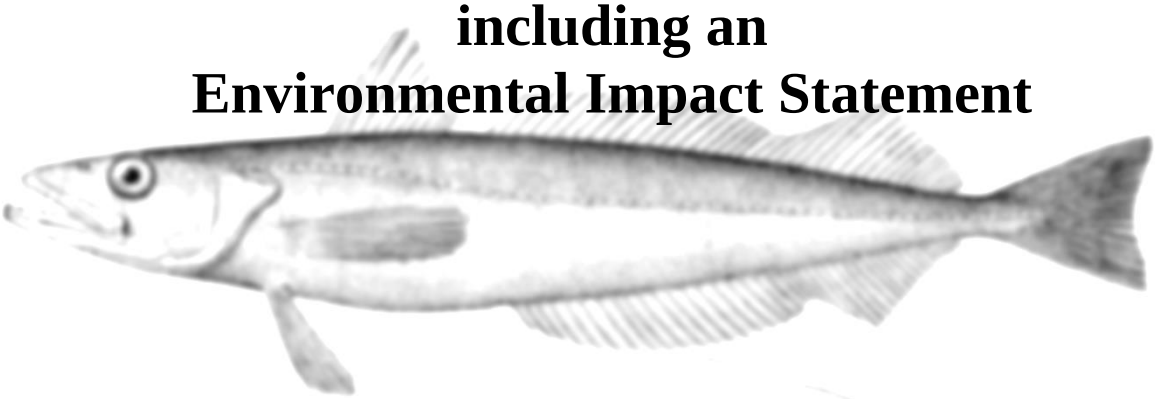
Draft Amendment 22 to the Northeast Multispecies FMP (Small-mesh Multispecies) including an Environmental Impact Statement



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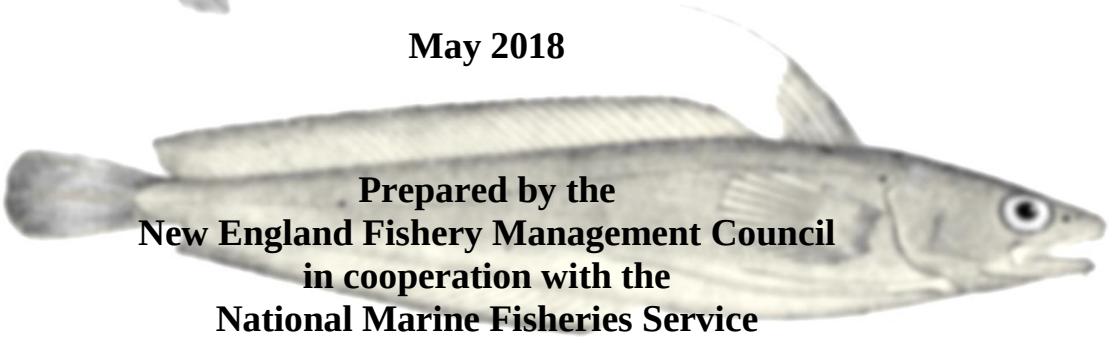

Prepared by the
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in cooperation with the
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NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

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1.0 EXECUTIVE SUMMARY

This executive summary presents an overview of the document, summarizes the alternatives and their expected impacts, and identifies which alternatives are at this time preferred. Section 1.1 summarizes the alternatives and the expected impacts. The choice of preferred alternatives for the draft amendment is explained in Section 1.2.

1.1 Summary of Alternatives and Impacts

In addition to No Action, Draft Amendment 22 offers alternatives to 1) adjust whiting possession limits and 2) implement a limited access program for the small-mesh multispecies fishery. If No Action (Section 4.1) is chosen, the Council may choose one of the alternatives (Section 4.2) to adjust the whiting possession limits. If one of the alternatives to qualify vessels for limited access (Action 1; Section 4.3.1) is chosen, the Council would choose one of the Action 2 alternatives (Section 4.3.2) to establish whiting and red hake possession limits by permit category (Category I, Category II, and Incidental) and a set of alternatives in Action 3 (Section 4.3.3) to establish permit allowances and conditions that would define how the three types of proposed permits could be used. For limited access, Draft Amendment 22 proposes to establish two levels of limited access permits, which would be called Category I and Category II. For each of the five qualification alternatives, Category I has a higher threshold to qualify than for Category II qualification. There are four sets of fishing history periods that are proposed, qualifying either historic or more recent fishery participants. In these alternatives, there is an inherent trade-off between equity (number of qualifiers) and latent effort (qualifiers that are not active in the fishery).

The Council has designated No Action as the preferred alternative in Draft Amendment 22. During public hearings it is important for the public to comment on all alternatives.

Table 1. Matrix of Amendment 22 alternatives and expected impacts.

Alternative	Measures	Target species	Non-target species	Protected Resources	Physical Environment and EFH	Economy and Fishery-dependent Communities
No Action (preferred) (Section 4.1)	**Retains open access fishery**	**Low negative**	**Negative**	**Low negative**	**Low negative**	**Positive**
Action alternatives						
Whiting possession limits (Section 4.2)		**Adjustments to whiting possession limits in the southern management area**				
Alternative 1	Status quo	Low negative	Low negative	Low negative	Low negative	Positive
Alternative 2	Raise to 50,000 lbs.	Low negative	Low negative	Neutral to low negative	Neutral to low positive	Low positive
Alternative 3	Lower to 30,000 lbs.	Low positive	Low positive	Neutral to low positive	Neutral to low negative	Low negative
Action 1: Limited access alternatives (Section 4.3.1)						
Action 1: Qualification (Section 4.3.1)	Five alternatives to qualify vessels for Category I or Category II permits	Low positive	Low positive	Low positive	Low positive	Low positive for qualifying vessels Negative for non-qualifying vessels
Action 2: Possession limits (Section 4.3.2)	Whiting and red hake possession limits for Category I, Category II, and Incidental permits	Low positive	Low positive	Low positive	Low positive	Low positive for qualifying vessels Negative for non-qualifying vessels
Action 2: Whiting possession limits for Category I (4.3.2.1)						
Alternative 1	Status quo	Low negative	Low negative	Low negative	Low negative	Positive
Alternative 2	Raise to 50,000 lbs.	Low negative	Low negative	Low negative to low positive	Neutral to low positive	Low positive
Alternative 3	Lower to 30,000 lbs.	Low positive	Low positive	Neutral to low positive	Neutral to low positive	Low negative
Action 2: Whiting possession limits for Category II (Section 4.3.2.2)						
Alternative 1	Status quo	Low negative	Low negative	Low negative	Low negative	Positive
Alternative 2	Lower to 15,000 lbs. whiting	Low positive	Low positive	Neutral to low negative	Neutral to low positive	Low negative
Action 2: Whiting possession limits for Incidental permits (Section 4.3.2.3)						
Alternative 1	Status quo	Low negative	Low negative	Low negative	Low negative	Positive
Alternative 2	2000 lbs. whiting and 400 lbs. red hake	Positive	Positive	Neutral to low positive	Neutral to low positive	Low negative

Alternative	Measures	Target species	Non-target species	Protected Resources	Physical Environment and EFH	Economy and Fishery-dependent Communities
Action 3: Permit allowances (Section 4.3.3)						
Limited access permits						
Alternative 1	Groundfish permit conditions	Depends on choice of Action 1 alternative	Same as impacts associated with the selected Action 1 alternative	Low positive	Low positive	Neutral
Alternative 2	No accumulation limit	Neutral or no meaningful impact	Neutral	Neutral	Neutral	Low positive
Alternative 3	Construction eligibility	Positive	Low positive	Low positive	Low positive	Low negative
Alternative 4	Qualification restriction	Positive	Low positive	Low positive	Low positive	Low positive
Alternative 5	Upgrading vessels	Neutral to low negative	Low negative	Neutral	Neutral	Low negative
Incidental permits						
Alternative 1	Fishing in exemption areas only by qualifiers	Low positive	Low positive	Low positive	Low positive	Low negative
Alternative 2a	May exceed incidental possession limit on a Multispecies DAS using large-mesh	Positive	Positive	Neutral	Neutral	Low positive
Alternative 2b	May not exceed incidental possession limit on a Multispecies DAS using large-mesh	Negative	Potentially negative	Neutral	Neutral	Low negative
Alternative 3	May exceed incidental possession limit when fishing for squids or herring	Positive	Positive	Neutral	Neutral	Low positive
Alternative 4	Allow vessels with an incidental permit to fish in exemption areas requiring a raised footrope trawl	Neutral to low negative	Low positive on flatfish and low negative on roundfish	Low negative	Low negative	Positive

1.2 Preferred alternatives

No Action was chosen as the "preferred alternative" because the small-mesh multispecies fishery is catching a small fraction of the current and future ACLs. A limited access program would impede the ability of new and existing vessels to increase catches of whiting, possibly more costly than other means of limiting and potentially reducing non-target catches of "choke species". Measures that could reduce bycatch include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest).

Although the Council chose No Action (and thus no limited access program) for the preferred alternative, in case a limited access program is chosen as the final alternative, the Council also designated preferred alternatives for Action 2 (Section 4.3.2; Possession Limits by Permit Type) and Action 3 (Section 4.3.3; Permit Allowances).

The Action 2 alternatives would apply to vessels that qualify for a Category I or II limited access permit, or hold an Incidental Permit (by vessels that do not qualify or apply for a limited access permit). Furthermore, in case the public favors and the Council chooses a final alternative from the Action 1 qualification alternatives, the Council has designated a set of Action 2 alternatives as "preferred". These preferred alternatives include Alternative 1 for Category I vessels that would retain current whiting and red hake possession limits.

In Action 3, the Council designated Alternatives 1 and 4 as preferred for small-mesh multispecies limited access permits. Alternative 1 would create limited access permits that had the same characteristics as those associated with a large-mesh Northeast Multispecies permit. Alternative 4 however would allow only one vessel to qualify based on a single history, or conversely no two vessels could qualify based on a single permit history (This was allowed for Northeast Multispecies qualification because of ambiguities in fishing history ownership before a limited access program existed).

Also in Action 3, the Council chose Alternative 3 as a preferred alternative. This alternative would allow a vessel using small-mesh trawls to target Atlantic herring, squid, mackerel, or butterfish to exceed the incidental whiting and red hake possession limits. In this case, the vessels would be able to retain whiting and red hake up to the amounts specified for qualified vessels, consistent with the mesh size in use. An additional alternative in Action 3 would allow any vessel to exceed the incidental whiting and red hake possession limits while fishing with small-mesh trawls in exemption areas that require a raised footrope configuration. Such vessel could land whiting and red hake up to the limits specified for the mesh in use (see Table 4).

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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	Day(s)-at-sea
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DPWG	Data Poor Working Group
DSEIS	Draft Supplemental Environmental Impact Statement
EA	Environmental Assessment
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
F	Fishing mortality rate
FEIS	Final Environmental Impact Statement
FMP	Fishery management plan

FW	Framework
FY	Fishing year
GARFO	Greater Atlantic Regional Fisheries Office, NMFS, Gloucester, MA
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
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
MRI	Moratorium Right ID. This is a number assigned to limited access permit to track its fishing history, accounting for permit transfers between vessels and owners.
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
NLSA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OBDBS	Observer database system
OLE	Office for Law Enforcement (NMFS)
OY	Optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
RFA	Regulatory
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
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

The purpose of this action is to implement measures through limited access that would prevent unrestrained increases in fishing effort by new entrants to the fishery. Limited access would establish a maximum number of vessels in the small-mesh multispecies fishery, improving the effectiveness of regulations that reduce or cap catches of species with sub-ACL or choke species (i.e. species with catches that equal or exceed their annual catch limits).

Although small-mesh multispecies fishing effort has remained historically low and the fishery has taken a fraction of the northern silver hake, southern whiting, and southern red hake Annual Catch Limits (ACL) since 2012, the directed fishery is completely open to new entrants. New entrants could cause catches to increase, which is or could be problematic for northern red hake, Georges Bank yellowtail flounder, and other large-mesh groundfish. Northern red hake and Georges Bank yellowtail flounder catches have exceeded their ACLs in past years and triggered Accountability Measures (AM).

Increasing catches of other groundfish have become more problematic, and the Council is considering establishing additional sub-ACLs for groundfish stocks caught in non-groundfish fisheries. The Council could take other actions such as reducing possession limits or requiring more selective gear (provided that such gear has been developed and tested), but these technical measures are less effective if directed fishing effort increases. Increases in fishing effort are likely if the availability of whiting and red hake increase, whiting and red hake prices increase, and/or regulations on alternative trawl fisheries become more restrictive. If the ACLs are exceeded, the AMs could have a harmful effect on existing fishery participants and/or increase discarding if non-target species landings are prohibited.

From another perspective, whiting and red hake ACLs could decline if stock biomass decreases and catch specifications are lowered. In the 2015 Annual Monitoring Report, presented to the Council in September 2016, the Plan Development Team warned that unless the survey biomass indexes increase in 2016-2017, the ACLs for southern whiting and southern red hake could be much lower, and could be close to current catch levels.

The need for the amendment is to reduce the potential for a rapid escalation of the small-mesh multispecies fishery, possibly causing overfishing and having a negative effect on red hake and whiting markets, both outcomes having negative effects on fishery participants. The amendment will help ensure that catches of the small-mesh multispecies and other non-target species will be at or below specifications, reducing the potential for triggering accountability measures, resulting closure of the directed fishery.

3.2 Management Background

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.

3.2.1 Goals and Objectives of FMP

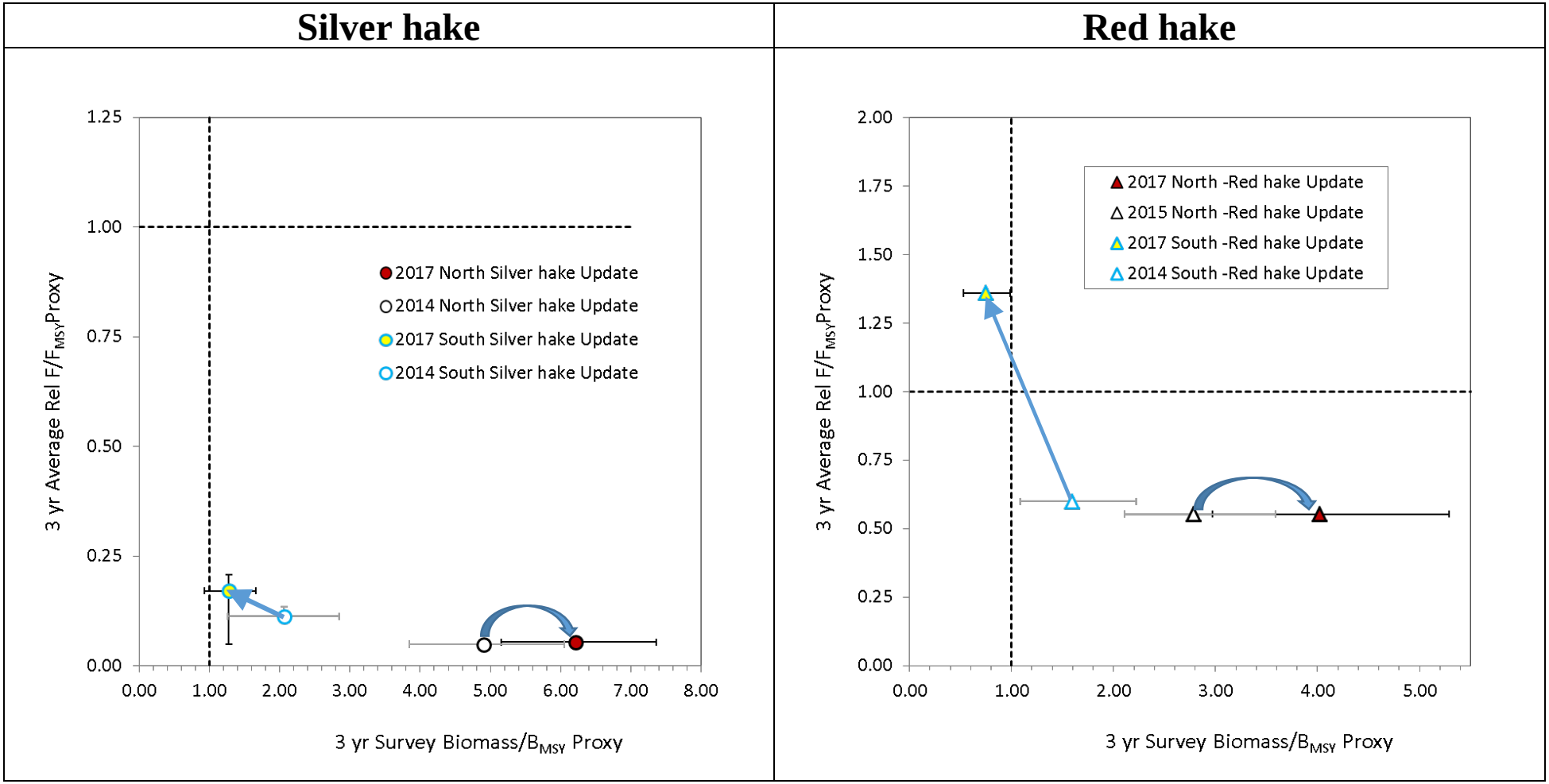
The Council's objective is to manage fisheries catching red, silver, and offshore hake that maintain stock size at levels capable of sustaining Maximum Sustainable Yield (MSY) on a continuing basis. In addition to existing restrictions on fishing through exemption areas and seasons to minimize groundfish bycatch, other measures are intended to optimize size selectivity and keep landings from temporarily flooding limited market demand. These measures include red and silver hake possession limits. The silver hake possession limits are higher when a vessel uses large mesh, providing an incentive to avoid catching juvenile or small silver hake. Amendment 19 established and specified catch and landings limits which are deemed to be sustainable, including 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.

3.2.2 Stock Status, Biological Reference Points and Specifications

3.2.2.1 Stock Status

According to the 2016 assessment update conducted by the NEFSC and included in the Stock Assessment and Fishery Performance Report for Fishing Year 2016 (NEFMC 2017), southern red hake has become overfished and overfishing is occurring. For all other stocks in the fishery, overfishing is not occurring (see Figure 1).

Figure 1. Stock status relative to MSY proxy values for exploitation (y-axis) and biomass (x-axis). Dashed lines (value=1) indicate targets. Biomass and fishing stock status plots for specification years 2016-2018 in the north (labeled as 2015), 2015-2017 in the south (labeled as 2014) and 2018-2020 (labeled as 2017) and associated 95% confidence intervals. The triangle symbols are point estimates derived from the ratio of the most recent 3yr average index to proxy reference points while the 95% CI were calculated from the 5th and 95th percentile of the cumulative distribution of the recent 3-year index of biomass and Relative F.



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4.0 ALTERNATIVES

4.1 No Action (Preferred)

No Action would retain the current permit system and permit conditions. Vessels fishing for small-mesh multispecies in an exemption program must possess either an open access (Category K) or limited access (Categories A-F) Northeast Multispecies permit. If the vessel has a limited access Northeast Multispecies permit, fishing for small-mesh multispecies may be conducted while the vessel is not fishing under a day-at-sea (DAS) and while declared out of the fishery, if the vessel is required to operate a Vessel Monitoring System (VMS).

Rationale: This alternative retains the existing regulation pertaining to open access (Category K) permits in case the final preferred alternative is the status quo, i.e. rejects limited access to manage the small-mesh multispecies fishery. The fishery would continue to be self-regulating due to market forces and regulation. Possession limits and other measures could be adjusted as needed to keep the fishery within catch limits for whiting, red hake, and other groundfish species.

No Action was chosen as the "preferred alternative" because the small-mesh multispecies fishery is catching a small fraction of the current and future ACLs. A limited access program would impede the ability of new and existing vessels to increase catches of whiting, possibly more costly than other means of limiting and potentially reducing non-target catches. Measures that could reduce non-target catches include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest).

In 2016, the fishery caught 15 percent of the northern silver hake ACL and 13% of the southern whiting ACL. The fishery however caught 86% of the northern red hake ACL and 67% of the southern red hake ACL, while the 2016 assessment update indicated that overfishing of southern red hake was occurring. If catches remain constant, relative to the 2018-2020 specifications, the fishery would catch 12% of the northern red hake ACL, 24% of the southern whiting ACL, 59% of the northern red hake ACL, and 108% of the southern red hake ACL. Red hake are a secondary target species for the small-mesh multispecies fishery.

4.2 Whiting[1] Possession Limit for Vessels Using 3-inch and larger Cod-End Mesh Trawls

4.2.1 Alternative 1 (Preferred; No Action) – Existing small-mesh multispecies possession limits apply

This alternative would apply the existing possession limits to all vessels using 3-inch mesh to target whiting, red hake, or other species. Under existing specifications, any vessel in a small-mesh exemption program in the Northern Fishery Management Area (i.e. the Gulf of Maine Grate Raised Footrope, Small-Mesh Areas I and II, the Cape Cod Raised Footrope Areas, and the Cultivator Shoals Area) may retain and land up to 30,000 lbs. of whiting and 3,000 lbs. of red hake. When fishing in the Southern New England and Mid-Atlantic exemption areas (Map 1), vessels may possess and land up to 40,000 lbs. of whiting and 5,000 lbs. of red hake. As they do now, lower whiting possession limits would apply if the vessel uses trawls with less than 3-inch mesh (see Table 4).

Rationale: Amendment 19 raised the whiting possession limit in the Southern New England and Mid-Atlantic exemption areas from 30,000 lbs. to 40,000 lbs. "to give vessels a better opportunity to harvest optimum yield and counter rising fuel prices." Although fuel prices have abated since that time, the fishery caught only 13.7% of the Annual Catch Limit (ACL) in fishing year 2015 (NEFMC 2016). If specifications are not substantially reduced, retaining the current possession limits would continue allowing the vessels to profitably target whiting. In the northern area, the fishery caught 23.9% of the whiting ACL, but exceeded the red hake ACL by 24.6%. Thus, increasing the whiting possession limit in the northern area is not justified because it could increase fishing effort and exceed the northern red hake ACL by an even greater amount despite the more restrictive accountability measure that takes effect in 2017.

4.2.2 Alternative 2 – Raise the Whiting possession limit from 40,000 to 50,000 lbs., January 1 to June 14 in the Southern New England and Mid-Atlantic exemption areas

Unless the possession limit is reduced to an incidental level by an in-season accountability measure [see §648(d)(4)], vessels would be able to possess and land up to 50,000 lbs. of whiting in the Southern New England and Mid-Atlantic exemption areas from January 1 to June 14, inclusive. The whiting possession limit from June 15 to December 31 would remain at 40,000 lbs. As they do now, the 30,000 lbs. whiting possession limit in the northern area and lower whiting possession limits for vessels using trawls with less than 3-inch mesh [see §648(d)(1)] would continue to apply.

Rationale: Increasing the whiting possession limit would be justified to allow the fleet to land more whiting on a trip and improve their ability to catch optimum yield. The higher possession limit would be restricted to a season to avoid negatively affecting price when the northern small-mesh exemption areas are open.

[1] Whiting includes silver and offshore hakes.

4.2.3 Alternative 3 – Lower the Whiting possession limit from 40,000 to 30,000 lbs., June 15 to December 31 in the Southern New England and Mid-Atlantic exemption areas

Unless the possession limit is reduced to an incidental level by an in-season accountability measure (see §648(d)(4), vessels fishing in the Southern New England and Mid-Atlantic exemption areas would be able to possess and land 30,000 lbs. of whiting from June 15 to December 31, and 40,000 lbs. from January 1 to June 14. Whiting possession limits in the northern exemption areas would not be changed. As they do now, the 30,000 lbs. whiting possession limit in the northern area and lower whiting possession limits for vessels using trawls with less than 3-inch mesh [see §648(d)(1)] would continue to apply.

Rationale: A lower possession limit is needed because the proposed 2018-2020 southern whiting ACL is 35 percent lower than the 2017 ACL. Lower specifications were predicted by the Plan Development Team in the 2015 Annual Monitoring Report, because the 2014 and 2015 survey biomass indices were much lower than before[2]. Reducing the possession limit during June 15 to December 31 would also reduce the negative effect on prices when the northern exemption areas are open, yet leave the possession limit at 40,000 lbs. in the Southern New England and Mid-Atlantic exemption areas during the important winter season.

4.3 Limited Access Alternatives

4.3.1 Action 1 – Qualification Criteria

This action proposes a range of qualification criteria for vessels to continue targeting whiting and red hake with small-mesh trawls. Limited access would establish a maximum number of vessels in the small-mesh multispecies fishery, improving the effectiveness of regulations that reduce or cap catches of species with sub-ACL or choke species (i.e. species with catches that equal or exceed their annual catch limits).

If a limited access program is chosen as the final preferred alternative, the following five alternatives would allow various vessels to qualify for either a Category I (high level) or a Category II (lower level) limited access permit. Qualification would be based on total documented landings of red, silver, and offshore hakes (i.e. small-mesh multispecies) during the entire qualification period. While a fairly thorough analysis of vessel histories that carried through default permit transfers was conducted using dealer, vessel trip reports, and data matching imputation system records, vessel owners would be able to appeal preliminary qualifications used by NMFS probably based on dealer records. Thus, the number of qualifying limited access vessels estimated for analysis in this document could change (either up or down).

In the Rationale part of each of the alternatives below, there is a description of how many vessels are likely to qualify for a Category I or II permit. The description includes for each permit type how many qualifying vessels landed no more than 2000 lbs. whiting or 400 lbs. red hake on one or more trips during 2014-2016. It also includes a description of how many vessels would not qualify for limited access (according to the preliminary analysis), but had landings exceeding 2000 lbs. whiting or 400 lbs. red hake

[2] Whiting specifications are set for a three-year period using a three-year moving average for the survey biomass index. Thus in 2018-2020 (the next specifications cycle), the ACL will be set using the 2014-2016 fall survey data in a separate specifications package.

on one or more 2014-2016 trips. Landings data for 2017 were not available during the analysis phase of this document and it would be a significant amount of work to update these analyses, but it would not change the number of qualifiers.

Table 53 summarizes the qualification estimates given under each of the alternatives below.

Although the fishery history and the number of potentially qualifying vessels differs in the Northern Fishery Management Area from the Southern Fishery Management Area, a single set of qualification criteria would be simpler and less costly to administer. Regional differences in the small-mesh multispecies fisheries could be accommodated by adjusting the applicable possession limits for each limited access permit category (see Action 2).

No alternatives in Action 1 are designated as a "preferred alternative", because the alternatives reduce opportunities for new participants in the fishery when a small fraction of the whiting ACL is being caught. In 2016, the fishery caught 15% of the northern silver hake ACL and 13% of the southern whiting ACL. The fishery however caught 86% of the northern red hake ACL and 67% of the southern red hake ACL, while the 2016 assessment update indicated that overfishing of southern red hake was occurring. Red hake are a secondary target species for the small-mesh multispecies fishery.

4.3.1.1 Alternative 1 – Category I landings of 500,000 lbs. and Category II landings of 100,000 lbs. during 2008-2012

Vessels with documented landings at least 500,000 lbs. of whiting and/or red hake from January 1, 2008 to the November 28, 2012 control date would qualify for a Category I permit. Vessels that landed at least 100,000 lbs. of whiting and/or red hake between these inclusive dates would qualify for a Category II permit. Vessel history would apply to the applicable permit history accounting for vessel transfers, bills of sale, or written agreements; including Moratorium Right ID history for vessels with an existing limited access permit in another Northeast Region fishery.

Rationale: This alternative would qualify more vessels at the Category I level than would Alternative 2, but fewer vessels at the Category II level. Analysis will show which alternative is a better fit to match the existing fishery footprint and be more effective at limiting effort increases.

Based on preliminary analyses using dealer and vessel trip report data, this alternative would qualify 48 vessels for a Category I limited access permit and 88 vessels for a Category II limited access permit. Thirty-one (31) Category I qualifiers and 40 Category II qualifiers were using small-mesh trawls and landing whiting and/or red hake during 2014-2016. Seventeen (17) of Category I qualifiers and 48 of Category II qualifiers were not active in the recent fishery. Sixty-nine (69) vessels fishing with small-mesh trawls and landing more than 2,000 lbs. of whiting in 2014-2016 would not qualify for a limited access permit. Of these 69 vessels, 26 had no whiting fishery history during the qualification period.

4.3.1.2 Alternative 2 – Category I landings of 1,000,000 lbs. and Category II landings of 20,000 lbs. during 2008-2012

Vessels with documentation that show landings at least 1,000,000 lbs. of whiting and/or red hake from January 1, 2008 to the November 28, 2012 control date would qualify for a Category I permit. Vessels that landed at least 20,000 lbs. of whiting and/or red hake between these inclusive dates would qualify for a Category II permit. Vessel history would apply to the applicable permit history accounting for vessel transfers, bills of sale, or written agreements; including Moratorium Right ID history for vessels with an existing limited access permit in another Northeast Region fishery.

Rationale: This alternative would qualify fewer vessels at the Category I level than would Alternative 1, but more vessels at the Category II level. Analysis will show which alternative is a better fit to match the existing fishery footprint and be more effective at limiting effort increases.

Based on preliminary analyses using dealer and vessel trip report data, this alternative would qualify 25 vessels for a Category I limited access permit and 237 vessels for a Category II limited access permit. Nineteen (19) Category I qualifiers and 77 Category II qualifiers were using small-mesh trawls and landing whiting and/or red hake during 2014-2016. Six (6) of Category I qualifiers and 160 of Category II qualifiers were not active in the recent fishery. Thirty-nine (39) vessels fishing with small-mesh trawls and landing more than 2,000 lbs. of whiting in 2014-2016 would not qualify for a limited access permit. Of these 39 vessels, 23 had no whiting fishery history during the qualification period.

4.3.1.3 Alternative 3 – Category I landings of 500,000 lbs. and Category II landings of 100,000 lbs. during 2008-2016

Vessels with documentation with landings at least 500,000 lbs. of whiting and/or red hake from January 1, 2008 to December 31, 2016 would qualify for a Category I permit. Vessels that landed at least 100,000 lbs. of whiting and/or red hake between these inclusive dates would qualify for a Category II permit. Vessel history would apply to the applicable permit history accounting for vessel transfers, bills of sale, or written agreements; including Moratorium Right ID history for vessels with an existing limited access permit in another Northeast Region fishery.

Rationale: These qualification criteria are the same as those in Alternative 1 (Section 4.3.1.1), but history from the control date to the end of 2016 would also be considered for the purposes of qualification. Some vessels have recently entered the small-mesh multispecies fishery in response to more restrictive Northeast Multispecies regulations and lower quotas. Some of these vessels participated in the whiting fishery before 1996, particularly in the Ipswich Bay area when whiting were as abundant as they are now.

Based on preliminary analyses using dealer and vessel trip report data, this alternative would qualify 58 vessels for a Category I limited access permit and 113 vessels for a Category II limited access permit. Forty (40) Category I qualifiers and 49 Category II qualifiers were using small-mesh trawls and landing whiting and/or red hake during 2014-2016. Eighteen (18) of Category I qualifiers and 66 of Category II qualifiers were not active in the recent fishery. Sixty-four (64) vessels fishing with small-mesh trawls and landing more than 2,000 lbs. of whiting in 2014-2016 would not qualify for a limited access permit. Of these 64 vessels, three had no trips in the qualification period that exceeded 2,000 lbs. of whiting landings.

4.3.1.4 Alternative 4 – Category I landings of 500,000 lbs. and Category II landings of 100,000 lbs. during 2000-2016

Vessels with documentation with landings at least 500,000 lbs. of whiting and/or red hake from January 1, 2008 to December 31, 2016 would qualify for a Category I permit. Vessels that landed at least 100,000 lbs. of whiting and/or red hake between these inclusive dates would qualify for a Category II permit. Vessel history would apply to the applicable permit history accounting for vessel transfers, bills of sale, or written agreements; including Moratorium Right ID history for vessels with an existing limited access permit in another Northeast Region fishery.

Rationale: These qualification criteria are the same as those in Alternative 1 (Section 4.3.1.1), but history from the control date to the end of 2016 would also be considered for the purposes of qualification, as in

Alternative 4 above. This alternative also would allow more time for a vessel to meet the qualification criteria, to compensate for changes in the official policy that associated fleet history to an MRI. As a result, some vessels did not retain prior fleet history before this policy went into effect.

Based on preliminary analyses using dealer and vessel trip report data, this alternative would qualify 115 vessels for a Category I limited access permit and 201 vessels for a Category II limited access permit. Forty-three (43) Category I qualifiers and 44 Category II qualifiers were using small-mesh trawls and landing whiting and/or red hake during 2014-2016. Seventy-two (72) of Category I qualifiers and 157 of Category II qualifiers were not active in the recent fishery. Sixty-two (62) vessels fishing with small-mesh trawls and landing more than 2,000 lbs. of whiting in 2014-2016 would not qualify for a limited access permit.

4.3.1.5 Alternative 5 – Category I landings of 1,000,000 lbs. and Category II landings of 200,000 lbs. during 1996-2012

Vessels with documentation that show landings at least 1,000,000 lbs. of whiting and/or red hake from January 1, 1996 to the November 28, 2012 control date would qualify for a Category I permit. Vessels that landed at least 200,000 lbs. of whiting and/or red hake between these inclusive dates would qualify for a Category II permit. Vessel history would apply to the applicable permit history accounting for vessel transfers, bills of sale, or written agreements; including Moratorium Right ID history for vessels with an existing limited access permit in another Northeast Region fishery.

Rationale: Participating vessels in the small-mesh multispecies fishery before 2008 would qualify for a limited access permit. Some of these vessels were previously active in the fishery, but have not targeting whiting and red hake more recently because of regulations for other fisheries in which they participate, due to limited availability of whiting in the exemption programs, due to low prices for whiting and red hake, or all three. Some fishermen with these vessels have expressed an interest in remaining in the fishery and resuming fishing for whiting and red hake when conditions change. This alternative is likely to qualify more vessels than either Alternative 1 or 2 above, but more vessels currently are not active in the fishery which could enter the fishery when regulatory or market conditions change, providing flexibility for more fishermen.

Based on preliminary analyses using dealer and vessel trip report data, this alternative would qualify 97 vessels for a Category I limited access permit and 180 vessels for a Category II limited access permit. Twenty-seven (27) Category I qualifiers and 36 Category II qualifiers were using small-mesh trawls and landing whiting and/or red hake during 2014-2016. Seventy (70) of Category I qualifiers and 144 of Category II qualifiers were not active in the recent fishery. Seventy-two (72) vessels fishing with small-mesh trawls and landing more than 2,000 lbs. of whiting in 2014-2016 would not qualify for a limited access permit.

4.3.2 Action 2 – Possession Limits by Permit Type

Although the Council chose No Action (and thus no limited access program) for the preferred alternative, the Action 2 alternatives would apply to vessels that qualify for a Category I or II limited access permit, or hold an Incidental Permit (by vessels that do not qualify or apply for a limited access permit). Furthermore, in case the public favors and the Council chooses a final alternative from the Action 1 qualification alternatives, the Council has designated a set of Action 2 alternatives as “preferred”. These preferred alternatives include Alternative 1 for Category I vessels that would retain current whiting and red hake possession limits, plus Alternative 3 for Category II vessels and Alternative 3 for vessels holding

an Incidental Permit that would retain current whiting and red hake possession limits, but would automatically trigger a possession limit reduction if certain criteria are met.

This action would retain or adjust the whiting possession limit for vessels that qualify for a limited access permit. No adjustments to the 5,000 lbs. southern red hake or the 3,000/1,500 lbs. northern red hake possession limits are proposed. When required, whiting possession limits may be reduced to an incidental limit (currently 2,000 lbs. or whiting and 400 lbs. of red hake) as an in-season accountability measure when landings reach a specified fraction of the Total Allowable Landings [see §648.86(d)(4)]. These accountability measures would continue under any of the Action 2 alternatives, as adjusted by future changes in specifications.

4.3.2.1 Whiting[3] Possession Limit for Vessels with a Category I Limited Access Small-Mesh Multispecies Permit

4.3.2.1.1 Alternative 1 (Preferred; Status quo) – Existing small-mesh multispecies possession limits apply

This alternative would apply the existing possession limits to all vessels with a Category I limited access permit. Under existing specifications, any vessel in a small-mesh exemption program in the Northern Fishery Management Area (i.e. the Gulf of Maine Grate Raised Footrope, Small-Mesh Areas I and II, the Cape Cod Raised Footrope Areas, and the Cultivator Shoals Area) may retain and land up to 30,000 lbs. of whiting. When fishing in the Southern New England and Mid-Atlantic exemption areas (Map 1), vessels may possess and land up to 40,000 lbs. of whiting. As they do now, lower whiting possession limits would apply if the vessel uses trawls with less than 3-inch mesh.

Rationale: Amendment 19 raised the whiting possession limit in the Southern New England and Mid-Atlantic exemption areas from 30,000 lbs. to 40,000 lbs. "to give vessels a better opportunity to harvest optimum yield and counter rising fuel prices." Although fuel prices have abated since that time, the fishery caught only 13.7% of the Annual Catch Limit (ACL) in fishing year 2015 (NEFMC 2016). If specifications are not substantially reduced, retaining the current possession limits would continue allowing the vessels to profitably target whiting. In the northern area, the fishery caught 23.9% of the whiting ACL, but exceeded the red hake ACL by 24.6%. Thus, increasing the whiting possession limit in the northern area is not justified because it could increase fishing effort and exceed the northern red hake ACL by an even greater amount despite the more restrictive accountability measure that takes effect in 2017.

