risk of interacting with gear types used in small mesh multispecies fishery varies between ESA-listed species (e.g., listed species of large whales have never been documented/observed in bottom trawl gear), No Action is expected to have negligible to slightly negative impacts on ESA-listed species.

Overall Impacts to Protected Species

Based on the analysis presented above, No Action is expected to have slightly positive to slightly negative impacts on protected species (i.e., ESA-listed and MMPA protected), with slightly negative to slightly positive impacts expected for non-ESA-listed (i.e., MMPA protected) marine mammals, and negligible to slightly negative impacts expected for ESA-listed species.

Relative to both Option A and Option B presented under Alternative 2, impacts to protected resources for No Action are likely to be negligible. This is due to the fact that fishing behavior and effort under Alternative 2 are likely to be the same as that under No Action.

6.4.1.2 Alternative 2 - 2021-2023 Specifications Adjustment (Preferred with Option B for southern red hake specifications)

Changes in specifications relative to No Action are summarized in Table 29, which would reduce the northern silver hake specification and increase the specifications for southern whiting and red hake stocks. Although specifications would increase, the levels, type, and distribution of fishing activity in the small-mesh multispecies fishery is not expected to substantially change for reasons identified and discussed in Section 6.1.1 and because existing specifications have generally been non-constraining for the silver hake and whiting stocks which are the primary target of the small-mesh multispecies fishery. Specifications for northern and southern red hake stocks have been constraining, but they are not the primary target and the limits thus do not constrain fishing effort.

Some vessels may avoid catching red hake when the possession limit are reduced (as low as 400 lbs. when in-season AMs are triggered), which may result in vessels shifting effort to other areas. Depending on the number of vessels that shift effort in response to the reduced red hake possession limit, interaction risks to protected species have the potential to increase or decrease relative to current operating conditions in the fishery. Should vessels shift effort to other parts of the management area in a manner that results in the increased co-occurrence of vessels and protected species, interaction risks could increase (e.g., more vessels in one area = more gear being towed in the area relative to what was fished prior to the shift). The same could also hold true that the any shift in effort away from areas of red hake may result in vessels moving out of an area at a time when the co-occurrence of vessels and protected species are high. In turn, the shift in effort away from an area of high co-occurrence could help to reduce the potential for an interaction.

It is possible that if annual catch limits for squid decline or whiting prices substantially increase, the small-mesh multispecies could see higher amounts of fishing effort (especially during squid trimester closures). Even if this increase in small-mesh multispecies fishing effort occurs, much of the new effort would shift from one fishery to the other using substantially similar gear during the same season.

Also as discussed in Section 6.1.1, although vessels will be able to retain and land more red hake than they would under No Action red hake are not a primary target in the fishery due to their relatively low market prices and poor holding characteristics. There is a small potential for more target fishing for northern red hake for the bait fishery, but this amount of fishing is very minor (see Sections 5.2 and 5.6). Thus, large increases in the northern red hake and southern red hake specifications are unlikely to create an incentive to substantially increase or alter the distribution of fishing effort. Vessels will however be able to retain and land more red hake than they would under No Action. To some extent, the in-season

AMs would occur later in the season for Alternative 2 than they would for No Action and the higher possession limit during the season would not have the same effect on avoidance of red hake catches.

Based on the above, and the fact that, relative to current operating conditions, large changes in fishing effort and behavior are not expected, Alternative 2's impacts to protected species (i.e. ESA-listed and MMPA protected) are expected to be, slightly negative to slightly positive, similar to those provided in Alternative 1. Refer to section 6.4.1.1 for rationale to support this determination of impacts.

Although small-mesh multispecies specifications have not been constraining on fishing effort and substantial increases in effort are not expected, Alternative 2 would allow for more increases in small-mesh multispecies than would Alternative 1 particularly for southern whiting and the red hake stocks. Thus relative to No Action, Alternative is expected to have negligible to moderate negative impacts to MMPA species in poor condition and negligible to slightly negative impacts to MMPA species in good condition and to ESA-listed species.

Overall, relative to No Action, impacts to protected resources for Alternative 2 are likely to be negligible to moderately negative. This is due to the fact that fishing behavior and effort under Alternative 2 are likely to be the same as that under No Action.

6.4.1.2.1 Option A – SSC recommendation for southern red hake ABC

Options A and B (below) only pertain to catch limits set for southern red hake. Option A limits were recommended by the SSC and Option B reduces the ACL by 25% to promote rebuilding. Under either option, the new catch limits are higher than in the recent past and are thus are unlikely to be constraining unless southern red hake bycatch increases because southern red hake are not the primary (and rarely a secondary) target for vessels targeting southern whiting. Coupled with the selectivity measures in Framework 62, there may be some shifts in effort distribution to avoid catching southern red hake even if the ACL is raised from the No Action level.

The annual catch limits for southern red hake would be those recommended by the Council's SSC and relative to No Action are summarize in Table 29. The southern red hake specifications for Alternative 2 Option A are higher than No Action, but substantial increases of effort are not expected because southern red hake have relatively low value and are not the primary target in the small-mesh multispecies fishery. Option A may however allow vessels targeting whiting and other species to land more southern red hake that they catch, even with the new 1000lbs./600 lbs. dual southern red hake possession limit associated with Framework 62.

The annual catch limits for southern red hake would be higher than they would be under Option B and higher than 2019 estimated catch (see Section 5.2.2). Southern red hake possession limits are however less for the status quo (600 lbs. for standard small-mesh trawls and 1000 lbs. for selective small-mesh and large-mesh trawls) than it was in 2019 (5000 lbs. for all gears). The new possession limits coupled with Option A would mean that vessels may still avoid catching excess southern red hake by shifting times and areas they fish for whiting and other species, but the in-season AM (reducing the possession limit to 400 lbs.) would happen later in the fishing year, if at all.

Option A is expected to have negligible to moderate negative impacts to MMPA species in poor condition and negligible to slightly negative impacts to MMPA species in good condition and to ESA-listed species. Compared to Option B, the impacts to protected resources for Option A are likely to be negligible to slightly negative. This is due to the fact that fishing behavior and effort under Option A are likely to be similar as that under Option B.

6.4.1.2.2 Option B – Southern red hake ABC reduced by 25% to increase stock rebuilding potential (Preferred)

The annual catch limits for southern red hake would be lower of Option B than they would be for Option A above (see Table 30). Southern red hake catch limits for Option B would be about the same as actual estimated red hake catch in fishing year 2019 (see Section 5.2.2). Unlike 2019, the southern red hake possession limit at the beginning of the season would be 600 lbs. for trips fishing with standard small-mesh trawls and 1000 lbs. for selective small-mesh trawls and other large-mesh gears. These possession limits are less than the 5000 lbs. possession limit for the status quo, and as a result any in-season AM would be triggered somewhat later than it had been under the status quo. Option B would counter this effect and trigger an earlier in-season AM (reducing the possession limit to 400 lbs.) than would otherwise occur under Option A.

The lower southern red hake specifications for Option B would mainly have an effect on when an in-season AM will be triggered to reduce the risk of overfishing. Mainly it is intended to quell any partial targeting and encourage avoidance of catch southern red hake.

To the extent that the 400 lbs. possession limit for the in-season AM makes a difference, it could change fishing behavior to avoid catching excessive amounts of southern red hake. Fishermen could shift effort to other areas or fish at different times when southern red hake are not as present. It is unlikely that earlier implementation of a 400 lbs. in-season AM (as the result of lower southern red hake specifications in Option B) would change tow times, the number of tows, or the duration of the trip) because southern red hake are rarely the primary target of small-mesh multispecies fishing. Framework 62 (action pending) also encourages fishing with trawls that have better selectivity characteristics, but this measure is not related to the specifications in Option B.

The effects on non-ESA-listed marine mammals and on ESA-listed species is thus similar to the other alternatives: negligible to moderate negative impacts to MMPA species in poor condition and negligible to slightly negative impacts to MMPA species in good condition and to ESA-listed species. Compared to Option A, the impacts to protected resources for Option B are likely to be negligible to slightly negative.

6.4.2 Action 2 – NORTHERN RED HAKE TAL TRIGGER (ACCOUNTABILITY MEASURE, AM) ADJUSTMENT (Section 4.2)

The alternatives in Action 2 would determine when an in-season AM triggers a reduction in the northern red hake possession limit from 3,000 lbs. to 400 lbs., thereby reducing the risk of overfishing. It is intended to prevent vessels from targeting northern red hake and possibly avoiding catching them when landings approach the TAL. Increasing the TAL trigger is not expected to increase the amount of small-mesh multispecies fishing over all because the vast majority of small-mesh multispecies trips are targeting more valuable whiting, not red hake. While the northern red hake limit is at 3,000 lbs., some vessels may target or retain more northern red hake on small-mesh trips, by fishing in (or avoiding less) areas where northern red hake catch is higher than elsewhere. Any increases in targeting of northern red hake are expected to be minimal, but Alternative 2 is expected to allow more landings of red hake that are normally caught while targeting silver hake (and other species, e.g. Atlantic herring). Compared to status quo conditions, either alternative is not expected to have much effect on fishing because the in-season AM has not been triggered since 2017 (see Table 22), thus it has been non-binding lately. If the abundance of northern red hake increases, the TAL trigger associated with Alternative 1 could become binding and Alternative 2 would be less likely to be binding.

6.4.2.1 Alternative 1 – No Action (retains the TAL trigger at 37.9% of the TAL)

Based on the overall analysis provided in Section 6.4.1 and the expectation that fishing effort and the distribution of fishing effort is unlikely to change for No Action compared to the status quo, Alternative 1 is expected to have slightly positive to slightly negative impacts on protected species, with slightly negative to slightly positive impacts expected for non-ESA-listed marine mammals and negligible to slightly negative impacts expected for ESA-listed species.

Relative to Alternative 2 (which is not expected to provide incentive for fishing behavior or effort to change relative to status quo condition, see Section 6.4.2.2), the impacts to protected resources for No Action are likely to be negligible.

6.4.2.2 Alternative 2 - Restore the Northern Red Hake TAL trigger to 90% (Preferred)

Based on the overall analysis provided in Section 6.4.1 and the expectation that fishing effort and the distribution of fishing effort is unlikely to substantially change for Alternative 2 compared to the status quo, Alternative 2 is also expected to have slightly positive to slightly negative impacts on protected species, with slightly negative to slightly positive impacts expected for non-ESA-listed marine mammals and negligible to slightly negative impacts expected for ESA-listed species.

While a 3,000 lbs. possession limit is effective (presumably continuing later in the season due to the higher AM trigger), some fishermen may continue fishing in areas where red hake are abundant. Some fishermen may also target or partially target red hake for bait in the recreational/commercial tuna fishery (there is a 500 lbs. transfer at sea limit, but additional amounts may also be landed), but this activity is relatively low due to the low value of red hake compared to silver hake (see Section 5.6.1.2) and other species that many be landed while targeting silver hake. The action is unlikely to cause fishermen to change their gear configuration, change the length of tows, and/or lengthen their trips. Such changes would be too costly relative to the additional revenue since red hake are rarely the primary target of the small-mesh multispecies fishery and has relatively low value.

Thus, relative to No Action, the impacts to protected resources for Alternative 2 are likely to be negligible.

6.4.3 Action 3 – WHITING POSSESSION LIMITS (Section 4.3)

This action would increase the whiting possession limits for trips fishing with less than 3-inch mesh trawls, mostly trips that target Atlantic herring and squid. These vessels often have specialized equipment and processes to handle large quantities of these species which according to industry sources (M. Lapp, Seafreeze Ltd., pers. comm.) are unlikely to be used to target whiting especially with possession limits less than 30,000 lbs. Many of these vessels have refrigerated seawater (RSW) systems that would damage the more delicate whiting and red hake. Nonetheless, some smaller vessels that use bottom trawls may switch to targeting whiting with their trawls when and if they are faced with increasing herring and squid restrictions or whiting prices substantially rise. Atlantic herring regulations are expected to become more restrictive, but in the short-term, squid regulations are expected to be stable (J. Didden, MAFMC, pers. comm.). There is no a priori reason to anticipate increases in whiting prices and whiting prices have actually been declining recently (Section 5.6.1).

6.4.3.1 Potential impact on ESA-listed and MMPA-protected species

Alternatives for Action 3 (Section 4.3) could increase the whiting possession limit up to 30,000 lb., with a preferred alternative to raise the whiting possession limit to 15,000 lb (Section 4.3.3). Current possession limits are 3,500 lb. for vessels using less than 2-inch mesh trawls and 7,500 lb. for vessels using less than 2.5-inch mesh trawls. This substantial increase in the possession limit has the potential for targeting whiting with existing small-mesh bottom trawls (SBT) and for causing a change in gear to target whiting rather than herring or mackerel with mid-water trawls (MWT). For some MWT vessels, targeting whiting instead of herring or mackerel could have a prohibitive cost, estimated to be around $100,000. For smaller vessels, the cost could be considerably less and the revenue could be comparable to the amount of herring and mackerel that they currently land.

The Atlantic herring, Atlantic mackerel, and the squid fisheries are the most likely sources of effort to shift into the small-mesh multispecies fishery and target whiting. All three use small-mesh bottom trawls (SBT) that are very similar to gear used to target whiting, but the vessels are often rigged to process larger volumes of fish than those vessels in the whiting fishery. Some vessels in the squid fishery also fish for whiting. Also, some vessels in the herring fishery use mid-water trawls (MWT). Because estimated protected species bycatch rates are not analyzed by fishery but by gear type, it is difficult to determine whether the impacts on ESA-listed and MMPA-protected species would be more or less when targeting whiting; however as provided in Section 5.4, interactions between bottom trawl gear and ESA-listed species of sea turtles, Atlantic salmon, and Giant Manta rays have been observed or documented. Given this, the whiting fishery does pose an interaction risk to these species. Incidental takes of marine mammals appear to be higher for SBT (like those used in the whiting fishery) than they are for vessels using MWT.

The Atlantic herring and Atlantic mackerel fisheries, which use less than 3-inch SBT and MWT, is one potential source of added fishing effort in the whiting fishery in response to higher whiting possession limits for trips fishing with less than 3-inch mesh. Herring vessels using bottom trawls would not require them to change gear or mesh size, but mid-water trawl (MWT) herring vessels would need to use bottom trawls to target whiting because whiting tend to occupy depths closer to the bottom than where herring are often found.

In 2018, MWT herring fishing primarily occurred near the outer portion of Cape Cod (Map 9, upper left with grey/black shading). It also occurred on Stellwagen Bank, offshore of Boston, and on the NE part of Georges Bank. Fishing in the first two areas is partially within the new MWT restricted area (pink shaded area off the coastline). Fishermen taking herring trips in these two areas have a few choices, fish for herring further offshore or fishing for whiting or squid. Many of these vessels have refrigerated seawater

systems in their hold to keep large quantities of herring fresh, but these facilities are said to be too rough for retaining whiting (Megan Lapp, Seafreeze Inc, pers comm.).

If these MWT vessels fish for whiting, they would be more likely to fish in the late fall in the nearby raised footrope trawl exemption areas off the outer cape.

Quantifying this potential for the preferred alternative, Section 6.1.1.3.1 estimates that up to 12 vessels making 194 herring and 25 mackerel trips using MWT gear could begin targeting whiting with SBT. Compared to the amount of whiting fishing that already occurs and the amount of fishing that could target whiting instead of squid (the squid fishery uses the same gear during basically the same season and general area), the impact of MWT vessels switching to target whiting is estimated to be negligible. Possession limit alternatives less than 15,000 lb. would of course reduce this potential for shifting fishing effort. The non-preferred alternative with a 30,000 lb. whiting possession limit could increase this potential effort shift, but large changes in fishing effort appear to still be unlikely and negligible. It should also be recognized that under No Action and all of the Action 3 alternatives, this potential for leaving the herring and mackerel MWT fishery already exists to some extent, with a 30,000 to 40,000 lb. possession limit if the vessels using larger than 3-inch mesh bottom trawls.

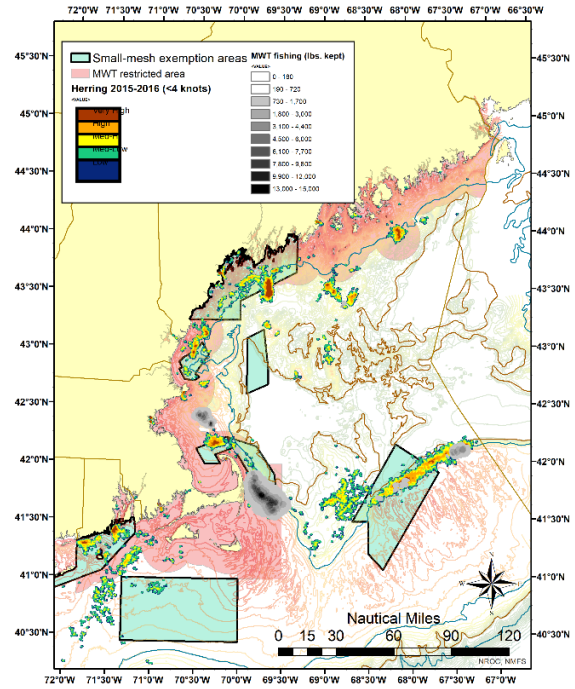
All types of herring fishing are likely to be subject to more restrictions to address an overfished condition for the herring stock. Much of this herring fishing occurs on the northern portion of Georges Bank (Map 9, upper left), which mainly overlaps the Cultivator Shoals Area. These trips, if they shift to the whiting fishery, are also likely to fish in the Cultivator Shoals Area during the late fall and winter, having a similar risk of incidental takes of ESA-listed species.

The second potential source of effort shift into the whiting fishery would be from trips targeting squid, which often use 2-inch mesh trawls. The squid fishery primarily occurs off Southern New England, in the Cultivator Shoals Area, and near Tillies Bank, east of Boston (Map 9, upper right). In all three cases, if these trips shift into the whiting fishery, they would likely fish in nearby the Nantucket Lightship exemption area, the Cultivator Shoals Area, and Small-mesh Area II or the raised footrope trawl area off the outer cape. According to the MAFMC (Jason Didden, pers comm.), it is unlikely that the more valuable squid fishery will be facing more restrictions in the near future, however.

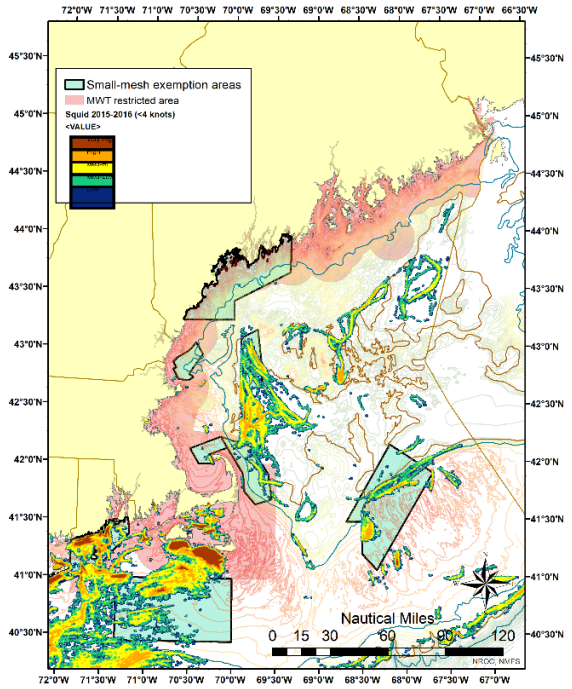
Thus, the effects on ESA-listed and MMPA-protected species caused by fishermen changing the area or season where vessels target whiting rather than squid are expected to be mixed in effect and negligible in scale.

Map 8. Sources of potential effort shift from the herring (upper left) and squid (upper right) fisheries into the whiting fishery (lower right) and potential interaction with ESA-listed species (lower left). Mid-water herring trawl fishing distribution from DePiper et al. (2014) and Benjamin et al. (2018). Herring fishing, squid fishing, fall silver hake and ESA-listed species distribution data from the NE Ocean Data Portal.

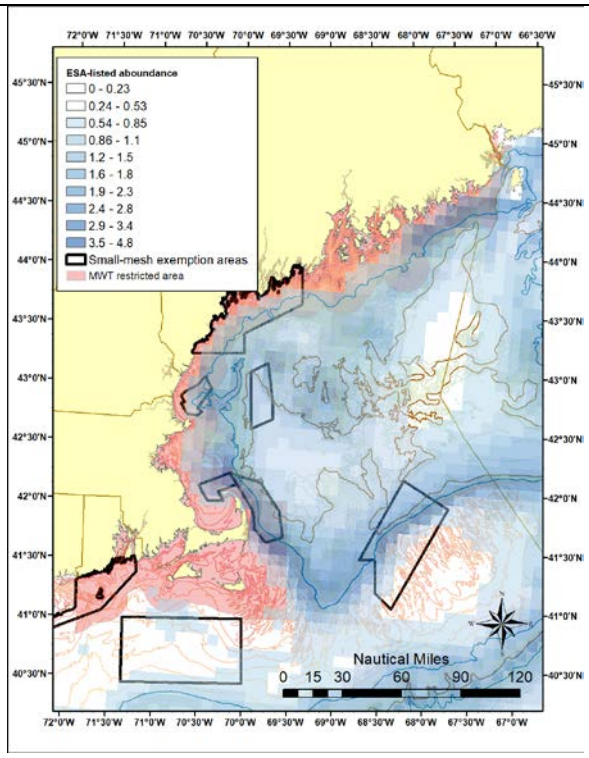
2015-2016 herring fishing effort and 2018 mid-water trawl herring catch



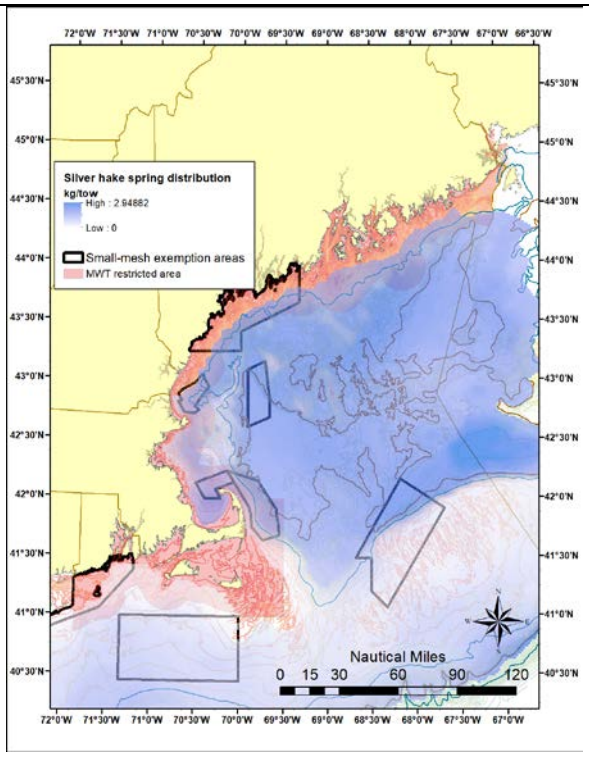
2015-2016 squid fishing effort



Estimated ESA-listed species abundance



Estimated silver hake biomass, NEFSC fall bottom trawl survey



6.4.3.2 Alternative 1 – No Action

Under this alternative, small-mesh multispecies fishing behavior and effort are not expected to change and trawl gear will continue to cause adverse impacts as described in Section 5.5.3. Since interaction risks to protected species are strongly associated with fishing effort, and this alternative is not expected to change fishing effort, then the impacts to protected species can be described based on the current state of fishing effort/stock status (e.g., MMPA species: slight negative to slight positive; ESA listed species: slight negative).

When compared to Alternatives 2, 3, and 4, impacts from No Action based on the analysis in Sections 6.4.3.1 and 6.1.1.3.1 (MWT) will be negligible as the type of fishing behavior and effort is expected to remain largely the same as they are currently.

6.4.3.3 Alternative 2 - Increase the Possession Limit to 6,000 lbs. for vessels using trawls with less than 2.5-inch mesh and to 12,000 lbs. for vessels using trawls with 2.5-inch to 3-inch mesh

This alternative is intended to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield and is not expected to change existing fishing behavior or effort. Since interaction risks to protected species are strongly associated with fishing effort, and this alternative is not expected to change fishing effort, then the impacts to protected species can be described based on the current state of fishing effort/stock status (e.g., MMPA species: slight negative to slight positive; ESA listed species: slight negative).

When compared to Alternatives 2, 3, and 4, impacts from No Action based on the analysis in Sections 6.4.3.1 and 6.1.1.3.1 (MWT) will be negligible as the type of fishing behavior and effort is expected to remain largely the same as they are currently.

6.4.3.4 Alternative 3 – Increase the Possession Limit to 15,000 lbs. for vessels using trawls with less than 3-inch mesh (Preferred)

This alternative is intended to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield. There is potential under this alternative that given the larger whiting possession limit, and vessels facing increased restrictions in other fisheries such as herring and mackerel, that there could be additional targeting of whiting by vessels using less than 3-inch mesh trawls. Additionally, those vessels using greater than 3-inch mesh bottom trawls could be incentivized to switch effort and begin using smaller mesh to keep and land more whiting. Any increased targeting of whiting by vessels using less than 3-inch mesh could increase trawl impacts, however vessels that currently use greater than 3-inch mesh, and switch effort to use less than 3-inch mesh, may also shorten their trip length and decrease adverse trawl impacts. Vessels using SBT to land whiting, herring, mackerel, and squid are using essentially the same gear in similar areas and seasons as they would fish using less than 3-inch mesh SBT.

Most of the concern about protected species impacts is associated with a change in fishing effort that could begin targeting whiting with SBT instead of targeting herring and mackerel using MWT. Because some herring and mackerel MWT trips derive the same or less revenue from herring and mackerel compared to landing 15,000 lb. of whiting, Section 6.1.1.3.1 estimates that up to 12 vessels making 194 herring and 25 mackerel trips using MWT gear could begin targeting whiting with SBT. Compared to the amount of whiting fishing that already occurs and the amount of fishing that could target whiting instead of squid (the squid fishery uses the same gear during basically the same season and general area), the impact of MWT vessels switching to target whiting is comparatively negligible.

Since interaction risks to protected species are strongly associated with fishing effort, and changes in effort from this alternative are expected to be negligible, then the impacts to protected species can be described based on the current state of fishing effort/stock status (e.g., MMPA species: slight negative to slight positive; ESA listed species: slight negative).

When compared to No Action, Alternative 2, and Alternative 4, the impacts from Alternative 3 will be negligible as the type of fishing behavior and effort is expected to remain largely the same as they are currently.

