Draft Amendment 19 to the Northeast Multispecies FMP (Small-mesh Multispecies) Environmental Assessment Regulatory Impact Review and Initial Regulatory Flexibility Analysis

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Prepared by the
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in cooperation with the
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1.0 EXECUTIVE SUMMARY

This document serves as Draft Amendment 19 to the Northeast Multispecies FMP, the Draft Environmental Assessment (EA) which updates and supplements the original EIS for the small-mesh multispecies fishery (available at http://www.nefmc.org/nemulti/planamen/GFAmend12.pdf) contained in Amendment 12 (NEFMC 2000). The purpose of the amendment is to establish and implement Annual Catch Limits (ACLs) and Accountability Measures (AMs) to bring management of the small-mesh fishery into compliance with the re-authorized Magnuson Fishery Conservation and Management Act, using best available science developed during and derived from the recent benchmark assessment (NEFSC 2011a).

This amendment is a follow up on a Secretarial Amendment which NMFS has developed at the same time as and in parallel with this amendment. The Secretarial Amendment follows a different approval procedure and contains many but not all of the alternatives included in this document.

The Secretarial Amendment is expected to include the same ACL specifications and stock wide Total Allowable Landings (TALs) for red, silver, and offshore hake that are included in this document. The Secretarial Amendment also proposes a general specifications process, an annual monitoring process, stock wide TAL triggers, in-season accountability measures, and a pound-for-pound post season accountability measure. These measures, at whatever levels are approved in the final Secretarial Amendment, are considered to be No Action in this document.

Alternatives in this document that are not included in the Secretarial Amendment include a formal adoption of the overfishing definitions (Section 5.1.1) that were recommended by the SAW during the benchmark assessment, landings targets (Section 5.3.2 and 5.3.3) and in-season AMs (Section 5.4.3) for the small-mesh area exemption programs, quarterly TAL allocations for the southern stock area (Section 5.5.2 and 5.5.3), roll over and adjustment provisions for unlanded TALs or overages (Section 5.3.4), year-around red hake possession limits for the northern and southern stock areas by mesh category (Section 5.7), two alternatives for post-season AMs (Section 5.8), a more detailed specifications process (Section 5.2.1), two annual monitoring alternatives (Section 5.2.2), and new reporting requirements (Section 5.2.3). The Council may select AMs that differ in value or parameters than those approved in the Secretarial Amendment.

Red, silver, and offshore hakes are fish in families of cod-like stocks known as hakes. Individually, these managed stocks are described as hakes in this document. The fishery however is known as the whiting fishery and collectively catches of silver and offshore hake are known as 'whiting'. Sometimes this document will refer to the whiting fishery, which is meant to describe vessels using small-mesh to target one or all of red, silver, and offshore hakes. Occasionally, this document will describe landings or catch as 'whiting', which is meant to include silver and offshore hake, but not red hake.

1.1 Document organization

This is an integrated document that complies with the requirements of the Magnuson-Stevens Act, the National Environmental Policy Act, and other applicable laws. The Affected Environment section of this EA describes the Biological Environment (Section 7.2 including a description of the biology, the population dynamics of the hake stocks, and a summary/description of the fishery), the Physical Environment and Essential Fish Habitat (Section 7.3), and Human Communities (aka Economic and Social Environment; Section 7.5).

The document also includes a discussion of the Management Background (Section 3.3) and a brief History of the Fishery (Section 3.2), the Purpose and Need for action (Section 3.1), a description of Proposed Alternatives (Section 4.0) and Considered And Rejected Alternatives (Section 6.0), an analysis of Environmental Consequences of the proposed alternatives (Sections 8.1 to 8.7), and a Cumulative Effects analysis (Section 8.8; including an evaluation of past, present, and reasonably foreseeable future actions). The Environmental Consequences evaluation includes an analysis of the direct and indirect impacts on hakes and the small-mesh multispecies fishery (Section 8.1), on protected species (Section 8.2.3), on habitat, including essential fish habitat (EFH; Section 8.6), on the economy and on social and community factors (Section 8.7).

1.2 Specifications and Alternatives

The Allowable Biological Catch (ABC) and ACL specifications for fishing years 2012-2014 by stock are presented as a separate section. Section 4.0 describes and adopts the ACL specifications (ABCs and ACLs, Sections 4.1 and 4.2, respectively) which were developed by the Whiting PDT, recommended by the Council's SSC, and through this amendment approved by the Council. These measures are expected to be implemented by the Secretarial Amendment. The ACL framework is consistent with the Magnuson-Act requirements, National Standard 1 guidelines, the recommendations of the Council's SSC, and best available science, and therefore there are no proposed alternatives. The Council is not proposing any changes to the framework and the analysis developed for the Secretarial Amendment is still applicable. Therefore, no additional analysis is necessary.

Total Allowable Landings (TAL) allocations are part of the ACL specifications, but the Secretarial Amendment is expected to implement stock-wide annual TALs for red and silver hakes (offshore hakes would be counted against the southern stock area TAL for silver hake, aka 'whiting'). Amendment 19 includes these stock wide annual TAL specifications, but also includes alternatives for landings targets by small-mesh area program in the northern stock area and by quarter in the southern stock area. Since these are alternatives which differ from the status quo. They are included in Sections 5.2.3 and 5.5, and are analyzed in Section 8.1.2 of this document.

The proposed alternatives described in Section 5.0 include TAL allocations and AMs, a proposed specification and annual monitoring process, year round red hake possession limits, and new reporting requirements to enable NMFS to monitor the fishery consistently with the proposed ACL specifications. Overfishing definitions, ABCs, ACLs, the specification process, the annual monitoring process, monitoring requirements, and post-season AMs that would apply to both the northern and southern stock areas (Map 2) are described in alternatives that apply to both stocks. Various TAL allocation alternatives (Sections 5.2.3 and 5.5) and in-season AM alternatives (Sections 5.4 and 5.6) apply differently in the northern and southern stock areas are described in separate sets of alternatives. The TAL and in-season AM alternatives differ by stock area largely because of the small-mesh exemption area programs that are present entirely in the northern stock area. The Council may choose different approaches in each area for the proposed action in the final amendment.

The table below summarizes the measures included in each alternative and a general approach or philosophy behind each alternative.

Alternative	Proposed measures	Philosophy or rationale	Preferred alternative
Section 5.1	Revised overfishing definitions; red and silver hake	Recommended by the SAW using best available science	Section 5.1.1. SAW51 overfishing definitions
Section 5.2.1	Specification framework	Enables the Council to change specification via a new (for the small-mesh multispecies fishery) specification process, similar to that used to adjust specifications in other FMPs.	Section 5.2.1.1. Adjustments via specification package
Section 5.2.2	Annual monitoring procedures	Enables the Council to keep abreast of changes in the fishery, respond to changes through framework adjustments.	Section 5.2.2.3. Monitoring reports prepared by NMFS and reviewed by the PDT, and Section 5.2.3.1.
Section 5.2.3	TAL monitoring and reporting requirements	Monitoring and reporting changes needed to assign landings and catch to appropriate stock boundaries	Section 5.2.3.1. Weekly VTR submission requirement to assign landings to monitor management area TALs
Section 5.3	Northern stock area TALs for red and silver hakes	Stock wide TALs to account for expected discards and state water landings, with potential sub-allocations for the small-mesh area exemption programs, possibly with a roll over provision for unlanded TAL for the Cultivator Shoals Area.	Section 5.3.1. Stock-wide TAL
Section 5.4	Northern stock area accountability measures (AMs) • Incidental red hake possession limit alternatives of 200, 300, and 400 lbs. • Incidental silver hake possession limit alternatives of 500, 1000, and 2000 lbs.	TAL triggers and incidental possession limits to reduce the risk that catches will exceed ACLs, by restricting the directed hake fisheries and by putting limits on incidental catch.	Sections 5.4.1.3 400 lbs. red hake and 5.4.2.3. 2000 lbs. silver hake incidental possession limits

Alternative	Proposed measures	Philosophy or rationale	Preferred alternative
Section 5.5	Southern stock area TALs for red and silver hakes	Stock wide TALs to account for expected discards and state water landings, with potential sub-allocations by quarter, possibly with roll over provisions.	Sections 5.5.3. Triggered quarterly TAL allocations and 5.5.4.2. Roll up TAL monitoring and TAL triggers.
Section 5.6	Southern stock area accountability measures (AMs) • Incidental red hake possession limit alternatives of 200, 300, and 400 lbs. • Incidental silver hake possession limit alternatives of 500, 1000, and 2000 lbs.	TAL triggers and incidental possession limits to reduce the risk that catches will exceed ACLs, by restricting the directed hake fisheries and by putting limits on incidental catch.	Sections 5.6.1.3 400 lbs. red hake and 5.6.2.3. 2000 lbs. silver hake incidental possession limits
Section 5.7.1 and 5.7.2	Year round red hake possession limits; ranges vary by stock area and mesh category <u>North</u>: • 1,000 to 3,000 lbs. for vessels using 2.5 to 5 inch mesh trawls • 300 to 1,200 lbs. for vessels using any other gears or mesh size <u>South</u>: • 4,000 to 10,000 lbs. for vessels using 2.5 to 5 inch mesh trawls • 2,000 to 6,000 lbs. for vessels using any other gears or mesh size	Intended to reduce the risk of derby-style fishing behavior that might close the directed fishery early. Mesh-based possession limits are intended to improve size selectivity.	Section 5.7.3. Status quo/no action: No year round red hake possession limits
Section 5.7.4	Increase the southern whiting possession limit from 30,000 up to 40,000 lbs. in all or a portion of the Mid-Atlantic and Southern New England Exemption Areas (Map 5).	Intended to achieve optimum yield by countering the effects of rising fuel and operating costs.	None identified.
Section 5.8	Post-season accountability measures	If all else fails, one of the two alternatives will account for catches that exceed the stock wide annual catch limits.	Section 5.8.2. Reduce the incidental possession limit trigger as a post-season AM.

1.3 Proposed action

The proposed action will be identified in the Final Amendment 19 document, to be prepared after the Council conducts public hearings.

1.4 Final EA analysis

The proposed action will be analyzed and changes to the draft EA analyses in this document will be included in the Final Amendment 19 document, to be prepared after the Council conducts public hearings.

1.5 Conclusions

Conclusions will be based on the final alternatives selected by the Council as a proposed action and will include public comment on the Draft Amendment 19 document and EA.

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Document 1b – Guidance on Acceptable Biological Catch for Whiting Hake – Scientific and Statistical Committee, April 2011

Document 2a – Recommendations for Red, Silver, and Offshore Hake (Whiting) Allowable (sic) Biological Catches for 2012-2014 – Whiting PDT, July 2011

Document 2b – Acceptable Biological Catch Recommendations for Whiting for Fishing Years 2012-2014 - Scientific and Statistical Committee, September 2011

Document 3 – Analysis of Potential Red and Silver Hake Possession Limit Alternatives – Whiting PDT, November 2011

2.2 List of Tables

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2.5 List of Acronyms

ABC	Acceptable biological catch
ACL	Annual Catch Limit
AIM	An Index Method of Analysis (the assessment model used to determine red and silver hake status)
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	days-at-sea
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DPWG	Data Poor Working Group
DSEIS	Draft Supplemental Environmental Impact Statement
EA	Environmental Assessment
EEZ	exclusive economic zone

EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
F	Fishing mortality rate
FEIS	Final Environmental Impact Statement
FMP	fishery management plan
FW	framework
FY	fishing year
GARM	Groundfish Assessment Review Meeting
GB	Georges Bank
GIS	Geographic Information System
GOM	Gulf of Maine
GRT	gross registered tons/tonnage
HAPC	habitat area of particular concern
HPTRP	Harbor Porpoise Take Reduction Plan
IFQ	individual fishing quota
ITQ	individual transferable quota
IVR	interactive voice response reporting system
IWC	International Whaling Commission
LOA	letter of authorization
LPUE	landings per unit of effort
MA	Mid-Atlantic
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MPA	marine protected area
MRFSS	Marine Recreational Fishery Statistics Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSMC	Multispecies Monitoring Committee
MSY	Maximum sustainable yield
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NLSA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NT	net tonnage
OBDBS	Observer database system
OLE	Office for Law Enforcement (NMFS)
OY	optimum yield
PBR	Potential Biological Removal

PDT	Plan Development Team
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RMA	Regulated Mesh Area
RPA	Reasonable and Prudent Alternatives
SA	Statistical Area
SAFE	Stock Assessment and Fishery Evaluation
SAP	Special Access Program
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
SIA	Social Impact Assessment
SNE	Southern New England
SNE/MA	Southern New England-Mid-Atlantic
SSB	spawning stock biomass
SSC	Social Science Committee
TAL	Total allowable landings
TED	Turtle excluder device
TEWG	Turtle Expert Working Group
TMS	ten minute square
TRAC	Trans-boundary Resources Assessment Committee
TSB	total stock biomass
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	Vessel monitoring system
VPA	Virtual population analysis
VTR	Vessel trip report
WGOM	Western Gulf of Maine
YPR	Yield per recruit

3.0 INTRODUCTION AND BACKGROUND

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

The purpose of Amendment 19 is for the Council to formally adopt the 2012-2014 ACL specifications that were approved by NMFS (in consultation with the Council) in the Secretarial Amendment and implement accountability measures (AMs) for the small-mesh multispecies fishery, as well as a mechanism for adjusting specifications. The amendment also includes alternatives that would add measures to the Secretarial Amendment describing a specification process and implementing accountability measures to reduce the risk that catches will exceed ACLs and to account for overages if they occur. These measures taken together would take into account scientific and management uncertainty to reduce the risk of overfishing.

As non-preferred alternatives, Amendment 19 also considers setting landings targets with red hake incidental possession limits for the small-mesh exemption areas and setting year round red hake possession limits, measures that are not included in the Secretarial Amendment. The incidental limit would be triggered when landings from the Cultivator Shoals Area or other inshore exemption areas reach 90% of their respective landings target to reduce potential effects on other fisheries in the northern stock area. The proposed red hake possession limits would be related to the trawl mesh size used by the vessel to encourage use of more size selective gear, similar to the existing silver hake possession limits. It could also reduce the potential for vessels to target large quantities of red hake with extra small mesh in anticipation of a directed fishery closure when landings approach 90% of the TAL.

Amendment 19 is needed to implement management measures that have been evaluated through the Council process in order to complement the ACL framework established by the Secretarial Amendment, which NMFS expects to implement on May 1, 2012 for the 2012 fishing year.

3.2 History of the Fishery

The commercial silver hake fishery in the United States may have begun as early as the mid-1800s (Anderson et al, 1980). Prior to the early 1920s, landings of silver hake (commonly known as 'whiting') totaled less than seven million pounds annually, and most fishermen considered whiting a nuisance fish because its soft flesh tended to spoil quickly without refrigeration. Technological advances in handling, freezing, processing, and transportation aided in expanding this market as well as creating new opportunities to capitalize on whiting. Until this time, the fishery operated primarily inshore using pound nets. As the demand for whiting increased, operations began to extend offshore, and vessels started using otter trawls to catch more whiting. By 1950, U.S. commercial silver hake landings had increased to more than 45,000 metric tons. Floating traps, gillnets, purse seines, and longline trawls were also employed. Today, almost all of the U.S. commercial silver hake catch is taken with otter trawls.

Prior to 1960, the commercial exploitation of silver hake in the Northwest Atlantic was exclusively by U.S. fleets. Distant water fleets had already reached the banks of the Scotian Shelf by the late 1950s, and by 1961, scouting/research vessels from the USSR were fishing on Georges Bank. By 1962, factory freezer fleets (ranging from 500 to 1,000 GRT) intensively exploited the whiting and red hake stocks on the Scotian Shelf and on Georges Bank. Led by the USSR, the distant water fleet landed an increasingly larger share of the silver hake catch from the Gulf of Maine, Georges Bank, and northern Mid-Atlantic waters. In 1962, the distant water fleet landed 41,900 tons of silver hake (43% of the total silver hake landings), but that number had increased to 299,200 tons (85% of the total silver hake landings) in 1965.

That year marked the year of the highest total commercial silver hake landings, 351,000 tons. Recreational landings of silver hake in the southern New England and Mid-Atlantic areas were also at record levels between 1955 and 1965, averaging about 1,360 tons. Unable to sustain such high rates of fishing, the abundance of silver hake off the U.S. Atlantic coast began to decline. As a result, total commercial catches decreased significantly after 1965 and reached a 20-year low of 55,000 tons in 1970. U.S. recreational landings also dropped after 1965 to about half the levels of previous years.

After 1970, catches of silver hake by the distant water fleet in U.S. waters increased again, especially in southern New England and the Mid-Atlantic. Between 1971 and 1977, distant water fleet landings from the southern stock averaged 75,000 tons annually and accounted for 90% of the total harvest from the southern stock. The size and efficiency of distant water fleet factory ships also increased, many ranging between 1,000 and 3,000 GRT. In 1973, the International Commission for the Northwest Atlantic Fisheries established temporal and spatial restrictions that reduced the distant water fleet to small "windows" of opportunity to fish for U.S. silver hake. These windows restricted the distant water fleet to the continental slope of Georges Bank and the Mid-Atlantic. As effort control regulations increased, foreign fleets gradually left most areas of Georges Bank.

Although foreign fishing had ceased on Georges Bank by about 1980 and in the Mid-Atlantic by about 1986, the U.S. groundfish fleet's technologies and fishing practices began to advance, and between 1976 and 1986, fishing effort (number of days) increased by nearly 100% in the Gulf of Maine, 57% on Georges Bank, and 82% in southern New England (Anthony, 1990). Such increases in effort, although directed primarily towards principal groundfish species (cod, haddock, yellowtail flounder), were accompanied by a 72% decline in silver hake biomass. In turn, U.S. East Coast landings of silver hake began to decline, dropping to 16,100 tons in 1981. Since that time, landings have remained relatively stable, but at much lower levels in comparison to earlier years. U.S. East Coast silver hake catches are taken almost exclusively by otter trawls, either as bycatch from other fisheries or through directed fisheries targeting a variety of sizes of silver hake.

3.3 Management Background (EA,RFA)

The small-mesh multispecies fishery consists of three species: Silver hake (*Merluccius bilinearis*), red hake (*Urophycis chuss*), and offshore hake (*Merluccius albidus*). There are two stocks of silver hake (northern and southern), two stocks of red hake (northern and southern), and one stock of offshore hake, which primarily co-occurs with the southern stock of silver hake. There is little to no separation of silver and offshore species in the market, and both are generally sold under the name "whiting." Throughout the document, "whiting" is used to refer to silver hake and offshore and silver hake combined catches. A summary of the biological information from the most recent stock assessment (SAW 51) can be found in Section 4.1.

The small-mesh multispecies fishery is managed as a series of exemptions from the Northeast Multispecies Fishery Management Plan (FMP), which is managed by the New England Fishery Management Council (Council). In 2007, the reauthorized Magnuson-Stevens Act required all managed species to have annual catch limits (ACLs) and measures to ensure accountability (accountability measures, or "AMs"). The Magnuson-Stevens Act required ACLs and AMs by 2010 for stocks that were experiencing overfishing, and by 2011 for all other stocks. The Council started developing Amendment 19 with scoping hearings in early 2010, but the amendment was delayed to accommodate the Dec 2010 benchmark assessment. And in order to conduct public hearings on the draft amendment and accommodate the Secretarial review process, the amendment will not be implemented prior to the Magnuson-Stevens Act deadline. In order to meet that deadline, NMFS proposed a Secretarial Amendment on December 23, 2011 (76 FR 80318).

The Council began development of Amendment 19 in early 2010, but postponed development until new science could be considered in a benchmark assessment (NEFSC 2011a and 2011b). Prior assessments were not analytically based, due in large part to conflicting signals of increasing biomass and relatively fewer large fish (often called 'age truncation', which is often indicative of high fishing mortality) and uncertainties about stock identification. As a result, management previously relied on a set of survey-based biological reference points to determine overfishing and overfished status.

The Council expected that the new benchmark assessment would produce an analytic, model based assessment with appropriate reference points to set ABCs. Survey and fishery data were fitted to various population models, but none fit the data well and none were deemed reliable enough by the 51st SAW (NEMFC 2011a) to determine stock status. Instead, the benchmark assessment produced an index-based update of stock status, like previous assessments, but with newly proposed overfishing definitions.

If the benchmark assessment produced estimates of MSY using analytical models, these reference points could have been used straightaway to estimate ABCs and scientific uncertainty, allowing the Council's SSC to quickly set ABC and develop ACL specifications. Since analytical models were unavailable, the Council directed the Whiting PDT to develop ABC setting methods and recommend ABCs for the small-mesh multispecies (hake) stocks using the best available science. The Council reviewed the proposed methods during Apr 2011 (see Document 1a in the Appendix) and ACL recommendations in Aug 2011 (see Document 2a in the Appendix).

The Council intends to finalize Amendment 19 at its April Council meeting and submit Final Amendment 19 shortly thereafter to the Secretary of Commerce for approval. If approved, the final alternatives would be published as a rule and implemented in late 2012. The Council anticipates that the ACL specifications will be consistent with those in the Secretarial Amendment, but that some AMs may differ and apply to management areas and/or fishing year quarters. In addition, Amendment 19 would implement a specification process that is more detailed than contained in the Secretarial Amendment and possibly include year round red hake possession limits by gear.

The following sections summarize the management background and regulations pertaining to small-mesh fisheries that target hakes in the Northeast Region. Readers may access the text of these amendments and accompanying regulations via the Council's web page (http://www.nefmc.org/nemulti/planamen/planamen.html).

3.3.1 Amendment 1

The Northeast Multispecies Fishery Management Plan (Multispecies FMP; NEFMC 1985) was approved and implemented in 1985. In addition to regulating groundfish fishing with large mesh and other gears, it defined areas and seasons when fishing for red hake, silver hake, herring, and shrimp was permissible, with the intent on minimizing catches of large mesh groundfish species. Amendment 1 (NEFMC 1987) was implemented on Oct 1, 1987, decreasing the area and season when small-mesh fishing for red and silver hake was allowed in an Exempted Fishery Program. Amendment 1 also refined how the 10% allowance for regulated multispecies was defined.

3.3.2 Amendment 4

Amendment 4 (NEFMC 1990) was implemented on June 27, 1991. Among changes to measures regulating large mesh groundfish fisheries, the amendment also made some modifications to the Exempted Fisheries Program that regulated small-mesh fishing for hakes and other species. Most of the

changes were related to reporting and sea sampling. More importantly, Amendment 4 incorporated red and silver hake into the management unit (i.e. fisheries that targeted red and silver hake became regulated under the FMP), while establishing and defining the Cultivator Shoals Area Small-mesh Program. Amendment 4 also set a minimum 2.5 inch trawl mesh which restricted fishing for small-mesh multispecies, improving size selectivity and reducing bycatch of regulated multispecies.

3.3.3 Amendment 12

Amendment 12 (NEFMC 1999) was implemented on April 28, 2000. Amendment 12 focused on the management of small-mesh fisheries targeting hakes and established overfishing definitions and optimum yield for red, silver, and offshore hakes. It made adjustments to the Cultivator Shoals Area Small-mesh Program including adjustments to the fishing season. Most importantly, Amendment 12 established silver hake (aka whiting) and offshore hake possession limits for vessels fishing outside of the Cultivator Shoals Area. These limits varied by mesh size to encourage vessels to use more size selective fishing gear and to reduce targeting of small fish for a juvenile whiting market. Amendment 12 also made other gear regulation adjustments and made allowances for transferring silver hake at sea (for bait).

3.3.4 Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act

In 2006, the Magnuson-Stevens Act was passed, which updated the original Act as well as the Sustainable Fisheries Act of 1996. The bill reauthorized the MSA for Fiscal Years 2007 through 2013.

The MSA reauthorization contained several provisions that introduced new legal requirements for fishery management. One key change that pertains to this amendment is the following:

- A firm deadline to end overfishing in America by 2011. For stocks that are currently experiencing overfishing, the deadline for ending that overfishing is 2010. Two key approaches are included to achieve this mandate:
    - The reauthorization requires the use of Annual Catch Levels (ACLs) to prevent overfishing. Every management plan must contain an ACL, which is set at a level to ensure that overfishing does not occur in the particular fishery. The ACL is required to be set at or below the Acceptable Biological Catch (ABC) of the fishery. Furthermore, the Councils are directed to follow the recommendations of the Scientific and Statistical Committee (SSC), and the ACL cannot exceed the SSC's recommendation for ABC.
    - Accountability Measures (AMs) are required in each management plan that detail what actions will be taken in the event of an overage of harvest level.

Proposed specifications and measures in this amendment address the above mandate.

3.3.5 Current Management Measures

Collectively, the small-mesh multispecies fishery is managed under a series of exemptions from the Northeast Multispecies FMP. The Northeast Multispecies FMP requires that a fishery can routinely catch less than 5% of regulated multispecies to be exempted from the minimum mesh size. In the Gulf of Maine and Georges Bank Regulated Mesh Areas (Map 1), there are six exemption areas, which are open seasonally (Table 1).

Table 1. 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 30								
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 (Table 2) for all the areas with that requirement are:

Table 2. Mesh size dependent possession limits.

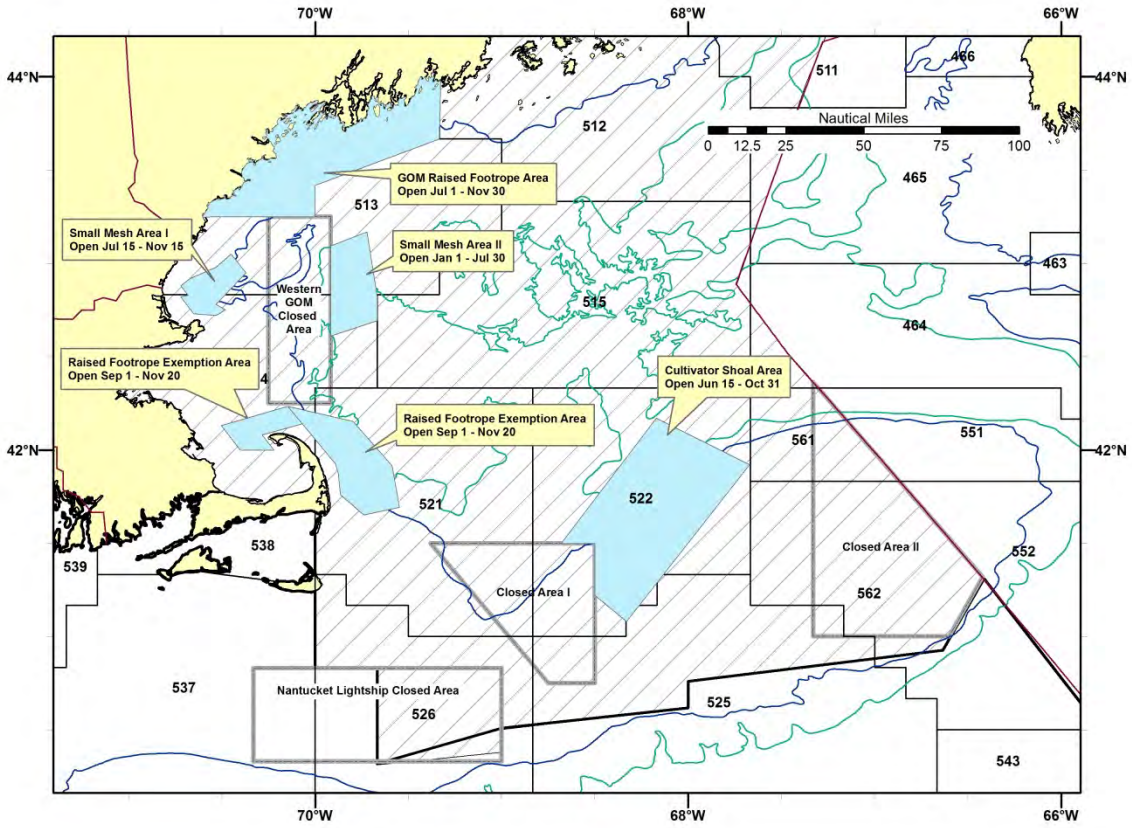
Codend Mesh Size	Silver and offshore hake, combined, possession limit
Smaller than 2.5”	3,500 lb
Larger than 2.5”, but smaller than 3.0”	7,500 lb
Equal to or greater than 3.0”	30,000 lb

The exemption areas were implemented as part of several different amendments and framework adjustments to the Northeast Multispecies FMP. In 1991, Amendment 4 incorporated silver and red hake and established an experimental fishery on Cultivator Shoal. Framework Adjustment 6 (1994) was intended to reduce the catch of juvenile whiting by changing the minimum mesh size from 2.5 inches to 3 inches. Small-mesh Areas I and II, off the coast of New Hampshire, were established in Framework Adjustment 9 (1995). The New England Fishery Management Council (Council) established essential fish habitat (EFH) designations and added offshore hake to the plan in Amendment 12 (2000). Also in Amendment 12, the Council proposed to establish limited entry into the small-mesh fishery. However, that measure was disapproved by the Secretary of Commerce because it did not comply with National Standard 4[1] as a result of measures that benefited participants in the Cultivator Shoal experimental fishery and because of the “sunset” provision that would have ended the limited entry program at some date. The Raised Footrope Trawl Area off of Cape Cod was established in Framework Adjustment 35 (2000). A modification to Framework Adjustment 35 in 2002 adjusted the boundary along the eastern side of Cape Cod and extended the season to December 31 in the new area. Framework Adjustment 37 modified and streamlined some of the varying management measures to increase consistency across the exemption

[1] National Standard 4 states that measures “shall not discriminate between residents of different States,” and that fishing privileges must be “fair and equitable to all such fishermen.”

areas. In 2003, Framework Adjustment 38 established the Grate Raised Footrope Exemption Area in the inshore Gulf of Maine area.

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



Vessels participating in any of the exemption areas must have a Northeast Multispecies limited access or open access category K permit and must have a letter of authorization from the Regional Administrator to fish in Cultivator Shoal and the Cape Cod Raised Footrope areas. None of the exemption areas have a possession limit for red hake. Most of the areas (Small-mesh Areas I and II, the Cape Cod Raised Footrope areas, Southern New England Exemption Area, and the Mid-Atlantic Exemption Area) have mesh size dependent possession limits for silver and offshore hake, combined (Table 2). The Gulf of Maine Grate Raised Footrope Area has a possession limit of 7,500 lb, with a 2.5-inch minimum mesh size, and Cultivator Shoal has a possession limit of 30,000 lb, with a 3-inch minimum mesh size.

3.4 Management Objectives

The Council's objective is to manage fisheries catching red, silver, and offshore hakes to build to and maintain stock size at levels that are capable of sustaining MSY on a continuing basis. In addition to existing restrictions on fishing through small-mesh regulations and exemption programs as well as silver hake possession limits specified according to the mesh size used by the vessel, this amendment will establish and specify catch and landings limits which are deemed to be sustainable. The amendment includes accountability measures which either reduce the risk that catches will exceed the ACL or to account for those overages in later seasons if they do occur.

3.5 Methods of Analysis

The analysis of this amendment uses the best available science to identify and set ACL specifications and analyze the potential effects of accountability measures. The ABCs were proposed by the Whiting PDT using reference points and analysis derived from the benchmark assessment (NEFSC 2011a) and approved by the Council's Scientific and Statistical Committee (SSC). The impact analyses (Section 7.1) were developed using data described in the Affected Environment (Section 7.0) and were reviewed by the Whiting PDT. These data and analyses were developed using accepted procedures and comply with the provisions of the Information Quality Act (Section 9.11).

3.6 Maximum Sustainable Yield (MSY) and Optimum Yield (OY)

National Standard 1 requires that FMPs achieve "on a continuing basis, the optimum yield from each fishery for the United States fishing industry." The term "optimum," with respect to yield from a fishery, is defined as the amount of fish which:

(A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
(B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and
(C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Optimum yield (OY) for silver hake, offshore hake, and red hake will therefore be the amount of fish that results from fishing under the set of rules designed to achieve the plan objectives. It is the amount of fish caught by the fishery when fishing at target fishing mortality rates (F_{target}) at current biomass levels (B_t), or when fishing in a manner intended to maintain or achieve biomass levels biomass capable of producing maximum sustainable yield (MSY) on a continuing basis. Accounting for scientific uncertainty in the estimate of MSY, F_{target} is defined as the mortality that would produce the ACL at existing stock biomass and size selectivity. Expressed as an equation:

$$OY = F_{target} \times (B_t)$$

For a rebuilt stock, B_t is always greater than B_{MSY} (stock biomass capable of sustaining MSY over time). F_{target} is the target level of fishing mortality and is set safely below F_{MSY} (the fishing mortality rate capable of producing MSY over time) to prevent overfishing and ensure that OY can be achieved on a continuing basis. For an overfished stock, B_t is the current stock biomass level estimated or projected from the most recent assessment, and F_{target} is the fishing mortality rate objective that will achieve the desired rebuilding. If the current F, F_{target}, or B_t is unknown, proxy control rules are applied and the long-term potential yield may be a satisfactory proxy for OY.

The target fishing mortality rate (F_{target}) is the rate that will achieve the plan objectives with an acceptable degree of safety or precaution. Factors to be considered in setting F_{target} will be calculated through periodic stock assessments and include the stock size relative to B_{MSY}, the current age structure of the population and recruitment, as well as projected growth and recruitment characteristics of the stock. The Council may also consider social and economic characteristics in setting F_{target} provided the stock rebuilding projections are within the Council's range of precaution.

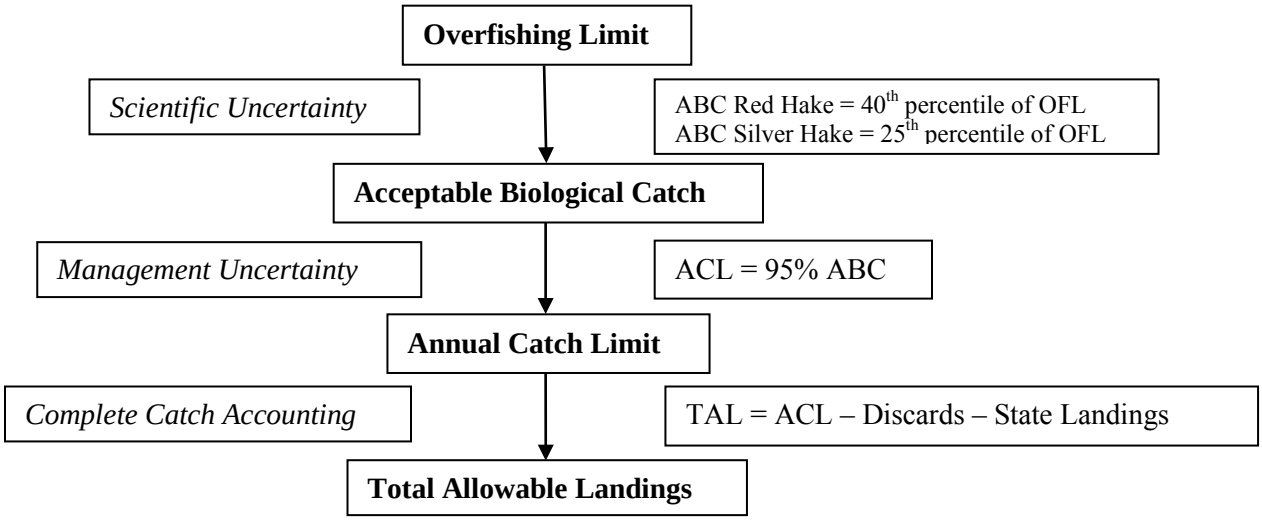
For an overfished stock (no stock is currently overfished), for example, the Council would set a target rate to rebuild the stock within a maximum time, usually not to exceed ten years. On a rebuilt stock, the Council should set F_{target} safely below the threshold level that will produce MSY. In setting target fishing mortality rates, the Council must balance maximizing short-term economic yield and providing for sustained participation of communities in the fishery against the risk or cost of allowing the biomass to decline to levels below B_{MSY}. Thus, the Council will consider social, economic, and ecological factors in setting the F_{target} in addition to considering the risk of not achieving stock recovery in an acceptable time period, or the risk of the rebuilt stock becoming overfished at any given time.

OY, therefore, is not a fixed amount but varies with the status of the stocks in the fishery, but it cannot be above a level that would exceed F_{MSY}. It is a quantity that represents the yield resulting from fishing at target levels on a rebuilt stock or stock complex, or the yield resulting from fishing at target levels designed to rebuild the stock in a specified time frame.

3.7 Acceptable Biological Catch (ABC) and Annual Catch Limit (ACL) Specifications

This amendment proposes ABCs for northern and southern stocks of red and silver hake. Due to insufficient data and science, there is no ABC for offshore hake, but an adjustment has been made in the silver hake ABC for the southern stock to account for customary catches of offshore hake in this mixed species trawl fishery. ACLs for each stock account for management uncertainty by reducing the ABC by 5% and after accounting for state landings and expected discards, the amendment would specify total allowable landings for each stock and species. More details and specifications are given in Sections 4.1, 5.2.3, and 5.5.

The ACL framework, including the overfishing limits and ABCs is illustrated below:



3.8 Stock Status

Using the biological reference points estimated by the benchmark assessment (NEFSC 2011a) and updated data through the 2010 calendar year and survey data through spring 2011, no stock of red or silver hake is overfished and overfishing is not occurring (see Document 1a in the Appendix). The status of offshore hake is unknown because the benchmark assessment (NEFSC 2011a) produced no biological reference points that were reliable for management and status determination.

3.9 Essential Fish Habitat (EFH)

Section 3.4 of the Amendment 11 (NEFMC 1999) described and identified EFH for red, silver, and offshore hakes, based on the observed distribution of eggs, juvenile, and adult fish. The section includes maps based on the distribution of juveniles and adults. In general, no information was available on the distribution of eggs.

This amendment proposes no changes to small-mesh multispecies (hake) EFH descriptions or designations.

4.0 SMALL-MESH MULTISPECIES SPECIFICATION FRAMEWORK WITH SPECIFICATIONS FOR 2012-2014 FISHING YEARS

This section describes and adopts the ABC and ACL specifications (Sections 4.1 and 4.2, respectively) that have been proposed in the Secretarial Amendment and are expected to be implemented. The framework and specifications were developed by the Whiting PDT, recommended by the Council's SSC, and through this amendment approved by the Council. The ACL framework described below is consistent with the Magnuson-Act requirements, National Standard 1 guidelines, the recommendations of the Council's SSC, and best available science, and therefore there are no proposed alternatives. The Council is not proposing any changes to the framework and the analysis developed for the Secretarial Amendment is still applicable. Therefore, no additional analysis is necessary.

Total Allowable Landings (TAL) allocations are part of the ACL specifications, but Amendment 19 includes alternatives that differ from those proposed in the Secretarial Amendment. The Secretarial Amendment proposes stock wide annual TALs for red and silver hake in the northern stock area and for red hake and whiting (silver and offshore hake) in the southern stock area. Although different values are proposed, the Council expects that the final rule for the Secretarial Amendment will include corrections that have been factored into the Amendment 19 analysis. Amendment 19 includes these stock wide annual TAL specifications, but also includes alternatives for landings targets by small-mesh area program in the northern stock area and by quarter in the southern stock area. Since these are alternatives which differ from the status quo, they are included in Sections 5.2.3 and 5.5, and are analyzed in Sections 8.1.2 and 8.1.3, respectively.

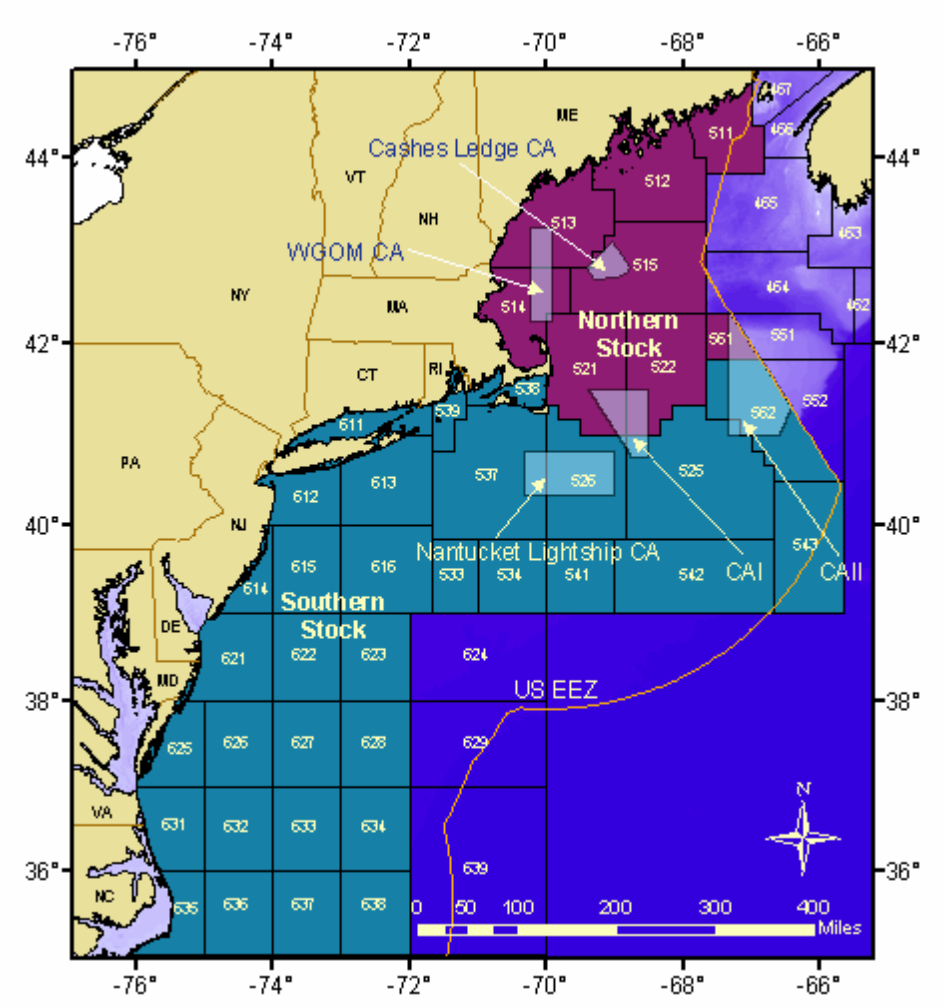
4.1 Allowable Biological Catch (ABC)

Using proxy values for F_{MSY} approved by the 51st SAW (NEFSC 2011a) and estimates of scientific uncertainty for the reference point and for the three year moving average for NMFS trawl survey biomass, the Council's SSC recommended (see Document 2a in the Appendix) ABCs for red and silver hake by stock area (see Map 2). Offshore hake are caught almost entirely in the southern stock area along the offshore edge of the continental shelf, sometimes as a target species and sometimes as an incidental or mixed catch with silver hake. Furthermore, the 51st SAW (NEFSC 2011a) found that commercial catch and survey indices were too noisy to provide a reliable indicator of stock condition. Therefore, the Whiting PDT recommended and the SSC approved combining the catch from both species into one species complex to account for the catches of silver and offshore hake[2].

The intent of establishing an allowable biological catch below F_{MSY} is to take into account scientific uncertainty and risk tolerance that the ABC may cause overfishing. Lower ABCs imply less risk. The small-mesh multispecies ABCs are expressed as a percentile of the overfishing level (OFL) distribution that estimates quantifiable scientific uncertainty, with the 50^{th} percentile being risk neutral (see Document 1a in the Appendix). The following ABCs would apply to the 2012-2014 fishing years, serving as a starting point to set other specifications in this amendment.

[2] AKA 'whiting' or 'southern whiting'

Map 2. Statistical areas used to define the northern and southern red and silver hake stocks.



These and future specifications would continue beyond the 2014 fishing year, unless changed by a planned specification setting process (see Section 5.2.1), a framework action, or a plan amendment.

Described below are the following ABC specifications:

1. Northern and southern red hake ABCs based on the 40th percentile of the stochastic estimate of OFL.

2. Northern and southern silver hake ABCs based on the 25th percentile of the stochastic estimate of OFL. In the southern stock area, the ABC is increased by 4% to account for the customary estimated catches of offshore hake.

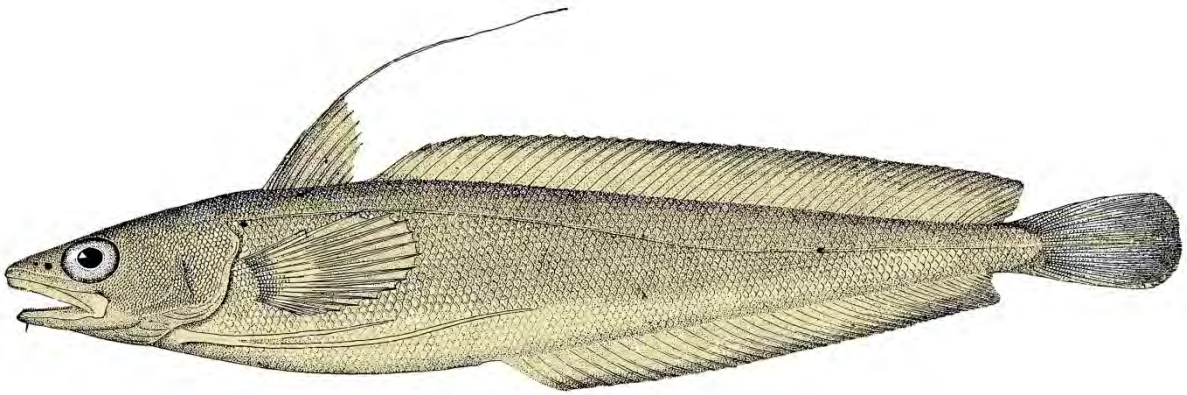
4.1.1 Red hake (northern and southern stocks)

All commercial and recreational red hake catches in each stock area (Map 2) will be capped at the following limits to prevent overfishing and account for scientific uncertainty in these limits to prevent

overfishing. These limits were drawn from the 40th percentile of the OFL and will apply to specifications beyond using new data, including an updated three year moving average for biomass from the NMFS spring trawl survey.

2012-2014 ABC set at 40th percentile of OFL to account for scientific uncertainty:

- 280.1 mt (89% of OFL; 90% of 2010 catch) north
- 3259 mt (95% of OFL; 241% of 2010 catch)) south



The proposed limits are less than the 50th percentile, which is equivalent to the median estimate of F_{MSY} and therefore considered to be risk neutral. Mathematically, the 40th percentile is 89 and 95% of the catches at the OFL, for the northern and southern stock areas, respectively. The values differ in this respect by stock area due to the differences in the distribution of OFL, but account for equivalent levels of scientific risk.

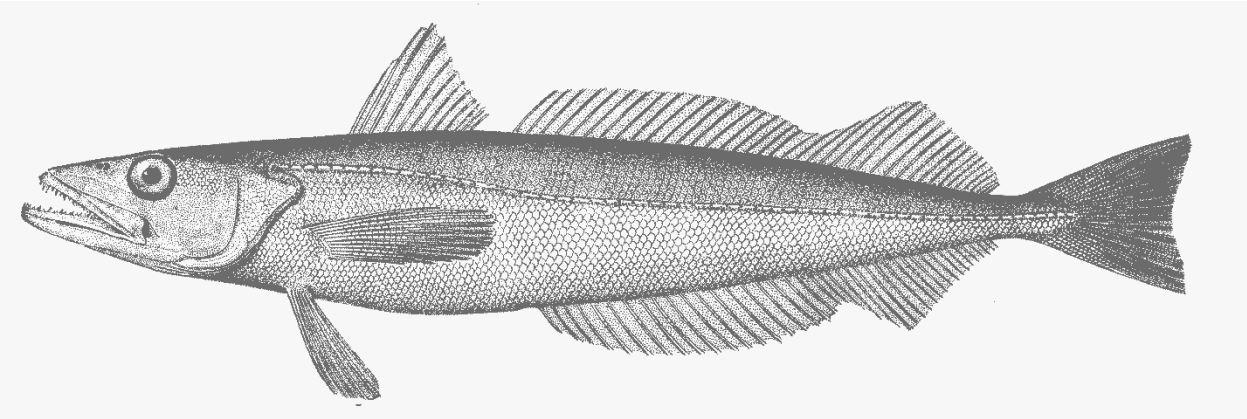
The Council decided that lower and less risky limits on catch (e.g. < 40th percentile on OFL) were not appropriate because of the relatively low economic value and costs of potential consequences of overfishing. Red hake is targeted infrequently and often is a common bycatch in the trawl and scallop dredge fisheries in the NE region. As such, excessively low catch limits that have a low risk could prevent the fishery from reaching optimum yield in these fisheries that target more valuable species.

4.1.2 Silver hake (northern and southern stocks)

All commercial and recreational silver hake catches in each stock area (Map 2) will be capped at the following limits to prevent overfishing and account for scientific uncertainty in these limits to prevent overfishing. These limits were drawn from the 25th percentile of the OFL and increased by 4% in the southern stock area to account for customary catches of offshore hake (see Section 4.1.3 and Document 2a in the Appendix). The limit at the 25th percentile of OFL will apply to specifications beyond 2014 and will be calculated using new data, including an updated three year moving average for biomass from the NMFS fall trawl survey.

2012-2014 ABC set at 25th percentile of OFL to account for scientific uncertainty:

- 13,177 mt (53% of OFL; 532% of 2010 catch) north
- 33,995 mt (52% of OFL; 459% of 2010 catch)) south



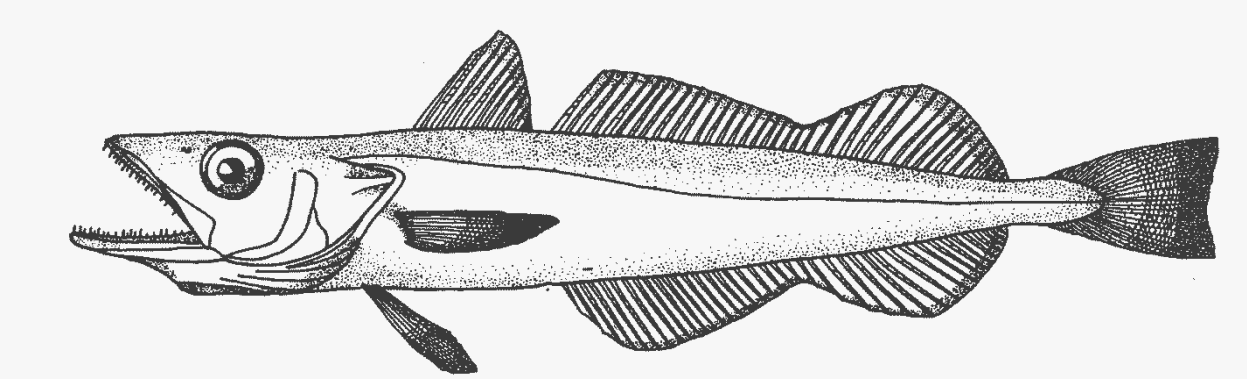
The proposed limits are less than the 50th percentile, which is equivalent to the median estimate of F_{MSY} and therefore considered to be risk neutral. Mathematically, the 25th percentile are 53 and 52% of the catches at the OFL for the northern and southern stocks, respectively.

The Council decided that more precaution was needed for silver hake than for red hake because of its higher economic value and relative amount of past and present targeting by the fishery. A core group of trawl vessels with open access groundfish permits target silver hake for specific markets, domestic and foreign. Much of the landings are processed and marketed through dealers in New York City. The vessels that target silver hake with small-mesh in exemption areas rely on these landings for a large proportion of their fishery income, so there would be a high cost for a concentrated group of fishermen if catches were unsustainable.

In addition, there were some additional unquantifiable risks identified by the Whiting PDT which were taken into consideration in the SSC recommendations for silver hake ABCs (see Document 2a in the Appendix). These include but are not limited to a declining relative abundance of large silver hake despite increases in biomass and a large amount of consumption by silver hake predators relative to catch.

4.1.3 Offshore hake

The silver hake southern stock ABC was increased by 4 percent to account for estimated historic catches of offshore hake and monitor silver and offshore hake together in southern stock area (SSC recommendation). This increases the 2012-2014 southern silver hake ABC to 33,995 mt.



Although sometimes targeted on specific trips, offshore hake are often landed and marketed as silver hake or 'whiting' due to a similarity in appearance and price. Some trips catch more offshore hake on certain tows, but others tows include a mixed catch which is seldom separated from silver hake.

Instead of requiring fishermen to separate catch and dealers to track and report separate landings of offshore hake (sometimes requiring dealers or fishermen to visually estimate the proportion of offshore hake in a trip's landings, or sort and separately weigh large volumes of similarly looking fish), the Council decided to monitor these two species as one species complex in the southern stock area and to increase the southern area whiting (silver and offshore hake) ABC to accommodate the historic average landings of offshore hake, estimated by two catch allocation models evaluated in the benchmark assessment (NEFSC 2011b). By doing so, all other ACL specifications (see the following sections) are adjusted accordingly to account for offshore hake landings.

4.2 Annual Catch Limits (ACL)

The ACLs for all four stocks or stock groups are equal to 95 percent of the corresponding ABC (see Table 3) to allow a buffer for management uncertainty.

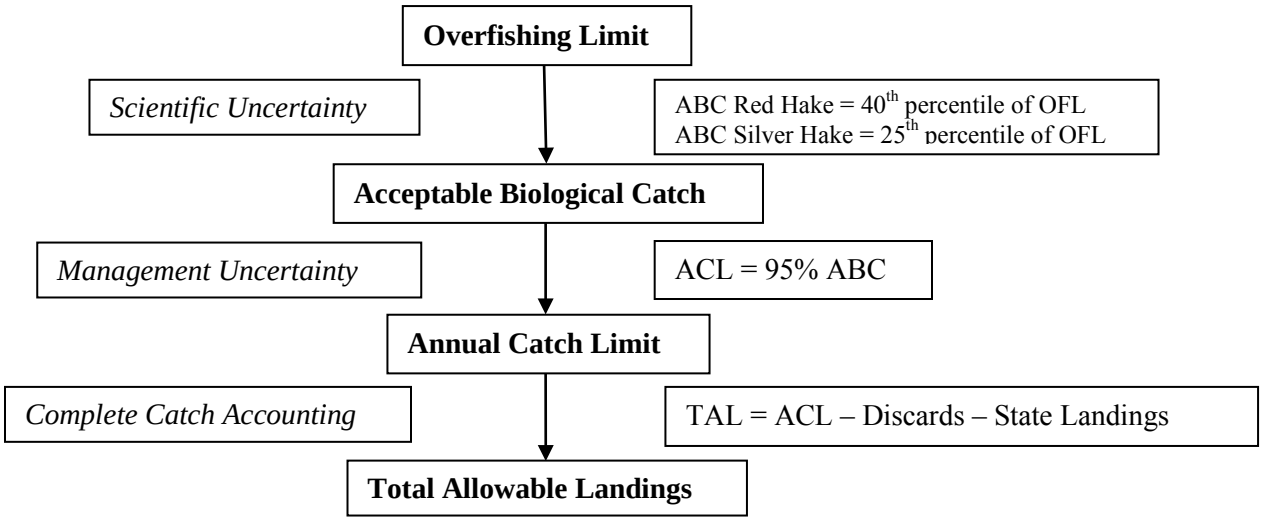
Table 3. 2012-2014 ACLs for small-mesh multispecies stocks.

	Northern Red Hake	Southern Red Hake	Northern Silver Hake	Southern Whiting
ABC	280.1 mt	3,259 mt	13,177 mt	33,995 mt
ACL	266 mt	3,096 mt	12,518 mt	32,295 mt

Table 4. Comparison of Proposed 2012-2014 Northern Area ACLs to recent catch

	Northern Red Hake	Northern Silver Hake
ACL	266.1 mt	12,518 mt
2010 Catch	311 mt	2,478 mt
Difference	-14%	+405%
	Southern Red Hake	Southern Silver Hake
ACL	3096 mt	32,295 mt
2010 Catch	1352 mt	7,110 mt
Difference	+129%	+354%

The ACL framework, including the overfishing limits and ABCs is illustrated below:



The fishery is and will be relatively heavily regulated and monitored and subject to a post-season accountability measure if catches exceed the ACL. Catches in the fishery have also demonstrated remarkable stability over the last decade or so, related to trip limits, the unique fishing characteristics, limited market demand, and prices. Although some of these factors may change, the Council believes that there is and will be sufficient safeguards that a 5% buffer to account for management uncertainty will be adequate. Setting the ACL at 95% of ABC is also being used to account for management uncertainty in other large mesh groundfish stocks, which have similar monitoring procedures. The Council may revisit this buffer in a future specification if it is found to be inadequate.

5.0 DESCRIPTION OF MANAGEMENT ALTERNATIVES AND RATIONALE (EA,RFA)

Because of the overlapping nature of Amendment 19 and the Secretarial Amendment, the discussion of a "no action" or "status quo" alternative is complicated. The Secretarial Amendment proposes an ACL framework mechanism, including ABCs, ACLs, stock-area TALs, and a specifications setting process. In addition, the Secretarial Amendment proposes an in-season accountability measure that would implement an incidental possession limit (400 lb for red hake; 1,000 lb for silver hake/whiting) when 90 percent of a TAL is projected to be harvested. A pound-for-pound payback of any ACL overage is proposed by the Secretarial Amendment for a post-season accountability measure. These measures, when they are alternatives below, are considered the "no action/status quo" alternative, even though those measures are currently only "proposed." Amendment 19 proposes to address a number of other management measures that were not addressed in the Secretarial Amendment. In those instances, the regulations that have been in effect for several years are the "no action/status quo" alternatives

5.1 Overfishing definitions

The red and silver hake overfishing definitions were reviewed during the most recent stock assessment (NEFMC 2011). The SAW51 panel recommended and the Council's SSC approved changes to the existing overfishing definitions which would be made by this amendment.

The following two alternatives describe the SAW51 recommended overfishing definitions for the northern and southern stocks of red and silver hake, compared to the previous stock assessment's definitions.

5.1.1 SAW51 recommended overfishing definitions (Preferred Alternative)

New overfishing definitions would apply independently to red and silver hakes in the northern and southern stock areas (Map 2) as follows:

5.1.1.1 Revised red hake overfishing definition

Red hake is overfished when the three-year moving arithmetic average of the spring survey weight per tow (i.e., the biomass threshold) is less than one half of the B_{MSY} proxy, where the B_{MSY} proxy is defined as the average observed from 1980 – 2010. The current estimates of $B_{THRESHOLD}$ for the northern and southern stocks are 1.27 kg/tow and 0.51 kg/tow, respectively.

Overfishing occurs when the ratio between catch and spring survey biomass exceeds 0.163 kt/kg and 3.038 kt/kg, respectively, derived from AIM analyses from 1980-2009.

Rationale: These overfishing definitions were proposed based on new analysis of red hake stock dynamics and was approved by the SAW 51 review panel and recommended for implementation by the Council's SSC. These overfishing definitions include updated survey biomass thresholds, in FRV Albatross units for consistently sampled survey strata.

The Council designated this alternative as preferred because it has been developed through the SAW process, has been peer reviewed, and represents best available science.

5.1.1.2 Revised silver hake overfishing definition

Silver hake is overfished when the three-year moving average of the fall survey weight per tow (i.e. the biomass threshold) is less than one half the B_{MSY} proxy, where the B_{MSY} proxy is defined as the average observed from 1973-1982. The most recent estimates of the biomass thresholds are 3.21 kg/tow for the northern stock and 0.83 kg/tow for the southern stock.

Overfishing occurs when the ratio between the catch and the arithmetic fall survey biomass index from the most recent three years exceeds the overfishing threshold. The most recent estimates of the overfishing threshold are 2.78 kt/kg for the northern stock and 34.19 kt/kg for the southern stock of silver hake.

Rationale: These overfishing definitions were proposed based on new analysis of red hake stock dynamics and was approved by the SAW 51 review panel and recommended for implementation by the Council's SSC. These overfishing definitions include updated survey biomass thresholds, in FRV Albatross units for consistently sampled survey strata.

The Council designated this alternative as preferred because it has been developed through the SAW process, has been peer reviewed, and represents best available science.

5.1.1.3 Offshore hake

Overfishing for offshore hake could not be defined using the available stock assessment information. Indices of abundance and biomass from surveys and commercial catch data were deemed to be unreliable for management.

5.1.2 No action (pre-SAW51 overfishing definition)

The following overfishing definitions would continue to apply:

5.1.2.1 Existing red hake overfishing definition

The southern stock of red hake is in an overfished condition when the three-year moving average weight per individual in the fall survey falls below the 25^{th} percentile of the average weight per individual from the fall survey time series 1963-1997 (0.12) AND when the three-year moving average of the abundance of immature fish less than 25 cm falls below the median value of the 1963-1997 fall survey abundance of fish less than 25 cm (4.72).

5.1.2.2 Existing silver hake overfishing definition

Silver hake is overfished when the three-year moving average of the fall survey weight per tow is less than 3.31 kg/tow and 0.89 kg/tow for the northern and southern stocks respectively, one half of the B_{MSY} proxy (the average observed from 1973 – 1982). If an analytical assessment (e.g. VPA) for silver hake is available, the three-year moving average will be replaced with the terminal year biomass estimate and compared with the mean biomass estimated for 1973 – 1982.

Overfishing occurs when fishing mortality, derived from the latest three years of survey data, exceeds $F_{0.1}$ (0.41 and 0.39 for the northern and southern stocks of silver hake respectively). If an analytical assessment is available, then the terminal year fishing mortality rate will be compared to $F_{0.1}$.

Rationale: There is no rationale to retain the existing overfishing definitions since it would violate guidelines that require using best available science.

5.1.2.3 Offshore hake

No overfishing definition for offshore hake exists.

5.2 Mechanism for Specifying Annual Catch Limit (ACL)

The intent of the ACL is to set a catch limit that will account for management uncertainty. This is the amount of catch that would trigger post season accountability measures if the fishing year catch exceeds the values below. The ACLs that are expected to be implemented by Secretarial Amendment would be adopted by the Council in Section 4.0. The alternatives described below provide options on how to administer the ACLs and the specifications setting process.

The following options are described below:

1. Specifications Process Alternatives
    a. Specifications Process, including those measures which may be adjusted in a framework
    b. No specifications process
2. Annual Review Alternatives
    a. Council-led annual reports
    b. NMFS-led annual reports
    c. No Annual Reports

5.2.1 Setting Annual Specifications and Frameworkable Measures

The intent of the specification process is to allow for adjustment of various specifications, including but not limited to ACL specifications and possession limits. These adjustments would respond to changes in resource conditions indexed by the survey and/or estimated by an assessment as well as changes in fishery conditions, such as discarding.

In addition, the amendment would allow for adjustment to new management measures implemented by this amendment in future years using the Council's framework adjustment process.

5.2.1.1 Specification package (Preferred Alternative)

Every three years beginning with the 2015 fishing year, the Council will initiate a specification package that would update the ACL specifications and possibly other measures such as possession limits, responding to new data and changes in fishery conditions. These specifications and adjusted measures would apply for another three-year specification cycle. Where needed, the Council may also initiate a framework adjustment, responding to information provided in annual monitoring reports.

In the spring of 2014 (and every three years thereafter), the Council would begin the process with the Whiting PDT developing a report on the fishery which provides information to help the Council in its decision-making. The term of reference for the PDT will be to monitor the effectiveness of the management plan and if necessary develop options for changes in specifications or inclusion in a framework adjustment or amendment such that the plan continues to meet the objectives. This report will also provide information and form the basis of the Affected Environment and Impact Analysis sections of a Specifications Package.

Data in this report will include but will not be limited to new survey biomass indices, reported landings, estimated discards. In fishing year 2014 the available data would include survey data for 2011-2013 fall and 2012-2014 spring biomass indices, plus calendar year 2011-2014 landings reports and discard estimates. The report may also include relevant information about recently implemented or developing alternatives in other plans that have or may affect the effectiveness of the existing management measures and specifications. Estimates of OFL, ABC, ACL, and TAL specifications will be provided using the new data.

If the PDT recommends adjustments to the FMP to meet the plan objectives and to respond to new data and fishery conditions, it will make recommendations to the SSC, which will review the PDT's analysis and subsequently advise the Council at its June meeting on potential adjustments to the Small-mesh Multispecies FMP. If the Council agrees that action is required, it will initiate a framework action. Neither a framework action nor specifications process will be needed to apply automatic accountability measures for prior ACL overages.

For a specifications package, the document may be developed and approved by the Council at the summer or early fall Council meeting. Final framework documents would be approved by the Council during the fall meetings and submitted for NMFS review by December 1, so that the proposed and final rulemaking may be completed by the beginning of the fishing year (May 1). In addition to existing management measures that may be adjusted by framework action, the Council may also modify the ACL specifications (OFLs, ABCs, ACLs, TALs), allocations by mesh exemption program and quarter, catch monitoring procedures, the buffer separating the ABC from the OFL and the ACL from the ABC, the TAL triggers, and possession limits to be consistent with the revised specification recommendations and estimates of scientific and management uncertainty.

The Regional Administrator would publish the Councils' recommendation in the *Federal Register* as a proposed rule. The *Federal Register* notification of the proposed action will provide a public comment period in accordance with the Administrative Procedures Act. If the Regional Administrator concurs that the Councils' final recommendation meets the Northeast Multispecies FMP objectives and is consistent with other applicable law, and determines that the recommended management measures should be published as a final rule, the action would be published as a final rule in the *Federal Register*.

If a regulatory action is not implemented to establish new ACLs for the small-mesh multispecies fishery for a given year, either through the annual review procedure or triennial specification process, the OFL, ABC, ACL, and TAL specifications in effect during the previous year would remain in effect until new measures are implemented.

In addition to management measures that may already be adjusted by a framework process described in the Northeast Multispecies FMP, the Council may adjust the additional measures listed below. These framework measures are not considered to be part of a specification process which accommodates new data to set specifications like ABCs, ACLs, TALs, and possession limits.

- OFL and ABC values
- ACLs, TALs, and TAL allocations
- Red, silver, or offshore hake possession limits, including incidental possession limits that may be triggered
- Red and silver hake landings targets for specific small-mesh management programs
- Proportions used to allocate landings by area or season
- Changes to reporting requirements and methods to monitor the fishery

- Overfishing definition mortality, biomass proxy values, and the basis for establishing those MSY proxies, including
    - Selected reference time series
    - Survey strata used to calculate biomass indices and reference points
    - The selected survey used for status determination
- Other measures contained within the NE Multispecies that apply to the small-mesh multispecies fisheries

Rationale: The proposed process described above would be followed every three years to make necessary adjustments to specifications and measures in the plan. This process would include the development of a new specifications package to make routine adjustments based on new scientific data without following a more cumbersome framework adjustment or amendment development process. Inclusion of these new measures which were implemented by this amendment would give the Council added flexibility to deal with new issues in a timely manner.

The Council designated this alternative as preferred because it follows other successful procedures that the Council uses to develop and adjust specifications.

5.2.1.2 No specification process – all changes and specifications to be developed through amendments or framework actions, or through a more general process.

This alternative would require the Council to develop adjustments to specifications and management measures using the existing framework adjustment and plan amendment process.

Rationale: Although a framework adjustment process would take longer to develop and implement, amendments and framework actions allow for a greater amount of public input through official framework meetings or public hearings.

5.2.1.3 No Action - general specification process

This alternative would rely on a more general specification process NMFS adopted in the Secretarial Amendment . The specifications process in the Secretarial Amendment was not as detailed as to the timing of the process and did not include as comprehensive a list of frameworkable actions.

Rationale: The no action specifications process were developed by NMFS and are not as prescriptive as the other specifications process described above.

5.2.2 Annual Monitoring Alternatives

5.2.2.1 Annual monitoring report to be prepared and presented to the Council by the Whiting PDT

In addition to the specification process described in Section 5.2.1, the PDT will analyze the data and prepare an annual monitoring report to be presented at the summer Council meeting, or as soon as data from the prior calendar year becomes available to allow estimates of landings, discards, and survey biomass. The PDT may or may not recommend adjustments of management measures, depending on how drastically the indicators have changed since the last Council action. This report will also be used to determine whether post season accountability measures (Section 5.5) for the next fishing year are necessary.

Rationale: Although the Council may not initiate an action, an annual monitoring report by the PDT would help the Council to decide whether such action is necessary. This process is also described in the Secretarial Amendment and is likely to be approved.

5.2.2.2 Annual landings, discard estimates, and stratified mean survey biomass to be prepared and presented to the Council by NMFS

In addition to the specification process described in Section 5.2.1, NMFS will prepare an annual monitoring report to be presented at the summer Council meeting or when data from the prior calendar year becomes available to allow estimates of landings, discards, and survey biomass. This report will also be used to determine whether post season accountability measures (Section 5.5) for the next fishing year are necessary.

Rationale: The information needed to determine whether accountability measures need to apply is routine and would be sufficient for the Council to determine whether further work is needed by the PDT to develop a management action.

5.2.2.3 Annual landings, discard estimates, and stratified mean survey biomass to be prepared and presented to the PDT by NMFS; Whiting PDT to provide advice (Preferred Alternative)

Annually when data become available for analysis, NMFS would prepare a report summarizing the trends in the fishery and changes in stock biomass. NMFS would present this information to the Whiting PDT, which would review such information and advise the Council. Unlike the process in Section 5.2.2.1, NMFS would be responsible for preparing the summarized data, but the Whiting PDT will still be charged with reviewing the data and providing advice. This report will also be used to determine whether post season accountability measures (Section 5.5) for the next fishing year are necessary.

Rationale: Although requiring action at one or more meetings by the Whiting PDT, this alternative would require NMFS to prepare the relevant data summaries which would be reviewed by the Whiting PDT and reported to the Council.

The Council designated this alternative as preferred because it clearly assigns responsibilities as needed, without obligating the Council's PDT to a heavy workload. This process is used for other Council FMP monitoring processes and has worked well.

5.2.2.4 No Action

The Council would conduct periodic reviews as necessary to prepare management actions, either amendments or framework adjustments. Alternatively, an annual monitoring report will be prepared as described in the Secretarial Amendment to be approved and implemented.

Rationale: This alternative would rely on NMFS to determine whether post-season AMs would be triggered, without a formal report being made to the Council. Adjustments to specifications would be considered every three years and the Council could initiate a framework adjustment or develop a new amendment at any time in response to new issues that are brought to the Council's attention.

5.2.3 TAL monitoring, in addition to existing reporting requirements

Additional reporting requirements will be needed to make timely assessment of landings to stock or management area. In any of the alternatives described below, offshore hake in the southern stock area would be counted against the southern whiting TAL. If in the rare case that offshore hake are landed in the northern stock area (for example in the deep waters of the Gulf of Maine), the landings would count against the northern silver hake TAL, regardless of whether they were reported separately, or were silver hake misreported as offshore hake. This is consistent with the treatment of catches in the benchmark stock assessment (NEFSC 2010a) from which the Council derived ABCs.

5.2.3.1 Weekly Vessel Trip Reports (VTRs) (Preferred Alternative)

Vessels taking small-mesh multispecies trips and landing red, silver, or offshore hake would be required to make weekly VTR reports, which NMFS will use to assign dealer-reported hake landings to stock area or small-mesh area program. If necessary, NMFS may add a gear code to the VTR system to identify small-mesh trawls used to target red, silver, and offshore hake. No additional reporting requirements will be needed, but the reports must comply with existing rules for vessel operators submitting VTR reports.

In order to link this information the vessel operator must provide a VTR serial number to the dealer or dealers purchasing the fish from that trip, as well as to the observer if the trip is observed. The dealer will include this serial number when reporting purchases to NMFS. NMFS will provide directions for reporting this serial number for those vessels that fish in multiple statistical areas or use multiple gears on the same trip (vessels are required to submit a new VTR page for each statistical area fished or gear used).

Rationale: This requirement would enable NMFS to determine in near real time the origin of landings and assign the landings to the appropriate stock area or management program. Unless other more burdensome reporting or sampling occurs, NMFS would have no other way to assign landings to the proper area until well after the end of the fishing year, using existing processing procedures used to assign catch to stock area for assessments.

The Council designated this alternative as preferred because it would allow the timeliest monitoring of the TAL triggers and improve the accuracy of assigning landings to the appropriate stock and/or management area.

5.2.3.2 Assigning landings to management program based on gear use

Only red hake landings reported by vessels using small-mesh (including shrimp trawls) would be applied to the landings targets for Cultivator Shoals and other exempted areas (Map 3). The combination of a gear descriptions/codes and the three digit statistical area, and trip or landings dates will be used to assign landings to the appropriate small-mesh area program.

Landings by all other gears, including but not limited to large mesh trawl, gillnets, and herring mid-water trawls and purse seines [as defined in 50 CFR §648.2 and regulated under 50 CFR §648(d) and (e)] would be counted against the Gulf of Maine/Northern Georges Bank exemption area (Map 3) TAL. NMFS would use gear usage as reported on a vessel's VTR to assign landings appropriately.

This procedure would only apply to the northern stock area unless the Council later defined specific small-mesh exemption areas in the Mid-Atlantic and Southern New England Exemption areas. And this procedure is unnecessary unless there are small-mesh area program landings targets (Sections 5.3.2 and 5.3.3) and accountability measure triggers.

Rationale: This procedure would ensure that landings are monitored in the same manner as the procedure applied to estimate the small-mesh area program landings targets (Sections 5.3.2 and 5.3.3)

5.2.3.3 No additional monitoring (No Action) – landings assigned to stock area on an annual basis using existing NEFSC area allocations procedures that use Vessel Trip Reports (VTRs).

NMFS would use existing procedures to allocate catches and landings to stock area based on VTRs which are submitted according to the existing schedule

Rationale: This alternative would only be appropriate if no real time monitoring were needed to implement in season accountability measures.