4.3.2.1.2 Alternative 2 – Raise the whiting possession limit from 40,000 to 50,000 lbs., January 1 to June 14 in the Southern New England and Mid-Atlantic exemption areas

Unless the possession limit is reduced to an incidental level by an in-season accountability measure, vessels would be able to possess and land up to 50,000 lbs. of whiting in the Southern New England and Mid-Atlantic exemption areas from January 1 to June 14, inclusive. The whiting possession limit from June 15 to December 31 would remain at 40,000 lbs. As they do now, the 30,000 lbs. whiting possession limit in the northern area and lower whiting possession limits for vessels using trawls with less than 3-inch mesh would continue to apply.

[3] Whiting includes silver and offshore hakes.

Rationale: Increasing the whiting possession limit would be justified to allow limited access vessels to land more whiting on a trip and improve their ability to catch optimum yield. With limited access in place, the higher possession limit would not attract more vessels into the fishery, but inactive vessels with a limited access permit may be more likely to fish for whiting with a higher possession limit. The higher possession limit would be restricted to a season to avoid negatively affecting price when the northern small-mesh exemption areas are open.

4.3.2.1.3 Alternative 3 – Lower the whiting possession limit from 40,000 to 30,000 lbs., June 15 to December 31 in the Southern New England and Mid-Atlantic exemption areas

Unless the possession limit is reduced to an incidental level by an in-season accountability measure, vessels fishing in the Southern New England and Mid-Atlantic exemption areas would be able to possess and land 30,000 lbs. of whiting from June 15 to December 31, and 40,000 lbs. from January 1 to June 14. Whiting possession limits in the northern exemption areas would not be changed. As they do now, the 30,000 lbs. whiting possession limit in the northern area and lower whiting possession limits for vessels using trawls with less than 3-inch mesh would continue to apply.

Rationale: A lower possession limit is needed because the proposed 2018-2020 southern whiting ACL is 35 percent lower than the 2017 ACL. Lower specifications were predicted by the Plan Development Team in the 2015 Annual Monitoring Report, because the 2014 and 2015 survey biomass indices were much lower than before[4]. Reducing the possession limit during June 15 to December 31 would also reduce the negative effect on prices when the northern exemption areas are open, yet leave the possession limit at 40,000 lbs. in the Southern New England and Mid-Atlantic exemption areas during the important winter season.

4.3.2.2 Whiting Possession Limit for Vessels with a Category II Limited Access Small-Mesh Multispecies Permit

4.3.2.2.1 Alternative 1 (Status quo) – Existing small-mesh multispecies possession limits apply

Vessels would be able to possess and land the same amount as allowed for vessels that qualify for a Category I vessel. The limits that currently apply to vessels in small-mesh exemption programs is 30,000 lbs. in northern exemption areas and 40,000 lbs. in the Southern New England and Mid-Atlantic exemption areas. As they do now, lower whiting possession limits would apply if the vessel uses trawls with less than 3-inch mesh.

Rationale: This alternative would give vessels that qualify for any limited access permit the same opportunity to catch optimum yield. It would be justified if the fishery catches a fraction of the ACLs and the specifications are not reduced. Although the initial analysis shows that many of the vessels that would qualify for Category II limited access permits land smaller amounts per trip than the (typically larger) vessels that would qualify for a Category I permit, the alternative would allow the Category II vessels to take longer trips and catch optimum yield.

[4] Whiting specifications are set for a three-year period using a three-year moving average for the survey biomass index. Thus in 2018-2020 (the next specifications cycle), the ACL will be set using the 2014-2016 fall survey data in a separate Specifications Package.

4.3.2.2.2 Alternative 2 – Whiting possession limit of 30,000 lbs. in the northern exemption areas and 15,000 lbs. in the Southern New England and Mid-Atlantic exemption areas

Vessels that qualify for a Category II limited access permit would be able to possess and land 30,000 lbs. of whiting when fishing in the northern exemption areas (Gulf of Maine Grate Raised Footrope, Small-Mesh Areas I and II, the Cape Cod Raised Footrope Areas, and the Cultivator Shoals Area). This is the same as the limit for vessels that would qualify for a Category I limited access permit. As they do now, lower whiting possession limits would apply if the vessel uses trawls with less than 3-inch mesh [see §648.86(d)(1)].

Vessels that qualify for a Category II limited access permit would be able to possess and land 15,000 lbs. of whiting when fishing in the Southern New England and Mid-Atlantic exemption areas. Vessels that fish any part of the trip in the Southern New England and Mid-Atlantic exemption areas would be subject to the 15,000 lbs. limit unless transiting the area with gear properly stowed in a manner unavailable for fishing. As they do now, lower whiting possession limits would apply if the vessel uses trawls with less than 3-inch mesh.

Rationale: Fewer vessels that fish in the northern exemption areas are expected to qualify for a limited access permit and the fishery has caught a small fraction of the whiting ACL. On the other hand, many more vessels that fish in the southern area would qualify for a Category II limited access permit under any qualification alternative and typically land smaller amounts of whiting. A lower possession limit would reduce the incentive for Category II vessels to increase fishing effort, particularly if as anticipated the southern area specifications are lowered.

4.3.2.3 Incidental Possession Limit for Vessels without a Limited Access Small-Mesh Multispecies Permit

Possession for this set of alternatives would apply to vessels that do not qualify under Action 1 (Section 4.1) for a Category I or II limited access permit.

4.3.2.3.1 Alternative 1 (Status quo) – Existing small-mesh multispecies possession limits apply

Any vessel, including non-qualifying vessels, would be able to possess and land the existing amounts of whiting (30,000 lbs. of whiting in the northern exemption areas and 40,000 lbs. of whiting in the Southern New England and Mid-Atlantic exemption areas; 3,000 lbs. of red hake in the northern management area or 5,000 lbs. of red hake in the southern management area). As they do now, lower whiting possession limits for exemption areas would apply if the vessel uses trawls with less than 3-inch mesh. Lower whiting and red hake limits also may apply in the northern or southern management area if and when in-season accountability measures are triggered.

Rationale: This alternative would retain the current possession limits for vessels in the small-mesh exemption area programs, while allowing for a limited access program to be established. That is, the Council could establish a limited access framework and qualify vessels, but change possession limits by category in the future as needed. If reductions in possession limits are needed, the incidental limit for non-qualifying vessels could then be reduced if the fishery exceeds the ACLs for whiting, red hake, or other species. This alternative would allow greater participation in the fishery to harvest optimum yield relative to Alternative 3, as long as the ACLs are not exceeded and overfishing is not occurring.

4.3.2.3.2 Alternative 2 – 2,000 lbs. whiting and 400 lbs. red hake possession limit for non-qualifying vessels

Vessels that do not qualify for a Category I or II limited access permit would be able to obtain an incidental permit. Unless otherwise specified (see alternatives in Section 4.3.2.3), these vessels would be able to possess and land up to the incidental possession limit specified in §648.86(d)(4) when fishing in any area, currently 2,000 lbs. of whiting and 400 lbs. of red hake.

Rationale: These limits are consistent with the possession limits associated with accountability measures which are intended to discourage vessels from targeting whiting and red hake. Very few vessels using large-mesh trawls or target other species land more than 2,000 lbs. of whiting or 400 lbs. of red hake.

4.3.3 Action 3 – Permit Allowances

If a limited access program for the small-mesh multispecies fishery is implemented through this amendment, this Action considers the characteristics and conditions of the permit, and how similar they would be to other limited access permits commonly fished in conjunction with small-mesh multispecies permits. Alternative 1 would replicate many of the characteristics of other limited access permits used in conjunction, while Alternatives 2-5 consider specific differences that would apply to just the new small-mesh limited access permits.

Limited access permits issued under CFR §648.4 for Northeast region fisheries have a suite of characteristics and conditions that pertain to issuance, vessel replacement, and history assignment, etc. It is important that the characteristics and conditions for a limited access small-mesh multispecies fishery permit be consistent with other limited access programs if possible, particularly for fisheries that frequently intersect. The fisheries and limited access permits that most commonly intersect with vessels currently issued an open access small-mesh multispecies permit (Category K) are Northeast Multispecies DAS, Atlantic herring All Areas and Areas 2/3, and MAFMC squid, mackerel, and butter fish permits (see Table 2). Many of these permit characteristics and conditions are nearly the same, but there are some exceptions that may be important. The table below summarizes the conditions and characteristics of these three limited access fishery permits. Day-at-sea leasing and temporary quota transfers are not listed in the table and in Alternative 1 (Section 4.3.3.1.1) because they are not features of small-mesh multispecies fishery management.

Small-mesh multispecies fishery permitting issues that may differ from other fisheries may include whether or not there will be caps on permit ownership (Alternative 2, Section 4.3.3.1.2), whether or not there should be a one-year construction extension of the control date (Alternative 3, Section 4.3.3.1.3), whether or not more than one vessel qualifies for a permit based on its owner's history on a sold vessel (Alternative 4, Section 4.3.3.1.4), whether or not upgrade restrictions should apply (Alternative 4, Section 4.3.3.1.5), whether or not only qualifying vessels will be allowed to use small-mesh trawls in the exemption areas (Alternative 5, Section 4.3.3.2.1), whether or not vessels may exceed the incidental possession limit while on a Northeast Multispecies sector trip (Incidental permits Alternatives 1 and 2, Sections 4.3.3.2.1 and 4.3.3.2.2) or a while on a herrings or squids trip provided the vessel has a limited access permit for those fisheries (Incidental permits Alternative 2, Section 4.3.3.2.4). Alternative 1 (Section 4.3.3.1.1) lists the characteristics and conditions that currently apply to large-mesh multispecies permits. One or more of the alternatives that follow in this section may substitute for these default measures.

Table 2. Current limited access permit conditions and characteristics in the Northeast Multispecies, Atlantic herring, and squid, mackerel, and butterfish fisheries.

Attribute & CFR reference	**Northeast Multispecies**	**Herring**	**Squid, Mackerel, and Butterfish**
Limited access commercial permits	Common pool and individual DAS; handgear	Two area-specific and an all areas permit	Three tiers for mackerel
Incidental permit or limit		55,000 lbs. (25 mt)	2,500 lb (1.13 mt) of longfin squid, 600 lb (0.27 mt) of butterfish, or up to 10,000 lb (4.54 mt) of Illex squid
Open access permit		6,600 lbs. (3 mt); 20,000 lbs. (9 mt) in Areas 2 and 3 if issued a limited access Atlantic mackerel permit	
Eligibility	Must be: • Issued a moratorium permit for the preceding year, • Replacing a vessel that was issued a moratorium permit for the preceding year, OR • Replacing a vessel that was issued a confirmation of permit history	Same, but vessels may not exceed 165 feet Letter of Authorization or 750 GRT.	Same as Northeast Multispecies, but for Atlantic mackerel, vessels may not exceed 165 feet Letter of Authorization or 750 GRT, or the main propulsion may not exceed 3,000 HP.
Appeals §648.4 (a)(1)(i)(M)	Must be based on the grounds that information used to determine qualification was incorrect. Vessels may continue to fish pending the final outcome of an appeal.	Same	Same, but includes a secondary hearing request provision.
Accumulation limit §648.4 (a)(1)(i)(N)	5% cap on Northeast Multispecies limited access permit holdings, plus a 15.5% aggregate cap on potential sector contribution of allocated stocks. (Amendment 18).	No restrictions	No restrictions

Attribute & CFR reference	Northeast Multispecies	Herring	Squid, Mackerel, and Butterfish
History	One pound of regulated multispecies between 1988 and 1990.	Must have landed at least 500 mt (1,103,311 lbs.) for All Areas or 250 mt (551,156 lbs.) in Areas 2 and 3 during any one calendar year between 1993 and 2003. For an incidental permit, the vessel must have landed at least 15 mt (33,069 lbs.) in any calendar year between 1988 and 2003.	Mackerel Tier 1 – 400,000 lbs. (149.3 mt) between 1997 and 2005; Tier 2 – 100,000 lbs. (37.3 mt) between March 1, 1994 and December 31, 2005; Tier 3 – 1,000 lbs. (0.4 mt) in any one calendar year March 1, 1994 and December 31, 2005. Mackerel history before April 3, 2009 may be retained separate from non-mackerel limited access permits to qualify a different vessel.
Construction extension of eligibility	Unknown	An applicant who submits written evidence that a vessel was under construction, reconstruction, or was under written contract for purchase as of XXX, may extend the period for determining landings for one year from the control date.	None
Application/renewal §648.4 (a)(1)(i)(B)	All permits are issued for fishing years, except for owners of a CPH. Applications required no later than 30 days before the end of the permit year. Failure to renew bars renewal in subsequent years. Limited access vessels may not be issued an open access permit.	Same	Same
Qualification restriction §648.4 (a)(1)(i)(C)	No more than one vessel may qualify based on that or another vessel's fishing and permit history.	Same	Same, except that mackerel history may be generated and retained by separate parties to qualify more than one vessel.
Change in ownership §648.4 (a)(1)(i)(D)	Fishing and permit history presumed to transfer with the vessel unless there is a written agreement.	Same	Same

Attribute & CFR reference	Northeast Multispecies	Herring	Squid, Mackerel, and Butterfish
Replacement vessels §648.4 (a)(1)(i)(E)	Limited to one replacement per year, subject to upgrade limits.	Same, but vessels being replaced must have been issued a Northeast Multispecies, Atlantic mackerel, Atlantic herring, Squid, or Butterfish permit issued between November 10, 2003 and November 9, 2005. Replacement vessel must be owned by the same owner as the one being replaced, or have a written agreement retaining the permit and all herring landings history.	Same as Northeast Multispecies
Upgraded vessel §648.4 (a)(1)(i)(F)	120% of HP baseline 110% of length baseline	Same	Same, but for mackerel restricts fish hold capacity to 110% of baseline specification.
Consolidation restriction §648.4 (a)(1)(i)(G)	May not be combined or consolidated (except by lease or DAS transfer).	Same	Same
Vessel baseline specifications §648.4 (a)(1)(i)(H)	Determined by the vessel that was initially issued a limited access permit	Same, but applied to original vessel or CPH.	Same, but includes a fish hold specification for mackerel.
Change in permit category §648.4 (a)(1)(i)(I)	One change in category per year within 45 days of the permit's effective date	[Reserved]	[Reserved]
Confirmation of permit history (CPH) §648.4 (a)(1)(i)(J)	A CPH preserves fishing privileges and history of a qualified vessel. No later than 30 days before the end of the first full fishing year that a vessel permit cannot be issued, a person not owning a vessel may apply for a CPH for an eligible vessel that has been sunk, destroyed, or transferred to another person. A CPH may in the future be applied to another vessel, subject to the vessel replacement provisions and upgrade limits.	Same	Same

Attribute & CFR reference	Northeast Multispecies	Herring	Squid, Mackerel, and Butterfish
Permit abandonment §648.4 (a)(1)(i)(K)	Failure to renew or relinquishment of a permit retires that permit and its fishing history.	Same	Same
Restriction on permit splitting §648.4 (a)(1)(i)(L)	Only one permit may be issued based on the history of a qualified vessel or CPH.	The history of a sold vessel may not be used to qualify another vessel, if there is a written agreement transferring its history with the sold vessel. For the purposes of the Atlantic herring fishery, herrings landings history generated by separate owners of a single vessel at different times may be used the qualify more than one vessel, provided that each owner applying for a limited access permit, demonstrates that he/she created distinct fishing histories, and that such histories have been retained	Same as Northeast Multispecies, with an exception for mackerel history.

4.3.3.1 Limited access permit characteristics and conditions

4.3.3.1.1 Alternative 1 – Characteristics and conditions in common with other Northeast region limited access permits (Preferred)

The following permit characteristics and conditions would apply to Category I and II limited access small-mesh multispecies fishery permits:

Eligibility: Vessels may be issued a limited access permit if they were:

- Issued a moratorium permit for the preceding year,
- Replacing a vessel that was issued a moratorium permit for the preceding year, OR
- Replacing a vessel that was issued a confirmation of permit history

Appeals: Owners of vessels may appeal a denial of eligibility based on a vessel's history in the small-mesh multispecies fishery based on the grounds that information used to determine qualification was incorrect. Vessels may continue to fish pending the final outcome of an appeal.

Accumulation Limit: Consistent with the Amendment 18 regulations pertaining to Northeast Multispecies limited access permits, no individual, permit bank, or other entity shall hold over 5% of the Category I and II small-mesh multispecies fishery limited access permits currently issued. Partial or proportional ownership is counted as if it were whole ownership for the purposes of determining compliance.

History: See alternatives described in Section 4.1.

Due to a variety of marketing and sale arrangements in the high-volume small-mesh multispecies fishery, a substantial fraction of dealer reports do not encompass the entire landings of a trip and similarly, a dealer report can also include landings of more than one trip for a vessel. These reports are also often missing landings that occur via transfers at sea for the use of whiting and red hake as bait. Split trips: many times, a vessel lands and sells a trip's catch at two or three dealers. Sometimes a second or third dealer assumes that the fish were reported by another dealer. Sometimes landings at a dealer were reported, but no matching vessel trip report (VTR) exists, possibly because one or the other source has an inaccurate permit or VTR serial number.

To analyze the number and characteristics of qualifying vessels, the Council used the best landings from dealer reports, VTRs, or Dealer Matching Imputation System (DMIS). The latter source, available since 2008, is an amalgam of dealer and vessel reports, used for catch monitoring. Although NMFS uses dealer reports as the official record of fleet history, the Council encourages NMFS to evaluate the use of all supporting data to determine qualification. In all cases, the fleet history of a vessel is assumed to be associated with a moratorium right ID (MRI) number for vessels with other types of limited access fishing permits. For actual qualification, NMFS may also apply different associations of fleet history where it has written evidence that the history of a sold vessel was retained by the seller.

Construction extension of eligibility: An applicant who submits written evidence that a vessel was under construction, reconstruction, or was under written contract for purchase as of November 28, 2012, may extend the applicable vessel history for determining qualification to November 28, 2013.

Application/renewal: Except for owners of a CPH, all small-mesh multispecies permits would be issued for the entire fishing year. Permit applications would be required no later than 30 days before the end of

the permit year. Failure to renew would bar renewal in subsequent years. Vessels issued a limited access permit would not be issued an (open access) incidental possession limit permit (a vessel with a limited access permit is assumed to also hold an incidental small-mesh multispecies permit). See CFR §648.4 (a)(1)(i)(B).

Qualification restriction: No more than one vessel could qualify based on that or another vessel's fishing and permit history. See CFR §648.4 (a)(1)(i)(C).

Change in ownership: Fishing and permit history would be presumed to transfer with the vessel unless there is a written agreement between the buyer and seller of a qualified limited access vessel. See CFR §648.4 (a)(1)(i)(D).

Replacement vessels: Vessels with a limited access small-mesh multispecies permit would be limited to one replacement per year, subject to upgrade limits. Vessels being replaced would need to have been issued a Northeast Multispecies, Atlantic mackerel, Atlantic herring, Squid, or Butterfish permit issued between November 10, 2003 and November 9, 2005. A replacement vessel must be owned by the same owner as the one being replaced, or have a written agreement retaining the permit and all herring landings history. See CFR §648.4 (a)(1)(i)(E).

Upgraded vessel: Vessels would not be able to increase HP above 120% and length above 110% of the vessel baseline established by the first issuance of a limited access small-mesh multispecies permit. See CFR §648.4 (a)(1)(i)(F).

Consolidation restriction: Small-mesh multispecies limited access permits would not be able to be combined or consolidated, but may participate in a Northeast Multispecies lease or DAS transfer which has no bearing on small-mesh multispecies fishing. See CFR §648.4 (a)(1)(i)(G).

Vessel baseline specifications would be determined by the vessel that was initially issued a limited access Category I or II permit. See CFR §648.4 (a)(1)(i)(H).

A **change in permit category** provision would not apply to a small-mesh multispecies limited access permitted vessel. Changes from a Category I to II or vice versa might be accomplished by vessel replacement.

Confirmation of permit history (CPH): A CPH preserves fishing privileges and history of a qualified vessel. No later than 30 days before the end of the first full fishing year that a vessel permit cannot be issued, a person not owning a vessel may apply for a CPH for an eligible vessel that has been sunk, destroyed, or transferred to another person. A CPH may in the future be applied to another vessel, subject to the vessel replacement provisions and upgrade limits. See CFR §648.4 (a)(1)(i)(J)

Permit abandonment: Failure to renew or relinquishment of a permit would retire that permit and its fishing history. See CFR §648.4 (a)(1)(i)(K).

Restriction on permit splitting: The history of a sold vessel could not be used to qualify another vessel, if there is a written agreement transferring its history with the sold vessel. For the purposes of the small-mesh multispecies fishery, small-mesh multispecies landings history generated by separate owners of a single vessel at different times could be used the qualify more than one vessel, provided that each owner applying for a limited access permit, demonstrates that he/she created distinct fishing histories, and that such histories have been retained by prior written agreement.

Rationale for permit characteristics and conditions: These measures are most consistent with limited access permit conditions and characteristics in other limited access fisheries that intersect with vessels having Category K small-mesh multispecies permits and probable qualifying vessels. Ownership caps would serve to maintain diversity in the fishery and limit impacts on smaller fishing communities.

Exemption programs: Vessels fishing for small-mesh multispecies in an exemption program must possess either a Category I or Category II small-mesh multispecies limited access permit, or an incidental possession limit permit and a limited access (Categories A-F) Northeast Multispecies permit under the rules pertaining to each exemption area.

Rationale: This alternative would allow any vessel with a Multispecies permit to fish in the exemption areas, even if it does not qualify for a small-mesh multispecies limited access permit, but the applicable possession limits would apply. Thus, a vessel with an incidental small-mesh multispecies permit, for example, could fish in an exemption program and target small-mesh multispecies, but land a small amount under the incidental limit specified in the alternatives above.

Sector participants: If the vessel has a limited access Northeast Multispecies permit AND a limited access Small-mesh Multispecies Category I or II permit, fishing for small-mesh multispecies may be conducted under the rules of an exemption program while the vessel is not fishing under a day-at-sea (DAS) and while declared out of the fishery (DOF), if the vessel is required to operate a Vessel Monitoring System (VMS).

Rationale: This requirement would be consistent with the current rules that apply to holders of a limited access Northeast Multispecies permit, which specify that the vessel is not on a groundfish DAS while fishing for small-mesh multispecies.

4.3.3.1.2 Alternative 2 – No accumulation limit

There would be no limits on holdings of small-mesh limited access permits. Persons and entities could purchase qualified vessels and hold any number of Category I and II permits.

Rationale: Accumulation limits were implemented through Amendment 18 for Northeast multispecies limited access permits to prevent an individual or entity from acquiring or controlling excessive shares of the fishery access privileges, which could create undue hardship on the remaining permit holders that lack (or unable to obtain) quota for a species might be unable to fish for groundfish. The small-mesh multispecies fishery is not a Limited Access Privilege Program (LAPP), so allocations are not made to individuals or entities (e.g. to sectors under the Northeast multispecies LAPP). Because the whiting market is dominated by shipping product to NY markets, any aggregation of permits by persons or businesses is unlikely to harm smaller fishing communities.

4.3.3.1.3 Alternative 3 – Construction extension of eligibility

No qualification allowances for vessels under construction as of the November 28, 2012 control date would be made.

Rationale: The limited access program is meant to prevent increases in effort by vessels that entered the fishery after the control date.

4.3.3.1.4 Alternative 4 – Qualification restriction (Preferred)

History of a single vessel cannot be used to qualify more than one vessel.

Rationale: This alternative would prevent multiple vessels from qualifying for a limited access permit based on the history of a single vessel that had been sold or transferred to a different owner. It would be more consistent with the number of vessels that had actually fished for small-mesh multispecies, rather than the number of participants that had owned vessels which targeted small-mesh multispecies.

4.3.3.1.5 Alternative 5 – Upgraded vessels

Qualified vessels with Category I or II limited access permits would be able to replace or modify their vessels without restriction on size or horsepower.

Rationale: The intent of the proposed limited access program is to constrain new entrants to the fishery, not constrain capacity of existing participants, if there is spare capacity in the fishery (i.e. catches do not exceed annual limits).

4.3.3.2 Incidental permit conditions

The alternatives in Section 4.3.3.2 describe how vessels may or may not fish for small-mesh multispecies while in possession of an incidental permit (alternatives for whiting and red hake incidental possession limits are described in Section 4.3.2.3). Special provisions for vessels on a Multispecies DAS or when targeting herring or squid are presented as separate alternatives. For the final amendment, the Council may select none, one, or more than one of these alternatives if a limited access program is established.

4.3.3.2.1 Alternative 1 – Only vessels with a limited access small-mesh multispecies permit may fish in exemption programs.

Only vessels that qualify for either a Category I or II limited access small-mesh multispecies permit would be able to target whiting and red hake while fishing in a small-mesh multispecies exemption program. Vessels with an incidental possession limit permit would be prohibited from using small mesh trawls in small-mesh multispecies exemption areas.

Rationale: The intention of the exemption programs is to allow fishing with small-mesh trawls for whiting and red hake. Since landings of these species often have relatively low prices, vessels must land large quantities of fish and targeting whiting and red hake with an incidental possession limit is inconsistent with the intent of having limited access to the fishery. Allowing vessels to use small-mesh trawls in exemption areas for small amounts of whiting and red hake could cause enforcement problems.

4.3.3.2.2 Alternative 2a – Incidental possession limit permits and Northeast Multispecies limited access permits

Vessels using large-mesh groundfish gear[5] while on a Northeast Multispecies DAS would be able to exceed the incidental whiting and red hake limits described in Section 4.3.2.3, including small-mesh exemption areas and other open fishing areas. These vessels must also possess a Category I or Category II or incidental small-mesh multispecies permit.

[5] Including gill nets, longlines, and regulated large-mesh trawls

Rationale: The alternative would enable limited access Northeast Multispecies vessels to target small-mesh multispecies with large-mesh trawls and other legal groundfish gear, or land amounts greater than the incidental limit while targeting groundfish on a DAS. It would generally be unlikely to target whiting and red hake with large-mesh groundfish gear because smaller whiting and red hake would escape, but when there are large whiting present, catches greater than the incidental limit may be possible. Thus, this alternative would minimize whiting and red hake discards in the large-mesh Northeast Multispecies fishery.

4.3.3.2.3 Alternative 2b – Incidental possession limit permits and Northeast Multispecies limited access permits

Vessels fishing for small-mesh multispecies in an exemption program must possess a Category I or II small-mesh multispecies limited access permit. Vessels with a small-mesh multispecies AND a Northeast Multispecies limited access permit may fish for small-mesh multispecies and exceed the incidental limit only while the vessel is not fishing under a day-at-sea (DAS) and while declared out of the fishery (DOF).

Rationale: This alternative specifies that a vessel fishing for small-mesh multispecies may not be on a groundfish day-at-sea and must be declared out of the groundfish fishery. Thus, vessels with Northeast Multispecies limited access permits are not automatically qualified to fish for small-mesh multispecies with small- or large-mesh. Vessel owners may however obtain an open-access incidental possession limit permit to retain small-mesh multispecies up to the specified incidental whiting and red hake limits.

4.3.3.2.4 Alternative 3 (Preferred) – Incidental possession limit permits and Atlantic herring and Squid limited access permits

Vessels fishing in a small-mesh multispecies exemption area while targeting Atlantic herring or squid with a limited access permit issued for those fisheries would be able to exceed the incidental possession limit for whiting and red hake. Vessels would be able to retain and land whiting and red hake up to the limits that apply to vessels with a Category I limited access small-mesh multispecies permit, but not exceed the lower whiting exemption area possession limits that apply to vessels using trawls with mesh less than 3-inches.

Rationale: This allowance would minimize discards of whiting and red hake in other small-mesh fisheries (namely in the herring, northern shrimp, and squid/mackerel/butterfish fisheries), regardless of whether the vessel qualified for a small-mesh multispecies limited access permit.

4.3.3.2.5 Alternative 4 – Exempt Vessels with an Incidental Permit from Limited Access Regulations in Areas that Require the Use of a Raised Footrope Trawl

This alternative would allow any vessel that does not qualify for a Category I or II limited access permit to fish for whiting and red hake in specific exemption areas that require the use of a raised footrope trawl (as specified in §???). Currently, these areas include the Gulf of Maine Grate area, Small-Mesh Areas I and II, and the Raised Footrope Areas I and II (see Table 3) and the existing whiting and red hake possession limits would apply (see Table 4), or the possession limit that applies to Category II vessels fishing in the same exemption areas.

Rationale: The raised footrope gear is an established net that reduces catches of many regulated groundfish and other benthic species. By itself, this selective gear reduces concerns about bycatch exceeding acceptable levels and sub-ACLs that apply to the fishery. Because of the selective gear

requirement, reducing access to the fishery when the target catch is below the applicable ACLs is not as problematic as it is in exemption areas that do not require selective gear.

4.4 Considered and Rejected Alternatives

4.4.1 Regional Limited Access Qualification

This alternative would allow vessels to qualify for a single or two-tier limited access permit using qualification criteria that are specified by region (see Section 4.3.1).

Rationale for rejection: Although it might allow more fine tuning of the number of qualifying vessels in each region, this alternative causes some difficult-to-solve fleet history problems. If this amendment were to consider different qualification criteria by area fished, for example, vessel owners would have to show or prove with dealer data, vessel trip reports, or other documents that their vessels had fished in a specific area. Split trips that fished in both areas would be problematic.

4.4.2 Automatic Qualification by Vessels with a Northeast Multispecies Limited Access Permit

In addition to vessels that qualify for a Category I or II small-mesh multispecies permit, vessels with a Northeast Multispecies limited access permit would be allowed to fish for small-mesh multispecies as they are currently allowed to do.

Rationale: This alternative would preserve the status quo, but allow continued access to the fishery by a limited number of vessels in the multispecies fishery. It could allow a limited number of vessels into the small-mesh multispecies fishery, relieving fishing pressure on large-mesh groundfish, without keeping the fishery open to an unlimited number of vessels. On the other hand, this alternative was considered and rejected because the number of vessels with a Northeast Multispecies limited access permit is much larger than the number of vessels that in recent decades have participated in the whiting fishery.

4.4.3 Triggered reductions to status quo possession limits

The Council considered a hybrid alternative that would have triggered reductions in small-mesh multispecies possession limits when certain conditions were met. The possession limit reductions would have applied to holders of Category II Limited Access and Incidental (i.e. non-qualifier) permits.

Initially, the limited access program would begin by qualifying vessels for limited access based on their history in the fishery, but all vessels would have the same whiting and red hake possession limits. If catches of target or non-target species had exceeded or approached a specified threshold relative to their ABC, possession limit reductions would have been automatically triggered via a tiered system.

Rationale: This alternative would retain the ability for vessels not qualifying for a Category I permit to fish under existing rules and possession limits for whiting and red hake. A triggered possession limit reduction would however reduce the opportunity for Category II vessels to increase fishing effort for target stocks of whiting and red hake, when one or more of the target stocks are at risk. The reduced possession limits are intended to be consistent with traditional levels of landings per trip by vessels qualifying for Category II permits before implementation of the limited access program.

On further evaluation, the Council decided that the alternative would be too inflexible and would depend on unpredictable conditions. An automatic possession limit reduction under a future condition could be

insufficient or too severe. In contrast, the FMP could achieve the same objectives as intended by this alternative by choosing Alternative 1 (status quo possession limits by permit category, Section 4.3.2) and making future adjustments, as needed. Due to the complexities and future unknown conditions, the Council felt that at this time this measure would be difficult to evaluate.

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5.0 AFFECTED ENVIRONMENT (EIS)

5.1 Management History

5.1.1 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, about 1,360 tons annually. 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 - 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 were advancing, 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 in other fisheries or through directed fisheries targeting a variety of sizes of silver hake.

5.1.2 Regulations and Plan Amendments

Collectively, the small-mesh multispecies fishery is managed under a series of exemptions from the Northeast Multispecies Fishery Management Plan. 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 3).

Table 3. 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 for all the areas with that requirement are shown below.

Table 4. Mesh size dependent possession limits

Codend Mesh Size	Silver and offshore hake, combined, possession limit	Red Hake South	Red Hake North
Smaller than 2.5”	3,500 lbs.	5,000 lbs.	3,000 lbs.
Larger than 2.5”, but smaller than 3.0”	7,500 lbs.	5,000 lbs.	3,000 lbs.
Equal to or greater than 3.0”	30,000 lbs. (40,000 lbs. in Southern Area)	5,000 lbs.	3,000 lbs.
Accountability measure, in-season trigger	2,000 lbs. 90% of TAL	400 lbs. 90% of TAL	400 lbs. 37.9% of TAL

The exemption areas were implemented as part of several different amendments and framework adjustments to the Northeast Multispecies FMP (Map 1). 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[6] 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 areas. In 2003, Framework Adjustment 38 established the Grate Raised Footrope Exemption Area in the inshore Gulf of Maine area.

The Northeast Multispecies FMP was implemented primarily to manage the commercial cod and haddock fisheries in the Gulf of Maine and Georges Bank[7]. The FMP is complicated and has been changed numerous times since 1985 (almost 20 Council amendments and over 50 framework adjustments; not including dozens of emergencies, interim, and Secretarial amendments implemented outside of the Council process.) A few of those amendments and several framework adjustments have addressed the small-mesh fishery specifically and are described below.

[6] 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.”

[7] The large-mesh species (cod, haddock, pollock, flounders, etc.) were commonly referred to as the “regulated” species because they were the focus of management originally. That term is confusing as almost all of the commercially viable stocks are now “regulated.” This document refers to the management of those species as the “groundfish fishery” or the “large-mesh multispecies fishery.”

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

Amendment 2 (1989) made some additional, minor changes to the exempted fishery program for whiting and other small-mesh stocks.

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

Amendment 5 (1994) established an overfishing definition for red hake, and implemented some other minor modifications to small-mesh management, including a standardized bycatch amount of 500 lb of large-mesh groundfish.

Framework Adjustment 3 (1994) modified the 500-lb bycatch limit to reduce the incentive for vessels to target groundfish with small mesh. This action changed the limit to "10-percent of the total weight of fish on board, or 500 lb, whichever is less." This preserved the Council's original intent of minimizing mortality on juvenile groundfish, while allowing the legitimate small-mesh fishery to continue.

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

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

An Adjustment to Amendment 7 (1996) made some minor modifications to non-groundfish bycatch limits in the Cultivator Shoals fishery.

Amendment 12 (1999/2000) addressed many small-mesh issues. This amendment officially incorporated offshore hake into the FMP; established essential fish habitat designations for all three small-mesh species; standardized the mesh-size based possession limits (see below); required a Letter of Authorization for several small-mesh exemption areas; and established a provision to allow the transfer of up to 500 lb of small-mesh multispecies at sea. Amendment 12 also proposed a limited access permit program for this fishery. However, that program was not implemented because NMFS determined that it did not comply with the requirement to treat residents of different states equally (National Standard 4.)

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

Framework Adjustment 37 (2003) eliminated some of the now unnecessary provisions from Amendment 12, clarified the transfer-at-sea provisions, and reinstated the full season (back to an October 31 end date) for the Cultivator Shoal Exempted Fishery. This framework also standardized the types and amounts of incidental species that could be retained in the small-mesh exemption areas between Small Mesh Areas I and II and the Cape Cod Exemption Area.

A new Control Date (2003) was formally established with the intentions of developing a limited access permit program.

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

A Secretarial Amendment (2012) brought this portion of the FMP into compliance with the Magnuson-Stevens Act requirements to have (1) annual catch limits and (2) measures to ensure accountability for each Council managed fishery. A Secretarial Amendment was necessary because the development of Amendment 19, the mechanism through which the Council was intending to adopt the new requirements, was delayed.

The Control Date for the small-mesh multispecies was modified to November 28, 2012.

Amendment 19 (2013) allowed the Council to incorporate updated stock assessment information and adopt the annual catch limit structure implemented in the 2012 Secretarial Amendment. Amendment 19 modified the accountability measures, adopted new biological reference points, and established a trip limit for red hake.

Framework Adjustment 50 (2013) established a separate, sub-annual catch limit of Georges Bank yellowtail flounder for the small-mesh fishery (whiting and squid fisheries.)

Framework Adjustment 51 (2014) implemented accountability measures for that sub-annual catch limit.

Post-season Accountability Measure (2015) reduced the TAL trigger for northern red hake from 90% of the TAL to 62.5% of the TAL.

Specifications for 2015-2017 (2016) adjusted the OFL, ABC. ACL, and TALs to account for changes in stock biomass. The specification document also changed the northern red hake possession limit to 3,000 lbs. at the beginning of the fishing year, which would automatically drop to 1,500 lbs. when landings reach 62.5% of the TAL. Due to prior overages, the TAL trigger was reduced to 45% of the TAL.

Post-season Accountability Measure (2016) reduced the northern red hake TAL trigger from 45% of the TAL to 37.9%.

New Specifications for 2018-2020 (2017) are being developed by the Council, based on an assessment update for 2016 prepared by the Northeast Fisheries Science Center (NEFSC). The new specifications are presented in Section 5.2.2.6, but have not yet been reviewed or approved by the Council's Scientific and Statistical Committee (SSC). The SSC meeting is tentatively scheduled for early October 2017 and the Council expects to approve a specification package in December 2017, so that new regulations become effective on May 1, 2018.