6.4.3.5 Alternative 4 – Increase the Possession Limit to 30,000 lbs. for vessels using trawls with less than 3-inch mesh

This alternative is intended to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield. There is potential under this alternative that given the larger whiting possession limit, and vessels facing increased restrictions in other fisheries such as herring and mackerel, that there could be additional targeting of whiting by vessels using less than 3-inch mesh trawls. Additionally, those vessels using greater than 3-inch mesh bottom trawls could be incentivized to switch effort and begin using smaller mesh to keep and land more whiting. Any increased targeting of whiting by vessels using less than 3-inch mesh could increase trawl impacts, however vessels that currently use greater than 3-inch mesh, and switch effort to use less than 3-inch mesh, may also shorten their trip length and decrease adverse trawl impacts. Vessels using SBT to land whiting, herring, mackerel, and squid are using essentially the same gear in similar areas and seasons as they would fish using less than 3-inch mesh SBT.

Most of the concern about protected species impacts is associated with a change in fishing effort that could begin targeting whiting with SBT instead of targeting herring and mackerel using MWT. Because some herring and mackerel MWT trips derive the same or less revenue from herring and mackerel compared to landing 30,000 lb. of whiting, Section 6.1.1.3.1 estimates that up to 12 vessels making 336 herring and 43 mackerel trips using MWT gear could begin targeting whiting with SBT. Compared to the amount of whiting fishing that already occurs and the amount of fishing that could target whiting instead of squid (the squid fishery uses the same gear during basically the same season and general area), the impact of MWT vessels switching to target whiting is comparatively negligible.

Since interaction risks to protected species are strongly associated with fishing effort, and changes in effort from this alternative are expected to be negligible, then the impacts to protected species can be described based on the current state of fishing effort/stock status (e.g., MMPA species: slight negative to slight positive; ESA listed species: slight negative).

When compared to No Action, Alternative 2, and Alternative 3, the impacts from Alternative 4 will be negligible as the type of fishing behavior and effort is expected to remain largely the same as they are currently.

6.5 Impacts on Physical Environment and Essential Fish Habitat

6.5.1 Action 1 – SPECIFICATIONS (Section 4.1)

6.5.1.1 Alternative 1 – No Action

Under current catch specifications, and as a result of the ACL and in-season/post-season AM's, the small-mesh multispecies fishery performance has remained stable. Therefore, No Action is not expected to change fishing effort or behavior and habitat impacts from small-mesh multispecies fishing gear are

expected to be the same as they have been in the recent past and as described in Section 5.5.3. Trawl gear, used primarily by the small-mesh multispecies fisheries, will continue to cause adverse impacts to the habitat areas in which the fishery already interacts and is likely to interact in the future. These areas have been identified as EFH for various species that are managed under the Northeast Multispecies FMP. Therefore, the No Action alternative would have a low negative impact on the physical environment and EFH. Relative to Alternative 2 with either Option A or B, the expected impacts of No Action is negligible.

6.5.1.2 Alternative 2 - 2021-2023 Specifications Adjustment (Preferred with Option B for southern red hake specifications)

Northern silver hake, southern whiting, and northern red hake catch have not been limited by their respective ACL's in recent years (Figure 2 and Figure 5). Southern red hake catch exceeded the ACL in 2018 and 2019 and AM's were triggered. Alternative 2 would decrease the ACL for northern silver hake but is still not likely to restrict catch (Table 8). Conversely, the ACL's for southern whiting, northern red hake, and southern red hake would all increase under Alternative 2 but similarly are not expected to limit catch. As a result, fishing behavior and effort under Alternative 2 (with either Option A or B) for all stocks is not likely to change and therefore the impact of small-mesh multispecies fishing gear on the physical environment and EFH are expected to remain low negative. When compared to Alternative 1, Alternative 2 Option A and Option B would likely be negligible as fishing effort is not expected to change.

6.5.1.2.1 Option A – SSC recommendation for southern red hake ABC

Under Option A the ABC for southern red hake would be determined by applying an exploitation rate of 3.1%. Although applying an exploitation rate of 3.1% to updated the biomass estimate would increase the ABC by 89%, and potentially allow for an increase in catch, the southern red hake TAL trigger would be 14% less than current specifications under No Action. Consequently, the increase in the southern red hake ABC is unlikely to cause any changes in fishing behavior or effort, and trawl gear will continue to cause adverse impacts resulting in Option A having a low negative impact on the physical environment and EFH. When compared to Alternative 1 or Alternative 2 with Option B, Alternative 2 Option A would likely be negligible as fishing behavior and effort is not expected to change.

6.5.1.2.2 Option B – Southern red hake ABC reduced by 25% to increase stock rebuilding potential (Preferred)

Option B would increase the southern red hake ABC by 42%, which is about the same level of catch that occurred in 2018 and 2019. Under this option however the TAL trigger would be 37% less than current specifications for No Action. Consequently, fishing behavior and effort is not be expected to change under Option B and trawl gear will continue to cause adverse impacts resulting in Option B having a low negative impact on the physical environment and EFH. When compared to Alternative 1 or Alternative 2 Option A, Alternative 2 Option B would likely be negligible as fishing effort is not expected to change.

6.5.2 Action 2 – NORTHERN RED HAKE TAL TRIGGER (ACCOUNTABILITY MEASURE, AM) ADJUSTMENT (Section 4.2)

6.5.2.1 Alternative 1 – No Action

Maintaining the current TAL trigger would not result in any changes in small-mesh multispecies fishing behavior or effort and trawl gear will continue to cause adverse impacts resulting in No Action having a low negative impact on the physical environment and EFH.

6.5.2.2 Alternative 2 - Restore the Northern Red Hake TAL trigger to 90% (Preferred)

As the Northern red hake ACL has not been exceeded since 2015, increasing the low in-season TAL trigger could reduce discards and improve the ability for the fishery to achieve optimum yield, but is not expected to change fishing behavior or effort. Trawl gear will continue to cause adverse impacts resulting in Alternative 2 having a low negative impact on the physical environment and EFH. Under this alternative, there is a small potential for fishermen to target northern red hake with a 3,000 lbs. possession limit that lasts longer in the season. Although this could lead to greater utilization of areas with higher red hake abundance, the substrates where red hake occur tend to be soft mud/sand bottom, which are less sensitive to alteration due to fishing with raised footrope trawls. Relative to No Action, impacts on the physical environment and EFH under Alternative 2 would likely be negligible as any potential small increase in fishing effort would occur in areas less sensitive to trawl gear impacts..

6.5.3 Action 3 – WHITING POSSESSION LIMITS (Section 4.3)

6.5.3.1 Alternative 1 – No Action

Under this alternative, small-mesh multispecies fishing behavior and effort are not expected to change thus trawl gear will continue to cause adverse impacts as described in Section 5.5.3. As such, it is anticipated that the impact on the physical environment and EFH will be slightly negative under No Action.

When compared to Alternative 2 or 3, impacts from No Action will be negligible as the type of fishing effort and behavior is expected to remain the same. Compared to Alternative 4, the impacts of No Action are expected to be slightly positive because fewer vessels are expected to switch from mid-water trawl (MWT) fishing to whiting fishing. This potential effort shift from the MWT fishery is however expected to be minor (see Section 6.1.1.3.1).

6.5.3.2 Alternative 2 - Increase the Possession Limit to 6,000 lbs. for vessels using trawls with less than 2.5-inch mesh and to 12,000 lbs. for vessels using trawls with 2.5-inch to 3-inch mesh

This Alternative is intended to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield and is not expected to change existing fishing behavior or effort. Trawl gear will continue to have adverse impacts on the physical environment and EFH resulting in Alternative 2 having a slightly negative impact. When compared to No Action or Alternative 3, impacts from Alternative 2 will be negligible as the type of fishing effort and behavior is expected to remain the same. Compared to

Alternative 4, the impacts of Alternative 2 are expected to be slightly positive because fewer vessels are expected to switch from mid-water trawl (MWT) fishing to whiting fishing.

6.5.3.3 Alternative 3 – Increase the Possession Limit to 15,000 lbs. for vessels using trawls with less than 3-inch mesh (Preferred)

This alternative is intended to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield. There is potential under this alternative that given the larger whiting possession limit, and vessels facing increased restrictions in other fisheries such as herring, that there could be more targeting of whiting by vessels using less than 3-inch mesh. Additionally, those vessels using greater than 3-inch could be incentivized to change mesh size, using smaller mesh to keep and land more whiting. Any additional targeting of whiting by vessels using less than 3-inch mesh could increase trawl impacts, however vessels that currently use larger than 3-inch mesh, and switch effort to use less than 3-inch mesh, may also shorten their trip length and decrease adverse trawl impacts.

Any potential changes in effort cannot be quantified and but it is expected that trawl gear will continue to have the same level of adverse impacts on the physical environment and EFH resulting in Alternative 3 having a slightly negative impact. When compared to No Action and Alternative 2 impacts from Alternative 3 will be negligible as the type of fishing effort and behavior is expected to remain the same. Compared to Alternative 4, the impacts of Alternative 3 are expected to be slightly positive because fewer vessels are expected to switch from MWT fishing to whiting fishing using small-mesh bottom trawls. This potential effort shift from the MWT fishery is however expected to be minor (see Section 6.1.1.3.1).

6.5.3.4 Alternative 4 – Increase the Possession Limit to 30,000 lbs. for vessels using trawls with less than 3-inch mesh

This alternative is intended to reduce regulatory discards and improve the ability of the fishery to achieve optimum yield. As discussed for Alternative 3 above, there is potential for increased targeting of whiting by vessels using less than 3-inch mesh and potential for vessels using larger than 3-inch mesh to switch effort and start using less than 3-inch mesh to retain more whiting. The whiting possession limit would be the same across all mesh sizes with Alternative 4, except for the 40,000 possession limit in the southern management area. Any potential changes in effort cannot be quantified and but it is expected that trawl gear will continue to have the same level of adverse impacts on the physical environment and EFH resulting in Alternative 4 having a low negative impact.

When compared to Alternatives 1, 2, and 3, impacts from Alternative 4 will be slightly negative as there is more potential for some mid-water trawl fishing effort to shift into the small-mesh multispecies bottom trawl fishery which, although not quantified, would have greater seabed impacts (see discussion in Section 6.1.1.2 of this EA). The characteristics of these impacts however will depend on where and how fishing occurs. Most whiting fishing occurs over softer bottom which is less vulnerable to impacts due to fishing.

6.6 Impacts on Human Communities

The analysis of impacts on human communities characterizes the magnitude and extent of the economic and social impacts likely to result from the alternatives considered for the 2021-2023 small-mesh multispecies fishery specifications. National Standard 8 requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. Thus, continued overall access to fishery resources is a consideration, but not a

guarantee that fishermen will be able to use a particular gear type, harvest a particular species of fish, fish in a particular area, or fish during a certain time of the year. The following analyzes the economic impacts of the proposed specifications for 2021-2023 primarily based on the impacts on the targeted species landings.

6.6.1 Action 1 – SPECIFICATIONS (Section 4.1)

6.6.1.1 Alternative 1 – No Action

The No Action alternative would maintain the current specifications (Table 7) which were analyzed in the Small-Mesh Multispecies Fishing Year 2018-2020 Specifications EA (NEFMC 2018b).

The expected value of the TAL under No Action potentially amounts to about $70 million[19] from silver hake/whiting and about $0.55 million from red hake in both northern and southern management areas (Table 35). The small-mesh multispecies fishery performance has remained stable in the last eight years with a revenue from small-mesh multispecies ranging between $9.6 to $ 13.1 million (in 2019 dollar) since the specifications were implemented. Despite increases in biomass of silver hake and northern red hake, landings and revenue have declined in recent years which is attributable to changes in market demand and restrictions placed on the fishery to minimize the catch of large-mesh groundfish (Table 35). The revenue from small-mesh multispecies narrowly fluctuated between $9 to $10 million in recent past three years (2017-2019). Table 19 provides summary of small multispecies effort, landings, revenue, and prices by management area for trips landing 1 or more pounds of whiting or red hake from 2012 to 2019.

Since the exploitation rate of whiting has remained quite low to about 13% to 18% of the TAL revenue value since the specifications were implemented, the No Action is expected to have slightly negative economic impact relative to Alternative 2 because other than southern red hake catch, the catches have been below the status quo specifications and are not expected to expand quickly due to external factors. The impacts on human communities from No Action are however positive because the harvest control rule and associated ACL framework has prevented stocks from becoming overfished and has promoted achievement of optimum yield. When overfishing has occurred (for northern red hake for example) or a stock has become overfished (for southern red hake for example), the harvest control rule and the associated ACL framework has invoked corrective action.

[19] This revenue from whiting may not be realized since such large volume of landings will also depress price.

Table 35. Summary of economic impacts on Action 1: Alternative 1 (No Action)

Stock	TAL (mt)	TAL trigger (mt)	TAL trigger (%)	TAL lbs. at trigger	TAL Revenue (in 2019 dollar)	TAL Revenue (in 2019 dollar) at trigger	Expected Revenue from Landing (Low)[20]	Expected Revenue from Landing (High)[21]
Northern silver hake	26,604	23,944	90%	52,771,694	$44,562,764	$40,106,488	$5,793,159	$8,021,298
Southern whiting	15,043	13,539	90%	29,839,295	$25,197,627	$22,677,864	$3,275,691	$4,535,573
Northern red hake	273	104	38%	228,643	$258,728	$98,316	$258,728	$258,728
Southern red hake	305	274	90%	604,998	$289,054	$260,149	$289,055	$289,055
Aggregated values by species groups:								
Whiting/Silver hake	41,647	37,483		82,610,989	$69,760,391	$62,784,352	$9,068,851	$12,556,870
Red hake	578	378		833,641	$547,783	$358,466	$547,782	$547,782
Small-multispecies	42,225	37,861		83,444,630	$70,308,174	$63,142,817	$9,616,633	$13,104,653

6.6.1.2 Alternative 2 - 2021-2023 Specifications Adjustment (Preferred with Option B for southern red hake specifications)

Alternative 2 would modify the specifications to be consistent with updated assessments from the September 2020 Management Track Assessment. The 2021-2023 specifications update relative to No Action will increase the TAL for red hake (north and south), southern whiting, but decrease for northern silver hake (Table 36). Overall, the expected impact is slightly positive relative to No Action because the limits on southern whiting (the stock that contributes to the majority of small-mesh multispecies fishery landings) would increase by 91%, but utilization is low and is not expected to significantly increase unless external factors (such as squid and herring availability or whiting prices) change. However, the increase in TAL for southern red hake even at reduced trigger could potentially increase southern whiting revenue by about $3 to $5 million (Table 37).

The impacts on human communities from Alternative 2 are however positive because the harvest control rule and associate ACL framework has prevented stocks from becoming overfished and has promoted achievement of optimum yield. When overfishing has occurred (for northern red hake for example) or a stock has become overfished (for southern red hake for example), the harvest control rule and the associated ACL framework has invoked corrective action. Moreover, coupled with Option B, Alternative 2 is consistent with the lower catch limits and procedure that the Council adopted in Framework 62 to promote southern red hake biomass rebuilding.

[20] Low case scenario is conservatively estimated at 13% exploitation rate of the northern silver hake or southern whiting TAL pounds allocations.

[21] High case scenario is conservatively estimated at 18% exploitation rate of the northern silver hake or southern whiting TAL pounds allocations.

Table 36. Updated specifications for fishing years 2021-2023 (SSC Recommendation for southern red hake ABC) and percent change from No Action.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	TAL (mt)	TAL trigger (mt)	TAL trigger (%)	Percent change in TAL from No Action
Northern silver hake	39,930	20,410	19,387	17,457	15,711	90%	-34%
Southern whiting	72,160	40,990	38,941	28,742	25,868	90%	91%
Northern red hake		3,452	3,278	1,405	533	38%	414%
Southern red hake (Option A)		2,006	1,906	573	235	41%	88%
Southern red hake (Option A)		1,505	1,429	422	173	-37%*	38%

*percent change in TAL trigger from No Action

6.6.1.2.1 Option A – SSC recommendation for southern red hake ABC

For Option A, the specifications for southern red hake would increase the TAL by 88% (Table 9). However, there will be a negligible economic impact from southern red hake landing itself since the TAL trigger for southern red hake is reduced by about 14%, thus reducing the southern red hake landing value by about $37,000 at the initial trigger, but eventually the revenue from southern red hake after trigger may increase by about $254,000 when southern red hake TAL is fully utilized by fishing year end (Table 37).[22]

So, the higher southern red hake TAL would result in moderate to high positive economic impacts from southern whiting landings compared to No Action (Alternative 1) because of increase in near two times increase in southern whiting TAL together with an increase southern whiting TAL as well given that there will also be a higher directed fishing effort for southern whiting to tap higher TAL for the species in the new specification.[23]

6.6.1.2.2 Option B – Southern red hake ABC reduced by 25% to increase stock rebuilding potential (Preferred)

For Option B, the ABC would be reduced by 25%, or applying an exploitation rate of 2.3%. The ABC would increase by 42% and the TAL would increase by 38%. This option will increase revenue from southern red hake alone by about $111,000 relative to No Action given all incremental southern red hake TAL in the new specification in this option is fully or near fully utilized (Table 37). This will also reduce southern whiting landing to some degree. Therefore, this option may slightly reduce southern whiting landing, hence, will have a slightly negative economic impact compared to Option A, but moderately

[22] Increase in southern red hake near full exploitation for the TAL for the species itself would amount to an increase in revenue by about $254,000 from southern red hake in the new specification.

[23] Increase in southern whiting for an increase in southern red hake is very conservatively estimated using a formula:

Incremental Revenue = (TAL_{new} – TAL_{old})*HistoricalTALExploitationRate * Price

Therefore, (28742 mt – 15043 mt)*2204 lbs *0.13 * $0.76/lb = $2,983,028 at an exploitation rate of 13%. The historical exploitation rate of whiting TAL has ranged between 13% to 18% in the recent past eight years. A lower value in the range is used to conservatively estimate the change in revenue from whiting or silver hake in the new specification.

positive economic impact on the small-mesh fishery relative to No Action because of higher TAL for southern whiting and southern red hake. Compared to Option A, this option will have a slightly negative economic impact in the short-term, but a low positive economic impact on overall small-mesh multispecies fishery due to a positive southern red hake stock rebuilding in the long-term (Table 37).

Table 37. Summary of economic impacts on Action 1—Alternative 2 (2021-2023 Specification with Option A and B on ABC)

Stocks	Options in Alternative 2	TAL (mt)	TAL trigger (mt)	TAL trigger (%)	TAL lbs. at trigger	TAL Revenue (in 2019 dollar) at trigger	Expected Revenue from Landing (in 2019 dollar)		Difference in TAL revenue (in 2019 dollar) at trigger relative to No Action	Difference in expected revenue from landings relative to No Action (in 2019 dollar)	
							Low	High		Low	High
Northern silver hake	-	17,457	15,711	90%	34,627,705	$26,317,056	$5,793,159	$6,925,541	-$13,789,432	$0	$1,132,382
Southern whiting	-	28,742	25,868	90%	57,012,631	$43,329,600	$6,258,720	$8,665,920	$20,651,736	$2,983,028	$5,390,228
Northern red hake	-	1,405	533	38%	1,176,716	$505,988	$1,331,547	$1,331,547	$407,671	$1,072,819	$1,072,819
Southern red hake	Option A	573	235	41%	517,786	$222,648	$543,044	$543,044	-$37,501	$253,989	$253,989
Southern red hake	Option B	422	173	41%	381,336	$163,975	$399,938	$399,938	-$96,175	$110,883	$110,883
Aggregated values by species groups:											
Whiting/Silver hake	-	46,199	41,579	90%	91,640,336	$69,646,656	$12,051,879	$15,591,461	$6,862,304	$2,983,028	$6,522,610
Red hake	Option A	1,978	768	38% to 41%	1,694,501	$728,636	$1,874,590	$1,874,590	$370,170	$1,326,808	$1,326,808
Red hake	Option B	1,827	706		1,558,052	$669,962	$1,731,484	$1,731,484	$311,497	$1,183,702	$1,183,702
Small-mesh multispecies	Option A	48,177	42,347	-	93,334,838	$70,375,291	$13,926,469	$17,466,051	$7,232,474	$4,309,836	$7,849,418
Small-mesh multispecies	Option B	48,026	42,285	-	93,198,388	$70,316,618	$13,783,364	$17,322,945	$7,173,800	$4,166,731	$7,706,312

6.6.2 Action 2 – NORTHERN RED HAKE TAL TRIGGER (ACCOUNTABILITY MEASURE, AM) ADJUSTMENT (Section 4.2)

6.6.2.1 Alternative 1 – No Action

No Action is slightly more conservative and risk adverse than Alternative 2.

No Action is expected to have negligible economic impact in the short-term, but low positive economic impact in the long-term by achieving conservation goals for the northern red hake stock. It will also have a negligible economic impact on northern whiting landings and revenues in the short-term. Compared to Alternative 2, No Action is expected to have a slightly negative economic impact arising from lower landings and higher discarding of northern red hake.

6.6.2.2 Alternative 2 - Restore the Northern Red Hake TAL trigger to 90% (Preferred)

Alternative 2 is expected to have negligible economic impact in the short-term, but low positive economic impact in the long-term by achieving conservation goals for the northern red hake stock. Compared to No Action, Alternative 2 is expected to have a slightly positive impact from increased landing of targeted and non-targeted northern red hakes by reducing regulatory discards. The measure will increase revenue from red hake by about $17,000 (Table 38).

Table 38. Estimated reduction in regulatory discards (lbs.) on FY 2017-2019 observed trips for deferment of the 400 lbs. AM possession limit from September to April, expanded to total fleet by the proportion of discard reduction to landings (lbs. whole).

Alternative	Regulatory discard change	% of landings	Estimated total landings increase (lbs.)	Estimated increase in red hake revenue (in 2019 dollar)
2	-23.5%	4.2%	39,898	$17,156

6.6.3 Action 3 – WHITING POSSESSION LIMITS (Section 4.3)

6.6.3.1 Alternative 1 – No Action

Current whiting possession limits for trips fishing with less than 3-inch trawls were originally implemented about 15 years ago to reduce the targeting of small whiting for a juvenile whiting foreign market. Retaining the limits would make it unlikely that market demand for juvenile whiting would reemerge.

No Action would retain the existing whiting possession limits and thus would cause no change in landings and discards. These possession limits have, however, successfully improved size selectivity of the fishery and greatly reduced targeting juvenile whiting primarily for foreign markets, which has been beneficial to the whiting stocks. Thus, No Action has a moderately positive effect on the northern silver hake and southern whiting stocks, because it improves yield per recruit and generates greater economic value than it would for a less selective whiting fishery. It is likely to have a slightly positive impact on the red hake stocks, because the measure maintains a healthy fishery. Therefore, the No Action alternative is likely to have slightly to moderately positive long-term economic impact on the small-mesh multispecies fishery.

No action would have a slightly negative economic impact compared to Alternative 2, a slightly to moderately negative impact compared to Alternative 3, and a moderately negative economic impact compared to Alternative 4.

6.6.3.2 Alternative 2 - Increase the Possession Limit to 6,000 lbs. for vessels using trawls with less than 2.5-inch mesh and to 12,000 lbs. for vessels using trawls with 2.5-inch to 3-inch mesh

Alternative 2 would retain a differential possession limit for mesh less than 3-inches, and would potentially reduce regulatory discards while fishing for other species, allowing vessels to land some additional whiting (by an estimated 51,000 to 77,000 lbs.) in their customary catch. The economic impact

of this alternative ranges between $39,000 to $58,000 (Table 39). Thus Alternative 2 would have a slightly positive economic impact.

Alternative 2 would also have a slightly positive economic impact compared to No Action, but a slightly negative economic impact compared to Alternative 3 and Alternative 4.

6.6.3.3 Alternative 3 – Increase the Possession Limit to 15,000 lbs. for vessels using trawls with less than 3-inch mesh (Preferred)

Alternative 3 would establish a single possession limit for mesh less than 3-inches and would potentially reduce regulatory discards while fishing for other species (such as herring and squid), allowing vessels to land some additional whiting (by an estimated 106,000 to 159,000 lbs.). The economic impact of this alternative ranges between $81,000 to $121,000 (Table 39). This alternative could also promote fishing for whiting by vessels that currently target other species (e.g. herring and squid). Thus, Alternative 3 would have a slightly positive economic impact.

Alternative 3 would also have a slightly to moderately positive economic impact compared to No Action and Alternative 2, but a slightly negative economic impact compared to Alternative 4.

6.6.3.4 Alternative 4 – Increase the Possession Limit to 30,000 lbs. for vessels using trawls with less than 3-inch mesh

Alternative 4 would establish a single possession limit for mesh less than 3-inches and would potentially reduce regulatory discards by a large amount while fishing for other species, allowing vessels to land some additional whiting (by an estimated 121,000 to 182,000 lbs.) (Table 39). It could also promote fishing for whiting with less than 3-inch mesh, by vessels that target other species (e.g. herring and squid) and by vessels that currently target whiting with greater than 3-inch mesh trawls, possibly reducing size selectivity of the fishery and over the long-term yield per recruit. The economic impact of this alternative would be an increase in revenue from $92,000 to $138,000 (Table 39) thus Alternative 4 would have a slightly positive economic impact.

In the short term, Alternative 4 has a moderately positive economic impact relative to No Action and Alternative 2, but a slightly positive impact relative to Alternative 3. In the long term, Alternative 4 has a moderately negative economic impact by reducing yield per recruit and hence sustainable yield.

Table 39. Estimated reduction in regulatory discards (lbs.) on FY 2017-2019 observed trips at various possession limits, expanded to total fleet by the proportion of discard reduction to landings (lbs. whole).

Alternative	2"-2.5"	2.5"-3"	Regulatory discard change	% of landings	Estimated landing increase (lbs.)			Increase in Revenue (in 2019$)		
					Low	High	Average	Low	High	Average
No Action	3,500	7,500	-	-	-	-	-	-	-	-
-	4,000	8,000	-4.60%	0.50%	9,665	14,526	12,096	$7,345	$11,040	$9,193
-	5,000	10,000	-16.60%	1.80%	35,110	52,770	43,940	$26,684	$40,105	$33,394
2	6,000	12,000	-24.20%	2.60%	51,317	77,128	64,223	$39,001	$58,617	$48,809
-	7,000	15,000	-32.40%	3.40%	68,586	103,082	85,834	$52,125	$78,342	$65,234
3	15,000	15,000	-50.10%	5.30%	106,093	159,455	132,774	$80,631	$121,186	$100,908
4	30,000	30,000	-57.10%	6.10%	121,102	182,013	151,558	$92,038	$138,330	$115,184
-	40,000	40,000	-63.30%	6.70%	134,134	201,599	167,867	$101,942	$153,215	$127,579

6.7 Cumulative Effects Analysis

6.7.1 Introduction

A cumulative effects analysis (CEA) is required by the Council on Environmental Quality (CEQ; 40 CFR part 1508.7) and NOAA policy and procedures for NEPA, found in NOAA Administrative Order 216-6A (Companion Manual, January 13, 2017). The purpose of the CEA is to consider the combined effects of many actions on the human environment over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective. Rather, the intent is to focus on those effects that are truly meaningful. The following remarks address the significance of the expected cumulative impacts as they relate to the federally managed small-mesh multispecies fishery.