5.3 Northern Stock Area Total Allowable Landings (TAL) Alternatives

Red and silver hake TALs are proposed for the northern stock area to reduce the risk that fishing effort targeting these species may increase, causing catches to exceed the ACLs. The intent of a stock wide TAL for each species is to account for expected discards and state water landings. Incidental possession limits would be triggered at 90% of the TAL to put a brake on the fishery and reduce catches, with the intention that landings should not exceed the TAL. This alternative is the same as the one proposed for the Secretarial Amendment and is therefore considered as No Action.

Small-mesh exemption area silver hake and red hake landings targets are also proposed. Unlike the stock wide TAL, the exemption area landings targets are mainly proposed to establish an in-season AM trigger at 90% of the landings target. The intent of this measure is to discourage fishing on a species approaching the landings target, reducing the risk that the stock wide TAL trigger would be met. It could prevent the directed small-mesh fishery from affecting fishing by vessels targeting other species and landing some red and silver hake as an incidental catch in the northern stock area.

The following alternatives are described below. They are not mutually exclusive and the Council may select a stock wide TAL, or a stock wide TAL with exemption area landings targets. The Council may or may not also select a roll-over provision for unlanded amounts in the Cultivator Shoals Area to make those pounds available in other small-mesh exemption areas that remain open later in the fishing year.

1. Stock wide annual TAL specifications (No Action), derived from the ACL and account for expected discards and state water landings
2. Exemption area landings targets for the Cultivator Shoals Area and the five small-mesh exemption area programs
3. A rollover provision for unlanded amounts allocated to the Cultivator Shoals Area, which would make unlanded pounds available in the other inshore small-mesh areas

5.3.1 Stock-wide Annual TAL (No Action; Preferred Alternative)

This alternative would establish a stock area-wide TAL for red and silver hake, individually.

The Council has recommended setting the discard rate equal to the most recent three-year average. For the 2012-2014 specifications, discards in the northern stock area as a proportion of total catch were 65% for red hake and 26% for silver hake (see Section 7.1.3). Discard mortality assumed in the benchmark assessment and used to establish the ABCs was 100% for all gear types. The Whiting PDT may propose

and the Council's SSC may approve variations in this procedure for future specifications, if there is good cause for expecting a change in discard rates due to regulatory changes or other causes.

The Council recommended that most recent three-year period to estimate discards because it is most reflective of probable conditions in the next specification cycle. An assumption about future discard mortality is needed to set future specifications, since many of the accountability measures rely on real-time monitoring of landings, instead of more costly real-time monitoring of discards and total catch.

The Council has recommended using an estimate of three percent to account for the landings of small-mesh multispecies by vessels without Federal permits (i.e., state landings). The Council may change this assumption for future specifications as the fishery adjusts to ACL management and new data are collected. Landings by vessels without Federal fishing permits and fishing exclusively in state waters cannot under normal circumstances be regulated by a Federal fishery management plan. Therefore, state waters catches cannot be limited by Federal regulations under this amendment, but still contribute to total stock removals which can cause overfishing, if not taken into account. The ABCs chosen by the Council to prevent overfishing are based on all catches, regardless of source or location. The Council and NMFS rely on cooperation with states to regulate state waters catches when needed to achieve shared conservation objectives, the most parsimonious approach is to assume that state water catches will remain nearly constant, unless there is some external reason to expect changes.

During much of the recent red and silver hake landings history (see Section 7.1.4), state water landings have remained relatively low, close to 3 percent of total landings. The Council accepted this level as a reasonable expectation of future state water landings and reduced the Federal TALs accordingly.

Table 5. 2012-2014 Northern Area TALs

	Northern Red Hake	**Northern Silver Hake**
ACL	266.1 mt	12,518 mt
2008-2010 Discard Rate	65%	26%
Estimated Discards	173.0 mt	3,267 mt
State Landings Rate	3%	3%
State Landings Estimate	2.8 mt	278 mt
Federal TAL	90.3 mt	8,973 mt

Table 6. Comparison of Proposed Northern Area TALs to recent landings

	Northern Red Hake	**Northern Silver Hake**
Proposed Federal TAL	90.3 mt	8,973 mt
2009 Landings	92 mt	1,031 mt
Difference	-2%	+770%
2010 Landings	69 mt	1,639 mt
Difference	+31%	+447%

Rationale: This alternative is included in the Secretarial Amendment, and is likely to be implemented.

The Council designated this alternative as preferred because it would be less costly to monitor and the small-mesh exemption area targets may not provide the expected benefits, reducing the impact on fishing targeting other species in the northern stock area.

5.3.2 Small-mesh Exemption Area Landings Silver Hake Targets

If the Council approves this alternative, Amendment 19 would establish separate landings targets for silver hake for the Cultivator Shoals Exemption Area Program and the inshore Gulf of Maine small-mesh exemption area programs (the Raised Footrope Trawl Exemption Area near Cape Cod, Small-mesh Area I, Small-mesh Area II, and the Gulf of Maine Raised Footrope Trawl Area along the coast of Maine). These calculations would start with the Federal TAL described in Section 5.3.1, but would further divide that TAL by the 2004-2010 landings proportions, described in Table 7. The remainder of the TAL and any of the landings not made by fishing in the small-mesh programs (i.e. the directed fishery in the northern stock area) would be available for incidental landings by vessels not fishing in one of the small-mesh exemption programs.

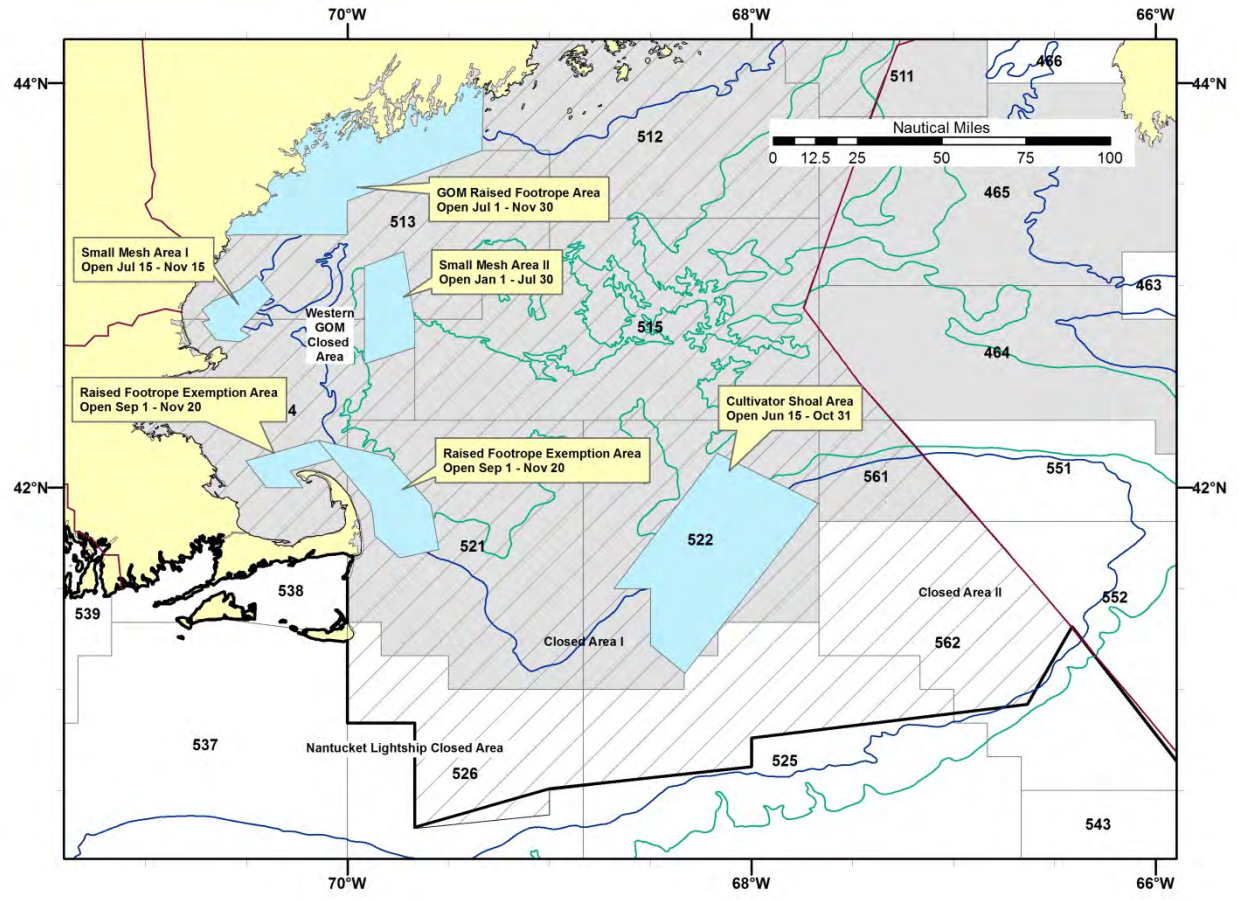
Silver hake landings by vessels fishing in the small-mesh exemption programs would be monitored based on VTRs and dealer reports. It is intended that this measure would work with the in-season accountability measure described in Section 5.4, which would reduce the possession limit to an incidental level when a trigger point is reached, as well as the alternative to require weekly VTRs by vessels landing small-mesh multispecies. Vessels using small-mesh to target silver hake, red hake, or shrimp would count toward the small-mesh area program allocations. Silver hake landings by vessels using other gears, large mesh trawls, or targeting herring with mid-water trawls or pelagic purse seines (as defined in 50 CFR §648.2 and as regulated in 50 CFR §648.80(d) and 50 CFR §648.80(e)) would count toward the northern stock silver hake TAL regardless of where fishing occurred in the northern stock area.

VTR data from 2004 to 2010 would be used as the basis for allocating these landing targets by exemption program. According to this data for silver hake, 50.9% of landings were derived from the Cultivator Shoals Area and 34.6% from the other small-mesh exemption areas[3]. These percentages would apply to the 2012-2014 fishing years (see table below) and future specifications.

Rationale: Because the small-mesh exemption programs serve different fleets, this measure would allow traditional vessels to catch and land silver hake in amounts consistent with their historic participation in the fishery since the small-mesh exemption programs were established. The Council's intention for this measure is for the landings allocations to serve as targets and to establish a level where directed fishing would be curtailed or temporarily close that small-mesh exemption program until the next fishing year.

[3] The remaining 14.5% of 2004-2010 landing were caught elsewhere in the Gulf of Maine by vessels not participating in a small-mesh exemption program.

Map 3. Small-mesh area programs (labeled) with areas closed to all mobile gear fishing in the Gulf of Maine/northern stock area. The larger hatched area is the Gulf of Maine exemption area. Catches from the shaded statistical areas are attributed to the northern stock area, consistent with the small-mesh multispecies stock assessments.



5.3.3 Exemption Area Red Hake Landings Targets

If the Council approves this alternative, Amendment 19 would establish separate red hake landings targets for the Cultivator Shoals Exemption Area Program and the inshore Gulf of Maine small-mesh exemption programs (the Raised Footrope Trawl Exemption Area near Cape Cod, Small-mesh Area I, Small-mesh Area II, and the Gulf of Maine Raised Footrope Trawl Area along the coast of Maine). These calculations would start with the Federal TAL described in Section 5.3.1, but would further divide that TAL by the 2004-2010 landings proportions (Table 7). The remainder of the TAL and any of the landings not made by fishing in the small-mesh programs would be available for incidental landings by vessels not fishing in one of the small-mesh exemption programs.

Red hake landings by vessels fishing in the small-mesh exemption programs would be monitored based on weekly VTRs and dealer reports (Section 5.2.3.1). It is intended that this measure would work with the in-season accountability measure described in Section 5.4, which would reduce the possession limit to an incidental level when a trigger point is reached. Vessels using small-mesh to target silver hake, red hake, or shrimp would count toward the small-mesh area program allocations. Red hake landings by vessels using other gears, large mesh trawls, or targeting herring with mid-water trawls or pelagic purse seines (as defined in 50 CFR §648.2 and as regulated in 50 CFR §648.80(d) and 50 CFR §648.80(e))

would count toward the northern stock red hake TAL regardless of where fishing occurred in the northern stock area.

VTR data from 2004 to 2010 would be used as the basis for allocating the landings targets by program. According to this data for red hake, 18.0% of landings were derived from the Cultivator Shoals Area, 56.7% from the other small-mesh exemption areas[4]. These percentages would apply to the 2012-2014 fishing years (see table below) and future specifications.

Rationale: Because the small-mesh exemption programs serve different fleets, this measure would reduce the potential that red hake catches and landings in the Cultivator Shoals Exemption Area Program would curtail access to the small-mesh fisheries in the other small-mesh exemption programs in the Gulf of Maine. This may be very important because the proposed ABCs for the northern stock of red hake are less than recent catches. Because red hake landings have lower value and the ABC is less than silver hake, this measure could prevent Cultivator Shoals Exemption Area Program landings of red hake from preventing access to silver hake and red hake in other inshore small-mesh programs.

Table 7. Proposed 2012-2014 small-mesh program area landings targets of red and silver hake in the northern stock area.

		Red hake	Silver hake
Total northern stock area TAL (mt)		90.3	8973
Cultivator Shoals Exemption Area Program landings targets	Percent allocation	18.0%	50.9%
	2012-2014 Target (mt)	16.3	4567
Inshore Gulf of Maine Exemption Area Programs landings targets	Percent allocation	56.7%	34.6%
	2012-2014 Target (mt)	51.2	3105

5.3.4 Cultivator Shoals Exemption Area Program Roll-Over Provision Alternatives

If the Council chooses one of the above alternatives that would sub-divide the stock-area TALs of for silver hake, red hake, or both, into the exemption area programs, the Council must choose between one of the following alternatives:

1. Cultivator Shoals Exemption Area Program Landing Target Roll-Over

2. No Cultivator Shoals Exemption Area Program Landing Target Roll-Over

5.3.4.1 Cultivator Shoals Exemption Area Program Landing Target Roll-Over

The Cultivator Shoals Exemption Area Program opens on June 15 and closes on October 31 of each year, proceeding at least some of the open seasons for the other small-mesh exemption programs in the Gulf of Maine. Red and/or silver hake landings which have not been made at the end of the Cultivator Shoals Exemption Area season (i.e., if landings are less than the Cultivator Shoals Exemption Area Program landing target) would be re-allocated during the fishing year to the other small-mesh exemption area program landing target. This in-season re-allocation may allow a re-opening of the other small-mesh area

[4] The remaining 25.3% of 2004-2010 landing were caught elsewhere in the Gulf of Maine or by vessels not using small-mesh gear to target shrimp, red hake, or silver hake.

programs, if their landings have already exceeded the in-season accountability measure triggers by increasing the possession limit from an incidental level (Section 5.4.3) to the normal year round possession limit for red hake (if applicable; see Section 5.7.1)) or silver hake.

For example, if vessels in the Cultivator Shoals Exemption Area Program land 15 mt (of the available 19.5 mt) of red hake and 2,800 mt (of the available 4,635 mt) of silver hake by October 31, the Regional Administrator would increase the landings targets for the other small-mesh exemption area program's landing target by 4.5 mt and 1,835 mt, respectively.

Rationale: The re-allocation of potential landings from the Cultivator Shoals Exemption Area Program would increase the availability of fish to the vessels participating in the inshore small-mesh exemption area programs, increasing the potential that optimum yield would be achieved, without exceeding the ACLs for the northern stock area.

5.3.4.2 No Cultivator Shoals Exemption Area Target Roll-Over Provision

This alternative would not implement a roll-over of unused landings from the Cultivator Shoals Exemption Area Program to the Inshore Gulf of Maine Exemption Area Programs landing target, if a sub-divided TAL is selected by the Council. This alternative may result in some landings of either red or silver hake not being available for the directed, small-mesh fishery. The potential remains that those landings could be taken incidentally in other fisheries throughout the northern stock area, however.

5.4 Northern stock area in-season accountability measures

The intent of in-season accountability measures is to limit landings and discourage trips targeting red, silver, and offshore hake when landings reach 90% of the TAL to reduce the risk that catches will exceed the northern stock area TALs.

In Section 5.4.3, the Council additionally proposes management alternatives that would apply to fishing in the small-mesh area programs for red and/or silver hake to prevent the landings in those areas from affecting fishing opportunity in other parts of the northern stock area.

The following alternatives are described below:

1. Incidental possession limits for red hake when landings reach a TAL trigger with alternatives for 200, 300, and 400 lbs.
2. Incidental possession limits for silver hake when landings reach a TAL trigger with alternatives for 500, 1000, and 2000 lbs.
3. Small-mesh area program incidental limits
    a. Incidental possession limits for red hake when landings reach a landings target trigger with alternatives for 200, 300, and 400 lbs.
    b. No small-mesh are incidental limits
4. No in-season accountability measures
5. No Action – a stock wide in-season AM to be chosen for the Secretarial Amendment. NMFS is expected to approve a 400 lbs. red hake and 1000 lbs. silver hake incidental possession limit.

5.4.1 Red hake incidental possession limits for the northern stock area

One of the following possession limits would be automatically triggered when northern stock area red hake landings reach 90% of the TAL and the Regional Administrator determines that without taking action landings would exceed the TAL for that stock by the end of the fishing year. If the Council chooses different red hake possession limits for the northern and southern stock areas and the vessel fishes in both the Gulf of Maine/Georges Bank (Map 3) and Southern New England or Mid-Atlantic exemption areas (Map 4) during a trip, the lower of the stock area possession limits will apply to that trip. These limits would be implemented by Notice Action and would remain in place until the end of the fishing year.

5.4.1.1 200 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 200 lbs. of whole or whole weight equivalent of red hake may be retained on board vessels fishing in the Gulf of Maine exemption area (see Map 3). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This incidental limit would discourage vessels from targeting red hake and encourage vessels to fish in other areas where red hake are less abundant. Out of the options examined by the PDT, this alternative was determined to be the most effective at discouraging vessels from targeting red hake, but would increase discards more than the other alternatives, particularly for vessels that target silver hake with small-mesh trawls.

5.4.1.2 300 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 300 lbs. of whole or whole weight equivalent of red hake may be retained on board vessels fishing in the Gulf of Maine exemption area (see Map 3). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting red hake and encourage vessels to fish in other areas where red hake are less abundant, but would be less effective than the above alternative and more effective than the alternative below. Compared to the expected behavior for the alternative above, some vessels fishing inshore on day trips may continue to target red hake, particularly to be sold as bait, and vessels targeting silver hake may have less incentive to avoid catching red hake.

On the other hand, this alternative would increase discards less than the above alternative because more trips would be unaffected by the higher incidental possession limit.

5.4.1.3 400 pounds of whole landings, no more than one landing in a calendar day (Preferred Alternative)

When triggered by the process described above, no more than 400 lbs. of whole or whole weight equivalent of red hake may be retained on board vessels fishing in the Gulf of Maine exemption area (see Map 3). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting red hake and encourage vessels to fish in other areas where red hake are less abundant, but would be less effective than either of the above alternatives. Compared to the expected behavior for the two alternatives above, some vessels fishing inshore on day trips may continue to target red hake, particularly to be sold as bait, and vessels targeting silver hake may have less incentive to avoid catching red hake.

On the other hand, this alternative would increase discards less than the other alternatives because more trips would be unaffected by the higher incidental possession limit.

N.B. This alternative is being proposed as part of the Secretarial Amendment.

The Council designated this alternative as preferred because analysis by the Whiting PDT indicates that it is likely to be effective in keeping landings (and induced discards) below the TAL. There isn't a meaningful contrast in the effectiveness of lower incidental possession limits, but a 200 lbs. possession limit is estimated to cause an unacceptable increase in discards.

5.4.2 Silver hake incidental possession limits for the northern stock area

One of the following possession limits would be automatically triggered when northern stock area silver hake landings reach 90% of the TAL and the Regional Administrator determines that without taking action landings would exceed the TAL for that stock by the end of the fishing year. If the Council chooses different red hake possession limits for the northern and southern stock areas and the vessel fishes in both the Gulf of Maine/Georges Bank (Map 3) and Southern New England or Mid-Atlantic exemption areas (Map 4) during a trip, the lower of the stock area possession limits will apply to that trip. These limits would be implemented by Notice Action and would remain in place until the end of the fishing year.

5.4.2.1 500 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 500 lbs. of whole or whole weight equivalent of silver hake may be retained on board vessels fishing in the northern stock area (see Map 3). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This incidental limit would discourage vessels from targeting silver hake and encourage vessels to fish in other areas where silver hake are less abundant, stop fishing, or target other species with different gear. Since vessels that land more than this amount of silver hake are typically using small-mesh trawls to target the species, many vessels would stop fishing for silver hake.

Out of the options examined by the PDT, this alternative was determined to be the most effective at discouraging vessels from targeting silver hake, but would increase discards more than the other alternatives, particularly for vessels that fish for other species using large mesh trawls and catch larger quantities of silver hake.

5.4.2.2 1000 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 1000 lbs. of whole or whole weight equivalent of silver hake may be retained on board vessels fishing in the northern stock area (see Map 3). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting silver hake and encourage vessels to fish in other areas where silver hake are less abundant, but would be less effective than the above alternative and more effective than the alternative below. Compared to the expected behavior for the alternative above, some vessels fishing inshore on day trips may continue to target silver hake, particularly to be sold as bait or food, and vessels targeting other species may have less incentive to avoid catching silver hake.

On the other hand, this alternative would increase discards less than the above alternative because more trips would be unaffected by the higher incidental possession limit.

N.B. This alternative is being proposed as part of the Secretarial Amendment.

5.4.2.3 2000 pounds of whole landings, no more than one landing in a calendar day (Preferred Alternative)

When triggered by the process described above, no more than 2000 lbs. of whole or whole weight equivalent of silver hake may be retained on board vessels fishing in the northern stock area (see Map 3). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting silver hake and encourage vessels to fish in other areas where silver hake are less abundant, but would be less effective than either of the above alternatives. Compared to the expected behavior for the two alternatives above, some vessels fishing inshore on day trips may continue to target silver hake, particularly to be sold as bait or food, and vessels targeting other species may have less incentive to avoid catching silver hake.

On the other hand, this alternative would increase discards less than the other alternatives because more trips would be unaffected by the higher incidental possession limit.

The Council designated this alternative as preferred because analysis by the Whiting PDT indicates that it is likely to be effective in keeping landings (and induced discards) below the TAL. There isn't a meaningful contrast in the effectiveness of lower incidental possession limits, but a 500 lbs. possession limit is estimated to cause an unacceptable increase in discards.

5.4.3 Red hake incidental possession limits for the Cultivator Shoals Area and other Small-mesh Area Programs

The intent of the special accountability measures for Cultivator Shoals Area and the other Small-mesh Area Programs is to prevent excessive landings from these programs from affecting the opportunity fish in areas that open later in the fishing year and to avoid higher discards that could occur if the northern stock area landings reach 90% of the TALs. At this time, the Council proposes that this alternative only apply to red hake landings because a) the recent red hake catches are closer to or exceed the proposed ACL and b) vessels fishing for silver hake with small-mesh trawls are often able to avoid catching red hake by fishing in different depth ranges. Because the recent silver hake catches are a relatively small fraction of the proposed ACL, exceeding the silver hake landings target in Cultivator Shoals Area or in the other Small-mesh Area Programs would be unlikely to cause silver hake catches to exceed the ACL for the northern stock area.

5.4.3.1 Reduce red hake possession limit an incidental level for vessels fishing in Small-mesh Area Programs

When landings of red hake reach 90% of the landings targets for the small-mesh area programs (Sections 5.3.2 and 5.3.3), the Regional Administrator will reduce the red hake possession limit to an incidental limit (Section 5.3.1), regardless of timing. The Council may select a different incidental limit of 200, 300, or 400 lbs. to apply to vessels fishing in the small-mesh area programs than the one chosen for the northern stock area (Section 5.4.1).

Rationale: The recent red hake landings are at or slightly above the proposed northern stock area TAL, so red hake landings in one area may affect the opportunity to fish with small-mesh in other areas and/or cause discarding in fisheries targeting other species with small or large mesh trawls. Industry advisors report that depending on existing conditions, they are able to fish in the small-mesh area programs to target silver hake while catching relatively few red hake by exercising more selective fishing behavior (for example fishing in specific depths). Consequently, limiting red hake landings when they reach the small-mesh area landings targets (Sections 5.3.2 and 5.3.3) could allow more opportunity to fish for silver hake while limiting discarding in fisheries using small and large mesh trawls to target groundfish, herring, shrimp, and other species.

5.4.3.2 No small-mesh management program accountability measures

If the final action includes small-mesh area landings targets, this alternative would mean that there would be no special in-season accountability measures for the small-mesh area program fishing. Incidental possession limits would only apply when triggered for the northern stock area. Thus landings of red or silver hake from the small-mesh areas could exceed the landings targets for each program (see Sections 5.3.2 and 5.3.3). If the landings from one area reached all or most of the stock area TALs, one program could affect the opportunity to fish in another area if it triggered stock area incidental limits (Section 5.3.1).

Rationale: In-season accountability measures for small-mesh programs could increase discarding in one program even though landings from other areas (which are open to fishing later in the fishing year) might be well under their targets and the stock wide landings are safely below the stock area TAL trigger.

5.4.4 No in-season accountability measures[5]

This alternative proposes no incidental possession limits for either red or silver hake in the northern stock area. Year round possession limits (which currently exist for silver hake and are proposed in Section 5.7.1 for red hake) would remain in place throughout the fishing year, regardless of whether or not landings exceed the TALs.

Rationale: The MSA does not require in-season accountability measures if post-season accountability measures exist. This alternative would rely entirely on post-season accountability measures (Section 5.5) to prevent overfishing. In-season accountability measures may be unnecessary at this time, particularly for stocks where catches have been significantly below the ACLs. The Council could develop and implement in-season accountability measures later if needed through an amendment or framework action, but doing so would take time and would be unavailable during a fishing year when catches first exceed the ACLs. This alternative would thus be more risky or carry substantial costs (by limiting fishing in future years as a payback for prior overages) compared to alternatives with in-season accountability measures.

5.4.5 No Action

This alternative will make no changes to the in-season accountability measures that may be included in the Secretarial Amendment to curtail landings and catch when the former approaches the TAL. The Secretarial Amendment is proposing a 400 lbs. incidental red hake possession limit and a 2000 lbs. incidental silver hake possession limit.

[5] This alternative is not equivalent to No Action, because the Council expects that the Secretarial Amendment will include some form of northern stock area in-season accountability measures.

Rationale: This measure is likely to be approved and implemented in the Secretarial Amendment. If one of the above alternatives is chosen it might be implemented mid-season after an accountability measure has already gone into effect.

5.5 Southern Stock Area TAL Alternatives

Red hake and whiting (includes silver and offshore hakes, whether reported separately or combined) TALs are proposed for the southern stock area to reduce the risk that fishing effort targeting these species may increase, causing catches to exceed the ACLs. Landings of offshore hake would monitored and count toward the silver hake TAL, which has been adjusted accordingly (by increasing the silver hake ABC by 4%) based on historic catch. The intent of a stock wide TAL for each species is to account for expected discards and state water landings. Incidental possession limits would be triggered at 90% of the TAL to put a brake on the fishery and reduce catches, with the intention that landings should not exceed the TAL. This alternative is the same as the one proposed for the Secretarial Amendment and is therefore considered as No Action.

Beginning at the start of the fishing year on May 1, quarterly red hake and southern whiting landings targets are also proposed. The intent of these quarterly TALs is to prevent landings from occurring quickly, causing a closure for an extended period until the end of the fishing year. The quarterly allocations are based on historic landings patterns. Overages or underages would by carried forward into future quarters, using one of the two alternative methods described below.

The following alternatives are described below. The Council may choose the stock wide TAL with or without (triggered or permanent) quarterly allocations. If one of the quarterly allocation alternatives are selected, one of the roll over provisions may also be selected.

1. Stock wide TALs for red and silver/offshore hakes (No Action)
2. Quarterly TALs triggered when landings are above 2/3rds of the proposed TAL specifications
3. Quarterly TALs
4. TAL rollover provisions
    a. A quarterly adjustment process
    b. Roll up TALs – landings monitored against a cumulative quarterly TAL
    c. No rollover provisions

5.5.1 Stock-wide annual TAL (No Action)

This alternative would establish a stock area-wide TAL for red and silver hake, individually.

The Council has recommended setting the discard rate equal to the most recent three year average. For the 2012-2014 specifications, discards in the southern stock area as a proportion of total catch were 56% for red hake and 13% for silver hake (see Section 7.1.3). Discard mortality assumed in the benchmark assessment and used to establish the ABCs was 100% for all gear types. The Whiting PDT may propose and the Council's SSC may approve variations in this procedure for future specifications, if there is good cause for expecting a change in discard rates due to regulatory or other causes. The most recent three year period is most reflective of probable conditions in the next specification cycle. An assumption about future discard mortality is needed to set future specifications, since many of the accountability measures rely on real-time monitoring of landings, instead of more costly real-time monitoring of discards and total catch.

The Council has recommended using an estimate of 3 percent to account for the landings of small-mesh multispecies by vessels without Federal permits (i.e., state landings). The Council may change this assumption for future specifications as the fishery adjusts to ACL management and new data are collected. Landings and catches by vessels without Federal fishing permits and fishing exclusively in state waters cannot under normal circumstances be regulated by a Federal fishery management plan. Therefore state waters catches cannot be limited by Federal regulations under this amendment, but still contribute to total stock removals which can cause overfishing if not taken into account. The ABCs chosen by the Council to prevent overfishing are based on all catches, regardless of source or location. Because the Council and NMFS rely on cooperation with states to regulate state waters catches when needed to achieve shared conservation objectives, the most parsimonious approach is to assume that state water catches will remain nearly constant, unless there is some external reason to expect changes.

During much of the recent red and silver hake landings history (see Section 7.1.2), state water landings have remained relatively low, close to 3 percent of total landings. The Council accepted this level as a reasonable expectation of future state water landings and reduced the Federal TALs accordingly.

This alternative is the status quo, if the Secretarial Amendment is implemented as proposed.

Table 8 2012-2014 Southern Area TALs

	Southern Red Hake	Southern Whiting
ACL	3,096 mt	32,295 mt
2008-2010 Discard Rate	56%	13%
Assumed Discards	1,718 mt	4,198 mt
State Landings Rate	3%	3%
Assumed State Water Landings	42 mt	842 mt
Federal TAL	1,336 mt	27,255 mt

Table 9 Comparison of Proposed Southern Area TALs to recent landings

	Southern Red Hake	Southern Whiting
Proposed Federal TAL	1,336 mt	27,255 mt
2009 Landings	675 mt	6,606 mt
Difference	+98%	+313%
2010 Landings	616 mt	6,330 mt
Difference	+117%	+331%

5.5.2 Quarterly fishing year TAL allocations

This alternative would divide the stock-area TAL, as described above, into quarterly TALs. The quarterly TAL allocations would be allocated in the average proportion of landings from 2008-2010. These proportions estimated by the Whiting PDT from dealer reported landings of red, silver, and offshore hake are given in the table below, along with the initial sub-TAL specifications for fishing years 2012-2014.

Rationale: Quarterly allocations would ensure that opportunities to target the small-mesh multispecies would be available in proportion to historic landings and also provide the market with a steadier supply of small-mesh multispecies compared to a single annual allocation. Roll-over and make-up provisions would provide some adaptability to market, biological, or regulatory change.

Table 10. Quarterly TAL allocations and initial specifications for the southern stock area.

		May - Jul	Aug - Oct	Nov - Jan	Feb - Apr
Southern red hake	Proportional allocations	33.30%	25.30%	17.70%	23.70%
	2012-2014 specifications (mt)	445	338	237	317
	Cumulative (mt)	445	783	1020	1336
Southern Whiting	Proportional allocations	27.00%	21.40%	22.80%	28.80%
	2012-2014 specifications (mt)	7359	5832	6214	7849
	Cumulative (mt)	7359	13191	19405	27254

5.5.3 Quarterly fishing year TAL allocations, triggered when prior landings exceed ⅔rds of the TAL (Preferred Alternative)

This alternative would implement the above described quarterly TALs when the landings in the previous year were two-thirds or more of the annual, stock-area TAL.

For example, if the fishing year 2012 red hake landings were 800 mt (74% of the 1,081 mt TAL), the quarterly red hake TAL allocations would be implemented for the 2014 fishing year, beginning on May 1, 2014. If the 2012 landings of silver and offshore hake were less than 2/3rds of the fishing year 2014 southern whiting TAL, there would be no quarterly allocation of silver/offshore hakes, even though red hake quarterly allocations had been triggered (and vice versa).

Rationale: The quarterly allocations are really unnecessary until landings begin to approach the TALs in future years, but this alternative would not take effect in the current year if landings reach the trigger. Consequently, increases in landings could cause a prolonged closure until the next fishing year when quarterly allocations began. Roll-over and make-up provisions would provide some adaptability to market, biological, or regulatory change.

The Council designated this alternative as preferred because it was recommended by the Advisory Panel to prevent long directed fishery closures, possibly affecting the ability to target whiting in the winter and spring. The quarterly allocations would spread fishing out more evenly throughout the year. This alternative would also implement quarterly allocations only when needed, if and when the landings approach the TALs, without requiring further Council action.

5.5.4 TAL roll over provisions

If there are quarterly allocation of TAL as presented in Section 5.5.2, which would be implemented when Amendment 19 becomes effective, or Section 5.5.3, which would be implemented when landings of either red or silver and offshore hake exceed 2/3rds of the TAL specification in the next fishing year, the Council intends that unlanded TAL may be carried over to a future quarter within the fishing year, and overages should be deducted. Two alternatives methods for allowing roll overs and accounting for quarterly overages are presented below.

5.5.4.1 Quarterly TAL adjustments

Unlanded amounts from the May-Jul (1st) quarter would be added to the allocation for the Nov-Jan (3rd) quarter. Unlanded amounts from the Aug-Oct (2nd) and Nov-Jan (3rd) quarters would be added to the allocation for the Feb-Apr (4th) quarter. All overages of quarterly TALs would be deduced from the fourth fishing year quarter.

Rationale: This alternative accounts for overages only at the end of the year. TAL triggers only increase in quarter 3 and remain unchanged in quarter 2. Thus the allowable landings in each quarter is more stable than the alternative below, except for quarter 4 when the in-season AM would be adjusted to account for prior overages if any occurred. This alternative could result in a longer closure period in quarter 4 (Feb-Apr) than might occur than for the procedure described in the alternative below.

5.5.4.2 Roll up TALs and triggers (Preferred Alternative)

Instead of a formal in-season adjustment mechanism described in the above alternative, landings would be monitored against cumulative quarterly TALs and AM triggers. In other words, the landings from quarter 1 (May-Jul) would be monitored and compared with the quarter 1 TAL and trigger. Cumulative landings for all of quarter 1 (even if an AM was triggered) and for quarter 2 would be monitored and compared to the sum of the quarter 1 and quarter 2 TALs and AMs. In quarter 3, cumulative landings since the start of the fishing year would be monitored and compared to the sum of the quarter 1, 2, and 3 TALs and triggers. And in quarter 4, the cumulative annual landings to date would be monitored and compared with the annual TALs and AM triggers. The table below gives an example.

Table 11. Example monitoring and adjustment of cumulative quarterly TALs.

Quarter	Cumulative TAL (mt)	TAL trigger (mt)	Cumulative landings (mt)	AM triggered
1 (May-Jul)	30	27	27	No
2 (May-Oct)	60	54	59	Yes
3 (May-Jan)	80	72	83	Yes
4 (annual)	100	90	95	Yes, but TAL not exceeded

Rationale: Any unlanded TALs could be taken in the next or future quarters in the fishing year, without a formal adjustment mechanism. Thus, the system would be easier than the alternative in Section 5.5.4.1 to monitor, manage, and understand.

The Council designated this alternative as preferred because it would be simpler to monitor and understand, yet provide most of the same benefits of a more structured approach that accounts for overages only at the end of the fishing year. Unlanded amounts in quarter 1 could be taken in quarter 2, unlike an alternative that requires publication of a Notice Action to make quarterly adjustments to the quarter after next, i.e. adjustments to quarter 3 allocations to account for unlanded amounts in quarter 1.

5.5.4.3 No roll over provisions

The quarterly allocations may be chosen in the final alternative with no provisions for roll over of underages or overages. In this case, any overages of the quarterly TALs would accrue and count against the stock wide TALs.

Rationale: Accounting and making frequent adjustment to quarterly allocations may be an unnecessary complication. All overages would accrue in the fourth quarter anyway in determining whether a stock wide TAL trigger had been met.

5.6 Southern stock area in-season accountability measures

The intent of in-season accountability measures is to limit landings and discourage trips targeting red, silver, and offshore hake when landings reach 90% of the TAL to reduce the risk that catches will exceed the southern stock area annual and/or quarterly TALs. If quarterly TAL specifications exist or have been triggered the incidental limits will apply for the remainder of the quarter. These accountability measures would apply on a fishing year or fishing year quarterly basis, whichever is applicable.

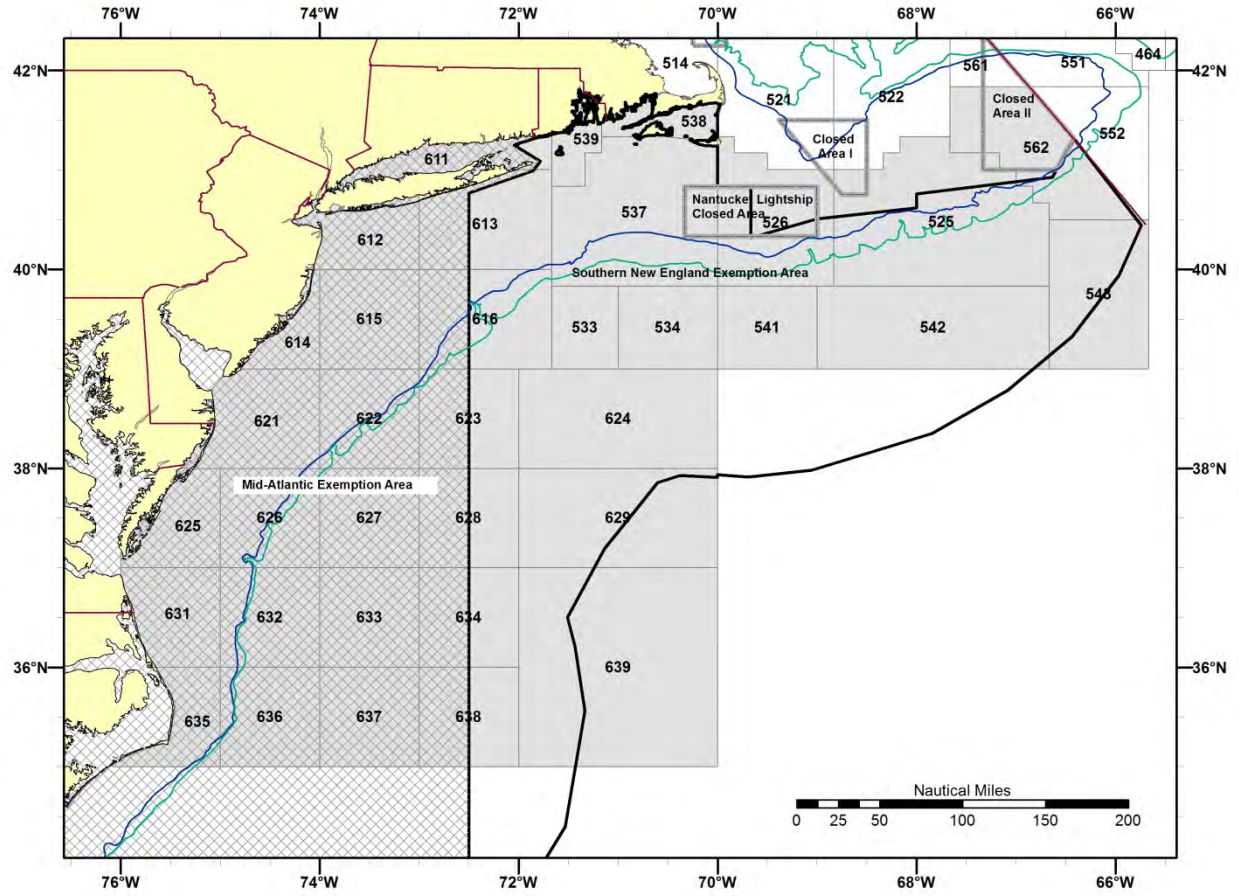
The following alternatives are described below:

1. Incidental possession limits for red hake when landings reach a TAL trigger with alternatives for 200, 300, and 400 lbs.
2. Incidental possession limits for silver and offshore hake when landings reach a TAL trigger with alternatives for 500, 1000, and 2000 lbs.
3. No in-season accountability measures
4. No Action – a stock wide in-season AM to be chosen for the Secretarial Amendment. NMFS is expected to approve a 400 lbs. red hake and 1000 lbs. silver hake incidental possession limit.

5.6.1 Red hake incidental possession limits for the southern stock area

One of the following possession limits would be automatically triggered when southern stock area red hake landings reach 90% of the TAL and the Regional Administrator determines that without taking action, landings would exceed the southern area TAL by the end of the fishing year or quarter. If the Council chooses different red hake possession limits for the northern and southern stock areas and the vessel fishes in both the Gulf of Maine/Georges Bank and Southern New England or Mid-Atlantic exemption areas (Map 4) during a trip, the lower of the stock area possession limits will apply to that trip. These limits would be implemented by Notice Action and would remain in place until the end of the fishing year.

Map 4. Relationship between three digit statistical areas and the Mid-Atlantic and Southern New England Exemption Areas. Catches from the shaded statistical areas would be attributed to the southern stock area, consistent with the small-mesh multispecies stock assessments.



5.6.1.1 200 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 200 lbs. of whole or whole weight equivalent of red hake may be retained on board vessels fishing in the Southern New England and/or Mid-Atlantic exemption areas (see Map 4). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This incidental limit would discourage vessels from targeting red hake and encourage vessels to fish in other areas where red hake are less abundant. Out of the options examined by the PDT, this alternative was determined to be the most effective at discouraging vessels from targeting red hake, but would increase discards more than the other alternatives, particularly for vessels that target silver hake with small-mesh trawls.

5.6.1.2 300 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 300 lbs. of whole or whole weight equivalent of red hake may be retained on board vessels fishing in the Southern New England and/or

Mid-Atlantic exemption areas (see Map 4). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting red hake and encourage vessels to fish in other areas where red hake are less abundant, but would be less effective than the above alternative and more effective than the alternative below. Compared to the expected behavior for the alternative above, some vessels fishing inshore on day trips may continue to target red hake, particularly to be sold as bait, and vessels targeting silver hake may have less incentive to avoid catching red hake.

On the other hand, this alternative would increase discards less than the above alternative because more trips would be unaffected by the higher incidental possession limit.

5.6.1.3 400 pounds of whole landings, no more than one landing in a calendar day (Preferred Alternative)

When triggered by the process described above, no more than 400 lbs. of whole or whole weight equivalent of red hake may be retained on board vessels fishing in the Southern New England and/or Mid-Atlantic exemption areas (see Map 4). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting red hake and encourage vessels to fish in other areas where red hake are less abundant, but would be less effective than either of the above alternatives. Compared to the expected behavior for the two alternatives above, some vessels fishing inshore on day trips may continue to target red hake, particularly to be sold as bait, and vessels targeting silver hake may have less incentive to avoid catching red hake.

On the other hand, this alternative would increase discards less than the other alternatives because more trips would be unaffected by the higher incidental possession limit.

N.B. This alternative is being proposed as part of the Secretarial Amendment.

The Council designated this alternative as preferred because analysis by the Whiting PDT indicates that it is likely to be effective in keeping landings (and induced discards) below the TAL. There isn't a meaningful contrast in the effectiveness of lower incidental possession limits, but a 200 lbs. possession limit (Section 5.6.1.1) is estimated to cause an unacceptable increase in discards.

5.6.2 Silver hake incidental possession limits for the southern stock area

One of the following possession limits would be automatically triggered when southern stock area whiting[6] landings reach 90% of the TAL and the Regional Administrator determines that without taking action landings would exceed the southern whiting TAL by the end of the fishing year or quarter. If the Council chooses different silver hake possession limits for the northern and southern stock areas and the vessel fishes in both the Gulf of Maine/Georges Bank and Southern New England or Mid-Atlantic exemption areas (Map 4) during a trip, the lower of the stock area possession limits will apply to that trip. These limits would be implemented by Notice Action and would remain in place until the end of the fishing year.

[6] Silver and offshore hake, whether reported separately or combined.

5.6.2.1 500 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 500 lbs. of whole or whole weight equivalent of silver and offshore hake may be retained on board vessels fishing in the Southern New England and/or Mid-Atlantic exemption areas (see Map 4). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This incidental limit would discourage vessels from targeting silver and offshore hake and encourage vessels to fish in other areas where silver and offshore hake are less abundant, stop fishing, or target other species with different gear. Since vessels that land more than this amount of silver and offshore hake are typically using small-mesh trawls to target the species, many vessels would stop fishing for silver and offshore hake.

Out of the options examined by the PDT, this alternative was determined to be the most effective at discouraging vessels from targeting silver hake, but would increase discards more than the other alternatives, particularly for vessels that fish for other species using large mesh trawls and catch larger quantities of silver hake. This measure would stop fishing for offshore hake, except as an incidental catch in the trawl fisheries that occur along the shelf edge, primarily during the winter and early spring.

5.6.2.2 1000 pounds of whole landings, no more than one landing in a calendar day

When triggered by the process described above, no more than 1000 lbs. of whole or whole weight equivalent of silver and offshore hake may be retained on board vessels fishing in the Southern New England and/or Mid-Atlantic exemption areas (see Map 4). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting silver and offshore hake and encourage vessels to fish in other areas where silver and offshore hake are less abundant, but would be less effective than the above alternative and more effective than the alternative below. Compared to the expected behavior for the alternative above, some vessels fishing inshore on day trips may continue to target silver hake, particularly to be sold as bait or food, and vessels targeting other species may have less incentive to avoid catching silver hake.

On the other hand, this alternative would increase discards less than the above alternative because more trips would be unaffected by the higher incidental possession limit.

N.B. This alternative is being proposed as part of the Secretarial Amendment, but based on subsequent analysis the alternative is not the Council's preferred alternative.

5.6.2.3 2000 pounds of whole landings, no more than one landing in a calendar day (Preferred Alternative)

When triggered by the process described above, no more than 2000 lbs. of whole or whole weight equivalent of silver and offshore hake may be retained on board vessels fishing in the Southern New England and/or Mid-Atlantic exemption areas (see Map 4). A vessel may not land more than the incidental possession limit in a single calendar day.

Rationale: This limit would discourage vessels from targeting silver and offshore hake and encourage vessels to fish in other areas where silver and offshore hake are less abundant, but would be less effective than either of the above alternatives. Compared to the expected behavior for the two alternatives above,

some vessels fishing inshore on day trips may continue to target silver hake, particularly to be sold as bait or food, and vessels targeting other species may have less incentive to avoid catching silver hake.

On the other hand, this alternative would increase discards less than the other alternatives because more trips would be unaffected by the higher incidental possession limit.

The Council designated this alternative as preferred because analysis by the Whiting PDT indicates that it is likely to be effective in keeping landings (and induced discards) below the TAL. There isn't a meaningful contrast in the effectiveness of lower incidental possession limits, but a 500 lbs. possession limit (Section 5.6.2.1) is estimated to cause an unacceptable increase in discards.

5.6.3 No in-season accountability measures[7]

This alternative proposes no incidental possession limits for either red, silver, and/or offshore hake in the southern stock area. Year round possession limits (currently applying to silver hake; red hake year round possession limits are proposed in Section 5.7) would remain in place throughout the fishing year, regardless of whether or not landings exceed the TALs.

Rationale: This alternative would rely entirely on post-season accountability measures (Section 5.8) to prevent overfishing. In-season accountability measures may be unnecessary at this time, particularly for stocks where catches have been significantly below the ACLs. The Council could develop and implement in-season accountability measures later if needed through an amendment or framework action, but this would take time and would be unlikely to be available during a fishing year when catches first approach the ACLs. This alternative could thus be more risky than ones with in season accountability measures and may limit fishing in future years as a payback for prior overages.

5.6.4 No Action

This alternative will make no changes to the in-season accountability measures that may be included in the Secretarial Amendment to curtail landings and catch when the former approaches the TAL. The Secretarial Amendment is proposing a 400 lbs. incidental red hake possession limit and a 2000 lbs. silver and offshore hake possession limit.

Rationale: This measure is likely to be approved and implemented in the Secretarial Amendment. If one of the above alternatives (see Sections 4 and 5.6.2) is chosen it might be implemented mid-season after an accountability measure has already gone into effect.

5.7 Year round possession limits

The intent of establishing red hake possession limits that apply year round is to reduce the potential for the season to end early, reduce the risk that catches may exceed the ACL or landings exceed the TAL, and/or improve size selectivity through differential possession limits for vessels targeting hakes with 3 inch or larger mesh, similar to existing regulations for possession of silver hake. A year-around possession limit also reduces the potential for fishermen to exhibit derby style fishing behavior, landing large quantities of red hake before a TAL trigger is met and incidental possession limits are imposed. The proposed possession limits are intended to be high to accommodate most or all landings that have occurred in recent years to achieve the above objectives, but not reduce landings.

[7] This alternative is not equivalent to No Action, because the Council expects that the Secretarial Amendment will include some form of northern stock area in-season accountability measures.

5.7.1 Northern red hake possession limits

Based on 2008-2010 dealer data, the Council would set a red hake possession limit between 1,000 and 3,000 pounds of whole red hake or whole weight equivalent for vessels using 2.5 to 5 inch square or diamond cod end mesh and from 300 and 1,200 pounds of whole red hake or whole weight equivalent for vessels using all other cod end meshes and other gears, while fishing in the Gulf of Maine/Georges Bank exemption area (Map 3). Vessels may not land more than the possession limit within a calendar day. If a vessel fishes in both the Gulf of Maine/Georges Bank and Southern New England exemption areas during a trip and different red hake possession limits apply, the lower of the exemption area possession limits will apply to that trip, the lower limit will apply to the entire trip.

Rationale: Recent red hake catches were at almost the same level as the proposed ACL. Year round possession limits would reduce the potential by existing vessels to increase fishing effort targeting red hake. This measure could reduce the potential for derby style fishing behavior. The proposed possession limits would accommodate 80% or more of the landings that occurred in 2008-2010. At the upper end of the range, the limit would have allowed all trips to land the amount of red hake they had landed under then-existing regulations, i.e. the limit would not have constrained reported trips but would prevent some trips from landing more than the proposed possession limit by increasing fishing effort targeting red hake. Lower limits for vessels using smaller than 2.5 inch mesh will discourage targeting red hake with very small-mesh. The lower limits for large mesh are based on historic landings and accommodate most or all of the reported trips.

5.7.2 Southern red hake possession limits

Based on 2008-2010 dealer data, the Council would set a red hake possession limit between 4,000 and 10,000 pounds of whole red hake or whole weight equivalent for vessels using 2.5 to 5 inch square or diamond cod end mesh and from 2,000 and 6,000 pounds of whole red hake or whole weight equivalent for vessels using all other cod end meshes and other gears, while fishing in the Southern New England or Mid-Atlantic exempted areas. Vessels may not land more than the possession limit within a calendar day. If the Council chooses different red hake possession limits for the northern and southern stock areas and the vessel fishes in both the Gulf of Maine/Georges Bank (Map 3) and Southern New England or Mid-Atlantic exemption areas (Map 4) during a trip, the lower of the stock area possession limits will apply to that trip.

Rationale: Recent red hake catches were at almost the same level as the proposed ACL. Year round possession limits would reduce the potential by existing vessels to increase fishing effort targeting red hake. This measure could reduce the potential for derby style fishing behavior. The proposed possession limits would accommodate 80% or more of the landings that occurred in 2008-2010. At the upper end of the range, the limit would have allowed all trips to land the amount of red hake they had landed under then-existing regulations, i.e. the limit would not have constrained reported trips but would prevent some trips from landing more than the proposed possession limit by increasing fishing effort targeting red hake.

5.7.3 No red hake possession limits (No Action/Status quo; Preferred Alternative)

Unless landings reached the TAL triggers and incidental possession limits apply, no red hake possession limits would apply. The Council may select No Action for one stock area, but establish a year round possession limit for the other area, or select No Action for both stock areas.

Rationale: Possession limits could unnecessarily constrain landings and could cause discarding when large catches of red hake occur. The Council designated this alternative as preferred because it was

unclear that the mesh size based possession limits would reduce the risk of increasing fishing effort on red hake or that the higher possession limits for 2.5 to 5 inch mesh would improve size selectivity by the fishery.

5.7.4 Southern whiting possession limits

The Council extended the public comment period and held a supplemental public hearing to consider raising the southern whiting possession limit, currently set at 30,000 lbs. This measure would apply year round. The intent of increasing the possession limit is to counter the effects of rising fuel and operating expenses and allow the fishery to achieve optimum yield, while managing the risk of effort shifts into the fishery or changes in selectivity by vessels using smaller mesh to target small whiting.

The following three options are described below:

1. Increase the southern whiting possession limit for vessels using trawls with 3-inch or larger mesh
    a. Increase possession limit 30,000 up to 40,000 lbs. in all of the Mid-Atlantic and Southern New England Exemption Areas
    b. Increase possession limit from 30,000 to 40,000 lbs. in all or a portion of the Southern New England Exemption Area
    c. Maintain existing 30,000 lbs. whiting possession limit (Status quo/No Action)

5.7.4.1 Increase possession limit from 30,000 lbs. up to 40,000 lbs. in all of the Mid-Atlantic and Southern New England Exemption Areas

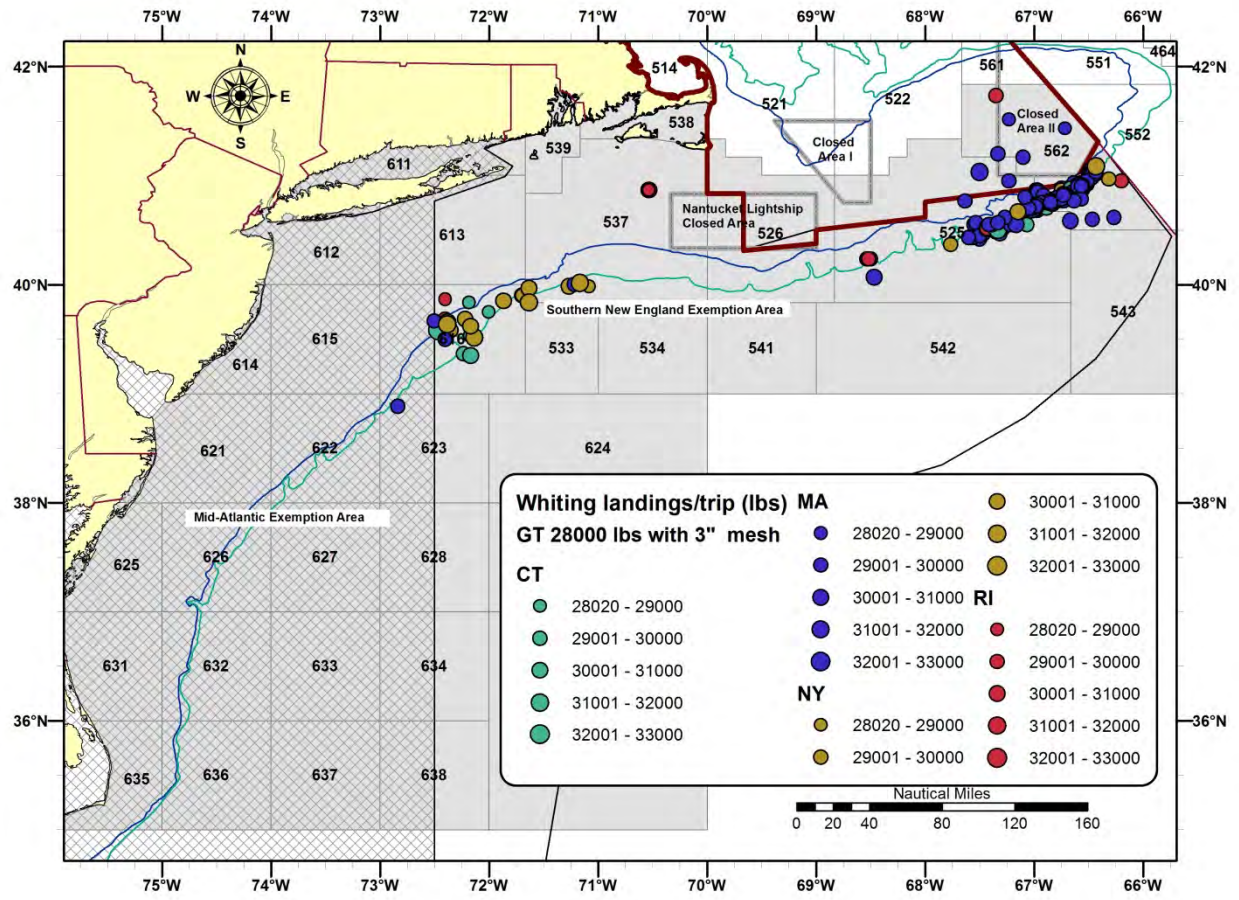
Any vessel fishing in the Mid-Atlantic and Southern New England Exemption Areas (Map 5) with trawls having 3 inch or larger mesh, square or diamond, would be able to retain and land up to 40,000 lbs. of whiting (silver and offshore hake combined).

Vessels fishing in both the Gulf of Maine/Georges Bank Exemption Area and either of the Southern New England or Mid-Atlantic Exemption Areas will be restricted to the lower of the applicable silver hake or whiting possession limits. Vessels may transit an area having a lower possession limit with up to 40,000 lbs. of whiting as long as fishing gear is properly stowed according to applicable regulations.

Rationale: During scoping for Amendment 19 and particularly during the public hearings for the draft amendment, industry and Advisory Panel members asked the Council to consider raising the possession limit. On one hand, raising the possession limit would give vessels a better opportunity to harvest optimum yield and counter rising fuel prices. Since the TAL (see Section 5.5) is several times greater than annual landings since 2000, there is room to increase fishing while keeping catches at or below a sustainable level.

The Council selected a 40,000 lbs. limit to retain the delicate balance between allowing a moderate increase in landings while trying not to attract excessive fishing effort to an open access fishery, which could cause catch to rapidly increase (possibly causing the incidental possession limit (see Section 5.6.2) to be triggered early in the fishing year). The Council also constrained this possession limit increase to vessels using trawls having 3 inch or larger mesh to maintain optimum size selectivity by the fishery, discouraging increases in fishing for smaller whiting.

Map 5. VTR-reported geographical distribution of 2009-2011 trips in the southern stock area landing more than 28,000 lbs. of whiting by vessels using trawls having 3 inch or larger mesh. The proposed increase in the possession limit would apply in areas south of the red line, which separates the Gulf of Maine/Georges Bank Exemption Area from the Southern New England Exemption Area.



5.7.4.2 Increase possession limit from 30,000 to 40,000 lbs. in all or a portion of the Southern New England Exemption Area

Any vessel fishing in the Southern New England Exemption Area (Map 5), or an area east of a line of longitude between 67°40' and 72°30' W Longitude with trawls having 3 inch or larger mesh, square or diamond, would be able to retain and land up to 40,000 lbs. of whiting (silver and offshore hake combined).

Vessels fishing in either the Gulf of Maine/Georges Bank or the Mid-Atlantic Exemption Areas and a portion of the Southern New England having up to a 40,000 lbs. possession limit will be restricted to the lower of the applicable silver hake or whiting possession limits. Vessels may transit an area having a lower possession limit with up to 40,000 lbs. of silver hake or whiting as long as fishing gear is properly stowed according to applicable regulations.

Rationale: This alternative would have nearly the same benefits for the fleet facing high fuel costs while fishing offshore as the alternative above, but would reduce the potential for a spike in landings as a

response to the higher possession limit. Over 80% of the trips that land over 28000 lbs. of silver hake or whiting occur east of 67°40' W Longitude (see Map 5).

Smaller fishing vessels fishing closer to the coastline and vessels in other fisheries would be less likely to increase fishing for whiting, while the existing vessels fishing for whiting offshore and on eastern Georges Bank would be able to continue fishing in the face of higher fuel costs. The higher costs of fishing offshore and on Georges Bank would discourage increases in fishing effort. Map 5 shows the distribution of fishing locations reported on VTRs for vessels landing more than 28,000 lbs. of whiting while using trawls having 3 inch or larger mesh.

5.7.4.3 Maintain existing 30,000 lbs. whiting possession limit (Status quo/No Action)

The silver hake and whiting possession limits would remain at the current amount, or 30,000 lbs. for vessels using trawls having 3 inch or larger mesh.

Rationale: Landings and silver and offshore hake have remained at sustainable and low levels for at least a decade, even though survey biomass of silver hake has been modestly increasing. A delicate balance has existed in this open access fishery due to the market demand for whiting (which appears to be driven by worldwide supply of hakes), fishing opportunities and restrictions in other NE region trawl fisheries, the costs and necessary experience to fish for whiting, and the existing whiting possession limits. The status quo would be most likely to maintain this delicate balance and reduce the risk that landings and catch could rapid increase.

5.8 Post season accountability measures (northern and southern stock areas individually)

The intent of post season accountability measures is to mitigate the effects of overharvesting when catches for prior years exceeds the ACL. Re-active measures could include one-for-one reductions in future catch and/or landings limits or changes in buffers and specifications to reduce the risk that catches will exceed the ACLs. The Council may select one alternative or the other, but not both.

5.8.1 Pound-for-pound payback provision to apply in year 2, following a year when catches exceed the ACL (No Action)

When catches of either red or silver/offshore hake exceed the ACL, the ACL for the second year after the overage occurs will be reduced by an equivalent amount. The TALs and small-mesh area program landings targets would be reduced accordingly. Landings that exceed a TAL will not trigger a post-season accountability measure if the ACL is not exceeded. This reduction to account for prior overages would be temporary and the ACL would revert back to previous amounts (as adjusted by specification updates), unless overages continued occurring and would be applied to future allocations.

If the 2012 silver hake ACL is exceeded by 1,000 mt, for example, the Regional Administrator will reduce the 2014 ACL by 1,000 mt by Notice Action. In 2015, the ACL would revert back to the specified amount unless more overages occurred in 2013.

Rationale: Some type of accountability when catches exceed the ACL is required by the Magnuson-Stevens Act. This alternative would ensure that catches do not continually exceed the ACLs and increase the risk of persistent overfishing. The adjustment is applied to the second year to allow time to collect the data necessary to determine whether the prior year's ACLs had been exceeded and apply it to a fishing

year that has not begun. Applying adjustments to a fishing year already underway could cause unnecessary disruptions and uncertainty, allowing insufficient time for the fishery to adjust.

N.B. This alternative is being proposed as part of the Secretarial Amendment.

5.8.2 Reduce the incidental possession limit trigger (described in Sections 5.3.1 and 5.5) in year 2, following a year when catches exceed the ACL (Preferred Alternative)

When catches of either red or silver hake exceed the ACL, the in season accountability measure trigger (proposed at 90% of TALs) would be reduced by an equivalent percentage that the prior year's catch exceeds the ACL. In this alternative, the ACL would remain at the same amount, but the incidental possession limit trigger level (proposed at 90%) would be reduced. This adjustment would persist indefinitely to reduce the risk of future overages, unless it was adjusted through the specifications process, a framework adjustment, or amendment.

If the 2012 catch exceeds the ACL by 8 percent, for example, the accountability measure trigger for 2014 would decrease from 90% (proposed by this amendment) to 82 percent of the stock area TALs and the management program landings targets (if approved in the final amendment).

Rationale: Reducing the landings triggers that initiate incidental possession limits would reduce the risk that future catches exceed the ACL and cause overfishing to occur. If the cause of the overage had been due to landings exceeding the TALs, this automatic adjustment would make that outcome less likely. If the cause of the overage had been an increase in discards, this automatic adjustment would make it less likely that landings would reach the TALs, leaving more room to account for the additional discards until the Council adjusted the specifications through regular procedures.

The Council designated this alternative as preferred because it more directly reduces the trips targeting red or silver hakes, and consequently overall landings and catch by the directed fishery.

6.0 CONSIDERED BUT REJECTED ALTERNATIVES

The following sections describe some management approaches that the Council considered but rejected at face value during the development of this amendment. A summary of the rationale for their rejection is given.

6.1 Limited Access and/or Catch Share Management

The Council would establish entry requirements and possibly allocations based on historic participation in the fishery. Future participation in the fishery would require a permit issued on the basis of prior participation and may include catch restrictions for a vessel or sector (a group of self-selected vessels) based on the level of their past participation. The Council established a control date of March 23, 2003 that could be used as part of the basis for determination of eligibility. Vessels that began participating in the fishery after the control date may be denied access to the future fishery or be given no allocation.

Rationale for rejection: Although supported by the fishing industry, development of limited access or catch share management was postponed, largely because such allocations are difficult to make, take time to develop, and are often controversial. The Council feared that if it attempted to develop such management measures in Amendment 19 it would delay implementation for at least a year, missing the MSA deadline to establish ACL specifications by 2011. The level of access or allocations would also

depend on the amount of fish that were likely to be available through the ABC. High ABCs could allow more liberal access, and vice versa. Therefore it was difficult to make much headway on this important management issue until Aug 2011 when the ABCs were approved.

6.2 Zero Possession Limits When Landings Reach 100% of TALS (i.e. Fishery Closure)

This measure to close a fishery when landings reach the TALs would prohibit posession during the allocation period (a fishing year, quarter, trimester, etc.). Vessels would be unable to target the species when this occurred and incidental catches while targeting other species would have to be discarded. Possibly as a part of this alternative, fishing in the small-mesh area programs might be prohibited when the landings for red or silver hake reached the TAL for that area.

Rationale for rejection: Although this management measure applies in some other fisheries, particularly in the Mid-Atlantic region, red and silver hake are caught in significant amounts in other fisheries (e.g. large mesh groundfish, shrimp, herring, scallop) and cannot be avoided. Thus this measure would have maximum effect on landings, but would not stop catches from occurring. The Council believes that such a measure would cause unacceptable discarding with little chance of survival.

6.3 TALs by Exemption Areas

This alternative would establish red and silver hake TALs for the fishing year in the Cultivator Shoals Area and the other Small-mesh Area (Gulf of Maine Raised Footrope, Small-mesh Area I and II, MA Raised Footrope Areas) Programs. These TALs would be the same as the proposed landings targets, but would be considered as ceilings or caps, rather than targets. Landings that exceeded the TALs would not be acceptable and post-season AMs would apply. In-season AMs might also apply, but might be more restrictive than those considered in this amendment to keep actual landings from exceeding the TALs.

Rationale for rejection: This type of alternative was deemed inconsistent with the objective to prevent catch from exceeding the ACLs for the stock area as a whole. It could also impose unnecessary economic costs on the industry and lost fishing opportunity. Vessels fishing for other species using large mesh, for example, might face incidental catch limits that do not allow them to land their entire red or silver hake catches, even if the landings from the small-mesh areas were well under the TALs. Conversely, fishing in the small-mesh areas might be restricted more than necessary to reduce the potential for incidental catches from elsewhere from exceeding the TAL for other types of fishing effort (such as herring fishing and fishing for large mesh multispecies).

6.4 In-Season AMs for Silver Hake Caught in Small-mesh Area Programs

In addition to stock area in-season AMs, this alternative would establish incidental possession limits (or other measures) that apply to small-mesh area programs as in-season AMs. This measure would be similar to the red hake AMs proposed in Section 5.4.3.1, intended to allow vessels to fish for silver hake while changing fishing behavior to catch fewer red hake.

Rationale for rejection: Unlike red hake, it is unlikely that silver hake landings will approach the TALs any time soon. Red hake could become a 'choke' species, preventing fishermen from targeting other species like silver hake, even though fishermen have indicated that they can fish in certain ways and at certain times of the year to avoid catching many red hake while they target silver hake. On the other hand, silver hake are the target of most trips in the small-mesh areas, nearly all trips in the Cultivator Shoals Area. Except for trips targeting red hake for bait sales, most trips target silver hake. The Council

therefore deemed small-mesh area in-season AMs for silver hake as being not only unnecessary, but inconsistent with the intended effect of such a measure.

6.5 Increase the silver hake possession limit in the northern stock area

This alternative would increase the silver hake possession limit in the northern stock area to the same level as proposed for the southern stock area, up to 40,000 lbs.

Rationale for rejection: Despite silver hake catches being well below the ACL in the northern stock area, the Council did not propose increases in the silver hake possession limit for the northern stock area because it is usually caught with red hake. Red hake catches are near or have been slightly above the ACL. Increasing effort on silver hake may therefore have a negative effect on the management of red hake, making an early trigger of the incidental possession limit more likely.

7.0 AFFECTED ENVIRONMENT (EA)

7.1 Biological Environment

7.1.1 Summary of life history characteristics

7.1.1.1 Silver hake

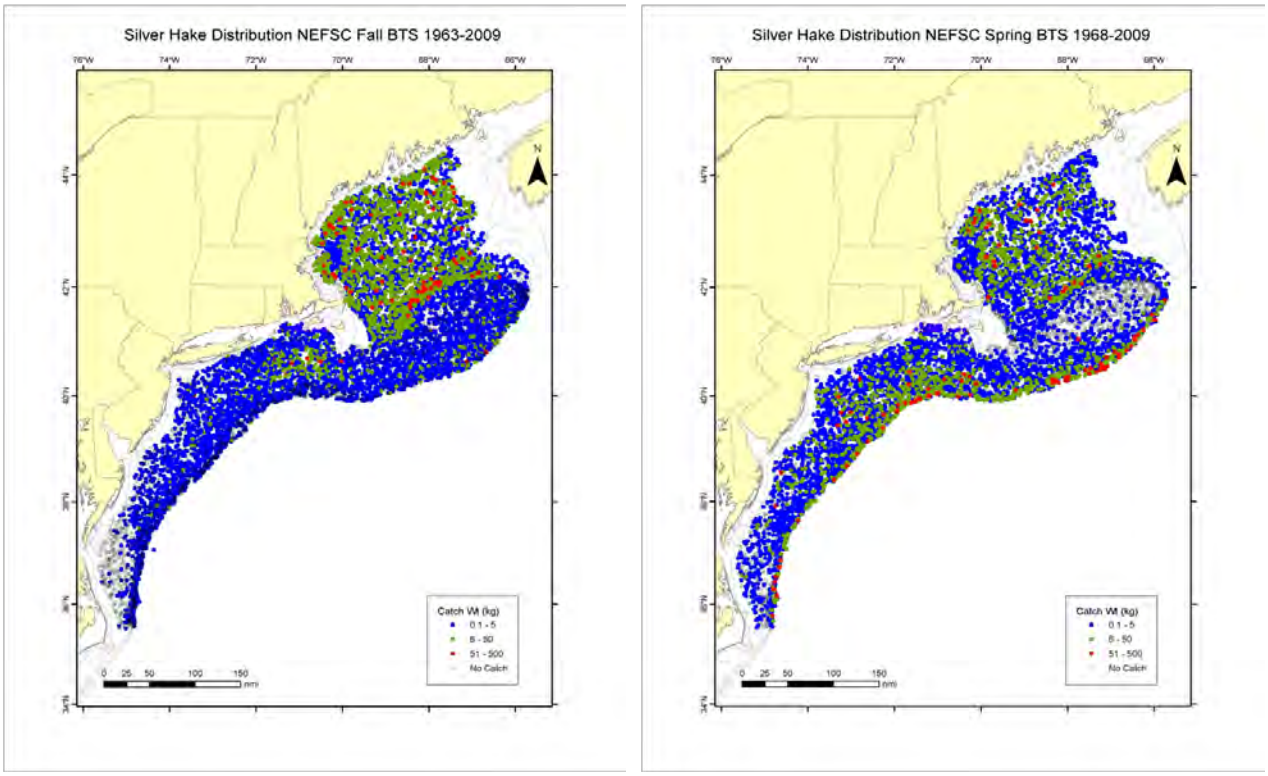
Silver hake, *Merluccius bilinearis*, also known as whiting, range from the Grand Banks of Southern Newfoundland to South Carolina (Brodziak, 2001, Lock and Packer 2004). In U.S. waters, two subpopulations of silver hake are assumed to exist within the EEZ based on numerous methods, primarily morphometric differences and otolith micro-constituent differences (Conover et al. 1967, Almeida 1987, Bolles and Begg 2000). The northern silver hake stock inhabits the Gulf of Maine to Northern Georges Bank waters, while the southern silver hake stock inhabits Southern Georges Bank to the Mid Atlantic Bight waters (Figure 3). However, Bolles and Begg (2000) reported some mixing of silver hake due to their wide migratory patterns, but the degree of mixing among the management areas is unknown. A re-evaluation of stock structure in the last silver hake assessment, based on trends in adult biomass, icthyolplankton survey, growth and maturity analyses, also suggests that reproductive isolation between the two stocks is unlikely (NEFSC, 2010). Based on the mixed evidence on silver hake stock structure (morphometrics, tagging, discontinuous larva distribution, homogeneous growth and maturity), it was concluded that there was no strong biological evidence to support either a separate or a single stock structure for silver hake. Thus, the two-stock structure definition remained as the basis for science and management (NEFSC, 2010).