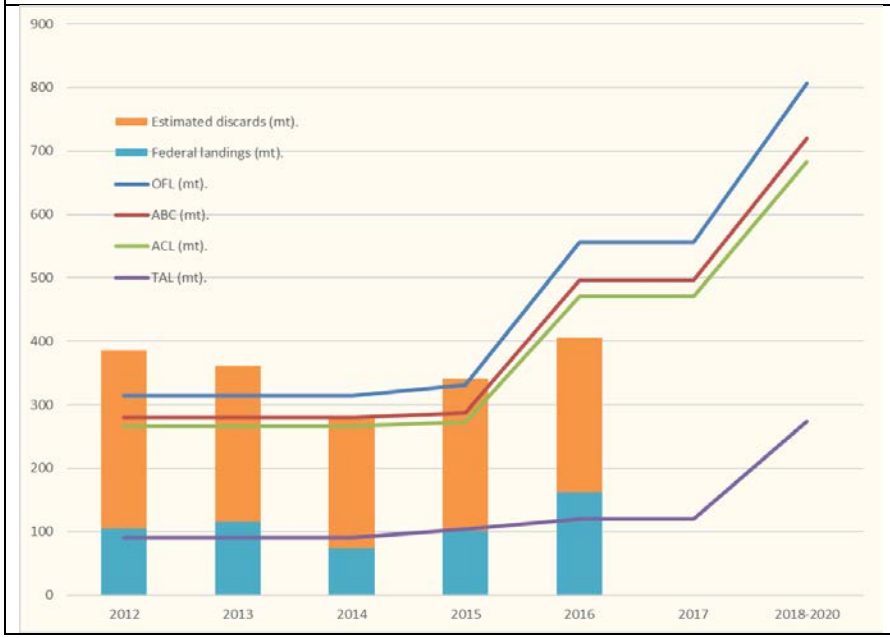
Figure 2 summarizes the past, current, and proposed specifications by stock.

Figure 2. Annual specifications and catch estimates for small-mesh multispecies by stock

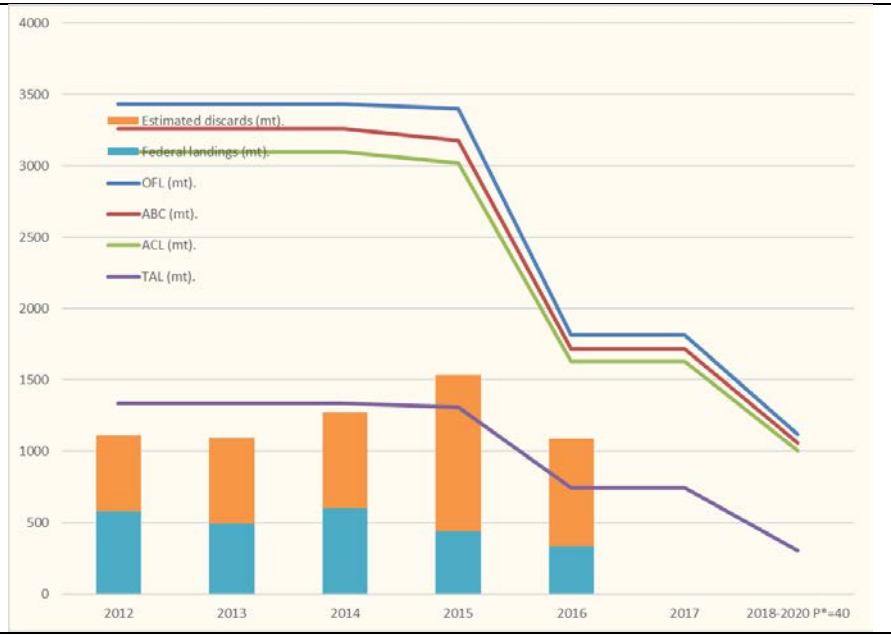
Northern silver hake

Southern whiting

Northern red hake



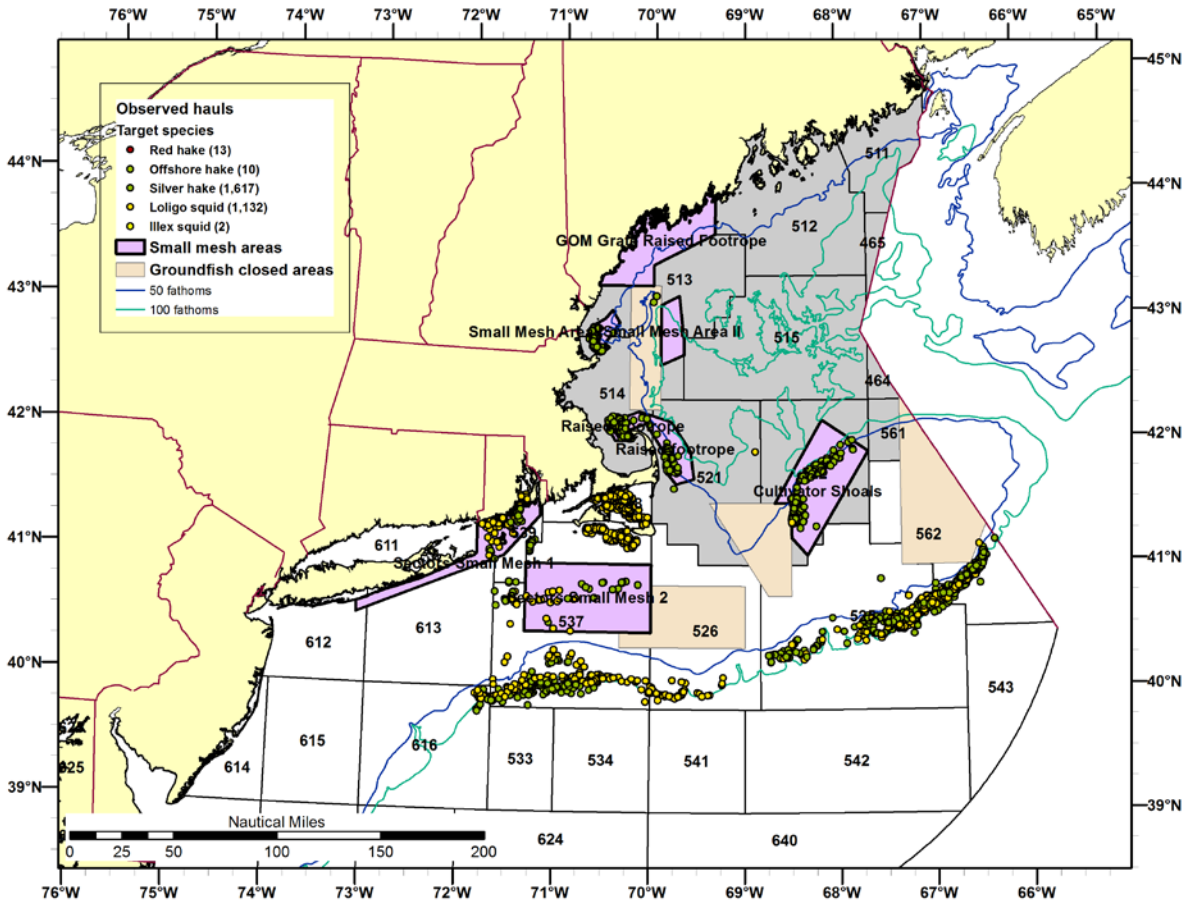
Southern red hake



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. 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 4). 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.

The red hake possession limit is 5,000 lb, regardless of area fished. Amendment 19 also implemented a 40,000 lb possession limit for vessels fishing in the southern stock area.

Map 1. Location of small-mesh fishing during 2002-2013 and exemption areas. Vessels that belong to a groundfish sector may fish for small-mesh multispecies in the two shaded exemption areas off NY, CT, and southern MA. The northern stock area is shaded grey, while the southern stock area is not shaded. The locations of groundfish closed areas shaded beige are shown for reference.



5.1.3 Magnuson-Stevens Fishery Conservation and Management Act

In 2006, the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was passed, which updated the original Magnuson-Stevens Act (MSA) and the Sustainable Fisheries Act of 1996. The MSFCMA introduced requirements for fishery management, including:

- 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
- Use of Annual Catch Levels (ACLs) to prevent overfishing, 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. Councils were directed to follow the recommendations of their Scientific and Statistical Committee (SSC); the ACL cannot exceed the SSC's ABC recommendation.
- Use of Accountability Measures (AMs), actions to be taken in the event of an ACL overage.

5.1.4 Essential Fish Habitat (EFH)

See Section 5.4.2 for a summary of EFH management actions.

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

5.2 Biological Environment

5.2.1 Summary of life history characteristics

5.2.1.1 Silver hake

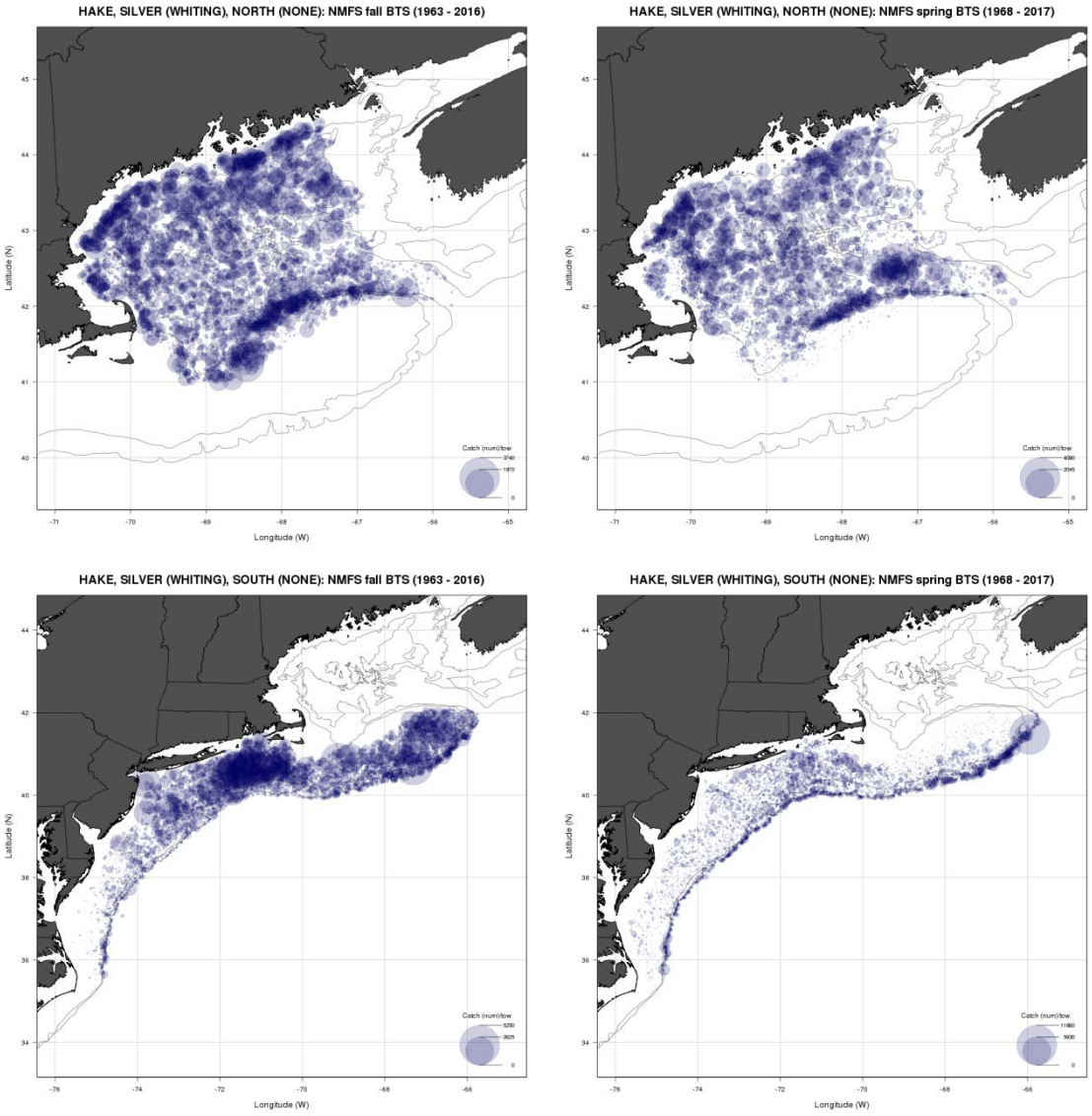
Silver hake, *Merluccius bilinearis*, also known as whiting, range from the Grand Banks of Southern Newfoundland to South Carolina (Brodziak, 2001, Lock and Packer 2004). In U.S. waters, two subpopulations of silver hake are assumed to exist within the EEZ based on numerous methods, primarily morphometric 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 3). 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 3 Fall (left) and spring (right) survey distribution of silver hake in the northern stock (Top) and southern stock (Bottom) from the NEFSC bottom trawl surveys, 1963-2017.



5.2.1.2 Red hake

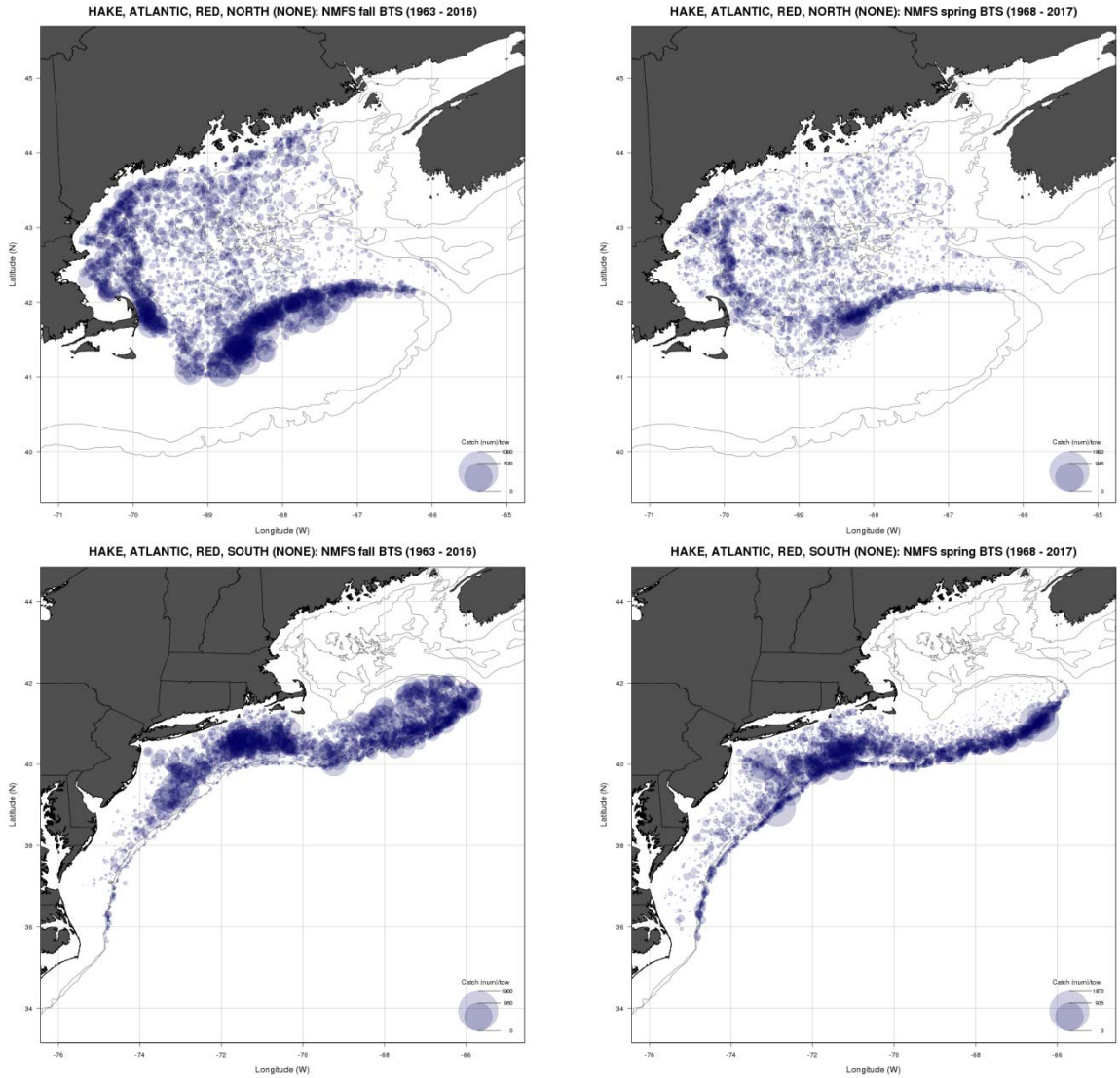
Red hake, *Urophycis chuss*, is a demersal gadoid species distributed from the Gulf of St. Lawrence to North Carolina, and are most abundant from the western Gulf of Maine through Southern New England waters. Red hake are separated into northern and southern stocks for management purposes. The northern 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 4). 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 4).

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 4 Fall (left) and spring (right) survey distribution of red hake in the northern stock (Top) and southern stock (Bottom) from the NEFSC bottom trawl surveys, 1963-2017



5.2.1.3 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 11-13ºC. 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 5).

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, like 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 5 Fall (left) and Spring (right) survey distribution of offshore hake from the NEFSC bottom trawl surveys, 1967-2017.

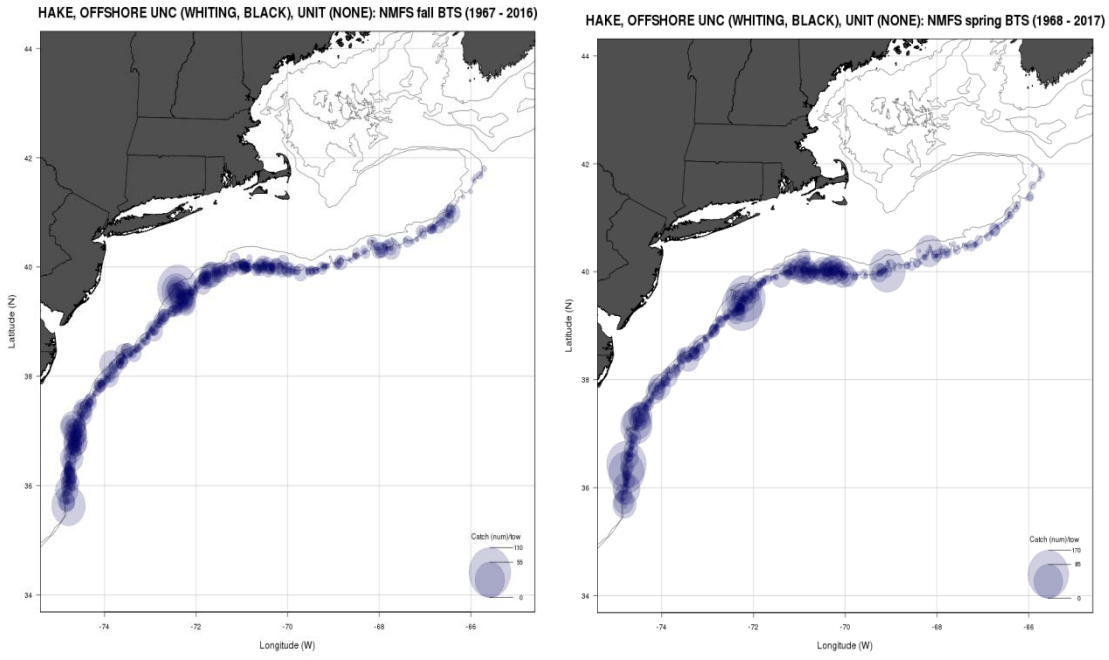
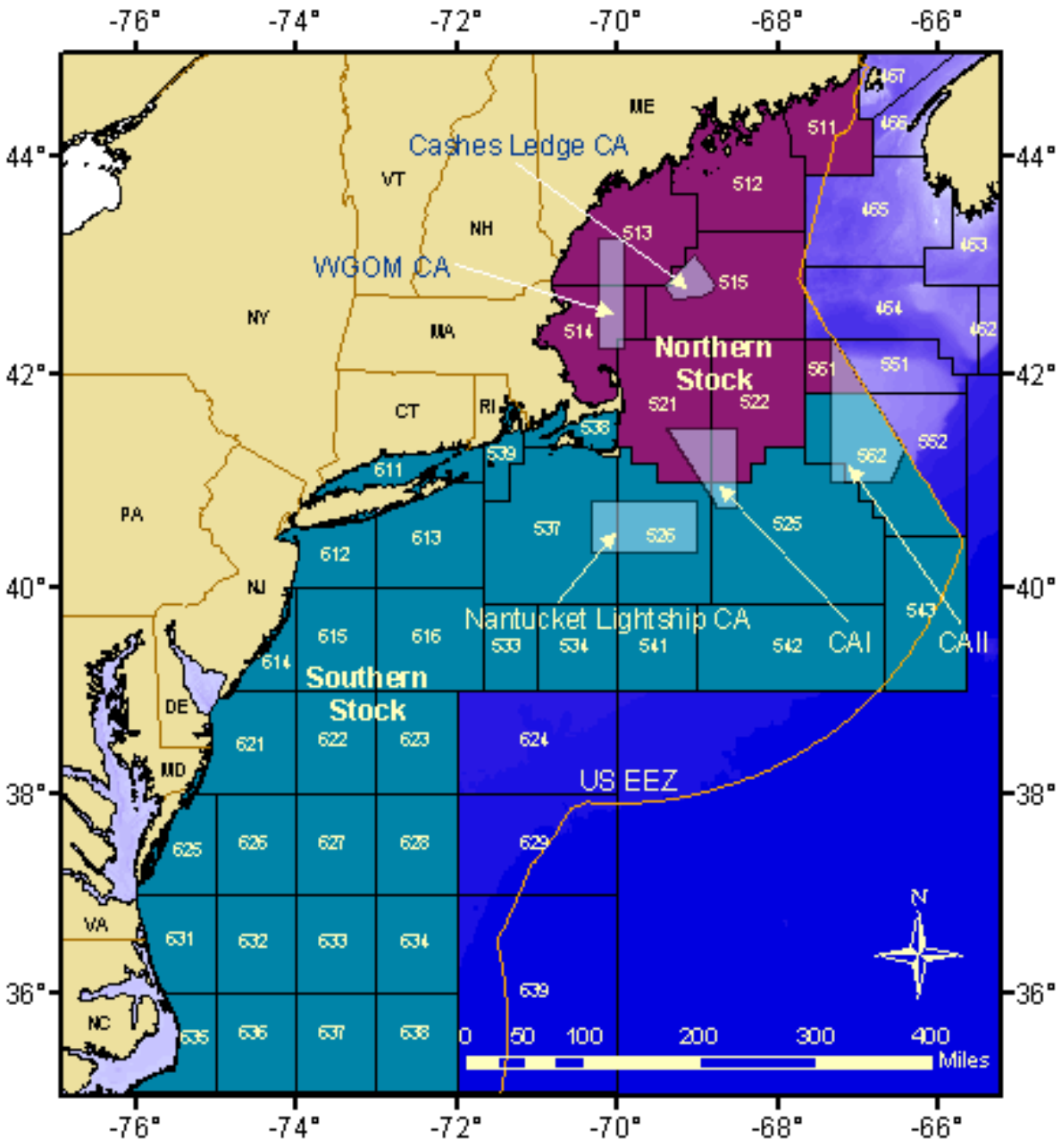


Figure 6. Statistical area used to define red and silver hake in the northern and southern management areas. Offshore hake statistical areas are restricted to the southern management region only.



5.2.2 Overfishing Definitions

The following overfishing definitions were chosen by the Council in Amendment 12 (https://www.nefmc.org/library/amendment-12-2) and re-evaluated in the 2010 benchmark assessment (NEFSC 2011) and subsequently approved by the Council's SSC for determining stock status.

5.2.2.1 Silver hake

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.

Table 5. 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)

5.2.2.2 Red hake

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 6. Red hake overfishing definition reference points.

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)

5.2.2.3 Offshore hake

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

5.2.2.4 Maximum Sustainable Yield (MSY)

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 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 BMSY (stock biomass capable of sustaining MSY over time). F_{target} is the target level of fishing mortality and is set safely below FMSY (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 BMSY, 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 BMSY. 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.

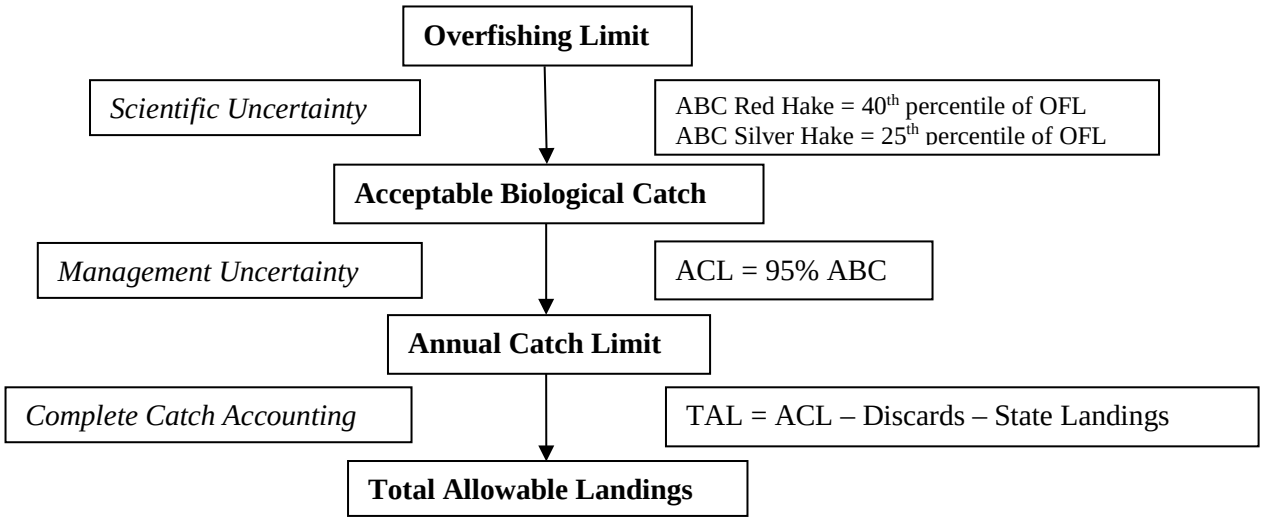
OY, therefore, is not a fixed amount but varies with the status of the stocks in the fishery, but it cannot be above a level that would exceed FMSY. It is a quantity that represents the yield resulting from fishing at

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.

5.2.2.5 Acceptable Biological Catch (ABC)

The process and formulae for developing specifications for red, silver, and offshore hake (target species for the small-mesh multispecies fishery) are described in §648.90(b). The regulations provide for an annual review and three-year specification process where the Council sets specifications for at least a three-year period, using best available science. The specifications for each stock include an overfishing limit (OFL), which is associated with maximum sustainable yield (MSY); an Acceptable Biological Catch (ABC), which accounts for scientific uncertainty; an Annual Catch Limit (ACL), which accounts for management uncertainty; and a Total Allowable Landings (TAL) limit that accounts for discards and catch by state-only permitted vessels.

This ACL framework, including the OFLs and ABCs, is illustrated below:



The OFL is derived from the average exploitation rate during a period that is considered to represent conditions that generated MSY. Adopted in the last benchmark assessment (SAW 51, NEFSC 2011), these baseline reference periods were 1980-2009 for red hake and 1973-1982 for silver hake. These average exploitation rates derived from the assessments were applied to the most recent three-year moving average biomass estimates gives the OFL (in mt) that is consistent with current stock conditions.

Precision (or conversely, scientific uncertainty) is estimated and a level of precaution was selected in Amendment 19 to account for scientific uncertainty. For red hake, the 40th percentile of the distribution of scientific uncertainty estimates was chosen as an appropriate level of precaution. For silver hake, a more conservative 25th percentile was chosen. This buffer between the OFL and ABC will vary with the degree of scientific uncertainty (getting smaller with greater amounts of precision in the estimates). In Amendment 19, the Council also chose a 5% buffer to account for management uncertainty to set the ACL. A three-year average discard rate (discards/catch) is applied for each stock to set the TAL, after deducting an assumed 3% catch for state-only permitted vessels.

Details about the estimation procedures and values derived from the latest stock assessment are given in the SAFE Report for the 2016 fishing year (NEFMC 2017).

5.2.2.6 Specifications (Allowable Biological Catch and Annual Catch Limits)

New Specifications for 2018-2020 (2017) are being developed by the Council, based on an assessment update for 2016 prepared by the Northeast Fisheries Science Center (NEFSC). The new specifications are presented in Table 7, but have not yet been reviewed or approved by the Council's Scientific and Statistical Committee (SSC). The SSC meeting is tentatively scheduled for early October 2017 and the Council expects to approve a specification package in December 2017, so that new regulations become effective on May 1, 2018.

An update assessment was performed by the Northeast Fisheries Science Center (NEFSC) and presented to the Whiting PDT in July. This assessment followed the same procedures that were applied in the benchmark assessment using new survey data and catch estimates. Also, scientific uncertainty in these estimates were estimated and the full range of potential ABC values as well as probability of overfishing (ABC>OFL) will be presented to the Scientific and Statistical Committee (SSC). These estimates included the ABC at the 25th percentile for silver hake and the 40th percentile for red hake, separately for the northern and southern management areas.

During the last update assessment and development of three-year specifications, two advisors raised concerns about red hake stock structure and survey availability due to interference with fixed gear. More data and analyses were presented to the SSC, who felt that the concerns were valid but also deemed the assessment was consistent with currently available information. The SSC did however recommend that these issues should be more thoroughly examined at the next benchmark assessment. In addition, it has been six years since the last benchmark assessment and will be nine years old by the next specification cycle. Changes in distribution and an apparent shift in relative productivity of northern and southern stocks may make the existing reference point benchmarks (1973-1982 for silver hake and 1980-2009 for red hake) less suitable for future management targets and thresholds. Further advancements could be made if red hake aging data can be used in the assessment. An alternative assessment could also be performed using survey data ONLY from the RV Bigelow time series, coupled with compatible state survey data (including the ME/NH and NEMAP trawl surveys). The 2011 benchmark assessment adjusted the RV Albatross survey series to RV Bigelow units based on calibration data (which has some level of uncertainty) that the NEFSC collected during the transition.

After reviewing the PDT advice, the SSC felt that the buffers the Council chose for scientific uncertainty were appropriate and had worked as intended during the 2012-2014 specification period. The SSC therefore approved using the 25th percentile for silver hake and a less conservative 40th percentile for red hake. The proposed 2018-2020 specifications are shown in the table below.

Table 7. Proposed 2018-2020 specifications.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	Change from 2016-2017	TAL (mt)
Northern silver hake	58,350	31,030	29,475	+33%	26,604
Northern red hake	840	721	685	+2.6%	274
Southern whiting	31,180	19,395	18,425	-37%	14,465
Southern red hake	1,150	1,060	1,007	-2.4%	305

5.2.3 Stock status

An update assessment (NEFSC 2017) was performed by the Northeast Fisheries Science Center (NEFSC). This assessment followed the same procedures that were applied in the benchmark assessment using new survey data and catch estimates. Also, scientific uncertainty in these estimates were estimated and the full range of potential ABC values as well as probability of overfishing (ABC>OFL) which was presented to the Scientific and Statistical Committee (SSC) on October 12, 2017 (https://www.nefmc.org/calendar/oct-12-2017-ssc-meeting). These estimates included the ABC at the 25th percentile for silver hake and the 40th percentile for red hake, separately for the northern and southern management areas. For offshore hake, there was no reliable information about catch or trends in abundance and biomass to guide management of offshore hake.

5.2.3.1 Silver hake

The 2017 silver hake assessment update 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 2016 and will be the basis for this report.

In the absence of an analytical assessment for silver hake, the biological reference points are described in the overfishing definitions for the northern and southern stocks (see Section 5.2.2.1). Overfishing thresholds are based on annual exploitation ratios (catch divided by arithmetic fall survey biomass) averaged from 1973-1982 (Table 5). Catch per tow is in "Albatross" units.

In the northern management area (Figure 7 below and Table 33 in NEFMC 2017a), the three-year average arithmetic mean biomass based on the NEFSC fall bottom trawl survey for data 2014-2016 (19.92 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 2014-2016 (0.15kt/kg) was below the overfishing threshold (2.78 kt/kg).

In the southern management area (Figure 8 below and Table 34 in NEFMC 2017a), the three-year arithmetic also based on the NEFSC fall bottom trawl survey data for 2014-2016 (1.05 kg/tow) was above the biomass threshold (0.83 kg/tow) but below the target (1.65 kg/tow). The three-year average exploitation index (total catch divided by biomass index) for 2014-2016 (2.95 kt/kg) was below the overfishing threshold (34.19 kt/kg). Therefore, based on the 2017 silver hake updated assessment, it is recommended that both stocks so silver hake are NOT overfished and overfishing is NOT occurring.

The range of years (1973 -1982) for defining the biological reference points reflect a period of high and low productivity in the fishery. However, the steep contrast in the fishery productivity between the 1970's and 1980's is a source of uncertainty in the fishing reference points. Recognizing the lack of contemporary measures for defining the reference points and potential for non-stationary in stock productivity, a precautionary approach corresponding to a low probability of overfishing was chosen by the Council as basis for the Allowable Biological Catch. This choice of acceptable risk was also made in part due to the economic and ecological importance of silver hake. percentile on the OFL distribution of scientific uncertainty estimates, corresponding to a low probability of overfishing.

Figure 7. ***Northern Silver hake*** fall survey biomass in kg/tow (LEFT) and relative exploitation ratios (RIGHT) of the total catch to the fall survey indices in kt/kg and associated 3-yr moving averages (red lines). The horizontal dash lines represent the biomass and overfishing thresholds and the solid line is the biomass target. The BOTTOM panels reflect the most recent 23 years of the entire time series.