A cumulative effects assessment makes effect determinations based on a combination of: 1) impacts from past, present, and reasonably foreseeable future actions; 2) the baseline conditions of the VECs (the combined effects from past, present, and reasonably foreseeable future actions plus the present condition of the VEC); and 3) impacts of the alternatives under consideration for this action.

6.7.1.1 Consideration of the Valued Ecosystem Components (VECs)

The valued ecosystem components for the small-mesh multispecies fishery are generally the "place" where the impacts of management actions occur and are identified in Section 6.0.

- Target Species
- Non-target species
- Physical environment / Essential Fish Habitat
- Protected species
- Human communities

The CEA identifies and characterizes the impacts on the VECs by the alternatives under consideration when analyzed in the context of other past, present, and reasonably foreseeable future actions. To enhance clarity and maintain consistency, terms are as defined in Table 21.

6.7.1.2 Geographic Boundaries

The geographic scope of the impacts to species is their range in the western Atlantic Ocean, as described in the Affected Environment (Section 5.0). The physical environment, including habitat and EFH, is bounded by the range of the small-mesh multispecies fishery, from the GOM through the Mid-Atlantic Bight, and includes adjacent upland areas (from which non-fishing impacts may originate). For protected species, the geographic range is the Northwest Atlantic Ocean. The geographic range for human communities focuses on the Northeast U.S.

6.7.1.3 Temporal Boundaries

While the effects of historical fisheries are considered, the temporal scope of past and present actions for regulated groundfish stocks, non-groundfish species, habitat, and the human environment is primarily focused on actions that have taken place since the implementation of the initial Small-Mesh Multispecies FMP. An assessment using this timeframe demonstrates the changes to resources and the human environment that have resulted through management under the Council process and through prosecution of the U.S. fishery rather than foreign fleets. For protected species, the context is largely focused on the 1980s and 1990s, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ.

The temporal scope of future actions for all VECs extends about five years (2026) beyond the expected implementation of this action. The dynamic nature of resource management for these species and lack of information on projects that may occur in the future make it difficult to predict impacts beyond this timeframe with any certainty

The impacts discussed in Section 6.7.4 are focused on the cumulative effects of the proposed action (i.e., the suite of preferred alternatives) in combination with the relevant past, present, and reasonably foreseeable future actions over these time scales.

6.7.2 Relevant Actions Other Than Those Proposed in this Document

A cumulative effects assessment ideally makes effect determinations based on the combination of: 1) impacts from past, present, and reasonably foreseeable future actions; 2) the baseline condition of the VECs (the combined effects from past, present, and reasonably foreseeable future actions plus the present condition of the VEC; and 3) impacts of the preferred alternative.

Important foreseeable actions include

- Large-mesh regulations in the Northeast Multispecies FMP
- Rebuilding program and measures for southern red hake, Framework 62 pending approval
- Rebuilding program and measures for Atlantic herring, through Framework 9 or an FMP amendment
- Windfarm development
- Aquaculture development and NOAA Fisheries Policy

6.7.2.1 Fishery Management Actions

Most of the actions affecting the VECs come from fishery-related activities (e.g., Federal fishery management actions), which have straightforward effects on environmental conditions, and were, are, ore will be taken, in large part, to improve those conditions. The reason for this is the statutory basis for Federal fisheries management, the reauthorized Magnuson-Stevens Act (SFA 2996). That legislation was enacted to promote long-term positive impacts on the environment in the context of fisheries activities. More specifically, the MSA stipulates that management comply with a set of National Standards that collectively serve to optimize the conditions of the human environment. Under this regulatory regime, the cumulative impacts of past, present, and future Federal fishery management actions on the VECs should likely result in positive long-term outcomes. Nevertheless, these actions are often associated with offsetting impacts. For example, constraining fishing effort frequently results in negative short-term socioeconomic impacts on fishery participants. However, these impacts are usually necessary to bring about the long-term sustainability of a given resource, and as such, should, in the long-term, promote positive effects on human communities, especially those that are economically dependent upon the managed resource. Generally, these actions have had low negative impacts on habitat due to continued fishing operations; however, some actions have had direct or indirect long-term positive impacts on habitat through designating or protecting important habitats. FMP actions have also had a range of impacts on protected species, including generally low negative impacts on ESA-listed species, and a range of impacts on non-ESA-listed marine mammals from slightly negative to slightly positive, depending on the species.

6.7.2.1.1 Small-Mesh Multispecies FMP Actions

Past, present, and reasonably foreseeable future actions for small-mesh multispecies management include the establishment of the original FMP, all subsequent amendments and frameworks, and the setting of annual specifications (annual catch limits and measures to constrain catch and harvest). Key actions are described below.

Taken together, these past, present, and reasonably foreseeable future actions meet the objectives to optimize yield to provide societal benefits while preventing overfishing and reducing the risk that small-mesh multispecies become overfished. They also achieve this while minimizing the catch of regulated groundfish stocks that sometimes co-occur or overlap with small-mesh multispecies, as a measure to reduce the risk of overfishing large-mesh groundfish stocks. Future actions are expected to continue achieving these benefits while minimizing effects on other marine resources and also increase the biomass of southern red hake by limiting catch and promoting the use of selective fishing gears.

Past and Present Actions

Section 3.3 of Framework 62 (NEFMC 2020a) describes the past management actions that regulate the small-mesh multispecies fishery. Most relevant to this EA (this document) are the following actions:

Amendment 1 (1987) reduced the spatial footprint of the winter inshore whiting fishery to protect struggling large-mesh species like gray sole, and dabs; focused the small-mesh target species to large-mesh species ratio on a selected set of species; and reduced the size of the Georges Bank whiting fishery area to protect yellowtail flounder.

Amendment 4 (1991) established the Cultivator Shoals Exemption Area and formally incorporated silver hake and red hake into the FMP. This amendment also established a minimum mesh size for the directed small-mesh fishery as well. This was intended to control the mortality of whiting and red hake in this fishery.

Framework Adjustment 6 (1994) was intended, in part, to reduce juvenile whiting mortality in the Cultivator Shoals whiting fishery and modified the requirements of that program.

Framework Adjustment 9 (1995) established Small Mesh Areas I and II in the Gulf of Maine and implemented the requirements for fishing in those areas.

Amendment 12 (1999/2000) addressed many small-mesh issues. This amendment officially incorporated offshore hake into the FMP; established essential fish habitat designations for all three small-mesh species; standardized the mesh-size based possession limits (see below); required a Letter of Authorization for several small-mesh exemption areas; and established a provision to allow the transfer of up to 500 lb. of small-mesh multispecies at sea.

Framework Adjustment 35 (2000) established the Raised Footrope Trawl Exemption Area off Cape Cod. A Modification to Framework 35 (2002) modified the boundaries and seasons of the Cape Cod exemption areas.

Framework Adjustment 38 (2003) established the Inshore Gulf of Maine Grate Raised Footrope Trawl Exemption Area along the coast of Maine.

Amendment 19 (2013) modified the accountability measures, adopted new biological reference points, and established a trip limit for red hake. It established specifications for the four stocks in the fishery and an accountability measure in the form of a triggered 400 lb. red hake possession limit when landings reach 90% of the TAL. This TAL trigger is reduced for prior overages, i.e. when the total catch exceeds the ACL to reduce the risk of continued overfishing.

Specifications adjustments for 2015-2017 and 2018-2020 that changed the overfishing level and annual catch limits to respond to changes in stock biomass, changes in discarding rates, and changes in state water landings.

Post-season accountability measures in 2014, and 2016 to account for 2013 and 2015 northern red hake catch overages and in 2019 to account for 2018 southern red hake catch overages. Because southern red hake catch also exceeded the annual catch limit during 2019, the post-season accountability measure would have taken effect in 2021 but was deferred because the effect of the 2018 accountability measure was not implemented until 2020 and the effects of pending Framework 62 (see below) have not yet been observed.

Reasonably Foreseeable Future Actions

If approved, Framework 62 will establish a rebuilding plan and management measures for the southern red hake stock. These measures include a rebuilding schedule of 5 to 10 years (target 7 years), an added reduction in the Annual Catch Limit to no more than 25% of the OFL to promote rebuilding, and a lower, tiered year-round trip possession limit based on gear selectivity for southern red hake with the in-season accountability measure remaining in place.

The Council submitted Framework 62 for review by the Secretary of Commerce on January 12, 2021. The measures include setting the ABC at 75% of the ACL, thereby capping southern red hake catches at a level below that which is otherwise associated with optimum yield. The lower catches are intended to enhance rebuilding prospects. The measures also lower the southern red hake possession limit to prevent targeting and to cause fishermen to avoid catching large amounts of southern red hake when they cannot land it.

Although the recent management track assessment did not estimate status determination criteria (SDC) and assessed the status as unknown, the Council submitted Framework 62 to rebuild southern red hake in response to a previous assessment that determined that the stock was overfished. Southern red hake is considered to be in a rebuilding plan.

Action 1, Alternative 2 has two options for setting southern red hake specifications. Option A was recommended by the Council's Scientific and Statistical Committee (SSC) to prevent overfishing and allow for stock rebuilding. Option B reduces that recommended catch limit by 25%, consistent with Framework 62. Other Actions are not expected to interfere with southern red hake rebuilding and no

alternatives would change the southern red hake possession limits that the Council adopted for Framework 62.

There are no other immediate actions on the horizon, but measures that could increase the utilization of the silver hake and whiting stocks are of some interest. Such actions if initiated might be able to reduce fishing restrictions in areas and seasons where regulated groundfish catch is acceptably low. This may come about through additional experimental fishery research to identify new areas or seasons or through gear research that identifies more selective fishing gears that catch less groundfish and other species when targeting whiting.

6.7.2.1.2 Other Fishery Management Actions

In addition to the Small-Mesh Multispecies FMP, there are many other FMPs and associated fishery management actions for other species that impacted these VECs over the temporal scale described in Section 6.7.1.3. These include FMPs managed by the Mid-Atlantic Fishery Management Council, New England Fishery Management Council, Atlantic States Marine Fisheries Commission, and to a lesser extent the South Atlantic Fishery Management Council. Omnibus amendments are also frequently developed to amend multiple FMPs at once. Actions associated with other FMPs and omnibus amendments have included measures to regulate fishing effort for other species, measures to protect habitat and forage species, and fishery monitoring and reporting requirements.

The FMPs that have had the greatest impact on small-mesh fishery VECs, other than the Small-Mesh Multispecies FMP, are the Northeast Multispecies, Monkfish, Atlantic Sea Scallop, and Atlantic Squid FMPs because of the spatial overlap of the fisheries and the relatively high level of incidental catch of southern red hake in those fisheries. Actions in related FMPs have a lesser effect on silver hake and whiting stocks because bycatch is relatively low, but these other management actions could have a greater effect on the small-mesh multispecies if there are effort shifts from other fisheries due to increasingly restrictive regulations, changes in market demand and prices, and potentially changes in species distribution affected by climate change.

Past and Present Actions

Northeast Multispecies. FW59 set 2020 TACs for U.S./Canada management units of Eastern GB cod, Eastern GB haddock, and GB yellowtail flounder stock, set 2020-2022 specifications for 15 other groundfish stocks, address commercial/recreational allocation issues if needed, and revise the GB cod incidental catch TAC.

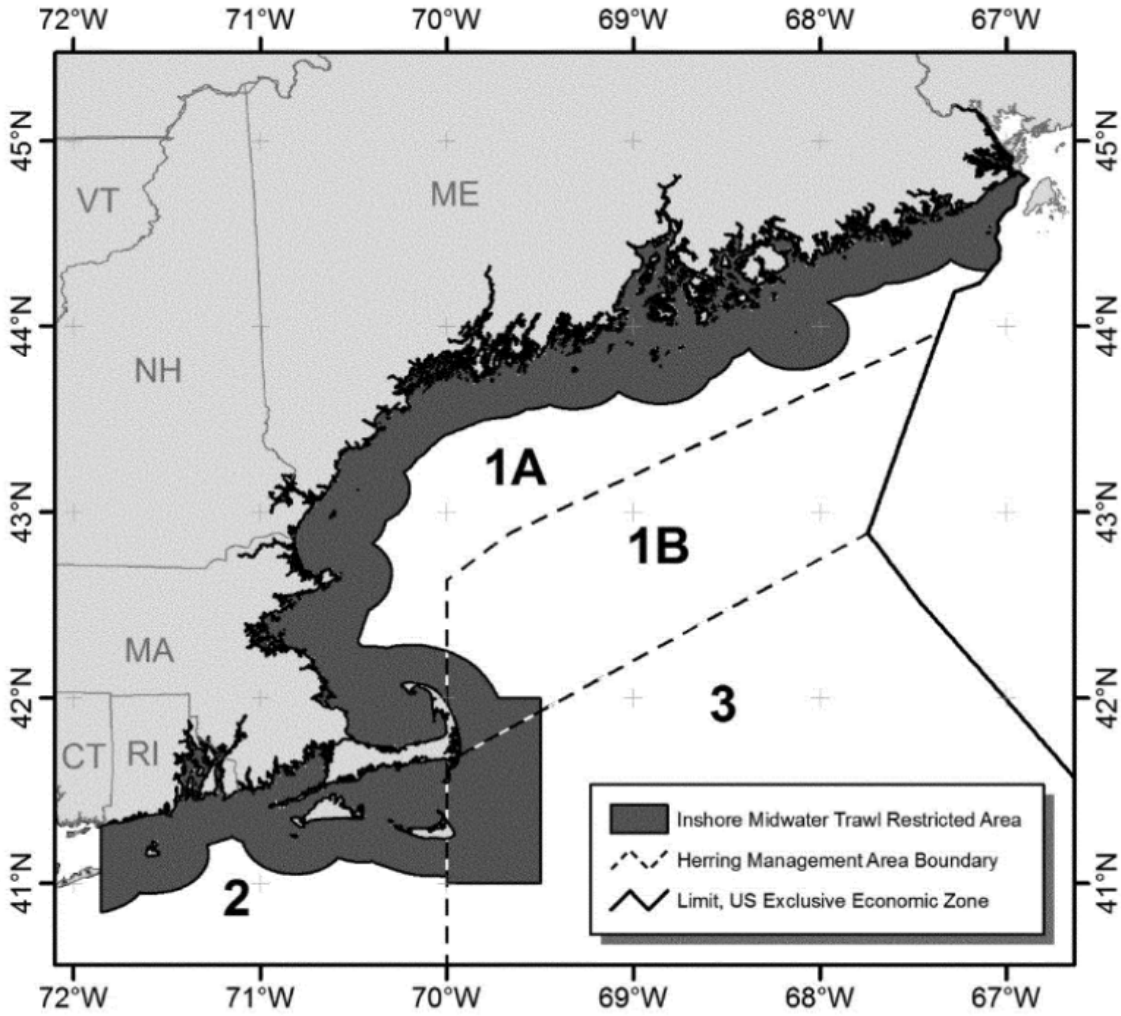
Atlantic Herring: The Council approved Amendment 8 to the Atlantic Herring FMP in 2018 and submitted the FEIS for approval on May 13, 2019. The purpose of the amendment was to implement a long-term ABC control rule for the Atlantic herring fishery that explicitly accounts for herring's role in the ecosystem and implement measures to address potential localized depletion of Atlantic herring to minimize possible detrimental biological impacts on predators of herring and associated socioeconomic impacts on other user groups.

In addition to revising the herring ABC control rule, Amendment 8 prohibited the use of midwater trawl (MWT) gear year-round from the shoreline to a distance of 12 nm. The closure (Map 9) extends along the coasts of ME, NH, MA, and RI from the US/Canada border south to roughly the RI/CT border. It extends further offshore to about 20 nm in three, 30-minute squares due east and southeast of Cape Cod.

It was recognized that some MWT vessels that normally fish in the new closure area could modify and use the gear to target whiting as an alternative. Some vessels might switch to another gear to target herring, or find different areas further offshore to target herring with MWT. Based on the amount of revenue generated through herring landings compared to potential revenue from landing whiting, the potential for effort shift from the herring MWT fishery to the whiting fishery is expected to be negligible (see Section 6.1.1.3.1for a quantitative analysis). The actual effects of Amendment 8 are as yet unknown,

primarily because they would have occurred in fishing year 2020 and the 2020 Annual Monitoring Report for the small-mesh multispecies fishery will be prepared in late 2021, after the end of the 2020 fishing year.

Map 9. Inshore mid-water trawl restricted area with Atlantic herring management areas



Squid: Illex and Loligo squid fisheries are managed by the Mid-Atlantic Fishery Management Council through its Squid, Mackerel, and Butterfish FMP. There is an overlap in vessels in the Loligo squid and whiting fisheries on Georges Bank, thus actions in the squid fishery affect fishing effort in the whiting fishery and vice versa. Although there are impediments to fishing for squid (gear restricted areas, windfarm lease areas, small mesh restrictions, etc.), stock biomass, catch limits, and catch has increased in recent years. Loligo squid are managed via trimester quotas and measures, which can have an effect on when vessels switch to fishing for whiting, which can cause market glut and depressed whiting pricing. Currently, Loligo squid abundance is high and this is expected to continue into 2021. Squid stock biomass and catch limits for this annual species are of course uncertain.

Monkfish. The Council developed Monkfish Framework 12, which set specifications for FYs 2020-2022 and is expected to be implemented in summer 2020.

Atlantic Sea Scallops. FW32 established scallop specifications for fishing years 2020 and 2021 and considered measures to mitigate scallop fishery impacts to Georges Bank yellowtail flounder.

Atlantic Squid. Amendment 20 through the Mid-Atlantic Fishery Management Council reduced latent directed permits, created limited access incidental permits, and lowered Trimester 2 post-closure trip limit to 250 pounds to discourage directed fishing after closures.

Omnibus Deep-Sea Coral Amendment. The Council recently developed a deep-sea coral amendment to protect deep sea coral habitats throughout New England from the negative impacts of fishing gears. The Deep-Sea Coral Amendment includes management areas to protect coral habitat from the impacts of fishing gears, provisions to encourage further research on deep-sea corals and fisheries, and measures to facilitate future updates to coral management approaches. The zone is to be a closure to all bottom-tending gears, with an exemption for the red crab pot fishery. The deep-sea coral zones are not expected to have direct impacts on any of the managed resources and have minimum impacts on the small-mesh multispecies fishery. If it becomes more attractive, vessels would be able to target offshore hake in other deep-water areas that are not closed to protect deep-sea corals.

Reasonably Foreseeable Future Actions

Northeast Multispecies. These regulations and related small-mesh exemptions restrict fishing for whiting and red hake stocks, except in areas and seasons where large-mesh groundfish catches are acceptably low. These measures are part of the reason that the fishery does not usually achieve Optimum Yield.

The Council approved Amendment 23 to the Northeast Multispecies FMP in September 2020 and THE Cl will be submitting the EIS soon. If approved by NOAA Fisheries, this action proposes adjustments to the current groundfish monitoring program to improve the reliability and accountability of catch reporting in the commercial groundfish fishery to ensure there is a precise and accurate representation of catch (landings and discards). These measures would take effect sometime in 2021. Although not directly related to them, many small-mesh multispecies fishery vessels also participate in the regulated large-mesh multispecies fishery and will be subject to the new catch reporting requirements. It is expected to ensure a more precise and accurate representation of catch (landings and discards), which could also improve small-mesh multispecies landings and catch data.

Framework 61 proposes: (1) 2021 total allowable catches for U.S./Canada stocks on Georges Bank; (2) 2021-2023 specifications for roughly half of the groundfish stocks; (3) white hake rebuilding measures; and, potentially, (4) a universal sector exemption to allow fishing for redfish, pollock, and haddock. The Council has approved these measures and if NOAA Fisheries approves, the measures will become effective on May 1, 2021. Increasing restrictions may induce groundfish fishermen to target alternative stocks, such as whiting. The whiting hake rebuilding measures are unlikely to cause fishermen to target whiting, but the sector exemptions may offer more alternatives to fish for healthy groundfish stocks rather than whiting. Framework 62 is expected to have a neutral impact on the whiting fishery.

Atlantic herring

The Council approved and will submit Framework Adjustment 8 EA, which proposes to adjust specifications, to implement a two-step incidental herring possession limit in areas 2 and 3, and eliminate the seasonal closure in area 1B. Implementation of these measures is expected on May 1, 2021.

Generally, stock biomass and catch have been declining, particularly since 2017. As a result, the herring fishery has faced increasingly restrictive measures and herring catch has been declining (see figure below). As a result, herring vessels may seek alternative species to target, such as mackerel, squid menhaden, and whiting. This could have a slightly negative impact on small-mesh multispecies biomass but it could have positive socio-economic benefits from increasing revenue from whiting landings. Although the increase in landings has been small relative to decreasing herring catch (Figure 18), many inshore vessels are more likely to target menhaden rather than whiting. Most of this potential retargeting whiting rather than herring is expected from the herring bottom trawl fishery rather than the MWT herring

fishery. Alternatives to fish for squid and Atlantic mackerel may also be more lucrative than fishing for whiting.

Figure 17. Comparison of annual Atlantic herring ACL and final catch (2008-2019)

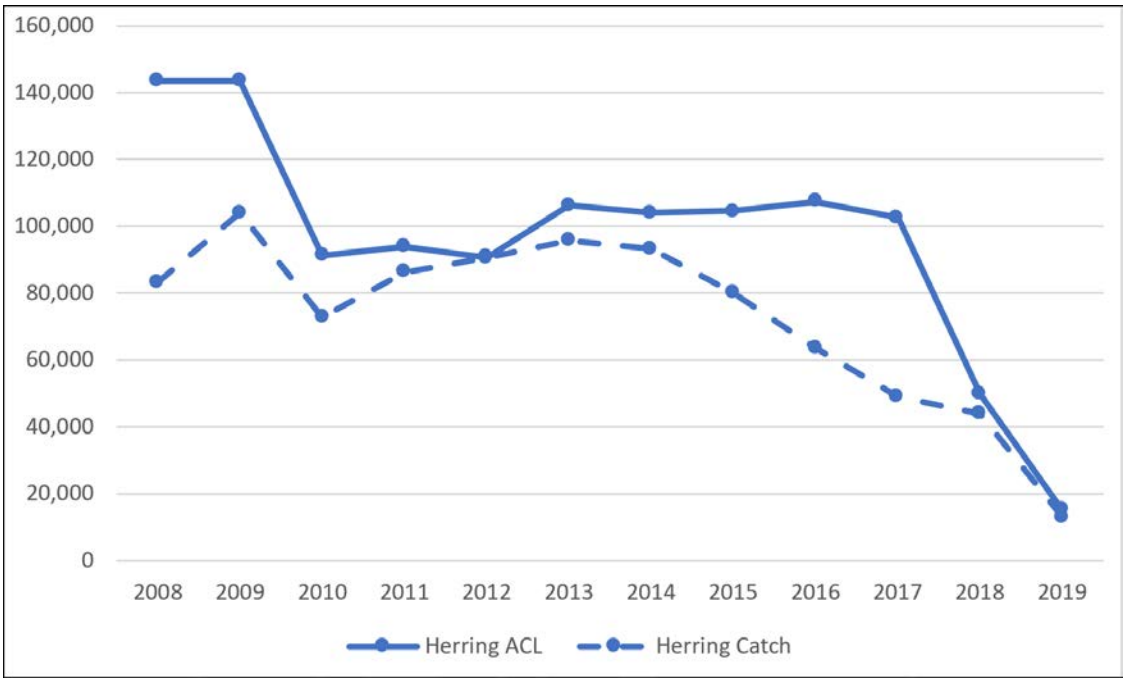
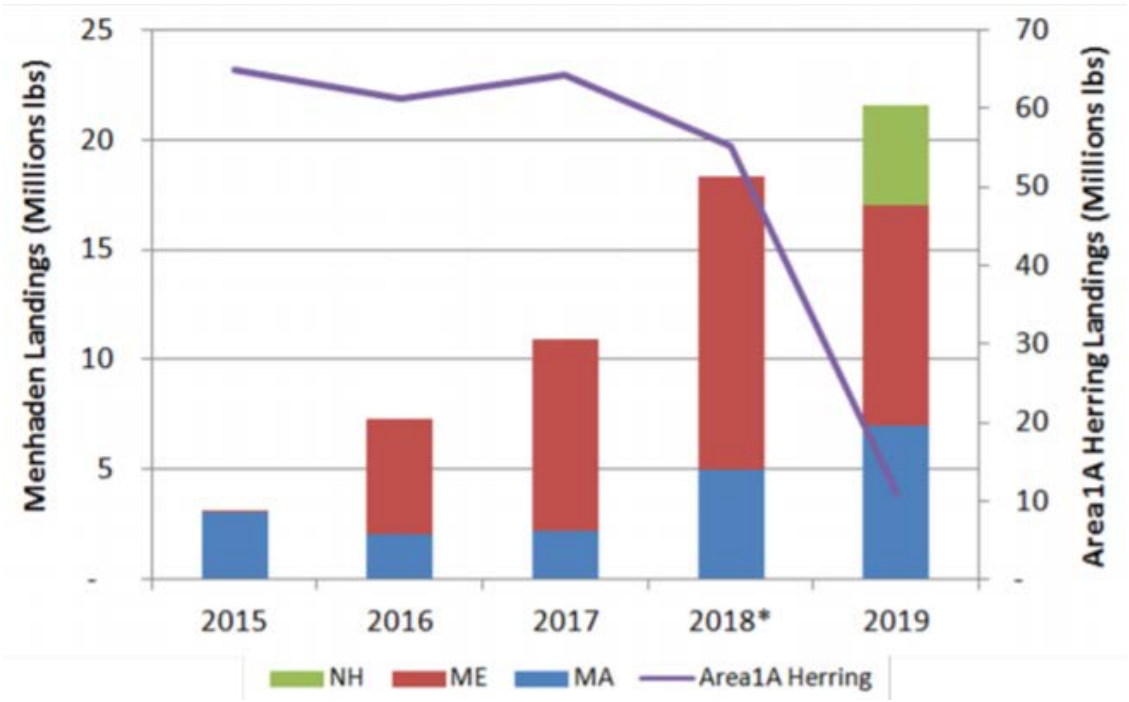


Figure 18. Annual menhaden landings by state and Area 1A herring landings, 2015-2019



The Council will be initiating a rebuilding plan for overfished Atlantic herring, which would likely be Framework 9 to the Atlantic Herring FMP. It is too early to identify the management measures that would be considered or their potential effects on the small-mesh multispecies fishery. Nonetheless, many vessels in the herring fishery use pair trawls or mid-water trawls to catch and land large amounts of Atlantic herring, many vessels with refrigerated sea water (RSW) systems. Whiting tend to be more delicate and would be more likely to be damaged and unmarketable if they are stored in the onboard RSW systems. Some vessels in the herring fishery use bottom trawls with less than 3-inch mesh.