Survey distribution suggests that most of the silver hake are in the Gulf of Maine and on Georges Bank in the fall and along the shelf edge in the spring (Figure 1). Silver hake migrate in response to seasonal changes in water temperatures, moving toward shallow, warmer waters in the spring. Silver hake spawn in shallow waters during late spring and early summer and then return to deeper waters in the autumn (Brodziak et al. 2001). The older, larger silver hake especially prefer deeper waters. During the summer, portions of both stocks can be found on Georges Bank. In winter, fish in the northern stock move to deep basins in the Gulf of Maine, while fish in the southern stock move to outer continental shelf and slope waters. Silver hake are widely distributed, and have been observed at temperature ranges of 2-17° C (36-63° F) and depth ranges of 11-500 m (36-1,640 ft). However, they are most commonly found between 7-10º C (45-50º F) (Lock and Packer 2004).

Female silver hake are serial spawners, producing and releasing up to three batches of eggs in a single spawning season (Collette and Klein-MacPhee eds. 2002). Major spawning areas include the coastal region of the Gulf of Maine from Cape Cod to Grand Manan Island, southern and southeastern Georges Bank, and the southern New England area south of Martha's Vineyard. Peak spawning occurs earlier in the south (May to June) than in the north (July to August). 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). Silver hake population 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).

Figure 1 Fall (left) and spring (right) survey distribution of silver hake from the NEFSC bottom trawl surveys, 1963-2009.



7.1.1.2 Red hake

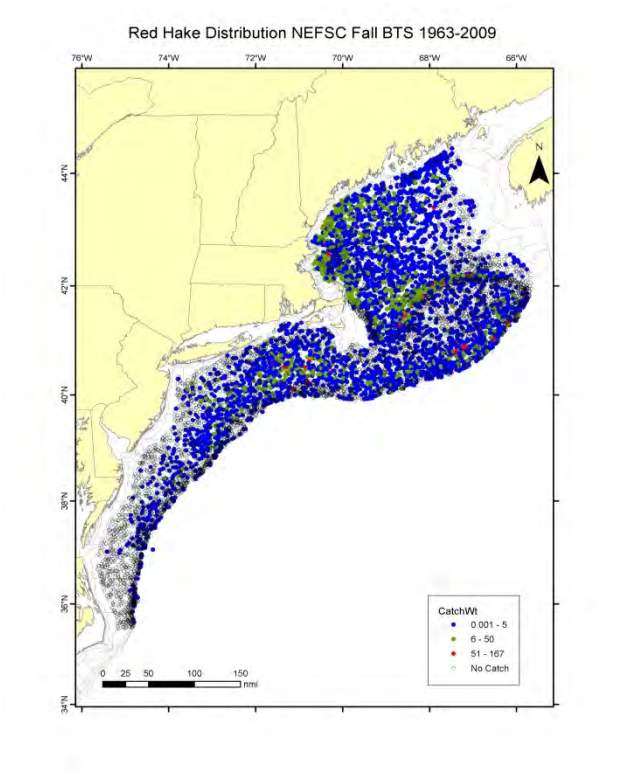
Red hake, *Urophycis chuss*, is a demersal gadoid species distributed from the Gulf of St. Lawrence to North Carolina, and are most abundant from the western Gulf of Maine through Southern New England waters. Red hake are separated into northern and southern stocks for management purposes. The northern stock is defined as the Gulf of Maine to Northern Georges Bank region, while the southern stock is defined as the Southern Georges Bank to Mid-Atlantic Bight region (Figure 3). Survey distributions indicate that there are higher concentrations of red hake by catch weight (kg) during the NEFSC spring surveys than the NEFSC fall surveys. Less red hake are caught in the middle of Georges Bank in the spring than the fall. They tended to be more in the Gulf of Maine and along the shelf, than in the middle of the bank (Figure 2).

Red hake migrate seasonally, preferring temperatures between 5 and 12° C (41-54° F) (Grosslein and Azarovitz 1982). During the spring and summer months, red hake move into shallower waters to spawn, then move offshore to deep waters in the Gulf of Maine and the edge of the continental shelf along Southern New England and Georges Bank in the winter. Spawning occurs from May through November, with primary spawning grounds on the southwest part of Georges Bank and in the Southern New England area off Montauk Point, Long Island (Colton and Temple 1961).

Red hake do not grow as large as white hake, and normally reach a maximum size of 50 cm (20 in) and 2 kg (4.4 lb) (Musick 1967). Females are generally larger than males of the same age, and reach a maximum length of 63 cm (25 in) and a weight of 3.6 kg (7.9 lb) (Collette and Klein-MacPhee eds. 2002). Although they generally do not live longer than 8 years, red hake have been recorded up to 14 years old. In the northern stock, the age at 50 percent maturity is 1.4 years for males and 1.8 years for females, and the size at 50 percent maturity is 22 cm (8.7 in) for males and 27 cm (10.6 in) for females (O'Brien et al. 1993). In the southern red hake stock, the age at 50 percent maturity is 1.8 years for males and 1.7 years for females, and the size at 50 percent maturity is 24 cm (9.5 in) for males and 25 cm (9.8 in) for females (O'Brien et al. 1993).

Red hake 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).

Figure 2 Fall (left) and spring (right) survey distribution of red hake from the NEFSC bottom trawl surveys, 1963-2009



7.1.1.3 Offshore hake

Offshore hake (*Merluccius albidus*) is a data-poor stock and very little is known about its biology and life history. They are commonly distributed from southern Georges Bank through the Mid-Atlantic Bight, at depths of 160-550 meters and temperatures ranging between 11-13°C. They are known to co-occur with

silver hake in the outer continental slopes of the Atlantic Ocean and are easily confused with silver hake because of their strong morphological resemblances. There appears to be seasonal differences in the patterns of distribution with concentrations shifting south of Georges Bank in the winter months and extending to the southern flank of Georges Bank and further south in the spring (Figure 4).

The primary source of biological information for offshore hake is the annual fishery independent surveys conducted by the Northeast Fisheries Science Center (NEFSC). Offshore hake Survey catches are generally low and variable relative to other hake species.

Offshore hake are located primarily on the continental shelf and presumably beyond the NEFSC survey area. 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.

Offshore hake appear to be sexually dimorphic with females slightly larger than males. Females mature at a larger length than males, similar to other gadoid species (O'Brien et al 1993). Maximum size observed in the survey was approximately 56 cm. Length at 50 percent maturity also differed significantly between sexes with females maturing at larger sizes (28 cm) relative to males (23 cm). Spawning generally occurs between April and July. Maximum observed size was approximately 43 cm for males and 56 cm for female (Traver et al. 2011).

Figure 3. 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.

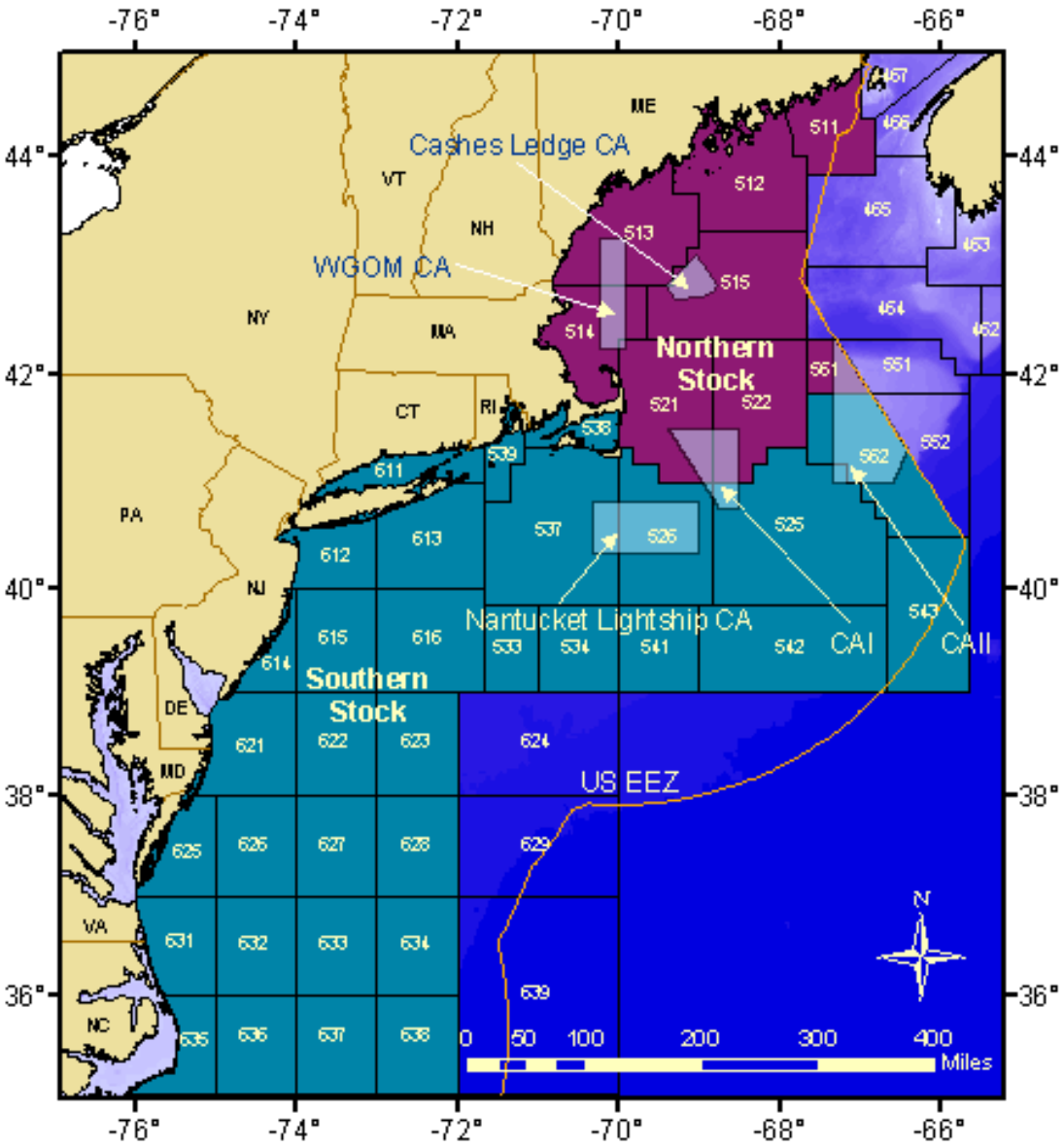
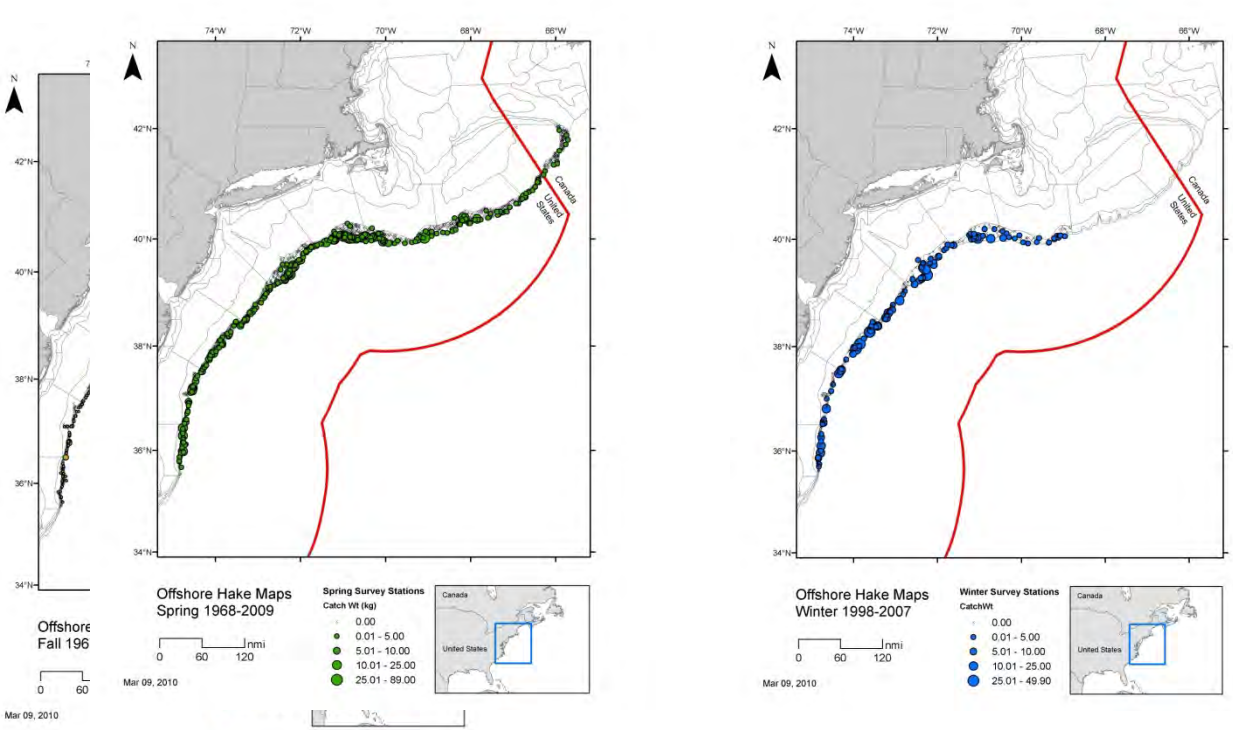


Figure 4 Fall (left), Spring (middle) and winter (right) survey distribution of offshore hake from the nefsc bottom trawl surveys, 1967-2009



7.1.2 Stock status

The 51st Stock Assessment Workshop (SAW 51) met from November 19 through December 3, 2010, at the NEFSC, in Woods Hole, MA to review the benchmark assessments of silver hake *(Merluccius bilinearis*), red hake (*Urophycis chuss*), and offshore hake (*Merluccius albidus*). Despite several attempts to produce an analytical assessment for the hake stocks, the benchmark could not ultimately resolve different signals coming from low catches (especially compared with those in the early part of the time series), increasing stock biomass, and an increasingly truncated age structure in survey catches (i.e., increasing absence of older fish, particularly silver hake). Nonetheless, the benchmark assessment made progress on resolving stock structure, species identification in the survey and commercial catches, and in estimating consumption. Despite the inclusion of predatory consumption estimates which were almost an order of magnitude greater than catch, the analytical models still did not perform well. Instead, the SAW accepted an index based assessment for both red and silver hake status determination, similar to previous assessments, with updated reference points (see Section 5.1.1). For offshore hake, there was no reliable information about catch or trends in abundance and biomass to guide management of offshore hake.

7.1.2.1 Silver hake

The 2010 silver hake assessment for both the northern and southern management areas included survey data from the NEFSC fall bottom trawl survey, commercial fishing data from vessel trip reports, dealer landings, and on-board fishery observer data through 2009. Since then, the Council's Small-Mesh Multispecies Planning Development Team (PDT) have updated the assessment results to include both the 2010 fall survey biomass and commercial catch data and will be the basis for this report (Table 13 and Table 14).

In the absence of an analytical assessment for silver hake, the biological reference points for both the northern and southern silver hake stocks are as follows (Table 12):

Silver hake is <u>overfished</u> when the three-year moving average of the fall survey weight per tow (i.e. the biomass threshold) is less than one half the B_{MSY} proxy, where the B_{MSY} proxy is defined as the average observed from 1973-1982. The most recent estimates of the biomass thresholds are 3.21 kg/tow for the northern stock, and 0.83 kg/tow for the southern stock.

<u>Overfishing</u> occurs when the ratio between the catch and the arithmetic fall survey biomass index from the most recent three years exceeds the overfishing threshold. The most recent estimates of the overfishing threshold are 2.78 kt/kg for the northern stock and 34.19 kt/kg for the southern stock of silver hake.

Overfishing threshold estimates are based on annual exploitation ratios (catch divided by arithmetic fall survey biomass) averaged from 1973-1982. Catch per tow is in "Albatross" units (Table 13 and Table 14).

Table 12 Revised silver hake overfishing definition reference points.

Stock	Threshold	Target
Northern Silver Hake	½ B_{MSY} Proxy (3.21 kg/tow) F_{MSY} Proxy (2.78 kt/kg)	B_{MSY} Proxy (6.42 kg/tow) F_{MSY} Proxy (n/a)
Southern Silver Hake	½ B_{MSY} Proxy (0.83 kg/tow) F_{MSY} Proxy (34.19 kt/kg)	B_{MSY} Proxy (1.65 kg/tow) F_{MSY} Proxy (n/a)

In the northern management area, the three year average arithmetic mean biomass based on the NEFSC fall bottom trawl survey for data 2008-2010 (8.50 kg/tow) was above the management threshold (3.21 kg/tow) and above the target (6.42 kg/tow). The three year average exploitation index (total catch divided by biomass index) for 2008-2010 (0.17 kt/kg) was below the overfishing threshold (2.78 kt/kg; Figure 5). In the southern management area, the three year arithmetic also based on the NEFSC fall bottom trawl survey data for 2008-2010 (1.76 kg/tow) was above the biomass threshold (0.83 kg/tow) and above the target (1.65 kg/tow). The three year average exploitation index (total catch divided by biomass index) for 2008-2010 (4.72 kt/kg) was below the overfishing threshold (34.19 kt/kg; Figure 6). Therefore, based on the accepted SAW 51 reference points, the northern and southern stocks of silver are NOT overfished and overfishing is NOT occurring.

Table 13. Northern silver hake stock - summary of catch and survey indices in albatross units for northern silver hake, 1955-2010 (*continues onto next page*)

Year	Northern Fall Survey arithmetic kg/tow	Northern Fall Survey 3-year average	Northern Landings (000'smt)	Northern Discards (000's mt)	Northern total catch (000 mt)	Northern Exploitation Index	Northern Exploitation Index (3 year avg)
1955			53.36		53.36		
1956			42.15		42.15		
1957			62.75		62.75		
1958			49.90		49.90		
1959			50.61		50.61		
1960			45.54		45.54		
1961			39.69		39.69		
1962			79.00		79.00		
1963	23.10		73.92		73.92	3.20	
1964	4.34		94.46		94.46	21.77	
1965	7.06	11.50	45.28		45.28	6.41	10.46
1966	4.19	5.20	47.81		47.81	11.41	13.20
1967	2.27	4.51	33.37		33.37	14.70	10.84
1968	2.28	2.91	41.38		41.38	18.15	14.75
1969	2.41	2.32	24.06		24.06	9.98	14.28
1970	3.03	2.57	27.53		27.53	9.09	12.41
1971	2.67	2.70	36.40		36.40	13.63	10.90
1972	5.78	3.83	25.22		25.22	4.36	9.03
1973	4.12	4.19	32.09		32.09	7.79	8.60
1974	3.45	4.45	20.68		20.68	5.99	6.05
1975	8.09	5.22	39.87		39.87	4.93	6.24
1976	11.25	7.60	13.63		13.63	1.21	4.05
1977	6.72	8.69	12.46		12.46	1.85	2.66
1978	6.32	8.10	12.61		12.61	2.00	1.69
1979	6.18	6.41	3.42		3.42	0.55	1.47
1980	7.23	6.58	4.73		4.73	0.65	1.07
1981	4.52	5.98	4.42	2.64	7.05	1.56	0.92
1982	6.28	6.01	4.66	2.91	7.57	1.21	1.14
1983	8.76	6.52	5.31	2.64	7.95	0.91	1.22
1984	3.36	6.13	8.29	2.59	10.88	3.24	1.78
1985	8.28	6.80	8.30	2.56	10.86	1.31	1.82
1986	13.04	8.23	8.50	2.35	10.86	0.83	1.79
1987	9.79	10.37	5.66	2.11	7.77	0.79	0.98
1988	6.05	9.63	6.79	1.79	8.57	1.42	1.01
1989	10.53	8.79	4.65	2.32	6.96	0.66	0.96
1990	15.61	10.73	6.38	1.96	8.34	0.53	0.87

Year	Northern Fall Survey arithmetic kg/tow	Northern Fall Survey 3-year average	Northern Landings (000'smt)	Northern Discards (000's mt)	Northern total catch (000 mt)	Northern Exploitation Index	Northern Exploitation Index (3 year avg)
1991	10.52	13.07	6.06	1.26	7.31	0.69	0.60
1992	10.25	15.61	5.31	1.42	6.73	0.66	0.53
1993	7.50	9.42	4.36	0.69	5.05	0.67	0.67
1994	6.84	8.20	3.90	0.24	4.14	0.61	0.65
1995	12.89	9.08	2.59	0.63	3.22	0.25	0.51
1996	7.57	9.10	3.62	0.82	4.44	0.59	0.48
1997	5.66	8.71	2.80	0.24	3.05	0.54	0.46
1998	18.91	10.71	2.05	0.69	2.74	0.14	0.42
1999	11.15	11.91	3.45	0.74	4.19	0.38	0.35
2000	13.51	14.52	2.59	0.36	2.95	0.22	0.25
2001	8.33	10.28	3.39	0.48	3.87	0.46	0.47
2002	7.99	10.09	2.59	0.51	3.11	0.39	0.47
2003	8.29	8.20	1.81	0.20	2.01	0.24	0.37
2004	3.28	6.52	1.05	0.12	1.16	0.35	0.33
2005	1.72	4.43	0.83	0.06	0.89	0.52	0.37
2006	3.69	2.90	0.90	0.04	0.94	0.26	0.38
2007	6.44	3.95	1.01	0.75	1.76	0.27	0.35
2008	5.27	5.13	0.62	0.17	0.79	0.15	0.23
2009	6.89	6.20	1.04	0.19	1.2320	0.18	0.20
2010	13.35	8.50	1.69	0.79	2.4784	0.19	0.17

Table 14. Southern silver hake stock– summary of catch and survey indices in albatross units for northern silver hake, 1955-2010 (*continues onto next page*)

Year	Southern Fall Survey arithmetic kg/tow	Southern Fall Survey 3-year average	Southern Landings (000'smt)	Southern Discards (000's mt)	Southern total catch (000 mt)	Southern Exploitation Index	Southern Exploitation Index (3 year avg)
1955			13.255		13.255		
1956			14.241		14.241		
1957			16.426		16.426		
1958			12.902		12.902		
1959			16.387		16.387		
1960			8.816		8.816		
1961			12.649		12.649		
1962			17.939		17.939		
1963	4.660		89.425		89.425	19.190	
1964	4.060		147.048		147.048	36.219	
1965	5.280	4.667	294.117		294.117	55.704	37.038
1966	2.640	3.993	202.318		202.318	76.636	56.186
1967	2.440	3.453	87.383		87.383	35.813	56.051
1968	2.730	2.603	58.157		58.157	21.303	44.584
1969	1.260	2.143	74.891		74.891	59.437	38.851
1970	1.350	1.780	26.832		26.832	19.876	33.539
1971	2.210	1.607	70.506		70.506	31.903	37.072
1972	2.130	1.897	88.179		88.179	41.399	31.059
1973	1.700	2.013	102.078		102.078	60.046	44.449
1974	0.850	1.560	102.396		102.396	120.466	73.970
1975	1.790	1.447	72.164		72.164	40.315	73.609
1976	1.990	1.543	64.608		64.608	32.466	64.416
1977	1.680	1.820	57.160		57.160	34.024	35.602
1978	2.500	2.057	25.834		25.834	10.334	25.608
1979	1.680	1.953	16.398		16.398	9.761	18.039
1980	1.630	1.937	11.684		11.684	7.168	9.087
1981	1.120	1.477	13.429	3.502	16.931	15.117	10.682
1982	1.560	1.437	14.152	4.654	18.806	12.055	11.447
1983	2.570	1.750	11.860	4.814	16.674	6.488	11.220
1984	1.40	1.84	12.96	4.88	17.84	12.74	10.43
1985	3.55	2.51	12.82	3.87	16.69	4.70	7.98
1986	1.45	2.13	9.70	4.33	14.03	9.68	9.04
1987	1.95	2.32	9.55	4.25	13.80	7.08	7.15
1988	1.78	1.73	8.95	4.50	13.45	7.55	8.10
1989	1.87	1.87	13.00	6.57	19.57	10.46	8.37
1990	1.52	1.72	13.02	5.97	18.99	12.49	10.17

Year	Southern Fall Survey arithmetic kg/tow	Southern Fall Survey 3-year average	Southern Landings (000'smt)	Southern Discards (000's mt)	Southern total catch (000 mt)	Southern Exploitation Index	Southern Exploitation Index (3 year avg)
1991	0.850	1.413	9.740	3.081	12.821	15.084	12.681
1992	0.990	1.120	10.531	3.446	13.977	14.118	13.899
1993	1.280	1.040	12.487	5.166	17.653	13.791	14.331
1994	0.790	1.020	12.181	5.936	18.117	22.933	16.947
1995	1.590	1.220	11.992	1.402	13.394	8.424	15.049
1996	0.450	0.943	12.134	0.479	12.613	28.029	19.795
1997	0.830	0.957	12.548	0.624	13.172	15.870	17.441
1998	0.570	0.617	12.558	0.526	13.084	22.954	22.284
1999	0.820	0.740	10.417	3.549	13.966	17.032	18.619
2000	0.720	0.703	9.472	0.329	9.801	13.613	17.866
2001	2.040	1.193	8.884	0.188	9.072	4.447	11.697
2002	1.180	1.313	4.888	0.410	5.298	4.490	7.516
2003	1.420	1.547	6.281	0.604	6.885	4.849	4.595
2004	1.240	1.280	6.965	1.203	8.168	6.587	5.309
2005	0.940	1.200	6.395	1.576	7.971	8.480	6.638
2006	1.420	1.200	4.583	0.161	4.744	3.341	6.136
2007	0.870	1.077	5.067	0.146	5.213	5.992	5.938
2008	1.360	1.217	5.582	1.033	6.615	4.864	4.732
2009	1.100	1.110	6.595	0.839	7.434	6.758	5.871
2010	2.818	1.759	6.330	0.780	7.110	2.523	4.715

Figure 5. Northern silver hake fall survey biomass in kg/tow (top) and relative exploitation ratios (bottom) of the total catch (kt) to the fall survey index with their calculated 3-yr running averages (red lines). The solid lines represent the overfishing thresholds.

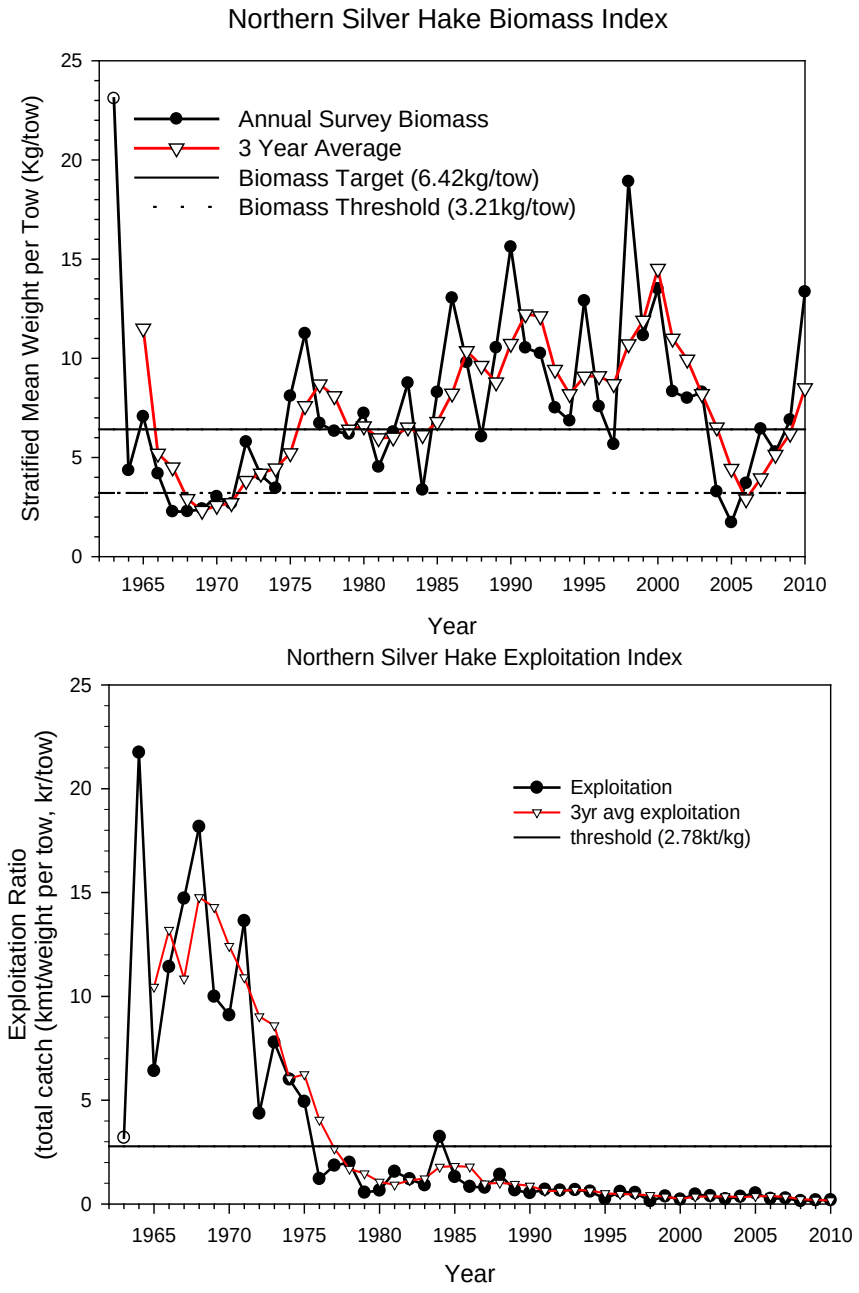
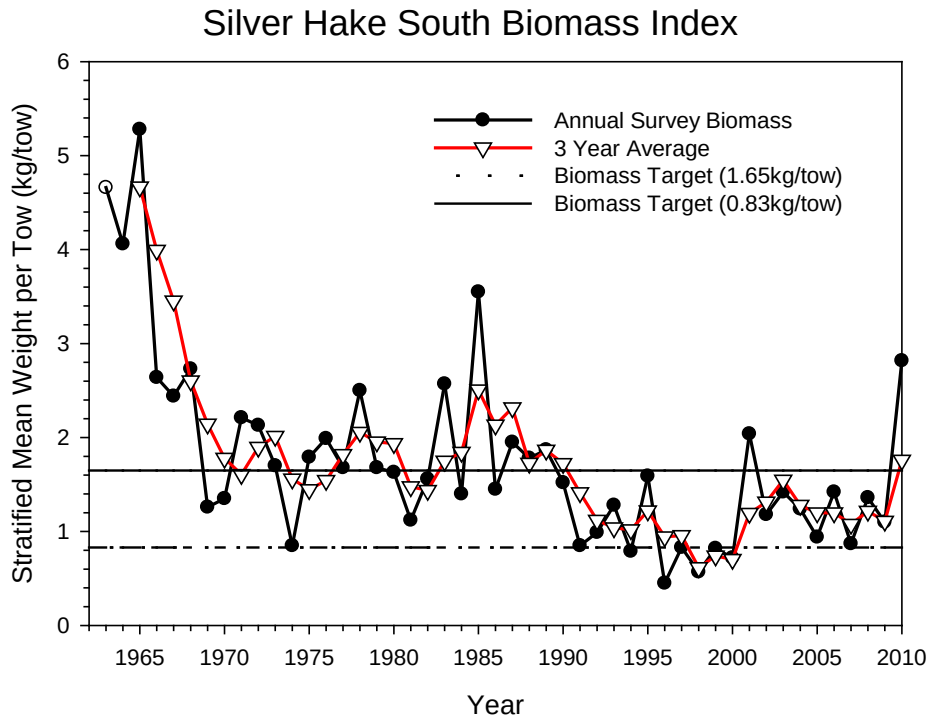
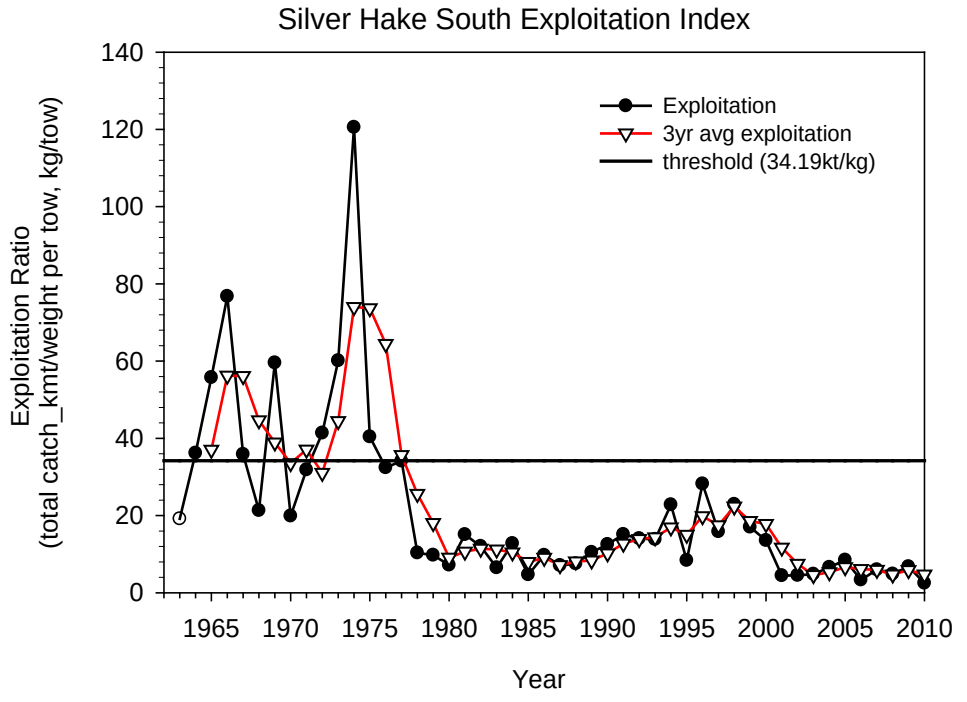


Figure 6. Southern silver hake fall survey biomass in kg/tow (top) and relative exploitation ratios (bottom) of the total catch (kt) to the fall survey index with their calculated 3-yr running averages (red lines). The solid lines represent the overfishing thresholds.





The range of years (1973-1982) adopted during the benchmark assessments for deriving the overfishing definition reference points are considered to be uncertain. The transition from the 1970's to the 1980's highlight a period of high and low productivity with respect to the stock dynamics. This time period also does not include more recent years as basis for defining the F_{MSY} proxy. Recognizing the potential for non-stationary productivity in the stock dynamics and the implications on estimates of the OFL, options for ABCs were explored to account for scientific uncertainty. Other sources uncertainty in the assessment include: truncation in the age structure, estimates of predatory consumption, and catch estimates relative to mixed landings in the fishery (NEFSC, 2011).

7.1.2.2 Red hake

The 2010 red hake assessment included survey data from the NEFSC spring bottom trawl survey through 2010, commercial fishing data from vessel trip reports, dealer landings, and on-board fishery observer data through 2009. Since the last assessment, the Council's Small-Mesh Multispecies PDT have updated the assessment results to include both the 2011 spring survey biomass and the 2010 commercial catch data and will be reflected in this report (Table 16 and Table 17). In the absence of a an analytical assessment for red hake, the biological reference points for both the northern and southern silver stocks are as follows (Table 15):

Red hake is <u>overfished</u> when the three-year moving arithmetic average of the spring survey weight per tow (i.e., the biomass threshold) is less than one half of the B_{MSY} proxy, where the B_{MSY} proxy is defined as the average observed from 1980 – 2010. The current estimates of $B_{THRESHOLD}$ for the northern and southern stocks are 1.27 kg/tow and 0.51 kg/tow, respectively.

<u>Overfishing</u> occurs when the ratio between catch and spring survey biomass for the northern and the southern stocks exceeds 0.163 kt/kg and 3.038 kt/kg, respectively, derived from AIM analyses from 1980-2009.

Table 15 Current Overfishing Definition Reference Points for Red Hake

Stock	Threshold	Target
Northern Red Hake	½ B_{MSY} Proxy (1.27kg/tow) F_{MSY} Proxy (0.163 kt/kg)	B_{MSY} Proxy (n/a) F_{MSY} Proxy (n/a)
Southern Red Hake	½ B_{MSY} Proxy (0.51 kg/tow) F_{MSY} Proxy (3.038 kt/kg)	B_{MSY} Proxy (n/a) F_{MSY} Proxy (n/a)

Table 16. Northern red hake stock - summary of catch and survey indices in albatross units for northern silver hake, 1962-2010 (*continues onto next page*)

Year	Northern Fall Survey arithmetic kg/tow	Northern Fall Survey 3-year average	Northern Landings (000'smt)	Northern Discards (000's mt)	Northern total catch (000 mt)	Northern Exploitation Index	Northern Exploitation Index (3 year avg)
1962			1.918	1.600	3.518		
1963			3.285	1.600	4.885		
1964			1.410	1.701	3.111		
1965			2.774	1.624	4.398		
1966			5.578	1.603	7.181		
1967			1.865	1.404	3.269		
1968	1.138		2.629	1.301	3.930	3.454	
1969	0.639		2.022	1.117	3.138	4.909	
1970	0.541	0.773	1.033	1.098	2.130	3.939	4.101
1971	0.648	0.609	4.806	1.162	5.969	9.211	6.020
1972	1.560	0.916	15.028	0.963	15.991	10.248	7.800
1973	4.311	2.173	15.289	0.909	16.199	3.757	7.739
1974	2.431	2.768	7.226	0.815	8.041	3.308	5.771
1975	4.254	3.665	8.703	1.199	9.902	2.328	3.131
1976	3.371	3.352	6.339	0.925	7.264	2.155	2.597
1977	2.656	3.427	0.894	1.081	1.976	0.744	1.742
1978	2.571	2.866	1.227	1.117	2.345	0.912	1.270
1979	2.041	2.422	1.529	1.223	2.751	1.348	1.001
1980	3.883	2.831	1.033	1.366	2.399	0.618	0.959
1981	6.353	4.092	1.277	1.324	2.601	0.409	0.792
1982	2.127	4.121	1.213	1.460	2.673	1.257	0.761
1983	3.698	4.059	0.895	1.353	2.248	0.608	0.758
1984	2.982	2.936	1.060	1.327	2.388	0.801	0.888
1985	3.913	3.531	0.992	1.270	2.262	0.578	0.662
1986	3.260	3.385	1.458	1.189	2.646	0.812	0.730
1987	2.941	3.371	1.013	1.052	2.066	0.702	0.697
1988	1.996	2.732	0.866	0.897	1.763	0.883	0.799
1989	1.651	2.196	0.777	1.447	2.224	1.347	0.977
1990	1.331	1.660	0.830	0.595	1.425	1.070	1.100

Year	Northern Fall Survey arithmetic kg/tow	Northern Fall Survey 3-year average	Northern Landings (000'smt)	Northern Discards (000's mt)	Northern total catch (000 mt)	Northern Exploitation Index	Northern Exploitation Index (3 year avg)
1991	1.621	1.621	0.745	0.818	1.563	0.964	0.964
1992	2.501	2.061	0.918	0.726	1.645	0.658	0.811
1993	2.824	2.315	0.769	0.083	0.853	0.302	0.641
1994	1.590	2.305	0.729	0.077	0.806	0.507	0.489
1995	1.973	2.129	0.187	0.063	0.250	0.127	0.312
1996	1.792	1.785	0.414	0.656	1.070	0.597	0.410
1997	1.811	1.859	0.339	0.125	0.464	0.256	0.327
1998	2.519	2.041	0.187	0.130	0.317	0.126	0.326
1999	2.322	2.217	0.220	0.468	0.687	0.296	0.226
2000	3.186	2.676	0.197	0.055	0.252	0.079	0.167
2001	3.579	3.029	0.223	0.135	0.358	0.100	0.158
2002	4.460	3.742	0.275	0.101	0.376	0.084	0.088
2003	0.996	3.012	0.210	0.088	0.297	0.298	0.161
2004	1.772	2.409	0.103	0.057	0.160	0.090	0.158
2005	1.097	1.288	0.096	0.057	0.153	0.140	0.176
2006	0.912	1.260	0.096	0.181	0.277	0.303	0.178
2007	2.056	1.355	0.069	0.127	0.197	0.096	0.180
2008	3.488	2.152	0.052	0.059	0.112	0.032	0.144
2009	1.748	2.431	0.085	0.095	0.180	0.103	0.077
2010	2.020	2.419	0.067	0.244	0.311	0.154	0.096
2011	**2.178**	1.982					

Table 17. Southern red hake stock - summary of catch and survey indices in albatross units for northern silver hake, 1962-2010 (*continues onto next page*)

Year	Southern Fall Survey arithmetic kg/tow	Southern Fall Survey 3-year average	Southern Landings (000'smt)	Southern Discards (000's mt)	Southern total catch (000 mt)	Southern Exploitation Index	Southern Exploitation Index (3 year avg)
1962			12.757	4.000	16.757		
1963			32.671	4.000	36.671		
1964			44.221	3.758	47.979		
1965			93.624	4.292	97.916		
1966			108.016	3.773	111.789		
1967			58.948	3.660	62.608		
1968	1.285		18.713	3.715	22.428	17.450	
1969	1.082		53.417	3.623	57.040	52.707	
1970	1.723	1.364	11.864	3.141	15.005	8.708	26.288
1971	3.488	2.098	35.421	2.313	37.734	10.817	24.077
1972	3.590	2.934	61.371	2.098	63.469	17.680	12.402
1973	3.992	3.690	51.679	2.240	53.919	13.506	14.001
1974	2.838	3.473	26.834	2.158	28.992	10.217	13.801
1975	3.179	3.336	20.028	1.763	21.791	6.855	10.193
1976	5.314	3.777	23.110	1.827	24.937	4.693	7.255
1977	2.300	3.598	7.812	1.818	9.630	4.186	5.245
1978	7.648	5.087	6.434	2.436	8.870	1.160	3.346
1979	1.514	3.821	7.837	2.665	10.502	6.938	4.095
1980	2.380	3.847	4.226	2.702	6.928	2.911	3.670
1981	4.613	2.835	2.496	2.715	5.211	1.130	3.660
1982	3.342	3.445	3.199	3.776	6.975	2.087	2.043
1983	2.207	3.387	1.576	3.889	5.465	2.476	1.898
1984	1.331	2.293	1.819	3.910	5.729	4.305	2.956
1985	1.392	1.643	0.932	2.968	3.901	2.802	3.194
1986	1.734	1.486	0.899	3.389	4.288	2.473	3.193
1987	0.878	1.335	1.415	3.313	4.728	5.389	3.554
1988	1.006	1.206	1.122	3.462	4.584	4.557	4.139
1989	0.487	0.790	1.367	5.006	6.372	13.077	7.674
1990	0.707	0.733	1.312	4.748	6.060	8.573	8.735

Year	Southern Fall Survey arithmetic kg/tow	Southern Fall Survey 3-year average	Southern Landings (000'smt)	Southern Discards (000's mt)	Southern total catch (000 mt)	Southern Exploitation Index	Southern Exploitation Index (3 year avg)
1991	0.611	0.602	1.210	2.612	3.822	6.257	9.302
1992	0.465	0.594	1.439	6.343	7.782	16.743	10.524
1993	0.424	0.500	1.014	5.308	6.321	14.926	12.642
1994	0.675	0.521	1.052	1.720	2.772	4.108	11.926
1995	0.516	0.538	1.473	1.329	2.801	5.433	8.156
1996	0.453	0.548	0.719	0.380	1.099	2.426	3.989
1997	1.161	0.710	1.172	2.422	3.595	3.097	3.652
1998	0.214	0.609	1.207	0.740	1.948	9.118	4.880
1999	0.455	0.610	1.404	1.060	2.465	5.420	5.878
2000	0.423	0.364	1.462	0.250	1.712	4.047	6.195
2001	0.642	0.507	1.492	0.138	1.630	2.540	4.002
2002	0.542	0.536	0.673	0.327	1.000	1.846	2.811
2003	0.206	0.463	0.641	0.345	0.986	4.794	3.060
2004	0.154	0.301	0.599	0.616	1.214	7.865	4.835
2005	0.376	0.245	0.411	1.007	1.418	3.772	5.477
2006	0.380	0.304	0.429	0.674	1.103	2.902	4.846
2007	0.857	0.538	0.489	1.545	2.035	2.373	3.015
2008	0.473	0.570	0.653	0.814	1.467	3.099	2.791
2009	1.342	0.891	0.674	0.869	1.543	1.150	2.207
2010	1.045	0.954	0.616	0.737	1.352	1.294	1.848
2011	**1.098**	**1.162**					

In the north, the three year arithmetic mean biomass index, based on the NEFSC spring bottom trawl survey for 2009-2011 (1.98 kg/tow) was above the management threshold (1.27 kg/tow) and below the target (2.54 kg/tow). The exploitation index (catch divided by biomass index for 2010 (0.15 kt/kg) was below the threshold (0.16 kt/kg; Figure 7). In the south, the three year arithmetic mean biomass index, based on the NEFSC spring bottom trawl survey for 2009-2011 (1.16 kg/tow) was above the management threshold (0.51 kg/tow) and above the target (1.02 kg/tow; Figure 8). The exploitation index (catch divided by biomass index for 2010 (1.29 kt/kg) was below the threshold (3.04 kt/kg; Figure 8). Therefore, based on the accepted SARC 51 reference points, the northern and southern red hake stocks are NOT overfished and overfishing is NOT occurring.

Figure 7. Northern red hake spring survey biomass in kg/tow (top) and relative exploitation ratios (bottom) of the total catch (kt) to the fall survey index with their calculated 3-yr running averages (red lines). The solid lines represent the overfishing thresholds.

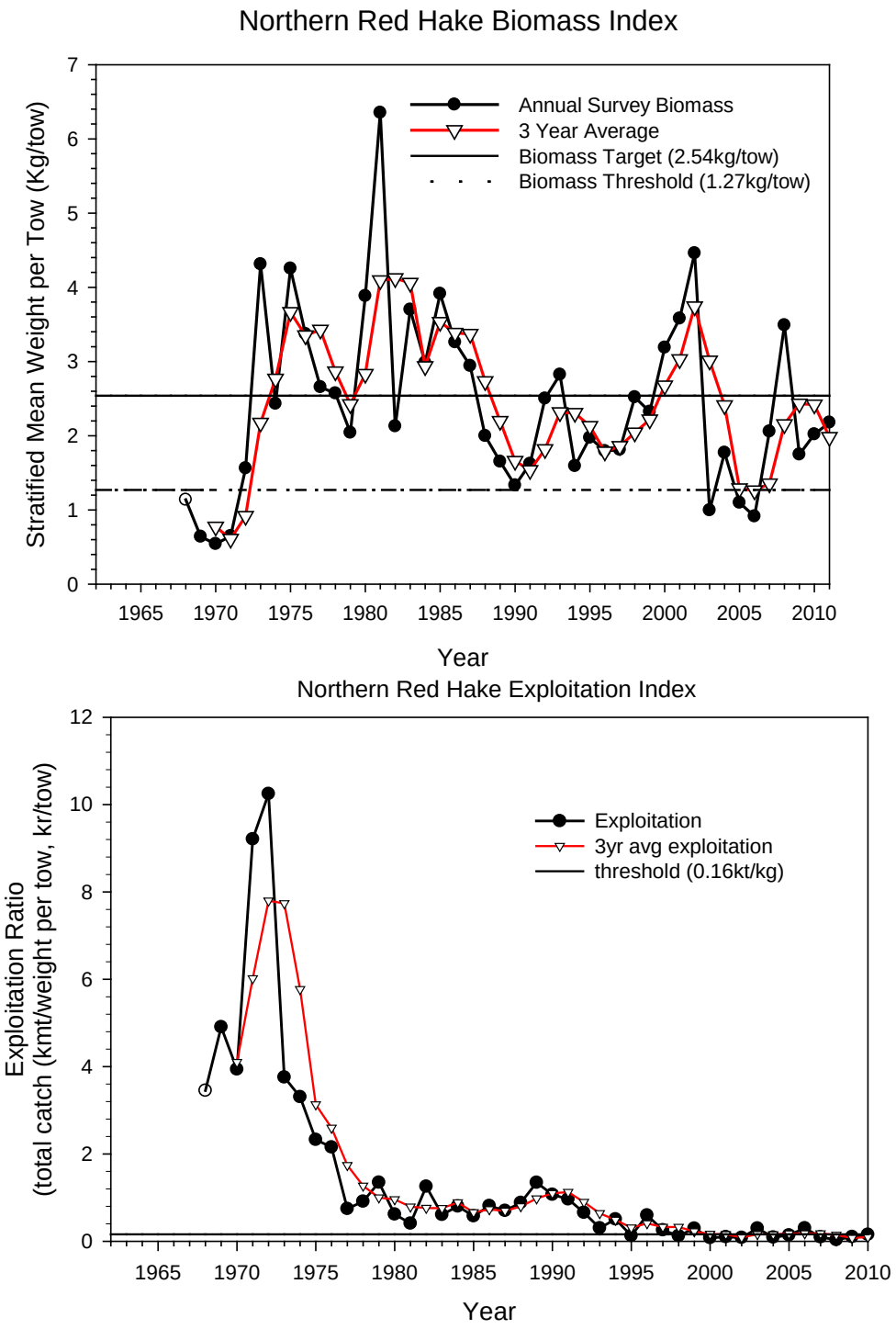
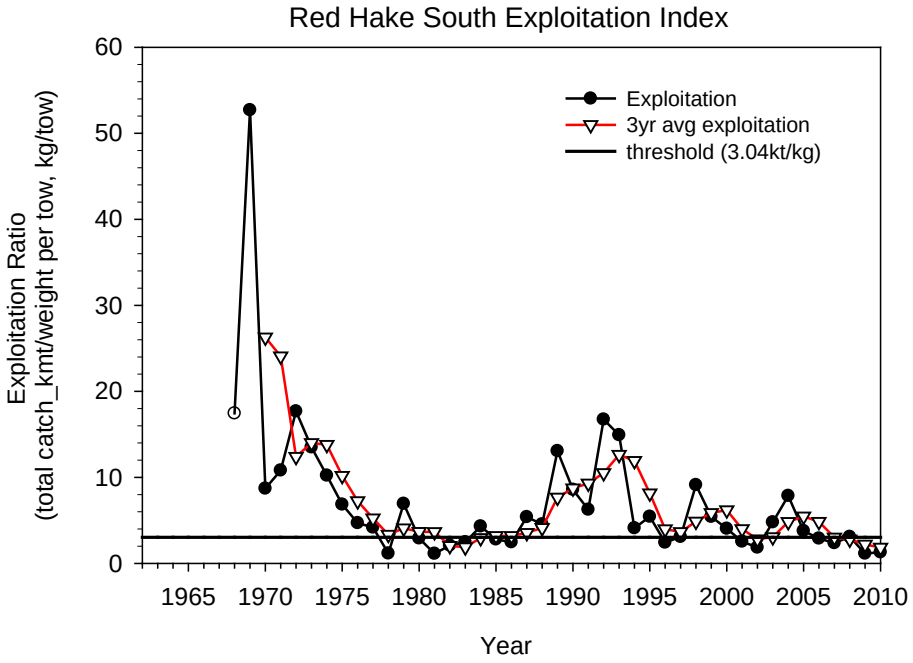
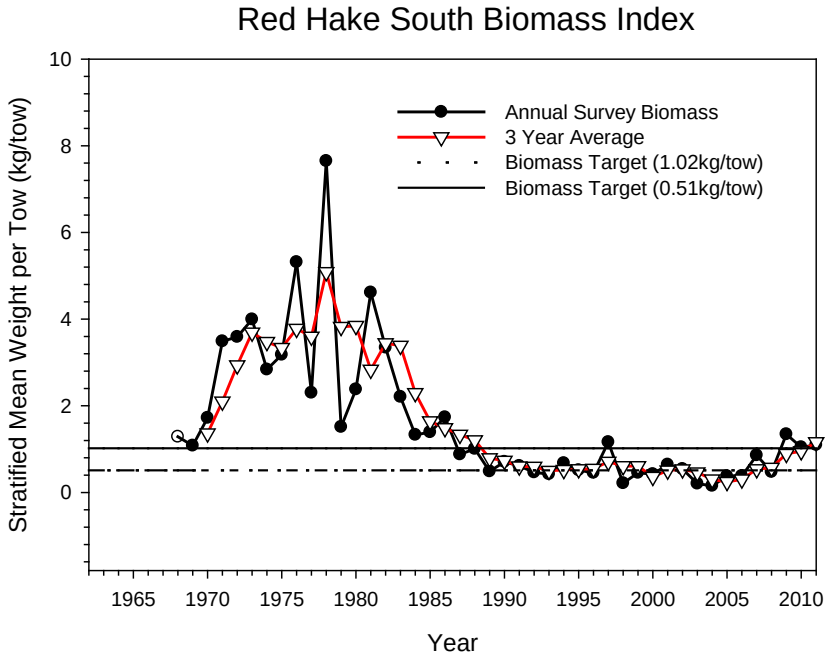


Figure 8. Southern red hake spring survey biomass in kg/tow (top) and relative exploitation ratios (bottom) of the total catch (kt) to the fall survey index with their calculated 3-yr running averages (red lines). The solid lines represent the overfishing thresholds.





7.1.2.3 Offshore hake

The new 2010 assessment concluded that information was not available to determine stock status for offshore hake because fishery data were insufficient and the survey data are not considered to reflect stock trends. It was not possible to recommend a reference points for offshore hake and the overfished and overfishing status of offshore hake is therefore unknown.

7.1.3 Landings and discards of target species

Using data from the benchmark stock assessment status table (NEFSC 2011a), the Whiting PDT calculated discards as a percent of total catch, including 'landings' reported by fishermen on VTRs as being transferred at sea for sale as bait. These data were used to estimate and set the TALs by stock area (see Sections 8.1.2 and 8.1.3).

Red and silver hake discards were estimated by applying the observed discard to total landings ratio (D/K_all) to total landings of all trips from a strata. Strata used for this analysis included gear type, two digit statistical area, and half-year. Landings data with no matching observed trips in a stratum were filled as appropriate. More details are provided in NEFSC 2011b.

The total discard rate (total estimated discards divided by total catch) for red and silver hake were computed from assessment data summarized in the catch and status table in NEFSC 2011a, updated to include calendar year 2010 and revised to account for corrections NMFS made in 2011 to the transfer at sea data in 2006-2010.

Red hake discards were comparatively high, ranging from 10-40% from 2000-2003, increasing to 50-80% from 2005 to present (Figure 9), in both the northern and southern stock areas. The main cause of the increasing discard rate appears to be related to limited markets and decreasing landings, rather than increases in discarding from higher red hake catches.

Nominal discard estimates in the northern region however increased from 59 mt in 2008 and 95 mt in 2009 to 244 mt in 2010 (Figure 9. Northern and southern red hake discard rate (percent of total catch).

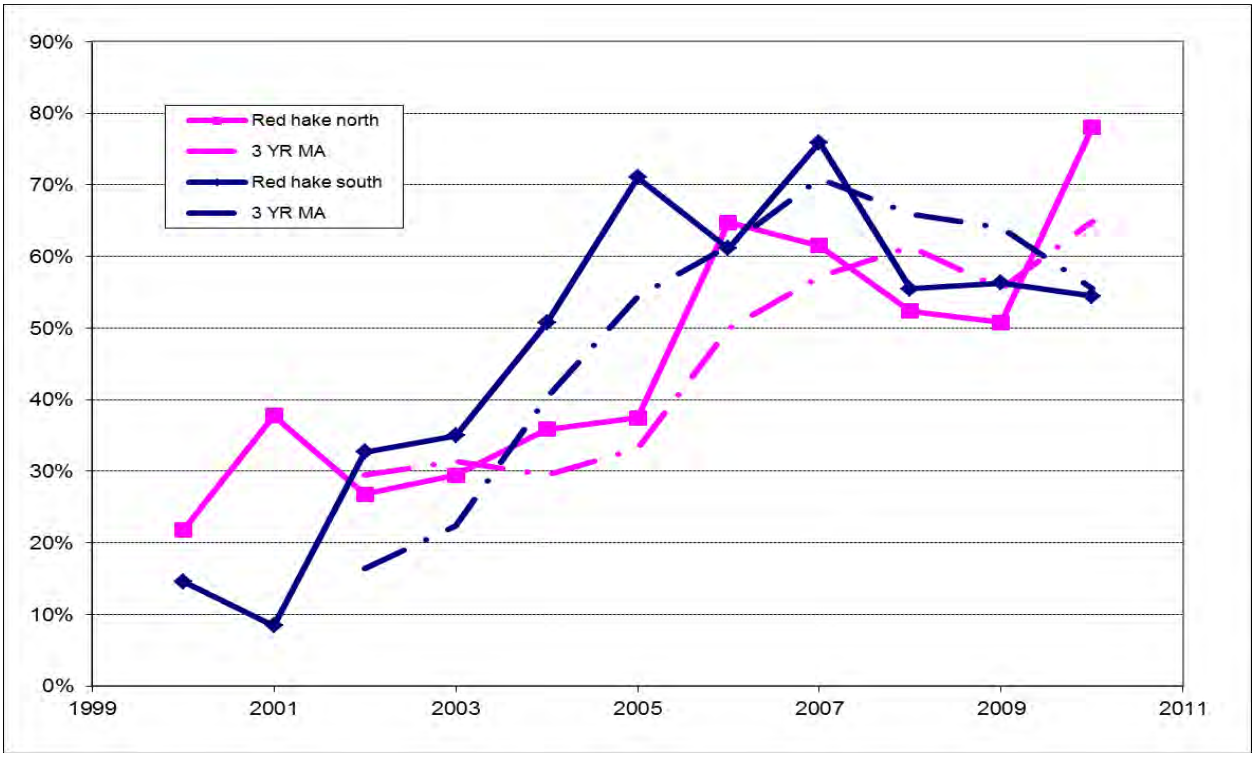


Figure 10). This discard increase drove the 2010 discard rate to 78%, from 52% in 2008 and 51% in 2009 (Figure 9). The three year moving average discard rate (used to set the TAL), also increased from 61% in 2008 and 55.5% in 2009 to 65% in 2010.

Nominal discard rates in the southern region also increased through the time series in Figure 9, through 2005 but since then has been more stable with a recent decline to 54-56% since 2008. As a result, the three year moving average has been declining from 66% in 2008 and 64% in 2009 to 55.5% in 2010.

Figure 9. Northern and southern red hake discard rate (percent of total catch).

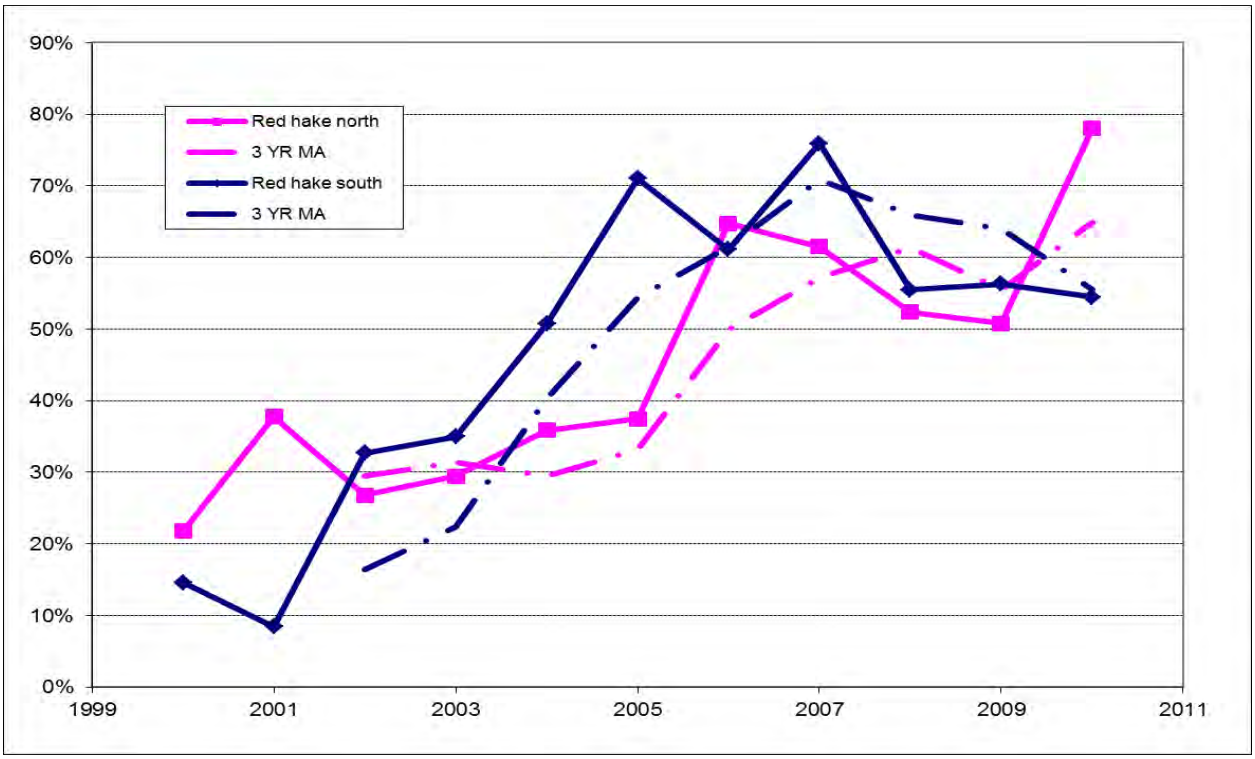
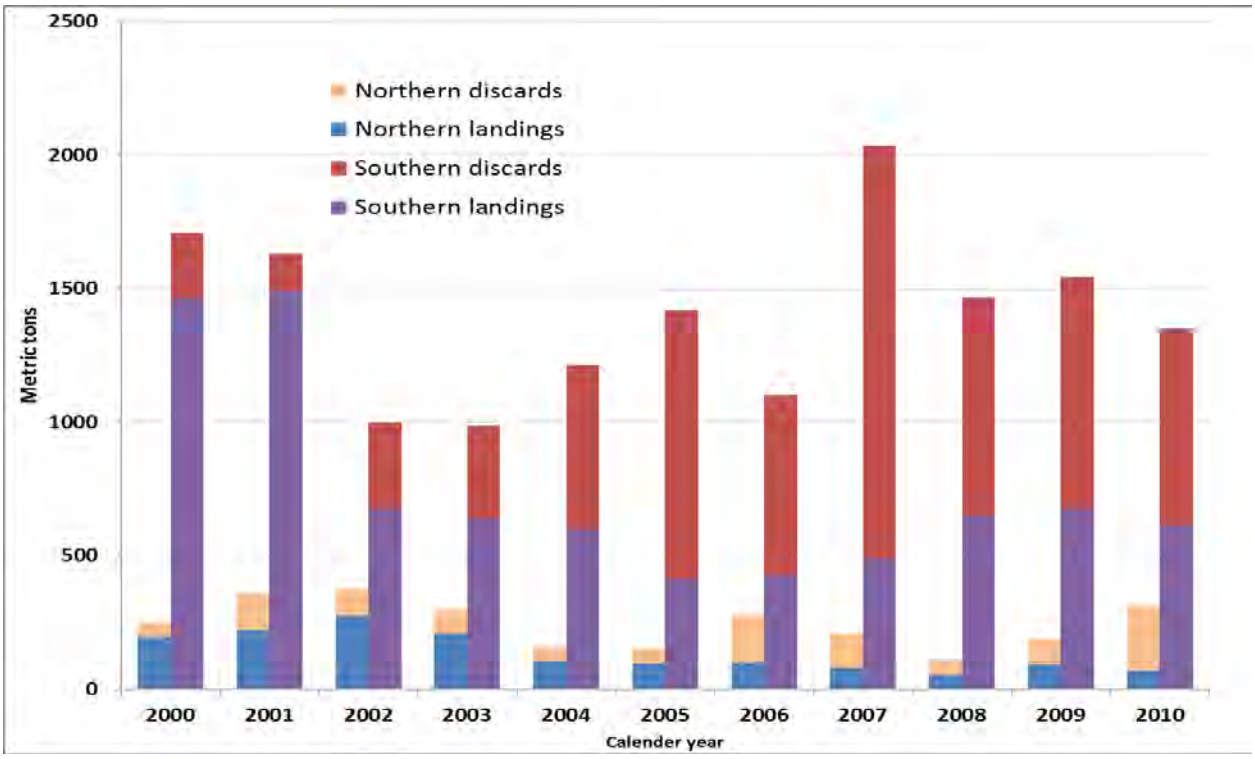


Figure 10. Landings and estimated nominal discards (mt) for northern and southern stocks of red hake, 2000-2010. Source: NEFSC 2011a, updated by Whiting PDT analysis.



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, dropping to 167 mt in 2008 and 221 mt in 2009, then increasing to 788 mt in 2010 (Figure 11). Again 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 (Figure 10). The thee year moving average is of course more stable, fluctuating from 27% in 2008 to 30% in 2009 and to 26% in 2010.

The silver hake discard rate in the southern stock area is typically even lower, under 20% throughout the time series (Figure 11), and unlike the general increasing trend in the northern area, the discard rate in the southern area appears to be varying without trend. Discards were estimated to be only 132 mt in 2007, but increased to 1045 mt in 2008, before declining to 828 mt in 2009 and 780 mt in 2010 (Figure 10). The discard rate peaked at 16% in 2008, before declining to 11% in 2009 and 2010. The three year moving average was therefore 13% in 2010.

Figure 11. Northern and southern silver hake discard rate (percent of total catch).

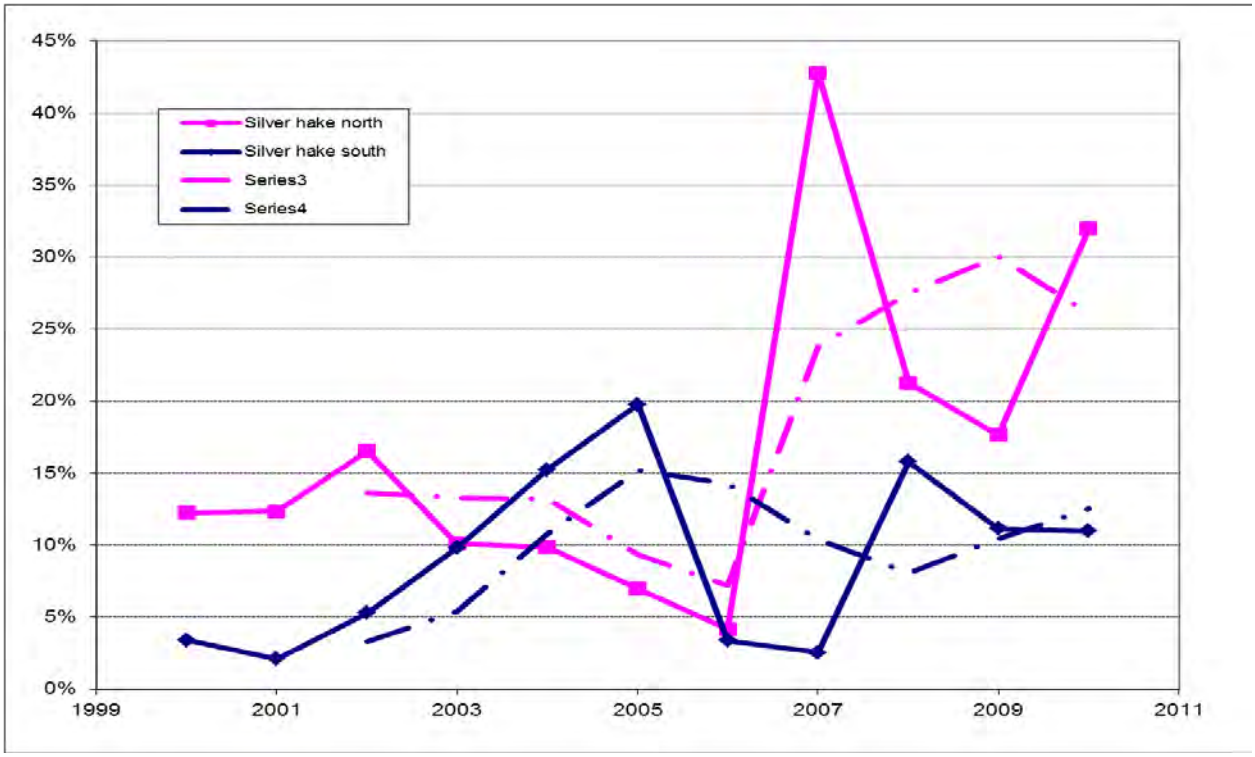
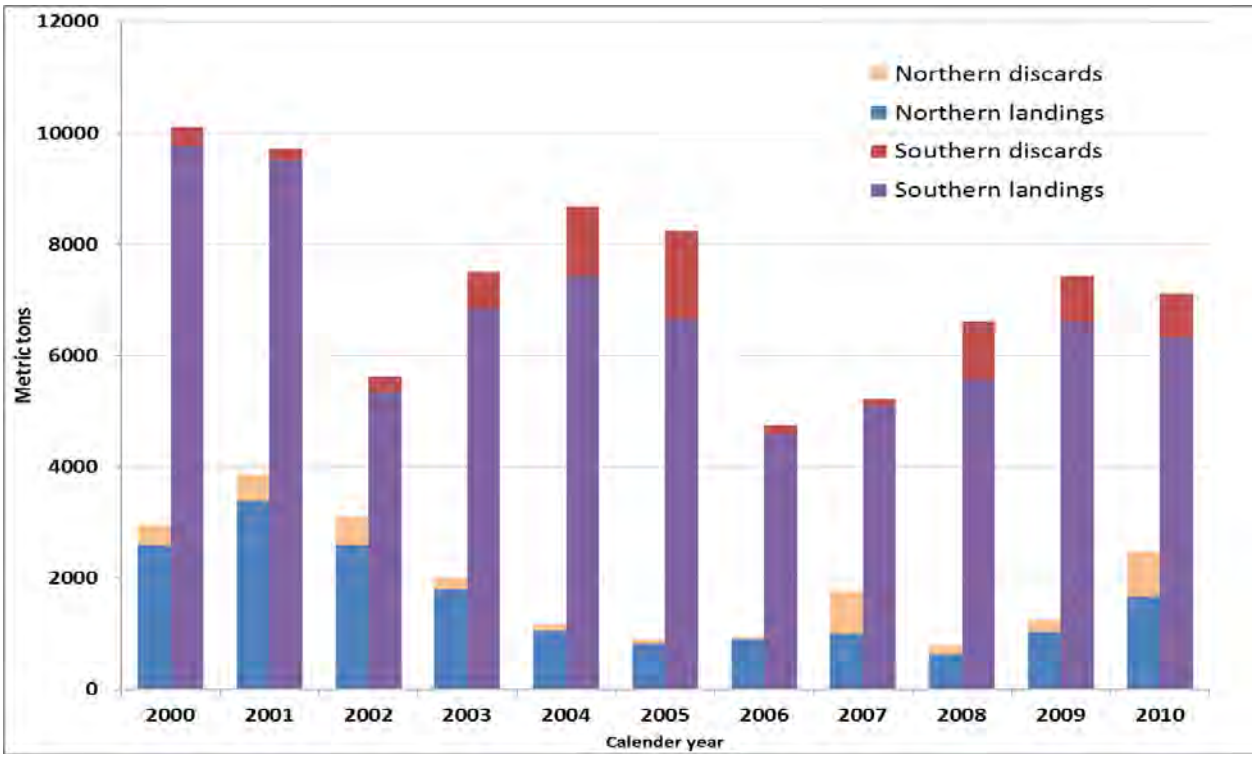


Figure 12. Landings and estimated nominal discards (mt) for northern and southern stocks of silver hake, 2000-2010. Source: NEFSC 2011a, updated by Whiting PDT analysis.



7.1.4 Landings and discards of non-target species on trips in the fishery

Information about the absolute level of bycatch species in the directed small-mesh multispecies fishery could not be determined due to difficulties of determining an appropriate trip definition for the hake fishery. Many factors were explored in attempt to define an observed hake trip, specifically regulated mesh size and possession limits for years 2000-2004. However, these factors were not sufficient to define "directed" small-mesh multispecies trips. This insufficiency results in trips that did target small-mesh multispecies being excluded, with potentially significant impacts. For the purpose of this exercise, bycatch species were determined using a broad definition of all trips (directed and non-directed) that caught small-mesh multispecies in the trawl fishery by mesh-size groups. Mesh size was grouped into three categories in an attempt to crudely disaggregate which trips are believed to most likely target small-mesh multispecies based on mesh regulations for the exempted area programs. The mesh groups include: <2.5-inch mesh (often trips targeting other species like herring, shrimp, and squid), 2.5-4.5-inch mesh (often trips targeting small-mesh multispecies), and > 4.5-inch mesh (often trips targeting other species like regulated groundfish, black sea bass, and summer flounder). In the southern area, trips that caught offshore hake were included with silver hake trips to account for mixed landings of whiting in the southern management area. In the analysis, mesh-size group 2.5-4.5-inches was used as a proxy for trips that are most likely to "target" small-mesh multispecies. However, it is also recognized that there are some overlaps with other targeted fisheries (i.e., the squid, mackerel, and butterfish fishery) within this category.

Table 18 – Table 33 provide a list of the most frequent discarded species or species group that comprised <1% or more of the discards on observed trips that caught either silver hake or red hake during 2004 - 2010 by management area based on data from the NEFSC Observer Program. Note the small-mesh multispecies resources are included in the list (grayed out in Table 18- Table 33). Across both stock areas, discards include the skate complex (*Raja eglanteria, Luecoraja erinacea, Leucoraja garmani, Malacoraja senta, Ambiraja radiate, Leucoraja ocellata*), dogfish (*Squalus acanthias*), fluke (*Paralicthys dentatus*), windowpane flounder (*Scophthalmus aquosus*), yellowtail flounder (*Limanada ferriginea*), American plaice (*Hippoglossoides platessoides*), witch flounder (*Glyptocephalus cynoglossus*), red hake (*Urophycis chuss*), silver hake (*Merluccidae billinearis*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), monkfish (*Lophius americanus*), cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), red crab (*Chaceon quinquedens*), scallops (*Placopecten magellanicus*), squid (*Loligo pealeii, Illex illecebrosus*), butterfish (*Peprilus triacanthus*), mackerel (*Scomber scombrus*), and redfish (*Sebastes fasciatus*).