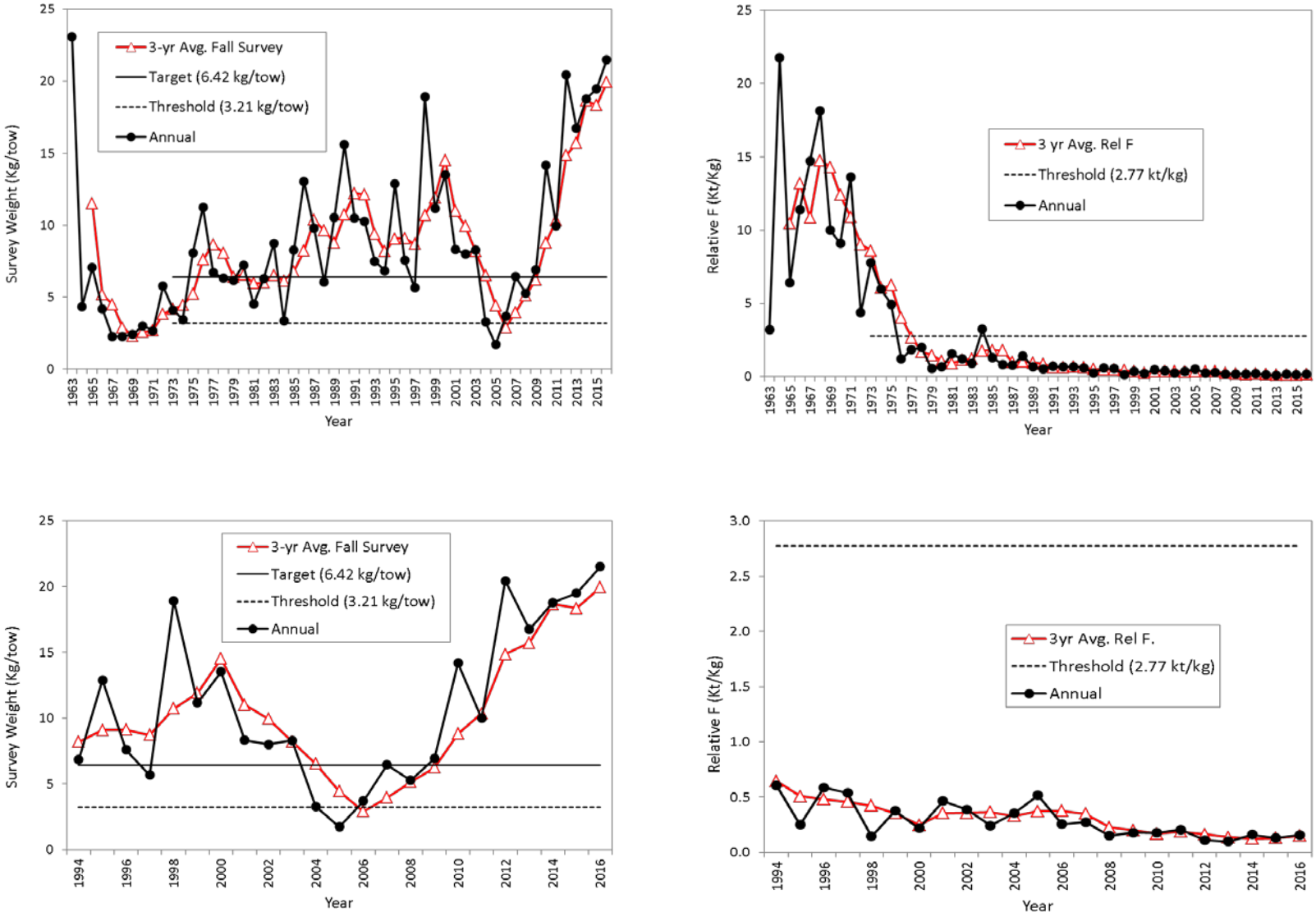
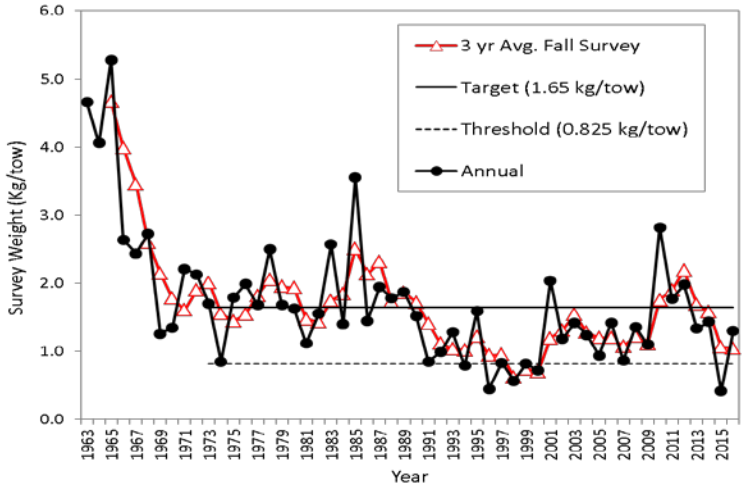
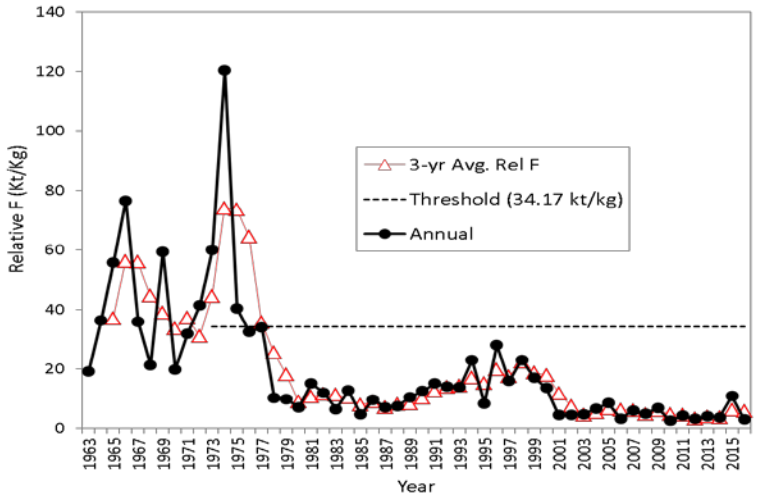
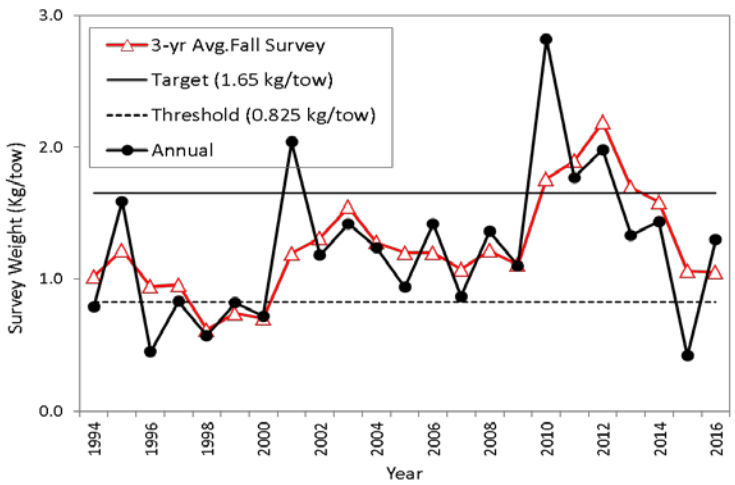
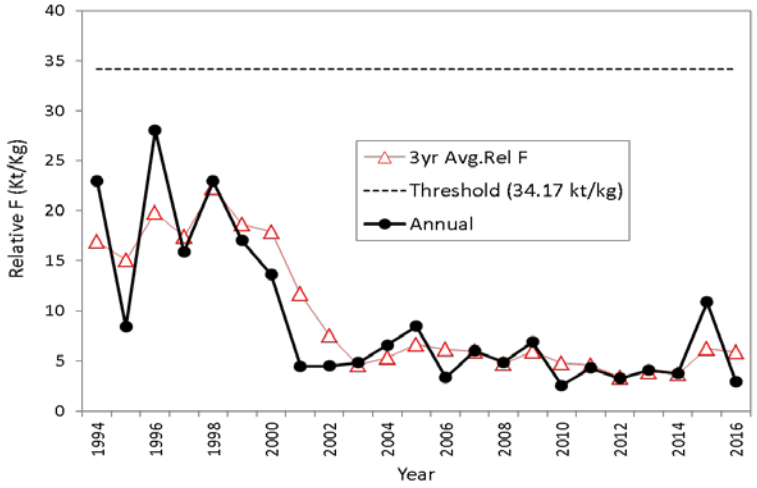


Figure 8. ***Southern silver hake*** fall survey biomass in kg/tow (LEFT) and relative exploitation ratios (RIGHT) of the total catch to the fall survey indices in kt/kg and associated 3-yr moving averages (red lines). The horizontal dash lines represent the biomass and overfishing thresholds and the solid line is the biomass target. The BOTTOM panels reflect the most recent 23 years of the entire time series









5.2.3.2 Red hake

The 2017 red hake assessment update for both the northern and southern management areas included survey data from the NEFSC spring bottom trawl survey through 2017, commercial fishing data from vessel trip reports, dealer landings, and on-board fishery observer data through 2016 (see Tables 33 and 34 in NEFMC 2017a). In the absence of an analytical assessment for red hake, the biological reference points for both the northern and southern silver stocks are described and specified in the overfishing definitions for northern and southern stocks (see Section 5.2.2.2 and Table 6).

In the north, the three-year arithmetic mean biomass index (Figure 9), based on the NEFSC spring bottom trawl survey for 2015-2017 (5.13 kg/tow) was above the management threshold (1.27 kg/tow) and above the target (2.54 kg/tow). The exploitation index (catch divided by biomass index for 2016 (0.09 kt/kg) was below the threshold (0.16 kt/kg; Figure 9).

In the south, the three year arithmetic mean biomass index (Figure 10), based on the NEFSC spring bottom trawl survey for 2015-2017 (0.38 kg/tow) was below both the management threshold (0.51 kg/tow) and the target (1.02 kg/tow). The exploitation index (catch divided by biomass index for 2016 (4.03 kt/kg) was above the threshold (3.04 kt/kg). Therefore, based on the 2017 assessment update, the northern is not overfished and overfishing is not occurring while in the south, the stock is overfished and overfishing is occurring.

The Council chose a less conservative buffer for scientific uncertainty than had been chosen for silver hake. Some of the known sources of uncertainty include stock structure, possible hybridization with white hake, and commensalism between juvenile red hake and scallop, which could potentially impact red hake abundance. All the other sources of uncertainty including survey measurement error, conversions between the RV Albatross and the RV Bigelow time series, and stock structure, also apply to the red hake assessment. The Council chose a less conservative buffer because red hake play a relatively more marginal role in the ecosystem, have lower economic value (and consequences if it became overfished), and are generally landed incidental to targeting other species (e.g. silver hake and squid). As such, red hake could become a choke species with significant economic consequences on the fishery with less benefit. The Council therefore felt that a conservative buffer with a higher risk (than silver hake) would be appropriate.

Figure 9. ***Northern red hake*** spring survey biomass in kg/tow (LEFT) and relative exploitation ratios (RIGHT) of the total catch to the spring survey indices in kt/kg and associated 3-yr moving averages (red lines). The horizontal dash lines represent the biomass and overfishing thresholds and the solid line is the biomass target. The BOTTOM panels reflect the most recent 24 years of the entire time series.

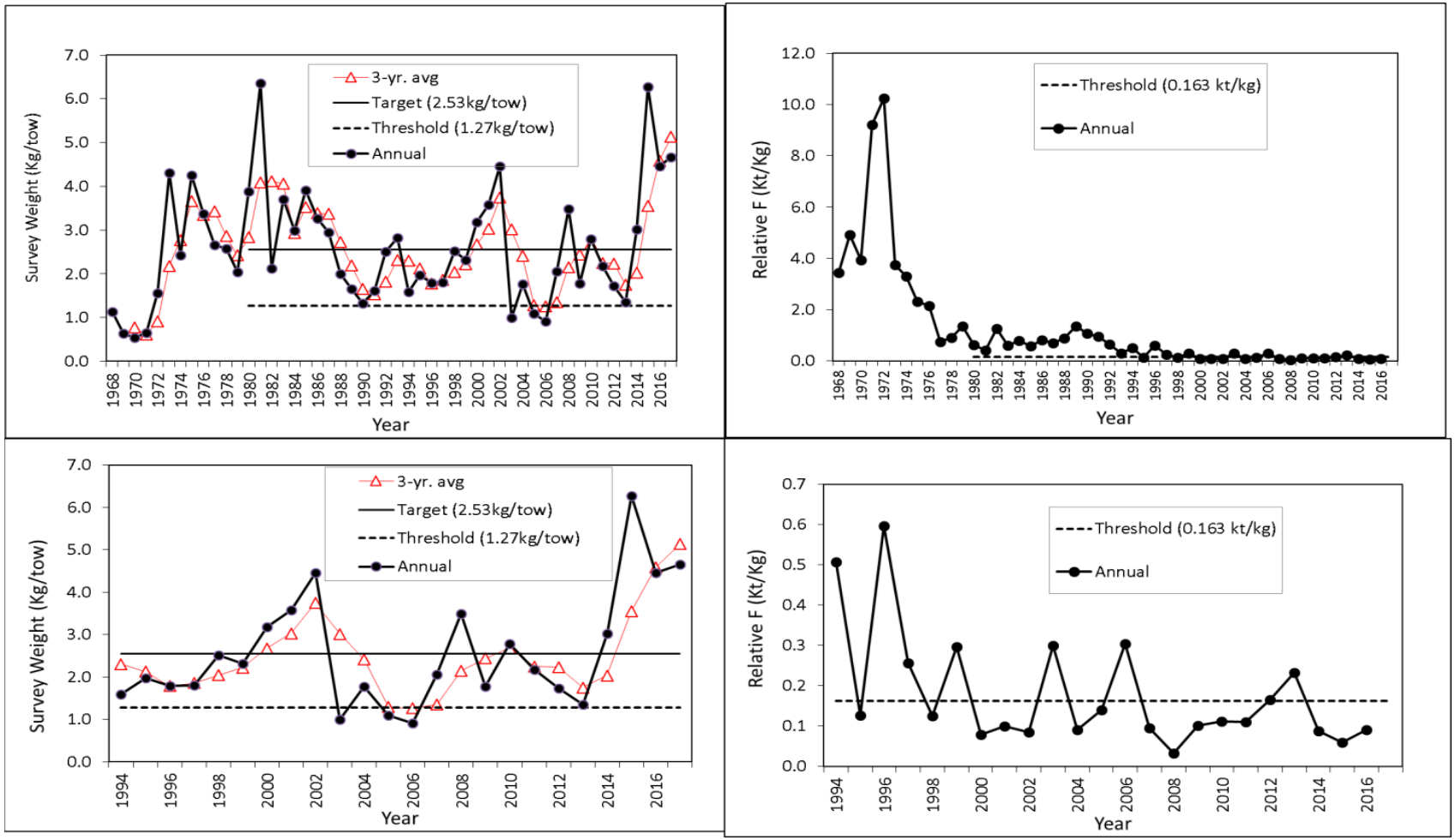
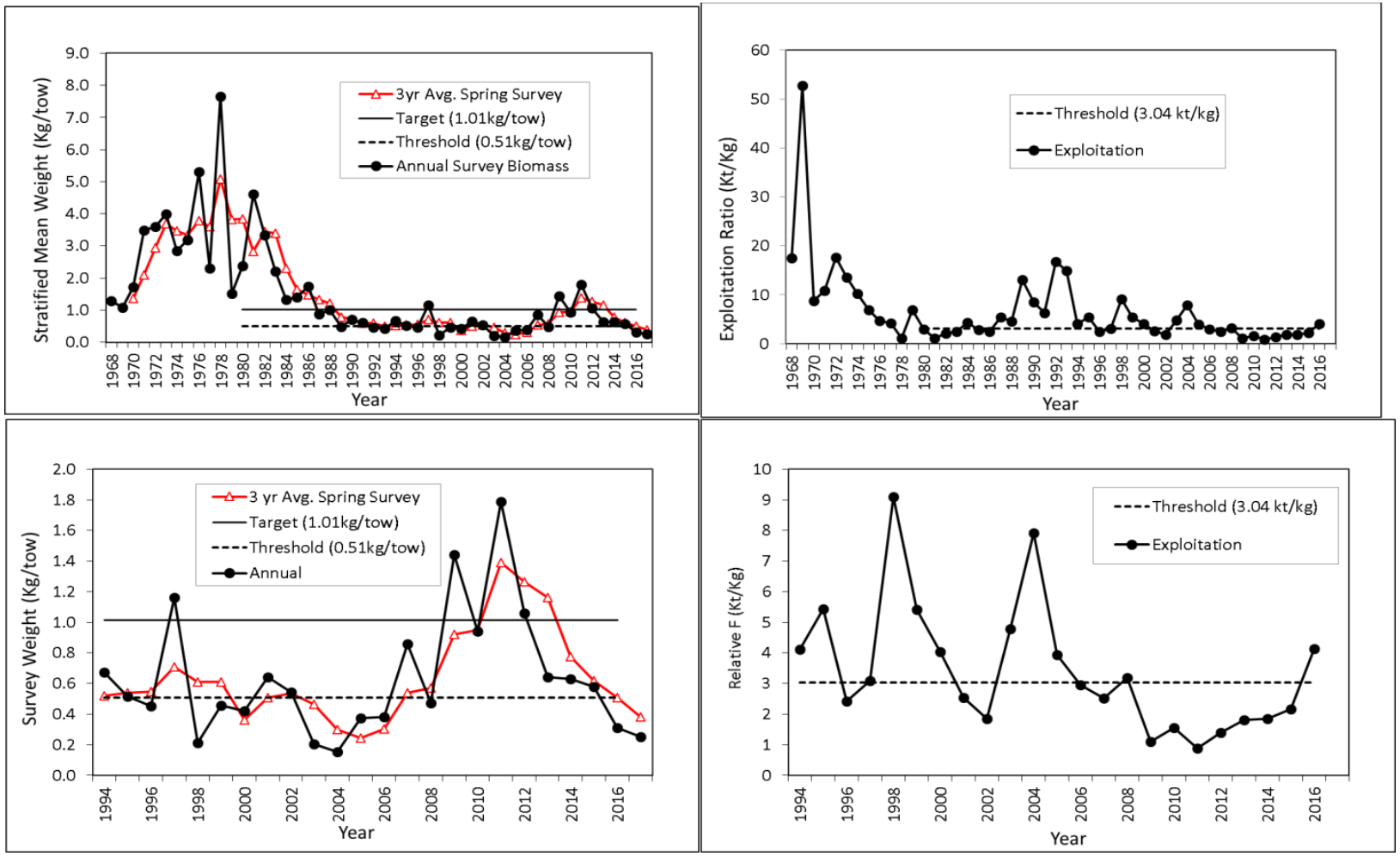


Figure 10. ***Southern red hake*** spring survey biomass in kg/tow (LEFT) and relative exploitation ratios (RIGHT) of the total catch to the spring survey indices in kt/kg and associated 3-yr moving averages (red lines). The horizontal dash lines represent the biomass and overfishing thresholds and the solid line is the biomass target. The BOTTOM panels reflect the most recent 24 years of the entire time series.



5.2.3.3 Offshore hake

The new 2010 benchmark 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.

5.2.4 Role in the Ecosystem

5.2.4.1 Silver hake

The characteristics of silver hake were summarized in the 2010 benchmark assessment (NEFSC 2011), which included estimates of per capita and total consumption of silver hake by predators. The EFH Source Document for Silver Hake (NMFS 1999) provides more details about the life history and habitat characteristics of silver hake.

As adults, silver hake are generally found and caught on silt-sand and sandy bottoms of the Gulf of Maine, Georges Bank, Southern New England, and in the Mid-Atlantic. Depth ranges and distribution are partially temperature dependent. In the spring, silver hake move inshore to warming shallow waters to feed and spawn. Larger silver hake tend to inhabit deeper water, particularly in the Gulf of Maine and the outer continental shelf of Georges Bank, Southern New England, and the Mid-Atlantic. Commercial vessels target silver hake in Ipswich and Massachusetts Bays in the late spring to fall and in the offshore waters in the winter and spring.

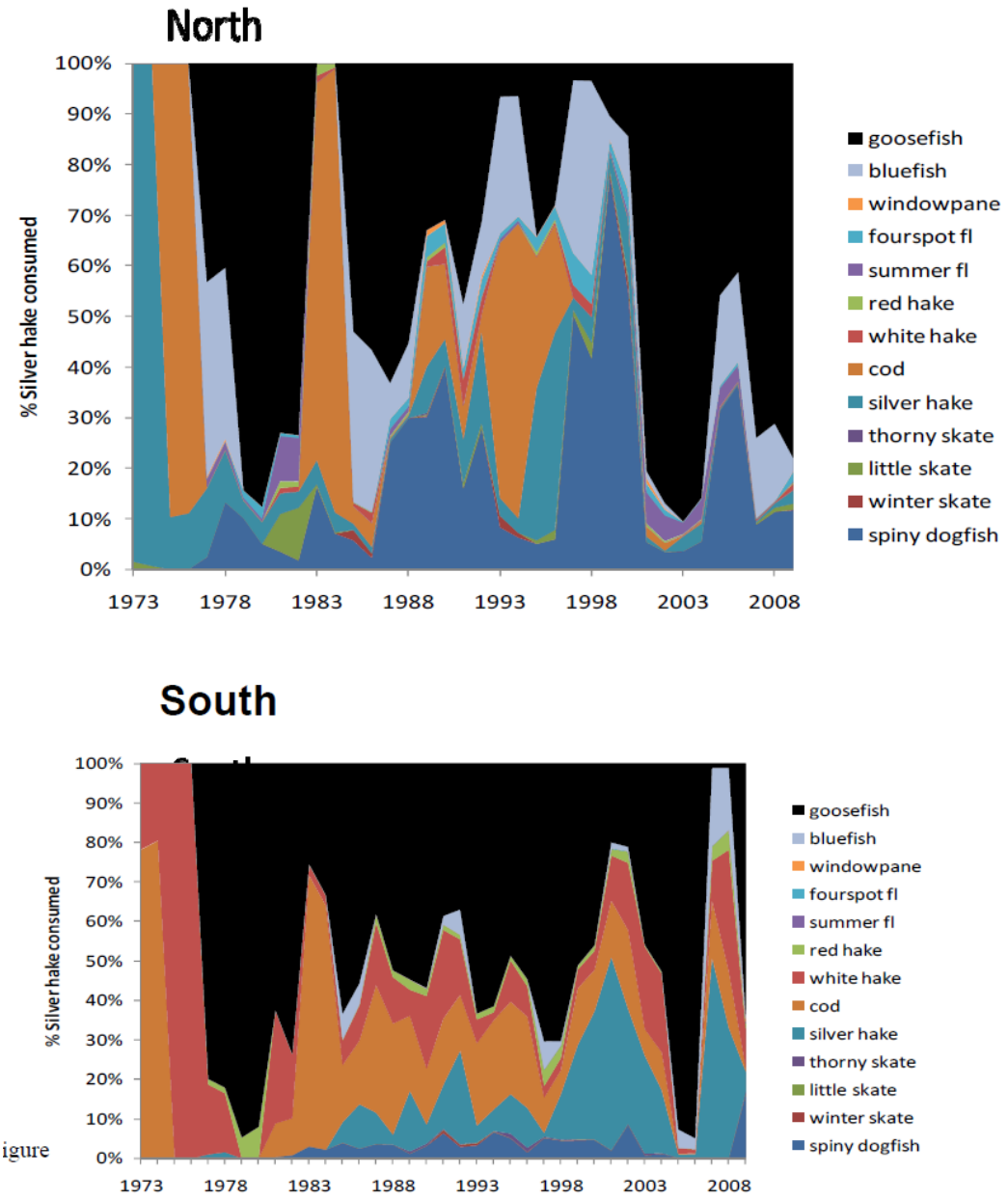
As adults, silver hake are primarily piscivorous (Bowman 1984) and cannibalistic (i.e. they consume smaller individuals of the same species; Link et al. 2012). The also prey on squids, crustacea, and small fish as juveniles (Schaefer 1960; Domanevsky and Nozdrin 1963; Dexter 1969; Edwards and Bowman 1979; Bowman 1984; Waldron 1993; Helser *et al.* 1995).

Total consumption estimates in NMFS 2011 were derived from the food habitats data, which samples randomly selected stomachs of fish caught in the NMFS spring and fall bottom trawl surveys. Per capita consumption was estimated using a gastric evacuation model (Eggers 1977, Elliott and Persson 1978), then scaled up to the abundance of primary predators determined by analytical assessments or swept area estimated abundance. The results indicated that in the north (roughly equivalent to the northern management area) the primary predators were goosefish (aka monkfish), spiny dogfish, cod, and bluefish (Figure 11). In the south, the primary predators included goosefish, silver hake, cod, and white hake.

Estimated total consumption ranged from 4,000 mt in 197 to 167,700 mt in 1986. Consumption declined from a peak in the mid-1980s to a low of 38,000 to 54,000 mt in the late-1980s and early-1990s, peaked again at 129,800 mt in 2000, then declined to 71,000 mt in 2009. More recent estimates of total consumption of silver hake are unavailable, but given recent trends in silver hake abundance and biomass, consumption has probably increased in the northern management area and declined in the southern management area. Most of the consumed silver hake were less than 25 cm, mostly comprised of age 0 (< 15 cm) and age 1 silver hake.

Since silver hake consumption is high (possibly an order of magnitude more than commercial catch) and also are a key predator, it is thought that silver hake play a key role in the ecosystem of the NE Region. This ecological importance was one of the key considerations when the Council set the Allocable Biological Catch using a conservative buffer to account for scientific uncertainty (NEFMC 2013). It is also for this relative ecological importance that silver hake are commonly included in multispecies trophic models that are being developed to evaluate the dynamics of managed species on Georges Bank and other areas (for more information on trophic models see https://www.nefsc.noaa.gov/ecosys/modeling/).

Figure 11. Proportion of consumption of silver hake by predators captured by the NMFS spring and fall bottom trawl survey. Estimates of total consumption were made during the 2010 benchmark assessment (NMFS 2011).



igure

5.2.4.2 Red hake

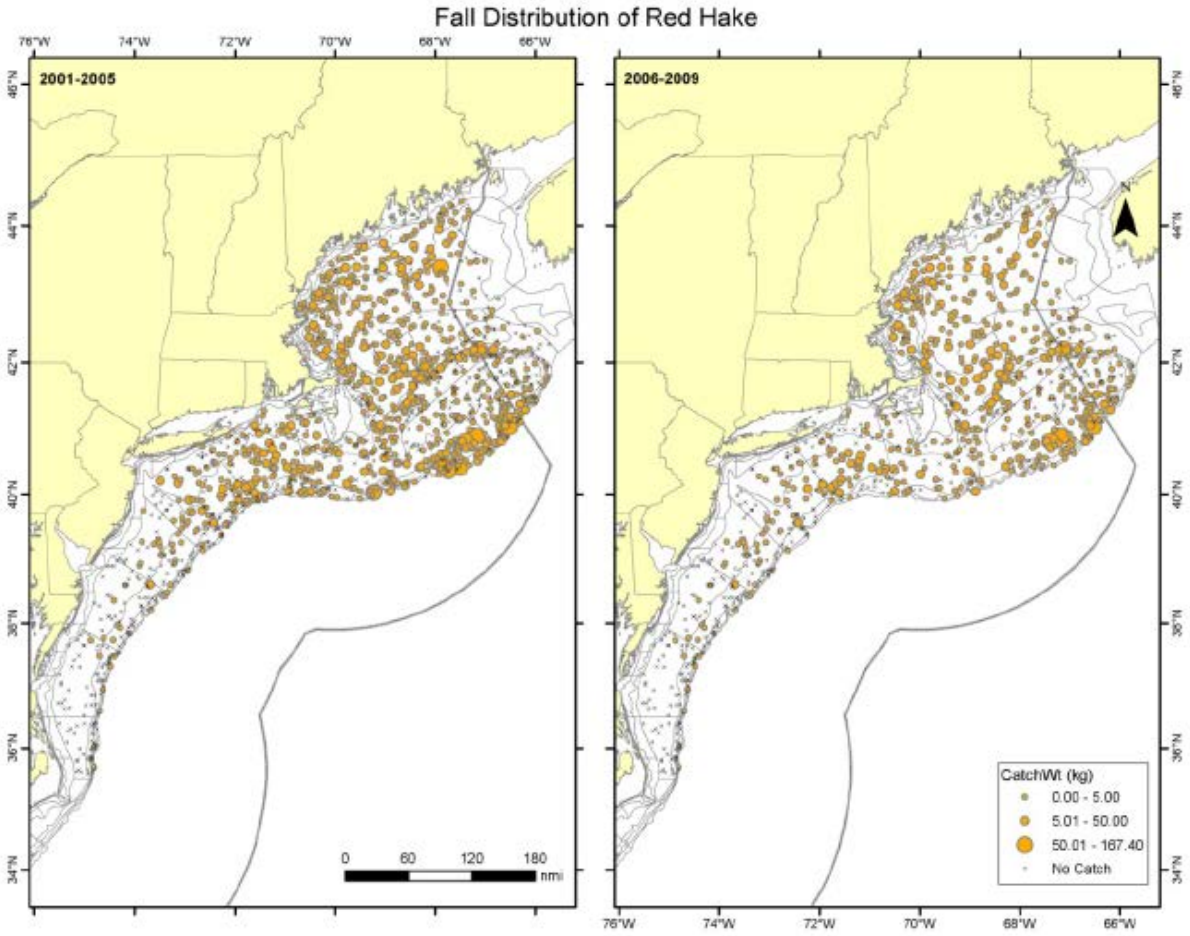
Red hake are distributed shelf-wide in the Mid-Atlantic and on Georges Bank, and throughout the Gulf of Maine (Map 2). According to the EFH Source Documents (NEFSC 1999a), red hake prey on many crustaceans, mysids, euphausids, and amphipods using their chin barbells to seek bottom prey, often using chemoreceptors at night. Adult red hake also prey on juvenile and small demersal and pelagic fish.

Although per capita and total consumption of red hake by specific predators was not reported in the 2011 benchmark assessment (NEFSC 2011), as it was for silver hake, total consumption was estimated and compared to commercial catch. In recent years, the consumption of red hake by predators was 4-8 times the amount of commercial catch.

Primary predators were identified from stomachs sampled in the spring and fall bottom trawl survey, but do not include birds, marine mammals, and other non-teleost predators. The primary predators sampled by the bottom trawl survey included spiny dogfish (*Squalus acanthias*), little skate (*Raja ocellata*), winter skate (*Raja erinacea*), thorny skate (*Raja radiata*), silver hake (*Merluccius bilinearis*), Atlantic cod (*Gadus morhua*), whit hake (*Urophycis tenuis*), fourspot flounder (*Paralichthys oblongus*), summer flounder (*Paralichthys dentatus*) windowpane flounder (*Scophthalmus aquosus*), sea raven (*Hemitripterous americanus*), and goosefish (*Lophius americanus*).

Red hake have a general, varied diet and have a broad variety of predators over a wide distribution. Although they are important food items for a wide variety of species, they are not considered as playing a key role in the ecosystem. Shelter from predators is however a key requirement for red hake (Steiner *et al.* 1982). Juvenile red hake are often found in depressions and are often associated with living sea scallops.

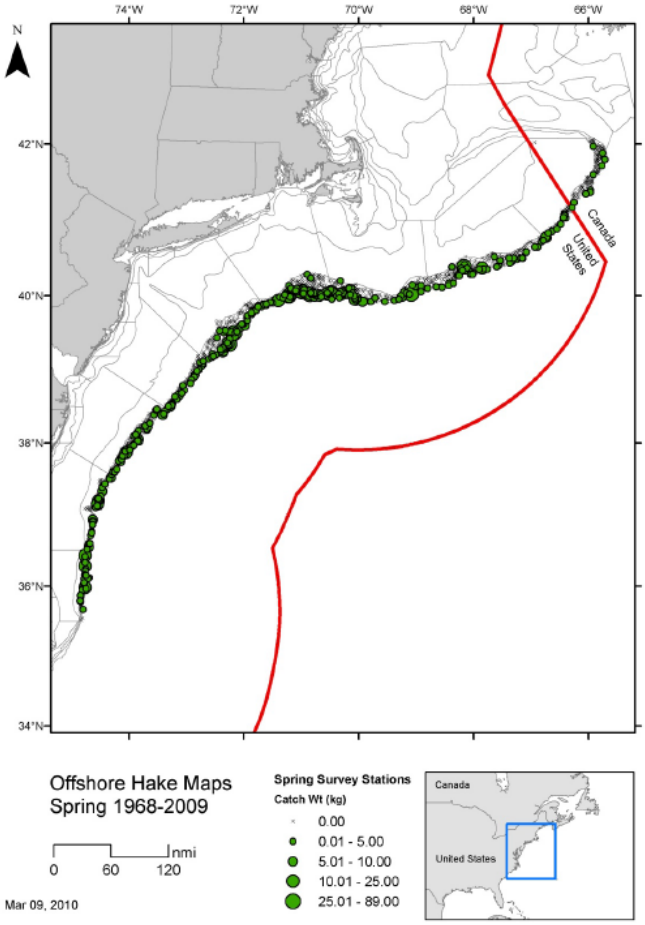
Map 2. Distribution of red hake weight per tow in the fall bottom trawl survey from 2001-2009 (from NEFSC 2011).



5.2.4.3 Offshore hake

Unlike silver and red hakes, offshore hake are commonly caught on the offshore edge of the spring and fall bottom trawl survey (Map 3) and total or per capita consumption of offshore hake by predators were not estimated in the benchmark assessment (NEFSC 2011). Because offshore hake inhabit a different depth range and area than do silver hake, the predators of offshore hake are likely to be very different than they are for silver hake.

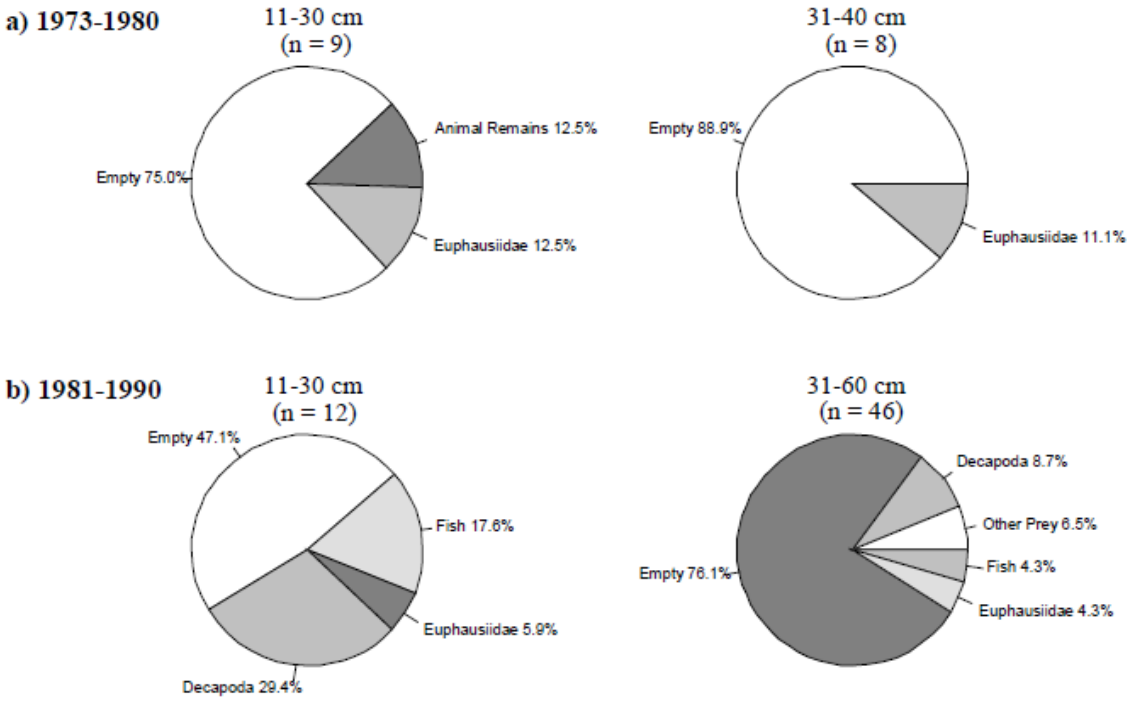
Map 3. Distribution of offshore hake from the NEFSC spring survey (catch weight per tow, kg), 1968-2009 (from NEFSC 2011).



The EFH source document (NMFS 1999b) reports that small juvenile offshore hake are prey for goosefish (*Lophius americanus*), fish, and larger conspecifics. Based on stomach contents collected by the NMFS spring and fall bottom trawl surveys, the EFH source document reports that offshore hake consume fish and invertebrates, with some diet differences with age. Frequent diet items include euphausids, unspecified fish, and unspecified decapods (Figure 12).

Because of their distribution, offshore hake do not appear to play a central role in the ecosystem of the Mid-Atlantic, Southern New England, or Georges Bank. Few if any offshore hake have been observed in the Gulf of Maine, probably due to water temperature and different water mass characteristics.

Figure 12. Abundance (percent occurrence) of the major prey items in the diet of offshore hake collected during NEFSC bottom trawl surveys from 1973-1980 and 1981-1990. The 11-30 cm size range corresponds, at least roughly, to juveniles, and the 31-60 cm size class corresponds to adults. The category "animal remains" refers to unidentifiable animal matter. Methods for sampling, processing, and analysis of samples differed between the time periods [see Reid *et al.* (1999) for details] (from NMFS 1999b).



5.2.4.4 With protected species

Most marine mammals have a broad diet of marine organisms, often focused on large zooplankton or squids that are not usually the target of commercial fisheries, keeping competition low between catch and food for marine mammals. Kaschner and Pauly (2005) estimated this competitive interaction worldwide in the 1990s using a biomass based food consumption model and population estimates. Prey taxa were grouped into nine broad categories, two of them being "Miscellaneous fishes" (MF) and "Small pelagic fishes". Diet composition of MF to which small-mesh multispecies would belong ranged from less than 10% for baleen whales, less than 15% for pinnipeds and large toothed whales, to about 25% for dolphins. Kaschner and Pauly (2005) noted that these values represent ocean-basin mean values and that localized competition between fishery catch and marine mammals can nonetheless occur in local areas and in specific seasons.

More recently, Smith *et al.* 2015, estimated consumption of marine mammals residing in the NE US large marine ecosystem by 12 broad taxa (Table 8). Small-mesh multispecies with some other hakes that are not targeted by US fisheries comprise the 'Small gadids' group. These values were derived by estimating per capita total consumption based on body weight and inferred diet composition from the literature, residence time and seasons on the NE continental shelf and the Gulf of Maine, and abundance trend information from NE region stock assessments.

Myticetes marine mammals (e.g. minke, fin, sei, and right whales) are classified as filter feeders or have a specialized diet. Odontocetes marine mammals (e.g. pilot whales and dolpins) eat fish and squids, including pelagic fishes like mackerel and forage fishes like herring. These two groups of marine mammal consumed relatively low amounts of small gadids.

Pinnipeds (e.g. gray and harbor seals) also eat fish including the gadids (cod-like fish), flatfish (flounders), and clupeids (e.g. herring). Small gadid consumption was significant for bottlenose dolphin (17%), Atlantic white-sided dolphin (25%), common dolphin (15%), harbor seal (31%), and harbor seals (20%). Small gadid consumption estimates were the primary diet item only for white-sided dolphin and harbor seal.

Table 8. Percent total diet composition estimates for marine mammals residing in the NE US large marine ecosystem (derived from estimates by Smith *et al.* 2015).