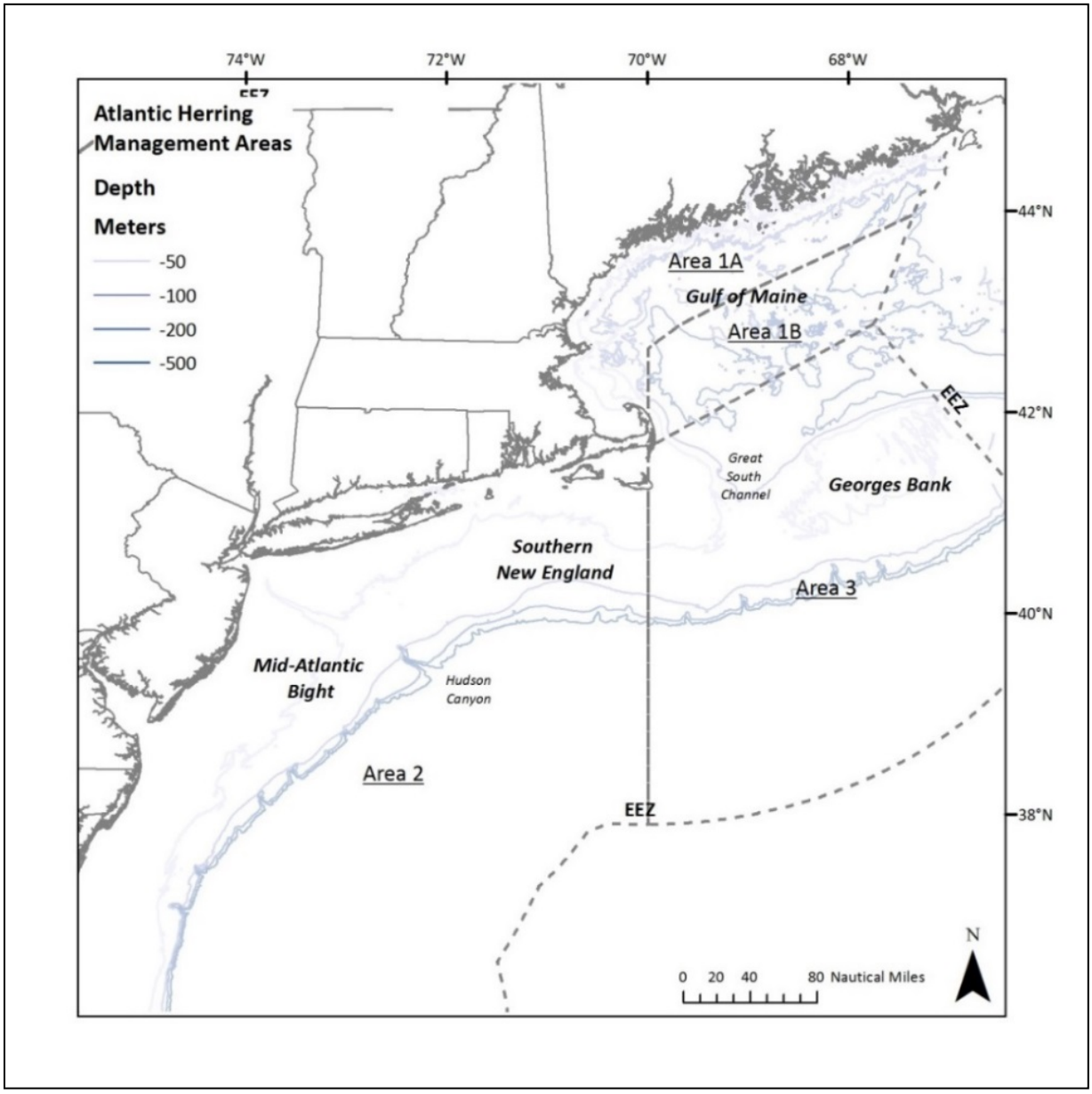
Some of these vessels may begin to target whiting with existing vessels and nets as they face greater fishing restrictions in the Atlantic Herring FMP. According to industry sources, it is unlikely that large vessels, typically using RSW systems to land herring, would be able to target whiting when faced with more herring restrictions. Section 6.1.1.3.1 provides a quantitative estimate of this potential to shift effort from the MWT fishery, and is estimated to be minor due to the potential revenue from whiting landings or from other targeted species, and minor compared to the cost of switching gear and fishing methods. They are more likely to target other species like mackerel (Atlantic mackerel are however overfished and overfishing is occurring) and squid. On the other hand, smaller vessels that fish inshore might find it attractive to target whiting using existing less than 3-inch mesh nets.

We do not have a breakdown by gear type and vessel length, but the number of 2020 herring permits by category are summarized in the table below. Most vessels with high herring possession limits (Categories A, B, and C) are 60 feet and over, often have specialized equipment and onboard processes to handle large amounts of herring, and are unlikely to be satisfied catching only 15,000 lbs. per trips (the preferred alternative for Action 2). The analysis in Framework Adjustment 8 to the Atlantic Herring FMP (NEMC 2021) estimated that most herring vessels facing more fishing restrictions in Herring Management Areas 1A and 1B would be more likely to begin targeting Atlantic mackerel rather than whiting. The number of active vessels landing herring and mackerel in areas 1A and 1B using bottom and mid-water trawls are roughly the same [see Table 27 of Framework Adjustment 8 to the Atlantic Herring FMP (NEFMC 2021)].

Table 40. Fishing year 2020 herring permits by vessel size. Source: NOAA fishery permit data base.

Vessel length (ft)	Cat A (limited access; unlimited lbs in all areas)	Cat B (limited access; unlimited lbs in areas 2/3)	Cat C (limited access; 55,000 lbs/d)	Cat D (open access; 6,600 lbs/d)	All Herring
< =30	0	0	0	167	167
30 – 45	0	0	7	374	381
45 – 60	1	1	4	129	134
60 – 90	15	3	28	380	423
90 – 120	9	0	2	41	52
120 - 160	7	0	0	2	9
Total	32	4	41	1093	1166

Map 10. Atlantic herring management areas.



Squid: The MAFMC is not currently considering pending actions to regulate the squid fishery, but the focus is on improving the stock assessment to identify appropriate biological reference points. The outcome of this process could change the perception of the stock and future management strategy.

Atlantic Sea Scallops. Amendment 21, initiated in February 2019, would address the Northern Gulf of Maine Management Area measures, the Limited Access General Category (LAGC) individual fishing quota (IFQ) possession limits, and the ability for Limited Access vessels with LAGC IFQ to transfer the quota to vessels that only hold these permits.

6.7.2.1.3 Fishery Management Action Summary

The Council has taken many actions to manage the small-mesh multispecies fishery. The MSA is the statutory basis for federal fisheries management. The cumulative impacts on the VECs of past, present, and reasonably foreseeable future federal fishery management actions under the MSA should generally be associated with positive long-term outcomes because they constrain fishing effort and manage stocks at sustainable levels. Constraining fishing effort through regulatory actions can have negative short-term socioeconomic impacts. These impacts are sometimes necessary to bring about long-term sustainability of a resource, and as such should promote positive effects on human communities in the long-term. A summary of the cumulative impacts of past, present, and reasonably foreseeable future actions on each VEC is provided in the table below.

Table 41. Summary of expected impacts of combined past, present, and reasonably foreseeable future actions on each VEC.

VEC	Past Actions (P)	Present Actions (Pr)	Reasonably Foreseeable Future Actions (RFFA)	Combined Effects of Past, Present, and Future Actions
Target Species	**Positive** Combined effects of past actions have improved optimum yield and reduced the risk of overfishing.	**Positive** Specification adjustments reduce the risk of overfishing to acceptable levels and promote southern red hake biomass rebuilding	**Positive** Future actions are anticipated to strive to maintain a sustainable stock	**Positive** Stocks are being managed sustainably
Non-Target Species	**Positive** Combined effects of past actions have limited interactions with and bycatch of other stocks, some of which are currently overfished.	**Neutral** The present actions do not increase or decrease exposure to other stocks that would be discarded or increase the risk of overfishing.	**Positive** Future regulations will be science based and may include new gears, technologies and ways of fishing to improved selectivity and minimize bycatch	**Positive** Measures limit interactions and bycatch of species that co-occur with whiting and red hake.

VEC	Past Actions (P)	Present Actions (Pr)	Reasonably Foreseeable Future Actions (RFFA)	Combined Effects of Past, Present, and Future Actions
Habitat	**Mixed** Combined effects of effort reductions and better control of non-fishing activities have been positive, but fishing activities and non-fishing activities have reduced habitat quality	**Mixed** Catch limits and better control of non-fishing activities have been positive, but fishing activities continue to reduce habitat quality	**Mixed** Future regulations will likely control effort and habitat impacts but as stocks improve, effort may increase along with additional non-fishing activities	**Mixed** Continued fisheries management will likely control effort and thus fishery related habitat impacts but fishery and non-fishery related activities will continue to reduce habitat quality
Protected Resources	**Negligible to Slightly positive** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources	**Negligible to Slightly positive** Current regulations continue to control effort, thus minimizing potential interactions	**Slightly negative to Slightly positive** Future regulations will likely control effort and thus protected species interactions, but as stocks improve effort will likely increase, possibly increasing interactions	**Negligible to Slightly positive** Continued effort controls along with past regulations will likely help stabilize protected species interactions
Human Communities	**Positive** The small-mesh multispecies fishery provides an alternative to target a healthy stock of whiting, providing jobs, income, and other benefits to coastal communities that are fishery-dependent.	**Positive** The present actions continue to provide an alternative for fishermen to target a healthy stock of whiting.	**Mixed** Future actions will continue to provide an alternative for fishermen to target a healthy stock of whiting. Windfarms and aquaculture siting could reduce access to the fishery and limit benefits.	**Mixed to Positive** Actions provide community benefits in the short- and long-term, but the benefits may be reduced by other oceanic development activities.

6.7.2.2 Non-Fishing Impacts

6.7.2.2.1 Other Human Activities

Non-fishing activities that occur in the marine nearshore and offshore environments and connected watersheds can cause the loss or degradation of habitat and/or affect the fish and protected species that utilize those areas. The impacts of most nearshore, human-induced, non-fishing activities tend to be localized in the areas where they occur, although effects on species could be felt throughout their populations since many marine organisms are highly mobile. For offshore projects, some impacts may be localized while others may have regional influence, especially for larger projects. Examples of non-fishing activities include point source and non-point source pollution, shipping, dredging/deepening, wind energy development, oil and gas development, construction, and other activities. Specific examples include at-sea disposal areas, oil and mineral resource exploration, aquaculture, construction of offshore wind farms, and bulk transportation of petrochemicals. Episodic storm events and the restoration activities that follow can also cause impacts. While localized impacts may be more severe, the overall impact on the affected species and their habitats on a population level is unknown, but likely to have impacts that mostly range from no impact to slightly negative, depending on the species and activity. More details about the scope and nature of non-fishing activities that affect the VECs associated with the small-mesh multispecies fishery are described in Section 6.7.2.2 of Framework 62 (NEFMC 2020a).

The following discussion of impacts is based on past assessments of activities and assumes these activities will continue as projects are proposed. While localized impacts may be more severe, the overall impact on the affected species and their habitats on a population level is unknown, but likely to have no impact to low negative impacts.

Non-fishing activities permitted by other Federal agencies (e.g., beach nourishment, offshore wind facilities) require examinations of potential impacts on the VECs. The MSA imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH (50 CFR 600.930). NMFS and the eight regional fishery management councils engage in this review process by making comments and recommendations on federal or state actions that may affect habitat for their managed species. Agencies need to respond to, but do not necessarily need to adopt these recommendations. Habitat conservation measures serve to potentially minimize the extent and magnitude of indirect negative impacts federally-permitted activities could have on resources under NMFS' jurisdiction. In addition to guidelines mandated by the MSA, NMFS evaluates non-fishing effects during the review processes required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by Federal, state, and local authorities. Non-fishing activities must also meet the mandates under the ESA, specifically Section 7(a)(2)[24], which ensures that agency actions do not jeopardize the continued existence of endangered species and their critical habitat.

In recent years, offshore wind energy and oil and gas exploration have become more relevant activities in the Greater Atlantic region. They are expected to impact all VECs, as described below.

Impacts of offshore wind energy development on Biological Resources (Target species, Non-target species, Protected Species) and the Physical Environment

Construction activities may have both direct and indirect impacts on marine resources, ranging from temporary changes in distribution to injury and mortality. Impacts could occur from changes to habitat in the areas of wind turbines and cable corridors and increased vessel traffic to and from these areas.

24 "Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an "agency action") is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat."

The full build out of offshore wind farms will result in broad habitat alteration. The wind turbines will alter hydrodynamics of the area, which may affect primary productivity and physically change the distribution of prey and larvae. It is not clear how these changes will affect the reproductive success of marine resources.

Wind farm survey and construction activities and turbine/cable placement will substantially affect NMFS scientific research surveys, including stock assessment surveys for fisheries and protected species[25] and ecological monitoring surveys. Disruption of such scientific surveys could increase scientific uncertainty in survey results and may significantly affect NMFS' ability to monitor the health, status, and behavior of marine resources and protected species and their habitat use within this region. Based on existing regional Fishery Management Councils' acceptable biological catch control rule processes and risk policies (e.g., 50 CFR §§ 648.20 and 21), increased assessment uncertainty could result in lower commercial quotas and recreational harvest limits that may reduce the likelihood of overharvesting and mitigate associated biological impacts on fish stocks. However, this would also result in lower associated fishing revenue and reduced recreational fishing opportunities, which could result in indirect negative impacts on fishing communities. A significant portion of the small-mesh multispecies fishery (about 9%) occurs in existing windfarm lease areas and difficulty surveying the small-mesh multispecies populations in these areas could have a substantial affect on uncertainty about resource conditions, thereby increasing uncertainty and reducing catch allocations.

Offshore wind energy development is being considered in parts of the outer continental shelf that overlap with the distribution of small-mesh multispecies (whiting and red hake), specifically in the southern region of New England (for example silver hake revenue shown in Map 11). The whiting fishery has been active in New England at present and is expected to be for the near future (Section 5.0). The social and economic impacts of offshore wind energy on fisheries could be generally negative due to the overlap of wind energy areas with productive whiting fishing grounds. Impacts may vary by year based on species availability. It is worth noting that this analysis represents only a rough approximation of potential effects from the areas; however, because this productive region of the resource would be expected to support whiting fishing in the future in the absence of offshore wind energy development, any restriction of fishing access to this region as a result of offshore wind energy development would be perceived as a negative overall effect to the fishery. In some cases, effort could be displaced to another area, which could compensate for potential economic losses if vessel operators choose not to operate in the wind energy areas.

There could also be social and economic benefits in the form of jobs associated with construction and maintenance, and replacement of some electricity generated using fossil fuels with renewable sources (AWEA 2020).

It remains unclear how fishing or transiting to and from fishing grounds (whether or not those grounds are within a wind farm) might be affected by the presence of a wind farm. While no offshore wind developers have expressed an intent to exclude fishing vessels from wind turbine arrays once construction is complete, it could be difficult for operators to tow bottom-tending mobile gear or transit amongst the wind turbines, depending on the spacing and orientation of the array and weather conditions.[26] If vessel operators choose to avoid fishing or transiting within wind farms, effort displacement and additional steaming time could result in negative socioeconomic impacts to affected communities, including increased user conflicts, decreased catch and associated revenue, safety concerns, and increased fuel

25 Changes in required flight altitudes due to proposed turbine height would affect aerial survey design and protocols (BOEM 2020a).

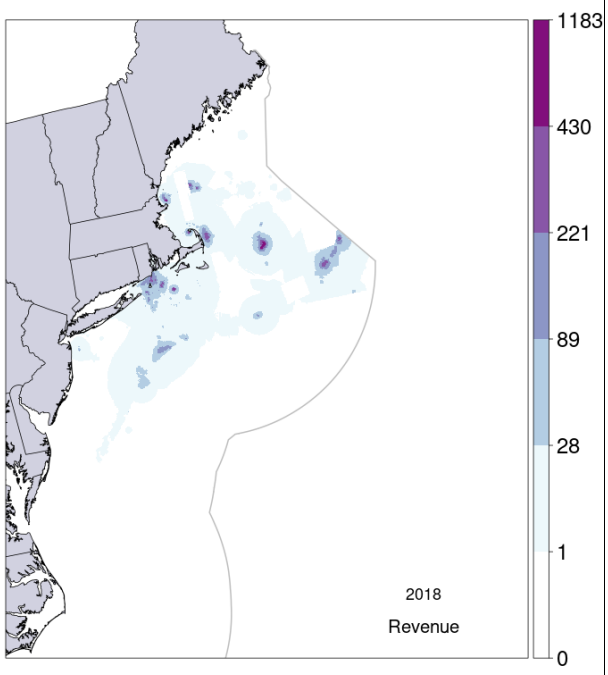
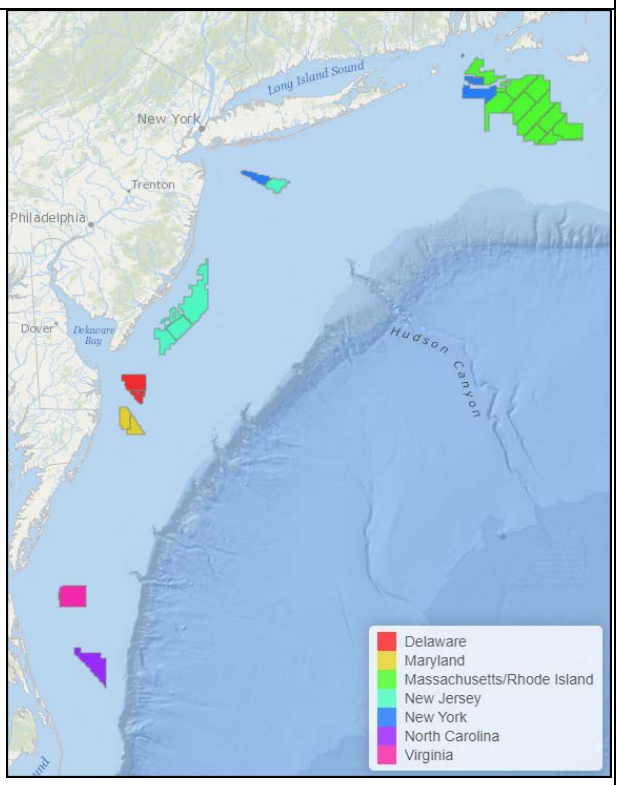
26 The United States Coast Guard has considered transit and safety issues related to the Massachusetts and Rhode Island lease areas in a recent port access route study, and has recommended uniform 1 mile spacing in east-west and north-south directions between turbines to facilitate access for fishing, transit, and search and rescue operations. Future studies in other regions could result in different spacing recommendations (UCSG 2020).

costs. If vessels elect to fish within wind farms, effects could be negative due to reduced catch and associated revenue, user conflicts, gear damage/loss, and increased risk of allision or collision.

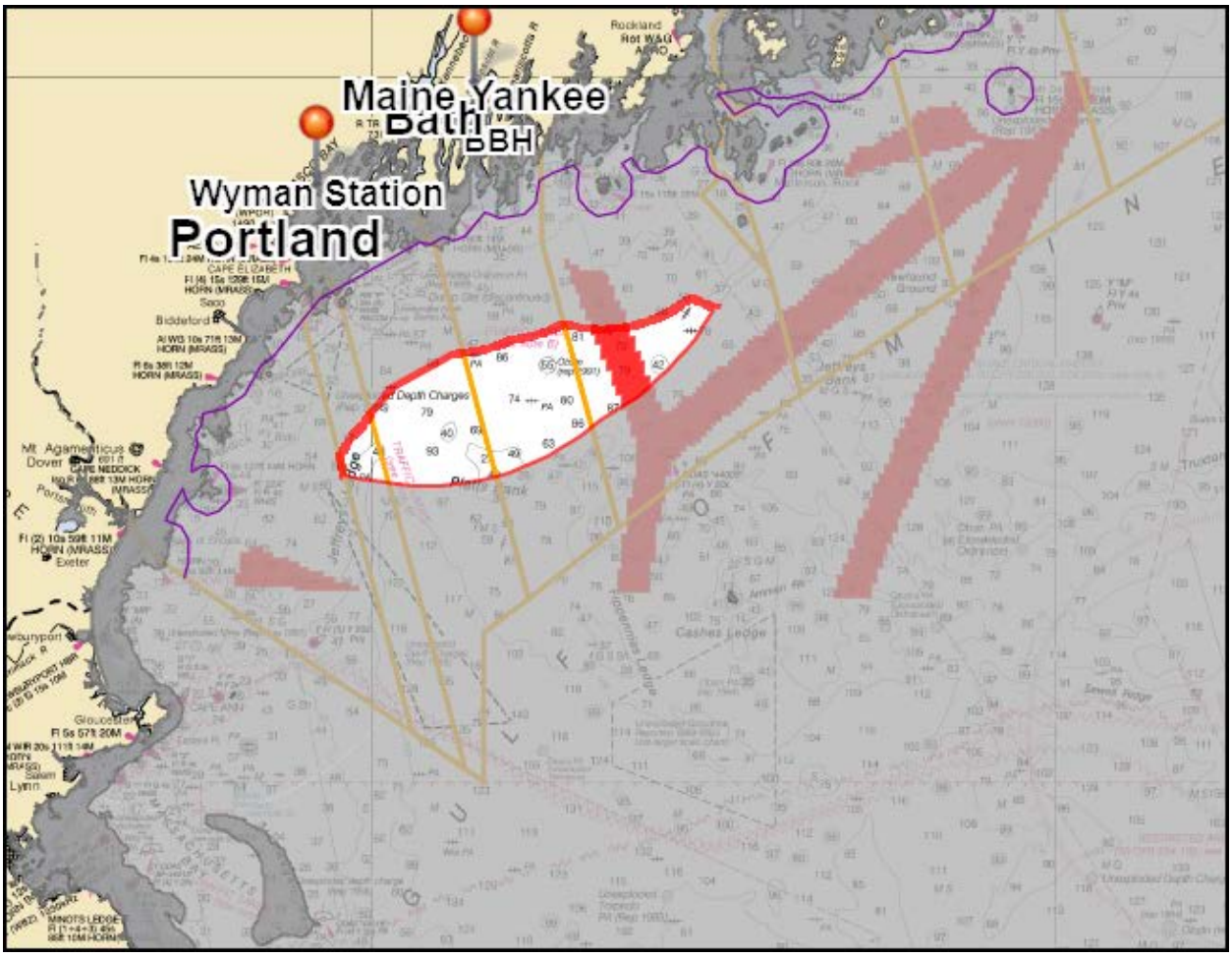
According to NOAA Fisheries data, 9.4% of the 2018 silver hake landings from the southern management area were caught within the boundaries of the existing lease areas (Map 11). No lease areas are proposed or anticipated for Georges Bank, so this overlap has a greater effect on the small-mesh multispecies fishery in Southern New England.

As the number of wind farms increases, so too would the level and scope of impacts to affected habitats, marine resources, and human communities. A windfarm area of interest has been identified for a region offshore of ME (Map 12), which partially overlaps the ME raised footrope trawl area and Small-Mesh Area II. A relatively minor amount of small-mesh multispecies fishing effort has occurred in these two areas, however, but they offer a potential alternative if silver and red hake distribution moves northward, and therefore could become more important to the fishery.

Map 11. Distribution of ex-vessel revenue from CY 2018 silver hake landings and established windfarm lease areas.

Silver hake revenue, CY 2018. (https://apps-nefsc.fisheries.noaa.gov/read/socialsci/fishing-footprints.php)	**Windfarm lease areas (https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/WIND/ALL_WEA_BY_AREA_DATA.html)**
	

Map 12. Map of State of Maine Offshore Wind Siting Map (https://maine.maps.arcgis.com/apps/webappviewer/index.html?id=8b6f103dbf0c4dc7b1127c9d11abd8be).



Impacts of Oil and Gas Development on Biological and Socioeconomic Resources

Cumulative impacts from oil and gas development could include leasing and possible surveys, depending on the direction of BOEM's 5-year planning process in the North and Mid-Atlantic regions. (Note that there are fewer oil and gas development activities in the region than offshore wind; therefore, the non-fishing impacts focus more heavily on offshore wind.) Seismic surveys can affect both fish behavior and while uncertain could cumulatively lead to negative population level impacts. If fishery resources are affected by seismic surveys, then so in turn the fishermen targeting these resources would be affected. However, such surveys could increase jobs, which may provide some positive effects on human communities (BOEM 2020b).

For protected species (sea turtle, fish, small cetacean, pinniped, large whale), behavioral or physiological impacts could occur depending on the species' hearing threshold and the overlap with frequencies emitted by the survey as well as duration. It is important to understand that seismic surveys for mineral resources are different from surveys used to characterize submarine geology for offshore wind installations, and thus these two types of activities are expected to have different impacts on marine species.

Offshore Energy Summary

The overall impact of offshore wind energy and oil and gas exploration on the affected species and their habitats at a population level is unknown, but likely to range from no impact to moderate negative, depending on the number and locations of projects that occur. The individual project phases (site assessment, construction, operation, and decommissioning) as well as different aspects of the technology (foundations, cables/pipelines, turbines) will have varying impacts on resources. Mitigation efforts, such as habitat conservation measures, time of year construction restrictions, layout modifications, and fishery compensation funds could lessen the magnitude of negative impacts as well. The overall impact on socioeconomic resources is likely slightly positive to moderate negative, potentially positive due to a potential increase in jobs and recreational fishing opportunities, but negative due to displacement and disruption of commercial fishing effort.