The proportion of observed catches that were discarded by total weight on trips that were likely to target either red or silver hake were fairly similar regardless of stock area, but lower for other mesh-size groupings, with the exception of large the mesh fishery (>4.5 inches) in the southern region. In the northern area, for 2004-2010, 38% of observed catches were discarded on trips that were likely to target silver hake (Table 20), and 40% of total catches were discarded on trips that were likely directed towards red hake (Table 21). During the same time period, discards of all species caught in the trips that likely targeted silver hake or red hake in the southern area represented 31% and 36% of the observed catch for these fisheries, respectively. For trips that likely targeted small-mesh multispecies, the majority of discards consisted of the small-mesh groundfish species complex (silver hake, offshore hake, and red hake). In the northern area, approximately 21-22% of the small-mesh multispecies catches were discarded (Table 20-Table 21) and in the southern area, 23-27% (Table 28-Table 29) of small-mesh multispecies were discarded. Other frequently discarded species on trips that caught small-mesh multispecies (i.e., trips with trawl mesh size < 2.5 inches or > 4.5 inches, as well as other gear types) include dogfish in the northern stock area, the squid, mackerel, and butterfish complex in the southern stock area, and skates in both the northern and southern stock areas (Table 18-Table 33). Because we are

unable to definitively identify "targeted" small-mesh multispecies trips, it is difficult to assign discards to particular fisheries. For example, skates and dogfish catch would be uninformative, as those species are also often caught incidentally (and with a relatively high trip limit) to trips directing on higher value, lower trip limit species. If we were to say a trip is a directed skate trip because of a relatively high proportion of its landings are skates, it is likely not accurate because the trip could have been targeting a lower landing limit of cod (a higher value species). Because of this, it would be difficult to tease out of the data that the lower landing limit, higher value species is, in fact, the target.

In the following tables (Table 18-Table 33), "Pct Discard (Overall)" represents the discard weight (lb) of that species divided by the total discard weight across all species. "Pct Discard (Sp)" represents the percentage of the catch (Kept + Discards) of a species that was discarded from trips that caught silver hake.

Table 18. **Northern Silver Hake** (Mesh < 2.5 Inches): Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught silver hake in the northern management area for mesh size < 2.5 inches, from the NEFSC OBDBS Program (2004 -2010).

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Dogfish	29,973	103,177	133,150	77%	32%
Groundfish, Small-Mesh	272,919	39,646	312,566	13%	12%
Groundfish, Large-Mesh	2,581	22,893	25,474	90%	7%
Silver Hake	217,275	19,996	237,271	8%	6%
Red Hake	55,588	19,650	75,238	26%	6%
Skate	-	19,086	19,086	100%	6%
Herring	64,237	17,542	81,779	21%	5%
Squid, Mackerel, Butterfish	8,899	11,873	20,773	57%	4%
General *Alosa*	4,160	9,194	13,354	69%	3%
Winter Flounder	-	7,233	7,233	100%	2%
American Plaice	-	6,759	6,759	100%	2%
River Herring	774	5,399	6,173	87%	2%
Mackerel	855	4,838	5,693	85%	1%
Yellowtail Flounder	10	4,651	4,661	100%	1%
Butterfish	4,104	4,499	8,603	52%	1%
Alewife	170	3,442	3,612	95%	1%
Unknown Herring	3,124	3,398	6,522	52%	1%
Illex	915	2,004	2,918	69%	1%
Blueback Herring	604	1,957	2,561	76%	1%
Other Species	5,569	8,011	13,580	59%	3%
Total	671,757	315,248	987,005	32%	NA

Table 19. **Northern Red Hake** (Mesh < 2.5 Inches): Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught red hake in the northern management area for mesh size <2.5 inches, from the NEFSC Program database (2004 -2010).

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Dogfish	24,983	96,355	121,338	79%	31%
Groundfish, Small-Mesh	266,406	39,301	305,708	13%	13%
Groundfish, Large-Mesh	1,524	22,055	23,579	94%	7%
Silver Hake	210,762	19,651	230,413	9%	6%
Red Hake	55,588	19,650	75,238	26%	6%
Skate	-	18,290	18,290	100%	6%
Herring	63,386	17,412	80,798	22%	6%
Squid, Mackerel, Butterfish	8,062	11,629	19,691	59%	4%
General *Alosa*	4,110	9,013	13,123	69%	3%
Winter Flounder	-	6,824	6,824	100%	2%
American Plaice	-	6,560	6,560	100%	2%
River Herring	771	5,284	6,054	87%	2%
Mackerel	855	4,838	5,693	85%	2%
Yellowtail Flounder	10	4,618	4,628	100%	1%
Butterfish	4,042	4,331	8,373	52%	1%
Unknown Herring	3,077	3,348	6,425	52%	1%
Alewife	167	3,327	3,494	95%	1%
Illex	915	1,975	2,889	68%	1%
Blueback Herring	604	1,957	2,561	76%	1%
Other Species	3,726	7,693	11,419	67%	3%
Total	648,985	304,112	953,096	32%	NA

Table 20. **Northern Silver Hake** (Mesh 2.5-4.5 Inches): Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught silver hake in the northern management area for mesh size range between 2.5 and 4.5 inches, from the NEFSC Program database (2004 -2010).

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Groundfish, Small-Mesh	545,261	198,314	743,574	27%	21%
Skate	8,121	164,917	173,038	95%	18%
Silver Hake	495,773	147,747	643,520	23%	16%
Dogfish	10,422	73,823	84,245	88%	8%
Groundfish, Large-Mesh	77,593	60,668	138,261	44%	7%
Herring	38,062	60,559	98,621	61%	7%
Red Hake	49,160	50,542	99,701	51%	5%
Squid, Mackerel, Butterfish	15,388	22,333	37,721	59%	2%
Winter Flounder	557	21,604	22,161	97%	2%
Yellowtail Flounder	524	13,397	13,921	96%	1%
American Plaice	15,623	12,854	28,477	45%	1%
Butterfish	8,112	11,304	19,416	58%	1%
Fluke, Scup, Black Sea Bass	486	9,532	10,018	95%	1%
Fluke	479	9,527	10,006	95%	1%
Illex	376	7,749	8,125	95%	1%
Monkfish	115,323	7,654	122,976	6%	1%
Haddock	6,096	4,890	10,986	45%	1%
Other Species	62,906	25,083	87,989	29%	3%
Total	1,450,259	902,496	2,352,755	38%	NA

Table 21. Northern Red Hake (Mesh 2.5-4.5 Inches): Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught red hake in the northern management area for mesh size range between 2.5 and 4.5 inches, from the NEFSC Program database (2004 -2010).

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Groundfish, Small-Mesh	527,119	197,298	724,416	27%	22%
Skate	1,713	163,293	165,006	99%	18%
Silver Hake	477,631	146,731	624,362	24%	16%
Dogfish	8,846	61,855	70,701	87%	7%
Herring	37,917	60,461	98,378	61%	7%
Groundfish, Large-Mesh	43,206	56,137	99,343	57%	6%
Red Hake	49,160	50,542	99,701	51%	6%
Squid, Mackerel, Butterfish	14,991	22,070	37,060	60%	2%
Winter Flounder	98	20,978	21,076	100%	2%
Yellowtail Flounder	3	12,957	12,960	100%	1%

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Butterfish	8,067	11,169	19,236	58%	1%
American Plaice	7,890	10,559	18,449	57%	1%
Fluke, Scup, Black Sea Bass	486	9,385	9,871	95%	1%
Fluke	479	9,380	9,859	95%	1%
Illex	330	7,659	7,989	96%	1%
Monkfish	69,172	6,819	75,991	9%	1%
Haddock	1,207	4,870	6,077	80%	1%
Other Species	41,745	23,146	64,891	36%	3%
Total	1,290,057	875,307	2,165,364	40%	NA

Table 22. **Northern Silver Hake** (Mesh 4.5 Inches): Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught silver hake in the northern management area for mesh size greater than 4.5 inches, from the NEFSC Program database (2004 -2010).

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Skate	5,319,058	15,531,636	20,850,694	74%	63%
Groundfish, Large-Mesh	23,700,480	2,399,490	26,099,970	9%	10%
Dogfish	67,352	1,823,470	1,890,821	96%	7%
Cod	4,028,453	705,852	4,734,305	15%	3%
Monkfish	6,513,241	466,669	6,979,910	7%	2%
Haddock	5,801,800	384,633	6,186,433	6%	2%
American Plaice	1,870,113	358,488	2,228,601	16%	1%
Fluke, Scup, Black Sea Bass	35,887	279,791	315,678	89%	1%
Fluke	35,853	279,594	315,447	89%	1%
Yellowtail Flounder	652,492	216,669	869,161	25%	1%
Redfish	1,477,410	188,120	1,665,530	11%	1%
Windowpane	11,887	160,987	172,875	93%	1%
Groundfish, Small-Mesh	21,638	157,841	179,479	88%	1%
Witch Flounder	1,740,960	148,353	1,889,313	8%	1%
Silver Hake	14,557	93,318	107,874	87%	0%
Red Hake	7,017	62,853	69,870	90%	0%
Other Species	8,345,849	690,582	9,036,431	8%	3%
Total	59,622,473	23,792,175	83,414,648	29%	NA

Table 23. **Northern Red Hake** (Mesh 4.5 Inches):Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught red hake in the northern management area for mesh size greater than 4.5 inches, from the NEFSC Program database (2004 -2010).

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Skate	3,612,312	10,695,964	14,308,276	75%	65%
Groundfish, Large-Mesh	14,923,343	1,564,081	16,487,424	9%	9%
Dogfish	36,008	1,166,609	1,202,617	97%	7%
Cod	2,560,364	431,717	2,992,081	14%	3%
Monkfish	3,924,702	285,250	4,209,953	7%	2%
Haddock	3,982,135	267,611	4,249,746	6%	2%
American Plaice	1,111,375	248,059	1,359,434	18%	1%
Fluke, Scup, Black Sea Bass	24,573	177,719	202,292	88%	1%
Fluke	24,545	177,554	202,099	88%	1%
Groundfish, Small-Mesh	16,063	133,136	149,199	89%	1%
Redfish	1,038,866	132,809	1,171,675	11%	1%
Yellowtail Flounder	444,145	127,356	571,501	22%	1%
Windowpane	8,602	105,638	114,240	92%	1%
Witch Flounder	1,109,369	97,112	1,206,481	8%	1%
Silver Hake	8,777	68,442	77,218	89%	0%
Red Hake	7,222	63,168	70,390	90%	0%
Other Species	4,832,168	480,529	5,312,697	9%	3%
Total	37,648,570	16,091,143	53,739,714	30%	NA

Table 24 Species comprising <1% (in red font) or more of all observed discards, aggregated across other gear groups (shrimp trawl, gillnet, and scallop dredge) for trips (directed and non-directed) that caught silver hake in the northern management area, from the NEFSC Program database (2004 -2010).

Northern Silver Hake Other Gears (All Mesh Categories)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Dogfish	516,059	1,288,709	1,804,768	71%	47%
Scallops	5,583,406	437,184	6,020,591	7%	16%
Skate	70,495	397,593	468,088	85%	15%
Groundfish, Large-Mesh	2,685,099	145,624	2,830,723	5%	5%
Monkfish	168,584	82,004	250,588	33%	3%
Cod	798,816	41,282	840,099	5%	2%
Pollock	1,421,239	34,524	1,455,763	2%	1%
Winter Flounder	14,907	25,398	40,305	63%	1%
Groundfish, Small-Mesh	8,624	17,894	26,518	67%	1%
Silver Hake	7,326	12,528	19,854	63%	0%
Red Hake	1,174	5,284	6,458	82%	0%

Northern Silver Hake Other Gears (All Mesh Categories)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Other Species	484,431	124,485	608,916	20%	5%
Total	11,751,661	2,594,697	14,346,357	18%	NA

Table 25 Species comprising <1% (in red font) or more of all observed discards, aggregated across other gear groups (shrimp trawl, gillnet, and scallop dredge) for trips (directed and non-directed) that caught red hake in the northern management area, from the NEFSC Program database (2004 -2010).

Northern Red Hake Other Gears (All Mesh Categories)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Dogfish	158,019	452,750	610,768	74%	31%
Scallops	4,367,243	356,307	4,723,550	8%	25%
Skate	21,980	313,594	335,573	93%	22%
Monkfish	68,713	77,356	146,069	53%	5%
Groundfish, Large-Mesh	928,149	67,877	996,027	7%	5%
Winter Flounder	6,142	19,899	26,041	76%	1%
Pollock	510,270	14,539	524,809	3%	1%
Groundfish Small-mesh	4,155	12,439	16,594	75%	1%
Yellowtail Flounder	1,977	8,807	10,784	82%	1%
Silver Hake	2,780	6,696	9,475	71%	0%
Red Hake	1,279	5,661	6,940	82%	0%
Other Species	193,666	60,724	254,390	24%	4%
Total	6,488,628	1,391,312	7,879,939	18%	NA

Table 26. Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught silver hake in the southern management area for mesh size < 2.5 inches, from the NEFSC Program database (2004 -2010).

Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Squid, Mackerel, Butterfish	15,448,841	1,381,682	16,830,523	8%	21%
Groundfish, Small-Mesh	949,017	831,921	1,780,937	47%	12%
Dogfish	35,614	582,134	617,748	94%	9%
Butterfish	82,100	554,129	636,229	87%	8%
Silver Hake	902,473	507,996	1,410,468	36%	8%
Illex	9,800,687	495,727	10,296,414	5%	7%
Red Hake	44,770	323,125	367,896	88%	5%
Skate	4,209	285,960	290,169	99%	4%
Fluke, Scup, Black Sea Bass	204,634	274,259	478,893	57%	4%
Loligo	5,458,945	166,864	5,625,809	3%	3%
Scup	78,505	159,069	237,574	67%	2%

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Mackerel	88,760	158,918	247,679	64%	2%
Groundfish, Large-Mesh	9,400	104,846	114,246	92%	2%
Fluke	114,409	93,918	208,327	45%	1%
General *Alosa*	32,314	92,494	124,808	74%	1%
Herring	793,439	66,675	860,113	8%	1%
Unknown Herring	4,186	56,757	60,943	93%	1%
Monkfish	54,492	47,496	101,988	47%	1%
Winter Flounder	580	37,621	38,201	98%	1%
Scallops	10,220	35,213	45,433	78%	1%
Other Species	130,689	200,201	330,890	61%	3%
Total	34,248,283	6,457,004	40,705,288	16%	NA

Table 27. Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught red hake in the southern management area for mesh size <2.5 inches, from the NEFSC Program database (2004 -2010).

Species	Kept (lb)	Discard (lb)	Grand Total (lb)	Pct Discard (Sp)	Pct Discard (Overall)
Squid, Mackerel, Butterfish	9,198,927	858,313	10,057,240	9%	19%
Groundfish, Small-Mesh	827,473	701,198	1,528,671	46%	16%
Silver Hake	780,885	376,637	1,157,523	33%	8%
Butterfish	45,585	369,776	415,361	89%	8%
Dogfish	22,978	345,752	368,730	94%	8%
Red Hake	44,823	323,779	368,602	88%	7%
Illex	5,969,498	285,418	6,254,916	5%	6%
Skate	1,822	192,553	194,376	99%	4%
Fluke, Scup, Black Sea Bass	127,286	146,845	274,131	54%	3%
Mackerel	24,238	106,597	130,834	81%	2%
Loligo	3,143,807	88,837	3,232,645	3%	2%
Groundfish, Large-Mesh	3,796	69,957	73,754	95%	2%
Scup	41,346	68,250	109,596	62%	2%
Fluke	76,387	62,538	138,925	45%	1%
Herring	203,092	40,420	243,512	17%	1%
Monkfish	41,461	34,001	75,462	45%	1%
General *Alosa*	12,488	32,967	45,455	73%	1%
Scallops	6,351	26,759	33,110	81%	1%
Other Species	64,252	155,644	219,896	71%	4%
Total	20,636,496	4,286,241	24,922,737	17%	NA

Table 28. Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught silver hake in the southern management area for mesh size range between 2.5 and 4.5 inches, from the NEFSC Program database (2004 -2010).

Southern Silver Hake (2..5-4.5 Inches)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Groundfish, Small-Mesh	1,313,028	476,629	1,789,657	27%	23%
Red Hake	65,831	285,951	351,782	81%	14%
Dogfish	19,098	245,006	264,105	93%	12%
Skate	4,920	202,153	207,073	98%	10%
Silver Hake	1,238,245	190,657	1,428,901	13%	9%
Fluke, Scup, Black Sea Bass	129,944	92,556	222,500	42%	5%
Squid, Mackerel, Butterfish	743,079	92,158	835,237	11%	4%
Groundfish, Large-Mesh	20,499	71,348	91,847	78%	3%
Scup	66,986	59,021	126,006	47%	3%
Illex	2,389	52,490	54,879	96%	3%
Butterfish	14,841	26,860	41,700	64%	1%
Fluke	27,922	24,072	51,993	46%	1%
Haddock	2,191	24,041	26,232	92%	1%
Monkfish	23,169	22,113	45,282	49%	1%
Witch Flounder	133	12,509	12,642	99%	1%
Redfish	243	10,512	10,755	98%	1%
General *Alosa*	1,232	10,326	11,558	89%	1%
Other Species	772,536	77,756	850,292	9%	4%
Total	4,446,285	1,976,156	6,422,441	31%	NA

Table 29 Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught red hake in the southern management area for mesh size range between 2.5 and 4.5 inches, from the NEFSC Program database (2004 -2010).

Southern Red Hake (2.5-4.5 Inches)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Groundfish, Small-Mesh	1,175,650	448,353	1,624,003	28%	27%
Red Hake	65,831	285,951	351,782	81%	17%
Skate	3,555	170,425	173,980	98%	10%
Silver Hake	1,100,867	162,380	1,263,247	13%	10%
Dogfish	14,276	122,322	136,598	90%	7%
Squid, Mackerel, Butterfish	171,009	78,516	249,525	31%	5%
Groundfish, Large-Mesh	19,961	64,704	84,665	76%	4%
Illex	1,010	49,063	50,073	98%	3%
Fluke, Scup, Black Sea Bass	42,927	31,262	74,189	42%	2%

Southern Red Hake (2.5-4.5 Inches)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Haddock	2,191	23,886	26,077	92%	1%
Butterfish	11,543	20,369	31,912	64%	1%
Scup	22,397	17,243	39,640	43%	1%
Monkfish	19,562	16,675	36,237	46%	1%
Fluke	17,107	12,636	29,743	42%	1%
General *Alosa*	1,189	9,840	11,028	89%	1%
Redfish	143	9,656	9,799	99%	1%
Witch Flounder	125	8,890	9,015	99%	1%
Winter Flounder	518	8,546	9,064	94%	1%
Other Species	165,553	47,704	213,257	22%	3%
Total	2,835,412	1,588,420	4,423,832	36%	NA

Table 30 Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught silver hake in the southern management area for mesh size greater than 4.5 inches, from the NEFSC Program database (2004 -2010).

Southern Silver Hake (Mesh > 4.5 Inches)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Skate	5,119,903	12,453,871	17,573,775	71%	63%
Groundfish, Large-Mesh	7,741,493	1,360,094	9,101,586	15%	7%
Dogfish	45,081	1,100,000	1,145,080	96%	6%
Fluke, Scup, Black Sea bass	1,997,872	957,238	2,955,110	32%	5%
Fluke	1,176,211	752,772	1,928,983	39%	4%
Windowpane	45,058	478,569	523,626	91%	2%
Yellowtail Flounder	3,361,626	415,506	3,777,132	11%	2%
Haddock	2,578,497	217,090	2,795,587	8%	1%
Monkfish	2,373,639	216,973	2,590,612	8%	1%
Red Crab	2,759	211,318	214,077	99%	1%
Groundfish, Small-Mesh	88,089	198,943	287,032	69%	1%
Scup	725,804	169,613	895,417	19%	1%
Scallops	419,208	162,783	581,991	28%	1%
Red Hake	6,595	127,581	134,176	95%	1%
Silver Hake	81,358	70,838	152,196	47%	0%
Other Species	2,129,145	488,804	2,617,949	19%	3%
Total	27,810,979	19,311,155	47,122,133	41%	NA

Table 31 Species comprising <1% (in red font) or more of all observed trawl discards from trips (directed and non-directed) that caught red hake in the southern management area for mesh size greater than 4.5 inches, from the NEFSC Program database (2004 -2010).

Southern Red Hake (Mesh > 4.5 Inches)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Skate	3,348,780	9,578,227	12,927,007	74%	66%
Groundfish, Large-Mesh	5,905,964	1,010,393	6,916,356	15%	7%
Fluke, Scup, Black Sea Bass	694,675	613,152	1,307,827	47%	4%
Fluke	410,784	543,993	954,777	57%	4%
Dogfish	27,147	485,902	513,049	95%	3%
Windowpane	30,233	363,897	394,129	92%	3%
Yellowtail Flounder	2,771,142	312,216	3,083,358	10%	2%
Groundfish, Small-Mesh	78,556	186,415	264,971	70%	1%
Haddock	1,806,250	169,791	1,976,040	9%	1%
Monkfish	1,576,626	165,144	1,741,770	9%	1%
Red Hake	6,613	127,753	134,366	95%	1%
Silver Hake	71,825.06	58,328.72	130,153.78	45%	0%
Scallops	343,693	117,346	461,039	25%	1%
Red Crab	-	92,235	92,235	100%	1%
Other Species	1,688,125	361,823	2,049,948	18%	3%
Total	18,688,588	14,128,284	32,816,872	43%	NA

Table 32 Species comprising <1% (in red font) or more of all observed discards, aggregated across other gear groups (shrimp trawl, gillnet, and scallop dredge) for trips (directed and non-directed) that caught silver hake in the southern management area, from the NEFSC Program database (2004 -2010).

Southern Silver Hake Other Gears (All Mesh Categories)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Skate	54,359	3,324,512	3,378,872	98%	38%
Scallops	59,736,048	3,238,524	62,974,572	5%	37%
Monkfish	615,961	918,620	1,534,581	60%	10%
Groundfish, Large-Mesh	9,564	239,731	249,295	96%	3%
Fluke, Scup, Black Sea Bass	4,949	198,391	203,340	98%	2%
Fluke	4,522	195,354	199,876	98%	2%
Yellowtail Flounder	3,932	124,150	128,082	97%	1%
Dogfish	260	84,309	84,569	100%	1%
Groundfish, Small-Mesh	7,598	55,466	63,064	88%	1%
Red Hake	28	40,545	40,573	100%	0%

Southern Silver Hake Other Gears (All Mesh Categories)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Silver Hake	3,405	13,274	16,679	80%	0%
Other Species	64,703	202,748	267,452	76%	2%
Total	60,501,895	8,581,806	69,083,701	12%	NA

Table 33 Species comprising <1% (in red font) or more of all observed discards, aggregated across other gear groups (shrimp trawl, gillnet, and scallop dredge) for trips (directed and non-directed) that caught red hake in the southern management area, from the NEFSC Program database (2004 - 2010).

Southern Red Hake Other Gears (All Mesh Categories)					
Species	**Kept (lb)**	**Discard (lb)**	**Grand Total (lb)**	**Pct Discard (Sp)**	**Pct Discard (Overall)**
Skate	1,449	2,392,311	2,393,760	100%	38%
Scallops	43,412,689	2,192,236	45,604,925	5%	35%
Monkfish	426,774	715,972	1,142,747	63%	11%
Groundfish, Large-Mesh	9,127	187,173	196,300	95%	3%
Fluke, Scup, Black Sea Bass	2,398	134,815	137,212	98%	2%
Fluke	2,088	132,773	134,861	98%	2%
Yellowtail Flounder	3,744	98,872	102,616	96%	2%
Groundfish, Small-Mesh	7,460	53,289	60,749	88%	1%
Dogfish	-	52,649	52,649	100%	1%
Red Hake	29	41,347	41,376	100%	1%
Silver Hake	3,265	10,302	13,567	76%	0%
Other Species	35,986	127,264	163,250	78%	2%
Total	43,901,744	6,128,701	50,030,445	12%	NA

7.1.5 Protected Resources

There are numerous species that inhabit the environment within the management unit for small-mesh multispecies, and that therefore potentially occur in the operations area of the small-mesh multispecies fishery, that are afforded protection under the Endangered Species Act of 1973 (ESA; i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act of 1972 (MMPA), and are under NMFS' jurisdiction. Seventeen species are classified as endangered or threatened under the ESA, three others are candidate species under the ESA, while the remainder is protected by the provisions of the MMPA.

7.1.5.1 Species Present in the Area

Below are listed the species, protected either by the ESA, the MMPA, or both, that may be found in the environment that would be utilized by the fishery. The list below also includes three candidate fish species as identified under the ESA. Candidate species are those petitioned species that are actively being considered for listing as endangered or threatened under the ESA, as well as those species for which

NMFS has initiated an ESA status review that it has announced in the Federal Register. Below are the species protected under the Endangered Species Act and Marine Mammal Protection Act that may occur in the operations area for the small-mesh multispecies fishery[8]:

Cetaceans	***Status***
Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Atlantic white-sided dolphin (*Lagenorhynchus acutus)*	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted dolphin (*Stenella frontalis*)	Protected
Bottlenose dolphin (*Tursiops truncatus*)[9]	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected
Sea Turtles	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered[10]
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Hawksbill sea turtle (*Eretmochelys imbricate)*	Endangered
Fish	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Atlantic sturgeon (*Acipenser oxyrinchus*)	
Gulf of Maine DPS	Threatened
New York Bight DPS	Endangered
Chesapeake Bay DPS	Endangered
Carolina DPS	Endangered
South Atlantic DPS	Endangered
Cusk (*Brosme brosme*)	Candidate
Alewife (*Alosa pseudo harengus*)	Candidate
Blueback herring (*Alosa aestivalis*)	Candidate

[8] MMPA-listed species occurring on this list are only those species that have a history of interaction with similar gear types within the action area of the skate fishery, as defined in the 2012 List of Fisheries.

[9] Bottlenose dolphin (*Tursiops truncatus*), Western North Atlantic coastal stock is listed as depleted.

[10] Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.

Pinnipeds

Harbor seal (Phoca vitulina)	Protected
Gray seal (Halichoerus grypus)	Protected
Harp seal (Phoca groenlandicus)	Protected
Hooded seal (Cystophora cristata)	Protected

A status review for Atlantic sturgeon was completed in 2007 which indicated that five distinct population segments (DPS) of Atlantic sturgeon exist in the United States (ASSRT 2007). On October 6, 2010, NMFS proposed listing these five DPSs of Atlantic sturgeon along the U.S. East Coast as either threatened or endangered species (75 FR 61872 and 75 FR 61904). Final listing rules were published on February 6th, 2012 (77 FR 5880 and 75 FR 5914). The GOM DPS of Atlantic sturgeon has been listed as threatened, and the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs of Atlantic sturgeon have been listed as endangered. Atlantic sturgeon from any of the five DPSs could occur in areas where the small-mesh multispecies fishery operates.

Candidate species receive no substantive or procedural protection under the ESA; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed project. NMFS has initiated review of recent stock assessments, bycatch information, and other information for these candidate and proposed species. The results of those efforts are needed to accurately characterize recent interactions between fisheries and the candidate/proposed species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information reviews. Please note that once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10).

7.1.5.2 Species Potentially Affected

The small-mesh multispecies fishery has the potential to affect the sea turtle, cetacean, and pinniped species discussed below. A number of documents contain background information on the range-wide status of sea turtle and marine mammal species that occur in the area and are known or suspected of interacting with fishing gear (gillnets and bottom trawls). These documents include sea turtle status reviews and biological reports (NMFS and USFWS 1995; Turtle Expert Working Group 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b, recovery plans for ESA-listed cetaceans and sea turtles (NMFS 1991, 2005; NMFS and USFWS 1991a, 1991b; NMFS and USFWS 1992), the marine mammal stock assessment reports (e.g., Waring et al. 1995---2011), and other publications (e.g., Clapham et al. 1999, Perry et al. 1999, Best et al. 2001, Perrin et al. 2002).

7.1.4.1.1 Sea turtles

Loggerhead, leatherback, Kemp's ridley, and green sea turtles occur seasonally in southern New England and Mid-Atlantic continental shelf waters north of Cape Hatteras, North Carolina. Turtles generally move up the coast from southern wintering areas as water temperatures warm in the spring (James et al. 2005, Morreale and Standora 2005, Braun-McNeill and Epperly 2004, Morreale and Standora 1998, Musick and Limpus 1997, Shoop and Kenney 1992, Keinath et al. 1987). A reversal of this trend occurs in the fall when water temperatures cool. Turtles pass Cape Hatteras by December and return to more southern waters for the winter (James et al. 2005, Morreale and Standora 2005, Braun-McNeill and Epperly 2004, Morreale and Standora 1998, Musick and Limpus 1997, Shoop and Kenney 1992, Keinath et al. 1987). Hard-shelled species typically occur as far north as Cape Cod whereas the more cold-tolerant leatherbacks occur in more northern Gulf of Maine waters in the summer and fall (Shoop and Kenney 1992, STSSN database http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp).

On March 16, 2010, NMFS and USFWS published a proposed rule (75 FR 12598) to divide the worldwide population of loggerhead sea turtles into nine DPSs, as described in the 2009 Status Review. Two of the DPSs were proposed to be listed as threatened and seven of the DPSs, including the Northwest Atlantic Ocean DPS, were proposed to be listed as endangered. NMFS and the USFWS accepted comments on the proposed rule through September 13, 2010 (June 2, 2010, 75 FR 30769). On March 22, 2011 (76 FR 15932), NMFS and USFWS extended the date by which a final determination on the listing action will be made to no later than September 16, 2011. This action was taken to address the interpretation of the existing data on status and trends and its relevance to the assessment of risk of extinction for the Northwest Atlantic Ocean DPS, as well as the magnitude and immediacy of the fisheries bycatch threat and measures to reduce this threat. New information or analyses to help clarify these issues were requested by April 11, 2011.

On September 22, 2011, NMFS and USFWS issued a final rule (76 FR 58868), determining that the loggerhead sea turtle is composed of nine DPSs (as defined in Conant et al., 2009) that constitute species that may be listed as threatened or endangered under the ESA. Five DPSs were listed as endangered (North Pacific Ocean, South Pacific Ocean, North Indian Ocean, Northeast Atlantic Ocean, and Mediterranean Sea), and four DPSs were listed as threatened (Northwest Atlantic Ocean, South Atlantic Ocean, Southeast Indo-Pacific Ocean, and Southwest Indian Ocean). Note that the Northwest Atlantic Ocean (NWA) DPS and the Southeast Indo-Pacific Ocean DPS were original proposed as endangered. The NWA DPS was determined to be threatened based on review of nesting data available after the proposed rule was published, information provided in public comments on the proposed rule, and further discussions within the agencies. The two primary factors considered were population abundance and population trend. NMFS and USFWS found that an endangered status for the NWA DPS was not warranted given the large size of the nesting population, the overall nesting population remains widespread, the trend for the nesting population appears to be stabilizing, and substantial conservation efforts are underway to address threats.

The September 2011 final rule also noted that critical habitat for the two DPSs occurring within the U.S. (NWA DPS and North Pacific DPS) will be designated in a future rulemaking. Information from the public related to the identification of critical habitat, essential physical or biological features for this species, and other relevant impacts of a critical habitat designation was solicited.

This proposed action only occurs in the Atlantic Ocean. As noted in Conant et al. (2009), the range of the four DPSs occurring in the Atlantic Ocean are as follows: NWA DPS – north of the equator, south of 60° N latitude, and west of 40° W longitude; Northeast Atlantic Ocean (NEA) DPS – north of the equator, south of 60° N latitude, east of 40° W longitude, and west of 5° 36’ W longitude; South Atlantic DPS – south of the equator, north of 60° S latitude, west of 20° E longitude, and east of 60° W longitude; Mediterranean DPS – the Mediterranean Sea east of 5° 36’ W longitude. These boundaries were determined based on oceanographic features, loggerhead sightings, thermal tolerance, fishery bycatch data, and information on loggerhead distribution from satellite telemetry and flipper tagging studies. Sea turtles from the NEA DPS are not expected to be present over the North American continental shelf in U.S. coastal waters, where the proposed action occurs (P. Dutton, NMFS, personal communication, 2011). Previous literature (Bowen et al. 2004) has suggested that there is the potential, albeit small, for some juveniles from the Mediterranean DPS to be present in U.S. Atlantic coastal foraging grounds. These data should be interpreted with caution however, as they may be representing a shared common haplotype and lack of representative sampling at Eastern Atlantic rookeries. Given that updated, more refined analyses are ongoing and the occurrence of Mediterranean DPS juveniles in U.S. coastal waters is rare and uncertain, if even occurring at all, for the purposes of this assessment we are making the determination that the Mediterranean DPS is not likely to be present in the action area. Sea turtles of the South Atlantic DPS do not inhabit the action area of this subject fishery (Conant et al. 2009). As such,

the remainder of this assessment will only focus on the NWA DPS of loggerhead sea turtles, listed as threatened.

In general, sea turtles are a long-lived species and reach sexual maturity relatively late (NMFS SEFSC 2001; NMFS and USFWS 2007a, 2007b, 2007c, 2007d). Sea turtles are injured and killed by numerous human activities (NRC 1990; NMFS and USFWS 2007a, 2007b, 2007c, 2007d). Nest count data are a valuable source of information for each turtle species since the number of nests laid reflects the reproductive output of the nesting group each year. A decline in the annual nest counts has been measured or suggested for four of five western Atlantic loggerhead nesting groups through 2004 (NMFS and USFWS 2007a), however, data collected since 2004 suggests nest counts have stabilized or increased (TEWG 2009). Nest counts for Kemp's ridley sea turtles as well as leatherback and green sea turtles in the Atlantic demonstrate increased nesting by these species (NMFS and USFWS 2007b, 2007c, 2007d).

7.1.4.1.2 Large cetaceans

The most recent Marine Mammal Stock Assessment Report (SAR) (Waring et al. 2010) reviewed the current population trend for each of these cetacean species within U.S. Economic Exclusion Zone (EEZ) waters. The SAR also estimated annual human-caused mortality and serious injury. Finally, it described the commercial fisheries that interact with each stock in the U.S. Atlantic. The following paragraphs summarize information from the SAR.

The western North Atlantic baleen whale species (North Atlantic right, humpback, fin, sei, and minke whales) follow a general annual pattern of migration. They migrate from high latitude summer foraging grounds, including the Gulf of Maine and Georges Bank, to and latitude winter calving grounds (Perry et al. 1999, Kenney 2002). However, this is a simplification of species movements as the complete winter distribution of most species is unclear (Perry et al. 1999, Waring et al. 2011). Studies of some of the large baleen whales (right, humpback, and fin) have demonstrated the presence of each species in higher latitude waters even in the winter (Swingle et al. 1993, Wiley et al. 1995, Perry et al. 1999, Brown et al. 2002). Blue whales are most often sighted along the east coast of Canada, particularly in the Gulf of St. Lawrence. They occur only infrequently within the U.S. EEZ (Waring et al. 2002).

Available information suggests that the North Atlantic right whale population increased at a rate of 1.8 percent per year between 1990 and 2005. The total number of North Atlantic right whales is estimated to be at least 361 animals in 2005 (Waring et al. 2011). The minimum rate of annual human-caused mortality and serious injury to right whales averaged 2.8 mortality or serious injury incidents per year during 2004 to 2008 (Waring et al. 2011). Of these, fishery interactions resulted in an average of 0.8 mortality or serious injury incidents per year.

The North Atlantic population of humpback whales is conservatively estimated to be 7,698 (Waring et al. 2011). The best estimate for the GOM stock of humpback whale population is 847 whales (Waring et al. 2011). Based on data available for selected areas and time periods, the minimum population estimates for other western North Atlantic whale stocks are 3,269 fin whales, 208 sei whales (Nova Scotia stock), 3,539 sperm whales, and 6,909 minke whales (Waring et al. 2009). Current data suggest that the GOM humpback whale stock is steadily increasing in size (Waring 2011). Insufficient information exists to determine trends for these other large whale species.

Recent revisions to the Atlantic Large Whale Take Reduction Plan (ALWTRP) (72 FR 57104, October 5, 2007) continue to address entanglement risk of large whales (right, humpback, and fin whales, and acknowledge benefits to minke whales) in commercial fishing gear. The revisions seek to reduce the risk of death and serious injury from entanglements that do occur.

7.1.4.1.3 Small cetaceans

There is anthropogenic mortality of numerous small cetacean species (dolphins, pilot whales, and harbor porpoise) in fishing gear. Seasonal abundance and distribution of each species off the coast of the Northeast U.S. varies with respect to life history characteristics. Some species such as white-sided dolphin and harbor porpoise primarily occupy continental shelf waters. Other species such as the Risso's dolphin occur primarily in continental shelf edge and slope waters. Still other species like the common dolphin and the spotted dolphin occupy all three habitats. Waring et al. (2009) summarizes information on the western North Atlantic stocks of each species.

7.1.4.1.4 Pinnipeds

Harbor seals have the most extensive distribution of the four species of seal expected to occur in the area. Harbor seals sighting have occurred far south as 30° N (Katona et al. 1993, Waring et al. 2009). Gray seals are the second most common seal species in U.S. EEZ waters. They occur primarily in waters off of New England (Katona et al. 1993; Waring et al. 2009). Pupping for both species occurs in both U.S. and Canadian waters of the western North Atlantic. Although there are at least three gray seal pupping colonies in U.S., the majority of harbor seal pupping likely occurs in U.S. waters and the majority of gray seal pupping likely occurs in Canadian waters. Observations of harp and hooded seals are less common in U.S. EEZ waters. Both species form aggregations for pupping and breeding off eastern Canada in the late winter/early spring. They then travel to more northern latitudes for molting and summer feeding (Waring et al. 2006). Both species have a seasonal presence in U.S. waters from Maine to New Jersey, based on sightings, stranding, and fishery bycatch information (Waring et al. 2009).

7.1.4.1.5 Atlantic sturgeon

Atlantic sturgeon is an anadromous species that spawns in relatively low salinity, river environments, but spends most of its life in the marine and estuarine environments from Labrador, Canada to the Saint Johns River, Florida (Holland and Yelverton 1973, Dovel and Berggen 1983, Waldman et al. 1996, Kynard and Horgan 2002, Dadswell 2006, ASSRT 2007). Tracking and tagging studies have shown that subadult and adult Atlantic sturgeon that originate from different rivers mix within the marine environment, utilizing ocean and estuarine waters for life functions such as foraging and overwintering (Stein et al. 2004a, Dadswell 2006, ASSRT 2007, Laney et al. 2007, Dunton et al. 2010). Fishery-dependent data as well as fishery-independent data demonstrate that Atlantic sturgeon use relatively shallow inshore areas of the continental shelf; primarily waters less than 50 m (Stein et al. 2004b, ASMFC 2007, Dunton et al. 2010). The data also suggest regional differences in Atlantic sturgeon depth distribution with sturgeon observed in waters primarily less than 20 m in the Mid-Atlantic Bight and in deeper waters in the Gulf of Maine (Stein et al. 2004b, ASMFC 2007, Dunton et al. 2010). Information on population sizes for each Atlantic sturgeon DPS is very limited. Based on the best available information, NMFS has concluded that bycatch, vessel strikes, water quality and water availability, dams, lack of regulatory mechanisms for protecting the fish, and dredging are the most significant threats to Atlantic sturgeon.

Comprehensive information on current abundance of Atlantic sturgeon is lacking for all of the spawning rivers (ASSRT 2007). Based on data through 1998, an estimate of 863 spawning adults per year was developed for the Hudson River (Kahnle et al. 2007), and an estimate of 343 spawning adults per year is available for the Altamaha River, GA, based on data collected in 2004-2005 (Schueller and Peterson 2006). Data collected from the Hudson River and Altamaha River studies cannot be used to estimate the total number of adults in either subpopulation, since mature Atlantic sturgeon may not spawn every year, and it is unclear to what extent mature fish in a non-spawning condition occur on the spawning grounds. Nevertheless, since the Hudson and Altamaha Rivers are presumed to have the healthiest Atlantic

sturgeon subpopulations within the United States, other U.S. subpopulations are predicted to have fewer spawning adults than either the Hudson or the Altamaha (ASSRT 2007). It is also important to note that the estimates above represent only a fraction of the total population size as spawning adults comprise only a portion of the total population (e.g., this estimate does not include subadults and early life stages).

7.1.5.3 Species Not Likely to be Affected

NMFS has determined that the action being considered in this EA is not likely to adversely affect shortnose sturgeon, the Gulf of Maine distinct population segment (DPS) of Atlantic salmon, hawksbill sea turtles, blue whales, or sperm whales, all of which are listed as endangered species under the ESA. Further, the action considered in this EA is not likely to adversely affect North Atlantic right whale (discussed above) critical habitat. The following discussion provides the rationale for these determinations.

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They occupy rivers along the western Atlantic coast from St. Johns River in Florida, to the Saint John River in New Brunswick, Canada. Although, the species is possibly extirpated from the Saint Johns River system. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while some northern populations are amphidromous (NMFS 1998). Since most of the small-mesh multispecies fishery would not operate in or near the rivers where concentrations of shortnose sturgeon are most likely found, it is highly unlikely that it would affect shortnose sturgeon.

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River. Juvenile salmon in New England rivers typically migrate to sea in spring after a one- to three-year period of development in freshwater streams. They remain at sea for two winters before returning to their U.S. natal rivers to spawn (Kocik and Sheehan 2006). Results from a 2001-2003 post-smolt trawl survey in the nearshore waters of the Gulf of Maine indicate that Atlantic salmon post-smolts are prevalent in the upper water column throughout this area in mid to late May (Lacroix, Knox, and Stokesbury 2005). Therefore, commercial fisheries deploying small-mesh active gear (pelagic trawls and purse seines within 10 m of the surface) in nearshore waters of the Gulf of Maine may have the potential to incidentally take smolts. However, it is highly unlikely that the action being considered will affect the Gulf of Maine DPS of Atlantic salmon given that operation of the small-mesh multispecies fishery does not occur in or near the rivers where concentrations of Atlantic salmon are likely to be found. Additionally, small-mesh multispecies gear operates in the ocean at or near the bottom rather than near the surface where Atlantic salmon are likely to occur. Thus, this species will not be considered further in this EA.

North Atlantic right whales occur in coastal and shelf waters in the western North Atlantic (NMFS 2005). Section 4.4.2.2 discusses potential fishery entanglement and mortality interactions with North Atlantic right whale individuals. The western North Atlantic population in the U.S. primarily ranges from winter calving and nursery areas in coastal waters off the southeastern U.S. to summer feeding grounds in New England waters (NMFS 2005). North Atlantic Right Whales use five well-known habitats annually, including multiple in northern waters. These northern areas include the Great South Channel (east of Cape Cod); Cape Cod and Massachusetts Bays; the Bay of Fundy; and Browns and Baccaro Banks, south of Nova Scotia. NMFS designated the Great South Channel and Cape Cod and Massachusetts Bays as Northern Atlantic right whale critical habitat in June 1994 (59 FR 28793). NMFS has designated additional critical habitat in the southeastern U.S. Small-mesh multispecies gear operates in the ocean at or near the bottom rather than near the surface. It is not known whether the bottom-trawl, or any other type of fishing gear, has an impact on the habitat of the Northern right whale (59 FR 28793). As discussed in the FY 2010 and FY 2011 sector EAs and further in Section 5.0, sectors would result in a

negligible effect on physical habitat. Therefore, FY 2012 sector operations would not result in a significant impact on Northern right whale critical habitat. Further, mesh sizes used in the small-mesh multispecies fishery do not significantly impact the Northern right whale's planktonic food supply (59 FR 28793). Therefore, Northern right whale food sources in areas designated as critical habitat would not be adversely affected by sectors. For these reasons, Northern right whale critical habitat will not be considered further in this EA.

The hawksbill turtle is uncommon in the waters of the continental U.S. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America. Hawksbills feed primarily on a wide variety of sponges, but also consume bryozoans, coelenterates, and mollusks. The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands. There are accounts of hawksbills in south Florida and individuals have been sighted along the east coast as far north as Massachusetts; however, east coast sightings north of Florida are rare (NMFS 2009a). Operations in the small-mesh multispecies fishery would not occur in waters that are typically used by hawksbill sea turtles. Therefore, it is highly unlikely that fishery operations would affect this turtle species.

Blue whales do not regularly occur in waters of the U.S. EEZ (Waring et al. 2002). In the North Atlantic region, blue whales are most frequently sighted from April to January (Sears 2002). No blue whales were observed during the Cetacean and Turtle Assessment Program surveys of the mid- and North Atlantic areas of the outer continental shelf (Cetacean and Turtle Assessment Program 1982). Calving for the species occurs in low latitude waters outside of the area where the sectors would operate. Blue whales feed on euphausiids (krill) that are too small to be captured in fishing gear. There were no observed fishery-related mortalities or serious injuries to blue whales between 1996 and 2000 (Waring et al. 2002). The species is unlikely to occur in areas where the small-mesh multispecies fishery would operate, and the small-mesh multispecies fishery operations would not affect the availability of blue whale prey or areas where calving and nursing of young occurs. Therefore, the Proposed Action would not be likely to adversely affect blue whales.

Unlike blue whales, sperm whales do regularly occur in waters of the U.S. EEZ. However, the distribution of the sperm whales in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring et al. 2007). Sperm whale distribution is typically concentrated east-northeast of Cape Hatteras in winter and shifts northward in spring when whales are found throughout the MA Bight (Waring et al. 2006). Distribution extends further northward to areas north of GB and the Northeast Channel region in summer and then south of New England in fall, back to the MA Bight (Waring et al. 1999). In contrast, the small-mesh multispecies fishery would operate in continental shelf waters. The average depth over which sperm whale sightings occurred during the Cetacean and Turtle Assessment Program surveys was 5,879 ft (1,792 m) (Cetacean and Turtle Assessment Program 1982). Female sperm whales and young males almost always inhabit open ocean, deep water habitat with bottom depths greater than 3,280 ft (1,000 m) and at latitudes less than 40° N (Whitehead 2002). Sperm whales feed on large squid and fish that inhabit the deeper ocean regions (Perrin et al. 2002). There were no observed fishery-related mortalities or serious injuries to sperm whales between 2001 and 2005 (Waring et al. 2007). Sperm whales are unlikely to occur in water depths where the small-mesh multispecies fishery would operate, and small-mesh multispecies fishery operations would not affect the availability of sperm whale prey or areas where calving and nursing of young occurs. Therefore, the Proposed Action would not be likely to adversely affect sperm whales.

Although marine turtles and large whales could be potentially affected through interactions with fishing gear, NMFS has determined that the continued authorization of the small-mesh multispecies fishery would not have any adverse effects on the availability of prey for these species. Sea turtles feed on a variety of plants and animals, depending on the species. However, none of the turtle species are known to

feed upon skates. Right whales and sei whales feed on copepods (Horwood 2002, Kenney 2002). The small-mesh multispecies fishery will not affect the availability of copepods for foraging right and sei whales because copepods are very small organisms that will pass through small-mesh multispecies fishing gear rather than being captured in it. Humpback whales and fin whales also feed on krill as well as small schooling fish such as sand lance, herring and mackerel (Aguilar 2002, Clapham 2002). Small-mesh multispecies fishing gear operates on or very near the bottom. Fish species caught in small-mesh multispecies gear are species that live in benthic habitat (on or very near the bottom). As a result, this gear does not typically catch schooling fish such as herring and mackerel that occur within the water column. Therefore, the continued authorization of the small-mesh multispecies fishery or the approval of the amendment will not affect the availability of prey for foraging humpback or fin whales.

7.1.5.4 Interactions between Gear and Protected Resources

NMFS categorizes commercial fisheries based on a two-tiered, stock-specific fishery classification system that addresses both the total impact of all fisheries on each marine mammal stock as well as the impact of individual fisheries on each marine mammal stock. NMFS bases the system on the numbers of animals per year that incur incidental mortality or serious injury due to commercial fishing operations relative to a marine mammal stock's Potential Biological Removal (PBR) level. PBR is the maximum number of animals, not including natural mortalities, which may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. Tier 1 takes into account the cumulative mortality and serious injury to marine mammals caused by commercial fisheries. Tier 2 considers marine mammal mortality and serious injury caused by the individual fisheries. This EA uses Tier 2 classifications to indicate how each type of gear proposed for use in the Proposed Action may affect marine mammals (NMFS 2009b). The table below identifies the classifications used in the final List of Fisheries for FY 2012 (76 FR 73912; November 29, 2011), which are broken down into Tier 2 Categories I, II, and III.

Interactions between gear and a given species occur when fishing gear overlaps both spatially and trophically with the species' niche. Spatial interactions are more "passive" and involve inadvertent interactions with fishing gear when the fishermen deploy gear in areas used by protected resources. Trophic interactions are more "active" and occur when protected species attempt to consume prey caught in fishing gear and become entangled in the process. Spatial and trophic interactions can occur with various types of fishing gear used by the small-mesh multispecies fishery through the year. Many large and small cetaceans and sea turtles are more prevalent within the operations area during the spring and summer. However they are also relatively abundant during the fall and would have a higher potential for interaction with sector activities that occur during these seasons. Although harbor seals may be more likely to occur in the operations area between fall and spring, harbor and gray seals are year-round residents. Therefore, interactions could occur year-round. The uncommon occurrences of hooded and harp seals in the operations area are more likely to occur during the winter and spring, allowing for an increased potential for interactions during these seasons.

Table 34. Marine mammals impacts based on northeast small-mesh multispecies fishing areas (based on 2010 list of fisheries)

Category	Category Description
Category I	A commercial fishery that has frequent incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is, by itself, responsible for the annual removal of 50 percent or more of any stock's PBR level.
Category II	A commercial fishery that has occasional incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is one that, collectively with other fisheries, is responsible for the annual removal of more than 10 percent of any marine mammal stock's PBR level and that is by itself responsible for the annual removal of between 1 percent and 50 percent, exclusive of any stock's PBR.
Category III	A commercial fishery that has a remote likelihood of, or no known incidental mortality and serious injury of marine mammals. This classification indicates that a commercial fishery is one that collectively with other fisheries is responsible for the annual removal of: a. Less than 50 percent of any marine mammal stock's PBR level, or b. More than 1 percent of any marine mammal stock's PBR level, yet that fishery by itself is responsible for the annual removal of 1 percent or less of that stock's PBR level. In the absence of reliable information indicating the frequency of incidental mortality and serious injury of marine mammals by a commercial fishery, the Assistant Administrator would determine whether the incidental serious injury or mortality is "remote" by evaluating other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, qualitative data from logbooks or fisher reports, stranding data, and the species and distribution of marine mammals in the area or at the discretion of the Assistant Administrator.

Although interactions between protected species and gear deployed by the small-mesh multispecies fishery would vary, interactions generally include:

- Entanglement in mesh (trawls)
- Entanglement in the float line (trawls), or
- Entanglement in the groundline (trawls)

NMFS assumes the potential for entanglements to occur is higher in areas where more gear is set and in areas with higher concentrations of protected species.

The table below lists the marine mammals known to have had interactions with gear used by the small-mesh multispecies fishery. This gear includes bottom trawls within the small-mesh multispecies region, as excerpted from the List of Fisheries for FY 2012 ([76 FR 73912; November 29, 2011], also see Waring et al. 2009). Sink gillnets (which are not used in the small-mesh multispecies fishery) have the greatest potential for interaction with protected resources, followed by bottom trawls.

Table 35. Marine mammals impacts based on small-mesh multispecies fishing areas (based on 2012 list of fisheries).

Fishery		Estimated Number of	Marine Mammal Species and Stocks Incidentally
Category	Type	Vessels/Persons	Killed or Injured
Category II	MA bottom trawl	1,388	Bottlenose dolphin, WNA offshore Common dolphin, WNA [a] Long-finned pilot whale, WNA [a] Short-finned pilot whale, WNA [a] White-sided dolphin, WNA Risso's dolphin, WNA
	Northeast bottom trawl	2,584	Bottlenose dolphin, WNA offshore Grey Seal, WNA Common dolphin, WNA Harbor porpoise, GOM/ Bay of Fundy Harbor seal, WNA Harp seal, WNA Long-finned pilot whale, WNA Short-finned pilot whale, WNA White-sided dolphin, WNA [a]

Notes:

[a] *Fishery classified based on serious injuries and mortalities of this stock, which are greater than 50 percent (Category I) or greater than 1 percent and less than 50 percent (Category II) of the stock's PBR.*

[b] *Although not included in the 2010 List of Fisheries, Waring et al. (2009) indicates that nine gray seal mortalities in 2007 were attributed to incidental capture in the northeast bottom trawl*

[c] *This fishery is classified by analogy.*

Sea turtles have been caught and injured or killed in multiple types of fishing gear, including gillnets, and trawls. However, impact due to inadvertent interaction with trawl gear is almost twice as likely to occur when compared with other gear types (NMFS 2009c). Interaction with trawl gear is more detrimental to sea turtles as they can be caught within the trawl itself and will drown after extended periods underwater. A study conducted in the MA region showed that bottom trawling accounts for an average annual take of 616 loggerhead sea turtles, although Kemp's ridleys and leatherbacks were also caught during the study period (Murray 2006). Sea turtles generally occur in more temperate waters than those in the Northeast small-mesh multispecies area.

Atlantic sturgeon are known to be captured in sink gillnet, drift gillnet, and otter trawl gear (Stein et al. 2004a, ASMFC TC 2007). Of these gear types, sink gillnet gear poses the greatest known risk of mortality for sturgeon bycatch (ASMFC TC 2007). Sturgeon deaths were rarely reported in the otter trawl observer dataset (ASMFC TC 2007). However, the level of mortality after release from the gear is unknown (Stein et al. 2004a). Nearly all catches of small-mesh multispecies occurs on vessels using otter trawls.

In a review of the Northeast Fishery Observer Program (NEFOP) database for 2001-2006, bycatch rates were calculated using observed Atlantic sturgeon bycatch to fishing effort to estimate total commercial fishery bycatch of Atlantic sturgeon. This review indicated sturgeon bycatch occurred in statistical areas abutting the coast from Massachusetts (statistical area 514) to North Carolina (statistical area 635)

(ASMFC TC 2007). Based on the available data, participants in an ASMFC bycatch workshop concluded that sturgeon encounters tended to occur in waters less than 50 m throughout the year, although seasonal patterns exist (ASMFC TC 2007). The ASMFC analysis determined that an average of 650 Atlantic sturgeon mortalities occurred per year (during 2001 to 2006) in sink gillnet fisheries. Stein et al. (2004a), based on a review of the NMFS Observer Database from 1989-2000, found clinal variation in the bycatch rate of sturgeon in sink gillnet gear with lowest rates occurring off of Maine and highest rates off of North Carolina in all months.

In an updated, preliminary analysis, the Northeast Fisheries Science Center (NEFSC) used data from the NEFOP database to update sturgeon bycatch estimates for 2006 to 2010. Data were limited by observer coverage to waters outside the coastal boundary (fzone>0) and north of Cape Hatteras, NC. Sturgeon included in the data set were those identified by federal observers as Atlantic sturgeon, as well as those categorized as unknown sturgeon. In this analysis, bycatch data were limited to information collected by the NEFOP. Limited data collected in the At-Sea Monitoring Program were not included, although preliminary views suggest the incidence of sturgeon encounters was low.

The preliminary analysis apportioned the estimated weight of all sturgeon takes to specific fishery management plans. The analysis estimates that for 2006 to 2010, 15,587 lbs of Atlantic sturgeon were captured and discarded on trips using bottom otter trawl (7,740 lbs) and sink gillnet (7,848 lbs) gear. The analysis results indicate that 7.1% (550 lbs) of sturgeon discards in bottom otter trawl gear could be attributed to the large mesh bottom trawl fisheries if a correlation of FMP species landings (by weight) was used as a proxy for fishing effort. Additionally, the analysis indicates that 4.0% (314 lbs) of sturgeon discards in sink gillnet gear could be attributed to the large mesh gillnet fisheries if a correlation of FMP species landings (by weight) was used as a proxy for fishing effort.

Since the Atlantic sturgeon DPSs have been listed as endangered and threatened under the ESA, the ESA Section 7 consultation for fisheries that interact with Atlantic sturgeon will be reinitiated, and additional evaluation will be included in the resulting Biological Opinion to describe any impacts of the fisheries on Atlantic sturgeon and define any measures needed to mitigate those impacts, if necessary. It is anticipated that any measures, terms and conditions included in an updated Biological Opinion will further reduce impacts to the species.

7.2 Physical Environment and EFH

7.2.1 Description of the physical environment and efh of the small-mesh multispecies fishery

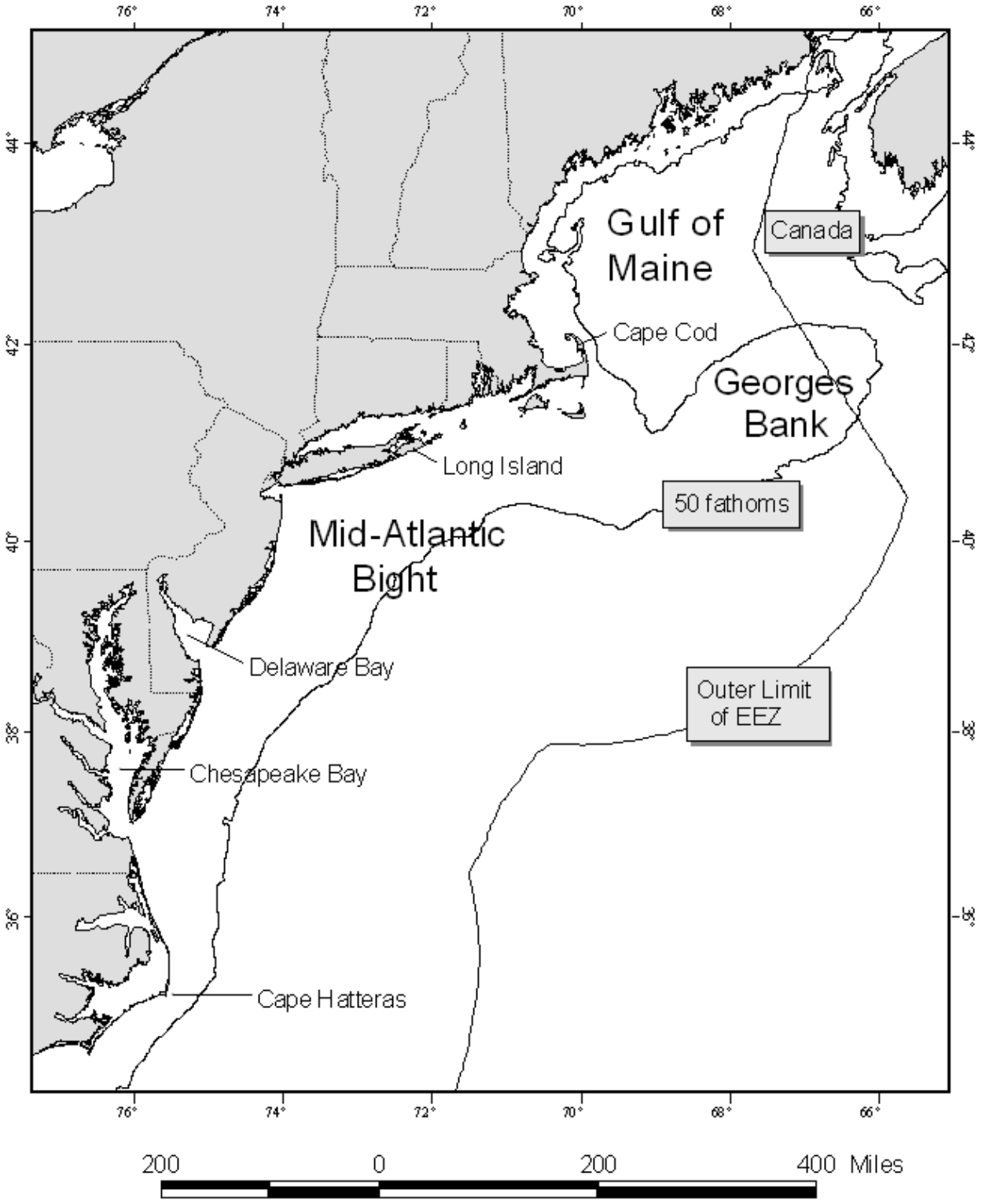
The Northeast U.S. Shelf Ecosystem includes the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream to a depth of 2,000 m (Section 7.2.1.1**,** Sherman et al. 1996). Four distinct sub-regions are identified: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. The physical oceanography and biota of these regions were described in Northeast Multispecies Amendment 16, Section 6.1. Much of this information was extracted from Stevenson et al. (2004), and the reader is referred to this document and sources referenced therein for additional information. The small-mesh multispecies fishery occurs throughout the Mid-Atlantic Bight, the Gulf of Maine, and Georges Bank. (Figure 3)

The first Essential Fish Habitat Amendment (Amendment 11 to the Northeast Multispecies FMP) in 1998 initially described and identified the essential fish habitat for silver and red hake. The EFH amendment addressed all elements required by the EFH provisions of the Sustainable Fisheries Act. This includes the

description and identification of silver and red hake EFH, the threats to EFH from fishing and non-fishing activities, and the conservation and enhancement measures to protect EFH for silver and red hake, which were updated in Amendment 13 to the Northeast Multispecies FMP. EFH for offshore hake was first described and identified in Amendment 12 to the Northeast Multispecies FMP in 2000. The Council is developing a second EFH Omnibus Amendment in two phases. The initial phase reviewed the existing EFH designations and recommends modifications to the current descriptions of EFH for the three small-mesh multispecies. However, the new designations will not be incorporated into the FMP until the completion of Phase II, which is intended to evaluate management measures to address adverse impacts to EFH from fishing. Summaries of EFH descriptions and maps for Northeast region species can be accessed at http://www.nero.noaa.gov/hcd/webintro.html.

The area that may potentially be affected by the proposed action has been identified as EFH for various species that are managed under the Northeast Multispecies; Atlantic Sea Scallop; Monkfish; Deep-Sea Red Crab; Northeast Skate Complex; Atlantic Herring; Summer Flounder, Scup, and Black Sea Bass; Tilefish; Squid, Atlantic Mackerel, and Butterfish; Atlantic Surfclam and Ocean Quahog Fishery Management Plans. EFH for the species managed under these FMPs includes a wide variety of benthic habitats in state and federal waters throughout the Northeast U.S. Shelf Ecosystem. EFH descriptions of the geographic range, depth, and bottom types for all the benthic life stages of the species managed under these FMPs are summarized in the following table. For more information on the geographic area, depth, and EFH description for each applicable life stage of these species, the reader is referred to Table 46 of Northeast Multispecies Amendment 16 EIS.

Figure 13 Northeast U.S. Shelf Ecosystem



7.2.1.1 Weather

One of the most frequently mentioned physical environmental parameters affecting fishing is the weather. High winds, waves, and extremely low temperatures can create extremely hazardous conditions, ranking commercial fishing among the most dangerous occupations in the world. Section E.6.2.2 of the FSEIS for Amendment 5 to the Northeast Multispecies FMP contains a complete description of weather patterns affecting the fisheries in question as well as southern New England and the Northeast region.

7.2.2 Description of habitat

A complete description of the physical environment in the Gulf of Maine, Georges Bank, and portions of the Continental Shelf south of New England is contained in Section E.6.2.1 the FSEIS for Amendment 5 to the Northeast Multispecies FMP. The following section contains additional information about the Mid-Atlantic region to Cape Hatteras because whiting and red hake generally tend to be distributed further south than other groundfish species.

7.2.2.1 Mid-Atlantic

The coastal zone of the Mid-Atlantic states varies from a glaciated and rugged coastline from Cape Cod south to the New York Bight; further south the coast is bordered by a 160 km wide plain. Along the coastal plain, the beaches of the outer banks and barrier islands are wide, gently sloped and sandy, with gradually deepening offshore waters. The area is characterized by a series of sounds, broad estuaries, large river basins (e.g. Connecticut, Hudson, Delaware and Susquehanna), and barrier islands. Conspicuous estuarine features are Narragansett Bay, Long Island Sound, the Hudson River, Delaware Bay, Chesapeake Bay, and the nearly continuous band of estuaries behind outer banks and barrier islands along southern Long Island, New Jersey, Delaware, Maryland, Virginia and North Carolina. The complex estuary of Currituck, Albemarle, and Pamlico Sounds behind the Outer Banks on Cape Hatteras (covering an area of 6,500 km2 or 2,500 square miles, with 150,000 acres of salt marsh) is an important feature of the region. Chesapeake Bay is the largest estuary in the U.S., draining 64,000 square miles of land
from five states, and includes almost 300,000 acres of salt marsh and 100,000 acres of tidal flats. Coastal marshes border small estuaries in Narragansett Bay and all along the glaciated coast from Cape Cod around Long Island Sound. Nearly continuous marshes occur along the shores of the estuaries behind the outer banks and around Delaware Bay. As a whole, this region contains more than 3,500 square miles of wetlands, one-third of which are in Chesapeake Bay. Atlantic coastal plain estuaries are characteristically shallow and subject to strong tidal circulation, thus creating ideal conditions for biological productivity.

At Cape Hatteras, the shelf extends seaward approximately 33 km, then widens gradually to 113 km off New Jersey and Rhode Island. It is intersected by numerous underwater canyons. Surface circulation north of Cape Hatteras is generally southwesterly during all seasons, although this may be interrupted by coastal in-drafting and some reversal of flow at the northern and southern extremities of the area. Speeds of the drift are on the order of 9 km per day. There may be a shoreward component to this drift during the warm half of the year and an offshore component during the cold half. The Gulf Stream is located about 160 km offshore of Cape Hatteras, but becomes less discrete and veers to the northeast north of the cape. Surface currents, as high as 200 cm per second (4 knots), have been measured in the Gulf Stream off Cape Hatteras.

Hydrographic conditions in the mid-Atlantic region vary seasonally due to river runoff and warming in spring and cooling in winter; the water column becomes increasingly stratified in the summer and homogenous in the winter due to fall-winter cooling of surface waters. In winter, mean minimum and

maximum sea surface temperatures are 0°C and 7°C off Cape Cod and 1°C and 14°C off Cape Charles (at the end of the Delmarva Peninsula); in summer, the mean minimums and maximums are 15°C and 21°C off Cape Cod, and 20°C and 27°C off Cape Charles. The tidal range averages slightly over one meter on Cape Cod, decreasing to a meter at the tip of Long Island and on the Connecticut shore. Westward within Long Island tide ranges gradually increase, reaching two meters at the head of the Sound and in the New York Bight. South of the bight, tidal ranges decrease gradually to slightly over a meter at Cape Hatteras.

The waters of the coastal mid-Atlantic region have a complex and seasonally dependent circulation pattern. Seasonally varying winds and irregularities in the coastline result in the formation of a complex system of local eddies and gyres. Surface currents tend to be strongest during the peak river discharge period in late spring and during periods of highest winds in the winter. In late summer, when winds are light and estuarine discharge is minimal, currents tend to be sluggish, and the water column is generally stratified.

7.2.3 Gear Impacts from the small-mesh multispecies fishery

The small-mesh multispecies fishery is primarily a trawl fishery (Table 36), with most of the exemption areas in the northern stock area (Gulf of Maine Grate Raised Footrope Exemption Area, Small-mesh Areas I and II, and the Raised Footrope Trawl Exemption Area near Cape Cod) requiring the use of a raised footrope trawl. Amendment 16 to the Northeast Multispecies FMP has a detailed description of the impacts of gear effects on EFH.

Table 36 Landings of small-mesh multispecies by gear (2008-2010)

Gear Type	% of Total Small-Mesh Multispecies Landings
Otter Trawl, including Raised Footrope Trawl	97.76%
Sink Gillnets	1.09%
All Other Gear‡	1.15%

‡Includes: Handgear, Pots and Traps, Shrimp Trawl, Dredges, Longline, and all other reported gear

According to the Council's initial EFH Amendment (NEFMC 1999, Amendment 11 to the Northeast Multispecies FMP), "bottom-tending mobile gears (otter trawls, scallop dredges, beam trawls, and hydraulic clam dredges) are most likely to be associated with adverse impacts to habitat. Jones (1992) suggests that beam trawls, otter trawls, and dredges are all essentially similar in impact, and the severity of the impact can be correlated to the weight of the gear that is in contact with the bottom. The heavier the gear that contacts the bottom, the greater the impact the gear has. This may be an oversimplification, but it illustrates an important point – the lighter the gear, the less impact it is likely to have." Section 9.3.1.2.2.1.1 in Amendment 13 to the Northeast Multispecies FMP has a detailed description of trawls and their many configurations.

A description of the raised footrope trawl, required in all of the inshore Gulf of Maine Exemption Areas (Gulf of Maine Grate Raised Footrope Trawl, Small-mesh Areas I and II and the Raised Footrope Trawl Area near Cape Cod), was included in the Council's on-going second EFH Omnibus Amendment's Swept Area Seabed Impact Model document (NEFMC 2011), as well as in Amendment 13 to the Northeast Multispecies FMP. The raised footrope trawl was "designed capture small-mesh species (silver hake, red hake, and dogfish). Raised-footrope trawls can be rigged with or without a chain sweep. If no sweep is used, drop chains must be hung at defined intervals along the footrope. In trawls with a sweep, chains connect the sweep to the footrope. Both configurations are designed to make the trawl fish about 0.45 - 0.6 m (1.5 - 2 ft) above the bottom (Carr and Milliken 1998). Although the doors of the trawl still ride on

the bottom, underwater video and observations in flume tanks have confirmed that the sweep in the raised footrope trawl has much less contact with the sea floor than does the traditional cookie sweep that it replaces (Carr and Milliken 1998)."

7.3 Human Communities (Economic and Social Trends)

7.3.1 Silver and offshore hake landings and revenue

Silver and offshore hake landings and revenue peaked in 1996 (Table 37). In 2006, the smallest amount of silver hake were landed, 5,000 mt, coinciding with the lowest revenue earned from silver hake landings. Since then, silver hake landings and revenues have been generally increasing. It appears that while current landings are lower than landings in the 1990's, there is an increasing trend in both landings and revenue in recent years (Figure 14). Peak landings in the Northern management area also occurred in 1996, at 3,619 mt, which earned $3 million in revenue. The lowest silver hake landings in the Northern area occurred in 2008 with 618 mt, earning $832,000 in revenue. In recent years, landings in the Northern area have been greater than 1,000 mt, earning revenue $1.2 million - $2.3 million (Table 38). Landings in the Southern area account for two-thirds to nearly all of the total landings (Table 38). Landings range from 4,629 mt – 13,441 mt. Peak landings in the Southern area in 2009 were 13,000 mt, earning $15 million in revenue. This was also the year with peak revenue from silver hake. The lowest landings occurred in 2006 and were 4,629 mt, earning approximately $6 million. The lowest revenue from silver hake was in 2002 at $5million in the Southern stock area (Table 38).

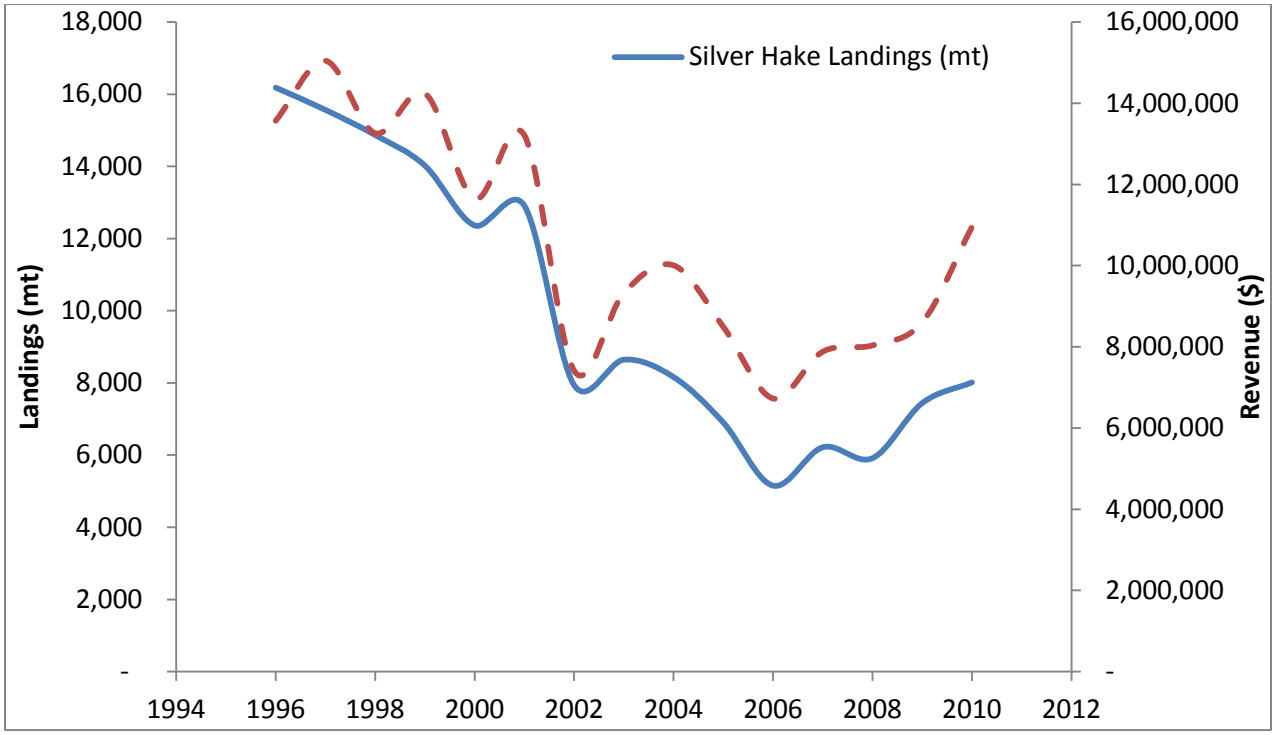
Table 37. Silver hake and offshore hake landings and revenue (1996-2010).