	Large gadids	Small gadids	Flatfish	Clupeids	Scombrids	Sandlance	Meso-pelagics	Misc. fish	Benthic invertebrates	Squid	Shrimp	Zooplankton	Total (thousand mt)
Fin whale	0.4%	0.3%	0.0%	8.7%	4.0%	5.2%	0.3%	3.4%	0.0%	3.6%	63.1%	11.0%	316.1
Humpback whale	0.0%	2.3%	0.0%	11.9%	7.6%	20.0%	0.0%	18.7%	0.0%	1.0%	36.4%	2.1%	48.4
Right whale	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.2%	84.8%	17.7
Sei whale	1.6%	0.2%	0.0%	7.0%	1.6%	3.8%	1.7%	3.9%	0.0%	5.5%	32.6%	42.1%	89.4
Minke whale	12.6%	3.1%	0.0%	29.5%	3.3%	15.8%	0.0%	1.4%	0.0%	0.6%	32.7%	0.8%	96.8
Pilot whale	0.0%	1.2%	0.0%	2.7%	14.1%	0.0%	0.5%	9.0%	0.8%	71.7%	0.0%	0.0%	85.2
Bottlenose dolphin	6.3%	16.8%	0.1%	6.3%	4.2%	0.6%	0.0%	50.4%	0.4%	14.7%	0.0%	0.0%	4.7
Atlantic white-sided dolphin	9.0%	25.2%	0.1%	18.0%	4.5%	8.1%	8.1%	5.4%	0.9%	20.7%	0.0%	0.0%	11.1
Common dolphin	0.1%	15.4%	0.0%	8.3%	20.7%	1.0%	8.0%	23.9%	0.1%	22.4%	0.0%	0.0%	87.7
Harbor porpoise	4.8%	31.2%	0.1%	28.4%	5.7%	8.5%	2.8%	14.2%	0.6%	2.8%	0.9%	0.0%	3.5
Gray seal	19.5%	8.1%	12.9%	9.0%	2.9%	36.2%	0.0%	8.1%	0.5%	2.9%	0.0%	0.0%	20.5
Harbor seal	9.5%	20.3%	12.9%	12.6%	1.1%	24.9%	0.0%	9.9%	1.1%	7.0%	0.6%	0.0%	97.7
Total	3.4%	5.2%	1.7%	10.8%	6.1%	9.0%	1.2%	7.7%	0.2%	12.3%	32.0%	10.1%	880.2

5.2.5 Landings and discards of target species

5.2.5.1 Commercial fishery

Using data from the 2017 assessment update (NEFMC 2017), 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.

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, three-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.

Silver hake

The discard rate for silver hake is typically lower than it is for red hake, presumably because of more market demand and better tolerance of shipping and handling. Nominal discards in the northern stock area were variable, peaking at 750 mt in 2007, and has been steadily declining but variable and currently estimated at 310 mt in 2016 (Figure 14). 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 14). The thee year moving average is of course is more stable, fluctuating from 27% in 2008 to 30% in 2009 and to 12% in 2016.

The silver hake discard rate in the southern stock area is typically even lower, under 20% for the majority of the time series (Figure 14). The proportion discard in the southern area appears to be varying without trend. Discards were estimated to be only 150 mt in 2007, but increased to 1800 mt in 2011, before declining to 290 mt in 2015 and estimated at 540mt in 2016 (Figure 14). The three-year moving average was approximately 11% of the total catch in 2016.

Figure 13. Northern and southern silver hake discard rate (percent of total catch).

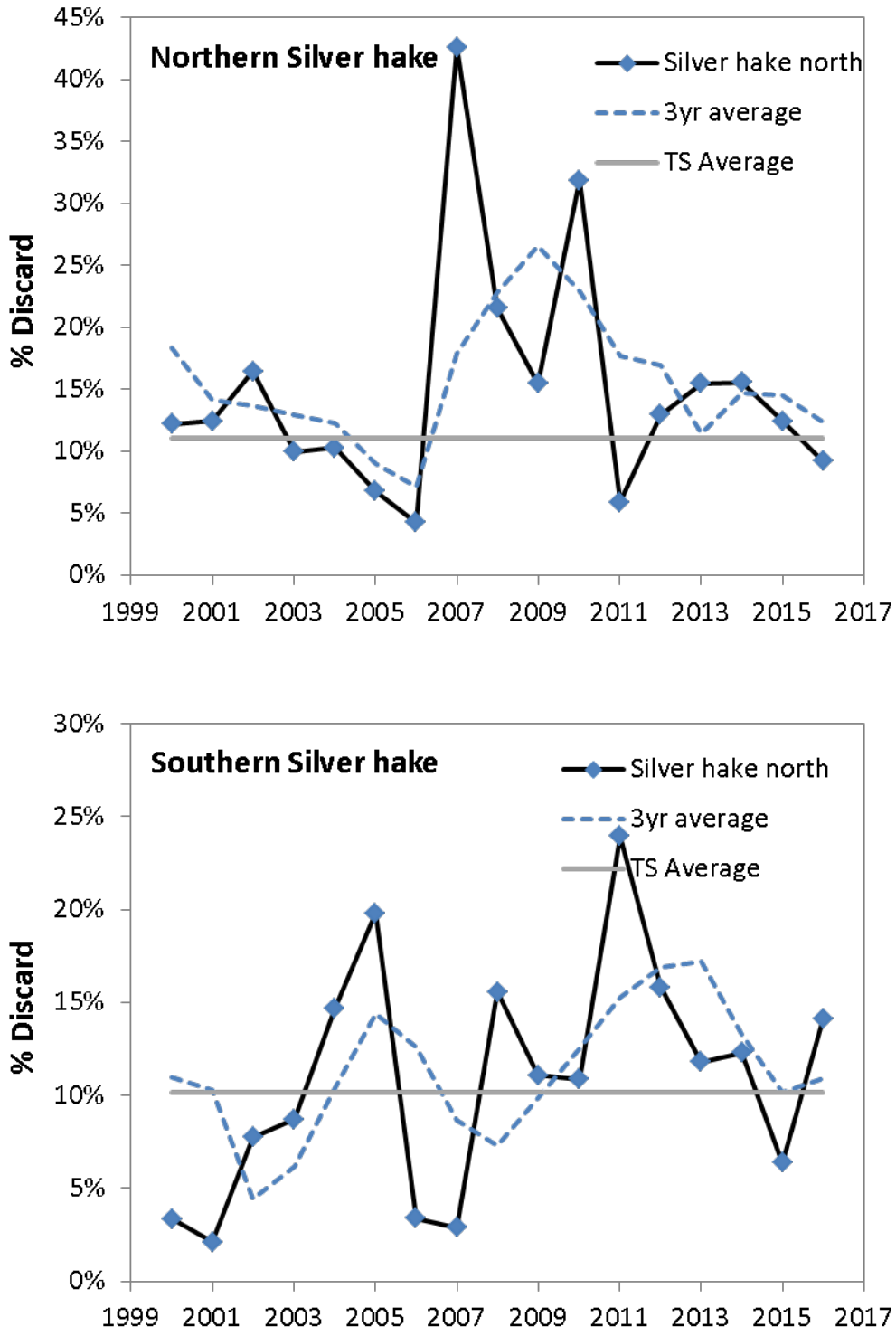
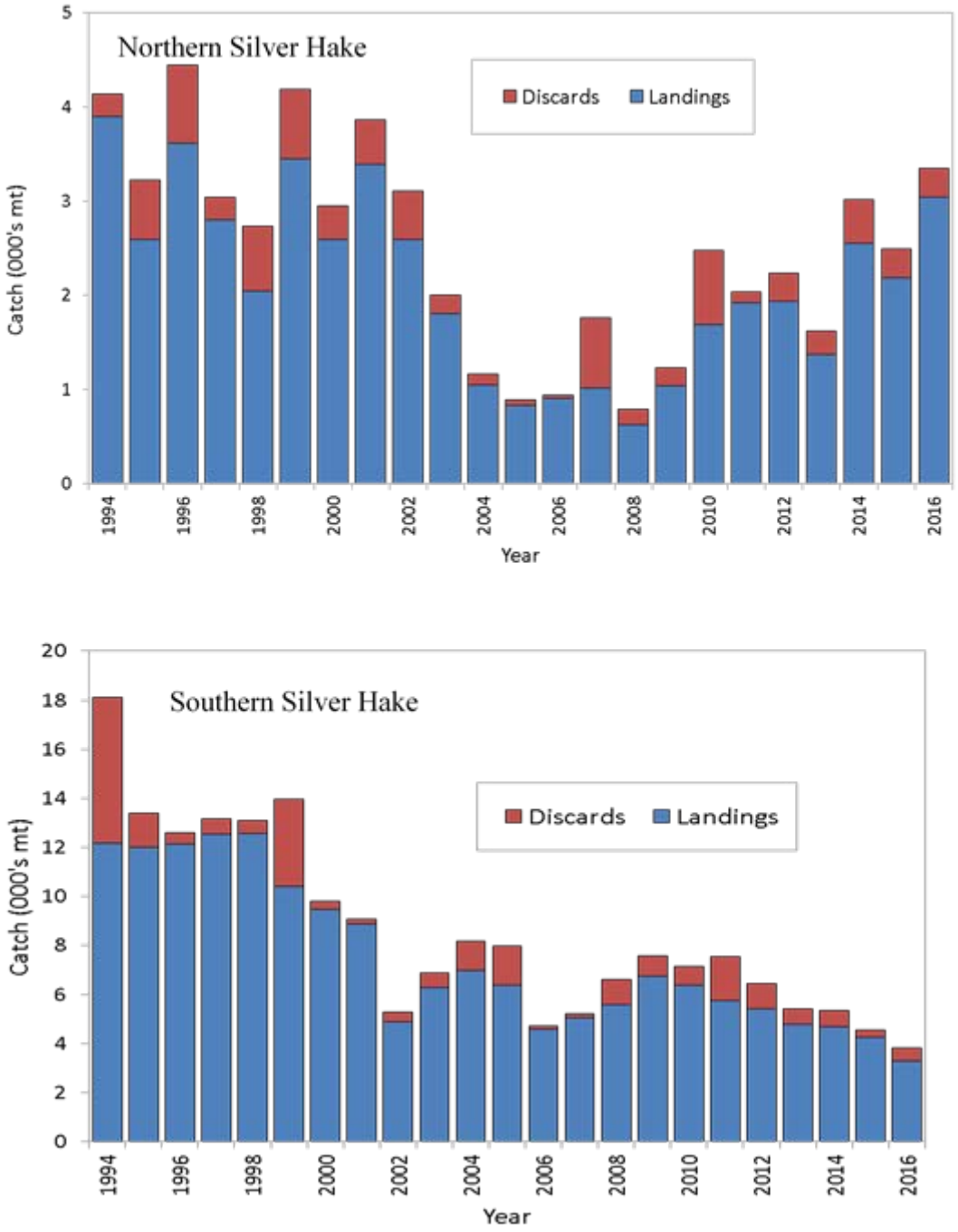


Figure 14. Landings and estimated nominal discards (mt) for northern and southern stocks of silver hake, 2000-2010. Source: NEFSC 2011a, updated by Whiting PDT analysis.



Red hake

Red hake discards were comparatively high, ranging from 10-40% from 2000-2003, increasing to 50-80% from 2005 to present (Figure 15), 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 16). This discard increase drove the 2010 discards to 78%, from 52% in 2008 and 51% in 2009 (Figure 15). Since, proportion of discards in the total catch has fluctuated around approximately 64% per year. The three-year moving average proportion discard (used to set the TAL), also increased from 61% in 2008 and 57% in 2009 to 70% in 2016.

Nominal discard rates in the southern region also increased through the time series in Figure 15, through 2005 but since then has been more stable. The proportion discards on average since 2010 is approximately 14% per year. In 2016, discard was 66% of the total catch. The three-year moving average has been declining but variable since and was estimated at 61% in 2016.

Figure 15. Northern and southern red hake discard rate (percent of total catch).

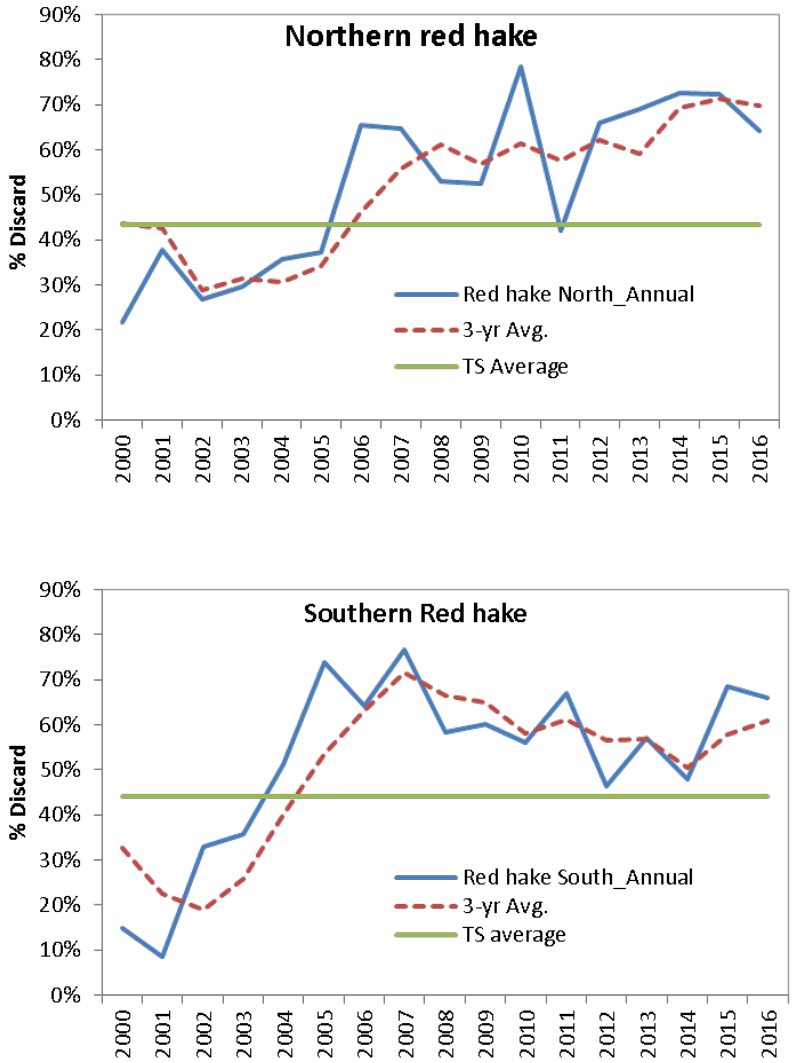
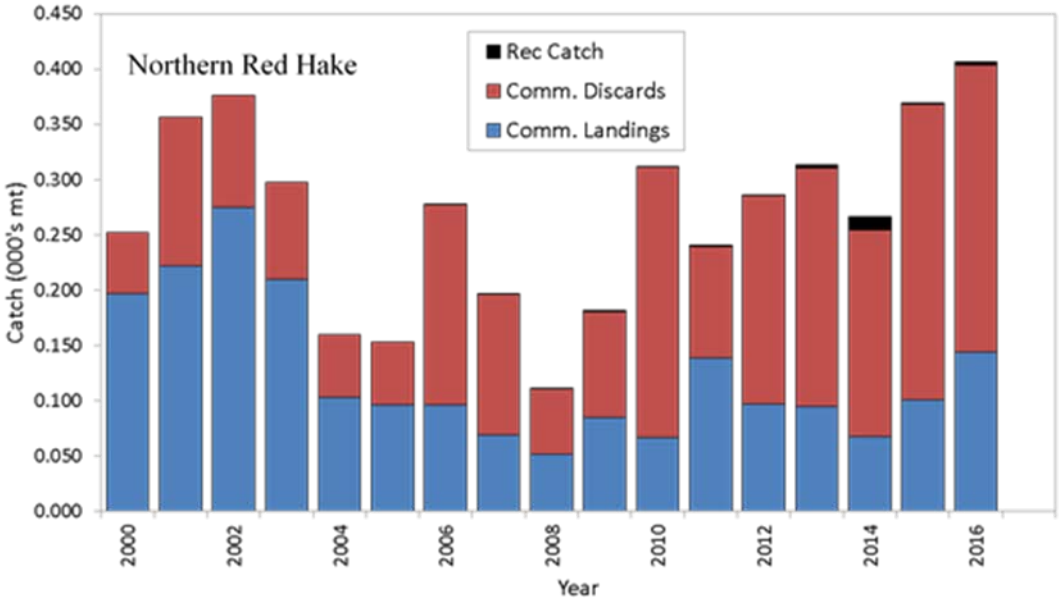
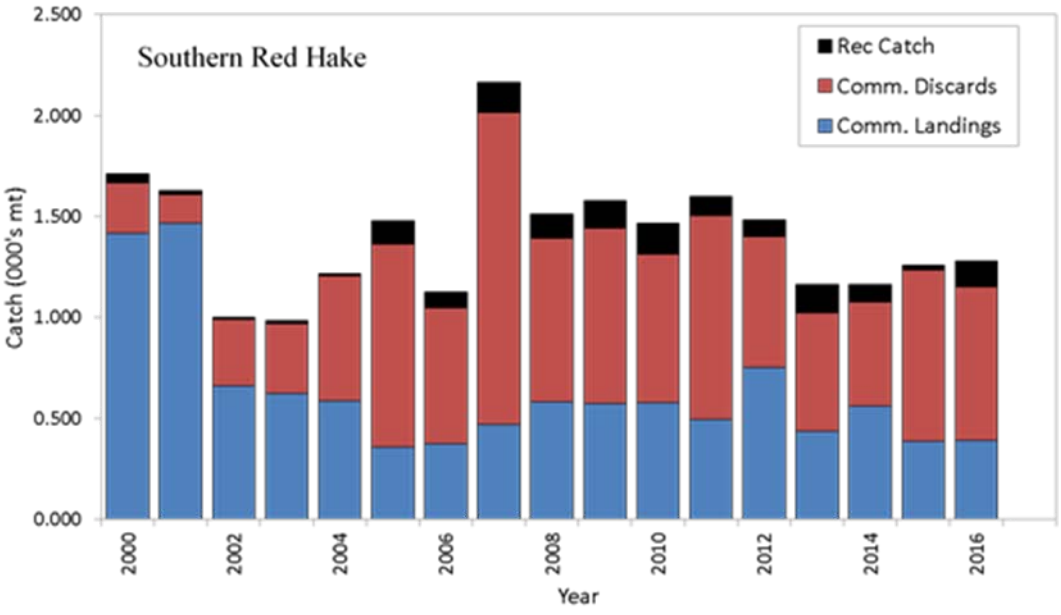


Figure 16. Landings and estimated nominal discards (mt) for northern and southern stocks of red hake, 2000-2010. Source: NEFSC 2011a, updated by Whiting PDT analysis.





5.2.5.2 Recreational catch and other landings

Catches of silver and red hakes by recreational fishermen and by commercial vessels that are only permitted to fish in state waters (less than 3 miles and internal waters) are a very minor component of total catch (Table 9). Over the five years since implementation of catch accounting in 2012, state landings overall have averaged 1.2% of the total, with a maximum of 6.4% for southern whiting (i.e. silver and offshore hakes) in 2012. Over the same period, state landings averaged 0.9% of total catch, with a maximum of 12% of southern red hake in 2016. The reasons for the increase of southern red hake recreational landings is unknown.

Recreational catch (Table 10) over the available time series has been low compared to Federal landings and catches from commercial boats, with notable exceptions of 66.5 mt of northern red hake in 1981, 23.4 mt of northern silver hake in 1995, 6.5 mt of southern red hake in 2002, and 7.4 mt of southern silver hake in 1983.

Table 9. Fishing year 2012-2016 landings by state-permitted commercial vessels and recreational landings summaries from annual catch monitoring (NEFMC 2014 and NEFMC 2017).

	Stock				
Fishing year	**Northern red hake**	**Northern silver hake**	**Southern red hake**	**Southern whiting**	**Grand Total**
2012					
Catch (mt)	386	2,199	1,152	6,496	10,233
State landings proportion	0.0%	0.6%	3.5%	6.4%	4.6%
Recreational landings proportion	0.1%	0.3%	3.4%	0.0%	0.5%
2013					
Catch (mt)	361	1,734	1,099	5,746	8,940
State landings proportion	0.0%	1.7%	0.2%	0.2%	0.5%
Recreational landings proportion	0.7%	2.6%	6.7%	0.0%	1.4%
2014					
Catch (mt)	278	2,991	1,277	5,653	10,199
State landings proportion	0.0%	0.4%	0.3%	0.1%	0.2%
Recreational landings proportion	0.0%	0.0%	0.0%	0.0%	0.0%
2015					
Catch (mt)	340	2,543	1,538	4,007	8,428
State landings proportion	0.0%	0.4%	0.1%	0.0%	0.2%
Recreational landings proportion	0.6%	0.7%	1.6%	0.0%	0.5%
2016					
Catch (mt)	405	3,419	1,093	3,843	8,760
State landings proportion	0.0%	0.3%	0.2%	0.1%	0.2%
Recreational landings proportion	0.7%	1.5%	12.0%	0.0%	2.1%
Total catch 2012-2016	1,770	12,886	6,159	25,745	46,560
State landings proportion	0.0%	0.6%	0.8%	1.7%	1.2%
Recreational landings proportion	0.4%	0.9%	4.4%	0.0%	0.9%

Table 10. Annual recreational catch (landings and dead discards, A+B1) of silver and red hake by management area. Catch by vessels fishing from ME, NH, and MA were assigned to the northern management area, while other NE region catches were assigned to the southern management area. MRIP Recreational Catch Time Series Query, December 1, 2017. URL: https://www.st.nmfs.noaa.gov/SASStoredProcess/do?.

.	Management						
	Northern		Total (mt)	Southern		Total (mt)	Grand Total
Calendar yea	Red hake	Silver hake		Red hake	Silver hake		
1981	66.5	9.9	76.4				76.4
1982	2.7	4.6	7.3				7.3
1983	0.0	1.8	1.8		7.4	7.4	9.1
1984	3.1	0.9	3.9	2.5	0.0	2.5	6.5
1985		1.5	1.5	0.0		0.0	1.5
1986	0.0	0.0	0.0		0.0	0.0	0.0
1987	0.5		0.5	0.3		0.3	0.8
1988	8.8		8.8	0.0	3.4	3.4	12.2
1989	1.5		1.5	1.2	0.0	1.2	2.7
1990	11.6	0.0	11.6	0.0		0.0	11.6
1991	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	1.6		1.6	0.1	0.0	0.1	1.7
1993	0.0	0.0	0.0	0.6	0.0	0.6	0.6
1994	0.5	0.1	0.6	0.0		0.0	0.6
1995	1.0	23.4	24.4		0.0	0.0	24.4
1996	1.6	1.2	2.7	0.0	0.0	0.0	2.7
1997	0.0	0.0	0.0	0.4	0.0	0.4	0.5
1998	0.0	0.0	0.0	1.5	0.0	1.5	1.5
1999	0.0	0.0	0.0	1.8	0.0	1.8	1.8
2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001	1.0	0.0	1.0	0.2	0.0	0.2	1.3
2002	0.9	0.0	0.9	6.5	0.0	6.5	7.4
2003	0.0	0.0	0.0	0.7	0.0	0.7	0.7
2004	0.0	0.6	0.6	0.5	0.0	0.6	1.2
2005	0.0	0.0	0.0	0.2		0.2	0.2
2006	0.1	0.0	0.1	0.3	0.0	0.3	0.4
2007	0.1		0.1	0.1		0.1	0.2
2008	0.4	0.0	0.4	0.4	0.0	0.4	0.8
2009	0.9	0.1	1.0				1.0
2010	0.3	0.7	1.0	0.0		0.0	1.0
2011	0.1	5.6	5.7	0.0		0.0	5.8
2012	0.1	1.8	1.9	0.1		0.1	2.0
2013	3.2	35.2	38.4	0.0		0.0	38.4
2014	1.6	9.5	11.1	0.0		0.0	11.1
2015	1.4	10.1	11.5	0.0		0.0	11.5
2016	1.6	23.0	24.7	0.4	0.0	0.4	25.0
2017	0.8	7.2	8.0	0.0	0.5	0.5	8.4

5.2.6 Landings and discards of non-target species

Bycatch in the small-mesh multispecies fishery was estimated by applying the ∑D/∑Kall (discard to kept-all) ratios from all observed tows (NEFOP and ASM) to landings off all species on trips using small-mesh trawls and landing at least 2,000 lbs. of whiting or 400 lbs. of red hake, stratified by year, quarter, and management area[8]. All observed tows on NEFOP and ASM were used to calculate the discard ratios (Table 12 and Table 13) Estimates of discards on unobserved tows were not applied.

In the northern area (Table 11, left panel), haddock (356.9 mt average), spiny dogfish (196.1 mt average), red hake (175.1 mt average), silver hake (114.4 mt average), winter skate (73.4 mt average), and Atlantic herring (34.0 mt average) were the top six species over 2014-2016. Haddock discards have been high as a result of an historically strong 2013 year class. It was also the top discard species in an experimental small-mesh trawl fishery conducted in June 2016 and observed by MA Division of Marine Fisheries (M. Griffin pers comm.). Red hake discards increased in response to a strong 2014 year class, which became vulnerable to capture in 2015 and is now contributing to the increase in specifications for 2018-2020. Silver hake discards increased during 2016 for unknown reasons, but it would be consistent with the higher 2016 silver hake landings (Table 21).

In the southern area, the top discards were comprised of red hake (1052.2 mt average), spiny dogfish (347.3 mt average), silver hake (317.3 mt average), butterfish (266.0 mt average), and little skate (126 mt average) (Table 11, right panel) during 2014-2016. Haddock discards declined from 234 mt in 2015 to 76 mt in 2016, possibly due to growing haddock moving out of the Cultivator Shoals Area.

[8] Note that the small-mesh multispecies management areas do not coincide with groundfish stock areas. For example, the Cultivator Shoals Area is a northern management area for small-mesh multispecies, but the catch of haddock is considered to be from the Georges Bank stock area for groundfish monitoring.

Table 11. Total discard (mt) estimates for vessels using small mesh trawls on trips landing more than 2,000 lbs. of whiting or 400 lbs. of red hake. Source: D/Kall ratios on NEFOP and ASM small-mesh multispecies trips applied to landings of all species by year, quarter, and management area.

Northern

Species	Calendar year 2014	2015	2016
Red hake	91.4	224.1	209.6
Haddock	476.8	241.0	353.0
Winter skate	6.8	114.9	98.4
Spiny dogfish	98.3	90.7	399.2
Butterfish	4.0	4.2	1.5
Little skate	12.3	29.1	44.6
Silver hake	175.2	34.5	133.5
Barndoor skate	2.9	4.0	7.5
Atlantic herring	20.2	77.3	4.6
Monkfish	0.9	2.6	5.7
Summer flounder	4.8	1.5	1.5
Yellowtail flounder	3.0	13.7	7.9
Witch flounder	1.5	4.9	14.0
Winter flounder	5.6	2.3	1.5
Ocean pout	0.1	0.7	0.6
American plaice	4.0	3.2	10.5
Cod	0.7	0.8	1.4
Windowpane	1.1	0.2	5.6
White hake	1.3	2.6	1.4
Smooth skate	0.0	0.0	0.0
Thorny skate	0.4	0.0	0.4
Pollock	0.9	0.1	0.2
Redfish	0.7	1.4	0.1
Total	913.0	853.8	1302.6

Southern

Species	Calendar year 2014	2015	2016
Red hake	657.0	1099.0	1400.6
Haddock	199.9	233.7	76.0
Winter skate	29.7	13.4	285.2
Spiny dogfish	534.9	376.3	130.8
Butterfish	376.5	260.4	161.2
Little skate	140.2	66.6	171.1
Silver hake	619.0	101.5	231.5
Barndoor skate	37.2	51.7	151.9
Atlantic herring	1.5	11.4	0.0
Monkfish	4.4	24.5	135.6
Summer flounder	21.7	129.5	93.4
Yellowtail flounder	1.5	0.0	0.8
Witch flounder	9.6	57.2	9.7
Winter flounder	15.1	0.2	25.6
Ocean pout	58.3	5.2	13.3
American plaice	0.0	0.0	0.1
Cod	0.3	0.0	1.1
Windowpane	2.3	0.0	2.0
White hake	0.0	0.1	1.1
Smooth skate	0.0	0.0	0.0
Thorny skate	0.0	0.0	0.0
Pollock	0.1	0.0	0.5
Redfish	0.0	0.0	0.0
Total	2709.3	2430.9	2891.5

Table 12. D/Kall statistics from NEFOP and ASM observed tows on small-mesh multispecies trips in the northern management area. Fishing for small-mesh multispecies does not generally occur in quarters 1 and 2 due to exemption area regulations.

		QUARTER	Statistic				
		1	1	3	3	4	4
YEAR	Values	Arithmetic Mean	Coefficient of Variation	Arithmetic Mean	Coefficient of Variation	Arithmetic Mean	Coefficient of Variation
2014	American plaice	0.002	0.654	0.024	4.222	0.002	2.863
2014	Atlantic herring	-		0.020	11.826	0.166	4.825
2014	Barndoor skate	0.001	2.646	0.002	6.931	0.003	1.986
2014	Butterfish	-		0.004	11.877	0.000	3.338
2014	Cod	-		0.001	6.804	0.001	3.127
2014	Haddock	0.002	0.654	0.402	3.501	0.095	0.827
2014	Little skate	-		0.008	7.210	0.007	2.724
2014	Monkfish	0.006	0.847	0.001	8.283	0.001	3.519
2014	Ocean pout	-		0.000	12.481	-	
2014	Red hake	0.002	2.236	0.286	4.573	0.017	1.843
2014	Silver hake	0.068	2.440	0.091	4.323	0.021	1.432
2014	Smooth skate	0.000	2.646	-		0.000	8.307
2014	Spiny dogfish	0.092	0.707	0.056	4.310	0.115	2.293
2014	Summer flounder	-		0.013	5.974	0.000	3.509
2014	Thorny skate	-		0.000	3.000	0.002	4.028
2014	White hake	0.004	1.083	0.001	4.532	0.002	3.503
2014	Windowpane flounder	-		0.001	9.428	0.003	2.718
2014	Winter flounder	-		0.006	6.350	0.001	2.996
2014	Winter skate	-		0.002	5.397	0.014	2.249
2014	Witch flounder	0.000	1.708	0.014	5.326	0.002	3.598
2014	Yellowtail flounder	-		0.007	5.689	0.005	1.712
2015	American plaice			0.010	5.708	0.012	1.406
2015	Atlantic herring			0.120	13.427	1.280	1.768
2015	Barndoor skate			0.023	9.692	0.014	2.236
2015	Butterfish			0.005	13.347	-	
2015	Cod			0.002	12.102	-	
2015	Haddock			0.712	6.566	0.333	1.758
2015	Little skate			0.174	11.003	0.007	1.491
2015	Monkfish			0.010	10.589	-	
2015	Ocean pout			0.004	11.147	-	
2015	Red hake			0.271	5.643	1.383	1.783
2015	Silver hake			0.020	9.684	0.064	1.953
2015	Smooth skate			-		-	
2015	Spiny dogfish			1.250	7.739	0.028	3.882
2015	Summer flounder			0.001	11.172	0.008	2.236
2015	Thorny skate			0.000	6.856	-	
2015	White hake			-		0.059	1.571
2015	Windowpane flounder			0.011	10.076	-	
2015	Winter flounder			0.010	10.189	-	
2015	Winter skate			0.190	6.039	0.010	1.482
2015	Witch flounder			0.011	6.328	0.056	1.251
2015	Yellowtail flounder			0.022	5.966	0.010	0.682
2016	American plaice			0.042	5.782	0.006	1.423
2016	Atlantic herring			0.007	6.668	0.018	1.895
2016	Barndoor skate			0.016	7.715	0.003	3.742
2016	Butterfish			0.004	14.171	-	
2016	Cod			0.002	11.579	-	
2016	Haddock			1.392	10.337	0.242	3.383
2016	Little skate			0.125	8.731	0.157	5.183
2016	Monkfish			0.006	9.111	0.006	4.800
2016	Ocean pout			0.000	16.149	0.001	2.098
2016	Red hake			0.475	9.247	0.078	3.585
2016	Silver hake			0.227	8.921	0.302	2.719
2016	Smooth skate			-		-	
2016	Spiny dogfish			0.047	5.407	0.748	3.536
2016	Summer flounder			0.001	4.413	-	
2016	Thorny skate			0.000	11.455	0.000	3.742
2016	White hake			0.009	5.527	0.003	2.604
2016	Windowpane flounder			0.002	3.767	-	
2016	Winter flounder			0.001	8.310	0.001	3.742
2016	Winter skate			0.531	10.768	0.172	4.493
2016	Witch flounder			0.015	5.717	0.048	3.400
2016	Yellowtail flounder			0.018	6.773	0.001	3.742

Table 13. D/Kall statistics from NEFOP and ASM observed tows on small-mesh multispecies trips in the southern management area. Fishing in the southern management area occurs throughout the year, but there are seasonal differences in effort.

		QUARTER	Statistic						
		1	1	2	2	3	3	4	4
YEAR	Values	Arithmetic Mean	Coefficient of Variation	Arithmetic Mean	Coefficient of Variation	Arithmetic Mean	Coefficient of Variation	Arithmetic Mean	Coefficient of Variation
2014	American plaice	-		-		0.000	6.083	-	
2014	Atlantic herring	0.001	8.367	0.038	5.129	-		0.001	2.828
2014	Barndoor skate	0.048	6.371	0.101	9.924	0.014	5.214	0.082	6.592
2014	Butterfish	0.152	2.198	0.157	5.630	0.362	4.898	0.480	3.966
2014	Cod	-		0.001	3.051	-		-	
2014	Haddock	0.003	5.993	0.039	13.351	0.096	2.864	0.042	1.981
2014	Little skate	0.001	4.034	0.209	7.246	0.626	5.054	0.277	3.572
2014	Monkfish	0.004	2.565	0.014	7.747	0.000	6.083	0.012	5.689
2014	Ocean pout	-		0.156	3.541	-		-	
2014	Red hake	0.093	2.393	0.731	8.698	0.795	2.855	0.140	5.277
2014	Silver hake	0.027	5.512	0.366	4.625	0.887	3.204	0.105	6.015
2014	Smooth skate	-		-		-		-	
2014	Spiny dogfish	0.307	3.301	0.588	7.337	0.063	4.560	0.170	3.716
2014	Summer flounder	0.034	2.360	0.056	8.782	0.002	6.083	0.030	4.776
2014	Thorny skate	-		-		-		-	
2014	White hake	-		-		-		-	
2014	Windowpane flounder	0.007	8.190	0.008	4.790	0.012	3.113	0.000	2.236
2014	Winter flounder	-		0.021	4.884	0.032	4.969	0.010	2.178
2014	Winter skate	0.032	5.791	0.001	6.403	0.304	3.584	0.001	7.032
2014	Witch flounder	0.009	4.378	0.016	7.622	0.000	8.911	0.001	7.032
2014	Yellowtail flounder	0.010	8.205	0.000	2.823	0.122	6.197	0.018	3.399
2015	American plaice	-		-		0.000	6.708	0.000	9.381
2015	Atlantic herring	0.003	7.141	0.199	7.966	0.003	4.708	0.008	8.626
2015	Barndoor skate	0.046	4.150	0.076	5.832	0.020	4.820	0.041	6.241
2015	Butterfish	0.238	5.590	0.040	5.481	0.106	1.609	0.106	9.339
2015	Cod	-		0.000	9.592	-		0.000	9.381
2015	Haddock	0.001	5.256	0.127	3.180	0.047	1.936	0.129	8.966
2015	Little skate	0.039	5.925	0.773	6.996	0.193	3.234	0.093	6.004
2015	Monkfish	0.044	3.822	0.051	8.262	0.003	2.929	0.020	4.998
2015	Ocean pout	0.002	6.469	0.008	8.163	0.000	6.059	0.000	12.059
2015	Red hake	0.520	4.179	0.358	7.193	0.229	3.329	0.651	2.779
2015	Silver hake	0.021	2.423	0.024	3.222	0.140	3.735	0.209	6.161
2015	Smooth skate	-		-		-		-	
2015	Spiny dogfish	0.700	3.360	1.306	7.167	0.006	3.625	0.535	8.910
2015	Summer flounder	0.296	4.900	0.073	7.005	0.020	2.652	-	
2015	Thorny skate	-		-		-		-	
2015	White hake	0.003	4.583	-		0.000	3.847	0.000	7.611
2015	Windowpane flounder	-		0.001	7.781	0.009	4.482	-	
2015	Winter flounder	-		0.001	6.810	0.006	4.404	-	
2015	Winter skate	0.068	7.792	0.107	6.934	0.010	5.569	-	
2015	Witch flounder	0.040	3.481	0.016	9.236	0.001	4.559	-	
2015	Yellowtail flounder	-		-		0.003	3.564	-	
2016	American plaice	0.000	7.141	-		-		-	
2016	Atlantic herring	-		-		-		-	
2016	Barndoor skate	0.240	5.200	0.017	4.330	0.004	4.800	0.001	4.506
2016	Butterfish	0.436	6.189	0.091	3.504	0.077	5.074	0.046	2.583
2016	Cod	0.004	5.541	-		-		-	
2016	Haddock	0.066	2.053	0.005	7.728	0.002	3.437	0.001	3.139
2016	Little skate	0.046	5.643	0.028	3.362	0.141	1.263	0.226	3.702
2016	Monkfish	0.151	5.776	0.019	6.617	0.008	1.741	0.062	2.953
2016	Ocean pout	0.006	2.260	0.017	2.395	0.000	4.963	-	
2016	Red hake	0.844	4.226	0.508	5.705	0.025	1.328	0.098	2.367
2016	Silver hake	0.021	3.547	0.506	7.249	0.054	2.630	0.234	1.320
2016	Smooth skate	-		-		-		-	
2016	Spiny dogfish	2.132	7.761	0.040	5.247	0.029	3.119	0.014	3.667
2016	Summer flounder	0.715	5.349	0.002	3.124	0.007	2.042	0.029	2.810
2016	Thorny skate	-		-		-		-	
2016	White hake	0.000	7.141	-		0.002	5.616	-	
2016	Windowpane flounder	0.001	3.162	0.001	4.003	0.005	1.938	-	
2016	Winter flounder	-		0.008	3.148	0.022	2.518	0.003	6.691
2016	Winter skate	0.234	2.154	0.003	5.353	0.010	3.563	-	
2016	Witch flounder	0.017	7.669	0.006	2.268	0.000	5.320	0.000	4.840
2016	Yellowtail flounder	-		-		0.004	2.128	0.001	5.096

5.2.6.1 Bycatch in Exempted Areas and Other Fishing Areas

5.2.6.1.1 Gear Trials and Experimental Fisheries

Fishing for small-mesh multispecies is allowed through a set of exemptions for the regulated mesh areas. On southern Georges Bank, in Southern New England, and the Mid-Atlantic (SNE/MA), small-mesh multispecies fishing is allowed with any type of trawl configuration and mesh (although the whiting possession limits vary by mesh size to encourage selective fishing with larger mesh trawls). This exempt Georges Bank (GB) fishing area are located within statistical reporting areas (SA) 525, 526, and 562. Trends of bycatch in the Southern New England and Mid-Atlantic areas were combined from observed hauls located in SAs 537 to 639.