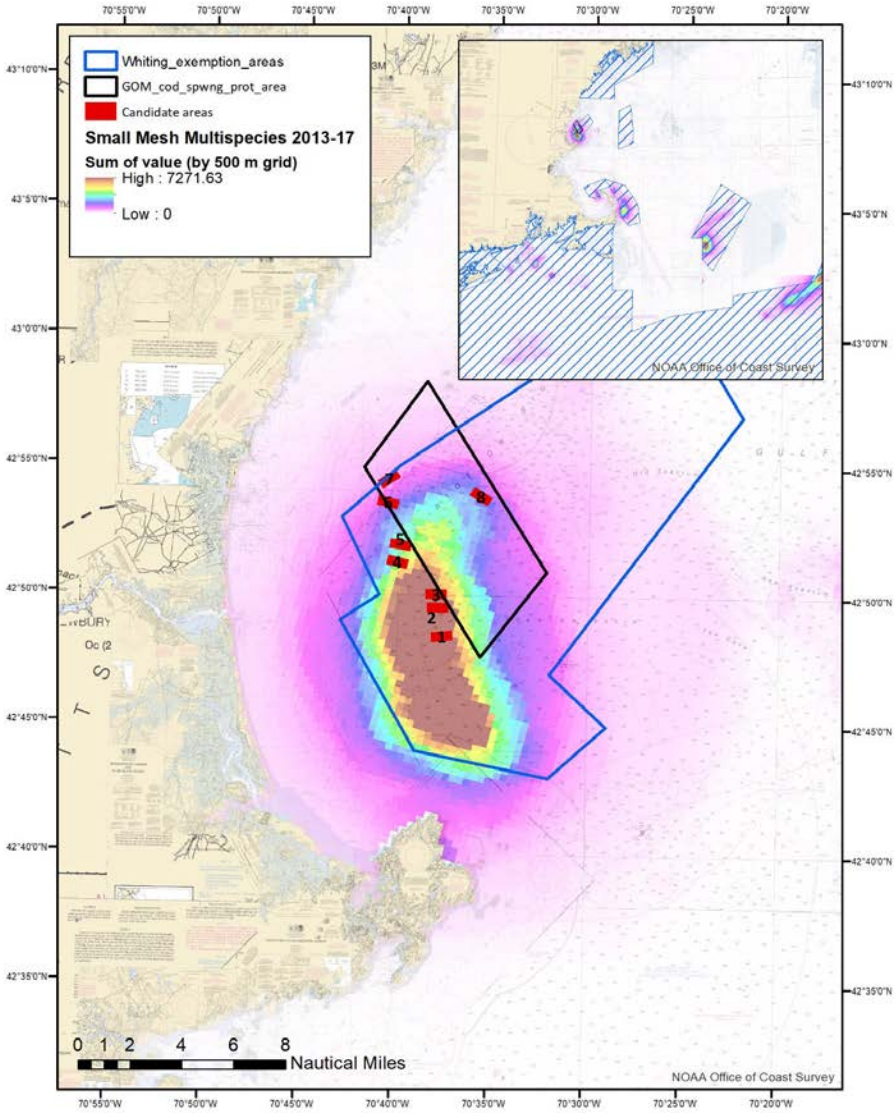
Offshore Windfarm development

Offshore windfarm development is likely to have a negative impact on where small-mesh multispecies fishing can occur withing areas where windfarms are sited, because the presence of turbines, foundations, and cables could prevent fishing with small-mesh trawls. If the windfarms overlap the small-mesh multispecies exemption areas, it could prevent the fishery from being prosecuted, causing the fishermen to seek alternative species, and/or fish in less optimal portions of the exemption areas.

Aquaculture development

Depending on the size and configuration of offshore aquaculture facilities, they could interfere with fishing with trawls for small-mesh multispecies. One area (Map 13) currently that under consideration to site offshore aquaculture facilities has a considerable overlap with Small-Mesh Area I where there is a substantial amount of small-mesh multispecies trawling which provides an important revenue source for vessels from Gloucester, MA, Seabrook, NH, and other ports in the Gulf of Maine.

Map 13. Candidate Aquaculture development areas and small mesh multispecies revenue distribution from VTR (mostly whiting, also referred to as silver hake; this data set also includes red and offshore hake) (DePiper 2014). As shown in the inset, effort in this fishery is associated with specific exemption areas, outlined in blue.



6.7.2.2.2 Global Climate Change

Global climate change affects all components of marine ecosystems, including human communities. Physical changes that are occurring and will continue to occur to these systems include sea-level rise, changes in sediment deposition; changes in ocean circulation; increased frequency, intensity and duration of extreme climate events; changing ocean chemistry; and warming ocean temperatures. Important climate change factors that affect NE marine fishes are identified in more detail in Section 6.7.2.2 of the Framework 62 EA (NEFMC 2020a) and in Hare et al. (2016).

Results from the Northeast Fisheries Climate Vulnerability Assessment indicate that climate change could have impacts on Council-managed species that range from negative to positive, depending on the adaptability of each species to the changing environment (Hare et al. 2016).

Based on this assessment for silver hake,

- Target species level of vulnerability to climate change is low (100% certainty from bootstrap analysis)
- Target species level of exposure to effects of climate change is high based on two contributing factors: ocean surface temperature (expert score of 3.9) and ocean acidification (expert score of 4.0). All life stages of silver hake use marine habitats.
- The directional effect of climate change on red hake is estimated to be negative (>95% certainty in expert scores). Continued warming will likely cause continued decreases in recruitment and northward shifts in distribution.
- Distributional vulnerability rank is high (100% certainty from bootstrap analysis); silver hake are habitat generalists and generally mobile and have dispersive early life stages (Lock and Packer, 2004).
- Biological sensitivity of silver hake to climate change is low (No sensitivity attributes scored above 2.5).

Based on this assessment for offshore hake,

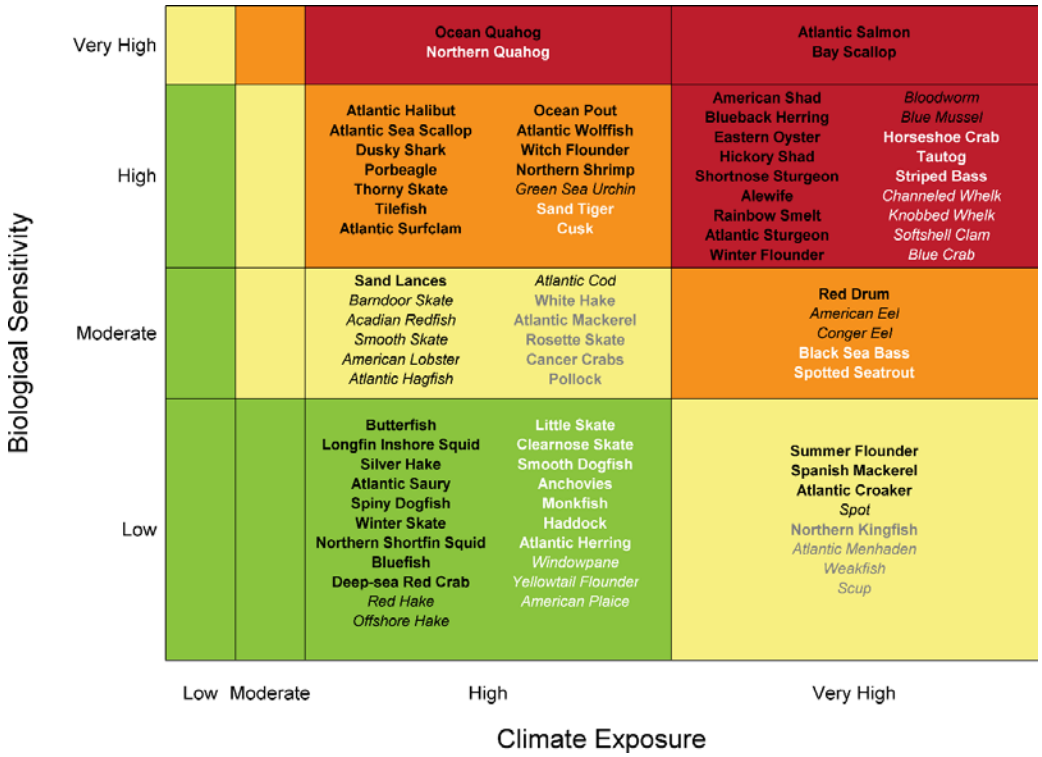
- Target species level of vulnerability to climate change is low (92% certainty from bootstrap analysis)
- Target species level of exposure to effects of climate change is high based on two contributing factors: ocean surface temperature (expert score of 3.9) and ocean acidification (expert score of 4.0). All life stages of offshore hake use marine habitats.
- The directional effect of climate change on red hake is estimated to be negative, but this estimate is highly uncertain (<66% certainty in expert scores). Offshore Hake is a cold-temperate species and warming will likely cause reductions in available habitat. However, there is little direct evidence of the effect of climate change on offshore hake productivity and distribution.
- Distributional vulnerability rank is high (100% certainty from bootstrap analysis); adults are habitat generalists with moderate mobility. Early life history stages are dispersive.
- Biological sensitivity of red hake to climate change is low; dispersal of early life stages may be partially limited as juveniles are commensal with Atlantic sea scallops.

Based on this assessment for red hake,

- Target species level of vulnerability to climate change is low (94% certainty from bootstrap analysis)
- Target species level of exposure to effects of climate change is high based on two contributing factors: ocean surface temperature (expert score of 3.9) and ocean acidification (expert score of 4.0). All life stages of red hake use marine habitats.
- The directional effect of climate change on red hake is estimated to be neutral (66-90% certainty in expert scores). Abundance in the southern portions may be decreasing, but the region-wide affects are unclear.
- Distributional vulnerability rank is high (94% certainty from bootstrap analysis); adults are habitat generalists and mobile. Eggs and larvae are planktonic.
- Biological sensitivity of red hake to climate change is low; dispersal of early life stages may be partially limited as juveniles are commensal with Atlantic sea scallops.

Overall vulnerability results for additional Greater Atlantic species, including most of the non-target species identified in this action, are shown in Figure 24 (Hare et al. 2016).

Figure 19. Overall climate vulnerability score for Greater Atlantic species, with small-mesh multispecies highlighted with red boxes.



Note: Overall climate vulnerability is denoted by color: low (green), moderate (yellow), high (orange), and very high (red). Certainty in score is denoted by text font and text color: very high certainty (>95%, black, bold font), high certainty (90–95%, black, italic font), moderate certainty (66–90%, white or gray, bold font), low certainty (<66%, white or gray, italic font).
Source: Hare et al. (2016).

6.7.3 Baseline Condition for the Resources, Ecosystems, and Human Communities

The CEA baseline conditions for resources and human communities are the combined effects of the past, present, and foreseeable future actions (Section 6.7.2) plus the present condition of the VECs (Section 5.0). Straightforward quantitative metrics of the baseline conditions are available for the managed resources, non-target species, and protected resources. The conditions of the habitat and human communities VECs are complex and varied (Sections 5.5 and 5.6, respectively).

Table 42. Baseline conditions of the VECs.

VEC		Status/Trends (Section 5.0)	Effects of Past, Present Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
		A	B	A+B
Target Species (Southern red hake)		Silver hake, southern whiting, and northern red hake stocks are not overfished and overfishing is not occurring. The status of southern red hake is unknown because biological reference points are not available. The stock biomass is at moderately low levels relative to past conditions.	**Positive** Stocks are being managed for sustainability	**Long-term Positive**: stocks are being managed for sustainability and adjustments are being made to help prevent overfishing and rebuild southern red hake biomass.
Non-target Species		Effort controls in the small-mesh multispecies fishery help control bycatch / discards.	**Positive** Continued effort controls under the small-mesh multispecies FMP and other FMPs with overlapping effort	**Positive** Discards also controlled in other FMPs
Protected Species	**Sea Turtles**	Endangered or threatened	**Slightly positive** Continued effort controls along with past regulations will likely help stabilize protected species interactions. Although the small-mesh multispecies fishery has had no observed interactions with right whales, future actions by NOAA Fisheries through ESA/MMPA is expected to reduce interactions with fixed gears and reduce associated mortality.	**Mixed** Continued catch and effort controls are likely to reduce gear encounters through effort reductions. Additional management actions taken under ESA/MMPA should also help mitigate the risk of gear interactions
	Large Whales	Endangered or MMPA protected		
	Small Cetaceans and Pinnipeds	MMPA protected		
	Giant Manta Ray	Threatened		
	Atlantic Sturgeon	Endangered or threatened		
	Atlantic Salmon	Endangered		
	Seabirds	Low-high conservation concern		

VEC	Status/Trends (Section 5.0)	Effects of Past, Present Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Physical Environment and Essential Fish Habitat	Fishing impacts are complex/variable and typically adverse; Non-fishing activities have had negative but site-specific habitat effects	**Mixed** Continued management of EFH for an increased quality of habitat but non-fishing impacts expected to increase	**Mixed** Reduced habitat disturbance by fishing gear impacts from non-fishing activities could increase and have negative impact
Human Communities	Small-mesh multispecies revenues have been relatively stable and could increase with higher catch limits proposed by this action.	**Positive** Continued management will likely control effort for a sustainable fishery and thus fishery and non-fishery related activities will continue	**Short- and Long-term Positive**: Sustainable resources should support viable communities and economies

6.7.4 Magnitude and Significance of Cumulative Effects

To determine the magnitude and extent of cumulative impacts of the preferred alternative, the incremental impacts of the direct and indirect impacts should be considered, on a VEC-by-VEC basis, in addition to the effects of all actions (those identified and described relative to the past, present, and reasonably foreseeable future actions of both fishing and non-fishing actions). Table 43 summarizes the likely effects of the management alternatives contained in this action. The CEA baseline (Table 42) represents the sum of the past, present, and reasonably foreseeable future (identified hereafter as "other") actions and conditions of each VEC. When an alternative has a positive effect on a VEC (e.g., reduced fishing mortality on a managed species), it has a positive cumulative effect on the stock size of the species when combined with the other actions that were also designed to increase stock size. In contrast, when an alternative has a negative effect on a VEC (e.g., increased fishing mortality on a managed species), the cumulative effect on the VEC would be negative and tend to reduce the positive effects of the "other" actions. The cumulative effects are described below for each VEC. As in Section 6.7.2.2, non-fishing impacts on the VECs generally range from no impact to slightly negative.

The preferred alternatives, in combination, are unlikely to result in significantly increased levels of fishing effort (Section 6.0). The impacts of the proposed actions are described in Sections 6.2 to 6.5.3 and summarized in Table 43.

Table 43. Incremental impacts of the proposed actions. Preferred alternatives are shaded.

Proposed Action	Alternative	Target Species	Non-target Species	Protected Species	Physical Environment & Essential Fish Habitat	Human Communities
2021-2023 Annual Catch Limits	**Alternative 2 Option A**	Slightly positive for all stocks overall; but slightly negative for southern red hake.	Slightly negative to slightly positive impacts	Slightly to moderately negative impacts relative to No Action for ESA-listed and MMPA-protected species in poor condition, slightly negative impacts to MMPA-protected species in good condition. Negligible impacts relative to Option B.	Slightly negative impact, but negligible change relative to other alternatives	Slightly positive; moderately to high long-term negative for southern red hake
	Alternative 2 Option B	Slightly positive for all stocks overall; and moderately positive for southern red hake relative to Option A	Slightly negative to slightly positive impacts	Slightly to moderately negative impacts relative to No Action for ESA-listed and MMPA-protected species in poor condition, slightly negative impacts to MMPA-protected species in good condition. Negligible impacts relative to Option A.	Slightly negative impact, but negligible change relative to other alternatives	Slightly negative; but moderate to high long-term positive for southern red hake

Proposed Action	Alternative	Target Species	Non-target Species	Protected Species	Physical Environment & Essential Fish Habitat	Human Communities
	No Action	Slightly positive for southern whiting and both red hake stocks; slightly negative for northern silver hake	Slightly negative to slightl positive impacts.	MMPA-protected species: Slightly negative to slightly positive ESA-listed species: Slightly negative Negligible impacts relative to Alternative 2	Slightly negative impact, but negligible change relative to other alternatives	Slightly negative
Northern red hake TAL Trigger	**Alternative 2**	Slightly negative impact on northern red hake and negligible impact on other stocks.	Slightly negative to negligible impact.	Slightly negative impacts relative to No Action	Slightly negative impact, but negligible change relative to other alternatives, but slightly potential increase in negative impacts.	Slightly positive
	No Action	Slightly positive impact on northern red hake and on other small-mesh multispecies stocks	Slightly positive to negligible impact.	MMPA-protected species: Slightly negative to slightly positive ESA-listed species: Slightly negative Negligible impacts relative to Alternative 2	Slightly negative impact	Slightly negative
Whiting Possession Limit	**6,000/12,000 lbs.**	Slightly negative impact on whiting and red hake stocks and a negligible impact on northern silver hake.	Slightly positive impact, but slightly negative impact on herring.	Negligible impacts relative to No Action and negligible relative to Alternatives 3 and 4.	Slightly negative impact, but negligible impact relative to No Action.	Slightly positive

Proposed Action	Alternative	Target Species	Non-target Species	Protected Species	Physical Environment & Essential Fish Habitat	Human Communities
	15,000 lbs.	Slightly negative impact on whiting stocks, a slightly positive impact on red hake, and a negligible impact on northern silver hake.	Slightly negative impact, but slightly positive impact on herring.	Negligible impacts relative to No Action and negligible relative to Alternatives 2 and 4.	Slightly negative impact, but negligible impact relative to other alternatives due to offsetting effects.	Slightly or moderately positive, but moderately long-term negative
	30,000 lbs.	Moderately negative impact on whiting stocks, slightly positive impact on red hake, and a negligible impact on northern silver hake.	Slightly negative impact, but slightly positive impact on herring.	Negligible impacts relative to No Action and negligible relative to Alternatives 2 and 3.	Slightly negative impact, but negligible impact relative to other alternatives due to offsetting effects.	Moderately short-term positive, but highly long-term negative
	No Action	Moderately positive impact on whiting stock and slightly positive impact on red hake stocks	Slightly positive impact, but slightly negative impact on herring.	MMPA-protected species: Slightly negative to slightly positive ESA-listed species: Slightly negative Negligible impacts relative to Alternatives 2, 3, and 4	Slightly negative impact	Moderately long-term positive

Target Species (small-mesh multispecies)

When the direct and indirect effects of the preferred alternative are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects would likely yield non-significant slightly positive impacts on the small-mesh multispecies stocks.*

Past fishery management actions taken through the Northeast Multispecies FMP (Small-Mesh Multispecies) and the triennial specifications process ensure that stocks are managed sustainably and that measures are consistent with the objectives of the FMP under the guidance of the MSA. The impacts of triennial specification of management measures largely depend on how effective those measures are in meeting the objectives of preventing overfishing and achieving optimum yield, and on the extent to which mitigating measures (e.g., incidental possession limits, AMs) are effective. These actions have generally had a mixed cumulative effect on small-mesh multispecies. Overall, the past, present, and reasonably foreseeable future actions on small-mesh multispecies have had slightly negative to positive cumulative effects.

The preferred alternatives are unlikely to significantly change levels of fishing effort and behavior (Section 6.2), but are expected to have slightly to moderately positive effects on the small-mesh multispecies resource (see table above).

Non-Target Species

When the direct and indirect effects of the preferred alternative are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects would likely yield non-significant slightly positive (non-overfished species) to slightly negative (overfished species) impacts on non-target species.*

The preferred alternatives are unlikely to significantly increase levels of fishing effort or change in behavior (Section 6.3), but are expected to have mixed cumulative effects depending on the degree to which bycatch species interact with whiting and red hake and the status of bycatch species in the whiting fishery. Catches of non-target species in the small-mesh multispecies fishery is primarily monitored and controlled through other FMPs and by selectivity of the small-mesh multispecies through the area exemption program. Depending on the non-target species, the preferred alternative is expected to have a slightly positive effect for non-target species that tend to co-occur with small-mesh multispecies because stocks are not overfished and overfishing is not occurring. The preferred alternatives could have a slightly negative impact on other species if they are overfished or are experiencing overfishing as the preferred alternatives are expected to continue with similar levels of fishing effort and behavior as current conditions.

Past fishery management actions taken through the FMP and annual specifications process have had a slightly negative (for overfished bycatch species) to a positive cumulative effect on non-target species and bycatch. In particular, the small-mesh multispecies fishery is managed through specific exemptions from large-mesh multispecies regulations in such a way to minimize interactions with non-target species and bycatch. Specifically, these regulations include exemption areas and seasons in the northern management area that through prior experimental fishing permits have been shown to have acceptably low bycatch rates of large-mesh groundfish. In the southern management area, vessels may target red, silver, and offshore hakes year-round, but operate in areas where large-mesh multispecies catches are low. Concern about these species is however changing, particularly for distressed or overfished species like yellowtail and windowpane flounders. There are however selective gears that have been identified (for example the large belly panel net) or are undergoing scientific testing in experimental fisheries that are designed to minimize bycatch of yellowtail flounder, windowpane flounder, and possibly red hake.

Protected Resources

When the direct and indirect effects of the preferred alternative are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions*), the cumulative effects would likely yield non-significant slightly negative to slightly positive impacts (MMPA non-ESA-listed species range from slightly negative to slightly positive impacts; ESA-listed species with slightly negative impacts).*

Past and present actions in fisheries that catch small-mesh multispecies have had slightly negative to slightly positive effects on protected resources. The preferred alternatives are unlikely to significantly change levels of fishing effort (Section 6.4), the timing and distribution of that fishing effort, or the characteristics of fishing gear that could affect interactions with protected resources. Therefore, impacts to protected resources are unlikely to substantially change relative to current conditions under the preferred alternatives and therefore, are expected to be slightly negative for ESA-listed species and slightly negative to slightly positive impacts to MMPA-protected species. Management measures and/or take reduction plans have also been implemented to reduce incidental injuries and deaths of sea turtles or specific species/stocks of marine mammals due to interactions with commercial fishing gear; this has resulted in slightly positive to positive effects to these species/stocks. Future positive impacts are likely as well.

Specific cumulative effects on protected species (sea turtles, marine mammals, and fish) are described in Section 6.7.4 of the Framework 62 EA (NEFMC 2020a). In general, marine activities and development can have a negative impact on these species which can be exacerbated by fishing activities, and vice versa.

Historically, the implementation of FMPs has resulted in reductions in fishing effort and as a result, past fishery management actions are thought to have had a slightly positive impact on strategies to protect protected species. Fixed gear entanglement continues to be a source of injury or mortality, resulting in some adverse effects on most protected species to varying degrees. One of the goals of future management measures will be to decrease the number of ESA-listed and MMPA protected species interactions with commercial fishing operations. The cumulative result of these actions to achieve optimum yield in the fishery will be slightly positive for protected resources. The effects from non-fishing actions are expected to be slightly negative to moderately negative as the potential for localized harm to VECs exists. The combination of these past actions along with future initiatives to reduce protected species interactions when considered with the preferred alternative would not result in significant cumulative impacts.

In addition to impacts caused by fishing activity, other types of human activities also affect protected species. Ship strikes are a recognized source of mortality, especially for large whales. Speed restrictions and shifts in navigation lanes to minimize interactions with marine mammals have been implemented. Besides this, other types of activities can also have subtle but important cumulative effects on protected species. One of these is climate change. A good recent example are changes in copepod (*Calanus finmarchicus*) distributions that serve as an important source of food for right whales. In recent years, the distribution of *C. finmarchicus* has changed (Record et al. 2019), possibly making the food source less available for right whales and other species that rely on *C. finmarchicus* as a food source. Changes in fishing activity and distribution as well as expectations for population recovery should consider the effect of changes in prey distribution that can be caused by changes in water temperature.

Physical Environment/Habitat/EFH

When the direct and indirect effects of the preferred alternative are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects would likely yield non-significant slightly negative impacts (related to interaction of mobile bottom tending gear with habitat).*

The management measures described above in the NE Multispecies, Scallop, and Small-Mesh Multispecies FMPs largely have positive effects on habitat due to reduced fishing effort, consequently reducing gear interaction with habitat. The other FMP actions that reduce fishing effort generally result in fewer habitat and gear interactions, resulting in slightly positive effects on habitat. The ALTWTRP resulted in slightly negative to negligible effects on habitat due to the possibility of groundline sweep on the bottom and "ghost gear." The preferred alternatives would possibly have negligible to slightly negative effects on habitat because even though effort is not expected to significantly change, gear is still expected to continue to degrade the quality of the habitat with which the fishery already interacts. In general, marine activities and climate change can have a negative impact on EFH which can be exacerbated by fishing activities, and vice versa.

The cumulative effect of past, present, and reasonably foreseeable future fishing actions has resulted in slightly positive effects on habitat. The effects of these actions, combined with impacts resulting from years of commercial fishing activity, have negatively affected habitat.

The preferred alternatives would likely have slightly negative impacts on the physical environment and EFH, because of interactions of mobile bottom tending gear with habitat. The preferred alternatives are unlikely to significantly change levels of fishing effort (Section 0), or the character of the fishing gear that interacts with and potentially causes adverse effects to EFH. Therefore, when considering the cumulative effects of this action in combination with past, present, and reasonably foreseeable future actions, impacts will remain slightly negative and no significant impacts to the physical environment, habitat or EFH from the preferred alternatives are expected.

Human Communities

When the direct and indirect effects of the preferred alternative are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), *the cumulative effects would likely yield non-significant slightly negative to slightly positive impacts in the short and long term on human communities overall.*

The preferred alternatives are expected to have a slightly positive short- and long-term effect on them due to the long-term sustainability of red, silver, and offshore hake stocks (see Section 6.5.3). By providing revenue and contributing to the overall functioning of and employment in coastal communities, the small-mesh multispecies fishery has both direct and indirect social impacts. As previously described, the preferred alternatives are unlikely to result in a substantial change to the level of fishing effort or the character of that effort relative to the current conditions. Through implementation of this action, the Council seeks to achieve the primary objective of the MSA, which is to achieve OY from the managed fisheries. Thus, the overall cumulative effects of past, present, and reasonably foreseeable future fishing actions has resulted in slightly positive effects on human communities.

6.7.5 Proposed Action on all the VECs

The Council's preferred alternatives (i.e., the proposed action) are described in Section 4.0. The direct and indirect impacts of the proposed action on the VECs are described in Sections 6.2 to 6.5.1 and are summarized in the Executive Summary (Section 1.0). The magnitude and significance of the cumulative effects, including additive and synergistic effects of the proposed actions, as well as past, present, and future actions have been taken into account (Section 6.7.4).