Year	Silver hake landings (mt)	Silver hake revenue ($)	Offshore hake landings (mt)	Offshore hake revenue ($)
1996	16,181	13,567,329	67	60,663
1997	15,565	15,045,264	23	16,005
1998	14,867	13,259,078	5	5,807
1999	14,020	14,243,589	12	19,673
2000	12,362	11,644,431	5	7,035
2001	12,908	13,211,153	2	2,013
2002	7,938	7,410,730	6	4,055
2003	8,643	9,326,001	11	18,150
2004	8,163	10,006,343	27	31,429
2005	6,902	8,493,180	14	15,265
2006	5,153	6,727,695	37	45,001
2007	6,217	7,880,472	12	10,806
2008	5,915	8,035,894	21	24,152
2009	7,441	8,602,262	20	31,371
2010	8,014	10,951,987	10	16,348

Table 38 Silver Hake landings and revenue by stock area.

	Northern Stock		Southern Stock	
Year	Landings (mt)	Revenue($)	Landings (mt)	Revenue($)
1996	3,619	3,034,584	12,560	10,531,566
1997	2,802	2,708,077	12,761	12,335,466
1998	2,045	1,824,252	12,828	11,440,726
1999	3,444	3,498,658	10,577	10,746,305
2000	2,591	2,440,854	9,734	9,169,144
2001	3,391	3,470,530	9,379	9,598,879
2002	2,593	2,420,618	5,343	4,988,009
2003	1,808	1,950,450	6,833	7,373,296
2004	1,012	1,240,949	7,436	9,115,907
2005	853	1,049,283	6,671	8,208,849
2006	879	1,147,976	4,629	6,043,655
2007	1,017	1,288,530	5,345	6,774,279
2008	613	832,397	5,645	7,669,565
2009	1,038	1,199,934	13,441	15,539,587
2010	1,693	2,313,869	6,386	8,726,243

Figure 14 Silver hake landings and revenue (1996-2010). Revenue is plotted on the secondary axis.

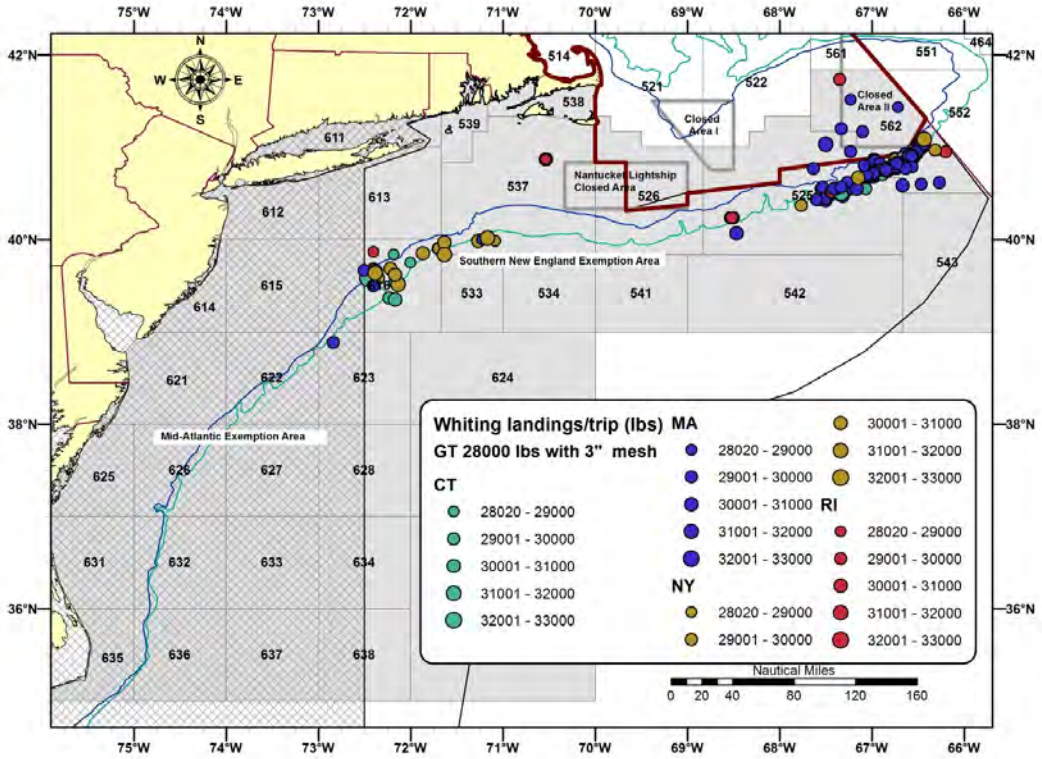


Whiting landings are regulated by possession limits that vary with the size of the mesh in trawls, in the northern and southern stock areas. These limits have helped maintain catches at or below sustainable levels since the limits became effective in 2003. Since this amendment is considering increasing the southern whiting possession limit, it is important to characterize the fishery with respect to landings per trip and the geographical distribution of fishing effort in the southern stock area.

Landings of silver hake come from a variety of fishing activities, including small mesh trawl fishing that targets silver and offshore hake, small mesh trawl fishing that targets other species (e.g. shrimp, squid, herring), and large mesh fishing targeting groundfish, skates, monkfish, and summer flounder. Vessels using trawls with 2.5 inch or smaller mesh may not possess more than 3,500 lbs. of silver and offshore hake, while vessels using trawls with 2.5 to 3 inch mesh may not possess more than 7,500 lbs. of silver and offshore hake. Vessels using larger mesh may possess up to 30,000 lbs. of silver and offshore hake. Using landings data from all types of trips, the landings frequency during 2009-2011 is shown in the figure below.

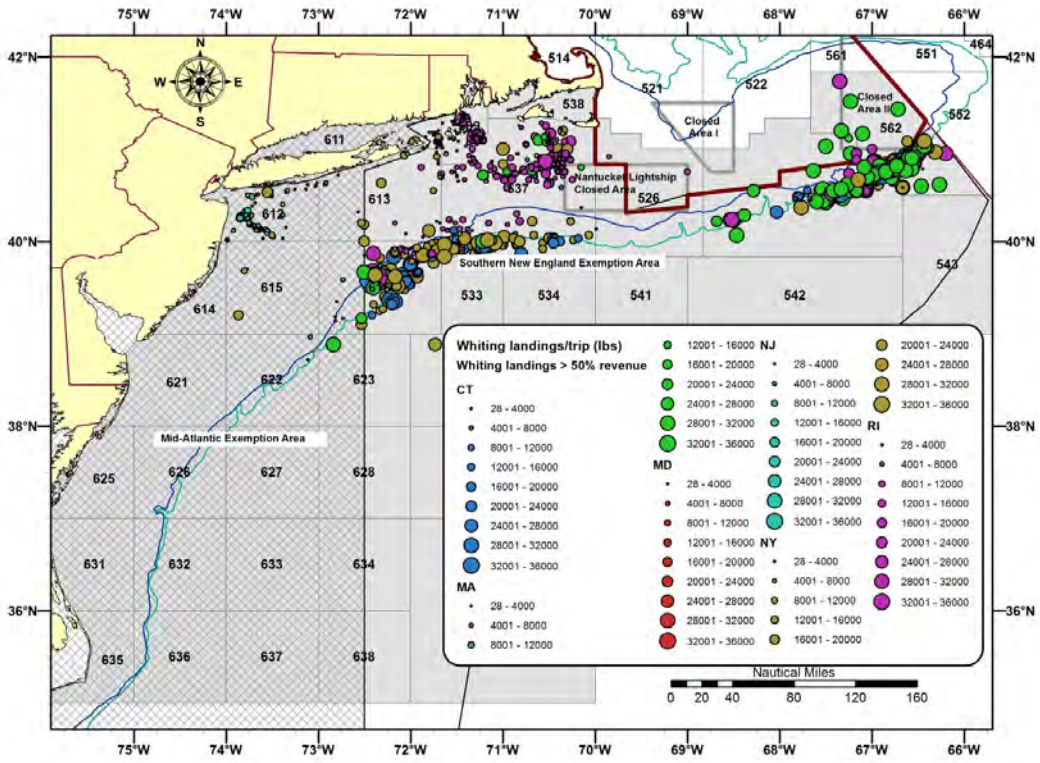
Vessels using 3 inch or larger mesh may possess and land up to 30,000 lbs. of whiting. Nearly all of the high landings on trips targeting whiting are made by vessels fishing along the Mid-Atlantic continental shelf edge and along the southern edge and eastern portion of Georges Bank (Map 1). Almost all trips landing more than 28,000 lbs. and targeting whiting fished in the Southern New England Exemption Area, according to VTR data. Trips landed fish in CT (mainly New London), MA (mainly New Bedford), NY (mainly Montauk), and RI (mainly Point Judith). Most trips landing in NY were reported to fish around and just north of Hudson Canyon in statistical areas 537 to 616. Most of the trips landing in MA and RI were reported to fish on southern Georges Bank, east of Munson Canyon, in statistical areas 525 and 562. According to the data, some trips appear to have ventured into the Gulf of Maine/Georges Bank exemption area (delineated by the red line in Map 1), but the reported positions on the VTRs are probably erroneous and the trip actually fished on the southern edge of Georges Bank, in the Southern New England Exemption Area.

Map 6. Reported fishing locations and state of landing for 2009-2011 trips targeting whiting while using trawls having 3 inch or larger mesh and landing more than 28,000 lbs. Source: Dealer reported landings data matched to VTR data.



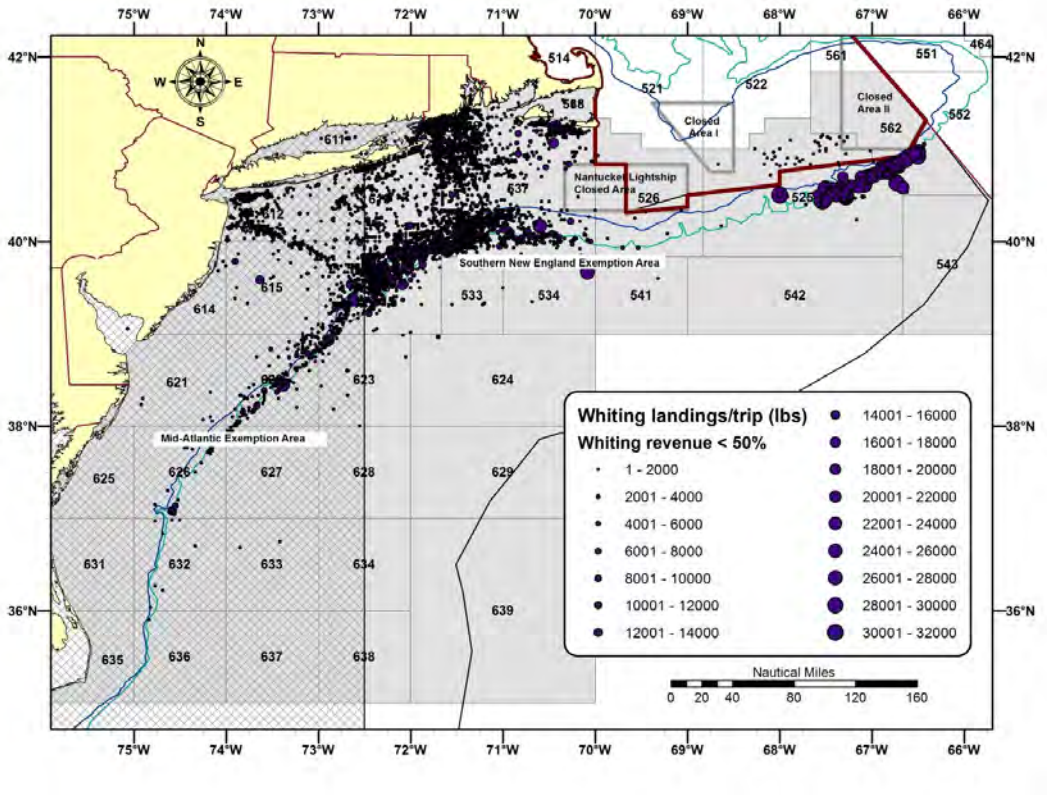
Trips targeting whiting but landings less than 28,000 lbs. are more diversified, geographically (Map 2). In addition to the above trips, there are more trips spread out along the Southern New England shelf edge in statistical areas 537 and 616, some trips using 3 inch mesh and other trips using smaller mesh. There is also an inshore whiting fishery using 2.5 inch or smaller mesh inshore in Southern New England, from Block Island to Martha's Vineyard in statistical area 537. There was also a small inshore whiting fishery in statistical area 613, off Ambrose Lightship, landing whiting in NJ (Point Pleasant and Belford) and NY (Southern Long Island).

Map 7. Reported fishing locations and state of landing for 2009-2011 trips targeting whiting while using trawls. Source: Dealer landings data matched to VTR data.



Whiting are also landed by larger mesh fisheries targeting other species, over a wider geographical range (Map 3). These trips range along the shelf edge from VA to MA, many trips targeting squids, summer flounder, and other species with a variety of mesh sizes. More inshore, trips fishing for other species often land whiting when fishing from NJ (Hudson Canyon) to RI and MA (statistical areas 537 and 538).

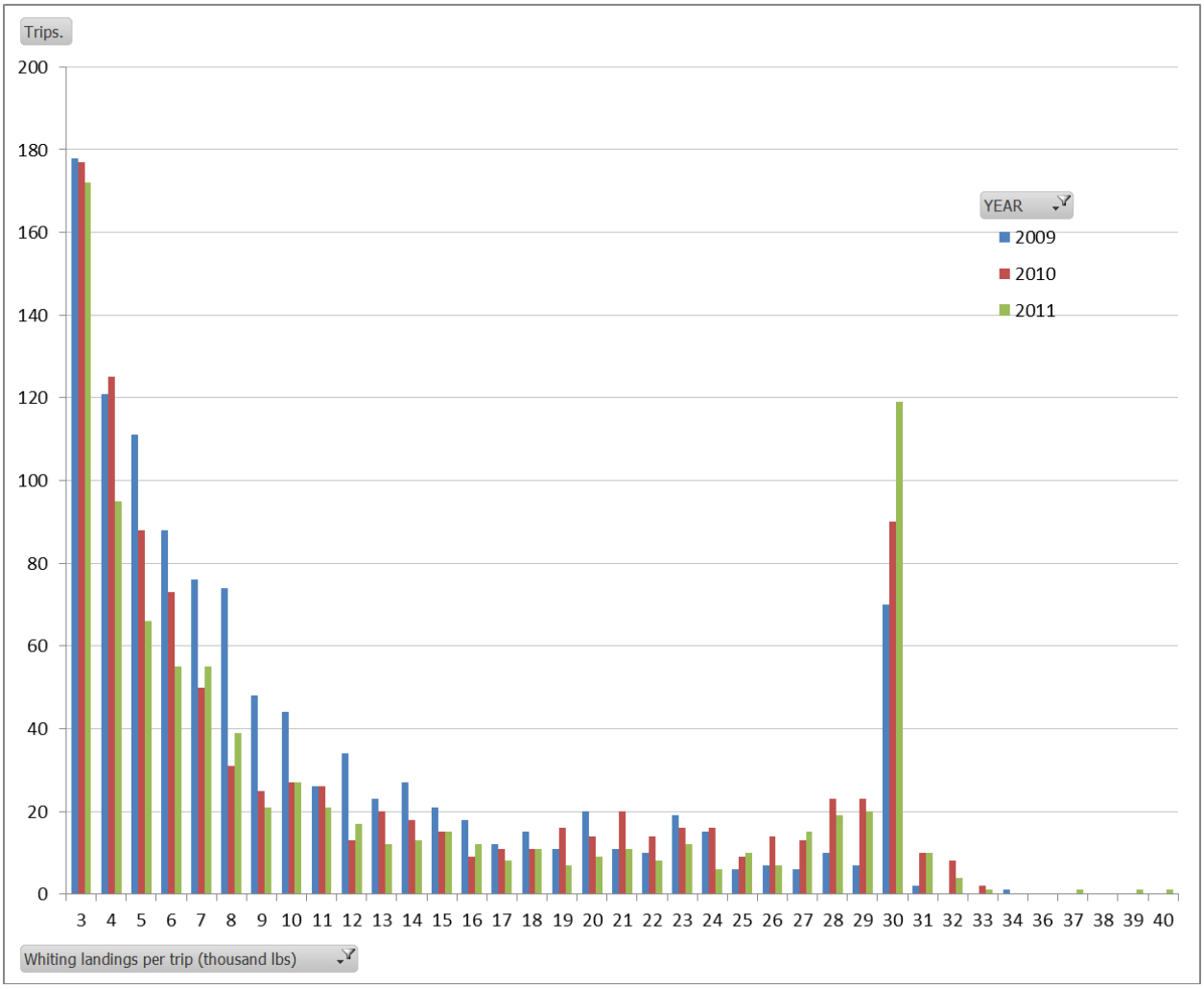
Map 8. Reported fishing locations and state of landing for 2009-2011 trips targeting species other than whiting while using trawls. Source: Dealer landings data matched to VTR data.



It is clear that there are a significant number of trips targeting silver and offshore hake (collectively called whiting) and land very close to 30,000 lbs. (Figure 15) in the southern stock area[11]. This appears to be an increasing trend, comparing 1999-2001 to the most recent three years and also during 2009-2011. The number of trips increased from 70 in 2009 to 119 in 2011, indicating an increasing trend in fishing that targets whiting in the southern stock area. Improving data collection procedures for dealers (including better coordination with NY dealers and electronic reporting) may be partially contributing to this trend, however. The number (and proportion) of trips landing between 500 and 20,000 lbs. of whiting however dropped from levels prevalent in 2009, indicating a shift in fishing effort to target higher quantities of whiting.

[11] There are a few trips in this figure that appear to land more than 30,000 lbs. of whiting, more than the legal limit. This may reflect landings from different trips being reported as being landed in the same day for a permit or reporting mistakes by the dealer. Dealer reported landings for some trips do not match the amount of landings reported by fishermen on vessel trip reports. The vast majority of trips are reported to land less than 32,000 lbs., however.

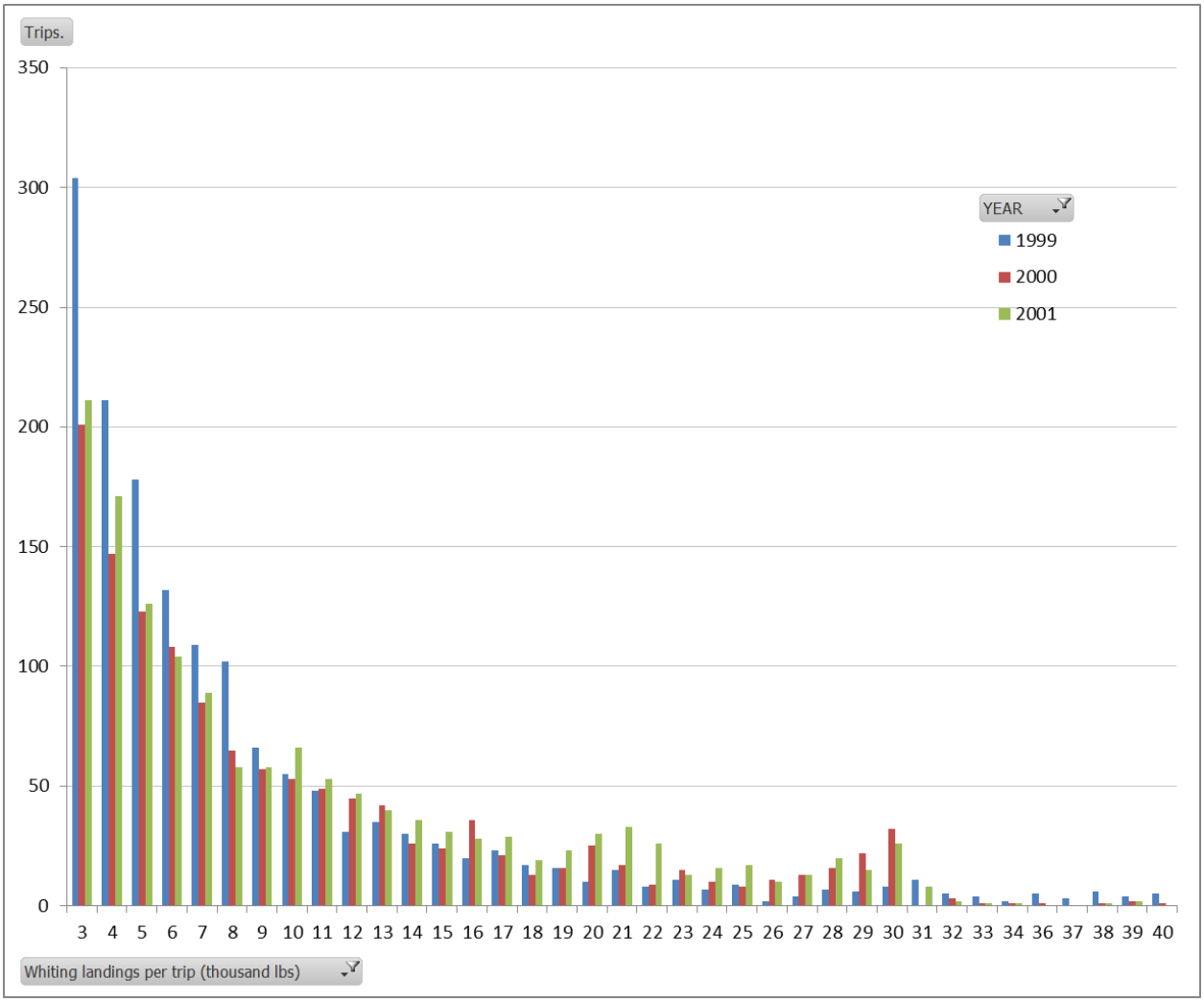
Figure 15. Frequency of trips landing various quantities of whiting (silver and offshore hake) reported by dealers from trips fishing in the southern stock area during 2009-2011. Source: NMFS SAFIS dealer landings reports matched to vessel trip reports. Trips with landings less than 250 lbs. have been excluded from the figure.



An earlier period before the 30,000 lbs. possession limit became effective in 2003 could show the potential for higher landings per trip if the current possession limit is raised. For this reason, the whiting landings during 1999-2001 are characterized in this section for reference to analyze impacts of proposed alternatives.

Before the 30,000 lbs. possession limit became effective, the vast majority of trips landed less than 30,000 lbs. of whiting. Only a few trips landed more than 30,000 lbs., mainly in 1999 (Figure 16). Unlike trips taken in 2009-2011 when the 30,000 lbs. was in effect (see figure above), a comparatively small fraction of trips landed amounts even close to 30,000 lbs. Whether this is due to limits on trip length, vessel hold capacity, targeting other species during mixed species trips, or other factors is unknown. It is however evident that many more trips landed less than 1,000 lbs. of whiting during this period.

Figure 16. Frequency of trips landing various quantities of whiting (silver and offshore hake) reported by dealers from trips fishing in the southern stock area during 1999-2001. Source: NMFS SAFIS dealer landings reports matched to vessel trip reports. Trips with landings less than 250 lbs. have been excluded from the figure.



A multiple linear regression statistical test was run on the three variables (with live pounds landed per day and lagged three day landings as independent variables and price as the dependent variable) to see if quantity of landings had a significant effect on the price. While the data failed the normality test ($P < 0.001$) and had a very low explained sum of squares (R-square), the results did show that higher landings could reduce price (a simple regression had a negative slope and was significant).

This relationship could have been confounded by exogenous factors that were not taken into account, however. So to derive a better model of the short term effect of price from daily landings (and thereby remove the potential effect of exogenous factors over longer term prices), the deviation in price from a 28-day moving average was regressed on the daily landings as a percent of the landings that occurred during the same 28-day moving period (two weeks before the landing date and two weeks after). And to account for the influence of short-term variation in the exchange rate, the daily price and 28-day mean price were adjusted by the Trade Weighted U.S. Dollar Index: Major Currencies (DTWEXM), obtained

from the Federal Reserve Bank of St. Louis Economic Research Division (http://research.stlouisfed.org/fred2).

A regression of these transformed and adjusted data (Figure 17) still failed a normality test and had a very low R^2 value however. A plot of residuals (Figure 18) does not show a trend or a non-normal distribution that would violate the assumptions of the model. There does appear to be a change in the variation of residuals as the percent of monthly (28-day) landings changes, however. Although the data in the transformed and adjusted model failed a stringent normality test, the model appears to be relatively robust and indicates that positive variations in daily landings have some (but modestly small effect on price). According to this model, a one percent increase in whiting landings could depress price by $0.006. Each time period is different so the results are not directly applicable, but over the time period in the analysis, one percent of daily landings were 2,934 lbs. So for each trip landing an extra 10,000 lbs., the daily price could be reduced by about 2 cents. It is important to remember that, although the slope is significant, the predictive value of this regression is very low due to the wide variation in the price deviation at any level of monthly landings, hence the low r-square value.

Figure 17. Regression of percent of price deviation on percent of monthly (28-day) landings.

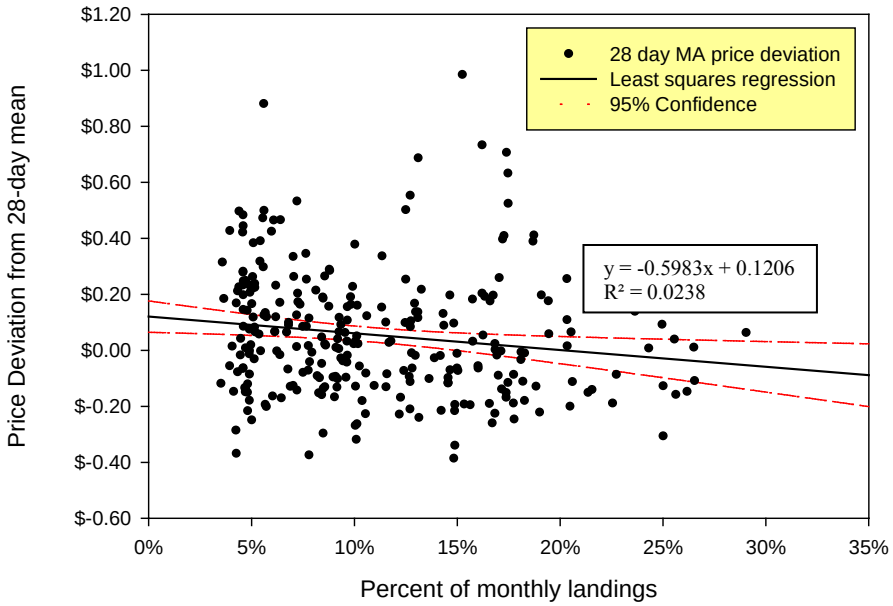
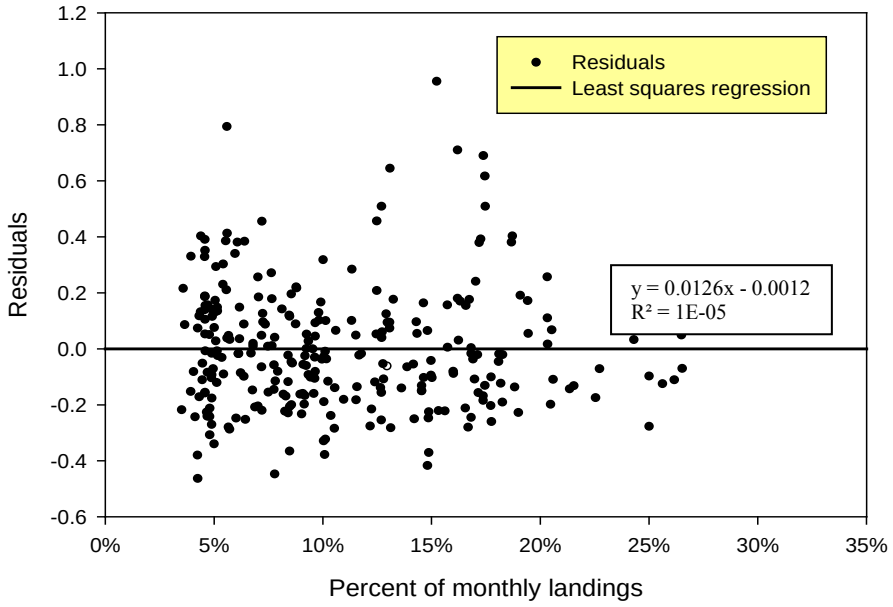


Figure 18. Residual plot



7.3.2 Red hake landings and revenue

Landings of red hake peaked in 2001 at 1,600 mt and revenue was also the greatest ($912,000) in this year (Table 39). The lowest red hake landings occurred in 2005; while in 2006, there was the least amount of revenue earned from red hake ($393,000). Peak landings in the Northern management area were 394 mt in 1996, which earned $252,000 in revenue (Table 40). The lowest red hake landings in the Northern area occurred in 2008 with 9 mt, earning $7,865 in revenue. In recent years, landings in the Northern area have been less than 100 mt, earning revenue $300,000 -$400,000.

Landings of red hake in the Southern area also account for two-thirds to nearly all of the total red hake landings (Table 40). Peak landings in the Southern area were in 2001 and were 1,464 mt, earning approximately $800,000 in revenue. In 2000, there was $808,000 earned revenue from red hake landings. The lowest landings occurred in 2005 and were 356 mt, earning approximately $400,000. The lowest revenue from red hake was in 2006 at $326,000 in the Southern stock area.

Table 39. Red Hake Landings and Revenue (1996-2010)

Year	Landings (mt)	Revenue ($)
1996	1,097	703,343
1997	1,322	790,556
1998	1,327	762,793
1999	1,557	920,320
2000	1,589	907,560
2001	1,672	912,883
2002	908	668,312
2003	808	557,278
2004	674	547,812
2005	427	478,070
2006	453	393,581
2007	512	415,368
2008	587	495,332
2009	613	463,879
2010	603	497,934

Table 40. Red hake landings and revenue by stock area.

	Northern Stock		Southern Stock	
Year	**Landings (mt)**	**Revenue($)**	**Landings (mt)**	**Revenue($)**
1996	394	252,760	700	448,738
1997	322	192,493	999	597,230
1998	173	99,212	1,154	663,553
1999	206	121,645	1,351	798,600
2000	172	98,106	1,415	808,329
2001	204	111,146	1,465	799,548
2002	245	180,070	663	488,059
2003	185	127,810	623	429,362
2004	82	66,906	588	477,880
2005	73	82,122	356	398,446
2006	77	67,183	375	326,416
2007	42	34,243	470	381,118
2008	9	7,685	579	488,910
2009	39	29,404	574	
2010	51	41,932	553	456,129

7.3.3 Small-mesh multispecies landings by state

Table 41 displays silver hake and red hake landings for each state in New England and the Mid-Atlantic (1996-2010) and the percentage of those landings compared to the state's entire landings. For the most part, silver hake comprises a small percentage of each state's landings. CT, RI and NY are among the states with the largest proportion of silver hake landings when compared to the state's total landings. Silver hake landings in CT have consistently been 15-32% of the state's total landings. The silver hake landings in both NY and RI have been 8-26% of the state's total landings.

The proportion of silver hake landings to total landings in ME has consistently been low; however, in recent years, this proportion has been nearly 0%. The landings in total and of silver hake have decreased from 1996-2010; however, the proportion of silver hake landings to total landings has been about equal for 1997-2010. In NH, the proportion of silver hake landings has been about 2%, while the red hake proportion is very minor, nearly 0%. The magnitude of silver hake landings is less in recent years than it had been in the late 1990s; however, the proportion of silver hake landings to total landings is nearly equal throughout the period.

The proportion of silver hake landings to total landings has fluctuated between 1-3%, while the reliance on red hake landings is very minor. Interestingly, while the magnitude of both silver hake and total landings has increased, the proportion of silver hake and red hake landings has not fluctuated much. RI has the second greatest magnitude of silver hake landings among the studied states, but the silver hake landings make up less than ten percent of total state landings. The reliance on silver hake has fluctuated between 3-10%, while red hake constituted less than one percent of total state landings.

In CT, up to one-third of state landings are silver hake. The proportion of silver hake to total landings has fluctuated from 15% (2003) – 36% (1999). While landings in the last ten years have been some of the lowest amount of silver hake landings, this is apparent across all fisheries. The proportion of silver hake to total landings has remained approximately equal over this same time period. Red hake is not relied upon as much in CT—less than five percent of state landings are red hake.

NY has the highest magnitude of silver hake landings of any other state in New England or the Mid-Atlantic. Silver hake comprised 8-26% of total landings; however, there has been an increasing reliance of silver hake from 2005-2010. Red hake comprise less than three percent of total state landings. Silver hake represent a minor proportion of NJ's state landings (1.25% to less than one percent) and red hake comprise an even smaller proportion of the state's landings (less than one percent).

Table 41 Silver and red hake landings by state as percentage of total state landings.

		Landings (mt)			***Proportion of total landings (%)***	
State	**Year**	**Silver hake**	**Red hake**	**Total**	**Silver hake**	**Red hake**
Maine	1996	1,454.5	0.386	115,426	1.26	0.00
	1997	564.3	0.015	120,346	0.08	0.00
	1998	73.6	0.24	93,643	0.06	0.00
	1999	64.4	0.025	113,323		0.00
	2000	9.8	0.03	116,759	0.01	0.00
	2001	15.2	0.77	116,248	0.01	0.00
	2002	19.2	0.07	94,678	0.02	0.00
	2003	1.0	0.01	102,293	0.00	0.00
	2004	6.4	0.00	107,893	0.01	0.00
	2005	1.1	.	99,530	0.00	.
	2006	1.6	.	97,147	0.00	.
	2007	0.2	0.03	86,159	0.00	0.00
	2008	0.5	0.04	92,305	0.00	0.00
	2009	0.3	0.02	89,981	0.00	0.00
	2010	3.7	.	77,882	0.00	.
New Hampshire	1996	111.1	.	4,623	2.40	.
	1997	148.5	0.003	4,549	3.26	0.00
	1998	49.0	.	4,284	1.14	.
	1999	110.6	0.648	4,767	2.32	0.01
	2000	162.5	.	7,648	2.13	.
	2001	135.7	0.30	7,902	1.72	0.00
	2002	79.0	0.07	10,056	0.79	0.00
	2003	83.7	0.04	12,014	0.70	0.00
	2004	57.3	0.17	9,475	0.60	0.00
	2005	45.8	0.01	9,289	0.49	0.00
	2006	41.3	0.01	4,734	0.87	0.00
	2007	95.1	.	3,905	2.44	.
	2008	81.2	.	4,494	1.81	.
	2009	139.3	0.04	5,997	2.32	0.00
	2010	99.5	.	5,103	1.95	.
Massachusetts	1996	1,233.0	392.95	93,547	1.32	0.42
	1997	1,293.0	314.07	92,105	1.40	0.34
	1998	1,191.6	143.42	102,736	1.16	0.14
	1999	1,921.9	184.35	78,676	2.44	0.23
	2000	2,260.0	179.74	75,578	2.99	0.24
	2001	2,489.3	169.42	97,561	2.55	0.17
	2002	2,158.7	211.89	98,833	2.18	0.21
	2003	2,722.8	194.57	120,967	2.25	0.16
	2004	2,139.5	136.28	139,344	1.54	0.10
	2005	1,862.4	73.84	140,060	1.33	0.05
	2006	1,255.6	105.30	148,246	0.85	0.07
	2007	1,438.0	80.91	125,846	1.14	0.06

		Landings (mt)			*Proportion of total landings (%)*	
State	**Year**	**Silver hake**	**Red hake**	**Total**	**Silver hake**	**Red hake**
	2008	1,308.2	39.00	135,897	0.96	0.03
	2009	2,303.5	99.27	150,613	1.53	0.07
	2010	3,041.8	106.09	118,202	2.57	0.09
Rhode Island	1996	4,231.5	337.54	60,867	6.95	0.55
	1997	5,246.2	435.34	61,513	8.53	0.71
	1998	4,670.4	553.85	58,326	8.01	0.95
	1999	4,381.6	652.51	55,038	7.96	1.19
	2000	4,766.3	683.56	52,588	9.06	1.30
	2001	4,185.8	728.47	51,101	8.19	1.43
	2002	2,305.6	290.45	45,425	5.08	0.64
	2003	2,6210	283.15	41,865	6.26	0.68
	2004	2,175.6	216.29	49,871	4.36	0.43
	2005	1,888.2	105.02	42,848	4.41	0.25
	2006	1,542.4	182.54	49,694	3.10	0.37
	2007	2,010.5	179.95	33,435	6.01	0.54
	2008	1,468.3	278.73	31,406	4.68	0.89
	2009	1,652.1	197.05	36,941	4.47	0.53
	2010	1,557.6	226.32	33,404	4.66	0.68
Connecticut	1996	2,559.9	105.29	8,662	29.55	1.22
	1997	1,888.8	174.77	8,062	23.43	2.17
	1998	1,761.6	119.83	7, 409	23.78	1.62
	1999	2,943.8	163.99	8,034	36.64	2.04
	2000	2,813.1	172.86	8,396	33.51	2.06
	2001	2,363.6	155.23	8,158	28.97	1.90
	2002	1,149.0	151.32	7,055	16.29	2.14
	2003	1,113.0	189.53	7,156	15.55	2.65
	2004	1,331.8	190.00	7,975	16.70	2.38
	2005	1,496.7	172.53	6,084	24.60	2.84
	2006	1,065.0	119.66	5,219	20.41	2.29
	2007	709.8	120.75	4,452	15.94	2.71
	2008	930.1	128.91	3,073	30.27	4.20
	2009	919.2	143.16	3,051	30.13	4.69
	2010	759.5	64.84	2,363	32.14	2.74
New York	1996	5,769.9	196.42	26,740	21.58	0.73
	1997	5,434.5	285.07	26,351	20.62	1.08
	1998	6,413.5	393.61	24,381	26.31	1.61
	1999	4,259.9	439.88	21,596	19.73	2.04
	2000	2,048.2	398.41	19,660	10.42	2.03
	2001	3,352.6	461.05	18,698	17.93	2.47
	2002	1,799.1	191.47	16,928	10.63	1.13
	2003	2,031.6	126.31	17,286	11.75	0.73
	2004	2,348.0	112.79	15,263	15.38	0.74
	2005	1,517.1	55.21	16,954	8.95	0.33
	2006	1,159.8	23.47	14,480	8.01	0.16
	2007	1,508.9	76.56	14,384	10.49	0.53
	2008	1,708.1	90.30	13,605	12.55	0.66
	2009	1,782.6	92.07	14,849	12.00	0.62
	2010	2,267.8	132.64	12,058	18.81	1.10
New Jersey	1996	815.6	60.88	81,290	1.00	0.07
	1997	986.3	106.51	77,475	1.27	0.14
	1998	701.1	111.50	87,427	0.80	0.13

		Landings (mt)			*Proportion of total landings (%)*	
State	**Year**	**Silver hake**	**Red hake**	**Total**	**Silver hake**	**Red hake**
	1999	335.7	112.54	75,376	0.45	0.15
	2000	299.0	153.75	77,077	0.39	0.20
	2001	358.7	144.74	75,292	0.48	0.19
	2002	421.1	60.95	72,598	0.58	0.08
	2003	65.0	14.27	76,163	0.09	0.02
	2004	102.6	17.87	84,157	0.12	0.02
	2005	90.7	20.60	69,273	0.13	0.03
	2006	84.3	19.51	68,535	0.12	0.03
	2007	452.3	52.60	69,082	0.65	0.08
	2008	308.9	47.27	72,675	0.43	0.07
	2009	640.4	80.81	85,266	0.75	0.09
	2010	281.5	72.44	62,438	0.45	0.12

Table 42 summarizes revenue from silver and red hake, as well as total revenue per state. The proportion of total revenue that is made of silver hake and red hake is also displayed. In ME there was $117-1.1 million in revenue from silver hake. These revenues comprised <0.0001-0.463% of total state revenues. In 1996, silver hake landings made up approximately 0.5% of total state revenue. Following 1996, there has been a steady decline in revenue from silver hake landings; the same trend is true for red hake landings. Revenue from red hake landings make up less than 0.001% of total state revenue. In NH, during the period 1996-2010, revenue from silver hake was $41,000-139,000, comprising less than 0.24-2.4% of total state fishing revenue. Revenue from red hake landings were $0-300, comprising less than 0.0001% of total state fishing revenues. The greatest proportion of NH's revenue from silver hake was in 2004, at 2.4%. In 2010, the largest revenue from silver hake landings was $139,000, representing approximately 2% of total state fishing revenues. Revenue from red hake landings are very minor, approximately $300 and less than 0.0001% of total state fishing revenues.

Revenue from silver hake landings in MA was $930,000-3,000,000 in 1996-2010; this was less than 3% of total state fishing revenues over the same time period. Revenue from red hake landings was $100,000-284,000, but this was less 0.1% of total MA fishing revenue. The largest revenue from silver hake on record in MA occurred in 2010; while, the greatest revenue from red hake landings occurred in 1996. Revenue from silver hake was $1.4-4.5 million from 1996-2010 in RI; while revenue from red hake landings was $100,000-284,000 during this same time period. Revenue from silver hake was 2-6% of total state fishing revenue; while revenue from red hake was 0.1-1.0% of total RI revenue for 1996-2010. In 1997, landings of silver hake were the most profitable in this time period, $4.5 million, representing about 6% of total state fishing revenues. It is interesting to note that in 2007, lower revenues achieved this same proportion of dependence on silver hake.

One-third of CT's total landings comprised silver hake; the same is true in terms of revenue. Revenue from silver hake landings in CT were $700,000-3 million, approximately 4.2-32% of total state fishing revenue. Revenue from red hake was less than 5% of total state fishing revenue. Revenue from silver hake landings in NY were $1.2– 6.3 million for 1996-2010, representing approximately 4-18% of total state fishing revenue. Revenue from red hake landings were $23,000-336,000, approximately less than one percent of NY's fishing revenue. In NJ uring the period 1996-2010, revenue from silver hake was $84,000-906,000, comprising less than one percent of total state fishing revenue. Revenue from red hake landings were $16,000-116,000 comprising less than 0.12% of total state fishing revenues.

Table 42.Silver and red hake revenue by state as percentage of total state revenue.

		Revenue (000$)			*Proportion of total revenue (%)*	
State	**Year**	**Silver Hake**	**Red Hake**	**Total**	**Silver hake**	**Red hake**
Maine	1996	1,174.93	0.34	253,284.77	0.4639	0.0001
	1997	319.28	0.02	274,754.74	0.1162	0.0000
	1998	47.74	0.05	277,453.16	0.0172	0.0000
	1999	49.76	0.01	323,837.18	0.0154	0.0000
	2000	13.35	0.04	348,053.64	0.0038	0.0000
	2001	12.00	0.41	299,618.65	0.0040	0.0001
	2002	10.37	0.14	307,266.99	0.0034	0.0000
	2003	1.06	0.01	315,268.02	0.0003	0.0000
	2004	6.02	0.00	407,557.58	0.0015	0.0000
	2005	0.46	.	415,636.14	0.0001	.
	2006	1.60	.	97,146.62	0.0017	.
	2007	0.17	0.03	86,158.93	0.0002	0.0000
	2008	0.47	0.04	92,304.93	0.0005	0.0001
	2009	0.30	0.02	89,980.57	0.0003	0.0000
	2010	3.72	.	77,881.67	0.0048	.
New Hampshire	1996	97.70	.	13,586.20	0.7191	.
	1997	112.69	0.01	12,586.58	0.8953	0.0001
	1998	41.20	.	11,186.35	0.3683	.
	1999	107.62	0.10	12,539.96	0.8582	0.0008
	2000	130.34	.	16,197.60	0.8047	.
	2001	121.46	0.12	17,909.77	0.6782	0.0007
	2002	84.91	0.04	16,736.87	0.5073	0.0003
	2003	86.03	0.02	15,315.41	0.5617	0.0001
	2004	58.00	0.30	8,035.83	0.7218	0.0037
	2005	54.17	0.02	22,232.42	0.2436	0.0001
	2006	41.32	0.01	4,733.59	0.8730	0.0002
	2007	95.14	.	3,904.85	2.4364	.
	2008	81.22	.	4,493.95	1.8073	.
	2009	139.26	0.04	5,996.71	2.3223	0.0007
	2010	99.47	.	5,102.81	1.9493	.
Massachusetts	1996	930.43	191.28	231,940.75	0.4012	0.0825
	1997	1,141.81	147.53	224,571.30	0.5084	0.0657
	1998	1,327.28	93.10	205,896.76	0.6446	0.0452
	1999	2,612.27	134.13	260,381.27	1.0033	0.0515
	2000	2,200.84	98.26	291,247.50	0.7557	0.0337
	2001	2,620.59	117.22	280,652.37	0.9338	0.0418
	2002	1,902.25	131.10	297,047.51	0.6404	0.0441
	2003	2,583.16	129.41	293,229.06	0.8809	0.0441
	2004	2,233.55	109.03	326,385.65	0.6843	0.0334
	2005	1,807.35	65.55	426,834.02	0.4234	0.0154
	2006	1,255.62	105.30	148,246.45	0.8470	0.0710
	2007	1,438.00	80.91	125,845.95	1.1427	0.0643
	2008	1,308.16	39.00	135,897.01	0.9626	0.0287
	2009	2,303.46	99.27	150,613.14	1.5294	0.0659
	2010	3,041.78	106.09	118,201.65	2.5734	0.0898
Rhode Island	1996	3,219.82	189.58	70,431.52	4.5716	0.2692
	1997	4,483.86	234.77	78,088.83	5.7420	0.3007
	1998	3,486.90	219.29	71,990.70	4.8435	0.3046

		Revenue (000$)			*Proportion of total revenue (%)*	
State	**Year**	**Silver Hake**	**Red Hake**	**Total**	**Silver hake**	**Red hake**
	1999	3,477.22	284.07	86,041.62	4.0413	0.3302
	2000	3,639.55	268.48	80,965.36	4.4952	0.3316
	2001	3,607.02	263.27	68,657.28	5.2537	0.3835
	2002	1,702.50	163.36	64,717.93	2.6307	0.2524
	2003	2,036.80	152.80	66,088.02	3.0819	0.2312
	2004	2,130.31	111.55	77,385.01	2.7529	0.1442
	2005	1,855.90	100.42	91,410.98	2.0303	0.1099
	2006	1,542.37	182.54	49,693.85	3.1037	0.3673
	2007	2,010.46	179.95	33,434.79	6.0131	0.5382
	2008	1,468.25	278.73	31,405.57	4.6751	0.8875
	2009	1,652.07	197.05	36,941.04	4.4722	0.5334
	2010	1,557.57	226.32	33,404.40	4.6628	0.6775
	1996	1,943.38	76.25	48,417.25	4.0138	0.1575
	1997	1,739.98	96.24	33,081.97	5.2596	0.2909
	1998	1,448.61	67.97	34,359.38	4.2161	0.1978
	1999	3,119.07	81.30	38,090.42	8.1886	0.2135
	2000	2,754.70	101.00	31,245.53	8.8163	0.3233
	2001	2,219.40	92.47	31,194.44	7.1147	0.2964
	2002	1,166.55	130.04	27,779.08	4.1994	0.4681
Connecticut	2003	1,460.25	139.10	29,825.50	4.8960	0.4664
	2004	2,028.11	192.52	33,399.34	6.0723	0.5764
	2005	2,183.02	209.72	37,570.31	5.8105	0.5582
	2006	1,065.02	119.66	5,219.07	20.4064	2.2928
	2007	709.77	120.75	4,452.08	15.9425	2.7122
	2008	930.07	128.91	3,072.57	30.2702	4.1955
	2009	919.21	143.16	3,050.65	30.1317	4.6929
	2010	759.52	64.84	2,363.04	32.1417	2.7438
	1996	5,578.85	189.82	86,670.00	6.4369	0.2190
	1997	6,337.49	232.52	89,614.78	7.0719	0.2595
	1998	6,273.31	299.20	81,828.13	7.6664	0.3657
	1999	4,571.00	338.91	74,787.60	6.1120	0.4532
	2000	2,589.67	322.50	61,121.40	4.2369	0.5276
	2001	4,218.39	336.14	55,072.52	7.6597	0.6104
	2002	2,127.89	188.51	51,264.53	4.1508	0.3677
New York	2003	3,055.45	119.55	51,603.26	5.9210	0.2317
	2004	3,448.59	110.69	46,877.09	7.3567	0.2361
	2005	2,480.61	72.23	56,436.68	4.3954	0.1280
	2006	1,159.80	23.47	14,479.63	8.0098	0.1621
	2007	1,508.92	76.56	14,383.96	10.4903	0.5322
	2008	1,708.09	90.30	13,605.46	12.5545	0.6637
	2009	1,782.58	92.07	14,849.02	12.0047	0.6201
	2010	2,267.75	132.64	12,057.75	18.8074	1.1000
	1996	617.49	54.30	94,677.33	0.6522	0.0574
	1997	906.78	76.44	99,628.31	0.9102	0.0767
	1998	630.30	80.68	97,235.08	0.6482	0.0830
	1999	305.21	80.51	97,856.85	0.3119	0.0823
New Jersey	2000	311.19	116.87	107,162.56	0.2904	0.1091
	2001	400.53	90.51	110,246.35	0.3633	0.0821
	2002	402.48	54.39	112,706.04	0.3571	0.0483
	2003	90.94	16.12	120,670.28	0.0754	0.0134
	2004	100.09	23.28	145,214.84	0.0689	0.0160

		Revenue (000$)			*Proportion of total revenue (%)*	
State	**Year**	**Silver Hake**	**Red Hake**	**Total**	**Silver hake**	**Red hake**
	2005	111.66	30.04	156,428.96	0.0714	0.0192
	2006	84.33	19.51	68,534.91	0.1231	0.0285
	2007	452.30	52.60	69,082.30	0.6547	0.0761
	2008	308.91	47.27	72,674.64	0.4251	0.0650
	2009	640.41	80.81	85,265.86	0.7511	0.0948
	2010	281.49	72.44	62,438.45	0.4508	0.1160

7.3.4 Small-mesh multispecies landings by port

Point Judith, RI leads all other ports in New England and the Mid-Atlantic in silver hake landings for the years 2000-2008. In 2009, Point Judith, RI drops to the second highest port in silver hake landings, and in 2010, drops to number 3 (Table 46). Stonington, CT has the second highest silver hake landings in 2000 and third in 2001, but drops to number 11 in 2002 (Table 43). Stonington drops to the 10th position in 2009, but slightly rebounds to the seventh positing in 2010 (Table 46). Hampton/Seabrook, NH was 13th in terms of silver hake landings in 2000 (Table 43), but dropped out of the top 20 in 2003 (Table 44). Tiverton, RI was 15th in 2000 and 18th in 2002 (Table 43), but eventually dropped out of the top 20 in 2003 (Table 44). Hampton Bays, NY dropped from the fifth position in 2008 (Table 45) to the ninth position in 2010 (Table 46).

Other ports began to gain prominence in silver hake landings. Cape May, NJ and Portland, ME entered the top 20 silver hake landing ports in 2006 (Table 45). New Bedford, MA had the eighth highest silver hake landings in 2000 (Table 43), but eventually rose to the leading port in 2009 (Table 46). Gloucester, MA moved from 10th in 2008 (Table 44) to the fifth in 2009 (Table 46). Provincetown, MA moved from the seventh position in 2000 (Table 43) to the fourth position in 2010 (Table 46).

Table 43. Ranking of silver hake landings and revenue for the top ports based on quantity of silver hake landed, 2000-2002.

	2000			2001				2002			
Port	**Rank**	**Landings (mt)**	**Revenue (000$)**	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**
Point Judith, RI	1	4,298.1	3,300.1	1	-	3,610.3	3,186.1	1	-	2,154.7	1,607.3
Stonington, CT	2	1,510.8	1,552.9	3	↓	1,209.7	1,113.5	11	↓	135.4	128.6
New London, CT	3	1,302.5	1,202.0	4	↓	1,153.9	1,105.9	4	-	1,013.6	038.0
Gloucester, MA	4	1,082.1	1,212.7	8	↓	619.3	726.4	6	↑	489.0	572.4
Montauk, NY	5	1,057.6	1,384.9	2	↑	2,342.6	3,031.0	2	-	1,164.4	1,473.4
Hampton Bays, NY	6	695.6	862.1	6	-	908.1	1,048.9	7	↓	455.3	477.0
Provincetown, MA	7	633.3	518.1	7	-	711.5	899.6	5	↑	563.6	449.1
New Bedford, MA	8	452.4	381.0	5	↑	1,080.1	896.3	3	↑	1,083.6	845.5
Newport, RI	9	381.2	290.2	9	-	576.7	421.9	9	-	155.9	97.7
Point Pleasant, NJ	10	223.3	229.0	10	-	296.6	345.1	8	↑	288.8	283.2
Greenport, NY	11	166.5	166.4	16	↓	14.0	15.6	13	↑	11.7	7.7
Freeport, NY	12	128.2	176.0	12	-	79.8	114.3	10	↑	143.7	145.8
Hampton Seabrook, NH	13	88.9	78.6	11	↑	109.2	105.4	15	↓	4.0	4.4
Chatham, MA	14	76.7	76.4	13	↑	72.3	93.1	14	↓	10.3	18.9
Tiverton, RI	15	74.6	48.4	.	↓			18	↑	0.1	0.0
Belford, NJ	16	65.4	74.2	14	↑	19.9	27.7	12	↑	124.8	116.7
Portsmouth, NH	17	58.0	40.1	15	↑	17.7	12.0	16	↓	2.7	3.4
Rye, NH	18	15.4	11.6	17	↑	8.7	4.0	17	-	2.4	3.0
Cape May, NJ					-				-		
Portland, ME					-				-		

Table 44. Silver hake landings and revenue for the top silver hake ports based on quantity landed, 2003-2005.

	2003				2004				2005			
Port	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**
Point Judith, RI	1	-	2,372.5	1,857.3	1	-	2,030.6	2,021.7	1	-	1,814.2	1,786.3
Stonington, CT	8	↑	99.0	106.6	8	-	85.3	111.9	7	↑	59.5	85.7
New London, CT	4	-	1,014.0	1,353.6	4	-	1,246.4	1,916.2	2	↑	1,437.2	2,097.3
Gloucester, MA	7	↓	231.7	339.9	6	↑	224.1	314.0	5	↑	451.0	503.8
Montauk, NY	3	↑	1,423.4	2,178.8	3	-	1,537.9	2,303.9	4	↓	1,216.4	2,035.6
Hampton Bays, NY	5	↑	495.3	752.2	5	-	465.0	611.1	6	↓	199.7	284.6
Provincetown, MA	10	↓	71.0	75.8	11	↓	25.7	27.2	15	↓	0.0	0.0
New Bedford, MA	2	↑	2,329.1	2,063.4	2	-	1,868.9	1,876.3	3	↓	1,413.4	1,305.2
Newport, RI	6	↑	248.8	179.7	7	↓	143.4	105.6	9	↓	43.9	42.5
Point Pleasant, NJ	12	↓	31.7	41.4	9	↑	56.7	51.6	10	↓	39.0	51.5
Greenport, NY	14	↓	24.7	24.7	14	-	7.0	13.4	11	↑	7.8	22.7
Freeport, NY	9	↑	82.0	89.9	13	↓	13.1	12.0		↓	.	.
Hampton Seabrook, NH		↓				-				-		
Chatham, MA	11	↑	49.4	62.8	12	↓	16.6	9.8	13	↓	0.4	0.4
Tiverton, RI		↓				-				-		
Belford, NJ	13	↓	31.1	47.8	10	↑	44.7	61.5	8	↑	50.0	58.1
Portsmouth, NH	15	↑	2.5	4.2	15	-	1.9	3.6	12	↑	1.3	1.4
Rye, NH	16	↑	0.4	0.5	16	-	0.5	0.6	14	↑	0.1	0.1
Cape May, NJ		-				-				-		
Portland, ME						-				-		

Table 45. Silver hake landings and revenue for the top silver hake ports based on quantity landed, 2006-2008.

	2006				2007				2008			
Port	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**
Point Judith, RI	1	-	1,488.2	1,653.5	1	-	1,936.7	2,076.3	1	-	1,417.6	1,790.5
Stonington, CT	7	-	107.8	156.6	9	↓	69.5	108.2	9	-	110.3	169.0
New London, CT	3	↓	957.2	1,358.1	4	↓	640.3	1,007.2	4	-	338.0	429.6
Gloucester, MA	6	↓	122.0	217.7	5	↑	312.4	472.1	10	↓	100.7	129.6
Montauk, NY	4	-	742.6	1,263.2	3	↑	906.3	1,435.7	2	↑	1,376.0	2,135.8
Hampton Bays, NY	5	↑	215.2	286.7	6	↓	267.7	331.6	5	↑	180.2	218.9
Provincetown, MA		-			11	↑	19.6	28.8	8	↑	134.0	206.0
New Bedford, MA	2	↑	1,127.8	1,252.2	2	-	1,069.4	1,183.9	3	↓	1,041.6	1,253.2
Newport, RI	8	↑	51.5	42.7	10	↓	48.6	45.3	11	↓	28.5	32.6
Point Pleasant, NJ	9	↑	45.5	59.5	8	↑	223.9	213.5	6	↑	161.8	173.0
Greenport, NY	12	↓	3.5	5.0	13	↓	4.9	8.2	12	↑	10.4	15.4
Freeport, NY	15	↑	0.1	0.3	18	↓	0.0	0.1	17	↑	0.1	0.1
Hampton/Seabrook, NH		-				-				-		
Chatham, MA	16	↓	0.1	0.1	15	↑	0.2	0.3	14	↑	1.6	2.4
Tiverton, RI		-				-				-		
Belford, NJ	10	↓	34.2	56.2	7	↑	226.5	279.1	7	-	137.2	185.5
Portsmouth, NH	13	↓	3.3	4.5	12	↑	7.0	8.1	18	↓	0.0	0.1
Rye, NH	17	↓	0.1	0.2	16	↑	0.2	0.3	16	-	0.4	0.6
Cape May, NJ	11	↑	4.7	2.8	14	↓	1.6	1.7	13	↑	9.8	5.2
Portland, ME	14	↑	1.6	2.1	17	↓	0.2	0.1	15	↑	0.5	0.7

Table 46. Silver landings and revenue for the top silver hake ports based on quantity landed, 2009-2010.

	2009				2010			
Port	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**	**Rank**	**Change in rank**	**Landings (mt)**	**Revenue (000$)**
Point Judith, RI	2	↓	1,633.9	1,529.4	3	↓	1,529.7	1,921.6
Stonington, CT	10	↓	148.1	237.2	7	↑	183.2	244.7
New London, CT	6	↓	281.2	324.7	6	-	246.0	377.6
Gloucester, MA	5	↑	308.9	352.5	5	-	246.9	340.9
Montauk, NY	3	↓	1,488.1	2,140.6	2	↑	1,620.2	2,513.8
Hampton Bays, NY	9	↓	192.0	245.2	9	-	179.1	216.3
Provincetown, MA	8	-	217.3	316.1	4	↑	253.1	494.9
New Bedford, MA	1	↑	1,745.6	1,933.3	1	-	2,420.0	3,019.3
Newport, RI	13	↓	18.0	20.2	11	↓	7.2	6.3
Point Pleasant, NJ	4	↑	358.0	283.8	8	↓	181.4	179.5
Greenport, NY	17	↓	0.1	0.2	15	↑	1.4	1.6
Freeport, NY	18	↓	0.0	0.0	14	↑	1.7	3.0
Hampton/Seabrook, NH		-				-		
Chatham, MA	14	-	0.6	0.6	16	↓	1.2	1.9
Tiverton, RI		-				-		
Belford, NJ	7	-	261.8	304.2	10	↓	93.8	105.1
Portsmouth, NH	15	↑	0.2	0.3	18	↑	0.2	0.2
Rye, NH	11	↑	27.6	19.3	13	↓	4.5	4.1
Cape May, NJ	12	↑	20.6	12.0	12	-	6.4	3.6
Portland, ME	16	↓	0.2	0.2	17	↓	0.6	1.0

7.3.5 Small-mesh multispecies permits by port

From 2000-2010, there was a 78% decrease in the number of permits that recorded landings of silver hake, offshore hake, or red hake in the state of Maine (Table 47 and Table 48). Portland, ME saw the majority of this decrease, with an 81% decline in the number of permits recording landings of the small-mesh multispecies over that decade. Other ports in Maine had relatively few permits landing small-mesh multispecies; in fact, most of these ports had less than three vessel permits reporting landings of the hake species. There was a 50% decrease in the number of permits reporting landings of silver hake, offshore hake, or red hake in New Hampshire for 2000-2010. The ports of Hampton, Seabrook, Rye, and Portsmouth, NH saw a decrease of 50-72% of permits landing hakes (Table 47). The number of unique permits reporting landings of silver hake, red hake or offshore hake decreased by 52% in the Commonwealth of Massachusetts of that decade. The principal fishing ports of Provincetown, Newburyport, Chatham, and Gloucester all saw declines of more than 50% of permits landing these hake species (Table 47).

There was a 42% decline in the number of permits reporting landings of small-mesh multispecies in the state of Rhode Island for 2000-2010. The number of permits landing in Point Judith, RI declined by about a quarter for 2000-2010; while there was an 81% decline in the number of permits reporting landings of these species in Newport, RI over that time period. There was an 18% decline in the number permits reporting landings of small-mesh multispecies in the state of Connecticut for 2000-2010 (Table 47). There was a 12.5% decline in the port of Stonington, CT.

There were declines in permitted vessels reporting hake landings in the mid-Atlantic. There was a decline of 24% of the number of permits reporting landings of small-mesh multispecies in the state of New York for 2000-2010. The ports of Montauk and Shinnecock experienced declines of 11% and 47%, respectively. There was a 150% increase in the number of permits reporting small-mesh multispecies landings in ports that could not be named due to confidentiality issues, indicating an increase in landings in incidental ports (Table 47). There was a 21% decline in the number of permits reporting landings of silver hake, offshore hake or red hake in the state of New Jersey for 2000-2010. There were declines in permits landing small-mesh multispecies in Belford (55%), Belmar (50%), Brielle (20%), Cape May (22%) and Highlands (60%). However, there were increases in the number of permitted vessels reporting silver hake, offshore hake or red hake landings in Barnegat (18%) and Point Pleasant (19%). See Table 47.

Table 48 displays the number of unique permits that landed silver hake, offshore hake, or red hake in the listed ports for the years 2000-2010 in ports that are slightly farther south of the stock areas. Overall, during this time period the number of unique permits landing small-mesh multispecies in Virginia increased by 21%; the same trend is true for the port of Chincoteague. However, there was a 25% decrease in the Hampton port (Table 48). Although, there was fluctuation over this time period, the number of unique permits landing silver hake, offshore hake, or red hake remained the same in Ocean City, MD and North Carolina (Table 48).

Table 47 Number of unique permits landing silver hake, offshore hake or red hake in each port.

Port	State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Boothbay Harbor	ME	3	3	3	*	*	*	*	*	*	*	*
Cape Porpoise	ME	3	*	*	*	*		*	*	3	*	*
Cundys Harbor	ME	3	*	4	*		*	*	*	*	*	
Five Islands	ME	3	3	*	*	*						
Kittery	ME	3	*	*							*	
New Harbor	ME		3	*	*	*						*
Ogunquit	ME	3	3	*	*	*	*	*	*	3	*	*
Port Clyde	ME	3	4	5	*	3	*			*		*
Portland	ME	57	49	37	23	21	21	12	7	8	10	11
Saco	ME	6	*	*	*		*	*	3	*	*	*
South Bristol	ME	4	3	*								
West Point	ME	*	4	*	*	*	*	*			*	*
York	ME	4	3	4	*	3	*		*		*	
*No. Confidential Permits	ME	19	21	26	26	17	14	14	13	15	19	14
TOTAL	*ME*	*111*	*96*	*79*	*49*	*44*	*35*	*26*	*23*	*29*	*29*	*25*
Hampton	NH	6	11	5	8	5	5	4	3	3	3	3
Portsmouth	NH	25	31	23	15	15	8	8	12	6	9	7
Rye	NH	10	10	8	6	7	5	5	7	8	7	6
Seabrook	NH	17	15	13	14	13	17	12	10	12	16	11
*No. Confidential Permits	NH		*	*	*				*	*	*	*
TOTAL	*NH*	*58*	*68*	*50*	*44*	*40*	*35*	*29*	*33*	*30*	*36*	*29*
Barnstable	MA		*	3	*	4	*	*			3	3
Beverly	MA	3	3	*	3		*	*	*	*	*	
Boston	MA	7	6	7	6	4	6	7	7	9	10	5
Chatham	MA	22	20	17	25	16	10	7	9	15	10	9
Gloucester	MA	101	102	98	83	69	52	34	46	56	60	44
Harwichport	MA	4	*			*	3	*	*	*		
Marblehead	MA	4	*	*	*	*				*	*	*
Marshfield	MA	*	*	*	4	*	3	*			*	*
New Bedford	MA	42	50	36	39	38	34	30	29	31	34	27
Newburyport	MA	10	10	9	11	9	4	*	*	3	4	5

Port	State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Plymouth	MA	7	7	5	7	5	4	*	5	3	3	*
Provincetown	MA	21	21	24	15	15	5	4	5	9	8	8
Rockport	MA	7	6	6	5	6	3	*	4	3	4	3
Salisbury	MA	5	3	4	*	*	*	*		*	*	*
Scituate	MA	8	7	11	8	4	3	6	4	8	9	9
*No. Confidential Permits	MA	15	12	11	14	8	6	15	8	7	11	10
TOTAL	*MA*	*256*	*247*	*231*	*220*	*178*	*133*	*103*	*117*	*144*	*156*	*123*
Little Compton	RI	4	*	*	*	4		*	3	*	*	
New Shoreham	RI	4	4	5	5	*		*	3	5		*
Newport	RI	26	30	19	17	12	11	12	10	7	8	5
North Kingstown	RI	3	*	*					*	*	*	*
Point Judith	RI	95	93	99	79	73	73	81	77	83	81	70
*No. Confidential Permits	RI	3	5	5	3	*	*	7	*	3	3	3
TOTAL	*RI*	*135*	*132*	*128*	*104*	*91*	*85*	*100*	*95*	*98*	*92*	*78*
New London	CT	4	5	6	3	4	5	5	4	*	*	3
Stonington	CT	16	18	13	9	10	11	13	10	14	13	14
*No. Confidential Permits	CT	*	3	*	4	*	*	*	*	3	3	*
TOTAL	*CT*	*22*	*26*	*21*	*16*	*15*	*17*	*19*	*15*	*17*	*16*	*18*
Babylon (Captree)	NY						*	*	*	4	3	5
Brooklyn	NY	5	7	7	4	4	*	3	4	7	9	6
East Hampton	NY	*		*	3		4	*	3	*	*	
Freeport	NY	5	8	7	4	3	6	5	3	3	8	7
Greenport	NY	9	4	*	6	4	4	*	*	*	*	*
Hampton Bay	NY	6	6	6	6	7	5	6	6	7	3	5
Island Park	NY	3		*	*	*	*	4	4	5	4	4
Islip	NY	*	*	*	*	*	*	*	*	3	3	*
Mattituck	NY	4	6	3	*	4	*	6	*			
Montauk	NY	53	43	48	39	55	31	37	40	44	42	47
New York City	NY	3	3	3	*		*					*
Oceanside	NY	*		*				*		*	3	*
Other Nassau	NY	6	4	3		4					*	*
Other Suffolk	NY	5	*			10				*		
Pt. Lookout	NY	8	7	7	5	5	5	6	7	9	10	9
Shinnecock	NY	49	49	44	27	26	20	29	28	25	28	26

Port	State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
*No. Confidential Permits	NY	6	4	13	14	4	13	15	7	6	10	15
TOTAL	*NY*	*162*	*141*	*141*	*108*	*126*	*88*	*111*	*102*	*113*	*123*	*124*
Atlantic City	NJ	4	4	*	*	*	*	*	5	*	*	
Barnegat	NJ	4	8	3						4	8	11
Belford	NJ	20	20	18	12	12	13	16	14	12	13	9
Belmar	NJ	10	10	5	5	4	*	5	4	4	4	5
Briele	NJ	5	7	9	7	4	3	4	5	4	4	4
Cape May	NJ	23	36	19	17	19	18	17	15	30	25	18
Highlands	NJ	10	8	6	*	4	*	*	*	3	5	4
Long Beach	NJ	16	12	3	7	9	6	8	10	15	3	*
Ocean City	NJ	*	*		*	*	*	*	3	*	*	*
Pt. Pleasant	NJ	37	44	27	30	30	31	36	29	47	40	44
Sea Isle City	NJ	*	4	3	*		*	*	*	4	4	5
Shark River	NJ	5	3	3	*	4	*	3	*	*	4	*
Wildwood	NJ	5	*	*	*	*	*	3	*	6	*	3
*No. Confidential Permits	NJ	11	11	10	18	13	14	7	12	15	15	16
TOTAL	*NJ*	*150*	*167*	*106*	*96*	*99*	*85*	*99*	*97*	*144*	*125*	*119*

*Ports having less than three permitted vessels are not listed for confidentiality reasons.

Table 48. Number of unique permits landing silver hake, offshore hake or red hake in 'non-traditional' ports.

Port	State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CHINCOTEAGUE	VA	3	4	4	*	4	*	*	*	5	3	6
HAMPTON	VA	4	5	*		*	*	3	*	*	3	3
NEWPORT NEWS	VA	*	*						*	*	3	
VIRGINIA BEACH	VA	*	*	9	3	5	*	3	4	4	6	6
*No. Confidential Permits	VA	7	7	*	4	6	6	3	7	6	2	2
TOTAL	*VA*	*14*	*16*	*15*	*7*	*15*	*6*	*9*	*11*	*15*	*17*	*17*
ENGELHARD	NC	3				*		*		9	*	*
HATTERAS	NC	3	5	*	*	*	*			*		*
WANCHESE	NC	3	*	3	*	*	*	5	4	9	5	7
*No. Confidential Permits	NC	4	6	4	7	8	*	3	*	*	3	6
TOTAL	*NC*	*13*	*11*	*7*	*7*	*8*	*	*8*	*5*	*19*	*8*	*13*
OCEAN CITY	*MD*	*13*	*11*	*10*	*10*	*11*	*7*	*11*	*14*	*14*	*10*	*13*
TOTAL	*FL, GA, SC, DE*	3	*	*	*	5	7	10	5	13	11	12

*Ports having less than three permitted vessels are not listed for confidentiality reasons.

8.0 ENVIRONMENTAL CONSEQUENCES (EA)

8.1 Biological Impacts on Target Species

8.1.1 Overfishing definitions (Section 5.1)

The revised overfishing definitions for red and silver hake would take into account new information provided by the baseline assessment (NEFSC 2011a and 2011b), which updates MSY proxy values for biomass and fishing mortality, using best available and peer reviewed science. These overfishing definition reference points were used to determine ABCs after accounting for scientific uncertainty and were or will be used to determine status (whether stocks are overfished or overfishing is occurring). As such, the new overfishing definitions provide for better management of the stocks and achievement of MSY. Thus the direct impact on target species is positive.

No action would retain the present overfishing definitions, but this would be inconsistent with National Standard 1 and with the new MSY proxy value estimates. Thus the direct impact on No Action on target species is negative as the probability of over fishing may be greater.

8.1.2 Northern Stock Area TALs, Specification Process, and Annual Monitoring (Sections 5.2 and 5.2.3)

The alternatives for the northern stock area are the implementation of a stock-wide TAL or the implementation of a stock-wide TAL, with landings targets for the small-mesh exemption area programs. If the exemption area program landings targets are implemented, a roll-over provision from the Cultivator Shoal Exemption Area Program landing target to the Inshore Gulf of Maine Exemption Area Program landing target would be included. The impacts of the TAL alternatives and the measures necessary to effectively implement those alternatives are discussed together below.

The northern stock area wide TAL is the status quo alternative, as well as the preferred alternative. The impacts of the continuation of a stock-wide TAL in the northern area are likely neutral. The Secretarial Amendment determined that the impacts of moving from a fishery with no catch limits to a fishery with catch limits would be positive for the target species. Maintaining catch limits that were based on the best available science would be neutral on the target species.

The three-year specification and annual monitoring processes are intended to keep the Council abreast of changes in the resource and the fishery, giving the Council an opportunity to make mid-course corrections to management measures when needed. Without these processes, chances of overfishing are higher and the fishery may not realize optimal benefits. Therefore impacts of these processes are expected to be positive. The status quo alternative would continue the more general specification process in the Secretarial Amendment, but may limit some of the Councils ability to respond to changes, having a slightly negative impact on target species.

The impacts on the target from implementing the exemption area program landing targets are also likely neutral. The overall landing limit would be the same as the stock-area TAL described above, but would simply be sub-divided based on the historical landing proportions of the Cultivator Shoal Exemption Area Program and the inshore Gulf of Maine exemption area programs. Likewise, the impact of the roll-over provision that would make available any underage of the Cultivator Shoal landing target to the inshore exemption area programs would also be neutral for the target stock. The provision would not allow for an increase in the total allowable landings limit, but just rearrange the sub-divided allocations.