The Cultivator Shoals Area (CSA) is a small-mesh exemption area open in the winter and spring to fish for whiting, squid, and other small-mesh species. Like areas to the south, this area does not require vessels to use any special gear configuration to reduce bycatch of regulated multispecies and other species. Interactions with regulated multispecies is achieved through area and season specifications (see Section 5.1). The Cultivator Shoals Area is almost entirely within statistical reporting area (SA) 522.

Small-mesh multispecies exemption areas in the western Gulf of Maine and the Outer Cape (O.Cape) require vessels to use a raised footrope trawl, a trawl designed and tested in the 1990s by MA Division of Marine Fisheries and Capt. Henry Souza (Carr 1996, McKiernan *et al*. 1998). Only six trips were tested using a control net, sequentially using a raised footrope trawl trawl and modified sweeps then using a standard 2 or 4-seam trawl with the same size small-mesh cod end. Catches of regulated multispecies were almost all lower with the raised footrope trawl compared to the standard trawl (see Figure 17) that had been in use to fish for small-mesh multispecies before the regulated mesh areas applied in 1994. Catches of the target whiting were also lower, but not as much. Catches of red hake were also reduced with the DMF raised footrope trawl by an amount similar to the observed reduction of silver hake catches. The comparable bycatch rate for roundfish (cod, haddock, pollock, etc) actually increased compared to the control net.

The researchers noted that net performance and characteristics were highly dependent on how the net was ‘tuned’ and that selectivity could be compromised by changing the sweep length. During testing, modifications to the raised footrope trawl net were made to improve performance and selectivity, primarily by changing the number of floats in the headrope to lift the footrope off the bottom. The MA DMF researchers recommended that specification and enforcement of the net configuration would be required to ensure adequate performance on unobserved trips. To our knowledge, no formal review of gear configuration on observed trips since 1998 has been performed to evaluate how well the fishery is conforming to the original tested gear standard.

Figure 17. Comparable catches of silver hake (target), red hake, regulated multispecies, and other species by body shape for six raised footrope trawl/control trials in 1994. Data from Carr 1996, used with permission of MA DMF.

Following the initial testing against a control, MA DMF proposed and monitored an experimental fishery in 1997 and 1998. Vessels in the experimental fishery were required to use a raised footrope trawl to target small-mesh multispecies in five areas (see Map 4) of Massachusetts Bay and the Outer Cape. MA DMF (McKiernan *et al.* 1998, McKiernan 1999) compared the catches of regulated multispecies only to a 5% threshold (the ratio of the catch of regulated large-mesh multispecies to total catch[9]), which the Council set to evaluate whether to allow exempted fisheries in regulated multispecies mesh areas. In most cases, the regulated multispecies catches were below the 5% threshold. An acceptable low fraction of trips and tows exceeded the 5% threshold (Figure 18), except in experimental fishing area 2C (Figure 19), where the bycatch of cod was unacceptably high. MA DMF also totaled the ratio of total discards to total kept (∑D/∑Kall), noting that it was unclear which metric should be used to evaluate bycatch.

[9] N.B. This was a different ratio than the one currently used (discard to kept) ratio that is now used to estimate catch and monitor bycatch.

Map 4. Experimental small-mesh multispecies fishery areas and observed trips/hauls during 1998 (McKiernan *et al.* 1999) Map used with permission of MA DMF.

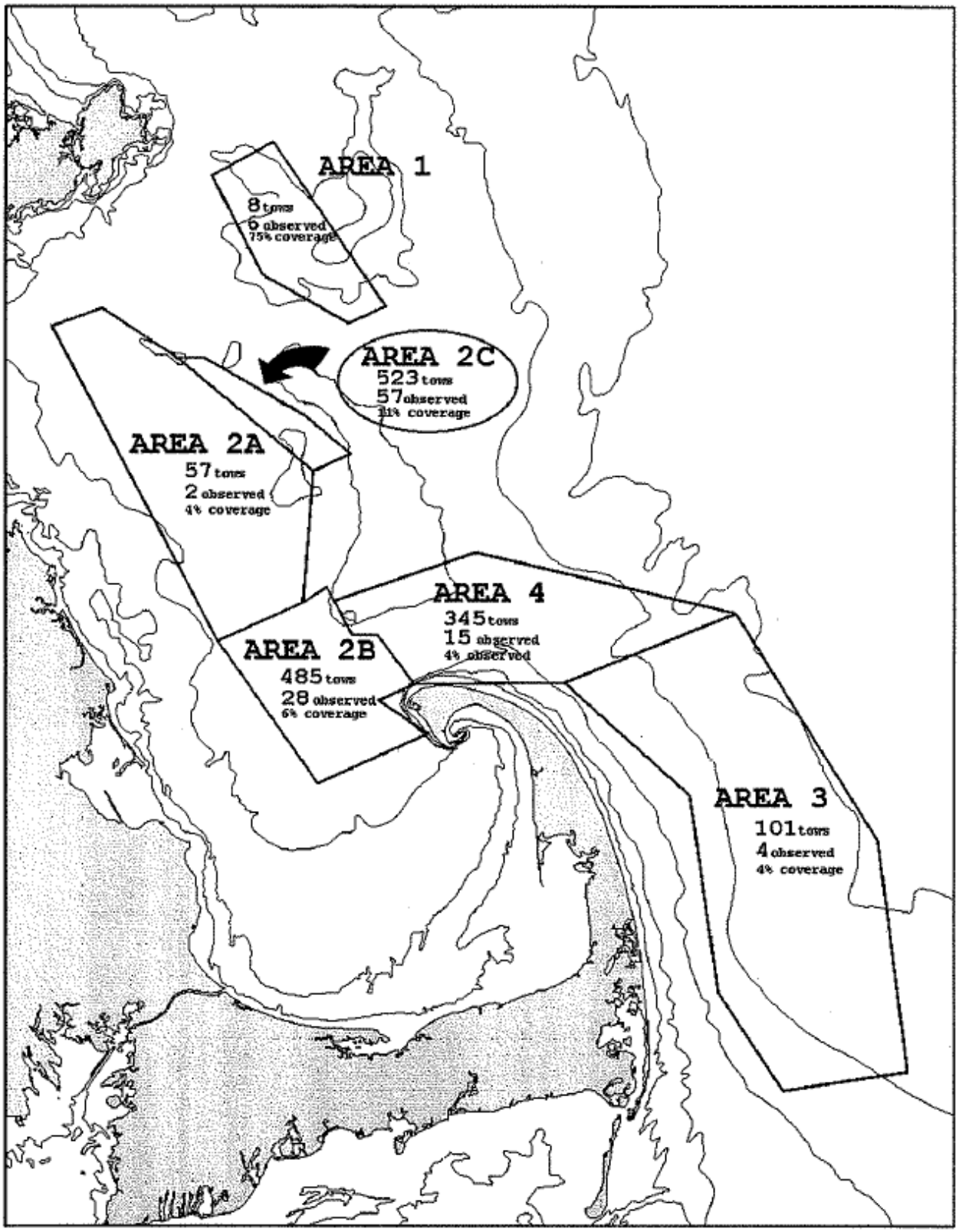


Figure 18. Regulated multispecies catch rates for the 1998 experimental fishery conducted in area 2B (McKiernan 1999). Used with permission of MA DMF.

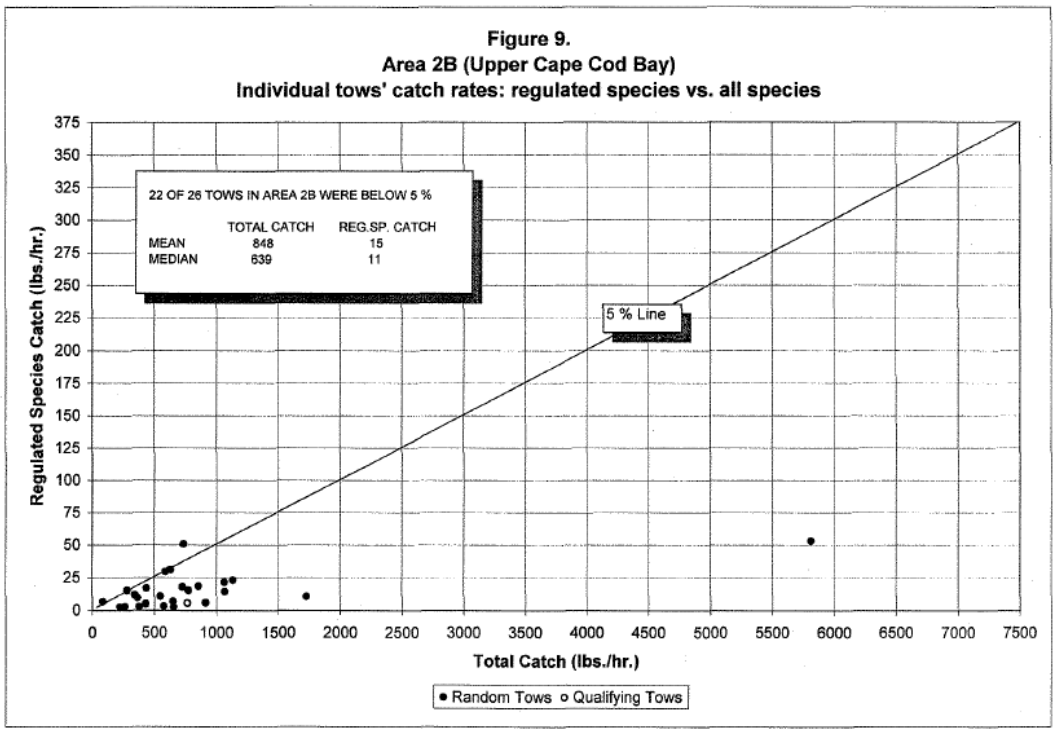
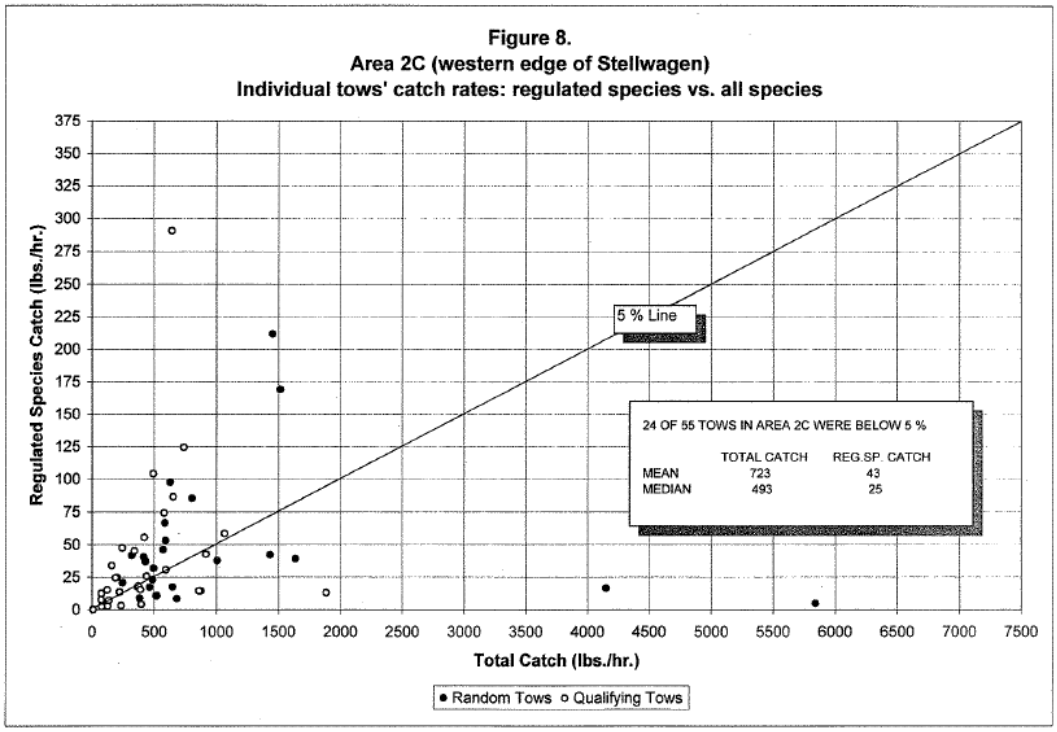


Figure 19. Regulated multispecies catch rates for the 1998 experimental fishery conducted in area 2C (western edge of Stellwagen Bank) (McKiernan 1999). Used with permission of MA DMF.



5.2.6.2 Bycatch of Regulated Multispecies

5.2.6.2.1 Trends in Total Discard to Kept-all (∑D/∑Kall) ratios

Here we examine the trends from 1989 to 2016 in observed bycatch in the small-mesh multispecies fishery, comparing bycatch rates between the five general SA groups that encompass the small-mesh multispecies exemption areas. In the time available, we were not able to separate out the observed tows by individual exemption area (this would require more complex GIS processing), but binned the data by SAs. Small-Mesh Areas I and II and the Inner Cape raised footrope trawl area are located in SAs 513 and 514. The Outer Cape Raised Footrope Trawl Area is located in SA 521, and the Cultivator Shoals Area is almost entirely in SA 522.

Regulated multispecies bycatch rates (∑D/∑Kall) in the Cultivator Shoals Area have been generally below the 5% threshold for most of the period (Figure 20, 1st panel). The average bycatch rate exceeded the 5% threshold in 2004 and 2007, while most trips exceeded the standard from 2004-2007 as well as 2010-2011. For 2014-2016, catches of regulated multispecies have been well above the 5% threshold with more than 90% of the trips exceeding that threshold. As it turns out, most of the high regulated multispecies catch is comprised of haddock, following a series of strong haddock year classes.

In the Georges Bank SAs (Figure 20, 2nd panel), the ∑D/∑Kall ratios fluctuated around 5%, exceeding the threshold in 2004, 2007, 2012, and 2015-2015[10]. Most trips exceeded the 5% threshold in only one year, 2012. Generally, the bycatch of regulated multispecies has been less than that for the Cultivator Shoals Area and did not increase in 2014-2016 when strong year classes of Georges Bank haddock became selected by the small-mesh multispecies nets.

Bycatch of regulated multispecies (∑D/∑Kall) in SAs 513 and 514 where exemption areas require vessels to use a raised footrope trawl were mostly below the 5% threshold (Figure 20, 3rd panel), substantially exceeding the 5% threshold in only 2010. Only in 2006 and 2010, most trips exceeded a ∑D/∑Kall ratio of 5% and bycatch of regulated multispecies were generally less than that for the Cultivator Shoals Area and Georges Bank SAs.

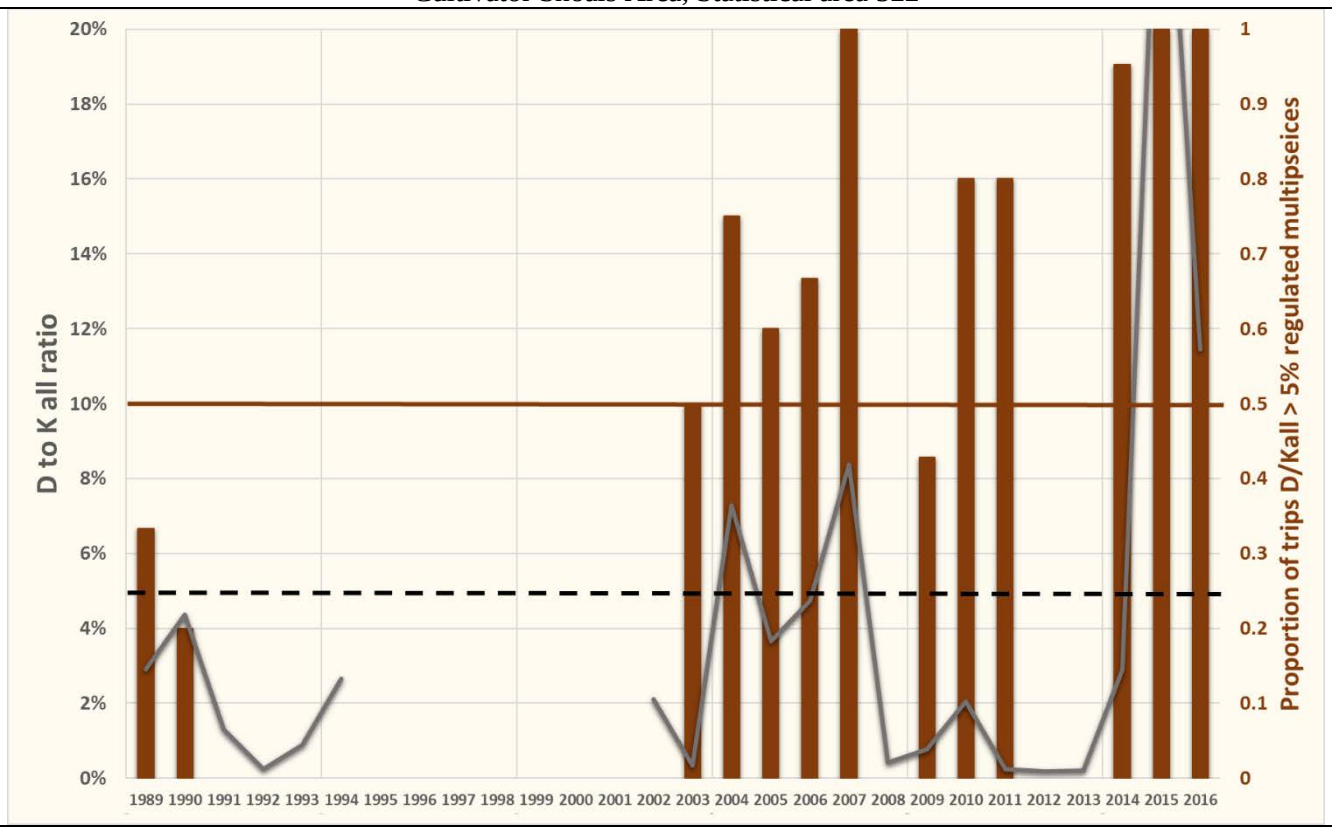
Samples on observed trips in SA 521, where the Outer Cape raised footrope trawl area is located, are generally sparse (Figure 20, 4th panel). Except for 2003, and 2016, the ∑D/∑Kall rato was below the 5% threshold. More than half of the trips exceed a 5% ∑D/∑Kall threshold in 2014 and 2016, like the pattern from the Cultivator Shoals Area, probably due to bycatch of abundant young haddock.

Except for 2007 when 50% of trips had ∑D/∑Kall ratios exceeding 5% of regulated multispecies, the regulated multispecies bycatch in SNE/MA areas has been low (Figure 20, 5th panel). Mainly, regulated multispecies bycatch is low because except for winter flounder groundfish abundance here is generally less than in the Gulf of Maine and on Georges Bank. Furthermore, most of the small-mesh multispecies fishery occurs in waters that are generally deeper than where groundfish inhabit.

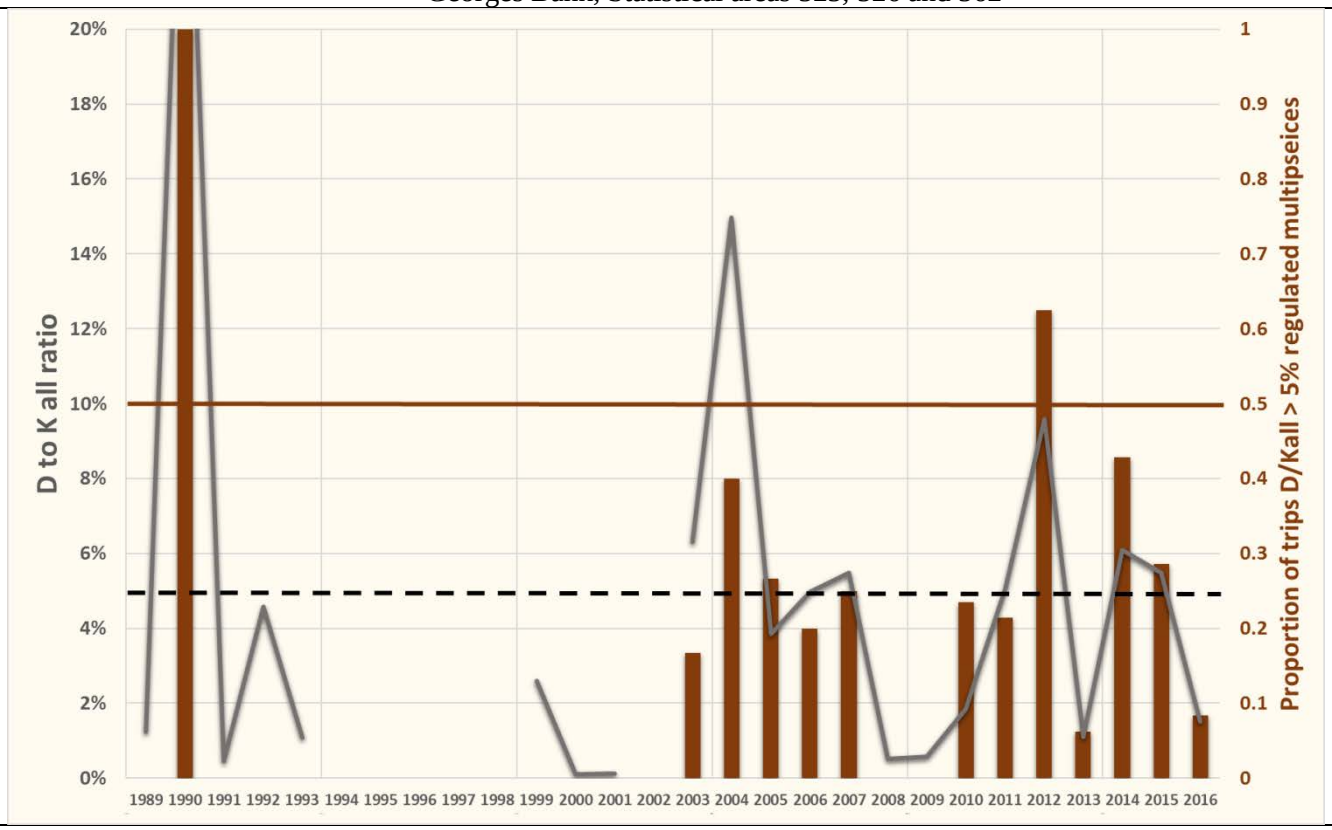
[10] Discount the high rate in 1990 because only one trip was sampled.

Figure 20. Regulated multispecies average annual discard to kept all ratios and trips exceeding the 5% threshold (dashed black line) by sub-area on small-mesh trawls trips landing more than 2000 lbs. whiting or 400 lbs. red hake. The solid red line represents when more than 50% of trips exceed the 5% threshold.

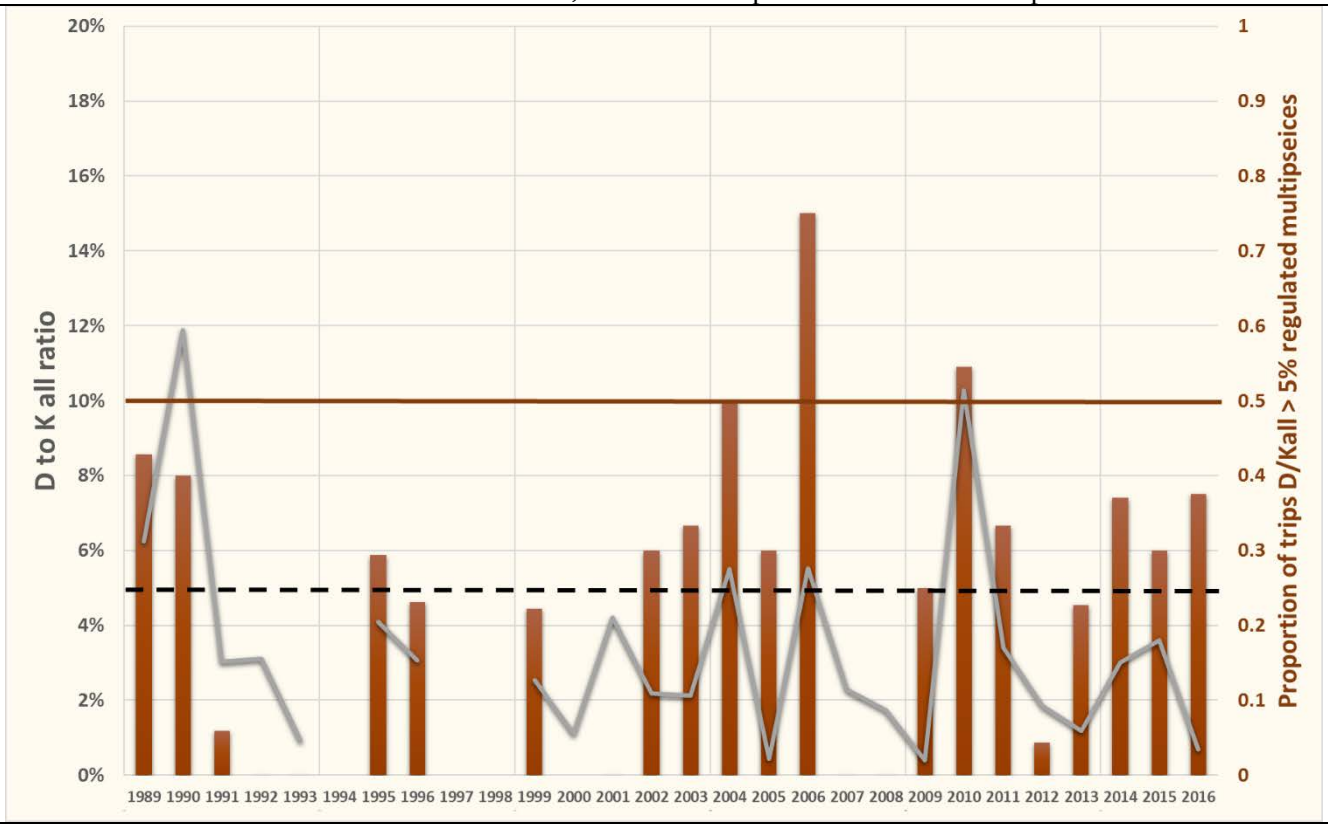
Cultivator Shoals Area, Statistical area 522



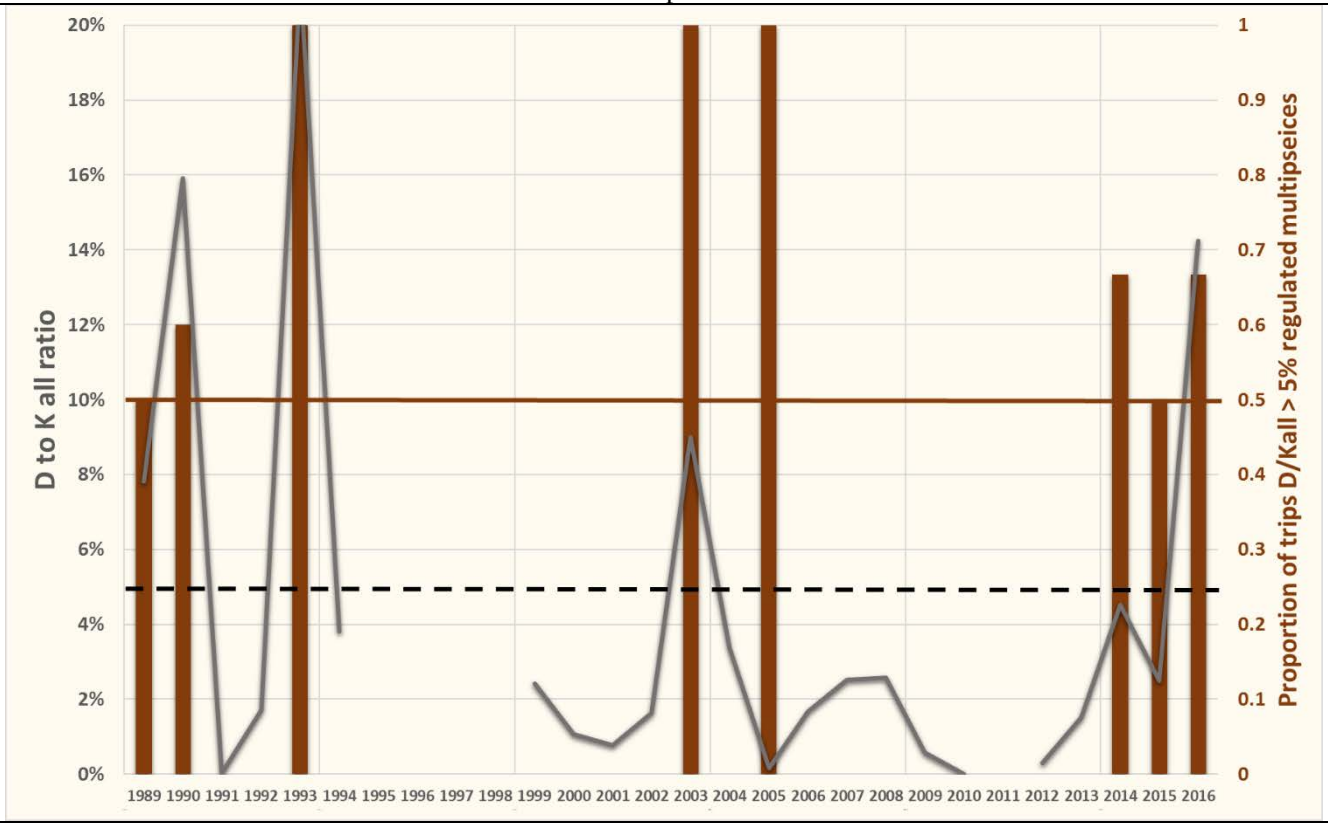
Georges Bank, Statistical areas 525, 526 and 562



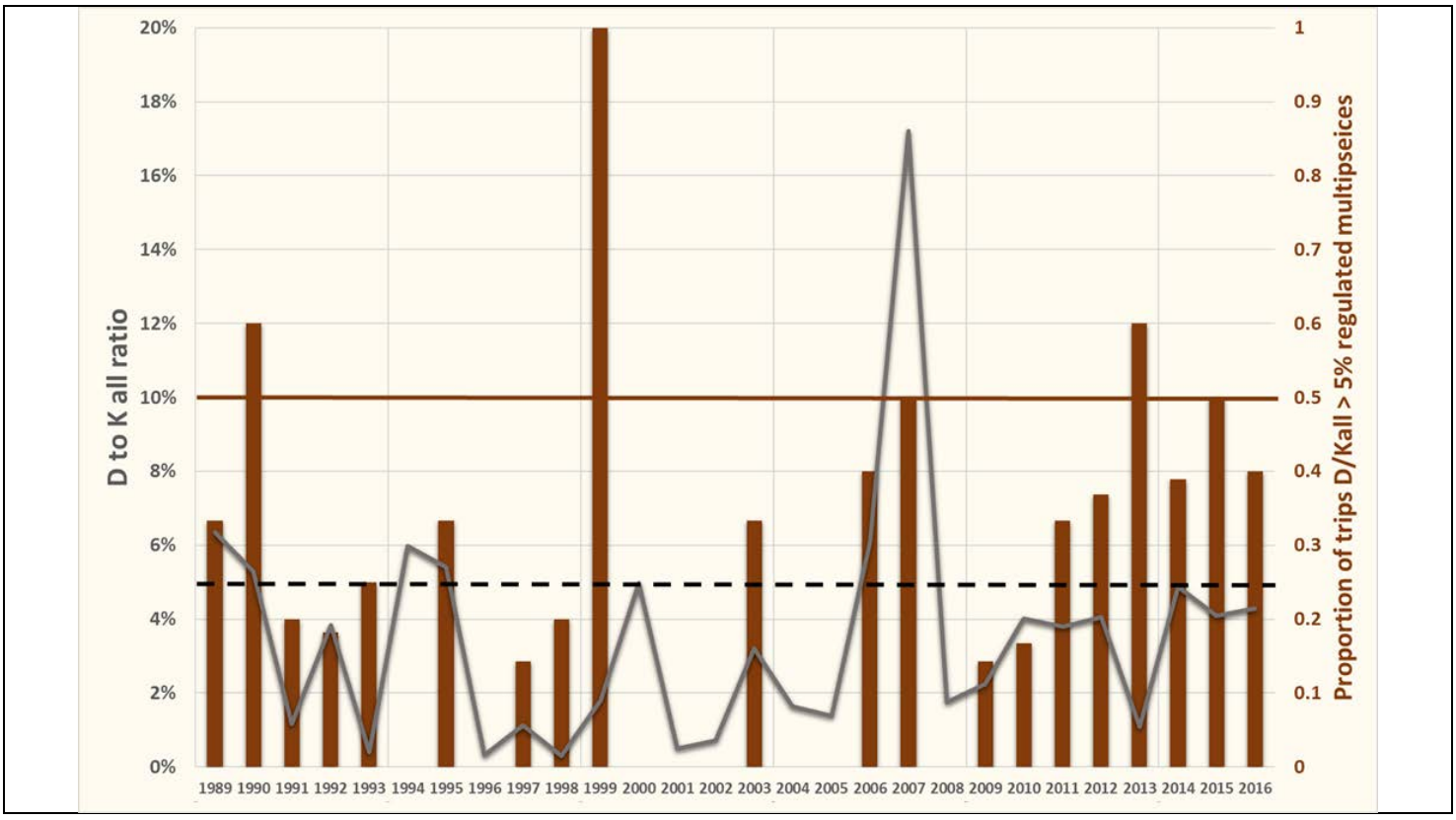
Gulf of Maine, Statistical areas 513-514
Small-Mesh Area 1 and 2; Raised Footrope Trawl area inside Cape



Outer Cape, Statistical area 521
Raised Footrope Trawl area



Southern New England/Mid-Atlantic; Statistical areas >= 537


D to K all ratio
Proportion of trips D/Kall > 5% regulated multipseices
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

5.2.6.2.2 Trends in Discard to Kept ratios on Individual Observed Hauls

Another way of examining the bycatch trends is to summarize the discard to kept-all (D/Kall) statistics for individual hauls. The trends shown in Figure 21 are not as cleanly differentiated between areas as are the ∑D/∑Kall ratios described in the previous section, but there are some parallels as would be expected.

Generally the D/Kall rates are higher in the Cultivator Shoals Area then elsewhere and frequently exceed the 5% threshold. Both the Cultivator Shoals Area (SA 522) and Georges Bank (SA 525,526,562) have an elevated bycatch of regulated multispecies in 2014-2016. During this period, the regulated multispecies bycatch frequently exceeded a 5% ratio on many observed hauls (Figure 22). It is also notable that except for the Cultivator Shoals Area, the bycatch rate of regulated multispecies was relatively low (i.e. "clean tows" seldom exceeding 5%) when the kept portion exceeded 5000 lbs. (i.e.it caught a lot of whiting). It may also be correlated with tow duration, a factor that we did not examine.

5.2.6.2.3 Conclusions

Many observed hauls in the Cultivator Shoals Area even exceeded a 25% ratio. These high catch rates appear to be related to large year-classes of haddock (as shown below) becoming vulnerable to the small-mesh trawls. This is probably not due to the infrequent use of raised footrope trawls in the Cultivator Shoals Area, which as discussed above is a roundfish that was not less selective in the raised footrope trawl/control gear trials conducted by Carr 1996/

Figure 21. Annual regulated multispecies discard to kept-all ratios by sub-area for trips using small-mesh trawls and landing at least 2000 lbs. of whiting or 400 lbs. of red hake, 1989-2016. Reference line represents the 5% regulated multispecies standard applied as a factor to allow an exempted fishery. Sub-areas are CSA (Cultivator Shoals Area;SA=522), GB (Georges Bank;SA=525,526,562), GOM (Western Gulf of Maine; SA 513,514), O.Cape (SA=521), and SNE/MA (SA >= 537). The GOM and O.Cape sub-areas include exemption areas requiring a raised footrope trawl.