When considered in conjunction with all other pressures placed on the fisheries by past, present, and reasonably foreseeable future actions, the preferred alternatives are not expected to result in any significant impacts, positive or negative. The impacts of the alternatives described in Section 4.0 and analyzed in Section 6.0 are generally slightly negative to slightly positive, mainly because the amount of

fishing effort is unlikely to substantially change, but vessels taking whiting trips are more likely to be able to retain and land more of the whiting and red hake that they catch.

The preferred alternatives are consistent with other management measures that have been implemented in the past for the small-mesh multispecies fishery and are part of a broader management scheme for the multispecies fishery. This management scheme has helped to reduce the risk of overfishing, correct for overfishing when it has occurred, and thus ensure long-term sustainability, while minimizing environmental impacts.

The regulatory atmosphere within which federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of managed species, habitat, and human communities. Consistent with NEPA, the MSA requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, impacts on all VECs from past, present and reasonably foreseeable future actions have generally been positive and are expected to continue in that manner for the foreseeable future. This is not to say that some aspects of the VECs are not experiencing negative impacts, but rather that when considered as a whole and as a result of the management measure implemented in these fisheries, the overall long-term trend is positive.

There are no significant cumulative effects associated with the preferred alternatives based on the information and analyses presented in this document and in past FMP documents (Table 44). Cumulatively, through 2026, it is anticipated that the preferred alternatives will result in non-significant impacts on all VECs, [ranging from magnitude/direction to magnitude direction - if not range just say general magnitude/direction].

Table 44. Summary of cumulative effects of the preferred alternatives.

	Target Species	Non-Target Species	Protected Resources	Habitat	Human Communities
Direct/Indirect Impacts of Preferred Alternative	Slightly negative to positive. Measures reduce the risk of overfishing and achieve sustainability.	Slightly negative to negligible or mixed impacts. Overall fishing effort is not expected to substantially increase but some changes in bycatch may occur.	Slightly negative to slightly positive to MMPA-protected species depending on their stock condition; Slightly negative impacts to ESA-listed species. Overall fishing effort is not expected to substantially increase or change in timing, distribution, or change gear characteristics.	Slightly negative impact, but negligible change relative to No Action. Effort is not expected to substantially increase and gear characteristics that cause contact with the bottom are not expected to change.	Slightly positive. Some increases of landings and revenue could occur and vessels may land more of their whiting and red hake bycatch.
Combined Cumulative Effects Assessment Baseline Conditions	Positive. Small-mesh multispecies stocks are being managed sustainably.	Positive. Measures limit interactions with and catches of bycatch species	Mixed. Fishery and non-fishery related activities continue to reduce habitat quality, but impacts are being minimized to the extent practicable.	Negligible to slightly positive. Continued effort controls along with past regulations will help stabilize protected species interactions.	Mixed to positive. Actions provide community benefits, but the benefits may be reduced by other oceanic development activities.
Cumulative Effects	Slightly negative to positive cumulative effects.	Slightly negative to positive cumulative effects.	Negligible to mixed cumulative effects.	Slightly negative to negligible cumulative effects.	Slightly negative to slightly positive cumulative effects.

7.0 APPLICABLE LAWS/EXECUTIVE ORDERS

7.1 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

7.1.1 National Standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires that regulations implementing any fishery management plan or amendment be consistent with ten national standards. Below is a summary of how this action is consistent with the National Standards and other required provisions of the Magnuson-Stevens Act.

The Council continues to meet the obligations of National Standard 1 by adopting measures designed to end overfishing on the southern red hake stock that was declared overfished in January in 2018 and to minimize the risk that northern red hake, northern silver hake, or southern whiting become overfished. This action adjusts management measures to maximize optimum yield while preventing overfishing, while achieving optimum yield for managed species and the U.S. fishing industry on a continuing basis. The primary goal of managing the small-mesh multispecies fishery is to maintain long-term sustainable catch levels and the first objective of the Northeast Multispecies FMP is to prevent overfishing. The Northeast Multispecies FMP established a fishery specifications process that ensures a consistent review of the small-mesh multispecies stock status, fishery performance, and other factors to manage by annual catch limits (ACLs) and prevent overfishing (also see NEFMC 2020c). The measures implemented through this action should further achieve the goals/objectives and reduce the possibility of overfishing the small-mesh multispecies resource. Northern red hake, northern silver hake, and southern whiting are currently not overfished, and overfishing is not occurring. Southern red hake were overfished and are currently in a rebuilding program via Framework 62 (NEFMC 2020a), pending approval by NOAA Fisheries (Section 5.2).

The Council uses the best scientific information available (National Standard 2). Specifically, this action was informed by fisheries-independent data from several surveys, commercial fishery landings data, stock assessments, and other scientific data sources (see NEFMC 2020c). The 2021-2023 specifications are supported by the best available scientific information, and recommendations for small-mesh multispecies catch limits during 2021-2023 are based on advice from the Council's Scientific and Statistical Committee (SSC). The supporting science and analyses, upon which the proposed action is based, are summarized and described in Sections 5.0 and 6.0.

The Council manages the small-mesh multispecies throughout its range and the preferred alternatives apply to the entire range of the small-mesh multispecies stocks (National Standard 3). In addition, the small-mesh multispecies fishery management measures are designed and evaluated for their impact on the fishery as a whole. State-water landings are a minor part of total catch of small-mesh multispecies, but are accounted for by deducing the landings from the Annual Catch Limit (ACL) to determine the Federal Total Allowable Landings (TAL) and state-water discards are taken into account by the estimated discard rate that is deducted from the ACL to determine the Federal TAL. Offshore hake are not assessed, but are managed by the FMP and included in the southern whiting specifications at an average 4% rate that had been estimated by previous stock assessments. Offshore hake are rarely landed as an identified species and are mixed with landings of silver hake, collectively called "whiting".

The preferred alternatives do not discriminate between residents of different states; the measures are intended to be applied equally to small-mesh multispecies permit holders of the same category, regardless of homeport or location (National Standard 4).

The proposed 2021-2023 fishery specifications allocate the stockwide small-mesh multispecies ACLs to management areas in a manner that is intended to maximize opportunities for the fishery while minimizing the potential for overfishing. The specifications proposed in this document should promote efficiency in the use of fishery resources through appropriate measures intended to provide access to the small-mesh multispecies fishery for both current and historical participants while minimizing the race to fish in any of the small-mesh multispecies management areas, and they do not have economic allocation as their sole purpose (National Standard 5).

The measures proposed account for variations in the fishery (National Standard 6). The 2020 research and management track stock assessments for all four small-mesh multispecies stocks were the basis for the proposed specification adjustments. Consistent with the Framework 62 rebuilding program, the southern red hake specifications preferred alternative are reduced compared to what is scientifically defensible to account for the additional risk and associated variation in biomass when stock size is low. There are several factors which could introduce variations into the small-mesh multispecies fishery, and there is some uncertainty in the estimate of current stock biomass and in recent recruitment. Variable catches of offshore hake also add uncertainty about the relationship between southern silver hake catch and exploitation on the stock. Offshore catches are however a minor fraction of southern whiting catch and landings which are accounted for by a 4% adjustment to the southern whiting specifications. Actual catches of offshore hake are more often than not, less than 4% of southern whiting catch.

Furthermore, market fluctuations, environmental factors, and predator-prey interactions constantly introduce additional variations among, and contingencies in, the small-mesh multispecies resources, the fishery, and the available catch. The proposed 2021-2023 small-mesh multispecies fishery specifications represent substantial changes in allowable catch from recent years. These specification adjustments account for the recent changes in biomass that have been estimated by the 2020 management track assessment (NEFSC 2020). The red hake specification adjustments also account for the recent assessment information indicating that exploitation is very low and at exploitation levels recently seen are an unlikely driver of changes in stock biomass. Additionally, these specifications intend to balance the needs of the small-mesh multispecies fishery while accounting for the documented changes in small-mesh multispecies biomass levels.

As always, the Council considered the costs and benefits associated with the proposed 2021-2023 fishery specifications. Any costs incurred as a result of the management action proposed in this document are necessary to achieve the goals and objectives of the Northeast Multispecies FMP and are viewed to be outweighed by the benefits of taking the management action. Consistent with National Standard 7, the management measures proposed in this document are not duplicative and were developed in close coordination with NMFS and other interested entities and agencies to minimize duplicity.

The proposed 2021-2023 fishery specifications consider the importance of fishery resources to fishing communities (National Standard 8). A complete description of the fishing communities participating in and dependent on the small-mesh multispecies fishery is in Section 5.6. Relative to the No Action alternative, the measures proposed are expected to have positive impacts on communities engaged in and dependent on the small-mesh multispecies fishery. Given the depleted state of the resource and the uncertainty in recruitment, a precautionary approach is required to ensure long-term sustainability of small-mesh multispecies. Thus, in the long-term, communities dependent on the small-mesh multispecies resource are expected to be sustained by this action.by managing the small-mesh multispecies resource in a precautionary manner to ensure long-term sustainable catch.

This action also considers National Standard 9; Section 5.3 has comprehensive information related to bycatch in the small-mesh multispecies fishery. The primary non-target species in this fishery are spiny dogfish, butterfish, and little skate, all of which are managed and not overfished. The measures in place in the fishery include exemption areas and seasons as well as requirements for selective gear (mesh restrictions and raised footrope trawl requirements) to minimize bycatch to the extent practicable while

still allowing an opportunity to achieve OY. The preferred alternatives are not expected to have any significant impact on bycatch of red, silver, or offshore hakes, or other species.

Finally, this action is consistent with National Standard 10 to promote the safety of human life at sea. The Council has the utmost concern regarding safety and understands how important safety is when considering allocations for the stockwide small-mesh multispecies ACLs to the individual management areas. The proposed 2021-2023 specifications ensure that access to the small-mesh multispecies fishery is provided for vessels of all sizes and gear types.

7.1.2 Other MSA Requirements

The Northeast Multispecies FMP contains the fourteen provisions required by Section 303 (a) of MSA.

1. *Contain the conservation and management measures, applicable to foreign fishing …*

   Foreign fishing is not allowed under this management plan or this action, so specific measures are not included to specify and control allowable foreign catch

2. *Contain a description of the fishery …*

   An updated description of the fishery is included in the Annual Monitoring Report for Fishing Year 2019 (NEFMC 2020a).

3. *Assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from the fishery …*

   The present and probable future condition of the small-mesh multispecies resource and estimates of MSY were updated through the most recent management track stock assessment in September 2020 (NEFSC 2020). Information related to the stock assessments and the status of the stocks relative to approved biological reference points are summarized in Section 5.2 .

4. *Assess and specify-- (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3); etc.*

   Vessels that have been permitted to fish for small-mesh multispecies have the capacity to harvest optimum yield. Existing regulatory restrictions to manage large-mesh multispecies bycatch and limits on market demand limit catch.

5. *Specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery …*

   Data regarding the type and quantity of fishing gear used, catch by species, areas fished, season, sea sampling hauls, and domestic harvesting/processing capacity are updated in the Affected Environment (Section 5.6).

6. *Consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions …*

   The preferred alternatives do not alter any adjustments made in the Northeast Multispecies FMP that address opportunities for vessels that would otherwise be prevented from harvesting because of weather or other ocean conditions affecting safety aboard fishing vessels. Therefore, consultation with the U.S. Coast Guard was not required relative to this issue. The safety of fishing vessels and life at-sea is a high priority issue for the Council and was considered throughout the development of the management measures proposed in Amendment 12 to this FMP (2000).

7. *Describe and identify essential fish habitat for the fishery …*

Essential fish habitat has been identified for red, silver, and offshore hakes in the Small-Mesh Multispecies FMP and has been addressed through all subsequent related management actions in a manner consistent with the MSA. Amendment 12 updated the description of the physical environment and EFH (NEFMC 2000) and evaluated the impacts on EFH of the preferred alternatives and other alternatives (Section 5.5). Nothing in this action changes those descriptions and evaluations.

8. *In the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;*

   Scientific and research needs are not required for specification adjustments. Current research needs are identified in Amendment 12 (NEFMC 2000). Nonetheless, the NEFMC has a process that it evaluates research needs that apply to one or more NEFMC FMPs.

9. *Include a fishery impact statement for the plan or amendment*

   Any additional impacts from measures proposed in this action are evaluated in Section 6.0.

10. *Specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished …*

    The Amendment 19 to the NE Multispecies FMP (NEFMC 2011) established criteria to determine whether the small-mesh multispecies stocks were either in an overfished condition, subject to overfishing, or both. This action does not change those criteria.

11. *Establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery …*

    In 2015, NMFS approved a Standardized Bycatch Reporting Methodology (SBRM) amendment submitted by the Councils. This action does not include changes to this amendment.

12. *Assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish …*

    Recreational catches are a very small proportion of total catches of red and silver hakes and are almost non-existent for offshore hake. As such, the catches are accounted for within the 5% allowance for management uncertainty but were estimated in the SAFE Report for Fishing Year 2019 (NEFMC 2020b).

13. *Include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery …*

    Amendment 19 as updated by the SAFE Report (NEFMC 2020b) provides a description of the commercial small-mesh multispecies fishery (Section 5.6.2)

14. *To the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery.*

    The preferred alternatives do not allocate harvest restrictions or stock benefits to the fishery. Such allocations were adopted in Amendment 12 where any vessel may currently enter the fishery by obtaining a Multispecies Category K permit. Framework 62 (NEFMC 2020a) adjusts management measures for the southern red hake stock within the existing allocation structure to improve rebuilding potential but these measures apply equally to all vessels and future allocations when the stock is rebuild do not favor any specific sector of fishing vessels.

15. *Establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.*

    The mechanism for establishing annual catch limits was adopted by Amendment 12 (2000). This action uses that mechanism to specify ACLs for future fishing years.

7.2 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is designed to meet the requirements of the MSA and NEPA. The Council on Environmental Quality has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508), as has NOAA in its policy and procedures for NEPA (NAO 216-6A §5.04b.1). All those requirements are addressed in this action, as described below.

7.2.1 Finding of No Significant Impact (FONSI)

The Council on Environmental Quality (CEQ) Regulations state that the determination of significance using an analysis of effects requires examination of both context and intensity and lists ten criteria for intensity (40 CFR 1508.27). In addition, the Companion Manual for National Oceanic and Atmospheric Administration Administrative Order 216-6A provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a proposed action are significant. Each criterion is discussed below with respect to the proposed action and considered individually as well as in combination with the others.

1. *Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?*

   The proposed action is not expected to result in significant impacts on any of the VECs, nor will it result in overall significant effects, either beneficial or adverse. The proposed action adjusts annual catch limits and other specifications that are consistent with the FMP's ACL framework to reduce the risk of overfishing and allow the fishery to achieve optimum yield. Adjustments to annual catch limits are consistent with the changes in stock biomass observed by the NEFSC bottom trawl survey and estimated by recent assessment. The proposed action is also consistent with the measures that the Council proposed for Framework 62 in order to increase biomass of (i.e. rebuild) southern red hake.

   This action is expected to have low positive impacts on target species, because it would keep the risk of overfishing acceptably low, responding to the changes in the assessment's stock biomass estimates. It would also promote increases in southern red hake biomass, which is at relatively low biomass and was declared overfished in 2018. The impacts of the annual catch limit adjustments and other specifications on whiting and red hake are estimated in Section 6.2.

   Depending on the non-target species, the proposed action is expected to have a low positive effect for non-target species that tend to co-occur with whiting and red hake because the stocks are not overfished and overfishing is not occurring. The proposed action could also have a low negative impact on non-target species that are overfished or experiencing overfishing if changes to specifications result in additional targeting of whiting and red hake where bycatch of overfished stocks is greater. Substantial changes in effort, in the seasonal and geographical distribution of

effort, and in gear characteristics that bear on bycatch rates is not expected, however. The impacts of the annual catch limit adjustments and other specifications on species that are commonly caught as bycatch are estimated in Section 6.3.

The impacts to protected resources would likely be negligible to low negative because entanglement in some fishing gears for some protected species continues to be a source of mortality. Substantial changes in effort, in the seasonal and geographical distribution of effort, and in gear characteristics that bear on interactions with protected species is not expected. The impacts of the annual catch limit adjustments and other specifications on protected species are estimated in Section 6.4. The impacts to the physical environment/EFH would likely be low negative because fishing effort would likely be similar to past fishing years and thus, continue to degrade the quality of habitat (Section 0).

The impacts to human communities is expected to be slightly positive because although large increase in effort and whiting catch is not expected, the proposed changes to specifications will allow vessel fishing for whiting, squid, and herring to land more whiting and red hake that they normally catch without triggering substantially increasing whiting fishing effort. Increases in landings generate revenue for the fishery and economic activity for fishery-dependent shore-side communities (Section 6.5.3).

2. *Can the proposed action reasonably be expected to significantly affect public health or safety?*

   The proposed action does not alter the way the industry conducts fishing activities for the target species. Therefore, no changes in fishing behavior are anticipated that would affect safety. The overall effect of the proposed action on these fisheries, including the communities in which they operate, will not adversely impact public health or safety.

3. *Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?*

   Historic or cultural resources (e.g., shipwrecks) may be present in the area where the small-mesh multispecies fishery occurs. However, vessels try to avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is unlikely that the proposed action would result in substantial impacts to unique areas.

4. *Are the proposed action's effects on the quality of the human environment likely to be highly controversial?*

   The impacts of the proposed action on the human environment are described in Section 6.0. The proposed action primarily would adjust annual catch limits that form the plan's ACL framework and would adjust other specifications that could allow trips targeting whiting, squid, and herring to retain more of the whiting and red hake that they normally catch. It is not expected that these changes will meaningfully alter the amount or characteristics of small-mesh multispecies fishing effort, which otherwise could affect impacts on bycatch, protected species, and/or essential fish habitat.

   The proposed action is based upon measures contained in the FMP which have been in place since 2012. In addition, the scientific information upon which the annual catch limits are based has been peer-reviewed and is the most recent information available. Therefore, the measures contained in this action are not expected to be highly controversial.

5. *Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?*

The impacts of the proposed action on the human environment are described in Section 6.5.3. The proposed action primarily would adjust annual catch limits that form the plan's ACL framework and would adjust other specifications that could allow trips targeting whiting, squid, and herring to retain more of the whiting and red hake that they normally catch.

The proposed action is not expected to substantially alter fishing methods or activities and is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort. The measures contained in this action are not expected to have highly uncertain, unique, or unknown risks on the human environment.

6. *Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?*

The proposed action is not likely to establish precedent for future actions with significant effects. The proposed action would adopt specific adjustments to annual catch limit and other specifications for 2021-2023. The annual catch limits will be adjusted in the future to respond to changes in stock biomass and productivity and the FMP also schedules periodic review and adjustment. The adjustments to the northern red hake TAL trigger as well as the whiting possession limits based on mesh size will continue beyond 2023 but are also subject to continuous monitoring through Annual Monitoring Reports and adjustment through a specifications process, framework adjustment, or plan amendment. As such, these measures will address specific circumstances and are not intended to represent a decision about future management actions that may adopt different measures.

7. *Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?*

The impacts of the proposed action on the biological, physical, and human environment are described in Section 6.0. The cumulative effects of the proposed action presented in Section 6.7 considers the impacts of the proposed action in combination with relevant past, present, and reasonably foreseeable future actions and concludes that no additional significant cumulative impacts are expected from the proposed action.

8. *Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?*

Although shipwrecks may be present in the area where fishing occurs, including some registered on the National Register of Historic Places, vessels typically avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is unlikely that the proposed action would adversely affect the historic resources listed above.

9. *Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?*

The proposed action is not expected to alter overall fishing operations, lead to a substantial increase of fishing effort, or alter the spatial and/or temporal distribution of current fishing effort (Section 6.1). Some redistribution of fishing effort may occur, but this redistribution is likely minor in time and space relative to the seasonal distribution of endangered or threatened species. But these relatively small changes in fishing effort are unlikely to increase interaction risks with ESA-listed species or cause adverse effects to critical habitat. Also, existing measures to protect endangered or threatened species, marine mammals, and critical habitat for these species would continue (Section 5.4). Based on this, it has been determined that fishing activities pursuant to this action will not affect endangered

and threatened species or critical habitat in any manner not considered in the 2021 Opinion on this fishery.

Pursuant to section 7 of the Endangered Species Act (ESA), NOAA's National Marine Fisheries Service (NMFS) issued a Biological Opinion (Opinion) on May 27, 2021, that considered the effects of the NMFS' authorization of ten fishery management plans (FMP), NMFS' North Atlantic Right Whale Conservation Framework, and the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2, on ESA-listed species and designated critical habitat. The ten FMPs considered in the Opinion include the: (1) American lobster; (2) Atlantic bluefish; (3) Atlantic deep-sea red crab; (4) mackerel/squid/butterfish; (5) monkfish; (6) Northeast multispecies; (7) Northeast skate complex; (8) spiny dogfish; (9) summer flounder/scup/black sea bass; and (10) Jonah crab FMPs. The American lobster and Jonah crab FMPs are permitted and operated through implementing regulations compatible with the interstate fishery management plans (ISFMP) issued under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACA), the other eight FMPs are issued under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

The 2021 Opinion determined that the proposed action may adversely affect, but is not likely to jeopardize, the continued existence of North Atlantic right, fin, sei, or sperm whales; the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, or North Atlantic DPS of green sea turtles; any of the five DPSs of Atlantic sturgeon; Gulf of Maine DPS Atlantic salmon; or giant manta rays. The Opinion also concluded that the proposed action is not likely to adversely affect designated critical habitat for North Atlantic right whales, the Northwest Atlantic Ocean DPS of loggerhead sea turtles, U.S. DPS of smalltooth sawfish, Johnson's seagrass, or elkhorn and staghorn corals. An Incidental Take Statement (ITS) was issued in the Opinion. The ITS includes reasonable and prudent measures and their implementing terms and conditions, which NMFS determined are necessary or appropriate to minimize impacts of the incidental take in the fisheries assessed in this Opinion.

10. *Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?*

The proposed action is intended to implement measures that would offer further protection of marine resources and would not threaten a violation of Federal, state, or local law or requirement to protect the environment. The proposed measures have been found to be consistent with other applicable laws as addressed in Section 7.0.

11. *Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?*

The proposed action is not expected to alter overall fishing operations, lead to a substantial increase of fishing effort, or alter the spatial and/or temporal distribution of current fishing effort in a manner that would increase interaction rates with marine mammals. Based on this and the information provided in Section 6.4, this action is not expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act.

12. *Can the proposed action reasonably be expected to adversely affect managed fish species?*

The proposed action cannot reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action. With respect to the target species in the small-mesh multispecies fishery, the proposed action adopts management measures that are consistent with target fishing mortality rates and promote rebuilding of southern red hake and/or sustaining stock sizes of the other target species. For fishery resources that are caught incidental to the small-mesh multispecies

fishing activity, there is no indication in the analyses that the alternatives will threaten sustainability (Section 6.3). The fishery does not currently jeopardize non-target species and it is not likely that these alternatives will change that status.

13. *Can the proposed action reasonably be expected to adversely affect essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act?*

    The proposed action cannot reasonably be expected to cause substantial damage to the oceans and coastal habitats and/or essential fish habitat. Analyses described in Section 0 indicate that this action is not expected to substantially change fishing methods and behavior and that habitat impacts are similar to those that currently occur in the fishery.

14. *Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?*

    The proposed action is not expected to allow substantial damage to vulnerable marine or coastal ecosystems beyond what has been analyzed in previous actions (Section 6.7). This action would likely not change total fishing effort (see Section 6.1) because small-mesh multispecies fishing is constrained by exogenous factors, such as limited market demand and price, limited exemption areas and seasons where and when vessels may use small-mesh trawls to target whiting, and specialized fishing technology that is difficult to master. Thus, fishing would continue to degrade the quantity and quality of habitat, like previous fishing years.

15. *Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?*

    The proposed action would adopt specific adjustments to annual catch limit and other specifications for 2021-2023, including adjustments to the annual catch limits, adjustment to the northern red hake TAL trigger, and adjustments to the whiting possession limits. These adjustments are not expected to substantially change the timing, distribution, or characteristics of small-mesh multispecies fishing activity (Section 6.1). Thus, it is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area.

16. *Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?*

    This action would not result in the introduction or spread of any non-indigenous species as it would not result in any vessel activity outside of the Northeast region. Fishing effort is not expected to change under this action due to exogenous factors that constrain small-mesh multispecies fishing activity, such as limited market demand and price, limited exemption areas and seasons where and when vessels may use small-mesh trawls to target whiting, and specialized fishing technology that is difficult to master. No nonindigenous species would be used or transported during fishing activities. Therefore, the proposed action would likely not result in the introduction or spread of a non-indigenous species.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for the 2021-2023 Specifications Document to the Northeast Multispecies (Small-Mesh Multispecies) Fishery Management Plan, it is hereby determined that the proposed actions will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

_____ _____

Regional Administrator, Greater Atlantic Region, NMFS Date

7.2.2 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b). They are included in this document as follows:

- The need for this action is in Section 3.2;
- The alternatives that were considered are in Section 4.0;
- The environmental impacts of the proposed action are in Section 6.0;
- A determination of significance is in Section 7.2.1; and,
- The agencies and persons consulted on this action are in Sections 7.2.4.

While not required for the preparation of an EA, this document includes the following additional sections that are based on requirements for an Environmental Impact Statement (EIS).

- An executive summary is in Section 1.0;
- A table of contents is in Section 2.0;
- Background and purpose are in Section 0;
- A summary of the document is in the executive summary, Section 1.0;
- A brief description of the affected environment is in Section 5.0;
- Cumulative impacts of the proposed action are in Section 6.7;
- A list of preparers is in Section 7.2.5.

7.2.3 Point of Contact

Questions concerning this document may be addressed to:

Mr. Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950 (978) 465-0492

7.2.4 Agencies Consulted

The following agencies were consulted in preparing this document:

- Mid-Atlantic Fishery Management Council
- New England Fishery Management Council, including representatives from:
  - Connecticut Department of Environmental Protection
  - Maine Department of Marine Resources

- Massachusetts Division of Marine Fisheries
- New Hampshire Fish and Game
- Rhode Island Department of Environmental Management
- National Marine Fisheries Service, NOAA, Department of Commerce
- United States Coast Guard, Department of Homeland Security

7.2.5 List of Preparers

The following personnel participated in preparing this document:

- **New England Fishery Management Council**. Andrew Applegate (Small-mesh Multispecies Plan Coordinator), Naresh Pradhan, Woneta Cloutier, Chris Kellogg, and Thomas Nies
- **National Marine Fisheries Service.** Dr. Larry Alade, Toni Chute, Ashleigh McCord, Shannah Jaburek, and Danielle Palmer
- **State agencies.** Nicole Lengyel-Costa (RI DEM) and Rebecca Peters (ME DMR)
- **Mid-Atlantic Fishery Management Council**. Jason Didden

7.2.6 Opportunity for Public Comment

This action was developed from 2020-2021, and there were eleven public meetings related to this action (Table 45). Opportunities for public comment occurred at Advisory Panel, Committee, and Council meetings. There were more limited opportunities to comment at PDT meetings. Meeting discussion documents and summaries are available at www.nefmc.org.