8.1.3 Southern Stock Area TALs, Specification Process, and Annual Monitoring (Sections 5.2 and 5.5)

In the Southern stock area, a stock-wide TAL would be monitored either on an annual basis, quarterly, or annually until landings exceed two-thirds of the TAL, in which case quarterly monitoring would be triggered. If quarterly TALs are implemented, a "roll-up" procedure would be used for monitoring. The impacts of the TAL alternatives and the measures necessary to effectively implement those alternatives are discussed together below.

The southern stock area-wide annual TAL is the status quo alternative. The impacts of the continuation of a stock-wide TAL in the southern area are likely neutral. The Secretarial Amendment determined that the impacts of moving from a fishery with no catch limits to a fishery with catch limits would be positive for the target species. Maintaining catch limits that were based on the best available science would be neutral on the target species.

The implementation of quarterly stock-wide TALs would likely have a neutral impact on the target stocks as compared to the status quo alternative. The overall catch limit would not change and was calculated using the best scientific information available. This is also true if the quarterly TALs are implemented after the two-thirds trigger. This alternative is the preferred alternative by the Council. The roll-up provision, which would use a cumulative quarterly TAL to monitor the fishery, would also have a neutral impact on the target stocks. This provision would not change the overall TAL, but would help to ensure that the landings do not exceed the limit.

As for the northern stock area above, the impacts of the three-year specification and annual monitoring processes on target species is expected to be positive. The status quo alternative would continue the more general specification process in the Secretarial Amendment, but may limit some of the Councils ability to respond to changes, having a slightly negative impact on target species.

8.1.4 TAL monitoring (Section 5.2.3)

A mechanism for monitoring landings to determine when the 90% TAL trigger is met must be applied. Two methods are proposed, one relying on more frequent VTR reports and the other using less timely mechanisms using existing procedures and gear use reported by dealers. The former is the more accurate of the two, and therefore provides the most accurate in-season accountability measures to prevent overfishing of target species. The assignment of landings to management area based on gear use relies on dealer reports and time of landing to make this determination. Existing procedures which are less timely would be used to assign landings to stock area, thus having the possibility that in-season actions may differ from the actual outcome of assessments which rely more on the marriage of VTRs with dealer data after the calendar year is finished. Without the weekly VTR reports, this procedure and the one NMFS would follow under No Action would provide less accurate management and may have a greater risk of overfishing occurring and would result in negative impacts to the managed resource.

8.1.5 Incidental Possession Limit Trigger (Sections 5.4 and 5.6)

This alternative would reduce possession to an incidental limit when a trigger level is projected to be reached. Under this alternative, the incidental possession limit would remain in effect, even if the TAL is projected to be exceeded. This is intended to work in conjunction with the post-season accountability measure which would be invoked if the overage of the TAL causes the catch for that year to exceed the ACL. This alternative would have neutral impacts because it would allow trips to continue, without causing large amounts of additional small-mesh multispecies discards.

8.1.6 In season accountability measures

The purpose of the proposed in-season accountability measures is to curtail trips targeting red, silver, and offshore hake when landings approach the TAL or landings target. Since there is no limited access or day-at-sea limits in the small-mesh multispecies fishery, the primary way of doing this is to reduce the possession limits to a level that discourages targeting without increasing discards to unacceptable levels.

Vessels that normally target red or silver hake would be affected economically, altering fishing behavior. Either the vessels would take fewer trips, target other species, or fish in ways that would catch fewer of the species under an incidental possession limit. Of course, vessels that did not alter fishing behavior would catch the same amount of fish, discarding the excess. Therefore the delicate balance is to set an incidental possession limit that would be effective without causing unacceptably high discarding.

Based on a preliminary analysis of the data (see Document 3 in the Appendix), the Council proposes three potential possession limit levels for red and silver hake. In the small-mesh area programs, the intent is to prevent excessive targeting of a species approaching a landings target, so that the stock area TALs don't become a constraint on fishing where catches of that species are already incidental and likely to cause excessive discarding. The intent is not to prevent landings in the small-mesh area programs from exceeding the landings target. Mainly the incidental limits are intended to encourage vessels that are fishing in the exemption programs to avoid either red or silver hake.

For the stock areas, on the other hand, the intent of the incidental possession limits is to reduce landings, discourage trips targeting red or silver hake, and reduce the risk that catches could exceed the ACL (triggering post-season accountability measures for overages).

The following analyses, using trip data from the 2006-2010 fishing years when landings exceeded the proposed TALs or landings targets, evaluate the potential effectiveness of the in-season accountability measure possession limits to constrain landings, discourage fishing, and limit catch. Only some years exceeded the TAL or landings targets and were used for the analysis. Landings of silver and offshore hakes came nowhere near the TALs in the past five years, so could not be used for the analysis and as such are unlikely to approach the TALs or landings limits in the near future. Trips that target both species together are less likely to change fishing behavior. Industry advisors that fish in the Cultivator Shoals Area Program say that during much of the season, they can target silver hake while catching relatively few red hake. Red hake landings are much more likely to reach the TALs or landings targets than are landings of silver hake.

8.1.6.1 Silver hake

Based on a preliminary PDT analysis of the effectiveness of various silver hake possession limits to reduce landings and catch (see Document 3 in the Appendix), the Council proposes three potential incidental possession limits as accountability measures for the northern and southern stocks of silver hake. Since the southern stock area TAL applies to both silver and offshore hakes, the in-season accountability measure would also apply to both species in the southern stock area. Very few offshore hake are caught in the northern stock area and the possession limit would only apply to silver hake.

The proposed incidental limits are 500, 1000, and 2000 lbs. for both stock areas, to be triggered when silver hake landings reach 90% of the TALs or landings targets. The alternatives are described in Sections 5.4.2 and 5.6.2. Since silver hake are unlikely to become a constraint any time soon, the Council does not propose any in-season accountability measures for the small-mesh area programs and landings would be curtailed throughout the northern stock area when they reach 90% of the TAL.

The analysis below for the northern and southern stock areas includes landings derived from dealer reports and transfers at sea on VTRs. Since recent landings are a small fraction of the proposed TALs, the expected effect on the bait fishery will be negligible, whether they occur in the small-mesh area exemption programs or elsewhere. Note, a 1000 lb incidental possession limit is the no action alternative.

8.1.6.1.1 Northern stock area (Section 5.4.3.1)

The proposed silver hake TAL for the northern stock area is 8,973 mt. Since 1994 when the regulated mesh areas were implemented by the Multispecies FMP to limit small-mesh fishing, peak landings were 3,781 mt in 1994, well below the TAL (see table below). It is unlikely that the silver hake landings will approach the proposed TAL and therefore the incidental possession limits will not be likely to have any effect.

However, a high possession limit such as 2000 lbs. will be less effective at reducing landings and discouraging vessels from targeting silver hake. On the other hand, a high incidental possession limit would create fewer discards on trips that target other species. Conversely a low possession limit, such as 500 lbs., will be more effective at discouraging trips that target silver hake and reducing landings. Since silver hake are often the primary target (and more valuable component) of trips in the small-mesh area programs, it is unlikely that these trips would continue fishing, making unacceptable increases in discarding (while targeting red hake) unlikely.

Based on this analysis, the proposed incidental possession limit accountability measures are unlikely to have any direct effect on the target species, on non-target species, on protected species, or on habitat, because in-season accountability measures are unlikely to be implemented. Catch for the last 10 or so years have been well below the ACLs.

Table 49. Landings of silver and offshore hake reported by dealers. Source: NMFS SAFIS data tables**.**

	STOCK		
	Northern Stock	Southern Stock	
FISHING_YEAR	Silver hake, mt. live	Silver hake, mt. live	Offshore hake, mt. live
1994	3,781	12,115	134.9
1995	2,233	13,045	46.0
1996	3,501	12,706	68.2
1997	2,710	12,601	22.8
1998	2,047	12,965	3.1
1999	3,632	9,606	7.7
2000	2,577	9,951	3.6
2001	3,323	7,765	0.4
2002	2,596	4,629	8.5
2003	1,857	7,964	3.6
2004	985	6,850	26.8
2005	803	6,198	12.4
2006	852	4,544	35.0
2007	1,142	5,858	17.0
2008	518	5,987	20.2
2009	1,115	7,327	15.7
2010	1,633	4,039	3.5

The silver hake landings target for the Cultivator Shoals Area is 4,568 mt and for the other Small-mesh Area Programs is 3,105 mt. Landings of red and silver hake were restricted by the Multispecies FMP since 1994 when the regulated mesh areas were implemented. Since then, six small-mesh area programs were identified where small-mesh fishing for red and silver hake could take place. For ACL management purposes, the Council is grouping the five inshore areas together and separating the Cultivator Shoals Area AM. Estimated silver hake landings are shown in the table below. Some of the estimated landings for the inshore small-mesh areas occurred before the programs were created but represent traditional fishing areas. Since 1994, peak silver hake landings were 1,972 mt in 1999 for the Cultivator Shoals Area and 2,078 mt in 1996 for the inshore small-mesh areas. All landings were well below the proposed landings targets. Negligible amounts of silver hake were reported by fishermen as transfers at sea for bait.

Table 50. Landings of silver hake reported by dealers for small-mesh area programs. Cultivator Shoals Area and small-mesh area programs are estimated based on three digit statistical area and landing date. Source: NMFS SAFIS data tables**.**

Silver hake, mt. live	MGMT_AREA2	
FISHING_YEAR	Cultivator Shoals	Small mesh areas
1994	1,238	1,914
1995	679	1,363
1996	1,140	2,078
1997	1,026	1,153
1998	1,169	675
1999	1,972	1,290
2000	816	1,438
2001	1,817	1,183
2002	1,360	1,078
2003	1,245	534
2004	589	278
2005	553	147
2006	688	137
2007	666	411
2008	91	384
2009	460	599
2010	962	541

8.1.6.1.2 Southern stock area (Section 5.6.2)

The proposed silver and offshore hake TAL for the southern stock area is 27,254 mt. Since 1994 when the regulated mesh areas were implemented by the Northeast Multispecies FMP and restricted small-mesh fishing[12], peak landings were 13,091 mt in 1995, well below the proposed TAL (Table 49). It is unlikely that the silver hake landings will approach the proposed TAL and therefore the incidental possession limits will not be likely to have any effect. Note, the no action alternative is an incidental possession limit of 1,000 lb of silver hake.

However, a high incidental possession limit such as 2000 lbs. will be less effective at reducing landings and discouraging vessels from targeting silver hake. On the other hand, a high incidental possession limit

[12] Large mesh restrictions had less effect in the southern stock area because automatic exemptions applied to much of the Mid-Atlantic and Southern New England regions.

would create fewer discards on trips that target other species. Conversely a low possession limit, such as 500 lbs., will be more effective at discouraging trips that target silver hake and reducing landings. Since silver hake are often the primary target (and more valuable component) of trips in the small-mesh area programs, it is unlikely that these trips would continue fishing, making unacceptable increases in discarding (while targeting red hake) unlikely. More trips in the southern stock area target silver and/or offshore hake while catching few red hake.

Based on this analysis, the proposed incidental possession limit accountability measures are unlikely to have any direct effect on the target species, on non-target species, on protected species, or on habitat, because in-season accountability measures are unlikely to be implemented. Catch for the last 10 or so years have been well below the ACLs.

8.1.6.2 Red hake

Based on a preliminary PDT analysis of the effectiveness of various red hake possession limits to reduce landings and catch (see Document 3 in the Appendix), the Council proposes three potential incidental possession limits as accountability measures for the northern and southern stocks of red hake.

The proposed incidental limits are 200, 300, and 400 lbs. for both stock areas and all small-mesh area programs, to be triggered when silver hake landings reach 90% of the TALs or landings targets. The alternatives are described in Sections 5.4.1 and 4. Note, the 400 lb incidental possession limit is the no action alternative for both the northern and southern areas.

Unlike silver hake, the Council proposes that these limits will also apply to the Cultivator Shoals Area and the small-mesh area programs when landings from those areas reach 90% of their respective landings targets (see Section 5.4.3.1). This is intended to act as a break on landings and catch from the small-mesh areas so that it reduces the risk that these landings may trigger the accountability measures for the entire northern stock area, reducing potential discards from large mesh and other fisheries.

8.1.6.2.1 Small-mesh area programs

The proposed red hake landings target for the Cultivator Shoals Area is 16.3 mt and 51.2 mt for the inshore small-mesh areas (Section 5.3.3). Since 1994, red hake landings from the Cultivator Shoals Area were often well above the 16.3 mt landings target (see table below). In 2010, red hake landings were about 50% above the landings target. Red hake landings from the inshore small-mesh areas have declined, but were above the 51.2 mt target as recently as 2007 and 2009. Combined with bait landings (transfers at sea reported on VTRs), landings for 2006 also exceeded the inshore small-mesh area landings target of 51.2 mt. In these cases, there is a high probability that future red hake landings will trigger accountability measures for the Cultivator Shoals Area and the small-mesh area programs.

Cultivator Shoals Area accountability measures

Only negligible amounts of transfers at sea for bait were reported for trips fishing in the Cultivator Shoals Area. And although silver hake transfers at sea have been increasing (Figure 15), most of these landings are of red hake and nearly all come from Small-mesh Area I and the Gulf of Maine Raised Footrope Area (Map 1).

The majority of red hake landings from the Cultivator Shoals Area were accepted and reported by dealers. During early to mid-August, red hake landings exceeded the Cultivator Shoals Area 16.3 mt landings

target during 2005, 2006, and 2010 (Figure 16). Red hake landings also exceeded the target in 2007, at the end of the Cultivator Shoals Area exemption season.

Table 51. Landings of red hake reported by dealers for small-mesh area programs. Cultivator Shoals Area and small-mesh area programs are estimated based on three digit statistical area and landing date. Source: NMFS SAFIS data tables. Data since 2006 include transfers at sea for bait, reported by fishermen on VTRs. These bait data have been revised since the benchmark assessment (NEFSC 2011a).

STOCK	(Multiple Items)	
Sum of Red hake, mt live	Small mesh program	
FISHING_YEAR	Cultivator Shoals	Small mesh areas
1994	41.7	433.0
1995	13.4	117.2
1996	20.7	317.5
1997	27.5	242.9
1998	48.2	108.0
1999	57.3	133.0
2000	29.1	117.6
2001	63.6	115.6
2002	64.2	161.9
2003	88.1	98.7
2004	33.9	34.4
2005	30.3	30.9
2006	43.3	49.3
2007	17.7	49.6
2008	2.2	49.3
2009	16.6	67.7
2010	24.6	33.4

Figure 19. Reported transfers at sea for bait by management area, landings of red and silver hake, mt live wt. Source: NMFS VTR tables.

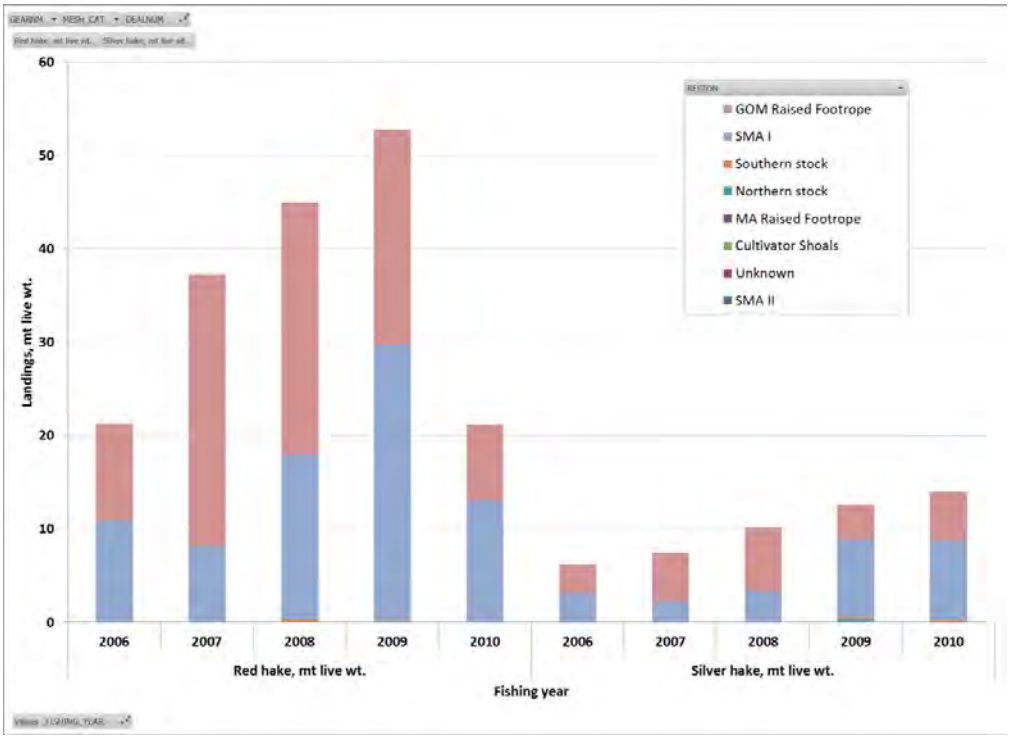
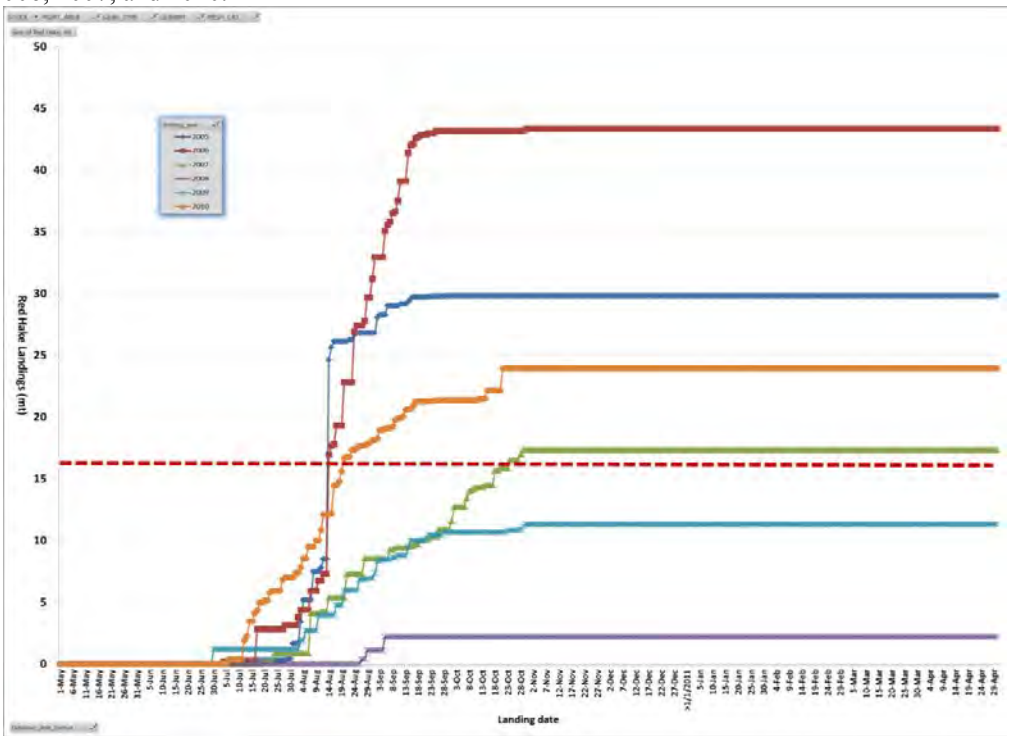


Figure 20. Daily cumulative red hake landings (including transfers at sea for bait) from the Cultivator Shoals Area program compared to 2012-2014 landings target (red dashed line). Landings exceeded the target in 2005, 2006, 2007, and 2010.



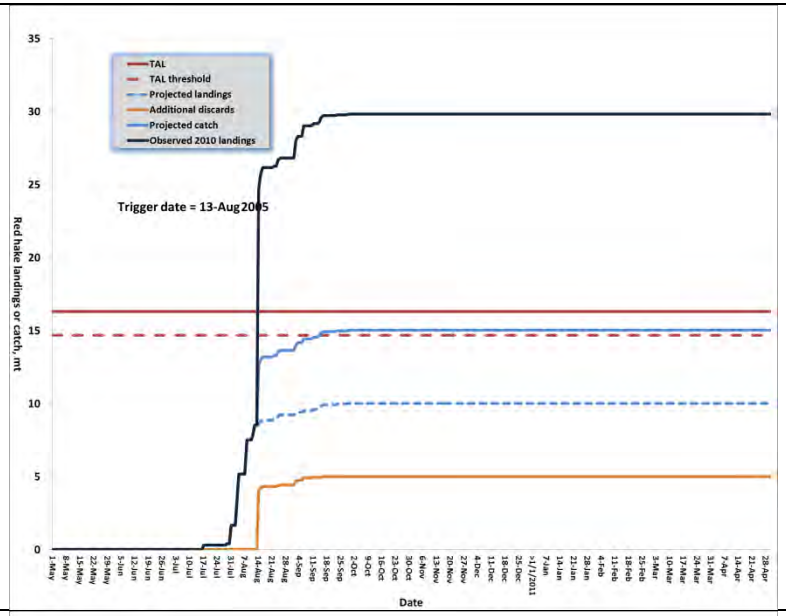
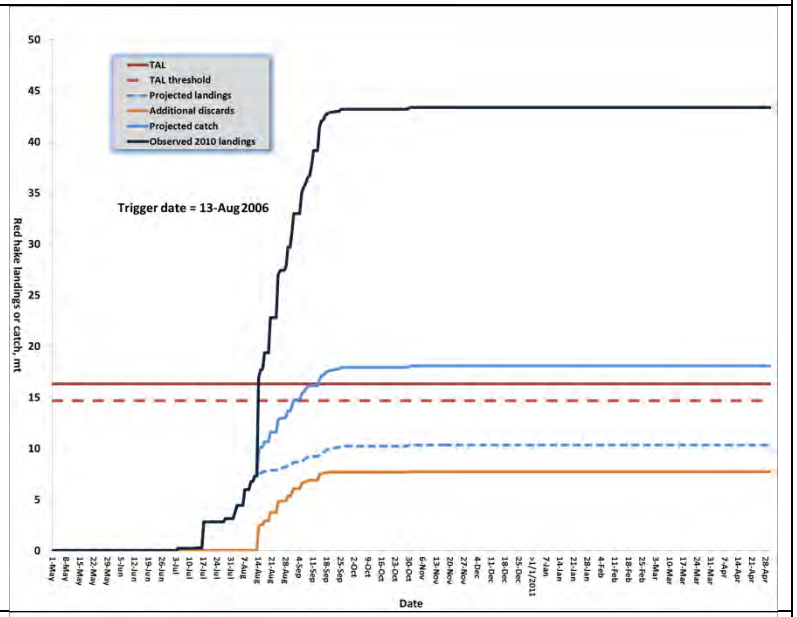
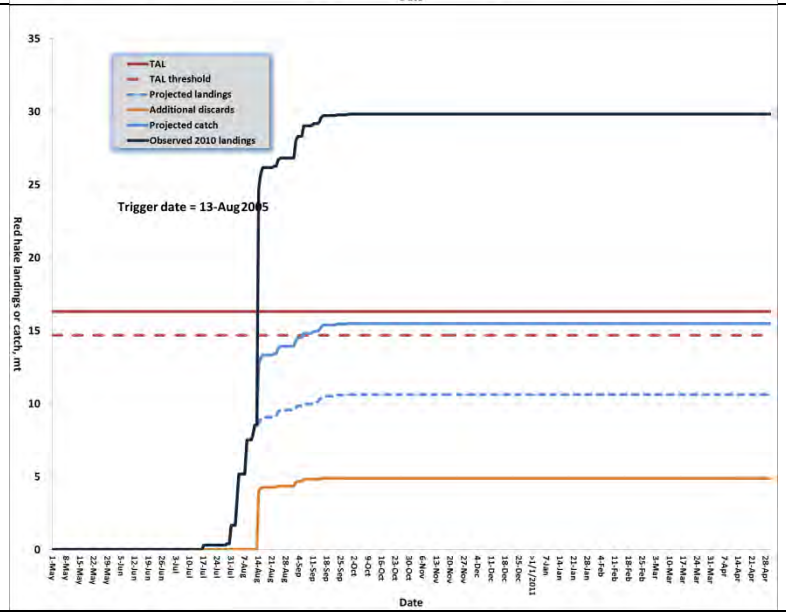
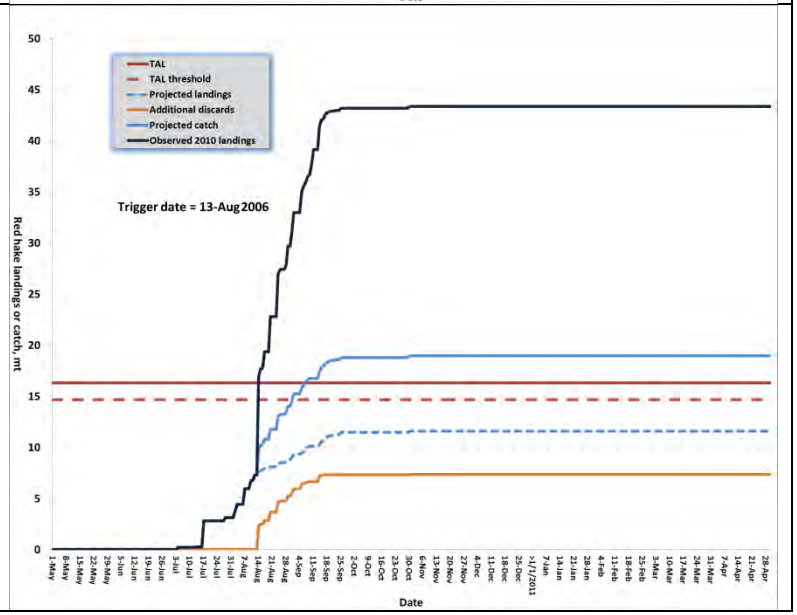
If the accountability measures had been in place during 2005 and 2006, red hake landings and catch would have been substantially reduced compared with actual results without an accountability measure, because most of the trips in the Cultivator Shoals Area were targeting hakes and some trips had a high proportion of red hake. Using the assumptions adopted by the PDT (see Document 1 of the Appendix), the effects on landings, catch and number of trips with curtailed landings is summarized in the table below.

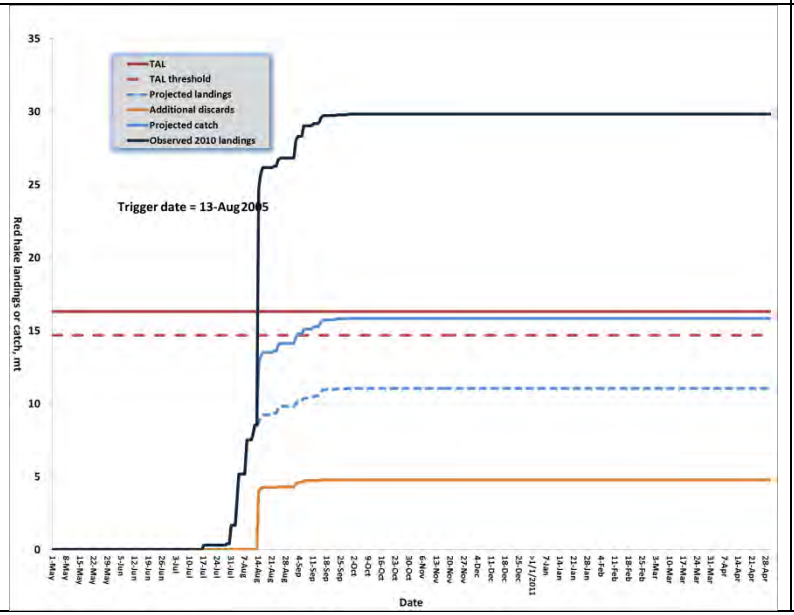
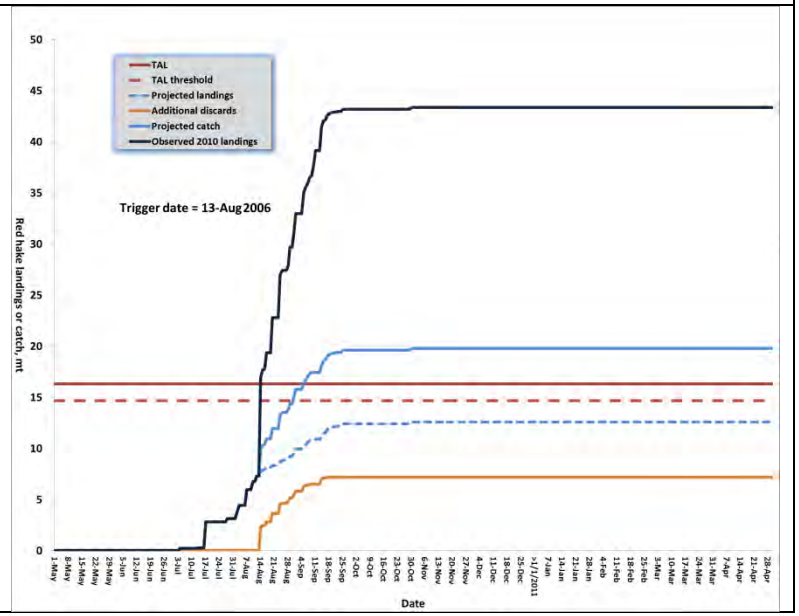
Landings are predicted to decline from 83.5 to 92.9% with catch declining by 59.7 to 68.2% (Table 52). Nine to fourteen trips (47.4-73.7%) would have been affected in 2005 and 24-34 trips (60.0-85.0%) in 2006. Discards however would increase by a considerable amount under any possession limit alternative, increasing to 1.44 to 3.50 times predicted landings. With any alternative, possibly excepting 400 lbs. in 2006, the PDT analysis suggests that any of the alternatives would keep landings below or near the target and substantially reduce catch (Figure 17).

Table 52. Predicted effects of various AM incidental possession limits for red hake caught in the Cultivator Shoals Area program based on historical trip data.

Fishing year	2005			2006		
Incidental possession limit	200	300	400	200	300	400
Predicted landings reduction	-92.9%	-90.1%	-88.1%	-90.6%	-86.6%	-83.5%
Predicted red hake revenue reduction	-92.9%	-90.1%	-88.1%	-90.6%	-86.6%	-83.5%
Predicted catch reduction	-68.2%	-66.0%	-64.0%	-65.9%	-63.0%	-59.7%
Discard to kept ratio	349.6%	243.9%	201.7%	262.8%	176.6%	143.9%
Proportion of trips affected	73.7%	52.6%	47.4%	85.0%	65.0%	60.0%
Trips affected	14	10	9	34	26	24

Figure 21. Cultivator Shoals Area program AM effectiveness at various possession limit alternatives.

AM possession limit	2005 fishing year	2006 fishing year
200 lbs.		
300 lbs.		

AM possession limit	2005 fishing year	2006 fishing year
400 lbs.		

Applying the same analysis to 2007 and 2010 trips, fishing years when landings also exceeded the proposed landings target, gives similar results as the analysis for the 2005 and 2006 fishing years. Landings would have been reduced by 41.8 to 81.1% and catches by 24.6 to 57.3%. Affected trips would have ranged from 6 to 31 trips. Fewer trips were affected in 2007 because fewer red hake landings from the Cultivator Shoals Area occurred after the trigger date. However the affected trips in 2010 were more frequently targeting hakes (both silver and red) and therefore the effect on red hake landings was predicted to be less.

In fishing years when landings exceeded the proposed target (2005-2007,2010), landings reached the 90% trigger between Aug 9 and Aug 16 (Figure 18). In 2005, 2007, and 2010, the 90% trigger is predicted to be sufficient to prevent catch (landings and additional discards) from exceeding the landings target. In 2006, however, landings exceeded the proposed target by a substantial amount, and to prevent the predicted catch from exceeding the target, the trigger would have to be scaled back to 27-37% of the target, reducing the incidental possession limit as early as Aug 2 to Aug 9, depending on the chosen possession limit.

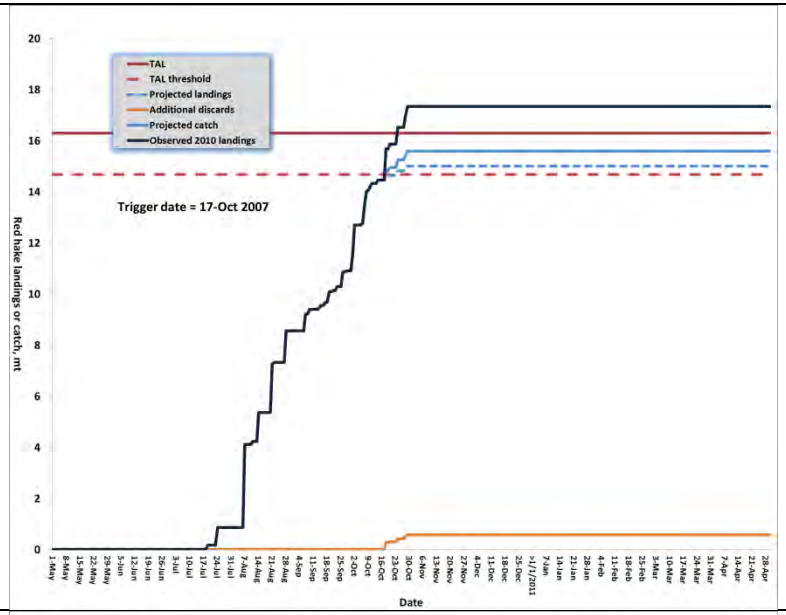
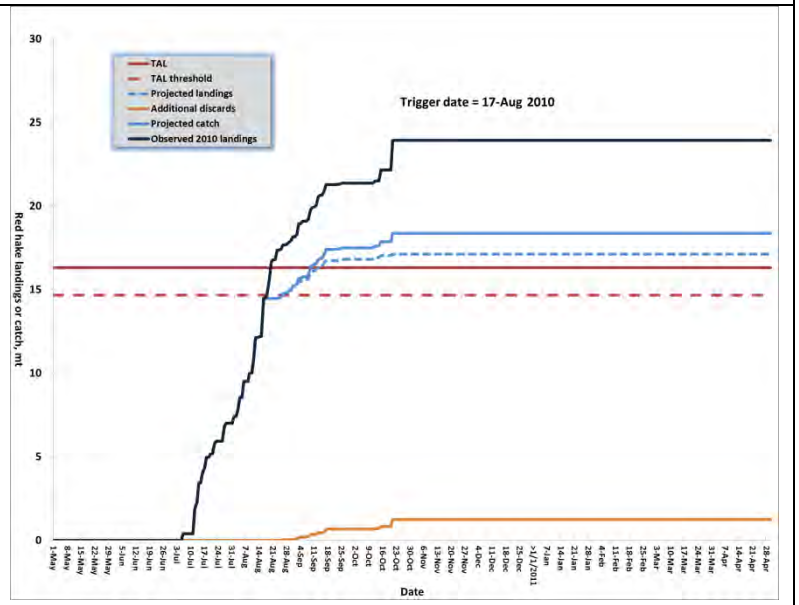
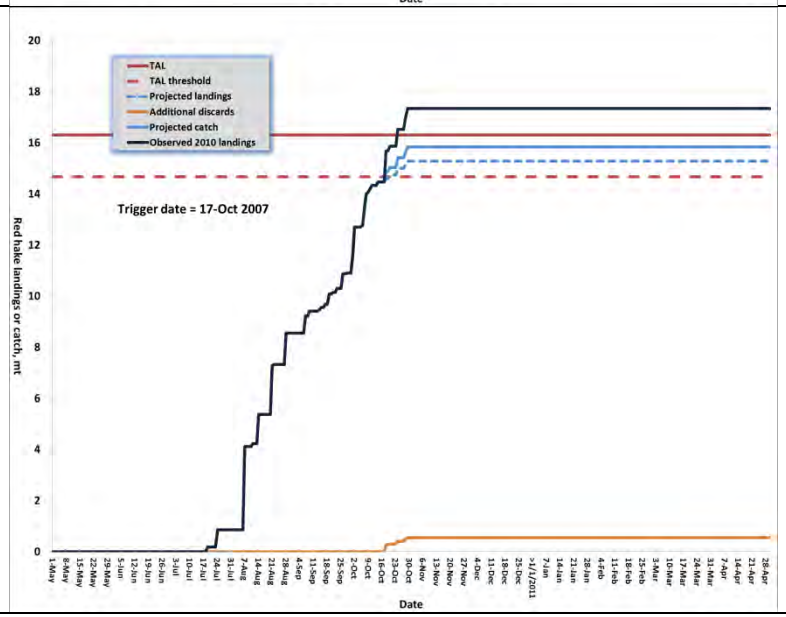
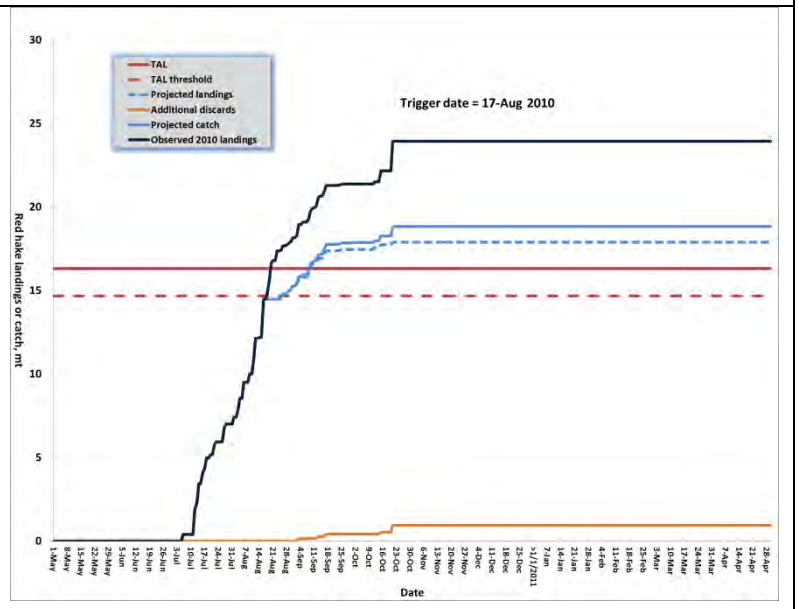
No transfers of sea of red hake were reported for trips fishing in the Cultivator Shoals Area between 2006 and 2010. Therefore no impact on the bait fishery by the incidental red hake possession limit is expected.

In summary, the proposed accountability measure alternatives for the Cultivator Shoals Area appear to be sufficient to keep landings and associated catch of red hake below or near the target. These results are dependent on changes in fishing behavior and are sensitive to assumptions about them. If fishermen are unable to avoid red hake while fishing for silver hake, or do not change fishing behavior, then landings might stay below the target, but catches would be not much different than they would be without the accountability measure.

Table 53. Predicted effects of various AM incidental possession limits for red hake caught in the Cultivator Shoals Area program based on historical trip data.

Fishing year	2007			2010		
Incidental possession limit	200	300	400	200	300	400
Predicted landings reduction	-81.1%	-71.7%	-62.2%	-60.7%	-48.2%	-41.8%
Predicted red hake revenue reduction	-81.1%	-71.7%	-62.2%	-60.6%	-48.2%	-41.7%
Predicted catch reduction	-57.3%	-46.7%	-38.4%	-35.4%	-28.6%	-24.6%
Discard to kept ratio	126.1%	88.2%	63.0%	64.5%	37.9%	29.5%
Proportion of trips affected	100.0%	100.0%	100.0%	59.6%	32.7%	21.2%
Trips affected	6	6	6	31	17	11

Figure 22. Cultivator Shoals Area program AM effectiveness at various possession limit alternatives.

AM possession limit	2007 fishing year	2010 fishing year
200 lbs.		
300 lbs.		

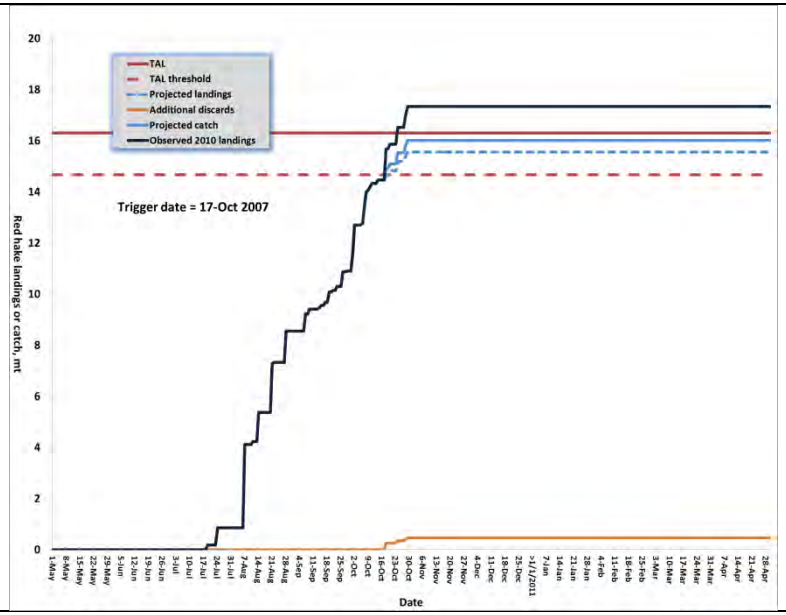
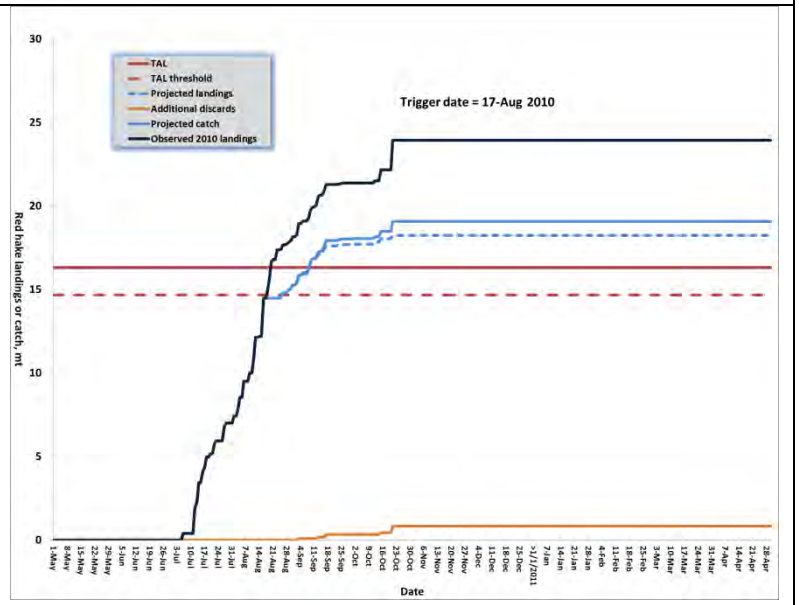
AM possession limit	2007 fishing year	2010 fishing year
400 lbs.		

Table 54. Trigger dates predicted to keep red hake catches below the Cultivator Shoals Area program landings target with various AM incidental limit alternatives.

Incidental possession limit	200 lbs.	300 lbs.	400 lbs.	90% trigger date
2005	90%	90%	90%	Aug 13
2006	37% Aug 9	36% Aug 6	27% Aug 2	Aug 13
2007	90%	90%	90%	Aug 9
2008		Landings did not reach the 90% AM trigger		
2009		Landings did not reach the 90% AM trigger		
2010	88% Aug 15	88% Aug 15	88% Aug 15	Aug 16

Inshore Small-mesh Area accountability measures (Section 5.4.3.1)

Since 2006, red hake landings including transfers at sea exceeded the proposed landings target only once, in 2009 (Figure 19; Table 51). Landings reached 67.7 mt and exceeded the 90% AM trigger on Aug 15.

Table 7 and Figure 8 summarize the predicted effectiveness of the proposed incidental possession limit alternatives to constrain landings and catch. Estimated landings decline by 59.5% with a 400 lbs. possession limit and by 77.5% with a 200 lbs. possession limit, affecting 32 to 43 trips which otherwise would have landed more than the proposed incidental possession limits. Assuming fishing behavior is consistent with the PDT's assumptions and fishermen are able to target other species and avoid catching red hake on some trips, additional discards are within acceptable limits, increasing to 59.7 to 115.4% of adjusted landings. Catches would therefore decline by 35.2% with a 400 lbs. possession limit, by 41.3% with a 300 lbs. possession limit and by 51.5% with a 200 lbs. possession limit.

For any of the proposed red hake incidental possession limit alternatives, the AM will keep landings and catch below the inshore small-mesh area program landings target, based on expected fishery performance using 2009 data when landings exceeded the proposed 51.3 mt landings target. If fishermen are targeting species like silver hake and are unable to change fishing behavior and avoid catching red hake, then the proposed AMs will be less effective at keeping catches within proposed limits.

Unlike the Cultivator Shoals Area Program potential effectiveness described above, more vessels in the inshore small-mesh areas target red hake with small-mesh, rather than silver hake. In those cases, fishermen would be less likely to take trips or will fish for other species. Thus the AMs for the inshore small-mesh areas are likely to be more effective than in areas where vessels target other species and land a minor amount of red hake.

The combined effect on red hake landings at dealers and those reported as transfers at sea for bait could not be analyzed because it is not possible to know whether these landings occurred on the same or on different trips, using the existing data. A separate analysis of the effect of the incidental red hake possession limits on transfers at sea is summarized in Table 56, for the 2009 fishing year, when landings exceeded the proposed TAL (Figure 19) and met the 90% TAL trigger on Aug 15. Table 56 summarizes the number of trips with reported transfers at sea that would be affected by each possession limit alternative and the expected reduction in transfers at sea, not taking into account the possibility that vessels could take more 'trips' to compensate or simply possess no more than the limit, by offloading catch to other vessels more frequently.

If triggered on Aug 15, a 200 lbs. possession limit would have affected 30 out of the 80 trips (37.5%) with reported transfers at sea in the small-mesh areas. Landings would decline by 21.4%. In contrast, a 400 lbs. possession limit would affect nearly the same number of trips (24) and reduce landings by almost the same amount (16.0%). Although there would be meaningful impacts on the bait fishery if an incidental limit became effective, the differences between the 200, 300, and 400 lbs. alternatives is small. Furthermore, vessels could mitigate the impacts by taking more 'trips', offloading catch to another vessel more frequently, or fishing for silver hake for bait, rather than red hake.

Figure 23. Daily cumulative red hake landings (including transfers at sea for bait) from the Small-mesh Area programs (Small-mesh Area I, Small-mesh Area II, Gulf of Maine Raised Footrope, MA Raised Footrope) compared to 2012-2014 landings target (red dashed line). Landings exceeded the target in, 2009.

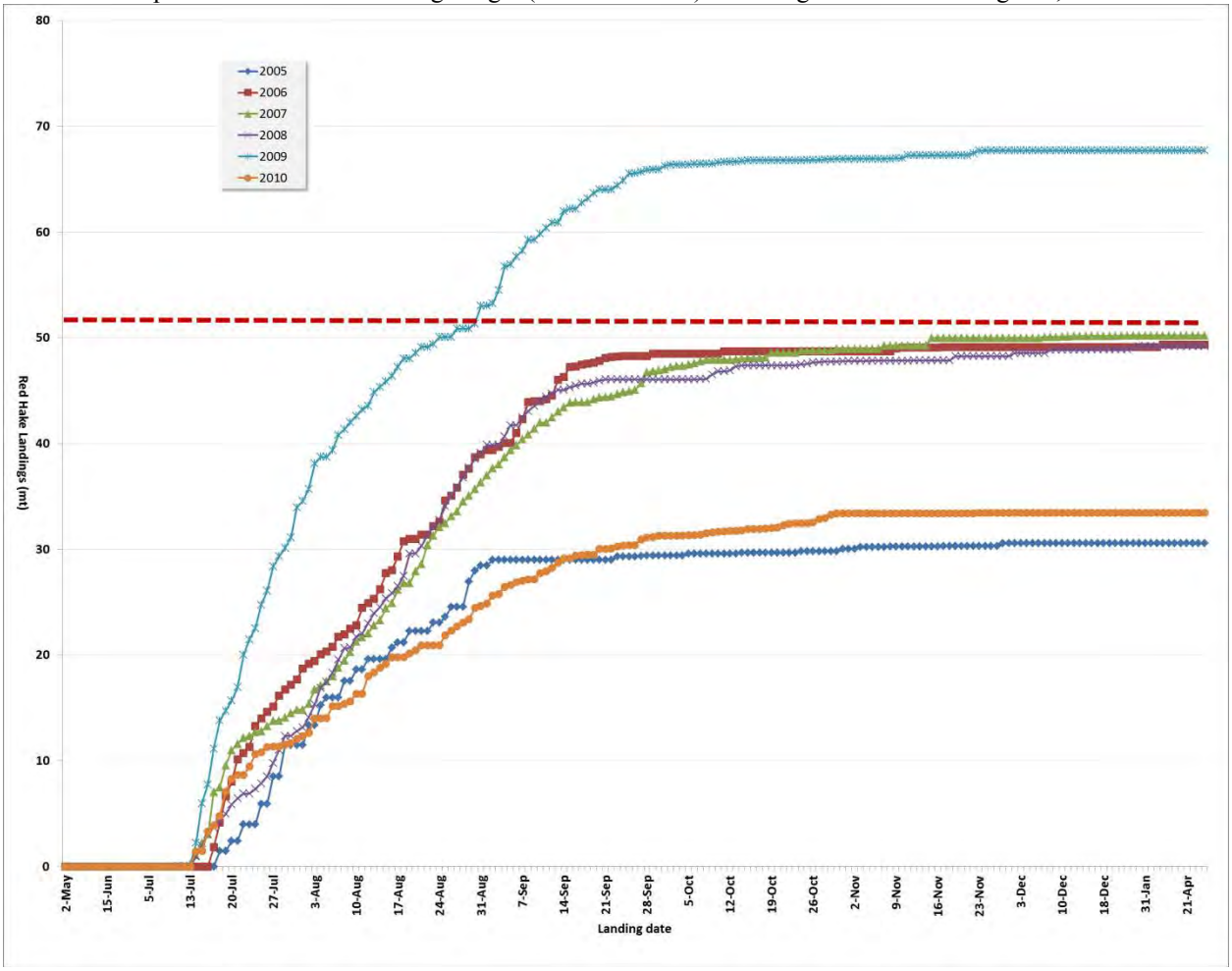
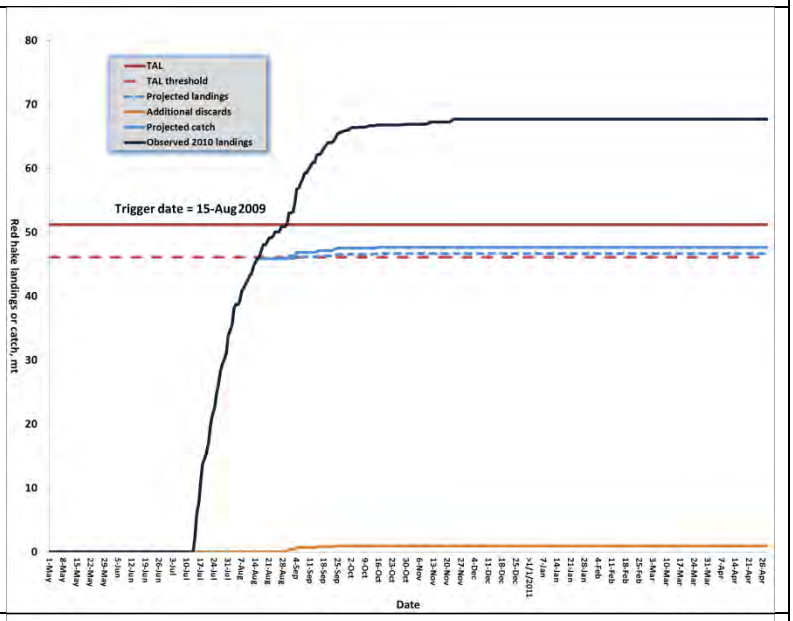
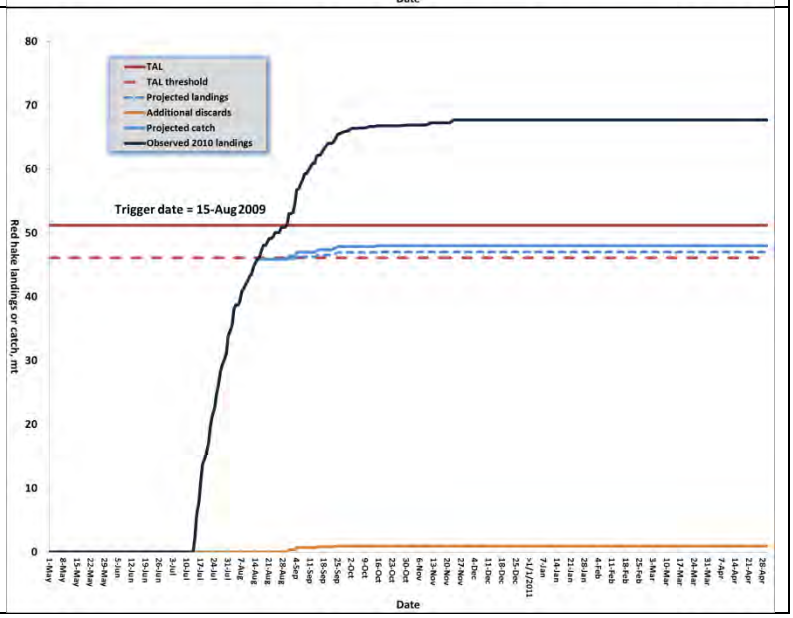


Table 55. Predicted effects of various AM incidental possession limits for red hake caught in the Small-mesh Area programs based on historical trip data**.**

Fishing year	2009		
Incidental possession limit	200	300	400
Predicted landings reduction	-77.5%	-67.9%	-59.5%
Predicted red hake revenue reduction	-77.5%	-68.0%	-59.5%
Predicted catch reduction	-51.5%	-41.3%	-35.2%
Discard to kept ratio	115.4%	83.1%	59.7%
Proportion of trips affected	78.2%	74.5%	58.2%
Trips affected	43	41	32

Figure 24. Small-mesh Area programs AM effectiveness at various possession limit alternatives.

AM possession limit	2009 fishing year
200 lbs.	
300 lbs.	

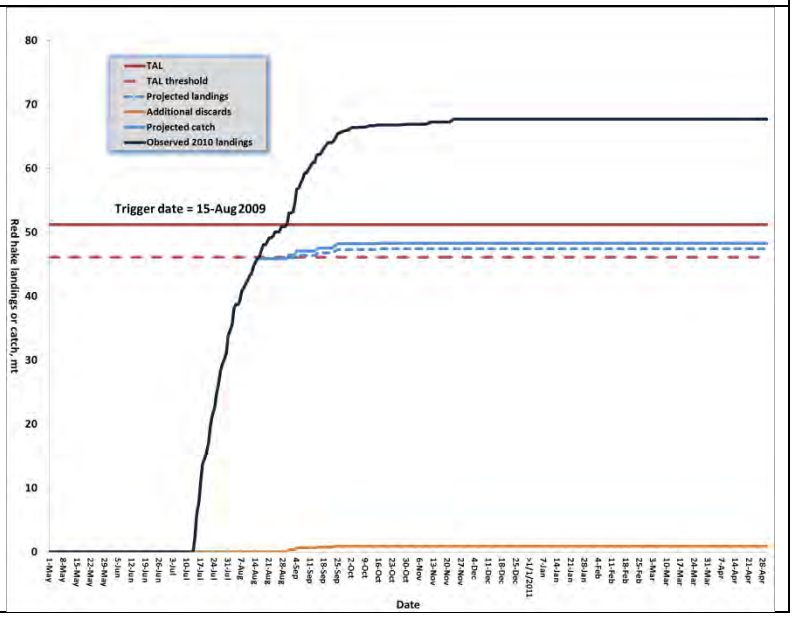
AM possession limit	2009 fishing year
400 lbs.	

Table 56. Effects of a triggered red hake incidental possession limit on inshore small-mesh area trips with reported transfers at sea for bait after the TAL trigger date.

Fishing year	2009	2009	2009
Incidental possession limit (lbs.)	200	300	400
Trips	80	80	80
Total landings (mt)			
Trigger date	15-Aug	15-Aug	15-Aug
Revised landings (mt)			
Reduction	-21.4%	-18.6%	-16.0%
Trips affected	30	29	24
Proportion	37.5%	36.3%	30.0%

8.1.6.2.2 Northern stock area (Section 5.4.1)

Annual and cumulative daily red hake landings for the northern stock area are summarized in Table 57 and Figure 21. Landings were below the proposed 90.3 mt TAL in every year since 2004, except for 2006 when 95 mt were landed. Landings would have exceeded the 90% TAL trigger on Sep 7, 2006.

If the incidental possession limits had been triggered in 2006 when landings exceeded the 90% TAL trigger, as proposed in this amendment's accountability measure alternatives (Section 5.4.1), it would have reduced landings by 78.6% with a 400 lbs. possession limit and by 88.4% with a 200 lbs. possession limit (Table 58). Additional discards would have been somewhat higher for the northern stock area than for the small-mesh area programs, because the affected trips include more that target other species, some using large mesh or other gears. Seventy-one trips after Sep 7 would have been affected with a 400 lbs. possession limit, 76 trips with a 300 lbs. possession limit, and 86 trips with a 200 lbs. possession limit.

Provided that fishermen change fishing behavior as assumed by the PDT[13] (see Document 3 in the Appendix), then additional discards would range from 1.1 to 2.1 times the predicted landings made after Sep 7. Therefore catches would decline by 54.8% with a 400 lbs. possession limit, by 58.9% with a 300 lbs. limit, and by 63.4% with a 200 lbs. possession limit. Under these assumptions, landings and catch would have stayed under the TAL (Figure 22), although more discarding would have occurred with a 200 lbs. possession limit, than either a 300 or 400 lbs. possession limit. If fishermen are unable to avoid catching or fishing for red hake as much as assumed, however, these incidental possession limit alternatives would be less effective of reducing catch to keep it below the TAL.

The combined effect on red hake landings at dealers and those reported as transfers at sea for bait could not be analyzed because it is not possible to know whether these landings occurred on the same or on different trips, using the existing data. A separate analysis of the effect of the incidental red hake possession limits on transfers at sea is summarized in Table 59, for the 2006 fishing year, when landings exceeded the proposed northern stock area TAL (Figure 21) and met the 90% TAL trigger on Sep 7. Table 59 summarizes the number of trips with reported transfers at sea that would be affected by each possession limit alternative and the expected reduction in transfers at sea, not taking into account the possibility that vessels could take more 'trips' to compensate or simply possess no more than the limit, by offloading catch to other vessels more frequently.

If triggered on Sep 7, a 200 lbs. possession limit would have affected 9 out of the 58 trips (15.5%) with reported transfers at sea in the small-mesh areas. Landings would decline by 5.5%. In contrast, a 400 lbs. possession limit would affect half of the trips (5) with reported bait sales after Sep 7 and reduce landings by about half (2.4%) of the reduction expected with a 2000 lbs. possession limit. Unlike what might occur in the small-mesh areas if a TAL trigger applied there, the TAL trigger for the northern stock area would be met later in the year, most likely after the demand for bait had abated. The effects of the stock wide TAL trigger and incidental limits is therefore expected to be low.

[13] The PDT assumed that fishermen would not change fishing behavior at all and would discard the excess when revenue from hakes was less than 75% of the trip total revenue. If hake revenue was greater than 75% and the red hake catch was less than twice the possession limit, then only 50% of trips would avoid catching excess red hake. If red hake landings were greater than twice the possession limit and hake revenue was greater than 75% of the trip total revenue, then 75% of the trips would avoid catching excess red hake and discard the surplus.

Table 57. Total landings of red hake reported by dealers and (post 2006) by fisherman as transfers at sea on VTRs. Source: NMFS SAFIS and VTR data tables.

Red hake, mt. live	STOCK	
YEAR	Northern Stock	Southern Stock
1994	716	1,021
1995	146	1,272
1996	380	912
1997	321	932
1998	168	1,259
1999	221	1,351
2000	169	1,582
2001	196	1,067
2002	240	649
2003	186	605
2004	71	548
2005	66	333
2006	95	377
2007	70	505
2008	52	638
2009	85	573
2010	68	370

Figure 25. Daily cumulative red hake landings (including transfers at sea for bait) northern stock area compared to 2012-2014 landings target (red dashed line). Landings exceeded the target only in 2009.

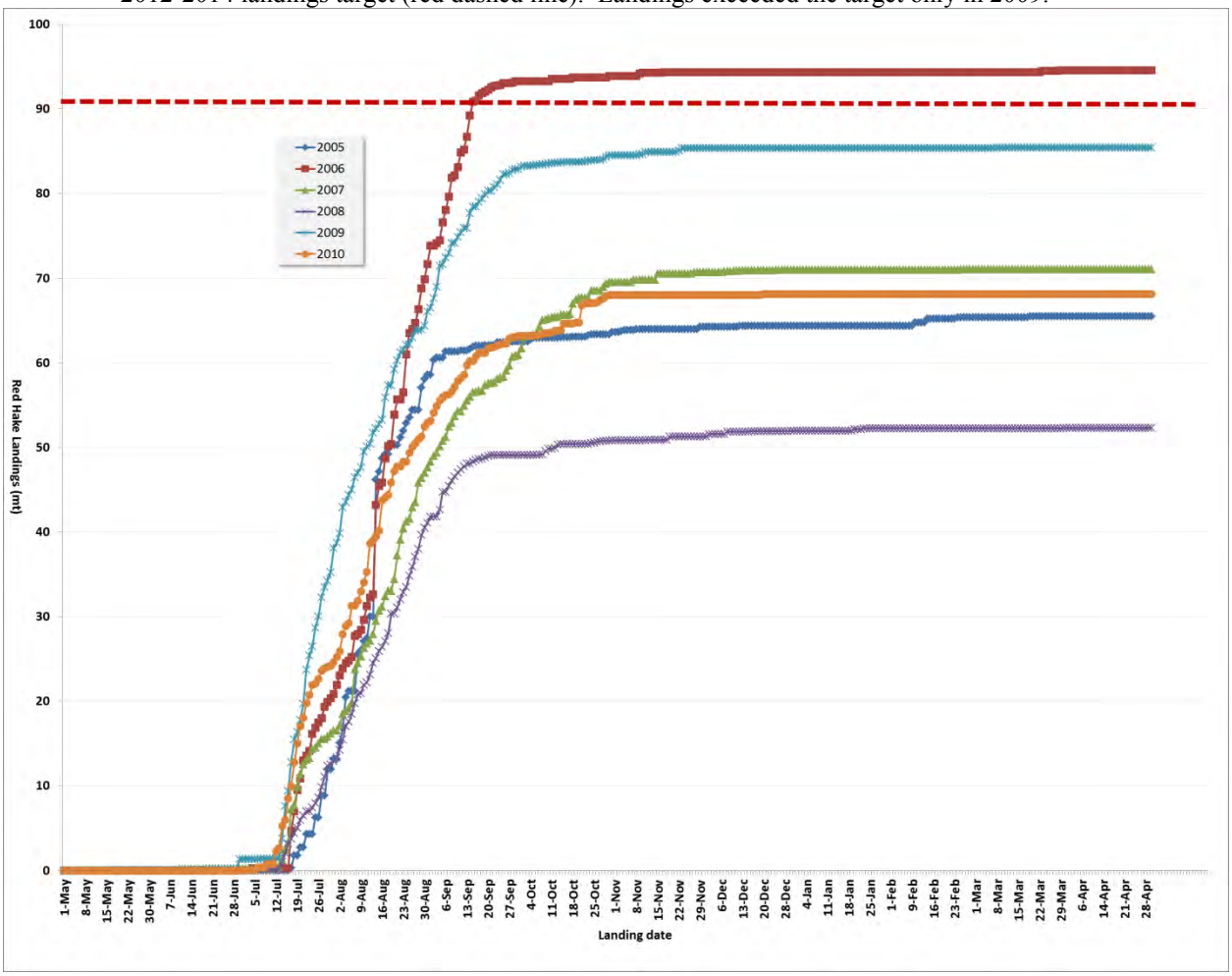
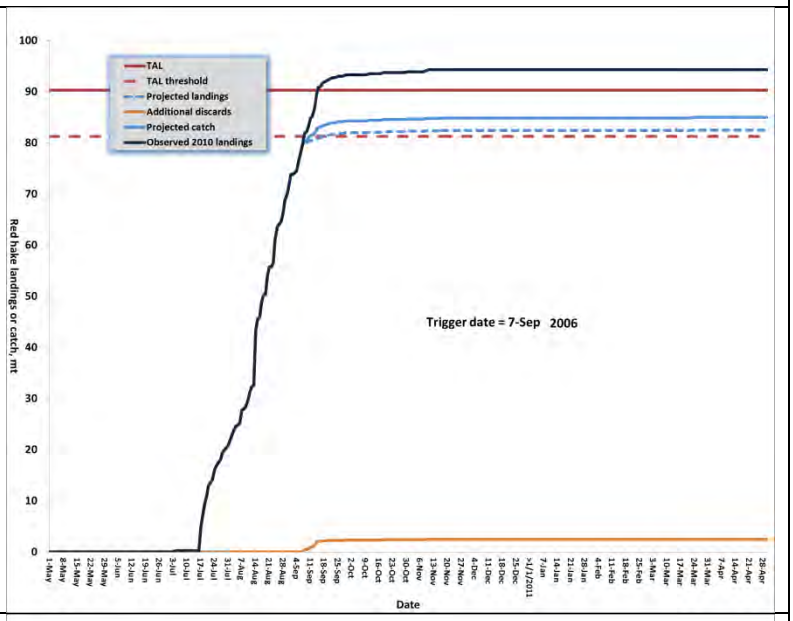
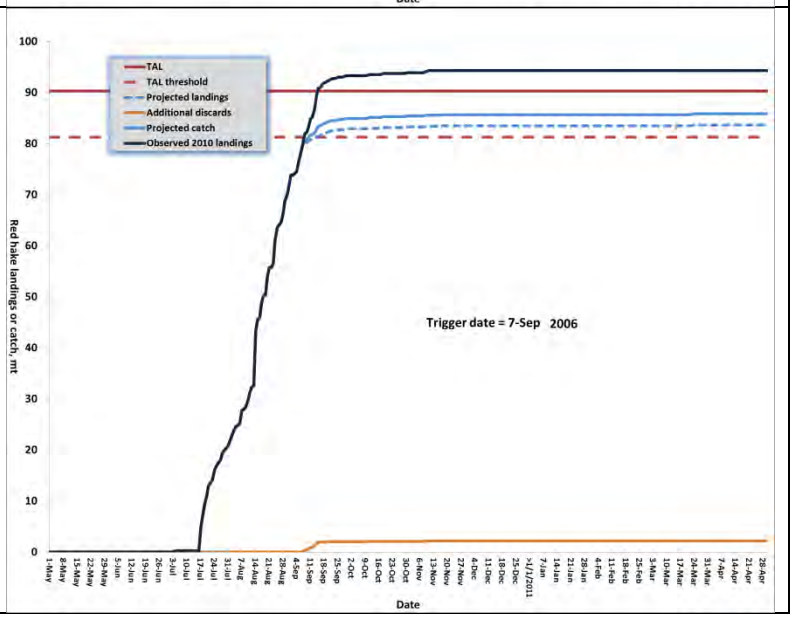


Table 58. Predicted effects of various AM incidental possession limits for red hake caught in the northern stock area based on historical trip data.

Fishing year	2006		
Incidental possession limit	200	300	400
Predicted landings reduction	-88.4%	-83.2%	-78.6%
Predicted red hake revenue reduction	-88.3%	-83.0%	-78.5%
Predicted catch reduction	-63.4%	-58.9%	-54.8%
Discard to kept ratio	214.0%	144.4%	111.9%
Proportion of trips affected	78.9%	69.7%	65.1%
Trips affected	86	76	71

Figure 26. Northern stock area AM effectiveness at various possession limit alternatives.

AM possession limit	2006 fishing year
200 lbs.	
300 lbs.	

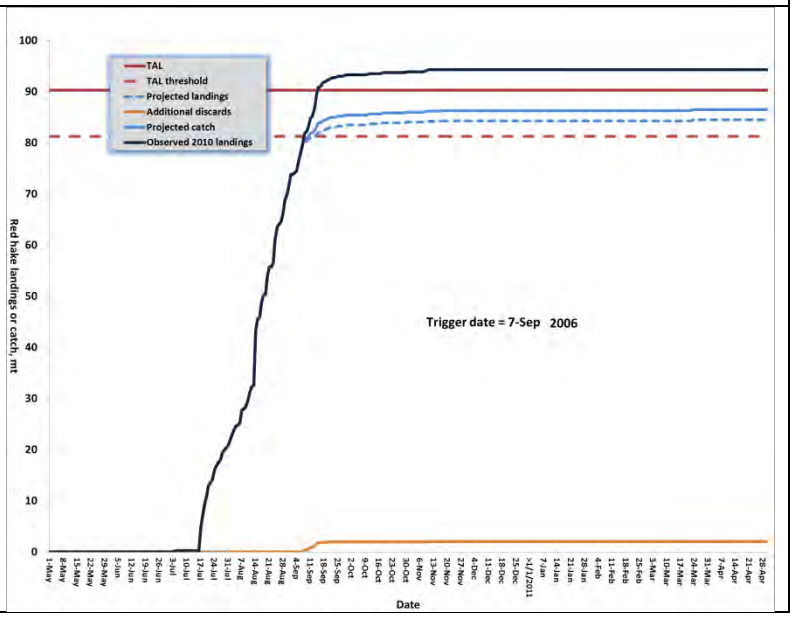
AM possession limit	2006 fishing year
400 lbs.	

Table 59. Effects of a triggered red hake incidental possession limit on northern stock area trips with reported transfers at sea for bait after the TAL trigger date.

Fishing year	2006	2006	2006
Incidental possession limit (lbs.)	200	300	400
Trips	58	58	58
Total landings (mt)			
Trigger date	7-Sep	7-Sep	7-Sep
Revised landings (mt)			
Reduction	-5.5%	-3.8%	-2.4%
Trips affected	9	7	5
Proportion	15.5%	12.1%	8.6%

8.1.6.2.3 Southern stock area (Section 4)

Red hake landings in the southern stock area have ranged from 370 mt in 2010 to 1,582 mt in 2000. Landings exceeded the proposed 1,336 mt TAL only in 1999 and 2000 (Table 57; Figure 23), well before many of the current groundfish management measures were implemented via Amendments 13 and 16. Under the current management regime, red hake landings have been well below the proposed TAL, so it is not possible to use existing data from relatively recent trips to evaluate the effectiveness of the incidental red hake possession limits as AMs. Landings would have to more than double for in-season AMs to become effective and for that to happen would require substantial increases in biomass, price, or both. If there were substantial increases in biomass, then it's probable that they would also trigger increases in ACL specifications.

In the unlikely event that in-season AMs were triggered in the southern stock area (see Section 4), then a 400 lbs. possession limit would be less likely to discourage fishing for red hake than a 200 lbs. limit, but would induce fewer discards. Table 60 summarizes the potential effects if the incidental limit were imposed year-around, including the number and proportion of trips with red hake landings higher than the possession limits.

Few reports of red hake (or silver hake) transfers at sea for bait occur in the southern stock area, and nearly all the landings are reported by dealers. The effects of potential incidental possession limits is therefore expected to be negligible.

8.1.6.3 No in-season accountability measures (Sections 5.4.4 and 5.6.3)

This alternative would result in no proactive, or in-season, AMs being implemented. This would have a potentially negative impact on the small-mesh multispecies stocks because it would not guarantee that catch and landings would stay within the limits recommended by the SSC and may result in a greater risk of overfishing than the preferred alternative.