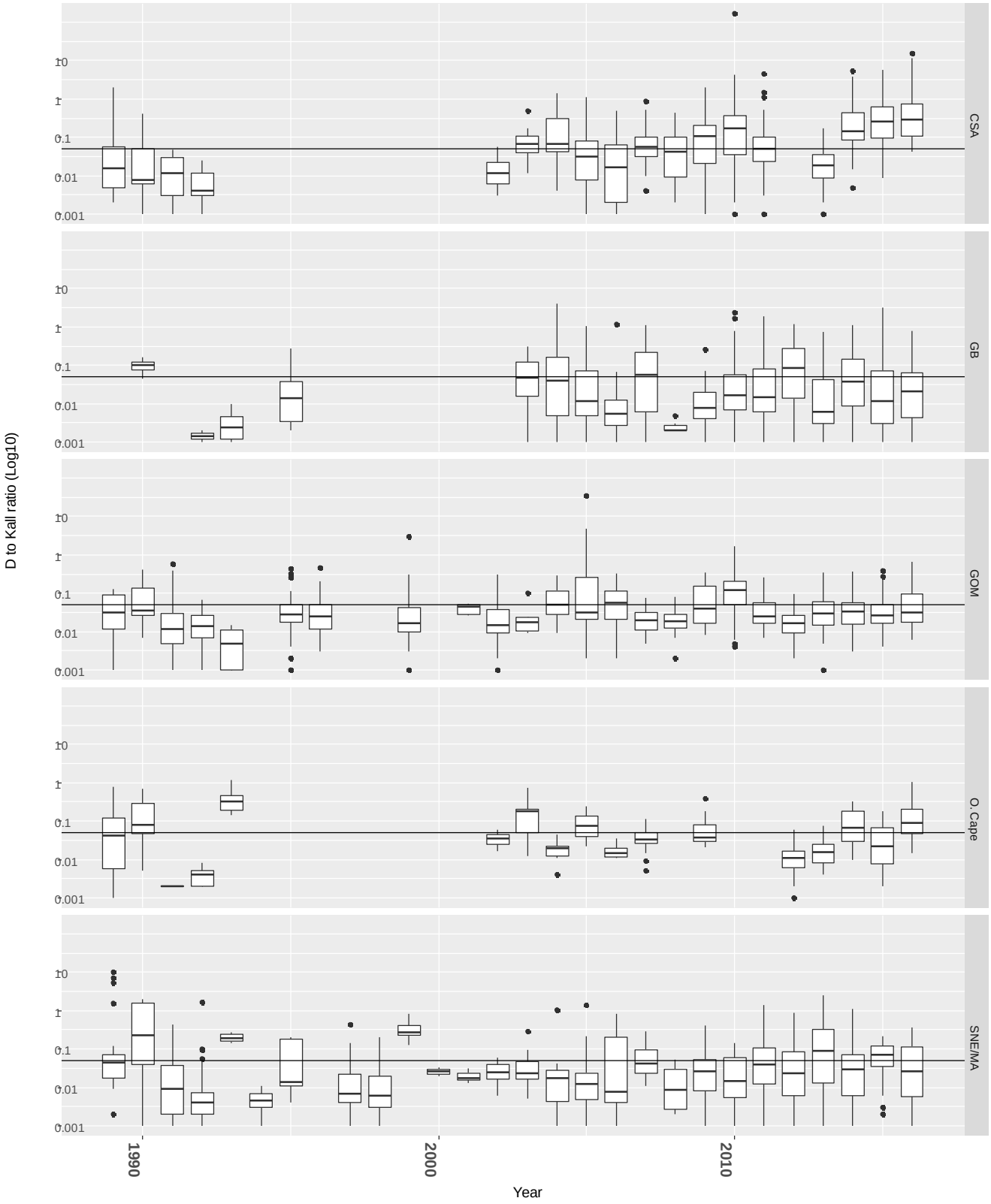
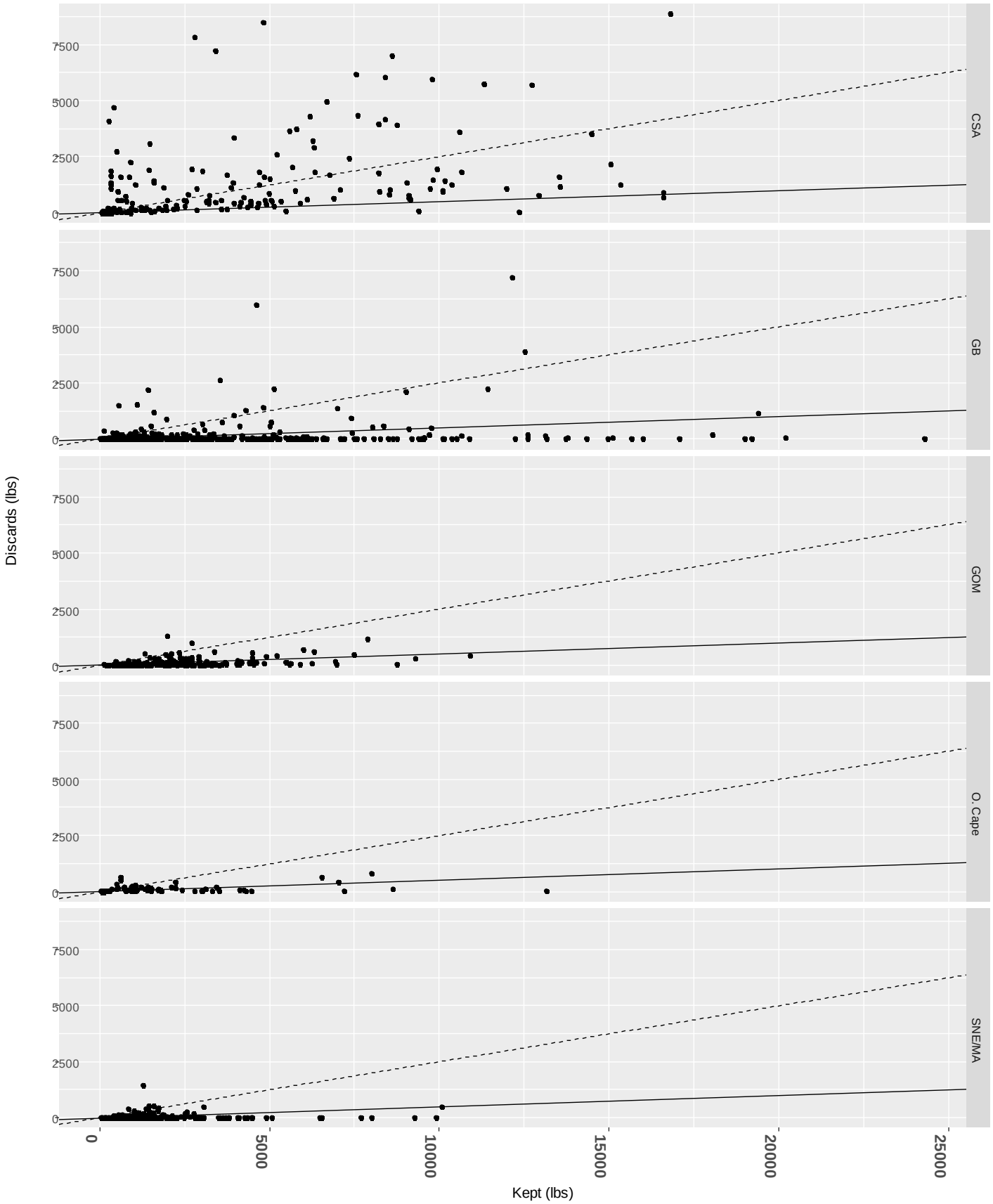


Figure 22. Regulated multispecies discard vs. kept by sub-area for observed hauls (each point represents a haul) during 2014-2016. Solid reference line = 5% ratio; dashed reference line = 25% ratio. Sub-area as in Figure 21.



5.2.6.2.4 Trends and Patterns in Species and Species Groups Bycatch

5.2.6.2.4.1 Roundfish (including haddock) and flatfish

Since the raised footrope trawl was designed to avoid catching flatfish (flounders, etc) and the net caught more roundfish than the control net in gear trials, it was worthwhile to compare the bycatch trends by area broken out by fish type. The trends and patterns for roundfish (cod, haddock, pollock, redfish, and ocean pout) are very similar to the overall trends and patterns for all regulated multispecies combined (Figure 23 and Figure 24). Catches of roundfish were below a 5% ratio, except for the Cultivator Shoals Area where the bycatch in 2014-2016 was dominated by haddock (Figure 27 and Figure 28).

Bycatch trends and patterns for flatfish (Figure 25and Figure 26) show a markedly different pattern. In general, the bycatch of flatfish (flounders, monkfish, and skates) appear to be lower in the raised footrope trawl areas (particularly Small-Mesh Areas I and II, SA 513-514: and the raised footrope trawl areas, SA 521) than elsewhere. Bycatch in the Cultivator Shoals Area (SA 522) did not increase in 2014-2016 as it did for haddock (a roundfish). It is also notable that the bycatch rate is generally lower for tows in all areas where the kept proportion (mainly whiting) exceeds 5000 lbs. per haul (i.e. they are clean tows).

Figure 23. Annual regulated multispecies roundfish (cod, haddock, pollock, redfish, ocean pout) discard to kept-all ratios by sub-area for trips using small-mesh trawls and landing at least 2000 lbs. of whiting or 400 lbs. of red hake, 1989-2016. Reference line represents the 5% regulated multispecies standard applied as a factor to allow an exempted fishery

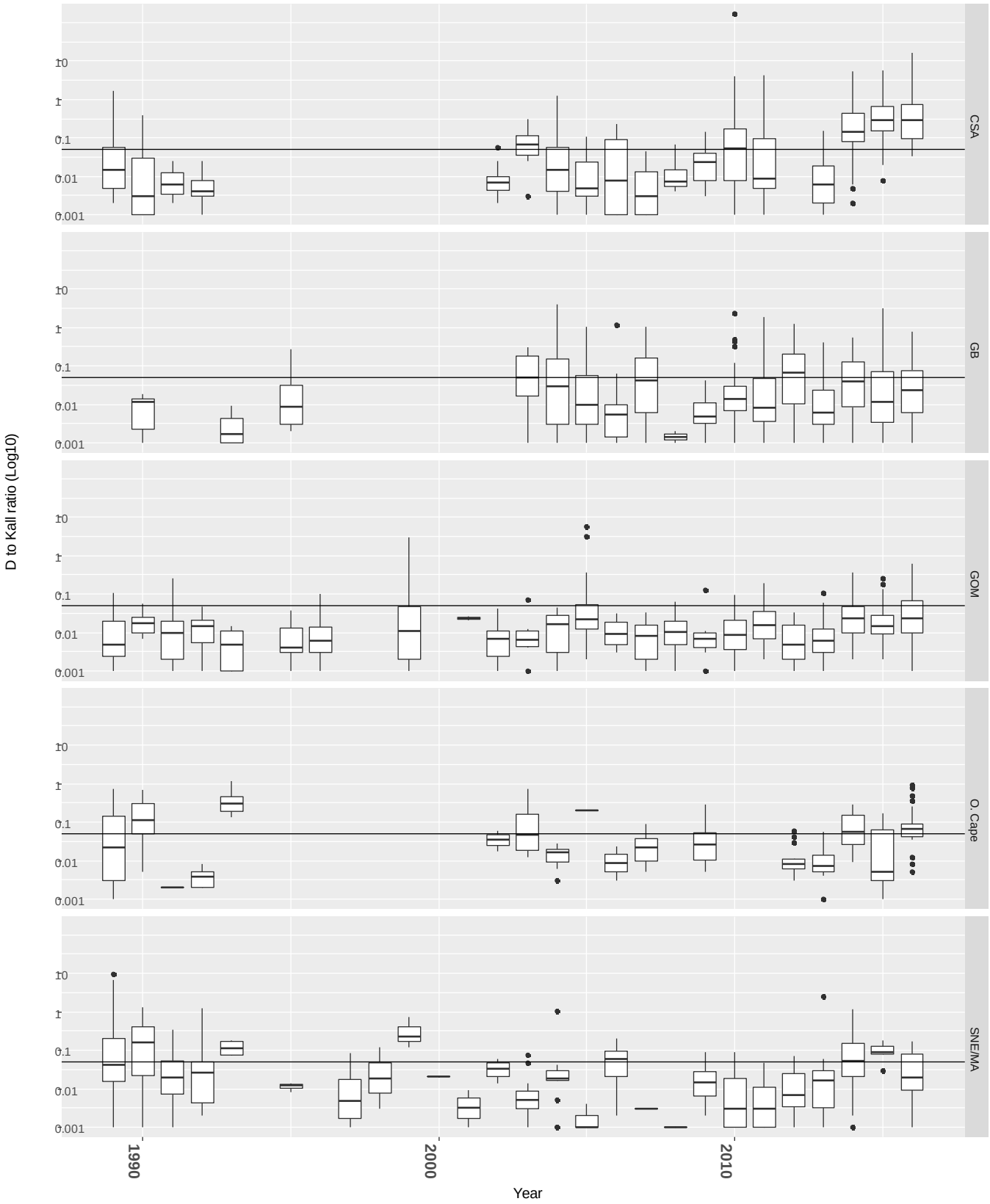


Figure 24. Regulated multispecies roundfish discard vs. kept by sub-area for observed hauls (each point represents a haul) during 2014-2016. Solid reference line = 5% ratio; dashed reference line = 25% ratio. Sub-area as in Figure 21.

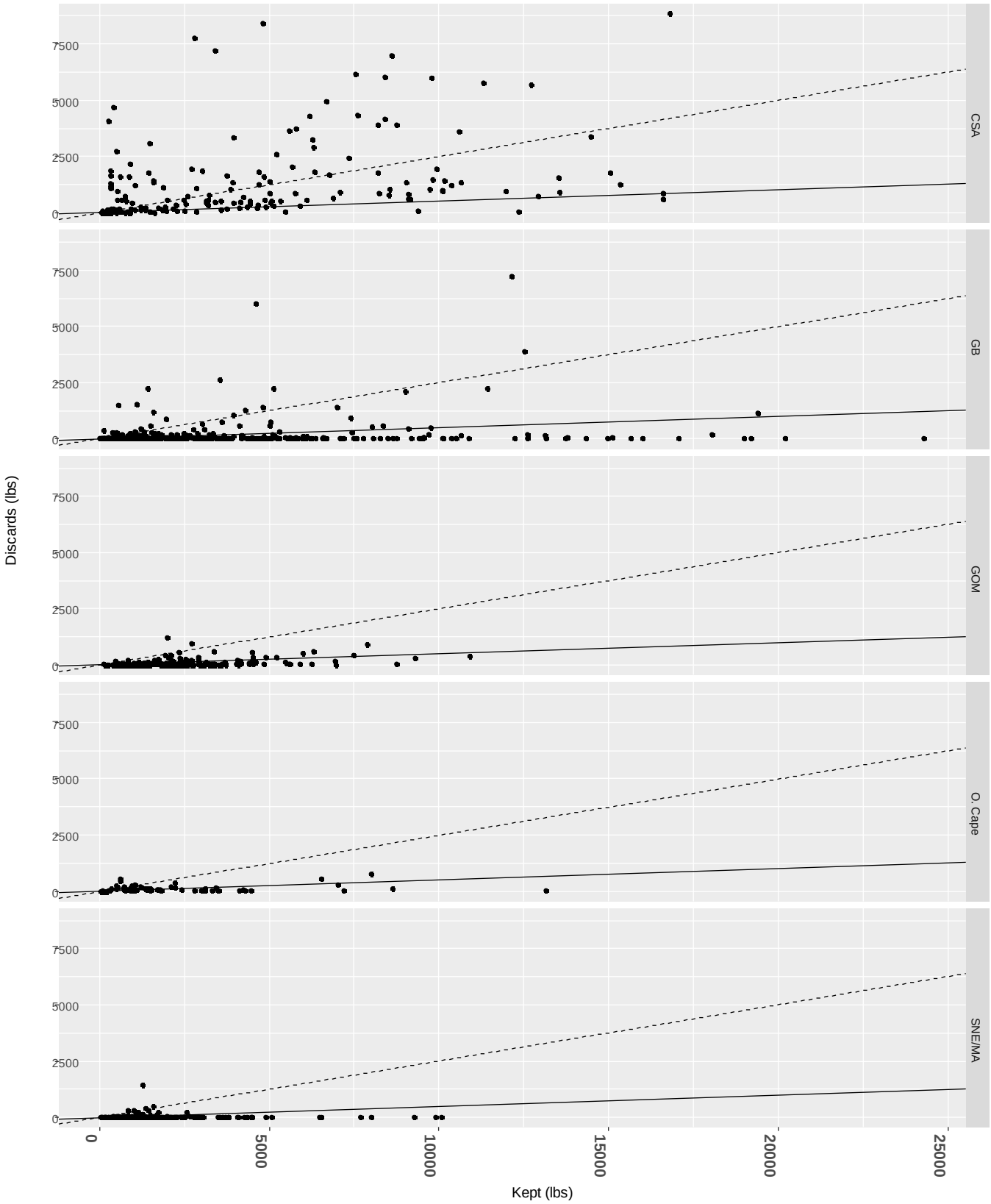


Figure 25. Annual flatfish (flounders, monkfish, and skates) discard to kept-all ratios by sub-area for trips using small-mesh trawls and landing at least 2000 lbs. of whiting or 400 lbs. of red hake, 1989-2016. Sub-area as in Figure 21.

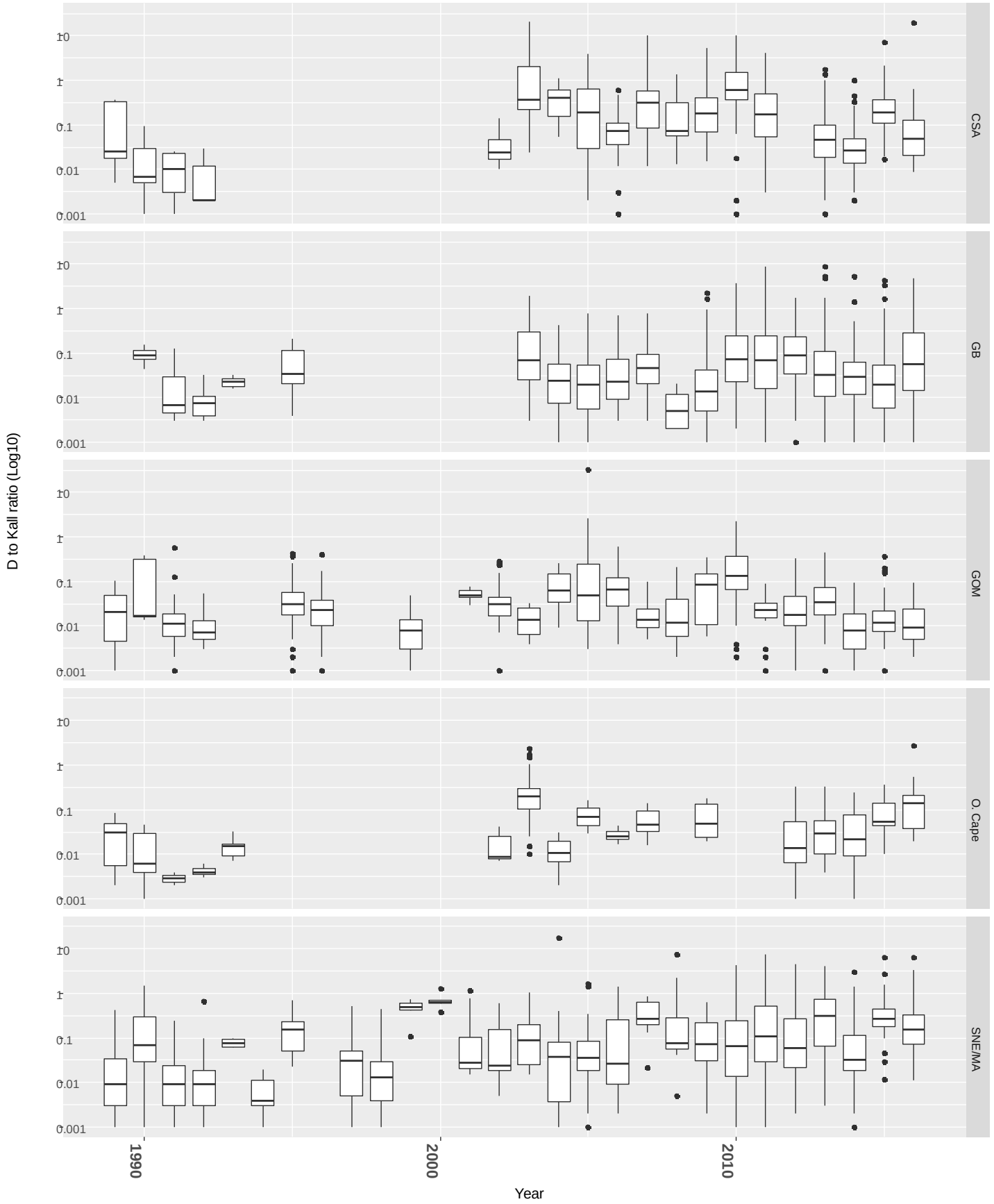

D to Kall ratio (Log10)
CSA
GB
GOM
O. Cape
SNE/MA
1990
2000
2010
Year

Figure 26. Flatfish discard vs. kept by sub-area for observed hauls (each point represents a haul) during 2014-2016. Solid reference line = 5% ratio; dashed reference line = 25% ratio. Sub-area as in Figure 21.

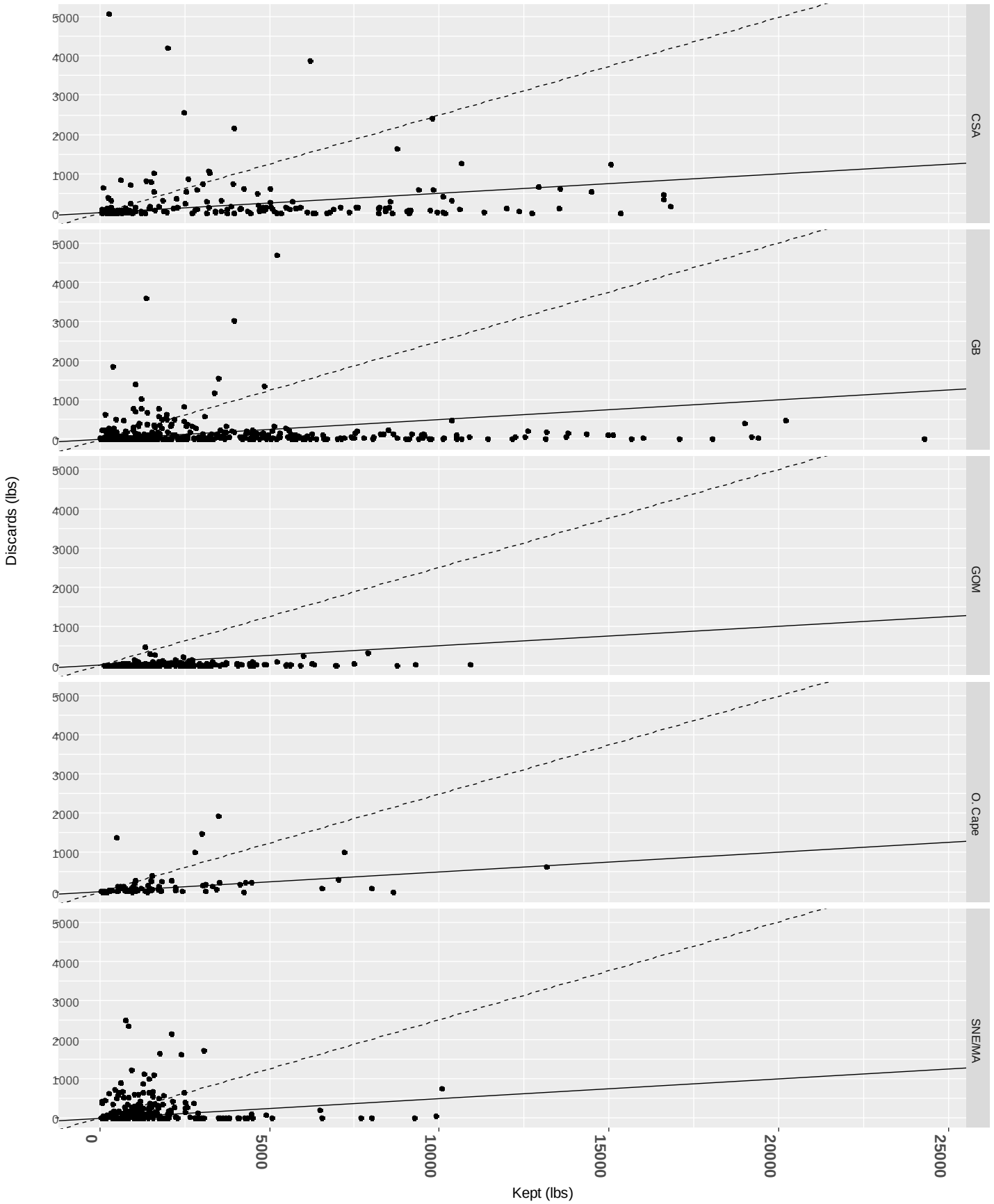


Figure 27. Annual haddock discard to kept-all ratios by sub-area for trips using small-mesh trawls and landing at least 2000 lbs. of whiting or 400 lbs. of red hake, 1989-2016. Sub-area as in Figure 21.

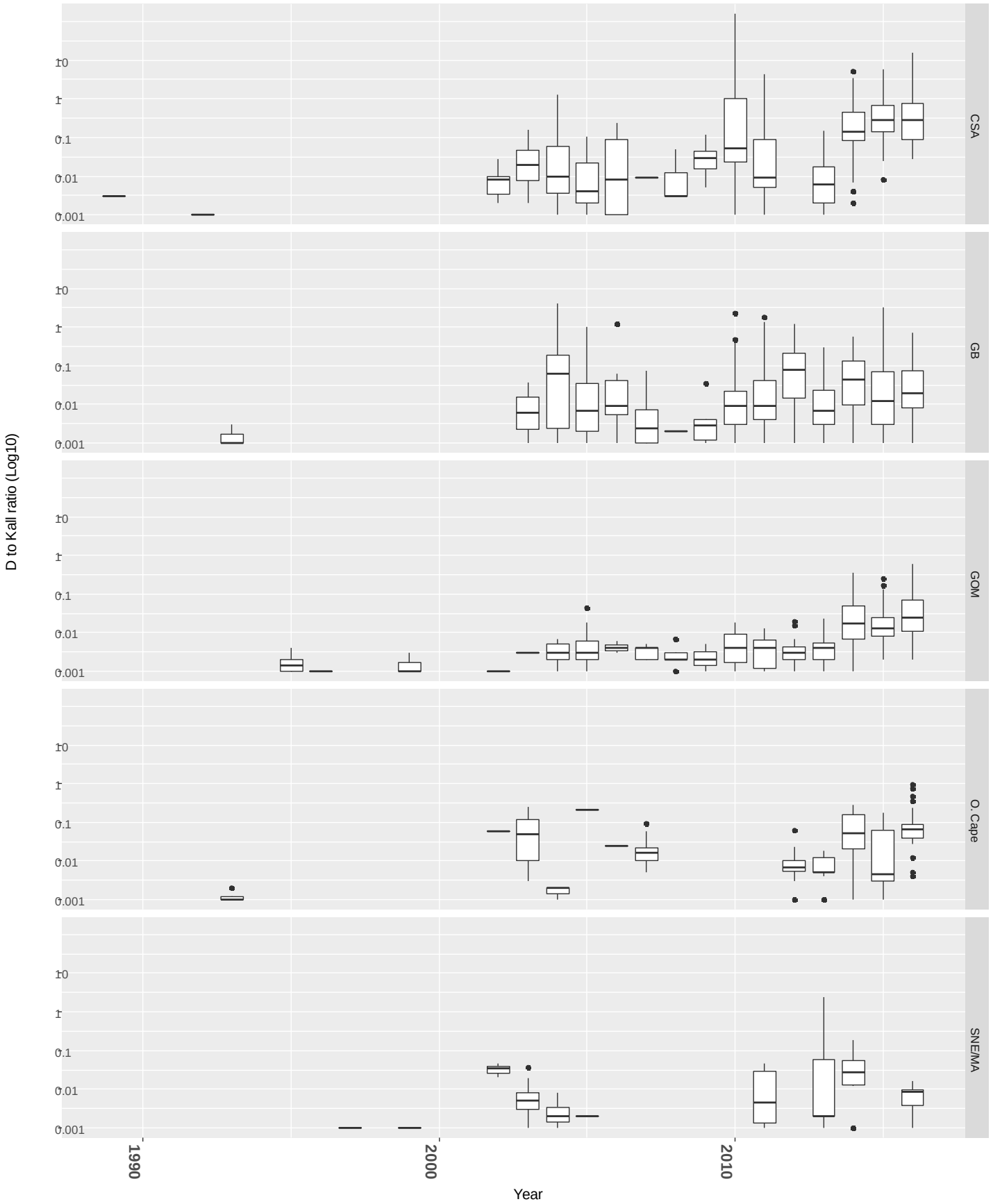
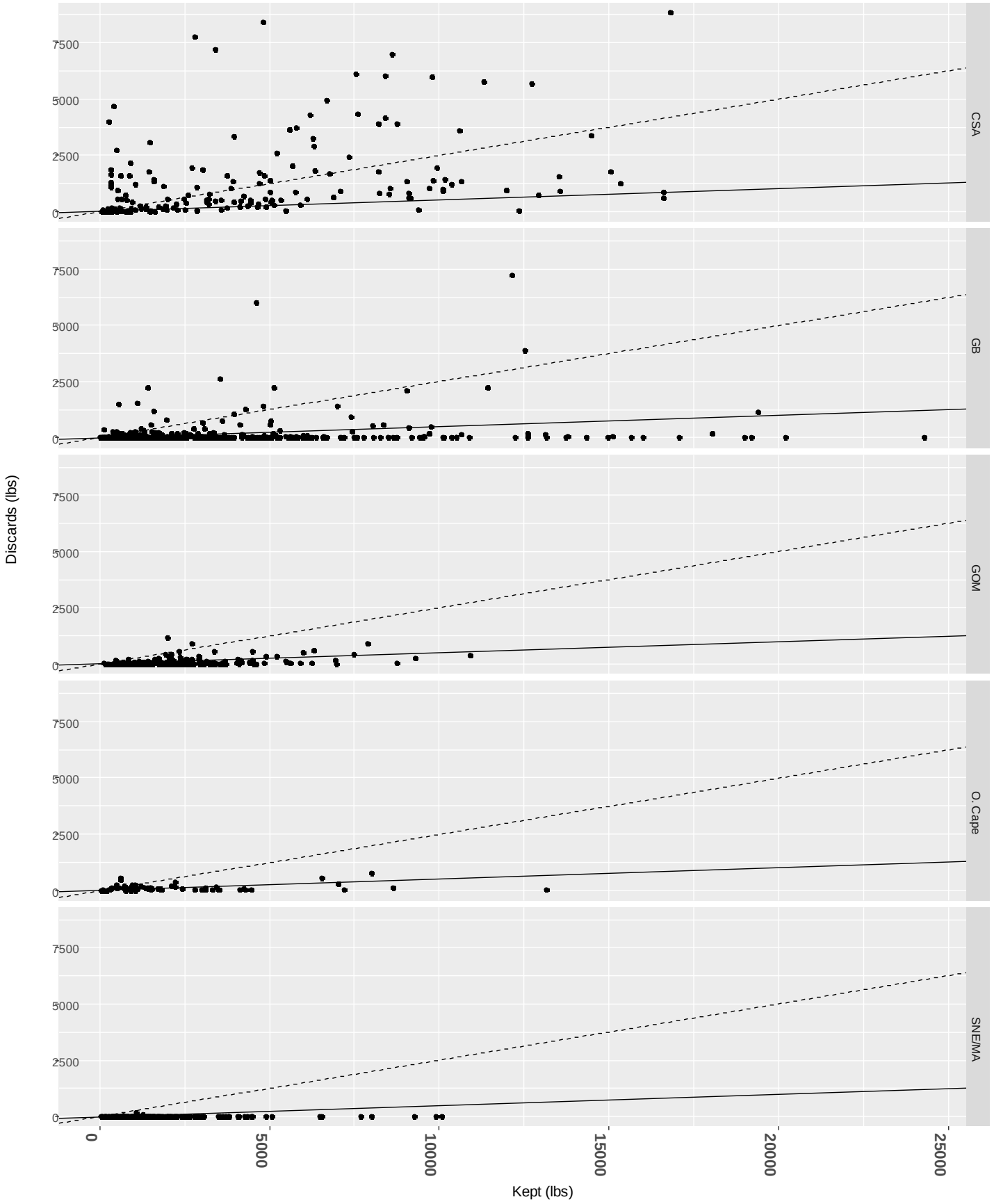


Figure 28. Haddock discard vs. kept by sub-area for observed hauls (each point represents a haul) during 2014-2016. Solid reference line = 5% ratio; dashed reference line = 25% ratio. Sub-area as in Figure 21.



5.2.6.2.4.2 Red hake

In the gear trials by Carr 1996, red hake catches were reduced slightly more in the raised footrope trawl than the catches of silver hake. Due to the low number of trips and tows observed, it is difficult to reach any conclusions about the catches of red hake from those data alone. Since then, we can compare the trends and patterns in red hake bycatch over time and between areas (Figure 29 and Figure 30). D/Kall ratios of red hake since 2004 appear to be relatively stable, varying around 10% in most areas. There appears to be a slight uptick in the red hake D/Kall ratio in the GOM (SA 513-514) since 2011, a period when accountability measures triggered an in-season reduction in the northern red hake possession limit to 400 lbs. Similar to the case for roundfish, the highest bycatch ratios appear to be correlated with low catch (kept) of the target species (i.e. whiting) (Figure 30).

Figure 29. Annual red hake discard to kept-all ratios by sub-area for trips using small-mesh trawls and landing at least 2000 lbs. of whiting or 400 lbs. of red hake, 1989-2016. Sub-area as in Figure 21.

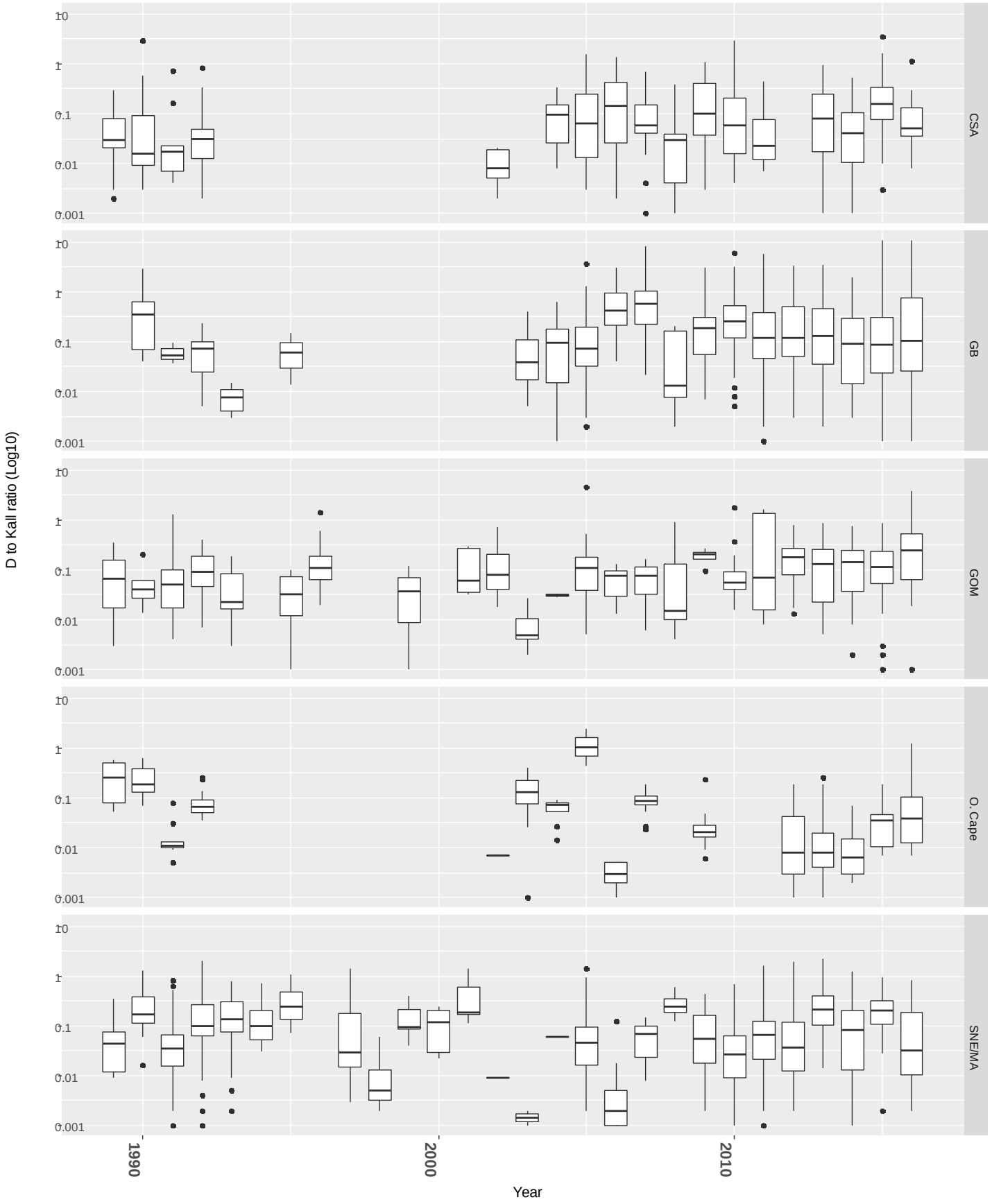
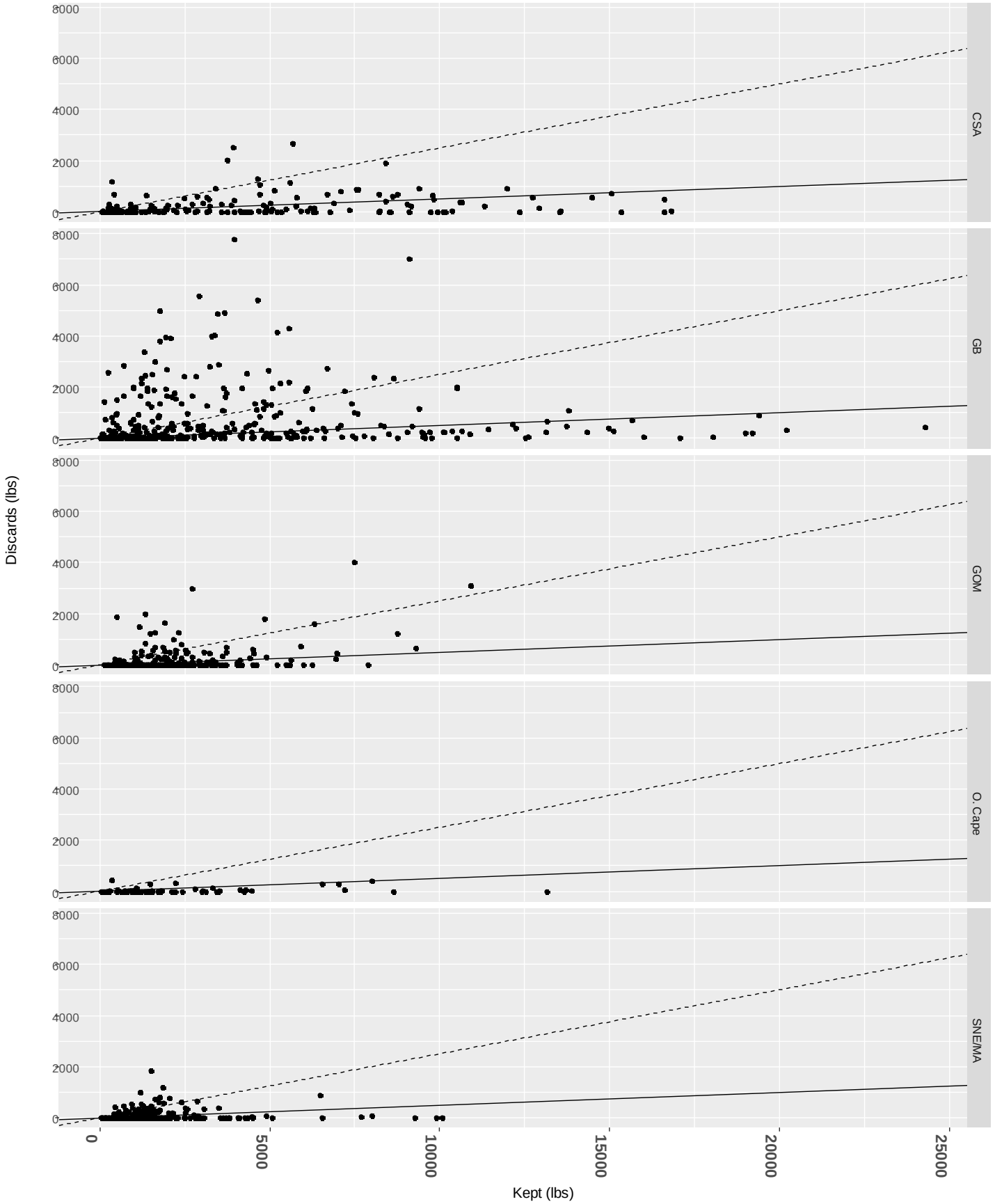


Figure 30. Red hake discard vs. kept by sub-area for observed hauls (each point represents a haul) during 2014-2016. Solid reference line = 5% ratio; dashed reference line = 25% ratio. Sub-area as in Figure 21.