Table 45. Public meetings related to 2021-2023 Specifications Adjustment.

Date	Meeting Type	Location
03/09-12/2020	Research Track Assessment	Woods Hole, MA
07/27/2020	Whiting PDT	Webinar
09/14-18/2020	Management Track Assessment	Webinar
10/08/2020	Whiting PDT	Webinar
10/26/2020	Whiting PDT	Webinar
11/04/2020	Whiting PDT	Webinar
11/12/2020	Scientific and Statistical Committee	Webinar
11/16/2020	Joint Whiting Committee and Advisory Panel	Webinar
12/02/2020	Council meeting	Webinar
01/11/2021	Whiting PDT	Webinar
01/28/2021	Council meeting	Webinar

7.3 Marine Mammal Protection Act (MMPA)

Section 6.4 contains an assessment of the impacts of the proposed action on marine mammals.

The New England Fishery Management Council has reviewed the impacts of the proposed 2021-2023 fishery specifications on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA. Although the proposed actions may impact marine

mammals occurring in the management unit of the small-mesh multispecies fishery, the specifications will not alter the effectiveness of existing MMPA measures to protect those species, and based on the overall reductions in fishing effort in the Small-Mesh Multispecies FMP, this action is not expected to impact marine mammals in any manner not considered in previous consultations on this fishery. A final determination of consistency with the MMPA will be made by the agency when this action is approved.

7.4 Endangered Species Act (ESA)

Pursuant to section 7 of the Endangered Species Act (ESA), NOAA's National Marine Fisheries Service (NMFS) issued a Biological Opinion (Opinion) on May 27, 2021, that considered the effects of the NMFS' authorization of ten fishery management plans (FMP), NMFS' North Atlantic Right Whale Conservation Framework, and the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2, on ESA-listed species and designated critical habitat. The ten FMPs considered in the Opinion include the: (1) American lobster; (2) Atlantic bluefish; (3) Atlantic deep-sea red crab; (4) mackerel/squid/butterfish; (5) monkfish; (6) Northeast multispecies; (7) Northeast skate complex; (8) spiny dogfish; (9) summer flounder/scup/black sea bass; and (10) Jonah crab FMPs. The American lobster and Jonah crab FMPs are permitted and operated through implementing regulations compatible with the interstate fishery management plans (ISFMP) issued under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (ACA), the other eight FMPs are issued under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

The 2021 Opinion determined that the proposed action may adversely affect, but is not likely to jeopardize, the continued existence of North Atlantic right, fin, sei, or sperm whales; the Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead, leatherback, Kemp's ridley, or North Atlantic DPS of green sea turtles; any of the five DPSs of Atlantic sturgeon; Gulf of Maine DPS Atlantic salmon; or giant manta rays. The Opinion also concluded that the proposed action is not likely to adversely affect designated critical habitat for North Atlantic right whales, the Northwest Atlantic Ocean DPS of loggerhead sea turtles, U.S. DPS of smalltooth sawfish, Johnson's seagrass, or elkhorn and staghorn corals. An Incidental Take Statement (ITS) was issued in the Opinion. The ITS includes reasonable and prudent measures and their implementing terms and conditions, which NMFS determined are necessary or appropriate to minimize impacts of the incidental take in the fisheries assessed in this Opinion.

7.5 Administrative Procedure Act (APA)

Sections 551-553 of the Administrative Procedure Act established procedural requirements applicable to informal rulemaking by federal agencies. The purpose is to ensure public access to the federal rulemaking process, and to give public notice and opportunity for comment. The Council did not request relief from notice and comment rule making for this action and expects that NOAA Fisheries will publish proposed and final rule making for this action.

7.6 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to minimize paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. It also ensures that the Government is not overly burdening the public with information requests. This action does not propose to modify any existing collections, or to add any new collections; therefore, no review under the Paperwork Reduction Act is necessary.

7.7 COASTAL ZONE MANAGEMENT ACT (CZMA)

Section 307 of the Coastal Zone Management Act (CZMA) is known as the federal consistency provision. Federal Consistency review requires that "federal actions, occurring inside or outside of a state's coastal zone, that have a reasonable potential to affect the coastal resources or uses of that state's coastal zone, to be consistent with that state's enforceable coastal policies, to the maximum extent practicable." Once the Council has adopted final measures and submitted this 2021-2023 Specifications Document to NMFS, NMFS will request consistency reviews by CZM state agencies directly.

7.8 INFORMATION QUALITY ACT (IQA)

Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554, also known as the Data Quality Act or Information Quality Act) directed the Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by federal agencies." OMB directed each federal agency to issue its own guidelines, establish administrative mechanisms allowing affected persons to seek and obtain correction of information that does not comply with the OMB guidelines, and report periodically to OMB on the number and nature of complaints. The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the Data Quality Act. Information must meet standards of utility, integrity and objectivity. This section provides information required to address these requirements.

Utility of Information Product

The proposed 2021-2023 fishery specifications and management measures include: a description of the management issues to be addressed, statement of goals and objectives, a description of the proposed action and other alternatives/options considered, analyses of the impacts of the proposed specifications and other alternatives/options on the affected environment, and the reasons for selecting the preferred specifications. These proposed modifications implement the FMP's conservation and management goals consistent with the Magnuson-Stevens Fishery Conservation and Management Act as well as all other existing applicable laws.

Utility means that disseminated information is useful to its intended users. "Useful" means that the content of the information is helpful, beneficial, or serviceable to its intended users, or that the information supports the usefulness of other disseminated information by making it more accessible or easier to read, see, understand, obtain or use. The information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the measures proposed, and the impacts of those measures. A discussion of the reasons for selecting the proposed action is included so that intended users may have a full understanding of the proposed action and its implications. The intended users of the information contained in this document are participants in the small-mesh multispecies fishery and other interested parties and members of the general public. The information contained in this document may be useful to owners of vessels holding a small-mesh multispecies permit as well as small-mesh multispecies dealers and processors since it serves to notify these individuals of any potential changes to management measures for the fishery. This information will enable these individuals to adjust their fishing practices and make appropriate business decisions based on the new management measures and corresponding regulations.

Until a proposed rule is prepared and published, this document is the principal means by which the information herein is publicly available. The information provided in this document is based on the most recent available information from the relevant data sources, including detailed and relatively recent information on the small-mesh multispecies resource and, therefore, represents an improvement over

previously available information. This document will be subject to public comment through proposed rulemaking, as required under the Administrative Procedure Act and, therefore, may be improved based on comments received.

This document is available in several formats, including printed publication, and online through the NEFMC's web page (www.nefmc.org). The Federal Register notice that announces the proposed rule and the final rule and implementing regulations will be made available in printed publication, on the website for the Greater Atlantic Regional Fisheries Office (www.greateratlantic.fisheries.noaa.gov), and through the Regulations.gov website. The Federal Register documents will provide metric conversions for all measurements.

Integrity of Information Product

Integrity refers to security – the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification. Prior to dissemination, information associated with this action, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information. All electronic information disseminated by NMFS adheres to the standards set out in Appendix III, "Security of Automated Information Resources," of OMB Circular A-130; the Computer Security Act; and the Government Information Security Act. All confidential information (e.g. dealer purchase reports) is safeguarded pursuant to the Privacy Act; Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business, and financial information); the Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity of Information Product

Objective information is presented in an accurate, clear, complete, and unbiased manner, and in proper context. The substance of the information is accurate, reliable, and unbiased; in the scientific, financial, or statistical context, original and supporting data are generated and the analytical results are developed using sound, commonly accepted scientific and research methods. "Accurate" means that information is within an acceptable degree of imprecision or error appropriate to the kind of information at issue and otherwise meets commonly accepted scientific, financial, and statistical standards.

For purposes of the Pre-Dissemination Review, this document is a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the MSA; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing NEPA. This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Several data sources were used in the development of this action, including, but not limited to, historical and current landings data from the Commercial Dealer database, vessel trip report (VTR) data, At-sea Monitoring and Fishery Observer Program data, and fisheries independent data collected through the NMFS bottom trawl surveys. The analyses herein were prepared using data from accepted sources and have been reviewed by members of the Small-Mesh Multispecies Plan Development Team and by the SSC where appropriate.

Despite current data limitations, the conservation and management measures considered for this action were selected based upon the best scientific information available. The analyses important to this decision used information from the most recent complete calendar years, generally through fishing year 2019. The data used in the analyses provide the best available information on the number of permits, both active and inactive, in the fishery, the catch (including landings and discards) by those vessels, and the revenue produced by the sale of those landings to dealers, as well as data about catch, bycatch, gear, and fishing effort from a subset of trips sampled at sea by government observers.

Specialists (including professional members of PDTs, technical teams, committees, and Council staff) who worked with these data are familiar with the most current analytical techniques and with the available data and information relevant to the small-mesh multispecies fishery. The proposed action is supported by the best available scientific information. The policy choice is clearly articulated in Section 4.0, the management alternatives considered in this action.

The supporting science and analyses, upon which the policy choice was based, are summarized and described in the SAFE Report for Fishing Year 2019 (NEFMC 2020b) and Section 6.0 . All supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency. Specific analytic methods that were used to estimate potential impacts on the small-mesh multispecies and the public are presented in Section 6.1.1. The review process used in preparation involves the responsible Council, the NEFSC, GARFO, and NOAA Fisheries Service Headquarters. The NEFSC's technical review is conducted by senior-level scientists specializing in population dynamics, stock assessment, population biology, and social science.

The Council review process involves public meetings at which affected stakeholders have opportunity to comment on the document. Review by staff at GARFO is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. The Council also uses its SSC to review the background science and the New England and MidAtlantic Region Stock Assessment results to recommend the Overfishing Limits (OFLs) and Allocable Biological Catch (ABCs) relevant to the specifications in this document. The SSC is the primary scientific and technical advisory body to the Council and is made up of scientists who are independent of the Council.

Final approval of the action proposed in this document and clearance of any rules prepared to implement resulting regulations is conducted by staff at NOAA Fisheries Service Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget. In preparing this action for the Small-Mesh Multispecies FMP (a subset of the NE Multispecies FMP regulations), NMFS, the Administrative Procedure Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, the Information Quality Act, and Executive Orders 12630 (Property Rights), 12866 (Regulatory Planning), 13132 (Federalism), and 13158 (Marine Protected Areas). The Council has determined that the proposed action is consistent with the National Standards of the MSA and all other applicable laws.

7.9 Executive Order 13158 (Marine Protected Areas)

Executive Order (EO) 13158 on Marine Protected Areas (MPAs) requires each federal agency whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions, and, to the extent permitted by law and to the maximum extent practicable, in taking such actions, avoid harm to the natural and cultural resources that are protected by an MPA. The EO directs federal agencies to refer to the MPAs identified in a list of MPAs that meet the definition of MPA for the purposes of the EO. The EO requires that the Departments of Commerce and the Interior jointly publish and maintain such a list of MPAs. A list of MPA sites has been developed and is available at: http://marineprotectedareas.noaa.gov/nationalsystem/nationalsystemlist/. No further guidance related to this EO is available at this time.

In the Northeast U.S., the only MPAs are the Stellwagen Bank National Marine Sanctuary (SBNMS), the Tilefish Gear Restricted Areas (TGRA) in the canyons of Georges Bank, and the National Estuarine Research Reserves and other coastal sites. The only MPAs that overlap the small-mesh multispecies fishery footprint is the SBNMS and the TGRA.

This action is not expected to more than minimally affect the biological/habitat resources of the SBNMS and the TGRA MPAs, which was comprehensively analyzed in the Omnibus Habitat Amendment 2 (NEFMC 2016). Fishing gears that are used by the small-mesh multispecies fishery and regulated by the Northeast Multispecies FMP are unlikely to damage shipwrecks and other cultural artifacts because fishing vessel operators avoid contact with cultural resources on the seafloor to minimize costly gear losses and interruptions to fishing.

7.10 Executive Order 13132 (Federalism)

Executive Order 131321 on federalism established nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. However, no federalism issues or implications have been identified relative to the measures proposed in this action, thus preparation of an assessment under EO 13132 is unwarranted. The affected states have been closely involved in the development of the proposed action through their representation on the Council. All affected states are represented as voting members of at least one Regional Fishery Management Council. No comments were received from any state officials relative to any federalism implications associated with this action.

7.11 Executive Order 12898 (Environmental Justice)

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations provides guidelines to ensure that potential impacts on these populations are identified and mitigated, and that these populations can participate effectively in the NEPA process (EO 12898 1994). The NOAA NAO 216-6, at Section 7.02, states that "consideration of E.O. 12898 should be specifically included in the NEPA documents for decision-making purposes." Agencies should also encourage public participation, especially by affected communities, during scoping, as part of a broader strategy to address environmental justice issues. Minority and low-income individuals or populations must not be excluded from participation in, denied the benefits of, or subjected to discrimination because of their race, color, or national origin.

Although the impacts of this action may affect communities with environmental justice concerns, the proposed actions should not have disproportionately high effects on low income or minority populations. The proposed actions would apply to all participants in the affected area, regardless of minority status or income level. The existing demographic data on participants in the small-mesh multispecies fishery (i.e., vessel owners, crew, dealers, processors, employees of supporting industries) do not allow identification of those who are classified as below the poverty level or who are racial or ethnic minorities. Thus, it is impossible to fully determine how the actions within this specification document may impact these population segments. The public comment process is an opportunity to identify issues that may be related to environmental justice, but none have been raised relative to this action.

For the top port communities relevant to this action (Section 5.6 and Table 20), poverty and minority rate data at the state and county levels are in Table 46. Generally, their minority population rates are below those of all states' averages. Only Essex and Suffolk counties in Massachusetts have minority rates higher than the states' averages. Similarly, counties important for small-mesh multispecies fishing have poverty rates generally lower than the state averages. Bristol and Suffolk counties in Massachusetts have poverty rates higher than the state average.

With respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. GARFO tracks these issues, but there are no federally recognized tribal agreements for subsistence fishing in federal waters off New England.

Table 46. Demographic data for small-mesh multispecies fishing communities (counties).

State/County	Minority Rate[a]	Poverty Rate[b]
New Hampshire	7.8%	7.8%
Rockingham	6.0%	4.7%
Massachusetts	23.6%	10.5%
Barnstable	8.6%	7.5%
Bristol	13.5%	11.3%
Essex	24.3%	10.1%
Suffolk	38.5%	17.5%
Rhode Island	23.5%	12.2%
Washington	7.9%	7.4%
Connecticut	20.0%	10.4%
New London	16.4%	9.8%
New York	30.3%	13.6%
Suffolk	15.6%	7.3%

Source: U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states.html
[a] Persons other than those who report as White persons not Hispanic.
[b] Persons below poverty level, 2006-2010.

7.12 Regulatory Flexibility Act (RFA)

The purpose of the Regulatory Flexibility Act (RFA) is to reduce the impacts of regulations and recordkeeping requirements on small businesses. To achieve this goal, the RFA requires Federal agencies to describe and analyze the effects of proposed regulations, and possible alternatives, on small business entities. To this end, this document contains an RFA, found below, which includes an assessment of the effects that the Proposed Action and other alternatives are expected to have on small entities.

Under Section 603(b) of the RFA, an RFA must describe the impact of the proposed rule on small entities and contain the following information:

1. A description of the reasons why the action by the agency is being considered.
2. A succinct statement of the objectives of, and legal basis for, the proposed rule.
3. A description—and, where feasible, an estimate of the number—of small entities to which the proposed rule will apply.
4. A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the types of professional skills necessary for preparation of the report or record.
5. An identification, to the extent practicable, of all relevant federal rules that may duplicate, overlap, or conflict with the proposed rule.

7.12.1 Reasons for Considering the Action

The purpose and need for this action are presented in Section 3.2.

7.12.2 Objectives and Legal Basis for the Action

The objectives for this action are presented in Section 3.2, and the legal basis is in Section 7.0.

7.12.3 Description and Estimate of Small Entities to Which the Rule Applies

For RFA purposes only, NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (see 50 CFR § 200.2). A business primarily engaged in commercial fishing (NAICS code 11411) is classified as a small business if it is independently owned and operated, and including its affiliates, is not dominant in its field of operation, and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide.

Description of regulated entities. Entities regulated by the proposed action are commercial fishing businesses issued open-access (small-mesh) multispecies permits. As of June 1, 2020 NMFS had issued 798 commercial open-access (small-mesh) permits; therefore, 798 permits are regulated by this action. Each vessel may be individually owned or part of a larger corporate ownership structure, and for RFA purposes, it is the ownership entity that is ultimately regulated by the proposed action. Ownership entities are identified on June 1st of each year based on the list of all permit numbers, for the most recent complete calendar year, that have applied for any type of Northeast Federal fishing permit. The current ownership data set is based on calendar year 2019 permits and contains gross sales associated with those permits for calendar years 2017 through 2019.

Number of regulated entities. Ownership data collected from permit holders indicates that there are 627 distinct business entities that hold at least one permit regulated by the proposed action. Of these 627 entities, all are engaged primarily in commercial fishing, and 106 did not have revenues (were inactive in 2019). 618 are categorized as small entities and 9 are categorized as large entities, per the NMFS guidelines.

Certification. The purpose of the Regulatory Flexibility Analysis (RFA) is to reduce the impacts of burdensome regulations and record-keeping requirements on small businesses. To achieve this goal, the RFA requires government agencies to describe and analyze the effects of regulations and possible alternatives on small business entities. Based on this information, the Regulatory Flexibility Analysis determines whether the preferred alternative would have a "significant economic impact on a substantial number of small entities." The overall impact of the proposed action is estimated to be positive for all regulated entities, with no adverse impact on a substantial number of small entities. The Chief Counsel for Regulation of the Department of Commerce certified to the Chief Counsel for Advocacy of the Small Business Administration (SBA) that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities.

7.12.4 Record Keeping and Reporting Requirements

There are no additional record keeping or reporting requirements associated with this action.

7.12.5 Duplication, Overlap, or Conflict with Other Federal Rules

No relevant Federal rules have been identified that would be duplicated overlapped or in conflict with the proposed rule.

7.12.6 Summary of the Proposed Action and Significant Alternatives

During the development of preferred alternatives for 2021-2023 specifications, NMFS and the Council considered ways to reduce the regulatory burden on and provide flexibility to the regulated community.

The measures that would be implemented by the new specifications would increase the long-term economic benefits on small entities. The proposed action would adjust the annual catch limits and related specifications to account for recent trends in stock biomass, and discards and state water landings of small-mesh multispecies. The preferred alternatives would also reset the northern red hake TAL trigger to its original value and increase whiting possession limits for vessels fishing with less than 3-inch mesh trawls (often targeting other species such as squid and herring).

Overall, the 2021-2023 specifications would ensure that catch levels are sustainable, reduce the risk of overfishing, and contribute to rebuilding southern red hake stock, and therefore, maximize yield. The increases in catch limits, the TAL trigger, and whiting possession limits are expected to have an immediate low positive economic gain and a low positive long-term economic gain.

7.13 Executive Order 12866 (Regulatory Planning and Review)

The purpose of E.O 12866 is to enhance planning and coordination with respect to new and existing regulations. This E.O. requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be "significant." E.O. 12866 requires a review of proposed regulations to determine whether the expected effects would be significant, where a significant action is any regulatory action that may:

- *Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;*
- *Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;*
- *Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or*
- *Raise novel legal or policy issues arising out of legal mandates, the President's priorities, of the principles set forth in the Executive Order.*

In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, include the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider.

7.13.1 Statement of the Problem/Goals and Objectives

Problem, goals, and objectives are explained in Section 3.2.

7.13.2 Management Alternatives and Rationale

The alternatives under consideration are explained in Section 4.0. Three actions are proposed and their alternatives are analyzed by this EA. Action 1 would change the annual catch limits and associated specifications to be consistent with changes in stock size. Alternative 2 is preferred to prevent overfishing and reduce the risk of a stock to become overfished. Alternative 2 Option B is preferred to be consistent with the Framework 62 rebuilding plan for overfished southern red hake. Alternative 2 in Action 2 would reset the northern red hake accountability measure trigger to its original value. Northern red hake stock biomass and catch rates have increased, so that keeping landings to a smaller fraction (as in Alternative 1) of the annual catch limit is no longer needed. Moreover, Alternative 2 could reduce northern red hake

discards and allow the fishery to land greater amounts of northern red hake for a longer duration during the fishing year.

7.13.3 Description of the Fishery

A description of the fishery is available in Sections 5.2 and 5.6.

7.13.4 Summary of Impacts

The expected short term economic effects of each specification alternative relative to no action for the small-mesh multispecies fishery are discussed throughout Section 6.6.1 and the preferred alternatives are summarized below.

1) Section 6.6.1.2: Alternative 2 (2021-2023 Specification with Option B on ABC; Preferred). The proposed changes in specifications are expected to increase ex-vessel revenues by a maximum of $4.2 to 7.6 million relative to No Action (Table 37). In actuality the fishing fleet has been underutilizing the whiting resource (i.e. catch is less than the annual catch limit) due to technical, regulatory, and market constraints. Thus, neither whiting catch nor landings is expected to rise as much as the new specifications will allow.

2) Section 6.6.2.2: Alternative 2 - Restore the Northern Red Hake TAL trigger to 90% (Preferred) Compared to No Action, Alternative 2 is expected to have a slightly positive impact from increased landing of targeted and non-targeted northern red hakes by reducing regulatory discards. The measure will increase revenue from red hake by about $17,000 (Table 38).

3) Section 6.6.3.3: Alternative 3 – Increase the Possession Limit to 15,000 lbs. for vessels using trawls with less than 3-inch mesh (Preferred) would establish a single possession limit for mesh less than 3-inches and would potentially reduce regulatory discards while fishing for other species (such as herring and squid), allowing vessels to land some additional whiting (by an estimated 106,000 to 159,000 lbs.).
   The economic impact of this alternative range between $81,000 to $121,000 (Table 39). This alternative could also shift some fishing effort from other small-mesh fisheries, e.g. herring and squid, to the whiting fishery.

The combined economic impacts of these alternatives compared to taking no action, therefore, could increase ex-vessel revenues by as much as $4.3 to $7.7 million, but it is expected to rise much less than this due to reasons stated above.

7.13.5 Determination of Significance

Based on the analyses provided in this document, the adjustments to fishery specifications for 2021-2023 do not constitute a “significant regulatory action.” This action will not have an impact of $100 million or more on the economy, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities. It also does not raise novel legal and policy issues and does not interfere with an action taken or planned by another agency. Finally, it does not materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients. As such, the Proposed Action is not considered significant as defined by EO 12866.

8.0 GLOSSARY

Area based management – In contrast to resource wide allocations of TAC or days, vessels would receive authorization to fish in specific areas, consistent with that area's status, productivity, and environmental characteristics.

ABC – "Acceptable biological catch" means a level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of OFL.

ACL – "Annual catch limit" is the level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures (AMs).

Adult stage – One of several marked phases or periods in the development and growth of many animals. In vertebrates, the life history stage where the animal is capable of reproducing, as opposed to the juvenile stage.

Adverse effect – Any impact that reduces quality and/or quantity of EFH. May include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include sites-specific of habitat wide impacts, including individual, cumulative, or synergistic consequences of actions.

Aggregation – A group of animals or plants occurring together in a particular location or region.

AMs – "Accountability measures" are management controls that prevents ACLs or sector ACLs from being exceeded, where possible, and correct or mitigate overages if they occur.

Amendment – a formal change to a fishery management plan (FMP). The Council prepares amendments and submits them to the Secretary of Commerce for review and approval. The Council may also change FMPs through a "framework adjustment procedure".

Availability – refers to the distribution of fish of different ages or sizes relative to that taken in the fishery.

Benthic community – Benthic means the bottom habitat of the ocean and can mean anything as shallow as a salt marsh or the intertidal zone, to areas of the bottom that are several miles deep in the ocean. Benthic community refers to those organisms that live in and on the bottom.

Biological Reference Points – specific values for the variables that describe the state of a fishery system which are used to evaluate its status. Reference points are most often specified in terms of fishing mortality rate and/or spawning stock biomass.

Biomass – The total mass of living matter in a given unit area or the weight of a fish stock or portion thereof. Biomass can be listed for beginning of year (Jan-1), Mid-Year, or mean (average during the entire year). In addition, biomass can be listed by age group (numbers at age * average weight at age) or summarized by groupings (e.g., age 1+, ages 4+ 5, etc.). See also spawning stock biomass, exploitable biomass, and mean biomass.

Biota – All the plant and animal life of a particular region.

Bivalve – A class of mollusks having a soft body with plate like gills enclosed within two shells hinged together; e.g., clams, mussels.

Bottom tending mobile gear – All fishing gear that operates on or near the ocean bottom that is actively worked in order to capture fish or other marine species. Some examples of bottom tending mobile gear are otter trawls and dredges.

Bottom tending static gear – All fishing gear that operates on or near the ocean bottom that is not actively worked; instead, the effectiveness of this gear depends on species moving to the gear which is set in a particular manner by a vessel, and later retrieved. Some examples of bottom tending static gear are gillnets, traps, and pots.

B_{MSY} – the stock biomass that would produce maximum sustainable yield (MSY) when fished at a level equal to F_{MSY}. For most stocks, B_{MSY} is about ½ of the carrying capacity.

Bycatch(v.) the capture of non-target species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program. Target species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program.

Capacity – the level of output a fishing fleet is able to produce given specified conditions and constraints. Maximum fishing capacity results when all fishing capital is applied over the maximum amount of available (or permitted) fishing time, assuming that all variable inputs are utilized efficiently.

Catch – The sum total of fish killed in a fishery in a given period. Catch is given in either weight or number of fish and may include landings, unreported landings, discards, and incidental deaths.

Coarse sediment – Sediment generally of the sand and gravel classes; not sediment composed primarily of mud; but the meaning depends on the context, e.g. within the mud class, silt is coarser than clay.

Continental shelf waters – The waters overlying the continental shelf, which extends seaward from the shoreline and deepens gradually to the point where the sea floor begins a slightly steeper descent to the deep ocean floor; the depth of the shelf edge varies, but is approximately 200 meters in many regions.

Council – New England Fishery Management Council (NEFMC).

CPUE – Catch per unit effort. This measure includes landings and discards (live and dead), often expressed per hour of fishing time, per day fished, or per day-at-sea.