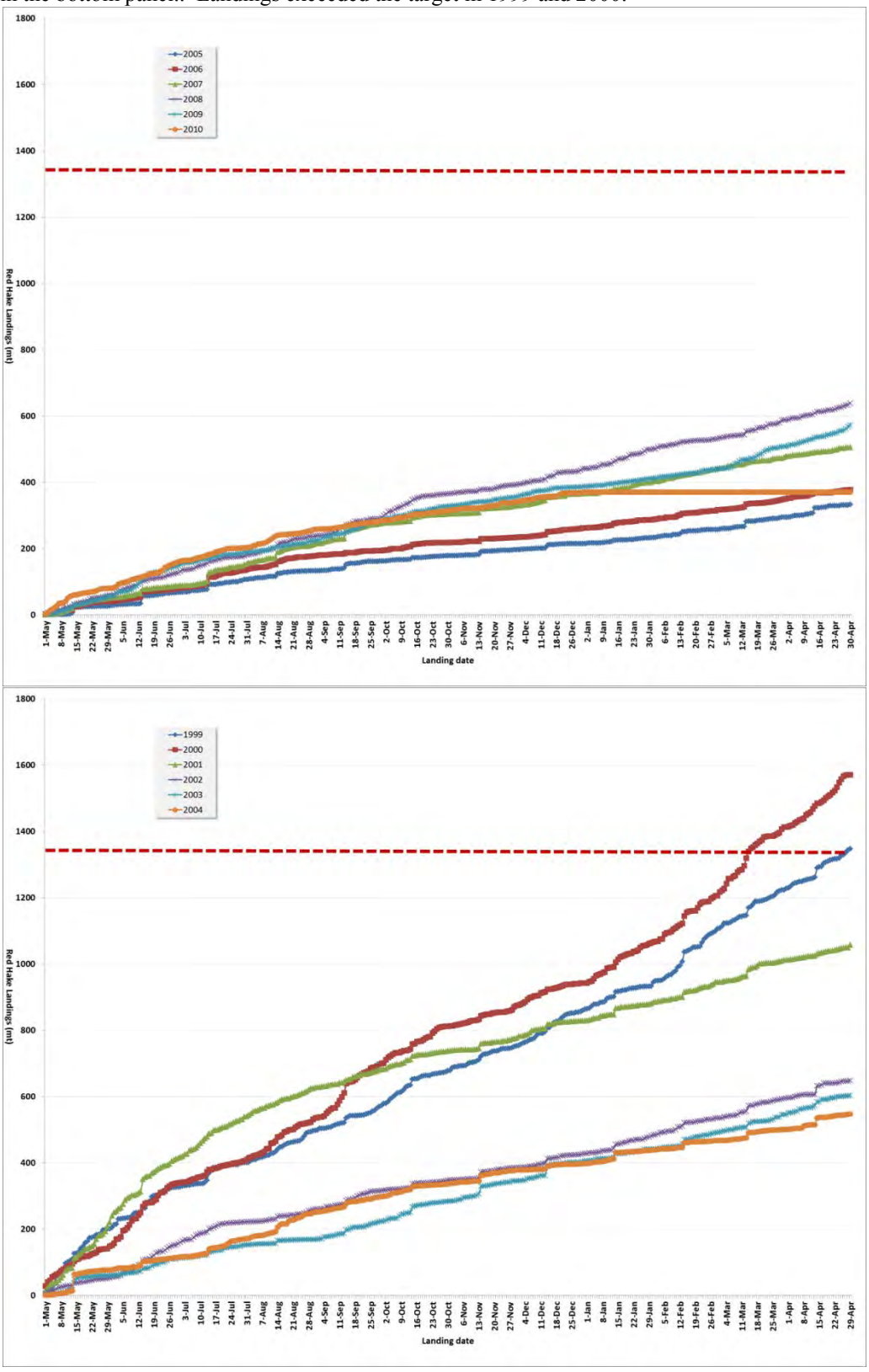
8.1.6.4 Status Quo/No Action (Sections 5.4.5 and 5.6.4)

Status quo/No Action would retain the incidental possession limits in the Secretarial Amendment, triggering reductions in allowed possession when landings reach 90% of the stock-wide annual TAL. The red hake incidental limit would be 400 lbs. and the silver hake incidental limit would be 1000 lbs. These incidental limits will have a positive effect on target species, because they would reduce the risk of overfishing. The 400 lbs. red hake incidental possession limit is the same as the Council's preferred alternative and would therefore have the same impacts. The 1000 lbs. silver hake incidental limit is half of the Council's preferred alternative and based on the analysis in this section would increase discarding by a substantial amount without appreciably reducing total catch.

Table 60. Predicted effects of various AM incidental possession limits for red hake caught in the southern stock area based on 2009 fishing year trip data (the last complete year available).

Fishing year	2009		
Incidental possession limit	200	300	400
Predicted landings reduction	-70.3%	-61.0%	-53.8%
Predicted red hake revenue reduction	-70.5%	-61.3%	-54.0%
Predicted catch reduction	-29.8%	-25.4%	-22.0%
Discard to kept ratio	136.1%	91.5%	68.8%
Proportion of trips affected	36.6%	28.7%	23.5%
Trips affected	1,280	1,006	824

Figure 27. Daily cumulative red hake landings (including transfers at sea for bait) southern stock area compared to 2012-2014 landings target (red dashed line). 2005-2010 data are plotted in the top panel, 1999-2004 data in the bottom panel.. Landings exceeded the target in 1999 and 2000.



8.1.7 Year round possession limits

The Whiting Oversight Committee and Industry Advisors also included in Draft Amendment 19 alternatives for red hake possession limits by mesh size, similar to existing limits for silver hake. These limits would help to prevent red hake from becoming a choke species for vessels targeting silver hake, promote fishing with larger more size selective mesh, while allowing for customary red hake landings on the majority of trips.

8.1.7.1 Red hake possession limits (Sections 5.7.1 and 5.7.2)

The intent of a high year round possession limit for red hake is to prevent fishermen from targeting large quantities of red hake when they anticipate that landings will exceed the 90% TAL trigger and the directed fishery would be closed by an incidental possession limit. This measure is very similar to the 20,000 lbs. skate bait possession limit which also prevents vessels from landing large quantities of skates, flooding the market, and triggering a premature closure of the fishery. But in addition, the Council wants to encourage fishermen to not use very small-mesh (i.e. < 2.5 inches) to target red hake because doing so would catch more small fish, decreasing yield per recruit.

The year round red hake possession limit is not meant to reduce landings and catch. Therefore the range of potential values is meant to accommodate most if not all fishing activity. By the same token, it would affect trips that are targeting red hake the most and therefore is most likely to affect fishing behavior, rather than simply create regulatory discarding. Trips targeting red hake will either return to port early if their catch reaches the possession limit, or fish elsewhere for other species. It is unlikely that fishermen will compensate by taking more frequent trips to target red hake, due to relatively low price.

A preliminary analysis of trip data (see Document 3 in the Appendix), indicated a potential range of red hake possession limits which varied by stock area, gear, and mesh size. Vessels using greater than 2.5 inch (but less than 5.5 inch large mesh) tended to land higher quantities.

There is no selectivity data to confirm that using larger mesh will improve size selectivity. And it is therefore not known to what extent this measure would help reduce mortality on small red hake. Many times selectivity depends on conditions, the behavior and response of the subject fish to the net, the tow duration, and what else is caught in the trawl net. But in general, size selectivity improves with larger mesh, particularly for gadiform fish, like red hake. Vessels that are using very small-mesh (i.e. < 2.5 inches) to target other species, e.g. northern shrimp and herring, are unlikely to switch to larger mesh. But by the same token, the measure would prevent these vessels from increasing effort on red hake if red hake prices increase in response to an impending incidental possession limit.

The Whiting PDT examined silver to red hake landings ratios on trips landing at least one pound of red hake, by mesh size and stock area. The intention was to use the data to provide some guidance applying these ratios to the silver hake possession limits to derive potential red hake possession limits. In the northern stock area, most of the trips used 2.5-4.5 inch mesh (mostly 3 inch mesh in the small-mesh exemption programs), or were trips without matching VTR serial numbers (hence no recorded mesh size). The PDT also examined these ratios by the percent of trip revenue from hake landings to determine whether this ratio was different on trips targeting other species.

The average silver hake to red hake landings ratio in the northern stock area was 6:1 to 11:1 on trips targeting hakes (>75% revenue) and 3:1 to 8:1 on mixed species trips (45-75% hake revenue). Trips

landing red hake in the northern area when using mesh < 2.5 inches or > 4.5 inches was sparser, but the silver to red hake landings ratio ranged from 6:1 to 9:1 (Figure 24). Thus with a 30,000 lbs. silver hake possession limit for large mesh, a reasonable red hake limit might range from 3,000 to 5,000 lbs. And with a 3,500 lbs. silver hake limit for vessels using less than 2.5 inch mesh, the landings ratio of 6:1 implies a 500 lbs. limit. Very few trips landed more than these amounts, however.

In the southern stock area (Figure 25), there are considerably more trips landing red hake with small (<2.5") and large (>4.5") mesh. For trips using 3" mesh and for trips without matching VTRs, the ratio of silver hake to red hake landings is about 3.5:1 to 4.5:1 for trips targeting hake, suggesting that with a 30,000 lbs. silver hake possession limit, an appropriate red hake possession limit might be about 6,500 to 9,000 lbs. But very few trips landed more than 7,500 lbs. For small-mesh (<2.5") trips, trips targeting hakes had an average silver hake to red hake landings ratio of 1.2:1 to 2.2:1. And with a 3,500 to 7,500 lbs. silver hake limit, these data suggest that a red hake limit around 3,000 lbs. might be appropriate.

Based on this analysis and more details in Document 3 (see Appendix), the Council chose an alternative with a possible range of possession limits. In the southern stock area, the alternative includes a range of 1,000 to 3,000 lbs. for vessels using 2.5 to 5 inch square or diamond cod end mesh, and 2,000 to 6,000 lbs. for all other gears and cod end meshes.

The impacts on trips landing red hake while using 2.5 to 4.5 inch mesh in the northern area, and on landings and catch, is summarized in Table 61 for the range of the proposed possession limit and for a mid-point. During 2006-2010, the 1,000 lbs. possession limit would have affected 126 trips (28.8%), reduced landings by 44.4%, reduced catch by 24.5% (if vessels react as assumed in the Document 3 analysis), increasing discards by 0.358 of the landings[14]. On the high end of the possession limit range, the measure would have affected 23 trips (5.3%), reduced landings by 15.0%, reduced catch by 6.1%, increasing discards by 0.053 of the landings. More recently in 2010, vessels landed less red hake and the proposed possession limits would have had less effect. At 1,000 lbs., the possession limit would have reduced landings by 24.6%, reduced catch by 7.9%, and increased discards by 0.222 of landings. At 3,000 lbs., only two trips would have been affected by the proposed limit, reducing landings by 1.2%, but the important point (and the intent of this measure) is to prevent INCREASES in fishing effort targeting red hake in anticipation of a directed fishery closure at the 90% TAL trigger.

The expected effects for vessels using other gears and meshes in the northern stock area is summarized in Table 62, with possession limits ranging from 300 to 1,200 lbs. and a mid-point of 750 lbs. During 2006-2010, the 300 lbs. possession limit would have affected only 22 trips, reducing landings for this group by 26.4%, reducing catch by 6.8% and increasing discards to 0.265 of landings. Higher possession limits and all possession limits in 2010 would have affected very few trips, but could prevent increases in fishing effort targeting red hake.

In the southern stock area, the alternative includes a range of 4,000 to 10,000 lbs. for vessels using 2.5 to 5 inch square or diamond cod end mesh, and 2,000 to 6,000 lbs. for all other gears and cod end meshes. Table 63 summarizes the expected impacts on vessels using 2.5 to 4.5 inch mesh trawls based on reported landings during 2006-2010 and for the most recent fishing year (2010). Like the results for the northern stock area, the more restrictive possession limits have greater impacts, reducing landings and catch, while increasing discards. Even at 10,000 lbs., the proposed possession limit would have affected 24 trips (0.3%), reducing landings by 10.0%, reducing catch by 6.0%, and increasing discards to 0.045 of landings. In 2010, a 4,000 lbs. possession limit would have affected only 6 trips and 1.0 percent of landings. Higher limits would affect no trips, but still may be effective in preventing vessels from

[14] In other words, the additional discards caused by the possession limit would be 35.8% of revised landings.

targeting and catching large quantities of red hake in anticipation of landings triggering an incidental possession limit as an accountability measure.

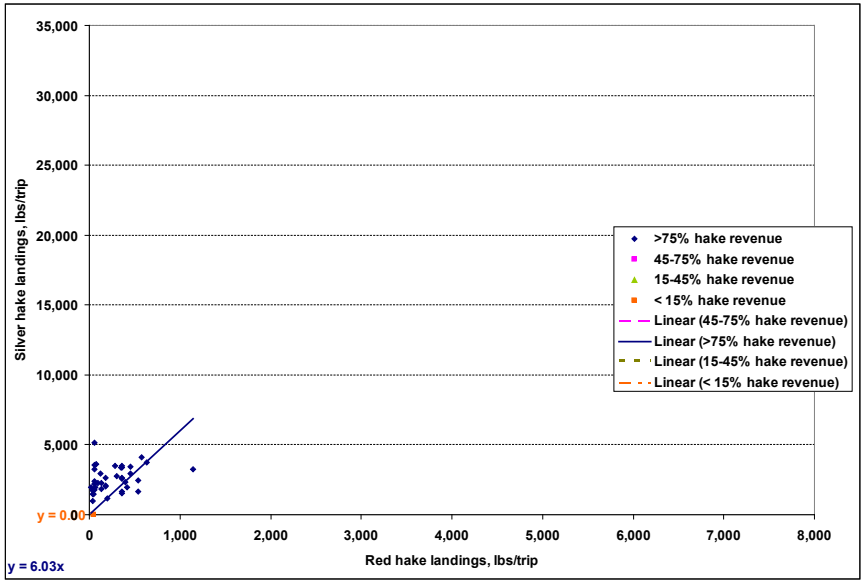
The expected impact of the proposed possession limits for all other gears and meshes is summarized in Table 64. Limits at 4,000 lbs. and above would have had very little impact, but again may be effective at preventing increases in fishing effort targeting red hake. Over 2006-2010, a 2,000 lbs. possession limit would have affected 109 trips, reducing landings by 17.3% and catch by 9.5%. It would have affected nearly the same amount of trip in 2010, but fewer really high landings occurred then and the measure would have reduced landings by 8.6% and catch by 1.8%.

Conclusion

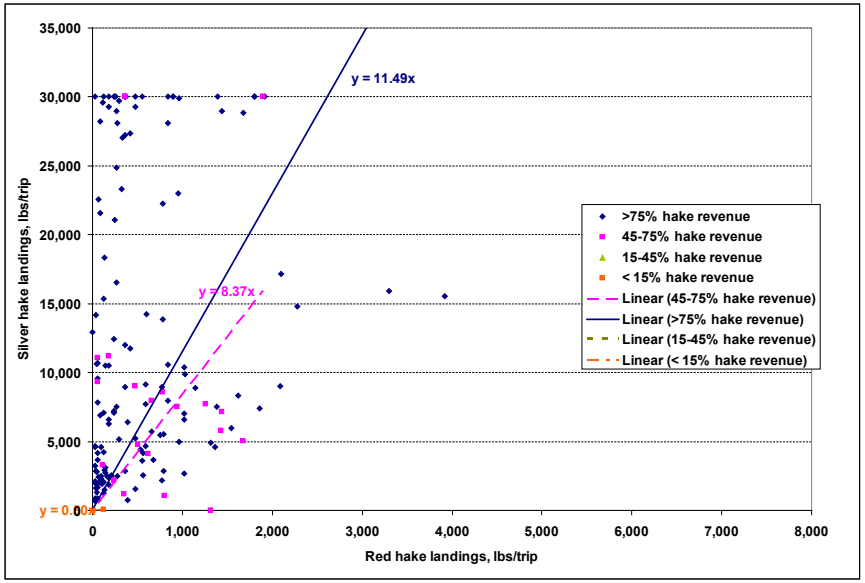
Except for the low end of the range, the proposed possession limits will have a marginal effect on fishing effort for red hakes, but could be very effective in preventing increases in fishing effort targeting red hake in anticipation of a directed fishery closure at the 90% TAL trigger. Allowing for higher limits for vessels using greater than 2.5 inch cod end mesh could improve selectivity based on general results for similar species, but the measure would be more effective in preventing vessels using mesh less than 2.5 inches from targeting red hake with that gear if red hake prices rise in anticipation of a directed fishery closure from the incidental possession limit. Therefore if like has been shown by related research on other groundfish stocks, size selectivity is poorer with trawls using very small mesh (i.e. < 2.5 inches), then the biological impact on the target species (red hake in this case) will be positive if the measure reduces or caps fishing effort on vessels using this gear.

Figure 28. Silver hake to red hake landings ratio by mesh in the northern stock area, 2008-2010. Each point represents landings on a specific day by a specific vessel using bottom trawls, summed over all dealers reporting landings. Source: NMFS SAFIS data.

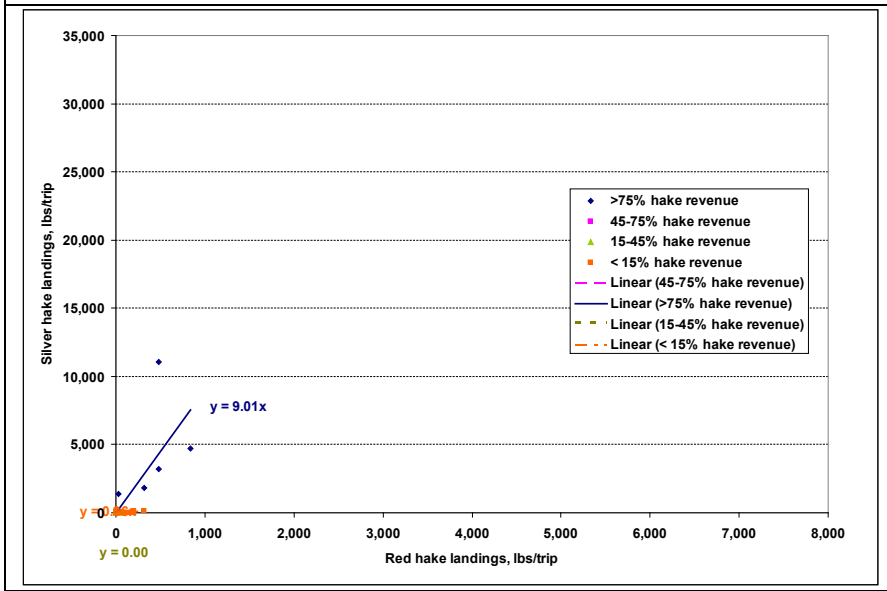
< 2.5" mesh



2.5-4.5" mesh



> 4.5" mesh



Unrecorded mesh

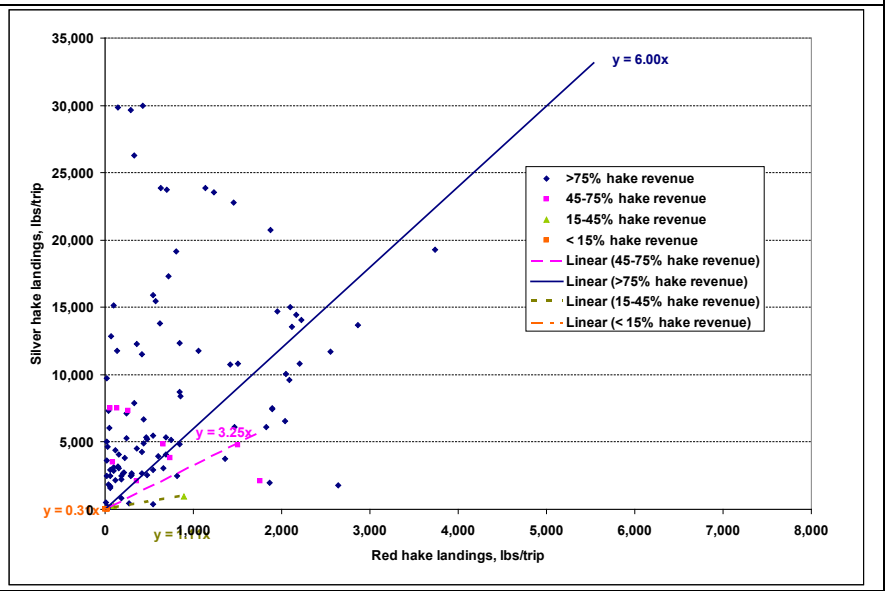
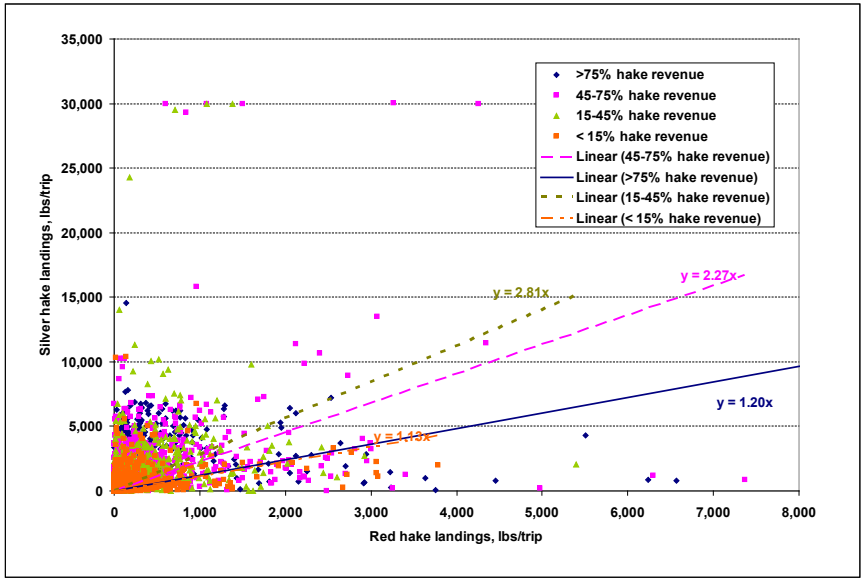
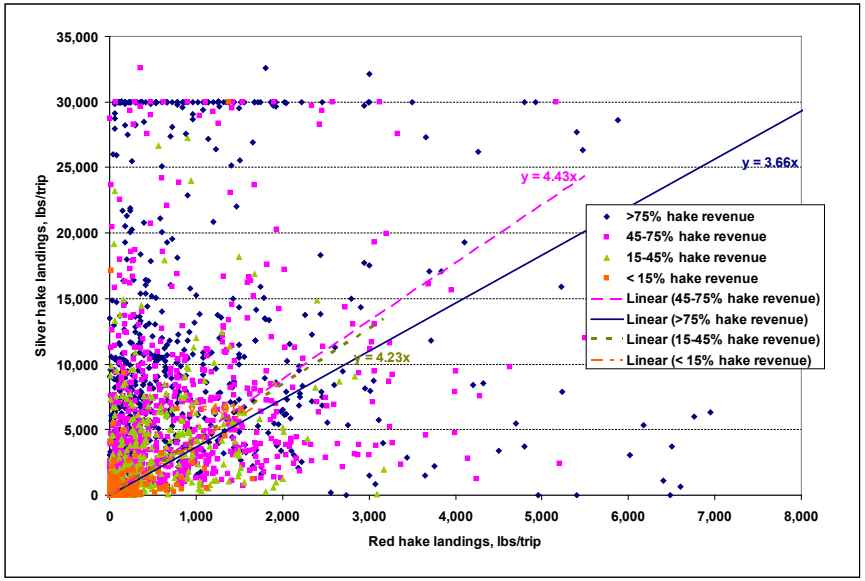


Figure 29. Silver hake to red hake landings ratio by mesh in the southern stock area, 2008-2010. Each point represents landings on a specific day by a specific vessel using bottom trawls, summed over all dealers reporting landings. Source: NMFS SAFIS data.

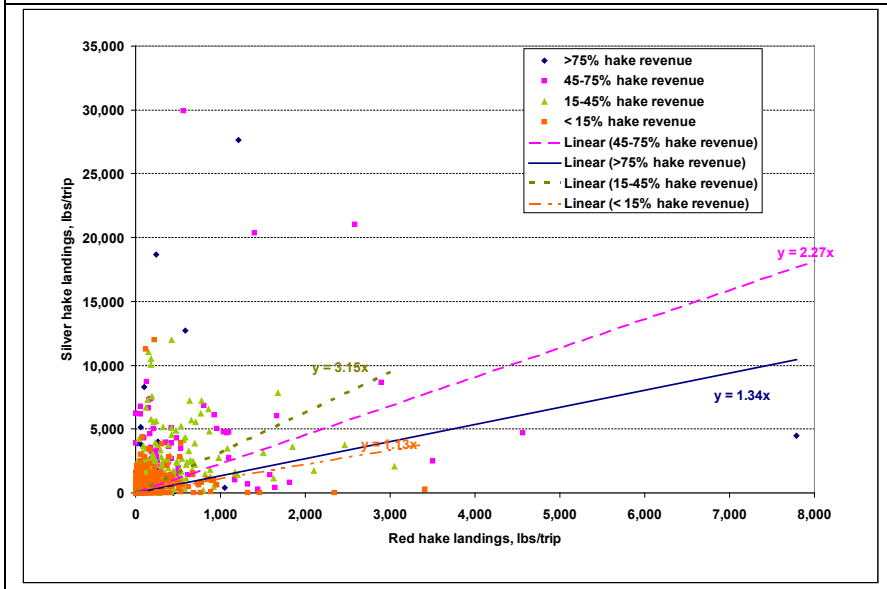
< 2.5" mesh



2.5-4.5" mesh



> 4.5" mesh



Unrecorded mesh

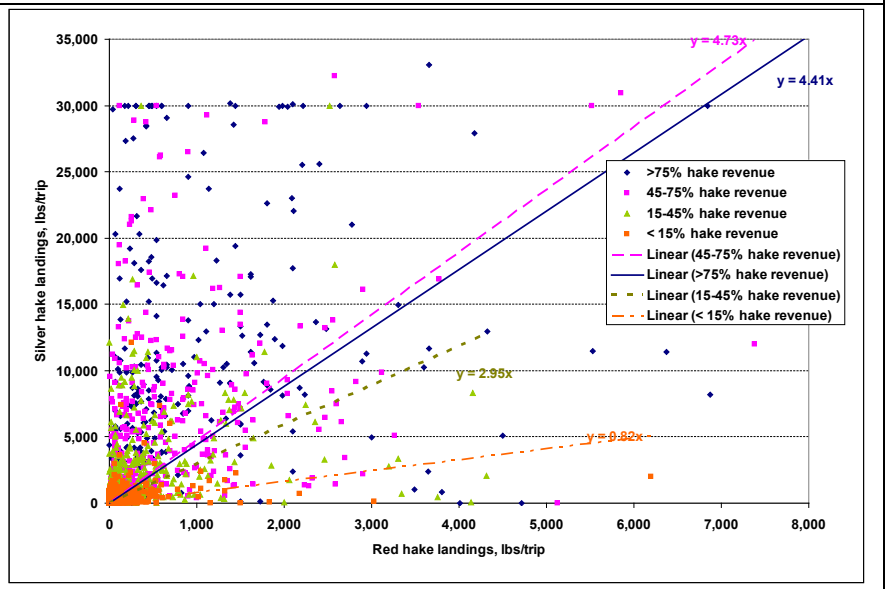


Table 61. Estimated effectiveness of year round red hake possession limits on trips in the northern stock area using trawls having 2.5 to 4.5 inch mesh during 2006-2010 fishing years (top) and during the 2010 fishing year (bottom).

Fishing year	2006-2010		
Incidental possession limit	1,000	2,000	3,000
Predicted landings reduction	-44.4%	-23.6%	-15.0%
Predicted red hake revenue reduction	-44.3%	-23.5%	-15.0%
Predicted catch reduction	-24.5%	-10.0%	-6.1%
Discard to kept ratio	35.8%	17.7%	10.5%
Proportion of trips affected	28.8%	12.1%	5.3%
Trips affected	126	53	23

Fishing year	2010		
Incidental possession limit	1,000	2,000	3,000
Predicted landings reduction	-24.6%	-4.7%	-1.2%
Predicted red hake revenue reduction	-24.9%	-4.7%	-1.2%
Predicted catch reduction	-7.9%	2.1%	0.9%
Discard to kept ratio	22.2%	7.1%	2.1%
Proportion of trips affected	18.6%	4.9%	1.1%
Trips affected	34	9	2

Table 62. Estimated effectiveness of year round red hake possession limits on trips in the northern stock area using trawls having less than 2.5 inch mesh or greater than 4.5 inch mesh during 2006-2010 fishing years.

Fishing year	2006-2010		
Incidental possession limit	300	750	1,200
Predicted landings reduction	-26.4%	-3.1%	0.0%
Predicted red hake revenue reduction	-25.5%	-2.9%	0.0%
Predicted catch reduction	-6.8%	0.9%	0.0%
Discard to kept ratio	26.5%	4.0%	0.0%
Proportion of trips affected	19.3%	1.8%	0.0%
Trips affected	22	2	0

Fishing year	2010		
Incidental possession limit	300	750	1,200
Predicted landings reduction	-2.6%	0.0%	0.0%
Predicted red hake revenue reduction	-2.1%	0.0%	0.0%
Predicted catch reduction	2.9%	0.0%	0.0%
Discard to kept ratio	5.6%	0.0%	0.0%
Proportion of trips affected	4.0%	0.0%	0.0%
Trips affected	1	0	0

Table 63. Estimated effectiveness of year round red hake possession limits on trips in the southern stock area using trawls having 2.5 to 4.5 inch mesh during 2006-2010 fishing years (top) and during the 2010 fishing year (bottom).

Fishing year	2006-2010		
Incidental possession limit	4,000	7,000	10,000
Predicted landings reduction	-17.3%	-12.4%	-10.0%
Predicted red hake revenue reduction	-18.0%	-13.0%	-10.5%
Predicted catch reduction	-9.5%	-7.4%	-6.0%
Discard to kept ratio	9.4%	5.7%	4.5%
Proportion of trips affected	1.5%	0.5%	0.3%
Trips affected	109	38	24

Fishing year	2010		
Incidental possession limit	4,000	7,000	10,000
Predicted landings reduction	-1.0%	0.0%	0.0%
Predicted red hake revenue reduction	-1.0%	0.0%	0.0%
Predicted catch reduction	0.5%	0.0%	0.0%
Discard to kept ratio	1.5%	0.0%	0.0%
Proportion of trips affected	0.4%	0.0%	0.0%
Trips affected	6	0	0

Table 64. Estimated effectiveness of year round red hake possession limits on trips in the southern stock area using trawls having less than 2.5 inch mesh or greater than 4.5 inch mesh during 2006-2010 fishing years.

Fishing year	2006-2010		
Incidental possession limit	2,000	4,000	6,000
Predicted landings reduction	-17.3%	-2.2%	-0.6%
Predicted red hake revenue reduction	-18.0%	-2.2%	-0.6%
Predicted catch reduction	-9.5%	0.0%	0.4%
Discard to kept ratio	9.4%	2.2%	1.0%
Proportion of trips affected	1.5%	0.3%	0.1%
Trips affected	109	19	7

Fishing year	2010		
Incidental possession limit	2,000	4,000	6,000
Predicted landings reduction	-8.6%	-4.7%	-1.2%
Predicted red hake revenue reduction	-8.6%	-4.5%	-1.1%
Predicted catch reduction	-1.8%	-0.4%	1.5%
Discard to kept ratio	7.5%	4.4%	2.7%
Proportion of trips affected	1.4%	0.6%	0.4%
Trips affected	101	7	4

8.1.7.2 Status quo/No Action (Section 5.7.3)

No Action would mean that trips in either the northern stock area, the southern stock area, or both have no red hake possession limit while landings are below the 90% TAL trigger. Thus, to the extent it occurs, no possession limit would allow vessels to target and catch more red hake if it appears that the incidental possession limit will take effect and it will not discourage vessels from using extra small-mesh (< 2.5 inches) to target red hake if there is an advantage to doing so. Thus if there is any improvement in selectivity by using mesh greater than 2.5 inches, it would not be realized under the No Action alternative.

The direct impact on red hake would therefore be negative if effort increases with extra small-mesh and the small-mesh trawls allow less escapement of small red hake.

8.1.8 Southern whiting possession limit

Two alternatives are proposed in Section 5.7.4 to increase the 30,000 lbs. whiting possession limit for vessels using trawls with 3 inch or greater mesh. To counter the effect of rising fuel costs for offshore trips targeting whiting and achieve optimum yield, the alternatives in Section 5.7.4 would increase the possession limit from 30,000 lbs. up to 40,000 lbs. in all of the Mid-Atlantic and Southern New England Exemption Areas (see Map 5), or in the Southern New England Exemption Area east of a line of longitude between 67°40' W to 72°30' W longitude.

8.1.8.1 Increasing the southern whiting possession limit from 30,000 up to 40,000 lbs. (Section 5.7.4.1) and Increasing the southern whiting possession limit to 40,000 lbs. in the eastern part of the Southern New England Exemption Area (Section 5.7.4.2)

There are no negative biological impacts, because the analysis suggests that the higher landings and catches resulting from increasing the possession limit as high as 40,000 lbs. are highly unlikely to exceed the TAL (Sections 5.3 and 5.5) or the ACL (Section 4.2), as long as the increase does not cause substantial effort shifts from other fisheries. And even if it does attract effort, the in-season accountability measures (Sections 5.4 and 5.6) and post-season accountability measures (Section 5.8) would prevent overfishing. And limiting the increase to vessels using trawls with 3-inch or larger mesh will maintain, if not improve size selectivity and yield per recruit.

The analysis indicates that if the number of whiting trips remains at present levels, increasing the whiting possession limit from 30,000 to 40,000 lbs. would increase landings by a maximum of 466 mt, or by about 10%. This increase is well under the difference between the 27,255 mt TAL and annual landings that have been under 10,000 mt since 2000. Whiting discards are unlikely to change due to the higher possession limit because when retained catch reaches these amounts; nearly all vessels in the directed whiting fishery stop fishing. Increasing the possession limit may, on the other hand, keep vessels that target whiting on eastern Georges Bank from shifting effort to the west, closer to port.

Although red hake and southern whiting are sometimes caught together on the same trip, this happens less frequently in the southern stock area as it does in the northern stock area. Southern whiting are targeted more frequently alone, unlike a mixed small mesh multispecies fishery in the northern stock area. However, there may be some associated increase in red hake catch and landings in the southern stock area due to a higher southern whiting possession limit. This is not expected to have any substantial effect on the biology or management of red hake because of the large buffer between recent landings and the proposed red hake TAL and recent catch and the proposed red hake ACL.

8.1.8.2 Status quo/No Action (Section 5.7.4.3)

No Action is also unlikely to have more than a marginal biological impact, although in the face of higher fuel and operating costs, it may be less likely for the fishery to achieve optimum yield (see the economic analysis in Section 8.7.8). Indirectly, the existing 30,000 lbs. possession limit is more likely to keep landings and catch near current levels, which may have an indirect effect on prey availability for other species that feed on silver hake. See the discussion of ABC considerations in Section 8.1.

8.1.9 Post-Season Accountability Measure Alternatives

8.1.9.1 Pound-for-Pound Payback of an ACL Overage (No Action; Section 5.8.1)

As analyzed in the Secretarial Amendment, a reactive, pound-for-pound AM adjustment could have a positive impact on the small-mesh multispecies stocks because it would ensure that catch over the long-term does not exceed an acceptable level. This type of AM may also provide positive impact for a stock as an incentive for participants to fish within the given landings limit. By having a measure that could potentially reduce landings in a following year, fishery participants may be more likely to fish within the landing limits to ensure long-term access to a particular resource and assist in long-term business planning.

This is the No Action alternative, expected to be approved in the Secretarial Amendment.
By definition, this alternative does not have a positive or negative impact on target species.

8.1.9.2 Reduce incidental possession limit trigger (Section 5.8.2)

A reactive AM could have a positive impact on the small-mesh multispecies stocks because it would ensure that catch over the long-term does not exceed an acceptable level. This type of AM may also provide positive impact for a stock as an incentive for participants to fish within the given landings limit. By having a measure that could potentially make in-season AMs more restrictive, fishery participants may be more likely to fish within the landing limits to ensure long-term access to a particular resource and assist in long-term business planning.

A more detailed analysis of how this alternative accountability measure would work in the event of an ACL overage compared to No Action is given in Section 8.7.8.

8.2 Biological Impacts to Non-Target Species

As discussed in Section 4.2, the following species are likely impacted by the small-mesh multispecies fishery:

Table 65. Other species that may be impacted by the small-mesh multispecies fishery.

Northeast Skate Complex
Spiny Dogfish
Summer Flounder
Windowpane Flounder
Yellowtail Flounder
American Plaice
Witch Flounder
Scup
Black Sea Bass
Monkfish
Atlantic Cod
Haddock
Red Crab
Atlantic Sea Scallop
Loligo squid
Illex squid
Butterfish
Mackerel
Redfish

8.2.1 Northern and Southern Stock Area TAL and TAL Monitoring Alternatives

All of the species likely to be impacted by the small-mesh multispecies fishery (Table 65) are currently managed by either the New England or Mid-Atlantic Fishery Management Council under ACL frameworks that would sufficiently limit the amount of redirected effort. Therefore, even though limiting catch on the small-mesh multispecies could result in a redirection of effort on to other species, the impact on non-target species, and their level of catch, are being managed by ABCs, ACLs, and AMs as well; thus, there would be neutral impacts on the non-target stocks from the small-mesh multispecies fishery implementing either of the TAL alternatives described above.

8.2.2 In-Season Accountability Measure Alternatives

8.2.2.1 Incidental Possession Limit Trigger (Section 5.4 and 5.6)

This alternative would reduce possession to an incidental limit when a trigger level is projected to be reached. Under this alternative, the incidental possession limit would remain in effect, even if the TAL is projected to be exceeded. This is intended to work in conjunction with the post-season accountability measure which would be invoked if the overage of the TAL causes the catch for that year to exceed the ACL. Because the incidental possession limit alternatives were designed to allow those fisheries who catch small-mesh multispecies incidental to continue without change, this alternative would have a neutral impact on non-target species because it would allow trips for other species to continue at approximately the same incidental level of small-mesh multispecies that are currently landed.

8.2.2.2 No in-season accountability measures (Sections 5.4.4 and 5.6.3)

This alternative would result in no proactive, or in-season, AMs being implemented. This alternative would have neutral impacts on non-target species because it would allow trips for other species to continue at the same incidental level of small-mesh multispecies that are currently landed.

8.2.2.3 Status Quo/No Action (Sections 5.4.5 and 5.6.4)

Status quo/No Action would retain the incidental possession limits in the Secretarial Amendment, triggering reductions in allowed possession when landings reach 90% of the stock-wide annual TAL. The red hake incidental limit would be 400 lbs. and the silver hake incidental limit would be 1000 lbs. These incidental limits will have a positive effect on target species, because they would reduce the risk of overfishing. The 400 lbs. red hake incidental possession limit is the same as the Council's preferred alternative and would therefore have the same impacts. The 1000 lbs. silver hake incidental limit is half of the Council's preferred alternative and based on the analysis in this section would increase discarding by a substantial amount without appreciably reducing total catch.

8.2.3 Year round red hake possession limits (Section 5.7)

8.2.3.1 Northern and southern possession limits by gear [Sections 5.7.1 (northern red hake possession limit and Section 5.7.2 (southern red hake possession limit)]

Alternatives in Section 5.7 proposes high year round possession limits for the northern and southern stock areas. These proposed possession limits are not intended to reduce effort and catch, but to discourage fishing for large quantities of red hake with trawl meshes less than 2.5 inches square or diamond. The possession limits are also meant to reduce the incentive to target large quantities of red hake in anticipation of a directed fishery closure when landings approach the 90% TAL trigger.

Since the effects of this measure is to avert a rapid increase of fishing effort targeting red hake, only a qualitative discussion of its impacts on non-target species is possible. It is not known what species would be captured by trawls with large quantities of red hake. Mostly the measure would reduce the potential for an expansion of fishing effort targeting red hake, particularly for vessels using very small mesh. This might have some ancillary benefit to species like herring, squid, and silver hake. It is not known whether possession limits at the lower end of the proposed range are any more positive than those at the higher end of the range. Therefore the impacts of this measure are expected to be slightly positive.

8.2.3.2 Status quo/No Action (Section 5.7.3)

Not having a year round red hake possession limit could entice some vessels to target large quantities of red hake, especially by vessels using less than 2.5 inch mesh. Although this change in fishing behavior is unlikely, it could increase fishing pressure and catch on species that are often caught in very small mesh trawls, such as northern shrimp, herring, and squid. Therefore the direct impact of the No Action alternative on non-target species is slightly negative.

8.2.4 Southern Whiting Possession Limit

Alternatives in Section 5.7 also propose increasing the southern whiting possession limit for vessels fishing in all (Section 5.7.4.1) or a portion (Section 5.7.4.2) of the Mid-Atlantic and Southern New England Exemption Areas from the current 30,000 lbs up to as much as 40,000 lbs. Besides allowing whiting catch and landings to increase on trips that the whiting fishing fleet already take (thereby lengthening the trip by increasing the limit on a target species), the alternatives may also attract new effort from two sources.

One source of potential effort shift into the whiting fishery comes from vessels that already target whiting on some trips made during the year (see discussion in Section 8.7.8.1). This is the most likely shift in fishing effort, because these vessels already have the correct fishing gear, knowledge of the fishery, and

market relationships. The other source of a potential effort shift into the whiting fishery is from vessels that use trawls, especially small mesh trawls to fish for other species. In most of these cases, the vessels might have to make some gear modifications, learn about new places to fish (for whiting), and develop new market relationships. Nonetheless new effort in the whiting fishery is a possibility.

In both of the above cases, however, increases in whiting fishing effort with trawls is likely to come from other fisheries, resulting in an offset number of trips. As a result, it is not anticipated that there would be large changes in catches of non-target species, since similar gear would be used in either case. The discard estimates in Section 7.1.4 provide a list of species whose non-target catches could increase if effort shifted into the fishery in response to a higher whiting possession limit.

8.2.4.1 Increasing the southern whiting possession limit from 30,000 up to 40,000 lbs. (Section 5.7.4.1)

Increasing the possession limit to a level between 30,000 and 40,000 lbs. is likely to have an intermediate effect on catches of non-target species. On one hand, a possession limit lower than 40,000 lbs. might not be as effective in countering rising fuel and operational costs, causing fishing vessels to target whiting closer to shore. Like the status quo, this response could increase non-target catches of species caught by trawls in the Mid-Atlantic, such as summer flounder, monkfish, and squid. On the other hand, an smaller increase in the possession limit would limit shifts in fishing effort from trips targeting species other than whiting and the potential to increase non-target catch of species caught by trawls on Georges Bank, such as yellowtail flounder and barndoor skate.

8.2.4.2 Increasing the southern whiting possession limit to 40,000 lbs. in the eastern part of the Southern New England Exemption Area (Section 5.7.4.2)

Reducing the area where higher whiting possession limit is allowed to the eastern part of Georges Bank would have a different effect on catches of non-target species. On one hand, restricting the applicability of a higher whiting possession limit to the eastern portion of Georges Bank would reduce the potential for effort shifts into the whiting fishery in other portions of the southern stock area. Although restricting the possession limit increase to the eastern part of the Southern New England Exemption Area might seem to limit increases in non-target species catches in the Mid-Atlantic region, most of the effort shift would come from other trawl trips in the Mid-Atlantic region, so the net effect on non-target species is likely to be negligible.

8.2.4.3 Status quo/No Action (Section 5.7.4.3)

No Action would probably reduce the current number of trips targeting whiting on Eastern Georges Bank, while potentially increasing the number of trips taken to target whiting and other species closer to shore, in response to higher fuel and operating costs. If fuel and operating costs remain stable or decline the number of trips taken to target whiting in the various fishing efforts would probably reflect historic norms. Whiting fishing NE of the Hudson Canyon would probably increase as fuel prices rise, since it would take less fuel to fish there for most vessels. Although total catches of non-target species may remain the same, the composition would change. Non-target catch of species like yellowtail flounder and barndoor skate would decline to the extent that the distribution of these species overlaps the distribution of whiting fishing. Non-target catches of other species like summer flounder, monkfish, and squid could increase if whiting trips shift to closer-to-shore fishing grounds in the western portion of the Southern New England Exemption Area.

8.2.5 Post-Season Accountability Measure Alternatives

8.2.5.1 Pound-for-Pound Payback of an ACL Overage (Section 5.8.1; No Action)

A reactive AM is designed to respond to exceeding the ACL, and, if invoked, would prevent catches from exceeding the OFL in the future. This would likely lead to either no change in fishing (if the AM is not invoked), or a reduction in fishing effort (if the AM reduces the allowable landings) on small-mesh multispecies. The existence of such controls on small-mesh multispecies fishing effort will likely have neutral impacts for non-target species. As discussed above (Section 8.1.8.1), although a reduction in the amount of small-mesh multispecies that may be landed in a given year due to the implementation of a payback may result in redirected fishing into other fisheries, the programs that are in place for those other species should sufficiently manage that impact that a small increase in effort may have.

8.2.5.2 Reducing the Incidental Possession Limit (TAL) Trigger (Section 5.8.1)

Reducing the time at which an incidental possession limit would become effective could reduce the amount of fishing effort in the small-mesh multispecies fishery and associate bycatch as a result. While this may have a positive benefit for some non-target species, it might also divert fishing effort into other areas where catches of non-target species are higher. For example, some vessels may fish less for small-mesh multispecies and fish more for large-mesh groundfish, fluke, or squid; with associated bycatch in those fisheries. Or it could induce vessels to fish less in areas where red hake are abundant to target silver hake, or vice versa. For certain non-target species, these changes in fishing activity may carry positive impacts (i.e. less catch) and for others negative impacts (i.e. more catch). Overall, the total impact on non-target species caused by this alternative is therefore neutral.

A more detailed analysis of how this alternative accountability measure would work in the event of an ACL overage compared to No Action is given in Section 8.7.8.

8.2.6 All other alternatives (Sections 5.1, 5.7, and 5.2.3)

These alternatives are mainly administrative and will not necessarily change the amount of fishing or catches of other species when red, silver, or offshore hake are targeted or landed. Thus the direct impact on non-target species for these alternatives is likely to be neutral.

8.3 Biological Impacts to Protected Resources

As described in Section 4.4, the following protected species may be impacted by the small-mesh multispecies fishery (Table 66):

Table 66. Protected species that may be impacted by the small-mesh multispecies fishery.

Cetaceans
North Atlantic right whale (*Eubalaena glacialis*)
Humpback whale (*Megaptera novaeangliae*)
Fin whale (*Balaenoptera physalus*)
Sei whale (*Balaenoptera borealis*)
Pilot whale (*Globicephala spp.*)
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)
Bottlenose dolphin (*Tursiops truncatus*)[b]
Sea Turtles
Leatherback sea turtle (*Dermochelys coriacea*)
Kemp's ridley sea turtle (*Lepidochelys kempii*)
Green sea turtle (*Chelonia mydas*)
Loggerhead sea turtle (*Caretta caretta*) Northwest Atlantic DPS
Fish
Cusk *(Brosme brosme)*
Atlantic sturgeon *(Acipenser oxyrinchus)*
Pinnipeds
Harbor seal (*Phoca vitulina*)
Harp seal (*Phoca groenlandicus*)

Although large whales and marine turtles may be potentially affected through interactions with fishing gear, it is likely that the continued authorization of the small-mesh multispecies fishery should not have any adverse effects on the availability of prey for these species. Right whales and sei whales feed on copepods (Horwood 2002, Kenney 2002). The small-mesh multispecies fishery would not affect the availability of copepods for foraging right and sei whales because copepods are very small organisms that would pass through even small-mesh multispecies fishing gear rather than being captured in it. Humpback whales and fin whales also feed on krill as well as small schooling fish (e.g., sand lance, herring, mackerel) (Aguilar 2002, Clapham 2002). Small-mesh multispecies fishing gear operates on or very near the bottom. Fish species caught in small-mesh multispecies gear are species that live in benthic habitat (on or very near the bottom) such as flounders versus schooling fish such as herring and mackerel that occur within the water column.

The alternatives under consideration in this action will not increase small-mesh multispecies fishing effort in either stock area, since they are administrative in nature, or otherwise do not affect the magnitude or distribution of fishing effort. Specifically, the alternatives under consideration which are not likely to affect small-mesh multispecies fishing effort, and by extension would not likely impact protected resources, include:

- Establishment of ABCs, ACLs, and TALs,
- Post-season accountability measures; and
- In-season accountability measures

The continued authorization of the small-mesh multispecies fishery should likely not affect the availability of prey for foraging humpback or fin whales. Moreover, none of the turtle species are known to feed upon small-mesh multispecies fishery stocks. In summary, the actions proposed in this amendment would have neutral impacts on protected species in the region.

8.3.1 Impacts to Atlantic Sturgeon

Formal consultation on the small-mesh multispecies fishery was reinitiated on February 9, 2012. NMFS has determined that there will not be any irreversible or irretrievable commitment of resources under section 7(d) of the ESA during the consultation period that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures. NMFS has also determined that the continued authorization of the small-mesh multispecies fishery during the consultation period, including the authorization of those fisheries to operate under the measures proposed in the Secretarial Amendment, is not likely to jeopardize the continued existence of ESA-listed species or result in the destructive or adverse modification of critical habitat.

While ESA Section 7 consultations are required when a proposed action may affect listed species, a conference is required only when the proposed action is likely to jeopardize the continued existence of a proposed species or destroy or adversely modify proposed critical habitat. Therefore, a conference would be required if it was determined that the small-mesh multispecies fishery was likely to jeopardize one or more of the five distinct population segments (DPS) of Atlantic sturgeon or one or more of the nine DPSs of loggerhead sea turtles. A biological assessment evaluates the potential effects of an action on listed and proposed species and designated and proposed critical habitat to determine whether any such species or habitat are likely to be adversely affected by the action. A biological assessment is used in determining whether formal consultation or a conference is necessary.

On February 6, 2012, NMFS listed the Gulf of Maine distinct population segment of Atlantic sturgeon as threatened, and listed the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs of Atlantic sturgeon as endangered (77 FR 5880 and 75 FR 5914). This action considered whether the small-mesh multispecies fishery, including implementation of the proposed action, is likely to jeopardize Atlantic sturgeon DPSs, as they were proposed to be listed, and concluded that is not. While it is possible there may be interactions between Atlantic sturgeon and gear used in the small-mesh multispecies fishery, the number of interactions that will occur during the limited duration of this action is not likely to cause an appreciable reduction in survival and recovery. This is supported by updated bycatch estimates based upon NEFOP data (2006-2010). Atlantic sturgeon are known to be captured in sink gillnet, drift gillnet, and otter trawl gear. Of these gear types, sink gillnet gear poses the greatest known risk of mortality for bycaught sturgeon. Sturgeon deaths were rarely reported in the otter trawl observer dataset. However, the level of mortality after release from the gear is unknown. In an updated, preliminary analysis, the Northeast Fisheries Science Center (NEFSC) was able to use data from the NEFOP database to provide updated estimates for the 2006 to 2010 timeframe. Data were limited by observer coverage to waters outside the coastal boundary (fzone>0) and north of Cape Hatteras, NC. Sturgeon included in the data set were those identified by federal observers as Atlantic sturgeon, as well as those categorized as unknown sturgeon. At this time, data were limited to information collected by the NEFOP; limited data collected in the At-Sea Monitoring Program were not included, although preliminary views suggest the incidence of sturgeon encounters was low.

The preliminary analysis apportioned the estimated weight of all sturgeon takes to specific fishery management plans. The analysis estimates that between 2006 and 2010, a total of 15,587 lb of Atlantic sturgeon were captured and discarded in bottom otter trawl (7,740 lb) and sink gillnet (7,848 lb) gear. The analysis results indicate that 1.1% (85 lb) of the weight of sturgeon discards in bottom otter trawl gear could be attributed to the small-mesh bottom trawl fisheries if a correlation of FMP species landings (by weight) was used as a proxy for fishing effort. Additionally, the analysis results indicate that 0.7% (55 lb) of the weight of sturgeon discards in sink gillnet gear could be attributed to the small mesh gillnet fisheries if a correlation of FMP species landings (by weight) was used as a proxy for fishing effort.

Given the limited scope of this action, and the overall low effort in the small-mesh multispecies fishery, the magnitude of that interaction during the timeframe of interest is not likely to result in jeopardy to the species based on current assessments of each DPS. Since Atlantic sturgeon DPSs have been listed, the formal consultation for the NE multispecies fisheries, including the small-mesh multispecies fishery, was reinitiated, as required and additional evaluation will be included to describe any impacts of the fisheries on Atlantic sturgeon and define any measures needed to mitigate those impacts, if necessary. It is anticipated that any measures, terms and conditions included in an updated Biological Opinion will further reduce impacts to the species. It is expected that the completion of the Biological Opinion will occur before the beginning of the 2012 NE multispecies fishing year on May 1, 2012. Additionally, there would likely be slightly negative impacts on the sturgeon DPSs because of the limited scope of the proposed action and the overall low effort in the small-mesh multispecies fishery.

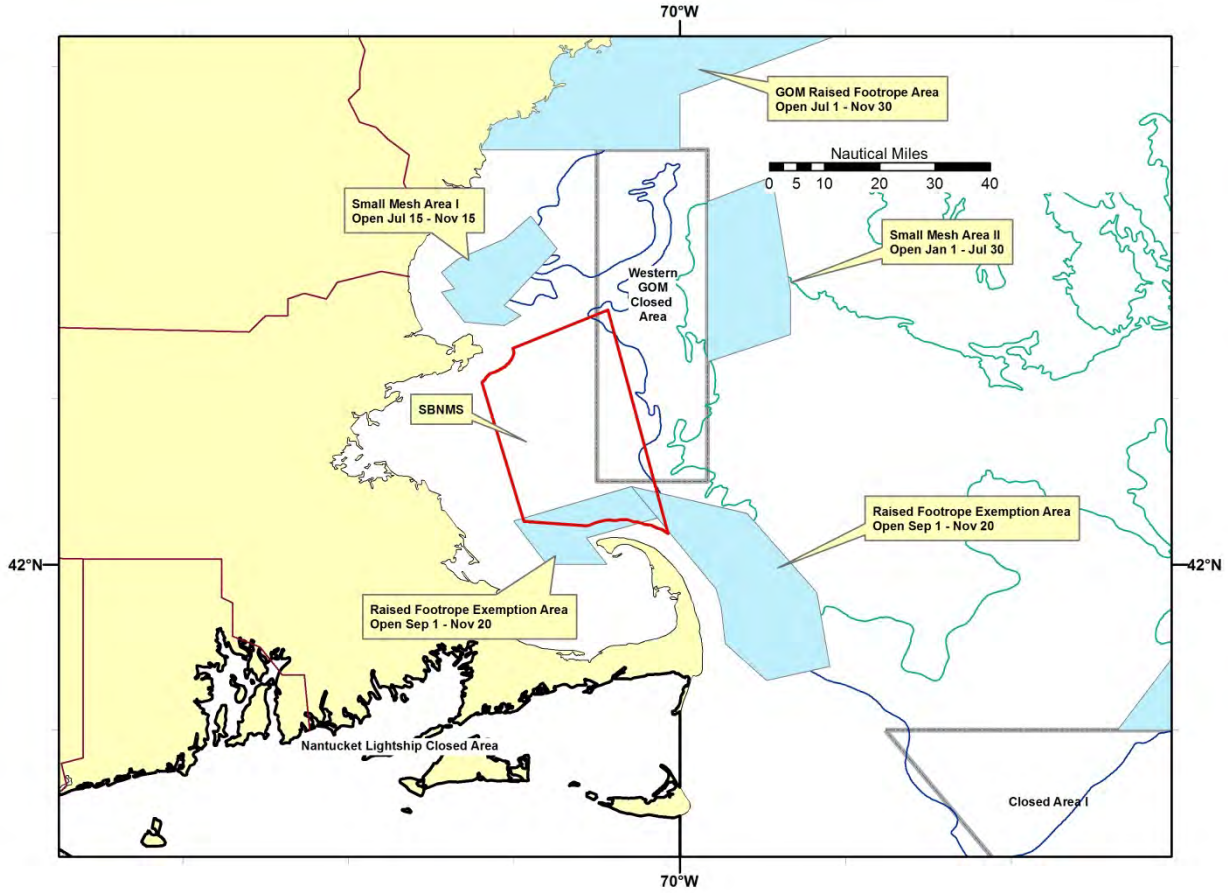
8.4 Impacts to the Physical Environment

Although the small-mesh multispecies fishery uses trawls, which are known to have an impact on the benthic environment, none of the alternatives described in Section 5.0 are expected to meaningfully change the amount of fishing or the type of gear used to target small-mesh multispecies. As an open access fishery where any vessel may obtain a small-mesh multispecies permit, the amount of fishing effort that targets small-mesh multispecies is a function of price and fishing opportunities dictated by regulations in other fisheries. And although the amount of fishing is and was unconstrained by catch limits, the ACLs proposed by this amendment are not expected to substantially change the fishery or fishing effort distribution. Therefore all alternatives in Section 5.0 are expected to have negligible or neutral impacts on the physical environment.

8.5 Impacts on Stellwagen Bank National Marine Sanctuary (SBNMS)

All or nearly all fishing for hakes with small-mesh occurs in specific areas surrounding the SBNMS (Map 5). Only part of the raised footrope exemption areas overlap with the southern portion of the SBNMS. Therefore all of the alternatives in Section 5.0 are expected to have a minimal or slightly positive impact on the SBNMS. Some species that inhabit that SBNMS feed on juvenile or adult small-mesh multispecies, so alternatives that prevent overfishing, particularly for northern red hake (see Sections 5.2.3, 5.4.1, 5.4.3, and 5.7.1) may have an indirect positive impact on the SBNMS.

Map 9. Relationship between the Stellwagen Bank National Marine Sanctuary and small-mesh exemption program areas.



8.6 Essential Fish Habitat (EFH) impacts

The overall effect of the fishery on EFH was analyzed and mitigated for in Amendment 13 to the Northeast Multispecies FMP. The small-mesh multispecies fishery is primarily a trawl fishery, with minor landings coming from sink gillnets and other gears (Section 3.2; Table 36). In the northern stock areas, a raised footrope trawl is required in several of the exempted fishing programs (the Gulf of Maine Raised Footrope Trawl, Small-mesh Areas I and II, and the Raised Footrope Exemption Areas near Cape Cod). The raised footrope trawl has less impact on habitat than a traditional otter trawl (see Section 3.3.3 for more information). Small-mesh multispecies fishing effort will continue to occur in areas that are open to mobile bottom-tending gears or by gears that have been determined to not adversely impact EFH in a manner that is more than minimal and less than temporary in nature.

The alternatives under consideration in this action will not increase small-mesh multispecies fishing effort in either stock area, since they are administrative in nature, or otherwise do not affect the magnitude or distribution of fishing effort. Specifically, the alternatives under consideration which are not likely to affect small-mesh multispecies fishing effort, and by extension would not likely impact EFH, include:

- Establishment of ABCs, ACLs, and TALs,
- Post-season accountability measures; and

- In-season accountability measures

The small-mesh multispecies fishery is moving from a system with no catch limits, to a system with catch limits. While the catch limits are, in most cases, substantially higher than recent catch, there was previously no limit. Therefore, it is likely that catches, and by extension, fishing effort, would not change due to the implementation of these measures. The only stock where recent (2010) catch is higher than the proposed ACL is northern red hake. In this case, the preferred alternatives may have a slightly positive impact on EFH, if there is less fishing in a given fishing year, as compared to 2010 (Table 67).

Table 67. Percent difference between proposed ACLs and 2010 catch.

	Northern Red Hake	Northern Silver Hake	Southern Red Hake	Southern Whiting
Proposed ACL	266 mt	12,518 mt	3,096 mt	32,243 mt
2010 Catch	311 mt	2,478 mt	1,352 mt	7,110 mt
% Difference	-15%	405%	129%	354%

In summary, the actions proposed in this amendment would have neutral impacts on EFH for any federally managed species in the region.

8.7 Impacts to Human Communities

8.7.1 TAL Alternatives

8.7.1.1 Stock Area TALs, including a Specifications Process (Sections 5.2, 5.2.3, and 5.5)

This alternative would implement a TAL framework, including the specifications process, for each of the following stocks/stock group: Northern red hake, northern silver hake, southern red hake, and southern whiting (southern silver hake and offshore hake combined). It is likely that implementing the stock area catch and landings limits framework and specifications process, as described in Section 5.2, would have neutral to positive economic impacts because the intent of the measure is to prevent overfishing and make adjustments to achieve optimum yield, after accounting for scientific and management uncertainty and other economic and ecological considerations.

The ACLs and TALs for the stocks are greater than recent catches and landings, respectively, with the exception of northern red hake. Landings and fishing effort therefore are unlikely to be affected by this alternative, at least in the short run. However, if there were changes, there would most likely be positive economic impacts to fishing communities because the TALs and ACLs are greater than previous years' landings. The proposed ACL for northern red hake is less than the catch in 2010; however, the proposed TAL is greater than 2010 landings of northern red hake. It is likely that there would also be a neutral to positive economic impact to those vessels targeting northern red hake. Red hake however are rarely targeted by themselves on most trips.

Based upon the average 2010 prices and the proposed Federal TAL, the estimated gross revenue would be greater than the average gross revenues earned from 2005-2010 for each of the species/stock areas (see table below).

Table 68. Average landings and revenue for the species/stock areas, compared to the proposed Federal TAL and estimated gross revenues (based upon 2010 average prices)[15].

Stock	Average landings, 2005-2010	Average revenue 2005-2010	Proposed Federal TAL	Estiumated gross revenue, 2010 prices
Northern red hake	105,906	$ 42,542	199,077	$ 92,278
Southern red hake	1,091,701	$ 424,442	2,945,375	$ 1,097,355
Northern silver hake	2,228,362	$ 1,293,335	19,782,073	$ 13,639,208
Southern whiting	13,353,517	$ 7,330,209	60,086,973	$ 36,341,982

8.7.2 Northern Stock Area TALs, Specification Process, and Annual Monitoring (Sections 5.2 and 5.2.3)

8.7.2.1 Small-mesh exemption area silver hake landings target (Section 5.3.2)

This alternative would establish separate landings target for silver hake for the Cultivator Shoals Exemption Area Program and the inshore Gulf of Maine small-mesh exemption area programs. This measure would work with the 1) in-season accountability measure that reduces the possession limit to an incidental level when a trigger point is reached and 2) the alternative that requires weekly VTRs from vessels landing small-mesh species.

Silver hake landings targets for the Cultivator Shoals Area and the collectively the other four exemption areas is expected to reduce negative impacts on specific fleets. For example, it would reduce the risk that excessive silver hake landings from the Cultivator Shoals Area could close the inshore exemption areas, and reduce the risk that silver hake landings from the exemption areas could restrict landings as incidental catches throughout the Gulf of Maine, thereby increasing discarding. While the exemption area landings targets can reduce impacts on fishing communities by assuring access to the inshore exemption areas and allowing greater opportunity to land incidental silver hake catches, the economic and social benefits could be partially offset by the higher reporting costs for submitting weekly VTRs (see Section 8.7.5.1 for further details). On the other hand, many vessels in the whiting fishery are already subject to weekly VTR reporting requirements in other fisheries.

8.7.2.2 Small-mesh exemption area red hake landings target (Section 5.3.3)

This alternative would establish separate landings target for red hake for the Cultivator Shoals Exemption Area Program and the inshore Gulf of Maine small-mesh exemption area programs. This measure would work with the 1) in-season accountability measure that reduces the possession limit to an incidental level when a trigger point is reached and 2) the alternative that requires weekly VTRs from vessels landing small-mesh species.

Like the analysis for silver hake above, red hake landings targets for the Cultivator Shoals Area and the collectively the other four exemption areas is expected to reduce negative impacts on specific fleets. It could also induce vessels fishing in a small-mesh exemption program to seek areas where red hake are less abundant if they are targeting silver hake. Industry advisors say that this change in fishing behavior is possible at certain times, although analysis of sea sampling data is less optimistic in this regard. If fishermen that target silver hake in the small-mesh exemption programs can fish in ways to reduce red hake catches, the in-season AM for red hake could have substantially positive benefits to fishing

[15] 'Southern whiting' includes landings of silver and offshore hake, whether reported separately or not.

communities. Separate landings targets could also be highly effective at preventing red hake landings from one area from impacting fishing for small-mesh species in other exemption areas, or prevent early implementation of incidental possession limits elsewhere in the northern stock area, potentially affecting fisheries targeting other species.

Landings targets in the exemption areas could prevent those few vessels targeting red hake from being penalized from an overage by the non-directed fishery. However if the overage is due to bycatch exceeding the discard estimate, fishermen targeting red hake may still be penalized and suffer revenue losses. Furthermore, the amount of time needed to submit weekly VTRs may have a high opportunity cost and could negatively impact fishing revenues.

While the exemption area landings targets can reduce impacts on fishing communities by assuring access to the inshore exemption areas and allowing greater opportunity to land incidental silver hake catches, the economic and social benefits could be partially offset by the higher reporting costs for submitting weekly VTRs (see Section 8.7.5.1 for further details). On the other hand, many vessels in the whiting fishery are already subject to weekly VTR reporting requirements in other fisheries.

8.7.2.3 Cultivator Shoals Exemption Area program roll-over provision alternatives (Section 5.3.4.1)

This alternative would re-allocate landings to other small-mesh exemption areas if the landings targets are not met in the Cultivator Shoals Exemption Area Program, allowing for vessels fishing in the inshore exemption areas to land unused amounts of the TALs. It provides greater flexibility for the fleet to respond to changing conditions and promotes achieving optimum yield. Except for the added reporting cost of weekly VTR reporting requirements, this measure should have a positive economic and social effect on fishing communities.

8.7.2.4 No Cultivator Shoals Exemption Area roll-over provision (5.3.4.2)

This alternative would not re-allocate landings to other small-mesh exemption areas if the landings targets are not met in the Cultivator Shoals Exemption Area Program. Not having a roll-over provision could reduce yield from the fishery, because unused TAL in one area may remain unharvested and unavailable in other portions of the Gulf of Maine. This alternative could therefore have a negative economic and social effect, increasing the regulatory burden on industry.

8.7.3 In-Season Accountability Measure Alternatives (Sections 5.4 and 5.6)

In-season accountability measures grant the Northeast Regional Administrator the authority to implement a management measure, such as reducing the trip limit or closing the fishery, when landings are projected to reach a pre-determined level. In this amendment, the Council proposes implementing a triggered incidental possession limit. The effectiveness of the proposed range of incidental possession limits is analyzed in Section 8.1.6.

8.7.3.1 Red hake and silver hake incidental possession limit triggers (Sections 5.4.1.1 to 5.4.1.3)

This alternative would reduce possession to an incidental limit when a trigger level is projected to be reached. Under this alternative, the incidental possession limit would remain in effect, even if the TAL is projected to be exceeded. The measure is intended to reduce the potential that post-season accountability measures would be triggered and prevent directed fishing for red hake, silver hake, or offshore hake while

allowing vessels to land incidental catches when fishing for other species. If annual catches do exceed the ACL, a post-season AM would be triggered to reduce the ACL and/or TALs in following fishing years.

Northern red hake is likely the only stock where an AM might be triggered in the near future. Table 67 summarizes the difference between the proposed ACLs and recent catch. Except for northern red hake, the proposed TALs are substantially higher than recent catch, and therefore unlikely that an AM might be triggered.

In the figure below, the proposed TAL and 90% of the proposed TAL are plotted with the 2006 – 2010 average daily landings of northern red hake, as reported through vessel trip reports. This graph demonstrates the effect of implementing a 400 lb incidental possession limit for northern red hake.

Based on vessel trip reported landings, including bait landings, the 90% AM trigger would be reached in late September. Assuming that, because red hake is rarely, if ever, the target species, all the trips would still occur, those trips that landed less than or equal to 400 lb (blue) would remain unaffected. Those trips that previously landed more than 400 lb (green) after September 26 would presume to continue, but would be capped at 400 lb. The trips that would be affected by a 400 lb possession limit represent approximately five percent of the trips that landed red hake from 2006-2010. These trips were taken by 30 different vessels over that time, with an average of seven vessels per year. The 400 lb incidental limit would affect, on average, 3.5 trips per vessel, over the 2006-2010 timeframe. However, in recent years, it may affect a fewer number of vessels, but a higher number of trips per vessel. At the average price of $0.37 per pound of red hake, this would result in approximately $282 lost revenue per trip for the 23 average trips per year, or a total loss across the fleet of $6,486.

Lower possession red hake incidental possession limits of 200 and 300 lbs. would affect more non-directed trips, being more effective at reducing landings, but would increase discards more than would a 400 lb possession limit. Therefore the economic and social effects on fishing communities is likely to be more negative with the lower incidental possession limits, even though they may be more effective at preventing catches from exceeding the ACL.

This analysis is difficult to do for northern silver hake, southern red hake, and southern silver hake[16] because landings only exceeded the proposed TALs in the distant past, when fishery conditions were different than they are now. The effectiveness of the proposed incidental possession limits to constrain catch is analyzed in Sections 8.1.6.1 and 8.1.6.2.3. Nonetheless, the in-season AMs (incidental possession limits) were analyzed and chosen to close the directed fishery (making it uneconomic to target species at incidental possession limits) while minimizing the effect on increasing discards. The fleets that catch small-mesh multispecies incidentally already do so at a level at or below the possession limits proposed by these AM alternatives, without a regulation requiring them to do so.

There is no reason to expect them to land more hake unless prices spike. If prices do spike, as happened with skates in 2010 when an incidental possession limit was triggered, then it is expected that more vessels will land their hake catches when fishing for other species, but not change fishing behavior so that discarding increases. If fishermen land more incidental catches of hakes in response to higher prices, the incidental possession limits would not increase catch to exceed the ACLs, but the cost of the reduced landings would not be as large as estimated herein, although the revenue would probably go to different vessels that participate in other fisheries.

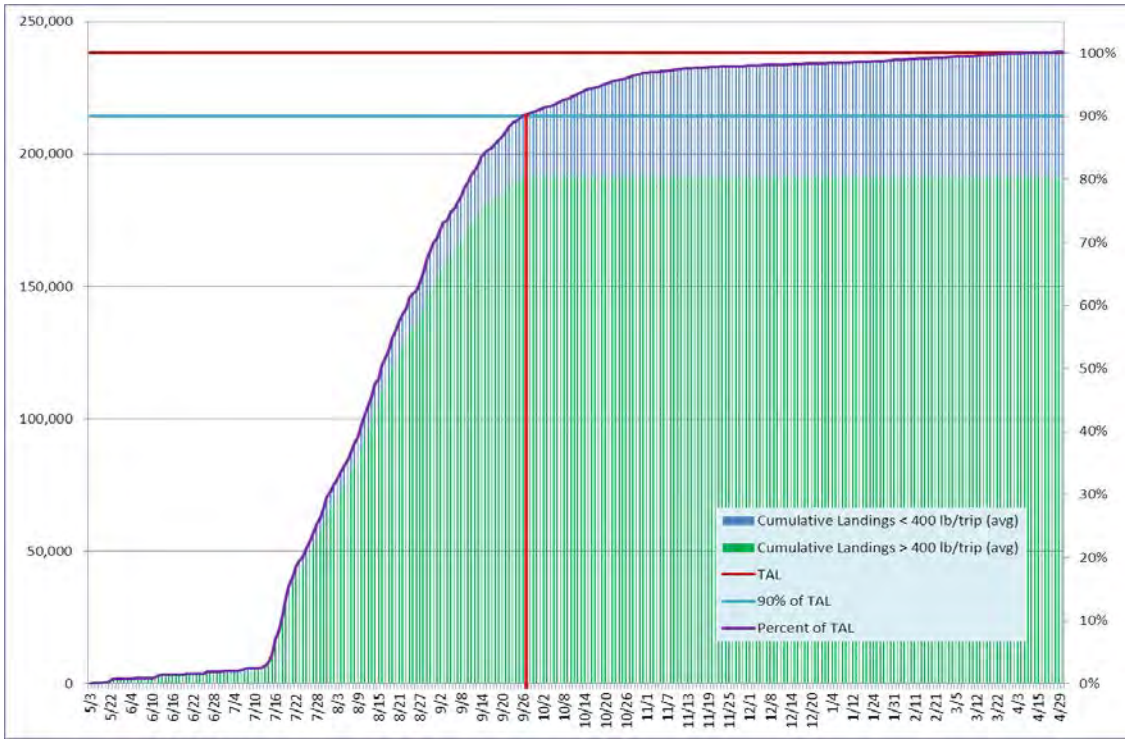
Moreover, the point of the incidental possession limit AMs was to discourage targeting and provide an incentive for the directed fishery to avoid the species approaching a TAL, without forcing the large-mesh

[16] Includes landings of offshore hake which are rarely reported separately.

fleet to discard small-mesh fish that they catch while targeting higher valued fish. This is particularly true in contrast to a considered and rejected alternative – which would have allowed no possession when landings reach 100% of the TAL, as is done in several other fisheries.

And although the short-term impacts of the proposed in-season AMs are negative if triggered, particularly for the directed fishery, they could be considered as positive compared with the effects on communities from reducing future ACLs or TALs through post-season AMs. Taken together, the in-season AM coupled with a post-season AM to account for overages would be highly effective in such a way that neither the TAL or the ACL are exceeded.

Figure 30**.** Northern red hake average landings per month (2006-2010) with proposed TAL and trigger.



8.7.3.2 No in-season accountability measures (Section 5.4.4)

This alternative would result in no proactive, or in-season, accountability measures being implemented. Not implementing a proactive accountability measure would have a negative impact to vessels targeting small-mesh multispecies stocks, but a positive impact on vessels that land an incidental amount of red and silver hake.

8.7.3.3 No Action alternative (Section 5.4.5)

400 lb red hake, 1000 lb southern whiting

The No Action Alternative makes no changes to the current in-season accountability measures that were included in the Secretarial Amendment. This Alternative would have a neutral impact to vessels targeting small-mesh multispecies stocks because there is no change from the current management.

8.7.4 Southern stock Area TALs, Specification Process, and Annual Monitoring (Sections 5.2 and 5.5)

8.7.4.1 Stock-wide TAL (Section 5.5.1; no action)

This alternative maintains the TAL established by the Secretarial Amendment for the southern red hake and whiting. The ACLs and TALs for the stocks are greater than recent catches and landings. Landings and fishing effort therefore are unlikely to be affected by this alternative, at least in the short run. There are neutral impacts to fishing communities because there is no change from the Status Quo.

However revenues could be greater than previous years because the proposed ACLs and TALs are greater than recent catches and landings. Based upon the average prices from 2005-2010 and the proposed federal TAL, the estimated gross revenue would be greater than the average gross revenues earned from 2005-2010 for both southern red hake and southern whiting (Table 68).

8.7.4.2 Quarterly TALs (Section 5.5.2)

This alternative divides the stock-area TALs into quarterly TALs. The quarterly TALs are allocated based upon the average proportion of landings from 2008-2010. There would be neutral or negligible impacts to fishing communities from implementing quarterly TALs. The overall TALs and ABCs are much greater than recent catches and landings of southern red hake and whiting; therefore, each of the quarterly TALs are substantial.

8.7.4.3 Quarterly TALs when landings exceed 2/3rds of previous year TAL (Section 5.5.3)

This alternative divides the stock-area TALs into quarterly TALs when landings in the previous fishing year exceed two-thirds the annual stock-area TAL. This provision is unlikely to occur in the near future because the overall TALs are much greater than recent landings (Table 68). This alternative is therefore unlikely to impact fishing communities any time soon, and the impacts would be neutral or negative.