DAS – A day-at-sea is an allocation of time that a vessel may be at-sea on a fishing trip. For vessels with VMS equipment, it is the cumulative time that a vessel is seaward of the VMS demarcation line. For vessels without VMS equipment, it is the cumulative time between when a fisherman calls in to leave port to the time that the fisherman calls in to report that the vessel has returned to port.

Demersal species – Most often refers to fish that live on or near the ocean bottom. They are often called benthic fish, groundfish, or bottom fish.

Discards – animals returned to sea after being caught; see Bycatch (n.)

Environmental Assessment (EA) – an analysis of the expected impacts of a fishery management plan (or some other proposed federal action) on the environment and on people, initially prepared as a "Draft" (DEA) for public comment. The Final EA is referred to as the Final Environmental Assessment (FEA).

Essential Fish Habitat– Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal

text definition and geographical area that are described in the Habitat Omnibus Amendment (1998). Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998) maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998).

Exclusive Economic Zone – for the purposes of the Magnuson-Stevens Fishery Conservation and Management Act, the area from the seaward boundary of each of the coastal states to 200 nautical miles from the baseline.

Exempted fisheries – Any fishery determined by the Regional Director to have less than 5 percent regulated species as a bycatch (by weight) of total catch according to 50 CFR 648.80(a)(7).

Exploitation Rate – the percentage of catchable fish killed by fishing every year. If a fish stock has 1,000,000 fish large enough to be caught by fishing gear and 550,000 are killed by fishing during the year, the annual exploitation rate is 55%.

Fathom – A measure of length, containing six feet; the space to which a man can extend his arms; used chiefly in measuring cables, cordage, and the depth of navigable water by soundings.

Final preferred alternative – The management alternative chosen by the Council in the final amendment, submitted to the Secretary of Commerce for approval and if approved publication as a proposed rule.

Fishing effort – the amount of time and fishing power used to harvest fish. Fishing power is a function of gear size, boat size and horsepower.

Fishing Mortality (F) – (see also exploitation rate) a measurement of the rate of removal of fish from a population by fishing. F is that rate at which fish are harvested at any given point in time. ("Exploitation rate" is an annual rate of removal, "F" is an instantaneous rate.)

F_{MSY} – a fishing mortality rate that would produce the maximum sustainable yield from a stock when the stock biomass is at a level capable of producing MSY on a continuing basis.

FMAX – the fishing mortality rate that produces the maximum level of yield per recruit. This is the point beyond which growth overfishing begins.

FMP (Fishery Management Plan) – a document that describes a fishery and establishes measures to manage it. This document forms the basis for federal regulations for fisheries managed under the regional Fishery Management Councils. The New England Fishery Management Council prepares FMPs and submits them to the Secretary of Commerce for approval and implementation.

Framework adjustments: adjustments within a range of measures previously specified in a fishery management plan (FMP). A change usually can be made more quickly and easily by a framework adjustment than through an amendment. For plans developed by the New England Council, the procedure requires at least two Council meetings including at least one public hearing and an evaluation of environmental impacts not already analyzed as part of the FMP.

$F_{threshold}$ – 1) The maximum fishing mortality rate allowed on a stock and used to define overfishing for status determination. 2) The maximum fishing mortality rate allowed for a given biomass as defined by a control rule.

Growth Overfishing – the situation existing when the rate of fishing mortality is above FMAX and then the loss in fish weight due to mortality exceeds the gain in fish weight due to growth.

Individual Fishing Quota (IFQ) – A Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by an individual person or entity

Landings – The portion of the catch that is harvested for personal use or sold.

Larvae (or Larval) stage – One of several marked phases or periods in the development and growth of many animals. The first stage of development after hatching from the egg for many fish and invertebrates. This life stage looks fundamentally different than the juvenile and adult stages and is incapable of reproduction; it must undergo metamorphosis into the juvenile or adult shape or form.

Limited Access – a management system that limits the number of participants in a fishery. Usually, qualification for this system is based on historic participation, and the participants remain constant over time (with the exception of attrition).

Limited-access permit – A permit issued to vessels that met certain qualification criteria by a specified date (the "control date").

LPUE – Landings per unit effort. This measure is the same as CPUE but excludes discards.

Maximum Sustainable Yield (MSY) – the largest average catch that can be taken from a stock under existing environmental conditions.

Mesh selectivity (ogive) – A mathematical model used to describe the selectivity of a mesh size (proportion of fish at a specific length retained by mesh) for the entire population. L25 is the length where 25% of the fish encountered are retained by the mesh. L50 is the length where 50% of the fish encountered are retained by the mesh.

Meter – A measure of length, equal to 39.37 English inches, the standard of linear measure in the metric system of weights and measures. It was intended to be, and is very nearly, the ten millionth part of the distance from the equator to the north pole, as ascertained by actual measurement of an arc of a meridian.

Metric ton – A unit of weight equal to a thousand kilograms (1kgs = 2.2 lb.). A metric ton is equivalent to 2,204.6 lb. A thousand metric tons is equivalent to 2.204 million lb.

Minimum Biomass Level – the minimum stock size (or biomass) below which there is a significantly lower chance that the stock will produce enough new fish to sustain itself over the long-term.

Mortality – Noun, either referring to fishing mortality (F) or total mortality (Z).

Multispecies – the group of species managed under the Northeast Multispecies Fishery Management Plan. This group includes whiting, red hake and ocean pout plus the regulated species (cod, winter flounder, witch flounder, American plaice, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish).

Natural Mortality (M) – a measurement of the rate of fish deaths from all causes other than fishing such as predation, cannibalism, disease, starvation, and pollution; the rate of natural mortality may vary from species to species.

Non-preferred alternative - All alternatives in the final amendment that were not chosen as a “final preferred alternative” are by definition non-preferred alternatives.

Northeast Shelf Ecosystem – The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream.

Northern stock area – for red and silver hake, fish are assumed to be in the southern stock area when the catches originate from fishing in statistical areas 464 to 515, or area 561. See map at http://www.nero.noaa.gov/nero/fishermen/charts/stat1.html.

Observer – Any person required or authorized to be carried on a vessel for conservation and management purposes by regulations or permits under this Act

OFL – "Overfishing limit" means the annual amount of catch that corresponds to the estimate of the maximum fishing mortality threshold applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish.

Open access – Describes a fishery or permit for which there is no qualification criteria to participate. Open-access permits may be issued with restrictions on fishing (for example, the type of gear that may be used or the amount of fish that may be caught).

Optimum Yield (OY) – the amount of fish which-

a) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of

b) marine ecosystems, is prescribed as such on the basis of the maximum sustainable yield from the fishery,

c) as reduced by any relevant economic, social, or ecological factor; and in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overfished – A conditioned defined when stock biomass is below minimum biomass threshold and the probability of successful spawning production is low.

Overfishing – A level or rate of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis.

PDT (Plan Development Team) – a group of technical experts responsible for developing and analyzing management measures under the direction of the Council; the Council has a Whiting PDT that meets to discuss the development of this FMP.

Preferred alternative – An alternative that was favored by the Council in the draft amendment document and DEA based on analysis available at that time and based on input from the Whiting Advisory Panel.

Proposed Rule – a federal regulation is often published in the Federal Register as a proposed rule with a time period for public comment. After the comment period closes, the proposed regulation may be changed or withdrawn before it is published as a final rule, along with its date of implementation and response to comments.

Rebuilding Plan – a plan designed to increase stock biomass to the BMSY level within no more than ten years (or 10 years plus one mean generation period) when a stock has been declared overfished.

Recruitment overfishing – fishing at an exploitation rate that reduces the population biomass to a point where recruitment is substantially reduced.

Recruitment – the amount of fish added to the fishery each year due to growth and/or migration into the fishing area. For example, the number of fish that grow to become vulnerable to fishing gear in one year would be the recruitment to the fishery. "Recruitment" also refers to new year classes entering the population (prior to recruiting to the fishery).

Regulated groundfish species – cod, winter flounder, witch flounder, American plaice, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish. These species are usually targeted with large-mesh net gear.

Relative exploitation – an index of exploitation derived by dividing landings by trawl survey biomass. This variable does not provide an estimate of the proportion of removals from the stock due to fishing but allows for general statements about trends in exploitation.

Sediment – Material deposited by water, wind, or glaciers.

Small-mesh multispecies – red hake, silver hake, and offshore hake

Small-mesh trawls – specified trawls that are exempt from large-mesh fishery regulations pertaining to trawl with cod end mesh greater than 5.5- or 6-inches square or diamond.

Southern stock area – for red and silver hake, fish are assumed to be in the southern stock area when the catches originate from fishing in statistical areas 521 to 543, area 562, or areas 611 to 639. See map at http://www.nero.noaa.gov/nero/fishermen/charts/stat1.html.

Spawning stock biomass (SSB) – the total weight of fish in a stock that sexually mature, i.e., are old enough to reproduce.

Status Determination Criteria – objective and measurable criteria used to determine if overfishing is occurring or if a stock is in an overfished condition according to the National Standard Guidelines.

Stock assessment – An analysis for determining the number (abundance/biomass) and status (life-history characteristics, including age distribution, natural mortality rate, age at maturity, fecundity as a function of age) of individuals in a stock

Stock – A grouping of fish usually based on genetic relationship, geographic distribution, and movement patterns. A region may have more than one stock of a species (for example, Gulf of Maine cod and Georges Bank cod). A species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

Surplus production models – A family of analytical models used to describe stock dynamics based on catch in weight and CPUE time series (fishery dependent or survey) to construct stock biomass history. These models do not require catch at age information. Model outputs may include trends in stock biomass, biomass weighted fishing mortality rates, MSY, F_{MSY}, B_{MSY}, K, (maximum population biomass where stock growth and natural deaths are balanced) and r (intrinsic rate of increase).

Surplus production – Production of new stock biomass defined by recruitment plus somatic growth minus biomass loss due to natural deaths. The rate of surplus production is directly proportional to stock biomass and its relative distance from the maximum stock size at carrying capacity (K). B_{MSY} is often defined as the biomass that maximizes surplus production rate.

Survival rate (S) – Rate of survival expressed as the fraction of a cohort surviving the a period compared to number alive at the beginning of the period (# survivors at the end of the year / numbers alive at the beginning of the year). Pessimists convert survival rates into annual total mortality rate using the relationship A=1-S.

Survival ratio (R/SSB) – an index of the survivability from egg to age-of-recruitment. Declining ratios suggest that the survival rate from egg to age-of-recruitment is declining.

TAL – Total allowable landings, which for whiting management is equivalent to the ACL The Federal TAL pertains to landings taken by Federally permitted vessels and excludes landings made by vessel with no Federal permits that fish in state waters. The Federal TAL pertains to landings taken by Federally permitted vessels and excludes landings made by vessel with no Federal permits that fish in state waters

Ten-minute- "squares" of latitude and longitude (TMS) – A measure of geographic space. The actual size of a ten-minute-square varies depending on where it is on the surface of the earth, but in general each square is approximately 70-80 square nautical miles at 40° of latitude. This is the spatial area that EFH designations, biomass data, and some of the effort data have been classified or grouped for analysis.

Total mortality – The rate of mortality from all sources (fishing, natural, pollution) Total mortality can be expressed as an instantaneous rate (called Z and equal to F + M) or Annual rate (called A and calculated as the ratio of total deaths in a year divided by number alive at the beginning of the year)

Year class (or cohort) – Fish that were spawned in the same year. By convention, the "birth date" is set to January 1st and a fish must experience a summer before turning 1. For example, winter flounder that were spawned in February-April 1997 are all part of the 1997 cohort (or year-class). They would be considered age 0 in 1997, age 1 in 1998, etc. A summer flounder spawned in October 1997 would have its birth date set to the following January 1 and would be considered age 0 in 1998, age 1 in 1999, etc.

9.0 REFERENCES

Atlantic States Marine Fisheries Commission (ASMFC). 2007. Special Report to the Atlantic Sturgeon Management Board: Estimation of Atlantic sturgeon bycatch in coastal Atlantic commercial fisheries of New England and the Mid-Atlantic. August 2007. 95 pp.

Atlantic States Marine Fisheries Commission (ASMFC). 2017. 2017 Atlantic sturgeon benchmark stock assessment and peer review report. October 18, 2017. 456 pp.

Benjamin S, Lee MY and DePiper G. 2018. Visualizing fishing data as rasters. NEFSC Ref Doc 18-12. 24 pp. URL: https://repository.library.noaa.gov/view/noaa/23030.

Bowman, R.E. 1984. Food of silver hake, Merluccius bilinearis. Fish. Bull. (U.S.) 82: 21-35.

Brodziak, J.K.T., E.M. Holmes, K.A. Sosebee, and R.K. Mayo. 2001. Assessment of the silver hake resource in the Northwest Atlantic in 2000. Northeast Fish. Sci. Cent. Ref. Doc. 01-03.

Chang S, Berrien PL, Johnson DL, Zetlin CA. 1999. Essential fish habitat source document: Offshore Hake, Merluccius albidus, life history and habitat characteristics. NOAA Tech Memo 1999; NMFS NE 130: 24 p. URL: http://www.nefsc.noaa.gov/nefsc/publications/tm/tm130/

Cole, T.V.N. and A.G., Henry. 2013b. Serious injury determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast and Atlantic Canadian Provinces, 2007-2011. Northeast Fish Sci Cent Ref Doc. 13-24; 14 p.

DePiper Geret S. 2014. Statistically assessing the precision of self-reported VTR fishing locations. NOAA Tech. Memo. NMFS-NE-229. 22 pp. URL: https://repository.library.noaa.gov/view/noaa/4806.

Garrison, L.P. and J.S. Link. 2000. Dietary guild structure of the fish community in the Northeast United States continental shelf ecosystem. Mar. Ecol. Prog. Ser. 202:231-240. URL: http://www.int-res.com/abstracts/meps/v202/.

Grabowski, J. H., M. Bachman, C. Demarest, S. Eayrs, B. P. Harris, V. Malkoski, D. Packer and D. Stevenson. 2014. Assessing the Vulnerability of Marine Benthos to Fishing Gear Impacts. Reviews in Fish. Sci. & Aquaculture: 142-155.

Hare JA, Morrison WE, Nelson MW, Stachura MM, Teeters EJ, Griffis RB et al. 2016. A vulnerability assessment of fish and invertebrates to climate change on the Northeast U.S. Continental Shelf. PLoS ONE 11(2): e0146756.

Hayes, S.A., E. Josephson, K. Maze-Foley, and P. E. Rosel. 2017. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments 2016. NOAA Technical Memorandum NMFS-NE-241.

Hayes, S.A, E. Josephson, K. Maze-Foley, and P. Rosel. 2018. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment-2017. NOAA Technical Memorandum NMFS-NE-245.

Klein-MacPhee G. 2002. Fishes of the Gulf of Maine, 3rd edition. In: BB Collete, G Klein-MacPhee (editors), Smithsonian Institution Press, Washington D.C.; 882 p.

Kocik. J.F., S.E. Wigley, and D. Kircheis. 2014. Annual Bycatch Update Atlantic Salmon 2013 U.S. Atlantic Salmon Assessment Committee Working Paper 2014:05. Old Lyme, CT. 6 pp. (cited with permission of authors).

Lock MC and D.B. Packer. 2004. Essential fish habitat source document: Silver hake, Merluccius bilinearis, life history and habitat characteristics, 2nd edition. NOAA Tech Memo NMFS NE 186; 68 p.

Lyssikatos, M.C., S. Chavez-Rosales, and J. Hatch. 2020. Estimates of cetacean and pinniped bycatch in Northeast and Mid-Atlantic bottom trawl fisheries, 2013-2017. Northeast Fish Sci Cent Ref Doc. 20-04; 11 p.

Miller, T. and G. Shepard. 2011. Summary of Discard Estimates for Atlantic Sturgeon. Northeast Fisheries Science Center, Population Dynamics Branch, August 2011.

Murray, K. T. 2007. Estimated bycatch of loggerheaed sea turtles (*Caretta caretta*) in U.S. mid-Atlantic scallop trawl gear, 2004-2005, and in scallop dredge gear, 2005. Northeast Fisheries Science Center Reference Document No. 07-04. Report No. 07-04.

Murray K.T. 2008. Estimated Average Annual Bycatch of Loggerhead Sea Turtles (*Caretta caretta*) in U.S. Mid-Atlantic Bottom Otter Trawl Gear, 1996–2004. Northeast Fisheries Science Center Reference Document 08-20. 32 p.

Murray K.T. 2015. The importance of location and operational fishing factors in estimating and reducing loggerhead turtle (Caretta caretta) interactions in US bottom trawl gear. *Fisheries Research. 172*: 440-451.

Murray KT. 2020. Estimated magnitude of sea turtle interactions and mortality in US bottom trawl gear, 2014-2018. NOAA Tech Memo NMFS NE. 260; 19 p.

Murray, K. T. and C. D. Orphanides. 2013. Estimating the risk of loggerhead turtle Caretta caretta bycatch in the U.S. Mid-Atlantic using fishery-independent and -dependent data. Marine Ecol. Prog. Ser. 477: 259-270

National Marine Fisheries Service (NMFS). 2013. Endangered Species Act Section 7 Consultation on the Continued Implementation of Management Measures for the Northeast Multispecies, Monkfish, Atlantic Bluefish, Northeast Skate Complex, Mackerel/Squid/Butterfish, and Summer Flounder/ Scup/Black Sea Bass Fisheries. URL: http://www.greateratlantic.fisheries.noaa.gov/protected/section7/bo/actbiops/batchedfisheriesopinionfinal121613.pdf.

NMFS. 2020. Procedural Guidance for Changing Assessed Stock Status from Known to Unknown. National Marine Fisheries Service Procedure 01-101-11.

New England Fishery Management Council (NEFMC). 1995. Framework Adjustment 9 to the Northeast Multispecies Fishery Management Plan. 61 pp. URL: https://s3.amazonaws.com/nefmc.org/Groundfish_Framework_9.pdf.

NEFMC. 1998. Omnibus Habitat Amendment 1. 388 pp. URL: http://archive.nefmc.org/habitat/planamen/original_omnibus/EFH_amendment2.htm.

NEFMC. 1999. Framework Adjustment 32 to the Northeast Multispecies Fishery Management Plan: To modify the whiting mesh size/possession limit enrollment program and to allow the use of a net strengthener with 2.5-inch mesh. 48 pp. URL: https://s3.amazonaws.com/nefmc.org/final_fw32.pdf.

NEFMC. 2000a. Framework Adjustment 35 to the Northeast Multispecies Fishery Management Plan: To Establish a Seasonal Whiting Raised Footrope Trawl Fishery in Upper Cape Cod Bay. 70 pp. URL: https://s3.amazonaws.com/nefmc.org/framework_35.pdf.

NEFMC. 2000b. Final Amendment 12 to the Northeast Multispecies FMP. 331 pp. URL: http://s3.amazonaws.com/nefmc.org/GFAmend12.pdf.

NEFMC. 2003. Framework Adjustment 38 to the Northeast Multispecies Fishery Management Plan: To Establish an Exempted Grate Raised Footrope Trawl Fishery in the Inshore Gulf of Maine. 74 pp. URL: https://s3.amazonaws.com/nefmc.org/whiting_fw-38.PDF .

NEFMC. 2004. Final Amendment 13 to the Northeast Multispecies FMP. 1728 pp. URL: http://s3.amazonaws.com/nefmc.org/Final-Amendment-13-SEISVol.-I-II.pdf.

NEFMC. 2011. The Swept Area Seabed Impact (SASI) approach: a tool for analyzing the effects of fishing on Essential Fish Habitat. IN: Omnibus Essential Fish Habitat Amendment 2 Final Environmental Impact Statement (2016). Newburyport, MA, New England Fishery Management Council: 257p. URL: Appendix_D_Swept_Area_Seabed_Impact_approach_171011_091330.pdf.

NEFMC. 2012. Final Amendment 19 to the Northeast Multispecies FMP (Small-mesh Multispecies) Environmental Assessment, Regulatory Impact Review and Initial Regulatory Flexibility Analysis. 308 pp. URL: http://s3.amazonaws.com/nefmc.org/Final_Amendment_19.pdf.

NEFMC. 2017. Omnibus Essential Fish Habitat Amendment 2, Final Environmental Impact Statement, vols 1-6. 489 pp. URL: https://www.nefmc.org/library/omnibus-habitat-amendment-2.

NEFMC. 2018a. Draft Amendment 22 to the Northeast Multispecies FMP (Small-mesh Multispecies) Environmental Assessment, Regulatory Impact Review and Initial Regulatory Flexibility Analysis. 308 pp. URL: https://s3.amazonaws.com/nefmc.org/Amendment-22-DEIS-revised.pdf.

NEFMC. 2018b. Small-Mesh Multispecies Fishing Year 2018-2020 Specifications Environmental Assessment Regulatory Impact Review and Initial Regulatory Flexibility Analysis. 216 pp. URL: https://s3.amazonaws.com/nefmc.org/2018-2020-Specifications-Document-final.pdf.

NEFMC. 2020a. Framework Adjustment 62 for Whiting, Red Hake, & Offshore Hake, Including an Environmental Assessment and Regulatory Flexibility Analysis. 216 pp. Preliminary Submission: https://s3.amazonaws.com/nefmc.org/200812_Whiting_FW62.pdf.

NEFMC. 2020b. Terms of Reference – Overfishing levels (OFLs) and acceptable biological catch (ABC) recommendations for small-mesh multispecies stocks for fishing years 2021 to 2023. Memo from the Scientific and Statistical Committee to Tom Nies, Executive Director. 14 pp. URL: https://s3.amazonaws.com/nefmc.org/SSC_response_HakeSpecies_Nov2020_FINAL.pdf .

NEFMC. 2020c. Stock Assessment and Fishery Evaluation (SAFE) Report for Fishing Years 2017-2019. 43 pp. Draft: https://s3.amazonaws.com/nefmc.org/3_Stock-Assessment-and-Fishery-Evaluation-SAFE-Report.pdf.

NEFMC. 2021. Framework Adjustment 8 and 2021-2023 Atlantic Herring Fishery Specifications Including an Environmental Assessment and Initial Regulatory Flexibility Analysis. 168 pp. URL: https://www.nefmc.org/library/framework-8-3.

NEFMC. 2020d. Fishing Effects Model Northeast Region. Newburyport, MA, New England Fishery Management Council. 109p. URL: https://www.nefmc.org/library/fishing-effects-model.

Northeast Fisheries Science Center (NEFSC). 2015. 51st Northeast Regional Stock Assessment Workshop (51st SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 2011; 11-02: 856 p. URL: http://www.nefsc.noaa.gov/publications/crd/crd1102//

NEFSC. 2020a. Final report of red hake stock structure working group. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 20-07; 185 p. URL: https://www.fisheries.noaa.gov/new-england-mid-atlantic/northeast-center-reference-document-series.

O'Brien, L., J. Burnett, and R. K. Mayo. 1993. Maturation of nineteen species of finfish off the Northeast coast of the United States, 1985-1990. NOAA Tech. Report. NMFS 113, 22-25 p.

Pace, R.M. III, P.J. Corkeron, and S.D. Kraus. 2017. State-space mark-recapture estimates reveal a recent decline in abundance of North Atlantic right whales. Ecology and Evolution 7(21):8,730–8,741. URL: https://doi.org/10.1002/ece3.3406.

Nicholas R. Record , Jeffrey A. Runge, Daniel E. Pendleton, William M. Balch, Kimberley T.A. Davies, Andrew J. Pershing, Catherine L. Johnson, Karen Stamieszkin, Rubao Ji, Zhixuan Feng, Scott D. Kraus, Robert D. Kenney, Christy A. Hudak, Charles A. Mayo, Changsheng Chen, Joseph E. Salisbury, Cameron R.S. Thompson. 2019. Rapid Climate-Driven Circulation Changes Threaten Conservation of Endangered North Atlantic Right Whales. Oceanography, 32(2): 162-169. URL: https://doi.org/10.5670/oceanog.2019.201.

Orphanides, C. 2010. Protected species bycatch estimating approaches: Estimating harbor porpoise bycatch in U.S. Northwestern Atlantic gillnet fisheries. Fish. Sci 42: 55-76.

Rountree, R.A. 1999. Nov. Diets of NW Atlantic fishes and squid. http://fishecology.org. Accessed 17 Aug. 2000.

Steimle FW, Morse WW, Berrien PL, Johson DL. 1999. Essential fish habitat source document: Red Hake, Urophycis chuss, life history and habitat characteristics. NOAA Tech Memo NMFS NE 1999; 133: 34 p. Accessed Online (August 2015): http://www.nefsc.noaa.gov/nefsc/publications/tm/tm133/

Steiner, W.W., J.J. Luczkovich, and B.L. Olla. 1982. Activity, shelter usage, growth and recruitment of juvenile red hake, Urophycis chuss. Mar. Ecol. Prog. Ser. 7: 125-135.

Warden M.L. 2011a. Modeling loggerhead sea turtle (*Caretta caretta*) interactions with U.S. Mid-Atlantic bottom trawl gear for fish and scallops, 2005-2008. Biological Conservation. 144: 2202-2212.

Warden M.L. 2011b. Proration of loggerhead sea turtle (*Caretta caretta*) interactions in U.S. Mid-Atlantic bottom otter trawls for fish and scallops, 2005-2008, by managed species landed. Northeast Fisheries Science Center Reference Document 11-04. 8 p.

Waring, G. T., C. P. Fairfield, C. M. Ruhsam, and M. Sano. 1992. Cetaceans associated with Gulf Stream features off the northeastern USA shelf. ICES C.M. 1992/N:12 29 pp

Waring G.T., E. Josephson, C.P. Fairfield-Walsh, K. Maze-Foley K, editors. 2007. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2007. NOAA Tech Memo NMFS-NE- 205. 415 pp.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, ed. 2014. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments—2013. NOAA Tech Memo NMFS- NE-228. 475 pp.

Waring, G.T., E. Josephson, K. Maze-Foley, P.E. Rosel, ed. 2015a. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2014. NOAA Tech Memo NMFS NE 231; 361 p. doi: 10.7289/V5TQ5ZH0.

Waring, G.T., E. Josephson, M.C. Lyssikatos, and F.W. Wenzel. 2015b. Serious injury determinations for small cetaceans and pinnipeds caught in commercial fisheries off the Northeast U.S. coast, 2012. Northeast Fish Sci Cent Ref Doc. 15-12; 19 p.

Waring, G.T., E. Josephson , K. Maze-Foley , and P. E. Rosel. 2016. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments 2015. NOAA Technical Memorandum NMFS-NE-238.

10.0INDEX