8.7.4.4 Quarterly TAL roll over provisions (Section 5.5.4)

This measure would roll over unlanded amounts of TAL from one quarter to the next, thereby promoting achievement of optimum yield. As such, it is likely to have positive economic and social benefits for fishing communities, although there may be a small offsetting cost from frequent adjustments through Notice Actions. The quarterly adjustment provision (Section 5.5.4.1) is more complicated and therefore likely to be more costly than the roll up TAL and triggers (Section 5.5.4.2, preferred).

8.7.5 TAL reporting and monitoring requirements (Section 5.2.3)

8.7.5.1 Weekly Vessel Trip Reports (Section 5.2.3.1)

This alternative would require vessels taking small-mesh multispecies trips to submit weekly Vessel Trip Reports (VTRs). The reports would allow more accurate real-time designation of landings to stock areas. The major impact from this alternative is the opportunity cost of time needed for fishermen to complete the VTRs to comply with the regulations. This has a small negative impact to fishing communities, because many vessels in the small-mesh fishery already submit weekly VTRs due to their participation in other fisheries having this requirement. Furthermore, because fishermen are already required to complete VTRs at the end of a trip under existing regulations, submitting weekly VTRs only changes the frequency at which they are mailed to NMFS, a rather minor additional cost.

8.7.5.2 Assigning landings based on gear use (Section 5.2.3.3; No action)

This alternative would apply red hake landings to a particular area based upon gears used. This procedure ensures that landings are monitored in the same manner as the procedure applied to estimate the small-mesh area program landings targets. There would be no impact to fishing communities from this alternative as the assignment of landings is completed at the Northeast Regional Office, but could have a negative impact if the landings are applied inaccurately, particularly if the Council applies exemption area landings targets (Sections 5.3.2 and 5.3.3).

8.7.6 Southern stock area in-season accountability measures (Section 5.6)

This alternative would reduce possession to an incidental limit when a trigger level is projected to be reached. Under this alternative, the incidental possession limit would remain in effect, even if the TAL is projected to be exceeded. The measure is intended to reduce the potential that post-season accountability measures would be triggered and prevent directed fishing for red hake while allowing vessels to land incidental catches when fishing for other species. If annual catches do exceed the ACL, a post-season AM would be triggered to reduce the ACL and TALs in following fishing years.

8.7.6.1 Red hake incidental limits (Section 4)

A possession limit would be triggered when southern red hake landings reach 90% of the TAL. Three possession limits are proposed at 200, 300 or 400 lb. It is unlikely that these possession limits would be triggered for the southern stock of red hake in the future because the proposed ACL and TAL are far greater than recent catches and landings; therefore, this alternative would have neutral impacts to fishing communities.

8.7.6.2 Southern whiting incidental limits (Section 5.6.2)

A possession limit would be triggered when southern whiting landings reach 90% of the TAL. Three possession limits are proposed at 500, 1,000 or 2,000 lb. It is unlikely that these possession limits would be triggered for the southern whiting stock in the future because the proposed ACL and TAL are far greater than recent catches and landings; therefore, this alternative would have neutral impacts to fishing communities.

8.7.6.3 No in-season accountability measures (Section 5.6.3)

This alternative would result in no proactive, or in-season, accountability measures being implemented. Not implementing a proactive accountability measure could have a negligible impact to vessels targeting small-mesh multispecies..

8.7.6.4 No Action Alternative (Section 5.6.4)

This alternative makes no changes to the current in-season accountability measures that were included in the Secretarial Amendment. This alternative would have a neutral impact to vessels targeting small-mesh multispecies stocks because there is no change from the current management.

8.7.7 Year-round red hake possession limits (Section 5.7)

The intended effect of this measure is described in Section 5.7. Ranges of red hake possession limits are presented as alternatives that would accommodate nearly all trips, but would prevent vessels from landing large quantities of red hake in the face of real or perceived threats of a pending closure of the directed fishery by in-season AMs, particularly by using very small-mesh trawls which could have poor size selectivity.

8.7.7.1 Northern stock area possession limits (Section 5.7.1)

This alternative would establish a red hake possession limit between 1,000-3,000 lb of red hake for vessels using 2.5 to 5 inch square or diamond cod end mesh size and 300-1200 lb of red hake for vessels using other mesh sizes while fishing in the Gulf of Maine/Georges Bank.

For some vessels and a very small proportion of trips, this alternative would have a negative impact on revenue, but for the majority of vessels it could delay implementation of an in-season AM, increasing the economic benefits for most vessels and communities.

8.7.7.2 Southern stock area possession limits (Section 5.7.2)

This alternative would implement a red hake possession limit between 4,000 - 10,000 lb of red hake for vessels using 2.5 to 5 inch square or diamond cod end mesh size and 2,000 – 6,000 lb of red hake for vessels using other mesh sizes while fishing in Southern New England or Mid-Atlantic exempted areas. If this possession limit were invoked, the impacts would most likely be negligible to negative on fishing communities.

For some vessels and a very small proportion of trips, this alternative would have a negative impact on revenue, but for the majority of vessels it could delay implementation of an in-season AM, increasing the economic benefits for most vessels and communities.

On the other hand, the proposed southern red hake TAL is nearly three times 2005-2010 landings (Table 68) and higher than any year since 2001. And although the alternative may induce some vessels to use gear with larger mesh (an increase in costs for vessels not using this mesh), this alternative is unlikely to affect when or if the in-season AM (an incidental possession limit) would apply. Therefore the overall effect of this measure is somewhat negative on fishing communities, arising from potential increased in gear costs and limits on landings for longer trips targeting red hake.

8.7.7.3 No Action/Status quo (Section 5.7.3)

No Action would not implement mesh-size based red hake possession limits. There could be a negative impact on fishing communities if a derby-style fishing behavior erupts from a real or perceived threat of a directed fishery closure via the in-season AMs, as is possible in the northern stock area. It is possible that using small-mesh (i.e. < 2.5 inches) to target red hake could reduce size selectivity and increase discards (of small unmarketable fish) if this were to occur.

8.7.8 Southern whiting possession limit

Two alternatives are proposed in Section 5.7.4 to increase the 30,000 lbs. whiting possession limit for vessels using trawls with 3 inch or greater mesh. To counter the effect of rising fuel costs for offshore trips targeting whiting and achieve optimum yield, the alternatives in Section 5.7.4 would increase the

possession limit from 30,000 lbs. up to 40,000 lbs. in all of the Mid-Atlantic and Southern New England Exemption Areas (see Map 5), or in the Southern New England Exemption Area east of a line of longitude between 67°40' W to 72°30' W longitude.

Increasing the possession limit to 40,000 lbs. in the entirety of both exemption areas would produce the most benefit to the existing whiting fleet fishing in the southern stock area, but could have a negative effect on whiting prices or reduce demand for whiting caught in the northern stock area. This alternative (Section 5.7.4.1) also carries a higher risk of attracting new fishing effort to the open access whiting fishery, particularly in areas that are closer to shore such as in the Mid-Atlantic Exemption Area and the western portions of the Southern New England Exemption Area.

There are three potential sources of increasing catch, caused by increasing the whiting possession limit. In order of highest to lowest likelihood of occurring, they are increases in landings by the existing fleet, increases in the number of trips taken by the existing vessels in the whiting fishery, and new effort from vessels entering the fishery from other small and large mesh fisheries. Taken together and considering the fishing costs and market constraints, increasing the possession limit is unlikely to cause landings to exceed the TAL, at least in the short term.

Increases in daily landings, however, may affect prices and the benefits may not be as great as assumed. Lower prices and limited demand may negatively affect whiting fisheries in the northern stock area, but the analysis of the relationship between domestic demand (paid in the US for export and other markets) and supply is analyzed and described in Section 7.3.1 . The analysis indicates that increasing daily landings would cause a decline of 0.6 cents for each one-percent increase in landings. Thus the revenue for a 30,000 lbs. trip in the northern stock area would decline by approximately $450, while the revenue for a Mid-Atlantic and Southern New England Exemption Area trip landing 40,000 rather than 30,000 lbs. of whiting would increase by $5,318.

Increases in effort from existing trips are the easiest to quantify. Trips that are most likely to change land more than 28,000 lbs. of whiting, i.e. close to the existing 30,000 lbs. possession limit. In the southern stock area, these trips frequently occur offshore along the continental shelf edge (Map 1), particularly east of 67°40' W longitude (the approximate location of Munson Canyon). For trips already being taken, the increase in the possession limit represents a real increase in fishing effort, because the vessels would usually fish longer to catch the 40,000 lbs. of whiting. Some trips may not land the full 40,000 lbs. however due to hold capacity or the duration of favorable weather.

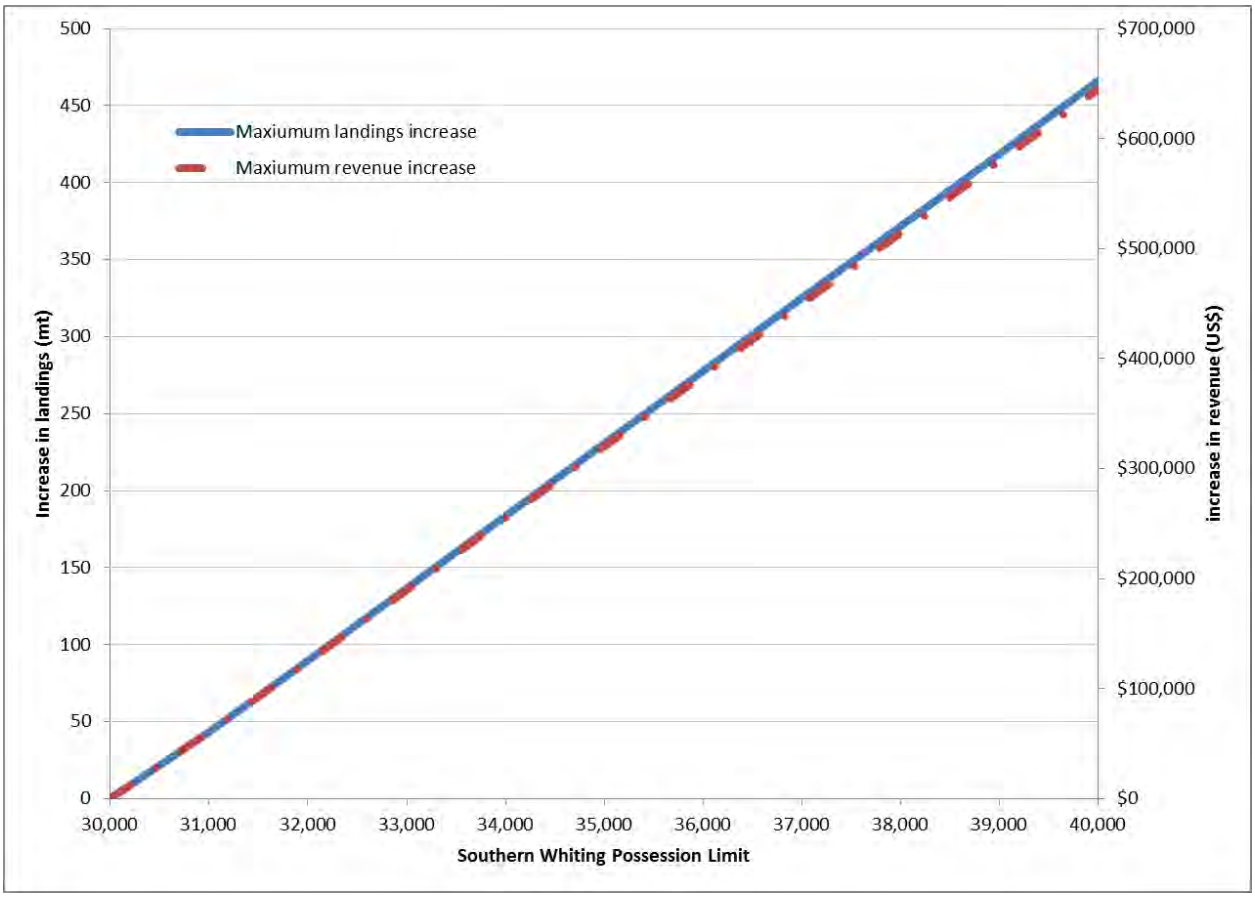
8.7.8.1 Increasing the southern whiting possession limit from 30,000 up to 40,000 lbs. (Section 5.7.4.1)

Assuming that all 2009-2011 trips which landed more than 28,000 lbs. by vessels using trawls having 3-inch or larger mesh would land 40,000 lbs., and that the total number of trips or vessels fishing for whiting remains constant, the expected increase in landings is 466 mt. During 2009-2011, the number of vessels making these trips increased from 9 to 12 and the number of trips increased from 67 to 158.

The direct impact on trips by the existing whiting fishing fleet is shown in the figure below for this alternative. With no changes in the number of trips, the increase in landings is expected to be 466 mt. This analysis assumes that trips landing 28,000 to 30,000 lbs. will land 38,000 to 40,000 lbs., maintaining the differential between actual landings and the possession limit. The total increase in revenue is expected to be about $650 thousand, assuming that 104 trips are made each year (average of 2009-2011). The slight difference between the expected increase in landings and price is the result of the price/quantity relationship estimated in Section 7.3.1.

On an annual basis, increasing the possession limit to an amount between 30,000 lbs. and 40,000 lbs. is expected to have a nearly linear relationship with increases in landings and revenue, but would carry less risk of increasing fishing effort by vessels making more trips or vessels from other fisheries that begin targeting whiting (see discussion below).

Figure 31. Expected maximum change in whiting landings and revenue at various possession limits.



It is likely that there would be a greater amount of vessels targeting the small mesh multispecies fishery were the possession limit increased to 40,000 lbs. Increasing the whiting possession limit by 10,000 lbs. is expected to also increase a whiting trip's revenue by $5000-6000 per trip (see table below). This table was created using the vessel trip reports of the total silver hake catch in 2009 and the corresponding price information. The revenues were calculated using the dealer's reported price per pound for silver hake. These data reflect a 25% revenue increase in landing whiting under the proposed possession limit.

Table 69. Silver hake price and revenue with estimated increase in value for vessels landing 40,000 lbs. of whiting.

Year	Species	Metric Tons	Pounds, live wt.	Revenue	$/lb.	Value of 40,000 lbs.	Increase
2009	Silver hake	7,761	17,108,943	8,658,936	0.506	$21,000	$5,250
2010	"	8,078	17,809,304	11,039,605	0.620	$24,920	$6,230
2011	"				0.644	$25,760	$6,440

Increases in whiting landings and catch from shifts in fishing effort by vessels in other fisheries is difficult to predict and impossible to quantitatively estimate. Over 2009-2011, there were about 80 vessels making an average of 437 trips annually in fisheries that conversion costs to fish for whiting would be minimal. These fisheries include the trawl fisheries targeting squid, summer flounder, black sea bass and scup, and groundfish.

Shifts in fishing effort are more likely than not for trips where the revenue from the trip was less than revenue that would be generated from landing 40,000 lbs. of whiting, but not for those trips that generated greater revenue. The Council was unable to estimate conversion costs to quantitatively assess this risk of effort shifts, especially since each situation would be different and unique.

With the potential increase of activity certainly evident, the logic behind a vessel switching to whiting if the possession limit was increased must be considered. Specifically, is the daily revenue for 40,000 lbs. of whiting greater than the daily revenue for what the vessel is currently fishing?

There was an average of 437 trips undertaken by vessels targeting other species with trawl gear that could be adapted at modest cost to target whiting (see table below)[17]. These trips represent the possible shift in fishing effort that could occur from raising the whiting possession limit to 40,000 lbs. Data in the table below include vessels that are capable of landing more than 30,000 lbs. per trip, because they reported higher landings on one or more trips during 2009-2011. The analysis assumed a trip would shift to whiting when the revenue from landing a higher amount of whiting would exceed that had been derived from fishing for other species with trawls in the southern stock area.

[17] There were a total of 80 vessels in 2009, 77 vessels in 2010 and 80 vessels in 2011 targeting these fisheries.

Table 70. Vessel and Trip Data for vessels targeting fisheries other than whiting

		Year.		
Species group name	Data	2009	2010	2011
AMBERJACK	Vessels.	21	6	10
	Trips.	57	7	12
BUTTERFISH	Vessels.	1		
	Trips.	2		
COD	Vessels.			2
	Trips.			2
FLOUNDER, SUMMER	Vessels.			2
	Trips.			2
FLOUNDER, WINTER	Vessels.	3	1	1
	Trips.	3	1	1
FLOUNDER, YELLOWTAIL	Vessels.			1
	Trips.			1
HADDOCK	Vessels.	20	36	31
	Trips.	41	114	72
HERRING, SEA	Vessels.	4	7	9
	Trips.	23	21	65
MACKEREL	Vessels.	3	4	
	Trips.	13	10	
MENHADEN	Vessels.	5	2	9
	Trips.	10	2	32
MONKFISH	Vessels.	23	27	25
	Trips.	24	33	28
POLLOCK	Vessels.	1		2
	Trips.	1		2
REDFISH	Vessels.		2	
	Trips.		2	
SKATE, NK	Vessels.	16	8	
	Trips.	48	26	
SQUID LOLIGO	Vessels.	31	27	36
	Trips.	186	180	281
WINDOW PANE-SAND DAB	Vessels.			8
	Trips.			9
Total Trips.		408	396	507

Vessels that already fish in the whiting fishery would have very little conversion costs to shift fishing effort, because they already have the fishing gear and market connections. Some of these vessels also participate in the squid and flounder fisheries, so they might fish less for these species and more for whiting. Vessels using less than 3 inch mesh (and are presently subject to a 3,500 or 7,500 lbs. possession limit would only need to change cod end mesh. It would be less likely that these vessels would be able to fish in the more easterly part of the Southern New England Exemption Area, so limiting the increase in possession limit to an eastern portion of the Southern New England Exemption would reduce the potential to increase fishing effort by vessels that do not currently land 28,000 or more pounds of whiting.

Table 71 summarizes trips taken by any vessels targeting other species with trawls in the southern stock area and landing more than 30,000 lbs. of fish on at least one trip during the year. The total number of vessels was 113 in 2009, 109 in 2010 and 111 in 2011. Trips targeting species other than whiting were categorized as generating less revenue or more revenue than would be generated by fishing for and landing 40,000 lbs. of whiting. This does not of course account for differences in fishing costs.

An average of 236 trips per year would generate more revenue by fishing for whiting with a 40,000 lb. possession limit. This includes vessels that already target whiting with small mesh, but target other species on some trips and vessels that do not target whiting with small mesh. If all 236 trips switched to whiting fishing, the potential effort shift could increase whiting landings by 9.44 million pounds (4,282 mt) valued at $5.8 million at $0.623 per pound. These additional landings and revenue would be offset by vessels making fewer trips in alternative fisheries.

Table 71. Revenue analysis when targeting whiting for all vessels capable of landing over 30,000 lbs. of fish

		Year.	Profit in switch to whiting				
		2009		2010		2011	
Target species group	Data	Less	More	Less	More	Less	More
AMBERJACK	Vessels.	8	13	1	5	1	9
	Trips.	14	43	1	6	1	11
BUTTERFISH	Vessels.	1					
	Trips.	2					
COD	Vessels.					2	
	Trips.					2	
FLOUNDER, SUMMER	Vessels.					2	
	Trips.					2	
FLOUNDER, WINTER	Vessels.	2	1	1		1	
	Trips.	2	1	1		1	
FLOUNDER, YELLOWTAIL	Vessels.					1	
	Trips.					1	
HADDOCK	Vessels.	21		39	4	36	
	Trips.	42		120	4	83	
HERRING, SEA	Vessels.	2	7	4	8	3	8
	Trips.	3	122	10	66	11	78
MACKEREL	Vessels.	2	4	2	2		1
	Trips.	11	7	8	2		1
MENHADEN	Vessels.		5		2		9
	Trips.		10		2		32
MONKFISH	Vessels.	16	12	24	13	19	24
	Trips.	17	12	32	17	22	31
POLLOCK	Vessels.	1				2	
	Trips.	1				2	
REDFISH	Vessels.			1	1		
	Trips.			1	1		
SKATE, NK	Vessels.	12	4	6	2		
	Trips.	15	33	8	18		
SQUID LOLIGO	Vessels.	46	11	30	16	38	15
	Trips.	224	55	172	79	266	77
WINDOW PANE-SAND DAB	Vessels.					9	
	Trips.					10	
Total Trips.		331	283	353	195	401	230

Of the total number of vessels and trips in these alternative fisheries that could be a source of effort shifts to fish for whiting, about 80 vessels and 437 trips were by vessels that did not target whiting during the year. Of these, 154 (35%) are estimated to generate more revenue by switching from fishing for other species with trawls in the southern stock area to fishing for whiting.

In contrast to the analysis discussed above (Table 71) that includes vessels already fishing in the whiting fishery, other potential sources of effort are important to consider. These include vessels that use trawls in the Mid-Atlantic and Southern New England Exemption Areas using trawls to target alternative species, like summer flounder, squid, monkfish, and butterfish, etc. From this potential effort source, it is more likely that shifts in fishing effort will come predominantly from trips that generate less revenue than that which is generated from landing 40,000 lbs. of whiting. Trips that generate greater revenue will likely not shift.

Unlike vessels that already target whiting on some or all of their trips, these vessels would have to modify their gear in more substantial ways, sometimes fish in unfamiliar areas, and often form new market contacts to target whiting. Fishermen furthermore report that market contacts are important and buyers favor traditional whiting fishermen that can deliver an appropriate amount of quality fish to market. They report that when landings are excessive, prices decline and fish cannot be marketed.

Table 72 summarizes trips in other trawl fisheries by vessels that did not target whiting and compares their revenues to the revenues from targeting whiting. The number of vessels fishing in alternative trawl fisheries and landing more than 30,000 lbs. of fish on one or more trips was 77 in 2009, 80 in 2010 and 77 in 2011. The Less/More columns are comparing the revenue in landing 40,000 lbs. of whiting versus what the vessel made from their trip fishing other species. A significant number of vessels could generate greater revenue from targeting whiting with a 40,000 lb. possession limit than in their target fishery for 2009-2011. If all 154 trips that would have generated more revenue by landing 40,000 lbs. of whiting were to switch, it would increase whiting landings by 6.16 million pounds (2,794 mt) valued at $3.8 million.

The above potential increase is included in the potential whiting landing and revenue increase for the fleet as a whole (Table 71). So in summary, the potential value from shifts in effort by vessels targeting alternative species in southern stock area trawl fisheries is 6.16 million pounds (2,794 mt) valued at $3.8 million by vessels that do not currently participate in the whiting fishery and by 3.28 million pounds (1,488 mt) valued at $2.0 million. This potential increase in landings and revenue may be partially offset by decreases in trips taken by the same vessels in alternative fisheries.

Table 72. Revenue comparison for vessels excluding those that target whiting and had landings of 2000 lbs. on one or more trips

		Year.	Profit in switch to whiting				
		2009		2010		2011	
Species group name	Data	Less	More	Less	More	Less	More
AMBERJACK	Vessels.	8	13	1	5	1	9
	Trips.	14	43	1	6	1	11
BUTTERFISH	Vessels.	1					
	Trips.	2					
COD	Vessels.					2	
	Trips.					2	
FLOUNDER, SUMMER	Vessels.					2	
	Trips.					2	
FLOUNDER, WINTER	Vessels.	2	1	1		1	
	Trips.	2	1	1		1	
FLOUNDER, YELLOWTAIL	Vessels.					1	
	Trips.					1	
HADDOCK	Vessels.	20		33	3	31	
	Trips.	41		111	3	72	
HERRING, SEA	Vessels.	2	2	4	3	3	6
	Trips.	3	20	10	11	11	54
MACKEREL	Vessels.	1	2	2	2		
	Trips.	10	3	8	2		
MENHADEN	Vessels.		5		2		9
	Trips.		10		2		32
MONKFISH	Vessels.	16	7	21	6	16	9
	Trips.	17	7	27	6	18	10
POLLOCK	Vessels.	1				2	
	Trips.	1				2	
REDFISH	Vessels.			1	1		
	Trips.			1	1		
SKATE, NK	Vessels.	12	4	6	2		
	Trips.	15	33	8	18		
SQUID LOLIGO	Vessels.	21	10	14	13	22	14
	Trips.	140	46	110	70	208	73
WINDOW PANE-SAND DAB	Vessels.					8	
	Trips.					9	
Total Trips.		245	163	277	119	327	180

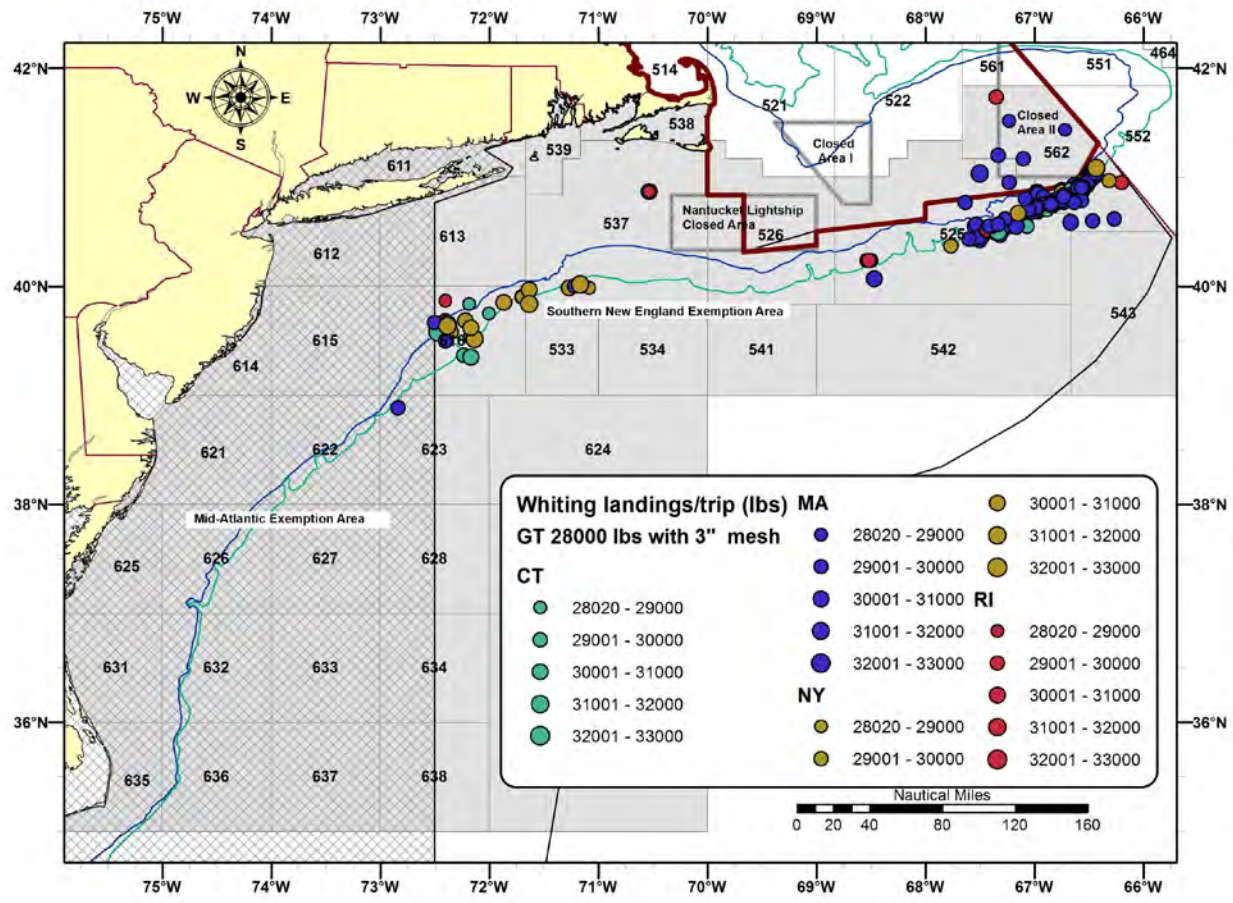
8.7.8.2 Increasing the southern whiting possession limit to 40,000 lbs. in the eastern part of the Southern New England Exemption Area (Section 5.7.4.2)

The alternative described in Section 5.7.4.2 could produce a substantial portion of the benefits that would accrue from increasing the limit in all of both exemption areas, with less risk of effort shifts into the fishery to cause rapid increases in catch. A smaller set of fishing vessels are suitable for fishing on eastern Georges Bank and therefore the pool of vessels that might enter the fishery with a higher possession limit is less than the alternative that raises the possession limit for all of the Mid-Atlantic and Southern New England Exemption Areas, analyzed in the Section above. This alternative thus carries less risk of rapidly increasing landings and the potential for much higher landings to trigger the incidental possession limit as an in-season accountability measure. Although the in-season accountability measure

has long-term economic benefits that come from preventing overfishing, it has short-term costs that are important to consider, especially if it results in an extended closure of the directed fishery.

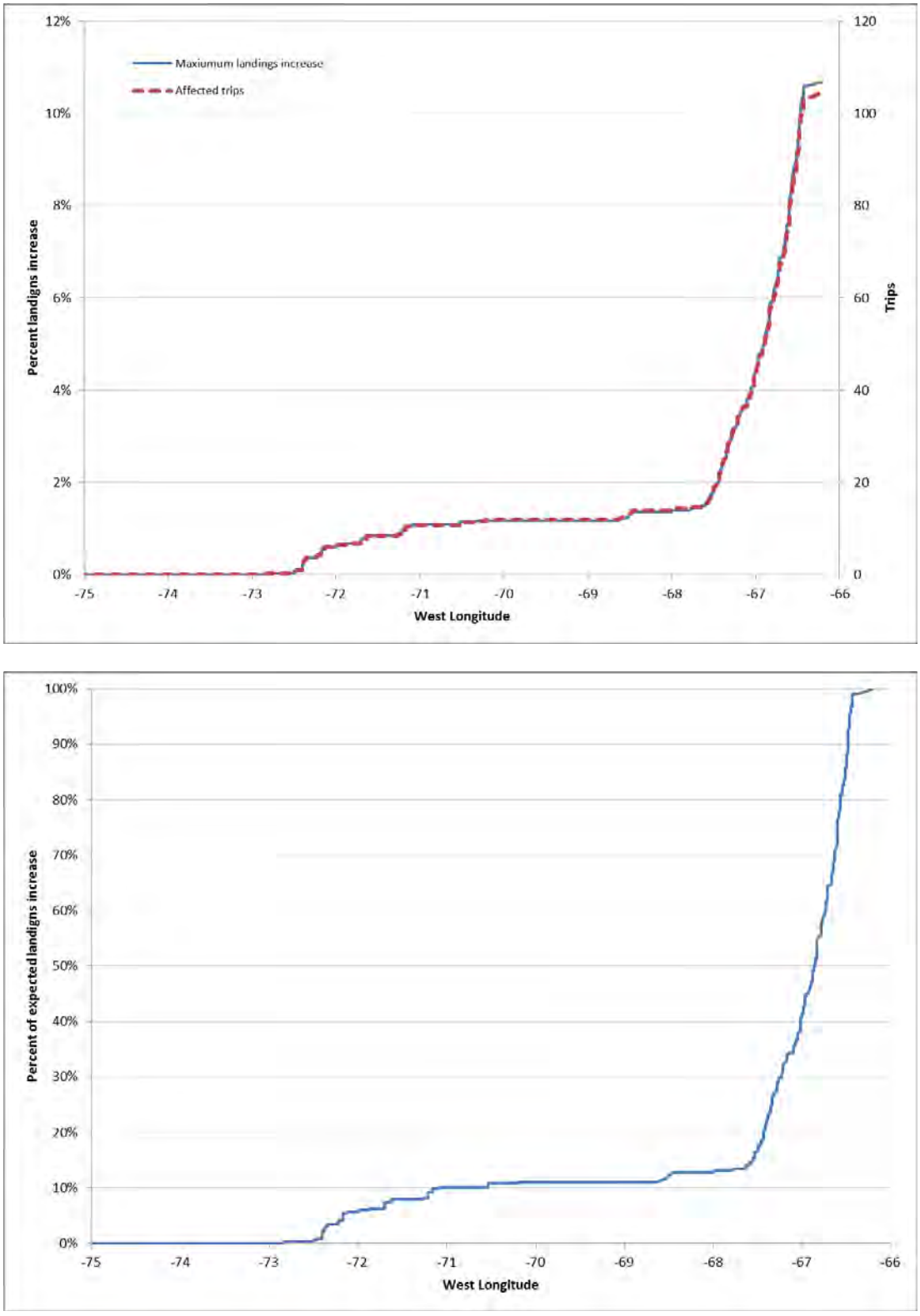
Most of the existing whiting fishing effort on trips landing more than 28,000 lbs. occur on eastern Georges Bank, east of 67°40' W longitude. (Map 10). Therefore if the higher limit applies east of this line most of the benefit would go toward the larger vessels fishing in this area, which tend to have higher fuel and operating costs.

Map 10. Reported fishing locations and state of landing for 2009-2011 trips targeting whiting while using trawls having 3 inch or larger mesh and landing more than 28,000 lbs. Source: Dealer reported landings data matched to VTR data.



As shown in the figures below, over 85% of the economic benefit from raising the possession limit to 40,000 lbs. on existing trips would go to vessels fishing east of 67°40' W longitude, approximately at the longitude of Munson Canyon. Without accounting for additional effort, whiting landings would increase by 873,000 lbs. (396 mt) valued at $544 thousand, for approximately 82 trips per year.

Figure 32. Effect of increasing the southern whiting possession limit to 40,000 lbs. vs. longitude of reported fishing location in the Mid-Atlantic and Southern New England Exemption Areas on 2009-2011 trips.



8.7.8.3 Status quo/No Action (Section 5.7.4.3)

No action would keep the southern whiting possession limit for vessels using trawls with 3-inch or larger mesh at 30,000 lbs. With constant fuel and operating costs, landings and revenue from whiting fishing would be expected to remain constant at recent levels or rise slightly due to higher catches on trips that presently land less than the possession limit. Price also has a significant effect on effort and since whiting demand is mostly foreign, a weaker dollar can improve demand and price for whiting (and vice versa). A weaker dollar can however cause fuel prices to rise (one of the reasons for the alternatives to raise the whiting possession limit).

Recent landings have been well below the proposed TAL and catches have been well below the ACL. So keeping the possession limit at 30,000 lbs. could prevent the fishery from reaching optimum yield unless demand for whiting increases, increasing profit from whiting fishing (which causes fishermen to target whiting more often).

8.7.9 Post-Season Accountability Measure Alternatives (Section 5.8)

The reactive (post-season) AMs would be triggered in the event of an ACL overage. The status quo/no action alternative would maintain the pound-for-pound payback mechanism established by the Secretarial Amendment. That is, the exact amount, in pounds, by which the ACL was exceeded in a given year (year 1) would be deducted from the ACL in a subsequent year (year 3). The discard and state landings estimates would be deducted from the new ACL as described in Section 5.8.1. The Council's preferred alternative (Section 5.8.2) would reduce the incidental possession limit TAL trigger by the same percentage by which the ACL was exceeded. That is, the ACL and TAL calculations would remain the same, but the 90 percent trigger described in Sections 5.4 and 5.6, would be reduced by the same percentage as the overage.

As an example, the 2010 fishing year northern red hake catch exceeds the ACL and will be used to illustrate the potential impacts of the two alternatives. Northern red hake catch was 311 mt in 2010, 17% or 45 mt above the 266 mt ACL. The 2012 ACL would be 266 mt. For this example, we assume that the discard rate and state water landings proportion remain constant. Table 69 provides a comparison of how the 45 mt overage would affect future specifications. Note that the No Action alternative by definition changes the assumption about discards and state landings in absolute values (but the proportions remain the same), while the preferred alternative does not change the absolute values of discards and state landings.

Table 73. Example red hake specifications after post-season accountability measures take effect in response to a 45 mt ACL overage.

Specification	No Action Pound-for-pound payback Sections 5.8.1 and 8.7.8.1	Preferred alternative TAL trigger adjustment Sections 5.8.2 and 8.7.8.2
Original ACL	266 mt	266 mt
Overage	-45 mt	17 % (45 mt)
Adjusted ACL	221 mt	266 mt
Discards (65%)	143.65 mt	173 mt
Landings Limit (State + Fed)	67.35 mt	93 mt
State Landings Set-aside (3%)	2 mt	2.8 mt
Federal TAL	65.36 mt (144,094.1 lb)	90.3 mt (199,077.4 lb)
Trigger Point	90% (129,685 lb)	73% (145,326.5 lb)

8.7.9.1 Pound-for-pound payback (Section 5.8.1; No Action)

This is the No Action alternative, expected to be approved in the Secretarial Amendment. By definition, this alternative does not have a positive or negative economic and social impact.

A reactive accountability measure is designed to respond to exceeding the ACL, and, if invoked, is intended to prevent catches from exceeding the OFL in the future. This would likely lead to either no change in fishing (if the accountability measure is not invoked), or a reduction in fishing effort (if the accountability measure reduces the allowable landings). Allowing the overage to be deducted from future years gives vessel owners an opportunity to adopt alternative fishing strategies to account for a pound-for-pound payback due to an ACL overage.

If this alternative is chosen, it would result in short-term negative economic impacts by reducing the amount of a particular stock that could be landed in a given year. Such controls on small-mesh multispecies fishing effort will likely have negligible to negative impacts for fishing communities. However, this would negatively impact the revenue of those vessels targeting stocks in the Northern areas. Catches of northern red hake have been increasing in recent years and are greater than the proposed ABC. If this trend continues, the accountability measures could be invoked. Vessels that land red hake would be subject to losses in revenue.

The in-season AMs (incidental possession limits triggered when landings exceed 90% of the applicable TAL), are meant to discourage targeting and induce fishermen to seek other locations where red hake are less abundant. And although discarding may increase (see Section 8.1.6 for estimated effects), they are unlikely to cause the catch to exceed the ACLs by themselves. Therefore a post-season, pound-for-pound payback would be less likely to be invoked if the in-season AMs are chosen in the final alternative. Thus the impact on communities would be negative in the short term, while preventing chronic overfishing would have positive long-term impacts. Coupled with in-season AMs, this alternative is likely to carry less negative impacts, while achieving the same long-term positive impacts derived from preventing chronic overfishing.

8.7.9.2 Reduce incidental possession limit trigger (Section 5.8.2)

This reactive accountability measure reduces future incidental possession limit triggers by the amount the ACL was exceeded in a current year. This has a similar effect on fishing communities as the pound-for-pound payback AM analyzed above, because both alternatives would reduce the TAL and reduce the risk of chronic overfishing, regardless of cause (increasing landings or discards). But unlike the pound-for-pound AM analyzed above, reducing the incidental possession limit trigger is more likely to have a higher impact on the directed small-mesh fisheries. Thus, the negative impacts of this alternative could have greater negative impacts on fishing communities that derive income from small-mesh fisheries, while other fishing communities would see a smaller negative impact.

Comparing the two post-season accountability measure alternatives, the deductions are taken at different points, and the effective management limit (i.e., the trigger point) differs between the two approaches. Using the same approach described the Secretarial Amendment to analyze the impacts of the incidental possession limit trigger (2006-2010 VTR average daily landings), the trigger point would be reached on or about August 19 (Figure X1), using the pound-for-pound alternative, and on or about August 24 (Figure X2), using the reduced possession limit trigger.

Both alternatives would cause the TAL trigger to be met earlier in the season if daily landings rates do not change before the incidental possession limit would take effect. In the case of the No Action alternative,

the 90% TAL trigger after the post-season accountability measure took effect would be 129,685 lbs. and would trigger a reduced incidental possession limit on Aug 19th (Figure 27). This TAL is 15,641 lbs. or $5,787 (assuming a dockside price of $0.37 per whole pound) less than it would be under the Council's preferred alternative. And since the ACL would be lowered to 221 mt, the analysis indicates that the new ACL could be exceeded again, triggering a new round of reductions. Under this scenario for the No Action alternative, landings would exceed the new 144,084 TAL by a considerable amount.

In contrast, the preferred alternative would keep the Federal TAL at the same level and reduce the TAL trigger from 90% to 73%. The estimated TAL trigger date would occur earlier than expected in 2012, on or about Aug 24th. The expected results are shown in Figure 28. The TAL trigger would be 15,641 lbs. or $5,787 higher than would occur under the No Action alternative. Furthermore, since the TAL remains unchanged, the earlier trigger of the incidental possession limit would unlike, the expectations for 2012, keep landings below the TAL and probably reduce total catch. Some discards would however continue to occur (under both alternatives) from vessels targeting other species.

It appears that while both post-season AM alternatives could potentially result in negative impacts to the fleet, the reduced TAL trigger alternative has less negative economic impact, while not creating the potential for sequential reductions in ACL and TAL.

Figure 33. Potential effects of the pound-for-pound AM adjustment for a 45 mt ACL overage, based on 2006-2010 average daily landings.

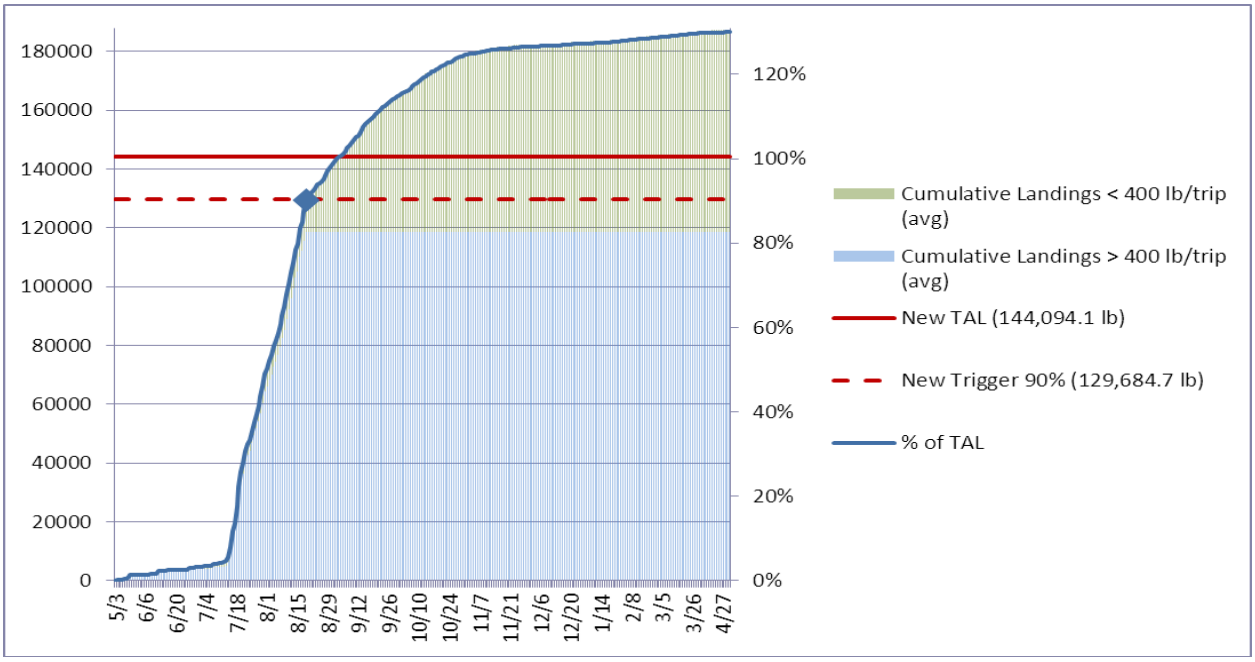
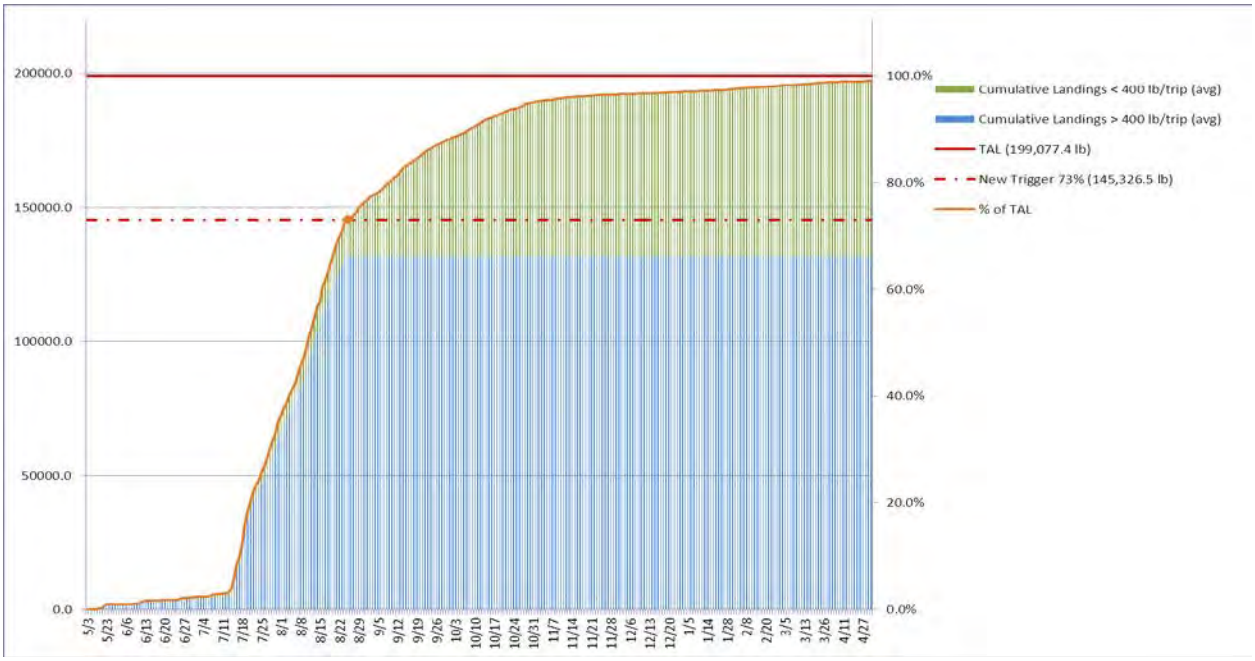


Figure 34. Potential effects of the TAL trigger (preferred alternative) adjustment for a 17% (45 mt) ACL overage, based on 2006-2010 average daily landings.



8.8 Cumulative Effects

A cumulative effects analysis is required by the Council on Environmental Quality (CEQ) (40 CFR part 1508.7). The purpose of a cumulative effects analysis 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, but rather, the intent is to focus on those effects that are truly meaningful. A formal cumulative impact assessment is not necessarily required as part of an EA under NEPA as long as the significance of cumulative impacts have been considered (U.S. EPA 1999). The following addresses the significance of the expected cumulative impacts as they relate to the federally managed small-mesh multispecies fishery.

8.8.1.1 Consideration of the Valued Ecosystem Components (VECs)

In Section 7.0 (Affected Environment), the VECs that exist within the small-mesh multispecies fishery environment are identified. Therefore, the significance of the cumulative effects will be discussed in relation to the VECs listed below.

1. Managed resources (offshore hake, red hake, and silver hake)
2. Non-target species
3. Habitat including EFH for the managed resource and non-target species
4. ESA-listed and MMPA-protected species
5. Human communities

8.8.1.2 Geographic Boundaries

The analysis of impacts focuses on actions related to the harvest of the small-mesh multispecies (offshore hake, red hake, and silver hake). The core geographic scope for each of the VECs is focused on the Western Atlantic Ocean (Section 7.0). The core geographic scopes for the managed resources are the range of the Mid-Atlantic Bight, the Gulf of Maine, and Georges Bank. For non-target species, those ranges may be expanded and would depend on the biological range of each individual non-target species in the Western Atlantic Ocean. For habitat, the core geographic scope is focused on EFH within the EEZ, but includes all habitat utilized by small-mesh multispecies and other non-target species in the Western Atlantic Ocean. The core geographic scope for endangered and protected resources can be considered the overall range of these VECs in the Western Atlantic Ocean. For human communities, the core geographic boundaries are defined as those U.S. fishing communities directly involved in the harvest or processing of the managed resources, which were found to occur in coastal states from Maine through North Carolina (Section 7.2).

8.8.1.3 Temporal Boundaries

The temporal scope of past and present actions for VECs is primarily focused on actions that have occurred after FMP implementation (1991, Amendment 4 to the Northeast Multispecies FMP for red and silver hake; and 2000, Amendment 12 to the Northeast Multispecies FMP for offshore hake). For endangered species and other protected resources, the scope of past and present actions is on a species-by-species basis (Section 7.1.5) and is largely focused on the 1980s and 1990s through the present, when NMFS began generating stock assessments for marine mammals and sea turtles that inhabit waters of the U.S. EEZ.

When approved during fishing year 2012, specifications for 2012-2014 and measures in Amendment 19 will replace the secretarial action. The specifications in this action would continue until re-evaluated, no later than the next three year specification process for the 2015 fishing year. This action includes a three-year specification process that will begin in 2014 for implementation on May 1, 2015. During this process, the Council will update relevant data on biological and fishery characteristics. This process will enable the Council to adjust the plan in response to changing conditions. If for some reason, the Council and NMFS are unable to modify the specifications, the proposed specifications will continue until changed.

The Council chose a three year specification period because a shorter period would create greater instability in the fishery, reducing potential revenue to the fishery and increasing the risk that changes may occur. This would make it more difficult for participants in the fishery to plan, invest, or obtain financing. A longer period, on the other hand, would make the plan less responsive to important changes in resource conditions, increasing the risk to the resource.

8.8.1.4 Actions Other Than Those Proposed in this Amendment

The impacts of each of the alternatives considered in this document are given in Section 7.1. Table 70 presents meaningful past (P), present (Pr), or reasonably foreseeable future (RFF) actions to be considered other than those actions being considered in this amendment document. These impacts are described in chronological order and qualitatively, as the actual impacts of these actions are too complex to be quantified in a meaningful way. When any of these abbreviations occur together (i.e., P, Pr, RFF), it indicates that some past actions are still relevant to the present and/or future actions.

8.8.1.4.1 Past, Present, and Reasonably Foreseeable Future Actions

8.8.1.4.2 Fishery related actions

The historical management practices of the Council have resulted in positive impacts on the health of the small-mesh multispecies stocks. Numerous actions have been taken to manage the fisheries for these three species through amendment and framework adjustment actions. In addition, the nature of the fishery management process is intended to provide the opportunity for the Council and NMFS to regularly assess the status of the fishery and to make necessary adjustments to ensure that there is a reasonable expectation of meeting the objectives of the FMP and the targets associated with any rebuilding programs under the FMP. The statutory basis for Federal fisheries management is the Magnuson-Stevens Act. To the degree with which this regulatory regime is complied, the cumulative impacts of past, present, and reasonably foreseeable future Federal fishery management actions on the VECs should generally be associated with positive long-term outcomes. Constraining fishing effort through regulatory actions can often have negative short-term socioeconomic impacts. These impacts are usually necessary to bring about long-term sustainability of a given resource, which should, in the long-term, promote positive effects on human communities, especially those that are economically dependent upon the small-mesh multispecies stocks. There are two amendments currently under development by the Council that will impact the small-mesh multispecies fishery. The Council is developing Amendment 19 that will update the ACL and AM framework that is being proposed in this action. The other amendment under development is an update to the Omnibus Essential Fish Habitat Amendment that is intended to revise the existing EFH descriptions and habitat protection areas. Given the nature of the Omnibus EFH Amendment and Amendment 19, it is likely that these actions would have positive biological impacts; however, full analyses of these actions has not yet been completed.

8.8.1.4.3 Non-fishing actions

Non-fishing activities that introduce chemical pollutants, sewage, changes in water temperature, salinity, dissolved oxygen, and suspended sediment into the marine environment pose a risk to all of the identified VECs. Human-induced non-fishing activities tend to be localized in nearshore areas and marine project areas where they occur. Examples of these activities include, but are not limited to, agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging, and the disposal of dredged material. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities. The overall impact to the affected species and their habitats on a population level is unknown, but likely neutral to low negative, since a large portion of these species have a limited or minor exposure to these local non-fishing perturbations.

In addition to guidelines mandated by the Magnuson-Stevens Act, NMFS reviews these types of effects through 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. The jurisdiction of these activities is in "waters of the U.S." and includes both river and marine habitats.

For many of the proposed non-fishing activities to be permitted under other Federal agencies (such as beach nourishment, offshore wind facilities, etc.), those agencies would conduct examinations of potential impacts on the VECs. The Magnuson-Stevens Act (50 CFR 600.930) imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH. The eight fishery management councils are engaged in this review process by making comments and

recommendations on any Federal or state action that may affect habitat, including EFH, for their managed species and by commenting on actions likely to substantially affect habitat, including EFH.

In addition, under the Fish and Wildlife Coordination Act (Section 662), "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the U.S., or by any public or private agency under Federal permit or license, such department or agency first shall consult with the U.S. Fish and Wildlife Service (USFWS), Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular state wherein the" activity is taking place. This act provides another avenue for review of actions by other Federal and state agencies that may impact resources that NMFS manages in the reasonably foreseeable future.

In addition, NMFS and the USFWS share responsibility for implementing the ESA. ESA requires NMFS to designate "critical habitat" for any species it lists under the ESA (i.e., areas that contain physical or biological features essential to conservation, which may require special management considerations or protection) and to develop and implement recovery plans for threatened and endangered species. The ESA provides another avenue for NMFS to review actions by other entities that may impact endangered and protected resources whose management units are under NMFS' jurisdiction.

8.8.2 Magnitude and Significance of Cumulative Effects

In determining the magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions, must be taken into account. The following section discusses the effects of these actions on each of the VECs.

Table 74. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the five VECs (not including those actions considered in this proposed action).

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
P, Pr, RFF Original FMP and subsequent Amendments to the Small-Mesh Multispecies FMP, including Amendment 19	Established fishery management measures	**Indirect Positive** Regulatory tool available to rebuild and manage stocks	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Benefited domestic businesses
P, Pr Developed and Applied Standardized Bycatch Reporting Methodology (SBRM) through Northeast Region SBRM Omnibus Amendment	Established acceptable level of precision and accuracy for monitoring of bycatch in fisheries	**Neutral** May improve data quality for monitoring total removals of managed resource	**Neutral** May improve data quality for monitoring removals of non-target species	**Neutral** Will not affect distribution of effort	**Neutral** May increase observer coverage overall and will not affect distribution of effort	**Potentially Indirect Negative** May impose an inconvenience on vessel operations
P, Pr, RFF Agricultural runoff	Nutrients applied to agricultural land are introduced into aquatic systems	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource
P, Pr, RFF Port maintenance	Dredging of coastal, port, and harbor areas for port maintenance	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Direct Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects
P, Pr, RFF Offshore disposal of dredged materials	Disposal of dredged materials	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource viability
P, Pr, RFF Beach nourishment	Offshore mining of sand for beaches	**Indirect Negative** Localized decreases	**Indirect Negative** Localized decreases	**Direct Negative** Reduced habitat	**Indirect Negative** Localized	**Mixed** Positive for mining

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
		in habitat quality	in habitat quality	quality	decreases in habitat quality	companies, possibly negative for fishing industry
	Placement of sand to nourish beach shorelines	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Positive** Beachgoers like sand; positive for tourism
P, Pr, RFF Marine transportation	Expansion of port facilities, vessel operations, and recreational marinas	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Mixed** Positive for some interests, potential displacement for others
P, Pr, RFF Installation of pipelines, utility lines, and cables	Transportation of oil, gas, and energy through pipelines, utility lines, and cables	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Direct Negative** Reduced habitat quality	**Potentially Direct Negative** Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects
RFF Offshore Wind Energy Facilities	Construction of wind turbines to harness electrical power (Several proposed from ME through NC)	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects
Pr, RFF Liquefied Natural Gas (LNG) terminals	Transport natural gas via tanker to terminals offshore and onshore (1 terminal built in MA; 1 under construction; proposed in RI, NY, NJ and DE)	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects
RFF Convening Gear Take Reduction Teams	Recommend measures to reduce mortality and injury to marine mammals	**Indirect Positive** Will improve data quality for monitoring total removals	**Indirect Positive** Reducing availability of gear could reduce bycatch	**Indirect Positive** Reducing availability of gear could reduce gear impacts	**Indirect Positive** Reducing availability of gear could reduce encounters	**Indirect Negative** Reducing availability of gear could reduce revenues

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
RFF Omnibus EFH Amendment	Reviewing and updating a gear effects evaluation and optimizing management measures for minimizing the adverse effects of fishing on EFH	**Indirect Positive** Will improve habitat protection, which is necessary for sustainable fish stocks	**Indirect Positive** Will improve habitat protection, which is necessary for sustainable fish stocks	**Positive** Will improve habitat protection	**Uncertain - Neutral to Indirect Negative** May result in redistribution of effort to areas of increased protected resources stocks	**Indirect Positive** Improved habitat protection will result sustainable fish stocks and long-term economic stability

8.8.2.1 Managed Resources

Those past, present, and reasonably foreseeable future actions, whose effects may impact the managed resources and the direction of those potential impacts, are summarized in Table 70. The indirectly negative actions described in Table 70 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on the managed resources is expected to be limited due to a lack of exposure to the population at large. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on productivity of the managed resources is unquantifiable. As described above (Section 6.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources under NMFS' jurisdiction.

Past fishery management actions taken through the FMP have had a positive cumulative effect on the managed resources. It is anticipated that the future management actions, described in Table 71, will result in additional indirect positive effects on the managed resources through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which offshore hake, red hake, and silver hake productivity depends. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to the small-mesh multispecies resources have had a positive cumulative effect.

Table 75 Summary of the effects of past, present, and reasonably foreseeable future actions on the managed resources.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Developed and Implement Standardized Bycatch Reporting Methodology	**Neutral**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Uncertain – Likely Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Indirect Negative**		
Beach nourishment – Sand placement	**Indirect Negative**		
Marine transportation	**Indirect Negative**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Indirect Negative**		
Offshore Wind Energy Facilities			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals		**Uncertain – Likely Indirect Negative**	
Convening Gear Take Reduction Teams			**Indirect Positive**
Omnibus EFH Amendment			**Indirect Positive**
Amendment 19 (Council's ACL and AM Amendment)			**Uncertain – Likely Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on the managed resources** *** See section 6.6 for explanation.**		

8.8.2.2 Non-Target Species or Bycatch

Those past, present, and reasonably foreseeable future actions, whose effects may impact non-target species and the direction of those potential impacts, are summarized in Table 70. The effects of indirectly negative actions described in Table 70 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on non-target species is expected to be limited due to a lack of exposure to the population at large. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on productivity of non-target resources and the oceanic ecosystem is unquantifiable. As described above (section 6.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. At this time, NMFS can consider impacts to non-target species (federally-managed or otherwise) and comment on potential impacts. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources within NMFS' jurisdiction.

Past fishery management actions taken through the FMP have had a positive cumulative effect on non-target species. Implementation and application of a standardized bycatch reporting methodology would have a particular impact on non-target species by improving the methods which can be used to assess the magnitude and extent of a potential bycatch problem. Better assessment of potential bycatch issues allows more effective and specific management measures to be developed to address a bycatch problem. It is anticipated that future management actions, described in Table 72, will result in additional indirect positive effects on non-target species through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which the productivity of many of these non-target resources depend. The impacts of these future actions could be broad in scope, and it should be noted the managed resource and non-target species are often coupled in that they utilize similar habitat areas and ecosystem resources on which they depend. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful have had a positive cumulative effect on non-target species.

Table 76 Summary of the effects of past, present, and reasonably foreseeable future actions on the non-target species.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Developed and Implement Standardized Bycatch Reporting Methodology	**Neutral**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Uncertain – Likely Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Indirect Negative**		
Beach nourishment – Sand placement	**Indirect Negative**		
Marine transportation	**Indirect Negative**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Indirect Negative**		
Offshore Wind Energy Facilities			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals		**Uncertain – Likely Indirect Negative**	
Convening Gear Take Reduction Teams			**Indirect Positive**
Omnibus EFH Amendment			**Indirect Positive**
Amendment 19 (Council's ACL and AM amendment)			**Uncertain – Likely Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on the non-target species** *** See section 6.6 for explanation.**		

8.8.2.3 Habitat (Including EFH)

Those past, present, and reasonably foreseeable future actions, whose effects may impact habitat (including EFH) and the direction of those potential impacts, are summarized in Table 70. The direct and indirect negative actions described in Table 70 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on habitat is expected to be limited due to a lack of exposure to habitat at large. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on habitat and EFH is unquantifiable. As described above (section 6.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' managed resources and the habitat on which they rely prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of direct and indirect negative impacts those actions could have on habitat utilized by resources under NMFS' jurisdiction.

Past fishery management actions taken through the FMP process have had a positive cumulative effect on habitat and EFH. As required under these FMP actions, EFH and HAPCs will be redefined for the managed resources. It is anticipated that the future management actions, described in Table 73, will result in additional direct or indirect positive effects on habitat through actions which protect EFH for federally-managed species and protect ecosystem services on which these species' productivity depends. These impacts could be broad in scope. All of the VECs are interrelated; therefore, the linkages among habitat quality and EFH, managed resources and non-target species productivity, and associated fishery yields should be considered. For habitat and EFH, there are direct and indirect negative effects from actions which may be localized or broad in scope; however, positive actions that have broad implications have been, and it is anticipated will continue to be, taken to improve the condition of habitat. There are some actions, which are beyond the scope of NMFS and Council management such as coastal population growth and climate changes, which may indirectly impact habitat and ecosystem productivity. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to habitat have had a neutral to positive cumulative effect.

Table 77 Summary of the effects of past, present, and reasonably foreseeable future actions on the habitat.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Developed and Implement Standardized Bycatch Reporting Methodology	**Neutral**		
Agricultural runoff	**Direct Negative**		
Port maintenance	**Uncertain – Likely Direct Negative**		
Offshore disposal of dredged materials	**Direct Negative**		
Beach nourishment – Offshore mining	**Direct Negative**		
Beach nourishment – Sand placement	**Direct Negative**		
Marine transportation	**Direct Negative**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Direct Negative**		
Offshore Wind Energy Facilities			**Potentially Direct Negative**
Liquefied Natural Gas (LNG) terminals		**Potentially Direct Negative**	
Convening Gear Take Reduction Teams			**Indirect Positive**
Omnibus EFH Amendment			**Positive**
Amendment 19 (Council's ACL and AM amendment)			**Uncertain – Likely Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, neutral to positive impacts on habitat, including EFH * See section 6.6 for explanation.**		

8.8.2.4 ESA-Listed and MMPA-Protected Species

Those past, present, and reasonably foreseeable future actions, whose effects may impact the protected resources and the direction of those potential impacts, are summarized in Table 70. The indirectly negative actions described in Table 70 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on protected resources, relative to the range of many of the protected resources, is expected to be limited due to a lack of exposure to the population at large. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude, although the impact on protected resources either directly or indirectly is unquantifiable. As described above (section 6.4), NMFS has several means, including ESA, under which it can review non-fishing actions of other Federal or state agencies that may impact NMFS' protected resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on protected resources under NMFS' jurisdiction.

NMFS will implement any appropriate measures outlined in the BO to mitigate harm to Atlantic sturgeon. Further, the encounter rates and mortalities for Atlantic sturgeon that have been calculated as part of the preliminary analysis of NEFOP data (as discussed in Section 7.1.5.4) include encounters and mortalities by all fisheries utilizing small-mesh otter trawl gear, including the squid fishery. Thus, it is likely that rates of encounters and mortalities by the small-mesh multispecies fishery would be lower than those estimates. Finally, this EA evaluates an action that is primarily administrative in nature and the biological impacts are primarily indirect. Therefore, impacts resulting from the approval of the Secretarial Amendment are not likely to be significant.

Past fishery management actions taken through the FMP process have had a positive cumulative effect on ESA-listed and MMPA-protected species through the reduction of fishing effort (potential interactions) and implementation of gear requirements. It is anticipated that the future management actions, described in Table 74, will result in additional indirect positive effects on protected resources. These impacts could be broad in scope. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to protected resources have had a positive cumulative effect.

Table 78 Summary of the effects of past, present, and reasonably foreseeable future actions on the protected resources.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Developed and Implement Standardized Bycatch Reporting Methodology	**Neutral**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Uncertain – Likely Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Indirect Negative**		
Beach nourishment – Sand placement	**Indirect Negative**		
Marine transportation	**Indirect Negative**		
Installation of pipelines, utility lines and cables	**Potentially Direct Negative**		
Offshore Wind Energy Facilities			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals		**Uncertain – Likely Indirect Negative**	
Convening Gear Take Reduction Teams			**Indirect Positive**
Omnibus EFH Amendment			**Uncertain - Neutral to Indirect Negative**
Amendment 19 (Council's ACL and AM amendment)			**Uncertain – Likely Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on protected resources** *** See section 6.6 for explanation.**		

8.8.2.5 Human Communities

Those past, present, and reasonably foreseeable future actions, whose effects may impact human communities and the direction of those potential impacts, are summarized in Table 70. The indirectly negative actions described in Table 70 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on human communities is expected to be limited in scope. It may, however, displace fishermen from project areas. Agricultural runoff may be much broader in scope, and the impacts of nutrient inputs to the coastal system may be of a larger magnitude. This may result in indirect negative impacts on human communities by reducing resource availability; however, this effect is unquantifiable. As described above (section 6.4), NMFS has several means under which it can review non-fishing actions of other Federal or state agencies prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on human communities.

Past fishery management actions taken through the FMP process have had both positive and negative cumulative effects by benefiting domestic fisheries through sustainable fishery management practices, while at the same time potentially reducing the availability of the resource to all participants. Sustainable management practices are, however, expected to yield broad positive impacts to fishermen, their communities, businesses, and the nation as a whole. It is anticipated that the future management actions, described in Table 75, will result in positive effects for human communities due to sustainable management practices, although additional indirect negative effects on the human communities could occur through management actions that may implement gear requirements or area closures and thus, reduce revenues. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to human communities have had an overall positive cumulative effect.

Despite the potential for slight negative short-term effects on human communities, the expectation is that there would be a positive long-term effect on human communities due to the long-term sustainability of offshore hake, red hake, and silver hake. Overall, the proposed actions in this document would not change the past and anticipated cumulative effects on human communities and thus, would not have any significant effect on human communities individually, or in conjunction with other anthropogenic activities (Table 75).

Table 79 Summary of the effects of past, present, and reasonably foreseeable future actions on human communities.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments to the FMP	**Indirect Positive**		
Developed and Implement Standardized Bycatch Reporting Methodology	**Potentially Indirect Negative**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Uncertain – Likely Mixed**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Mixed**		
Beach nourishment – Sand placement	**Positive**		
Marine transportation	**Mixed**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Mixed**		
Offshore Wind Energy Facilities			**Uncertain – Likely Mixed**
Liquefied Natural Gas (LNG) terminals		**Uncertain – Likely Mixed**	
Convening Gear Take Reduction Teams			**Indirect Negative**
Omnibus EFH Amendment			**Indirect Positive**
Amendment 19 (Council's ACL and AM amendment)			**Uncertain – Likely Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on human communities** *** See section 6.6 for explanation.**		

8.8.3 Preferred Action on all the VECS

The Council has identified its preferred action alternatives in section 3.0. The cumulative effects of the range of actions considered in this document can be considered to make a determination if significant cumulative effects are anticipated from the preferred action.

Table 80 Magnitude and significance of the cumulative effects; the additive and synergistic effects of the preferred action, as well as past, present, and future actions.

VEC	Status in 2011	Net Impact of P, Pr, and RFF Actions	Impact of the Preferred Action	Significant Cumulative Effects
Managed Resources	Complex and variable (Section 7.1)	Positive (Section 8.8.1.4.1)	Neutral to positive (Section 8.1)	**None**
Non-target Species	Complex and variable (Section 7.1.4)	Positive (Section 8.8.1.4.1)	Neutral (Section 8.2)	**None**
Protected Resources	Complex and variable (Section 7.1.5)	Positive (Section 8.8.1.4.1)	Neutral (Section 8.3)	**None**
Habitat	Complex and variable (Section 7.2)	Neutral to positive (Section 8.8.1.4.1)	Neutral to low positive (Section 8.4)	**None**
Human Communities	Complex and variable (Section 7.3)	Positive (Section 8.8.1.4.1)	Short-term negative to long-term positive (Section 8.7)	**None**

The 2012 fishing year will be the first year of implementation for the required specification of ACLs and accountability measures. This represents a major change to the current management program and is expected to lead to improvements in resource sustainability over the long-term. Direct and indirect impacts of these measures could be broad in scope and are further discussed in section 5.1 through section 5.5. The magnitude and significance of the cumulative effects, which include the additive and synergistic effects of the proposed action, as well as past, present, and future actions, have been taken into account throughout this Section 6.0. The action proposed in this Secretarial amendment builds off action taken in the original FMP and subsequent amendments.

The proposed action in this document would positively reinforce the past and anticipated positive cumulative effects on the managed resources, by achieving the objectives specified in the FMP. Therefore, the proposed action would not have any significant effect on the managed resources individually or in conjunction with other anthropogenic activities (Table 71).

The proposed action in this document has neutral impacts to non-target species and would not change the past and anticipated positive cumulative effects on non-target species. Thus, the proposed action would not have any significant effect on these species individually or in conjunction with other anthropogenic activities (Table 72).

The proposed action in this document would not change the past and anticipated cumulative effects on habitat and thus, would not have any significant effect on habitat individually or in conjunction with other anthropogenic activities (Table 73).

The proposed action in this document would not change the past and anticipated cumulative effects on ESA-listed and MMPA-protected species and thus, would not have any significant effect on protected resources individually or in conjunction with other anthropogenic activities (Table 74).

The proposed action in the document may have short-term negative to long-term positive impacts on human communities. However, such anticipated impacts would not significantly change the past and anticipated cumulative effects on revenues and the social well-being of fishermen and/or associated businesses individually or in conjunction with other anthropogenic activities (Table 75).

Therefore, when this action is considered in conjunction with all the other pressures placed on fisheries by past, present, and reasonably foreseeable future actions, it is not expected to result in any significant impacts, positive or negative. Based on the information and analyses presented in these past FMP documents and this document, there are no significant cumulative effects associated with the action proposed in this document (Table 76).

9.0 COMPLIANCE WITH OTHER APPLICABLE LAW

9.1 National Environmental Policy Act (NEPA)

9.1.1 Finding of No Significant Impact (FONSI)

To be completed in Final Amendment.

9.1.2 List of preparers; point of contact

The information contained in this document was prepared through the cooperative efforts of the Whiting Plan Development Team members, and other members of the staffs of NMFS and the New England Fishery Management Council. Contributors are:

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9.1.3 Agencies consulted

This proposed action was developed by the New England Fishery Management Council in coordination with the National Marine Fisheries Service and the Mid-Atlantic Fishery Management Council.

9.1.4 Opportunity for public comment

The proposed action in this specifications document was prepared by the New England Fishery Management Council during a series of public meetings, including SSC and Whiting Oversight Committee meetings, a Council meeting on June 19-21 2011, and a review of the final proposed specifications at the Sep 26-29, 2011. NMFS will publish the new management measures as a proposed rule following submission of this document to the Secretary of Commerce, which will provide an additional opportunity for public comment.

9.2 Endangered Species Act (ESA)

To be completed in Final Amendment.

9.3 Marine Mammal Protection Act (MMPA)

To be completed in Final Amendment.

9.4 Coastal Zone Management Act (CZMA)

To be completed in Final Amendment.

9.5 Administrative Procedure Act

To be completed in Final Amendment.

9.6 Executive Order 13132 (Federalism)

To be completed in Final Amendment.

9.7 Initial Regulatory Flexibility Analysis (IRFA) – Determination of Significance

To be completed in Final Amendment.

9.8 Executive Order 13158 (Marine Protected Areas)

To be completed in Final Amendment.

9.9 Paperwork Reduction Act

To be completed in Final Amendment.

9.10 Executive Order 12866

To be completed in Final Amendment.

9.11 Information Quality Act (IQA)

To be completed in Final Amendment.

10.0 Glossary

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).

ACT – "Annual catch target" is an amount of annual catch of a stock or stock complex that is the management target of the fishery.

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 platelike 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 nontarget species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program.

Capacity – the level of output a fishing fleet is able to produce given specified conditions and constraints. Maximum fishing capacity results when all fishing capital is applied over the maximum amount of available (or permitted) fishing time, assuming that all variable inputs are utilized efficiently.

Catch – The sum total of fish killed in a fishery in a given period. Catch is given in either weight or number of fish and may include landings, unreported landings, discards, and incidental deaths.

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.

Days absent – an estimate by port agents of trip length. This data was collected as part of the NMFS weighout system prior to May 1, 1994.

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 Impact Statement (EIS) – 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" (DEIS) for public comment. The Final EIS is referred to as the Final Environmental Impact Statement (FEIS).

Essential Fish Habitat (EFH) – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998).

Exclusive Economic Zone (EEZ) – 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.

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.)

$\mathbf{F_{MSY}}$ – 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.

$\mathbf{F_{MAX}}$ – 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.

$\mathbf{F_{threshold}}$ – 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 F_{MAX} 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 lbs.). A metric ton is equivalent to 2,204.6 lbs. A thousand metric tons is equivalent to 2.204 million lbs.

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, haddock, pollock, yellowtail flounder, 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

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 marine ecosystems;

(b) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and

(c) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

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.

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 B_{MSY} 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, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake and redfish. These species are usually targeted with large-mesh net gear.

Relative exploitation – an index of exploitation derived by dividing landings by trawl survey biomass. This 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, FMSY, BMSY, 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). BMSY 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 skate management is equivalent to the ACL minus the dead discard rate. 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)

Yearclass (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.

Yield-per-recruit (YPR) – the expected yield (weight) of individual fish calculated for a given fishing mortality rate and exploitation pattern and incorporating the growth characteristics and natural mortality.

11.0 REFERENCES

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