5.2.6.3 Conclusions

Although it appears that the bycatch rate of regulated multispecies is lower in the areas where the raised footrope trawl is required, it is difficult to say whether this lower rate is due to the required gear or the season and area where the fishery is allowed to occur. The gear trials (Carr 1996) strongly suggest that the gear is very effective at reducing flatfish catch and this is corroborated by first-hand experience of fishermen. We do not however have the right type of data available to draw this type of conclusion from the observer data. On the other hand, it appears that the elevated ∑D/∑Kall and D/Kall ratios that exceed the 5% threshold is mainly due to recent strong year-classes of haddock, which it does not appear that the raised footrope trawl addresses. Whether other selective gears, like the experimental large-mesh belly panel net helps reduce bycatch of other potential 'choke' species like red hake will require further investigation.

5.3 Protected Species (including Fish, Sea Turtles, and Marine Mammals)

5.3.1 Species Present in the Area

Protected species are those afforded protections under the Endangered Species Act (ESA; species listed as threatened or endangered under the ESA) and/or the Marine Mammal Protection Act (MMPA). Table 14 provides a list of protected species that occur in the affected environment of the small-mesh multispecies fishery and the potential for the fishery to impact the species, specifically via interactions with fishing gear.

Table 14. Species protected under the ESA and/or MMPA that may occur in the affected environment of the small-mesh multispecies fishery. Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks[1]. Shaded rows indicate species who prefer continental shelf edge/slope waters (i.e., >200 meters).

Species	**Status[2]**	***Potential to interact with small-mesh multispecies fishing gear?***
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***No***
Humpback whale, West Indies DPS, (*Megaptera novaeangliae*)	Protected (MMPA)	No
Fin whale (Balaenoptera physalus)	***Endangered***	***No***
Sei whale (Balaenoptera borealis)	***Endangered***	***No***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter macrocephalus	***Endangered***	***No***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.)[3]	***Protected (MMPA)***	***Yes***
Pygmy sperm whale (*Kogia breviceps*)	Protected (MMPA)	No
Dwarf sperm whale (*Kogia sima*)	Protected (MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes

Species	**Status**[2]	***Potential to interact with small-mesh multispecies fishing gear?***
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Atlantic Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Striped dolphin (*Stenella coeruleoalba*)	Protected (MMPA)	No
Beaked whales (*Ziphius and Mesoplodon spp*)[4]	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[5]	***Protected (MMPA)***	***Yes***
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	No
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Atlantic salmon	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk *(Brosme brosme)*	Candidate	Yes
Alewife (Alosa pseudoharengus)	Candidate	Yes
Blueback herring (Alosa aestivalis)	Candidate	Yes
Critical Habitat		
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA (Protected)	No
North Atlantic Right Whale Critical Habitat	ESA (Protected)	No

Species	Status[2]	*Potential to interact with small-mesh multispecies fishing gear?*

Notes:

[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3 of the MMPA of 1972).

[2] Status is defined by whether the species is listed under the ESA as endangered (i.e. at risk of extinction) or threatened (i.e. at risk of endangerment), or protected under the MMPA. Marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species for which ESA listing may be warranted.

[3] There are 2 species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often referred to as *Globicephala spp*.

[4] There are multiple species of beaked whales in the Northwest Atlantic. They include the cuvier's (*Ziphius cavirostris*), blainville's (*Mesoplodon densirostris*), gervais' (*Mesoplodon europaeus*), sowerbys' (*Mesoplodon bidens*), and trues' (*Mesoplodon mirus*) beaked whales. Species of *Mesoplodon* are difficult to identify at sea, therefore, much of the available characterization for beaked whales is to the genus level only.

[5] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.

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

5.3.2 Protected Species and Critical Habitat Not Likely Affected (via interactions with gear or destruction of essential features of critical habitat) by the small-mesh multispecies fishery

Based on available information, it has been determined that this action is not likely to affect (via interactions with gear or destruction of essential features of critical habitat) multiple ESA listed and/or marine mammal protected species or any designated critical habitat (Table 14). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or there have never been documented interactions between the species and the primary gear type used to prosecute the small-mesh multispecies fishery (i.e., bottom otter trawl (small mesh); Waring *et al.* 2014a, 2015, 2016; Hayes *et al.* 2017; NMFS NEFSC FSB 2015, 2016, 2017; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). In the case of critical habitat, this determination has been made because operation of the small-mesh multispecies fishery will not affect the essential physical and biological features of North Atlantic right whale or loggerhead (NWA DPS) critical habitat and therefore, will not result in the destruction or adverse modification of any species critical habitat (NMFS 2014; NMFS 2015a,b).

5.3.3 Species Potentially Affected by the Proposed Action

Table 14 provides a list of protected species of sea turtle, marine mammal, and fish species present in the affected environment of the small-mesh multispecies fishery, and that may also be affected by the operation of this fishery; that is, have the potential to become entangled or bycaught in the fishing gear used to prosecute the fishery. To aid in the identification of MMPA protected species potentially affected by the action, the MMPA List of Fisheries and marine mammal stock assessment reports for the Atlantic Region were referenced (http://www.nmfs.noaa.gov/pr/sars/region.htm; http://www.nmfs.noaa.gov/pr/interactions/fisheries/lof.html). To aid in identifying ESA listed species potentially affected by the action, the 2013 Biological Opinion issued by NMFS on the operation of seven commercial fisheries, including the multispecies (including small-mesh) FMP, and its impact on ESA listed species was referenced (NMFS 2013). The 2013 Opinion, which considered the best available information on ESA listed species and observed or documented ESA listed species interactions with gear types (e.g., gillnet, bottom trawl, and pot/trap) used to prosecute the seven FMPs, concluded that the seven fisheries may adversely affect, but was not likely to jeopardize the continued existence of any ESA listed species. The Opinion included an incidental take statement (ITS) authorizing the take of specific numbers of ESA listed species of sea turtles, Atlantic salmon, and Atlantic sturgeon[11]. Reasonable and prudent measures and terms and conditions were also issued with the ITS to minimize impacts of any incidental take.

Up until recently, the 2013 Opinion remained in effect; however, new information on North Atlantic right whales has been made available that may reveal effects of the fisheries analyzed in the 2013 Opinion that may not have been previously considered. As a result, per an October 17, 2017, ESA 7(a)(2)/7(d) memo issued by NMFS, the 2013 Opinion has been reinitiated. However, the October 17, 2017, memo concludes that allowing these fisheries to continue during the reinitiation period will not increase the likelihood of interactions with ESA listed species above the amount that would otherwise occur if consultation had not been reinitiated, and therefore, the continuation of these fisheries during the reinitiation period would not be likely to jeopardize the continued existence of any ESA listed species. Until replaced, the multispecies (including small-mesh) FMP is currently covered by the incidental take statement authorized in NMFS 2013 Opinion. It should be noted that while the potential for interactions with right whales and the small-mesh multispecies fishery exists, there has never been an interaction with right whales on trips targeting small-mesh multispecies on any observed trip (see Section 5.3.4.1).

As the primary concern for both MMPA protected and ESA listed species is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) data and observed records of protected species interaction with particular fishing gear types, in order to understand the potential risk of an interaction. Information on species occurrence in the affected environment of the small-mesh multispecies fishery is provided below, while information on protected species interactions with specific fishery gear is provided in Section 5.3.4.

[11] The 2013 Opinion did not authorize take of ESA listed species of whales because (1) an incidental take statement cannot be lawfully issued under the ESA for a marine mammal unless incidental take authorization exists for that marine mammal under the MMPA (see 16 U.S.C. § 1536(b)(4)(C)), and (2) the incidental take of ESA- listed whales by the black seabass fishery has not been authorized under section 101(a)(5) of the MMPA. However, the 2013 BiOp assessed interaction risks to these species and concluded that 7 FMPs assessed, may affect but would not jeopardize the continued existence of any ESA listed species of whales (NMFS 2013).

Sea Turtles

Kemp's ridley, leatherback, the North Atlantic DPS of green and the Northwest Atlantic DPS of loggerhead sea turtle are the four ESA-listed species of sea turtles that occur in the affected environment of the small-mesh multispecies fishery. Three of the four species are hard-shelled turtles (i.e., green, loggerhead, and Kemp's ridley). Additional background information on the range-wide status, descriptions, and life histories of these four species can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant *et al.* 2009; NMFS and USFWS 2013;NMFS and USFWS 2015; Seminoff *et al.* 2015), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS *et al.* 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

A general overview of sea turtle occurrence and distribution in waters of the Northwest Atlantic Ocean is provided below to assist in understanding how the small-mesh multispecies fishery overlaps in time and space with sea turtles. Maps depicting the range wide distribution and occurrence of sea turtles in the Greater Atlantic Region can be found at the following websites: https://www.greateratlantic.fisheries.noaa.gov/protected/section7/listing/index.html; http://marinecadastre.gov/; and, http://seamap.env.duke.edu/.

Hard-Shelled Sea Turtles

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

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

Leatherback Sea Turtles

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

Marine Mammals

Large Cetaceans

Multiple species of whales occur in the Northwest Atlantic, with the minke whale being the only whale species potentially affected by the proposed action (Table 14). In general, large whales, such as minke whales, follow an annual pattern of migration between low latitude (south of 35oN) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41oN; Waring *et al.* 2014, 2015, 2016; Hayes *et al.* 2017; NMFS 1991, 2005, 2010b, 2011a, 2012b). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g. right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Waring *et al.* 2014, 2015, 2016; Hayes *et al.* 2017; Khan *et al.* 2009, 2010, 2011, 2012; Brown *et al.* 2002; NOAA 2008; Cole *et al.* 2013; Clapham *et al.* 1993; Swingle *et al.* 1993; Vu *et al.* 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. As a result, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Mayo and Marx 1990; Kenney *et al.* 1986, 1995; Baumgartner *et al.* 2003; Baumgartner and Mate 2003; Payne *et al.*1986, 1990; Brown *et al.* 2002; Kenney and Hartley 2001; Schilling *et al.* 1992). For additional information on the biology, status, and range wide distribution of whale species, such as the minke whale, please refer to marine mammal stock assessment reports provided at: http://www.nmfs.noaa.gov/pr/sars/region.htm.

To further assist in understanding how the small-mesh multispecies fishery may overlap in time and space with the occurrence of minke whales, a general overview on species occurrence and distribution in the area of operation for the small-mesh multispecies fishery is provided in the following table.

Table 15. Minke occurrence in the affected environment of the small-mesh multispecies fishery.

Species	Prevalence and Approximate Months of Occurrence
Minke	• Widely distributed throughout continental shelf waters (<100m deep) of the Mid-Atlantic (Southern New England included), Gulf of Maine, and Georges Bank. • Most common in the EEZ from spring through fall, with greatest abundance found in New England waters; fall through spring widespread and common in deep-ocean waters.
***Sources*:** Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016; Hayes *et al*. 2017.	

Small Cetaceans

Small cetaceans can be found throughout the year in waters of the Northwest Atlantic Ocean (Waring *et al*. 2014a; Waring et al. 2015; Waring *et al*. 2016; Hayes *et al*. 2017). Within this range, however, there are seasonal shifts in species distribution and abundance. In regards to pinnipeds, species are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. They are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g. harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35ºN) (Waring *et al*. 2007, 2014a, 2015, 2016; Hayes *et al*. 2017).

To further assist in understanding how small-mesh multispecies fishery may overlap in time and space with the occurrence of small cetaceans and pinnipeds, a general overview of species occurrence and distribution in the affected environment of this fishery is provided in the table below

Table 16. Small cetacean and pinniped occurrence in the affected environment of the small-mesh multispecies fishery.

Species	Prevalence and Approximate Months of Occurrence
Atlantic White-Sided Dolphin	• Distributed throughout the continental shelf waters (primarily to 100 meter isobath) of the Mid-Atlantic (north of 35ºN), Southern New England, Georges Bank, and Gulf of Maine; however, most common in continental shelf waters from Hudson Canyon (~ 39ºN) to Georges Bank, and into the Gulf of Maine. • **January-May**: low densities found from Georges Bank to Jeffreys Ledge. • **June-September**: large densities found from Georges Bank through the Gulf of Maine. • **October-December**: intermediate densities found from southern Georges Bank to southern Gulf of Maine. • South of Georges Bank (Southern New England and Mid-Atlantic), low densities found year round, with waters off Virginia and NC representing southern extent of species range during winter months.

Species	Prevalence and Approximate Months of Occurrence
Short-Beaked Common Dolphin	• Regularly found throughout the continental shelf-edge-slope waters (primarily between the 100-2,000 meter isobaths) of the Mid-Atlantic, Southern New England, and Georges Bank (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons). • Less common south of Cape Hatteras, NC, although schools have been reported as far south as the Georgia /South Carolina border. • **January-May**: occur from waters off Cape Hatteras, NC, to Georges Bank (35^{o} to 42^{o}N). • **Mid-summer-fall**: occur primarily on Georges Bank with small numbers present in the Gulf of Maine; Peak abundance found on Georges Bank in the autumn.
Risso's Dolphin	• **Spring through fall**: Distributed along the continental shelf edge from Cape Hatteras, NC, to Georges Bank. • **Winter**: distributed in the Mid-Atlantic Bight, extending into oceanic waters. • Rarely seen in the Gulf of Maine; primarily a Mid-Atlantic continental shelf edge species (can be found year round).
Harbor Porpoise	• Distributed throughout the continental shelf waters of the Mid-Atlantic (north of 35^{o}N), Southern New England, Georges Bank, and Gulf of Maine. • **July-September**: concentrated in the northern Gulf of Maine (waters < 150 meters); low numbers can be found on Georges Bank. • **October-December**: widely dispersed in waters from NJ to Maine; seen from the coastline to deep waters (>1,800 meters). • **January-March**: intermediate densities in waters off NJ to NC; low densities found in waters off NY to Gulf of Maine. • **April-June**: widely dispersed from NJ to ME; seen from the coastline to deep waters (>1,800 meters).

Species	Prevalence and Approximate Months of Occurrence
Bottlenose Dolphin	**Western North Atlantic Offshore Stock** • Distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic from Georges Bank to FL. • Depths of occurrence: ≥40 meters **Western North Atlantic Northern Migratory Coastal Stock** • Warm water months (e.g. July-August): distributed from the coastal waters from the shoreline to approximately the 25-meter isobaths between the Chesapeake Bay mouth and Long Island, NY. • Cold water months (e.g. January-March): stock occupies coastal waters from Cape Lookout, NC, to the NC/VA border. **Western North Atlantic Southern Migratory Coastal Stock** • **October-December**: stock occupies waters of southern NC (south of Cape Lookout) • **January-March**: stock moves as far south as northern FL. • **April-June**: stock moves north to waters of NC. • **July-August**: stock is presumed to occupy coastal waters north of Cape Lookout, NC, to the eastern shore of VA.
Pilot Whales: *Short- and Long-Finned*	**Short-Finned Pilot Whales** • Except for area of overlap (see below), primarily occur south of 40°N • May through December (approximately): distributed primarily near the continental shelf break of the Mid-Atlantic and Southern New England; beginning in the fall, individuals appear to shift to southern waters (i.e., 35°N and south) . **Long-Finned Pilot Whales** • Except for area of overlap (see below), primarily occur north of 42°N. • Winter to early spring : primarily distributed along the continental shelf edge-slope. • Late spring through fall (: movements and distribution shift onto/within Georges Bank, the Great South Channel, and Gulf of Maine. **Area of Species Overlap:** between approximately 38°N and 41°N.
Harbor Seal	• Primarily distributed in waters from NJ to ME; however, increasing evidence indicates that their range is extending into waters as far south as Cape Hatteras, NC (35°N). • **Year Round**: waters of ME • **September-May**: waters from New England to NJ.

Species	Prevalence and Approximate Months of Occurrence
Gray Seal	• Distributed in waters from NJ to ME. • Year Round: waters from ME to MA. • September-May: waters from Rhode Island to NJ.
Harp Seal	• Winter-Spring (approximately January-May): waters from ME to NJ.
Hooded Seal	• Winter-Spring (approximately January-May): waters of New England.

Notes:

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

***Sources*:** Waring *et al*. 1992, 2007**,** 2014a, 2015, 2016; Hayes *et al*. 2017**;** Payne and Heinemann 1993; Payne *et al.* 1984; Jefferson *et al*. 2009.

Atlantic Sturgeon

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. Atlantic sturgeon from all five DPSs have the potential to be located anywhere in this marine range (ASSRT 2007; Dovel and Berggren 1983; Dadswell *et al.* 1984; Kynard *et al.* 2000; Stein *et al.* 2004a; Dadswell 2006; Laney *et al.* 2007; Dunton *et al.* 2010; Dunton *et al.* 2012; Dunton *et al.* 2015; Erickson *et al.* 2011; Wirgin *et al.* 2012, 2015 a, b; O'Leary *et al.* 2014; Waldman *et al.* 2013). Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 meter depth contour (Stein *et al*. 2004 a,b; Erickson *et al*. 2011; Dunton *et al*. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein *et al*. 2004a,b; Dunton *et al*. 2010; Erickson *et al*. 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that some Atlantic sturgeon may undertake seasonal movements along the coast (Erickson *et al.* 2011; Dunton *et al*. 2010; Wipplehauser 2012). For instance, tagging and tracking studies found that satellite-tagged adult sturgeon from the Hudson River concentrated in the southern part of the Mid-Atlantic Bight, at depths greater than 20 meters, during winter and spring, while in the summer and fall, Atlantic sturgeon concentrations shifted to the northern portion of the Mid-Atlantic Bight at depths less than 20 meters (Erickson *et al.* 2011).

Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard (i.e., waters off North Carolina, Chesapeake Bay, and Delaware Bay; New York Bight; Massachusetts Bay; Long Island Sound; and Connecticut and Kennebec River Estuaries); depths in these areas are generally no greater than 25 meters (Bain *et al.* 2000; Savoy and Pacileo 2003; Stein *et al*. 2004a; Laney *et al*. 2007; Dunton *et al*. 2010; Erickson *et al*. 2011; Oliver *et al*. 2013; Waldman *et al.* 2013; O'Leary *et al*. 2014; Wipplehauser 2012; Whipplehauser and Squiers 201). Although additional studies are still needed to clarify why these particular sites are chosen by Atlantic sturgeon, there is some indication that they may serve as thermal refuge, wintering sites, or marine foraging areas (Stein *et al*. 2004a; Dunton *et al*. 2010; Erickson *et al*. 2011).

Atlantic Salmon (Gulf of Maine DPS)

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the Gulf of Maine DPS extends from the Gulf of Maine (primarily northern portion of the Gulf of Maine) to the coast of Greenland (NMFS and USFWS 2005, 2016; Fay *et al*. 2006). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the Gulf of Maine and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay *et al*. 2006; USASAC 2004; Hyvarinen *et al*. 2006; Lacroix and McCurdy 1996; Lacroix *et al*. 2004, 2005; Reddin 1985; Reddin and Short 1991; Reddin and Friedland 1993, Sheehan *et al*. 2012; NMFS and USFWS 2005, 2016; Fay *et al*. 2006). For additional information on the on the biology, status, and range-wide distribution of the Gulf of Maine DPS of Atlantic salmon please refer to NMFS and USFWS 2005, 2016; Fay *et al*. 2006.

5.3.4 Interactions Between Gear and Protected Species

The small-mesh multispecies fishery is prosecuted with small-mesh bottom trawl gear. Protected species described in Section 1.1.2 are all vulnerable to interactions with bottom trawl gear, including small-mesh bottom trawl gear. Available information provided below on protected species serious injury or mortality, or estimated annual interactions is not specific to small-mesh bottom trawl gear, per say, but instead considers bottom trawl effort as a whole to provide an overall risk to a given protected species (or species group) from this gear type, in general.12 However, to provide an idea of the relative interaction risk associated with the small-mesh multispecies fishery, a section is provided that provides information on NEFOP observed interactions with the whiting fishery.

Gear Interactions with Sea Turtles

Bottom Otter Trawl

Sea turtle interactions with bottom trawl gear have been observed on Georges Bank, and in the Mid-Atlantic; however, most of the observed interactions have occurred in the Mid-Atlantic (Warden 2011a,b; Murray 2015). As no sea turtle interactions with bottom trawl gear have been observed in the Gulf of Maine, and few sea turtle interactions have been observed on Georges Bank, there is insufficient data available to conduct a robust model-based analysis on sea turtle interactions with bottom trawl gear in these regions or produce a bycatch estimate for these regions. As a result, the bycatch estimates and discussion below are for bottom trawl gear in the Mid-Atlantic.

Bottom trawl gear poses an injury and mortality risk to sea turtles, specifically due to forced submergence (Sasso and Epperly 2006). Green, Kemp's ridley, leatherback, loggerhead, and unidentified sea turtles have been documented interacting (e.g. bycaught) with bottom trawl gear. However, estimates are available only for loggerhead sea turtles. Warden (2011a,b) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic[13] was 292 (CV=0.13, 95% CI=221-369), with an additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but

12 Overall bottom trawl effort in relation to protected species interactions does take into consideration bottom trawl effort with small mesh gear used in the whiting fishery; see literature cited in sections discussing gear interactions with sea turtles, marine mammals, Atlantic salmon, and Atlantic sturgeon.
13 Warden (2011a) defined the Mid-Atlantic as south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border.

released through a Turtle Excluder Device (TED).14 The 292 average annual observable loggerhead interactions equates to approximately 44 adult equivalents (Warden 2011a,b). Most recently, Murray (2015) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic[15] was 231 (CV=0.13, 95% CI=182-298); this equates to approximately 33 adult equivalents (Murray 2015). Bycatch estimates provided in Warden (2011a) and Murray (2015) are a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated at 616 sea turtles (CV=0.23, 95% CI over the nine-year period: 367-890). This decrease is likely due to decreased fishing effort in high-interaction areas (Warden 2011a, b).

Gear Interactions with Atlantic Sturgeon

Bottom Otter Trawl

Atlantic sturgeon interactions (i.e., bycatch) with bottom trawl gear have been observed since 1989; these interactions have the potential to result in the injury or mortality of Atlantic sturgeon (NMFS NEFSC FSB 2015, 2016, 2017). Three documents, covering three time periods, that use data collected by the Northeast Fisheries Observer Program to describe bycatch of Atlantic sturgeon in bottom trawl gear: Stein *et al.* (2004b) for 1989-2000; ASMFC (2007) for 2001-2006; and Miller and Shepard (2011) for 2006-2010; none of these documents provide estimates of Atlantic sturgeon bycatch by Distinct Population Segment. Miller and Shepard (2011), the most recent of the three documents, analyzed fishery observer data and VTR data in order to estimate the average annual number of Atlantic sturgeon interactions in otter trawl in the Northeast Atlantic that occurred from 2006 to 2010. This timeframe included the most recent, complete data and as a result, Miller and Shepard (2011) is considered to represent the most accurate predictor of annual Atlantic sturgeon interactions in the Northeast bottom trawl fisheries (NMFS 2013).

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

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

15 Murray 2015b defined the Mid-Atlantic as the boundaries of the Mid-Atlantic Ecological Production; roughly waters west of 71°W to the North Carolina/South Carolina border)

Gear Interaction with Atlantic Salmon

Bottom Otter Trawl

Atlantic salmon interactions (i.e., bycatch) with bottom trawl have been observed since 1989; in many instances, these interactions have resulted in the injury and mortality of Atlantic salmon (NMFS NEFSC FSB 2015, 2016, 2017). According to the Biological Opinion issued by NMFS Greater Atlantic Regional Fisheries Office on December 16, 2013, NMFS Northeast Fisheries Science Center's (NEFSC) Northeast Fisheries Observer and At-Sea Monitoring Programs documented a total of 15 individual salmon incidentally caught on more than 60,000 observed commercial fishing trips from 1989 through August 2013 (NMFS 2013; Kocik *et al*. 2014); of those 15 salmon, four were observed caught in bottom trawl gear (Kocik (NEFSC), pers. comm (February 11, 2013) in NMFS 2013).The genetic identity of these captured salmon is unknown; however, the NMFS 2013 Biological Opinion considers all 15 fish to be part of the Gulf of Maine Distinct Population Segment, although some may have originated from the Connecticut River restocking program (i.e., those caught south of Cape Cod, Massachusetts). Since 2013, no additional Atlantic salmon have been observed in bottom trawl gear (NMFS NEFSC FSB 2015, 2016, 2017). Based on the above information, bottom trawl interactions with Atlantic salmon are likely rare (NMFS 2013; Kocik *et al*. 2014).

Gear Interactions with Marine Mammals

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

Large Whales

Bottom Otter
With the exception of one species, there have been no observed interactions with large whales and bottom trawl gear. The one exception is minke whales, which have been observed seriously injured or killed in trawl gear.

To date, bottom trawl interactions have only been observed in the northeast bottom trawl fisheries. From the period of 2008-2012, the estimated annual mortality attributed to this fishery was 7.8 minke whales for 2008 and zero minke whales from 2009-2012; no serious injuries were reported during this time (Waring *et al*. 2015). Based on this information, from 2008-2012, the estimated annual average minke whale mortality and serious injury attributed to the northeast bottom trawl fishery was 1.6 (CV=0.69) whales (Waring *et al*. 2015). Lyssikatos (2015) estimated that from 2008-2013, mean annual serious injuries and mortalities from the northeast bottom trawl fishery were 1.40 (CV=0.58) minke whales. Serious injury and mortality records for minke whales in U.S. waters from 2010-2014 showed zero interactions with bottom trawl (northeast or Mid-Atlantic) gear (Henry *et al*. 2016; Hayes *et al*. 2017).

Based on above information, bottom trawl gear is likely to pose a low interaction risk to any large whale species. Should an interaction occur, serious injury or mortality to any large whale is possible; however, relative to other gear types, such as fixed gear, trawl gear represents a low source serious injury or mortality to any large whale (Henry *et al*. 2016; Hayes *et al*. 2017).

Small Cetaceans and Pinnipeds

Bottom Trawl Gear

Small cetaceans and pinnipeds are vulnerable to interactions with bottom trawl gear (Read *et al*. 2006; Waring *et al*. 2014a; Waring *et al*. 2015; Waring *et al*. 2016; Hayes *et al*. 2017; 82 FR 3655 (January 12, 2017)).16 Based on the most recent five years of observer data (2010-2014), The table below provides a list of species that have been observed (incidentally) seriously injured and/or killed by List of Fisheries Category II bottom trawl fisheries that operate in the affected environment of the small-mesh multispecies fishery(Hayes *et al*. 2017; 82 FR 3655 (January 12, 2017)). Lyssikatos (2015) provided total annual bycatch mortality in Northeast and Mid-Atlantic commercial bottom trawl trips (considers all FMPs) from 2008-2013. The highest annual bycatch mortality in bottom trawl gear (Northeast and Mid-Atlantic combined) was observed for short beaked common dolphins, followed by Atlantic white-sided dolphins, gray seals, risso's dolphins, long-finned pilot whales, bottlenose dolphins, harbor seals, harbor porpoise, and harp seals (Lyssikatos 2015).

Table 17. Small cetacean and pinniped species observed seriously injured and/or killed by Category trawl fisheries in the affected environment of the small-mesh multispecies fishery.

Fishery	**Category**	**Species Observed or reported Injured/Killed**
Northeast Bottom Trawl	II	Harp seal
		Harbor seal
		Gray seal
		Long-finned pilot whales
		Short-beaked common dolphin
		White-sided dolphin
		Harbor porpoise
		Bottlenose dolphin (offshore)
		Risso's dolphin
Mid-Atlantic Bottom Trawl	II	White-sided dolphin
		Short-beaked common dolphin
		Risso's dolphin
		Bottlenose dolphin (offshore)
		Gray seal
		Harbor seal
Sources: Hayes *et al*. 2017; MMPA LOF 82 FR 3655 (January 12, 2017).		

In 2006, based on observed mid-water trawl interactions with long-finned pilot whales, short -finned pilot whales, common dolphins, and white sided dolphins, the Atlantic Trawl Gear Take Reduction Team (ATGTRT) was convened to address the incidental mortality and serious injury of these species incidental

16 For additional information on small cetacean and pinniped interactions prior to those provided in Waring et al. 2014a, see: http://www.nmfs.noaa.gov/pr/sars/region.htm

to bottom and mid-water trawl fisheries operating in both the New England and Mid-Atlantic regions. Because none of the marine mammal stocks of concern to the ATGTRT are classified as a "strategic stock", nor do they currently interact with a Category I fishery,17 it was determined that development of a take reduction plan was not necessary. In lieu of a take reduction plan, the ATGTRT agreed to develop an Atlantic Trawl Gear Take Reduction Strategy (ATGTRS). The ATGTRS identifies informational and research tasks, as well as education and outreach needs the ATGTRT believes are necessary to provide the basis for decreasing mortalities and serious injuries of marine mammals to insignificant levels approaching zero. The ATGTRS also identifies several voluntary measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals.18

5.3.4.1 Observed Protected Species Interactions with the Whiting Fishery

The information provided in Table 18 and Map 5 are based on NEFOP observed protected species interactions with trips targeting or landing whiting, with small-mesh bottom trawl gear, over the last 10 years (i.e., 2007-2016). From 2007-2016, a total of 24 protected species interactions were observed in the whiting fishery, with interactions occurring primarily with common dolphins (i.e., 20/24 observed interactions). In addition, over the 10 years of observed interactions with protected species, there was no significant trend in time of year in which interactions were observed (i.e., interactions were observed year-round).

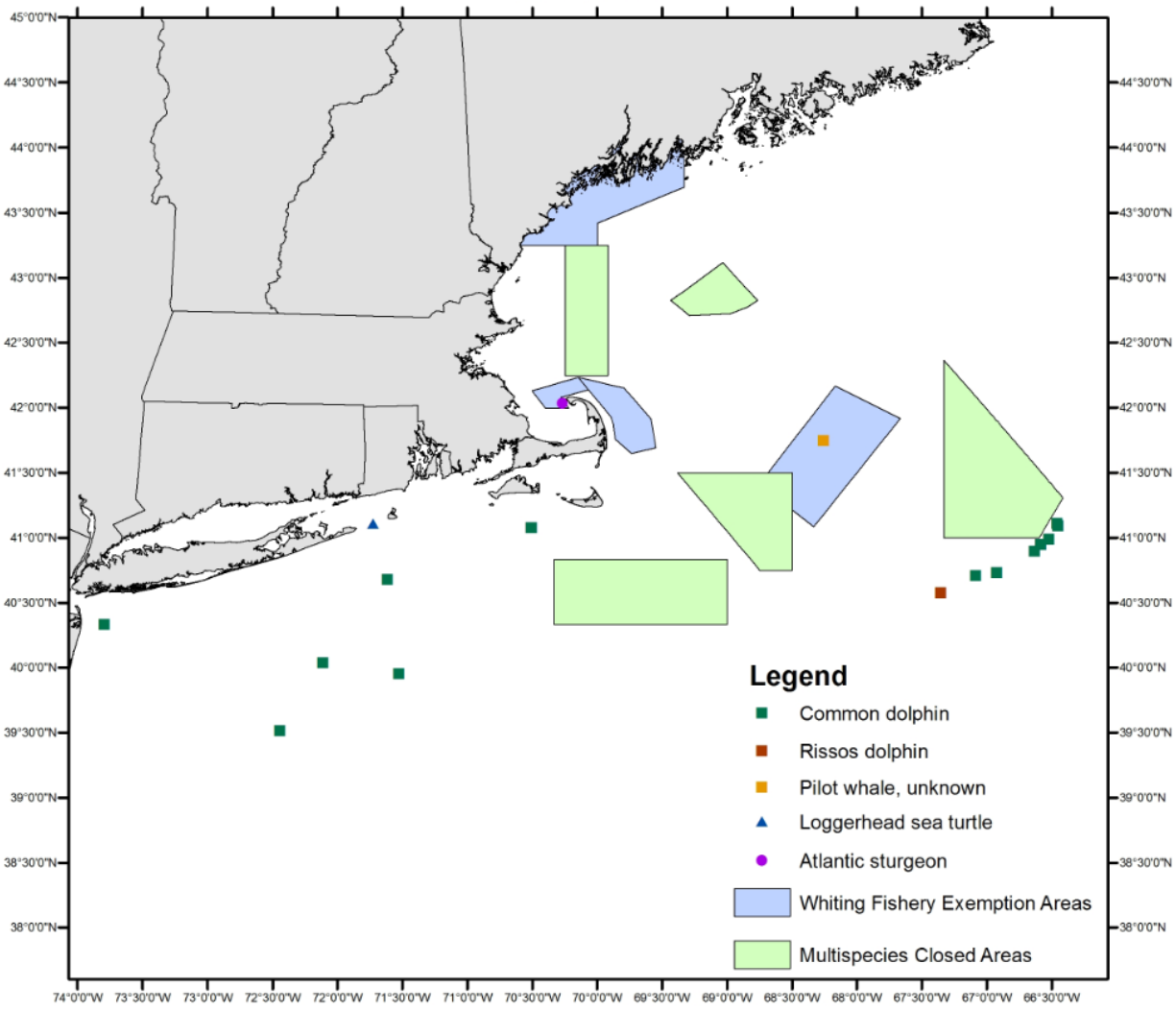
17 Category I fisheries have frequent incidental mortality and serious injury of marine mammals.

18 For additional details on the ATGTRS, visit: http://www.greateratlantic.fisheries.noaa.gov/Protected/mmp/atgtrp/

Table 18. Observed Protected Species Interactions with the Whiting Fishery from 2007-2016

Species	Number of Interactions Observed
Common Dolphin	20
Pilot Whale (spp)	1
Risso's Dolphin	1
Atlantic Sturgeon	1
Loggerhead Sea Turtle	1
Total	24

Map 5. Observed takes of protected species in the small-mesh multispecies fishery.



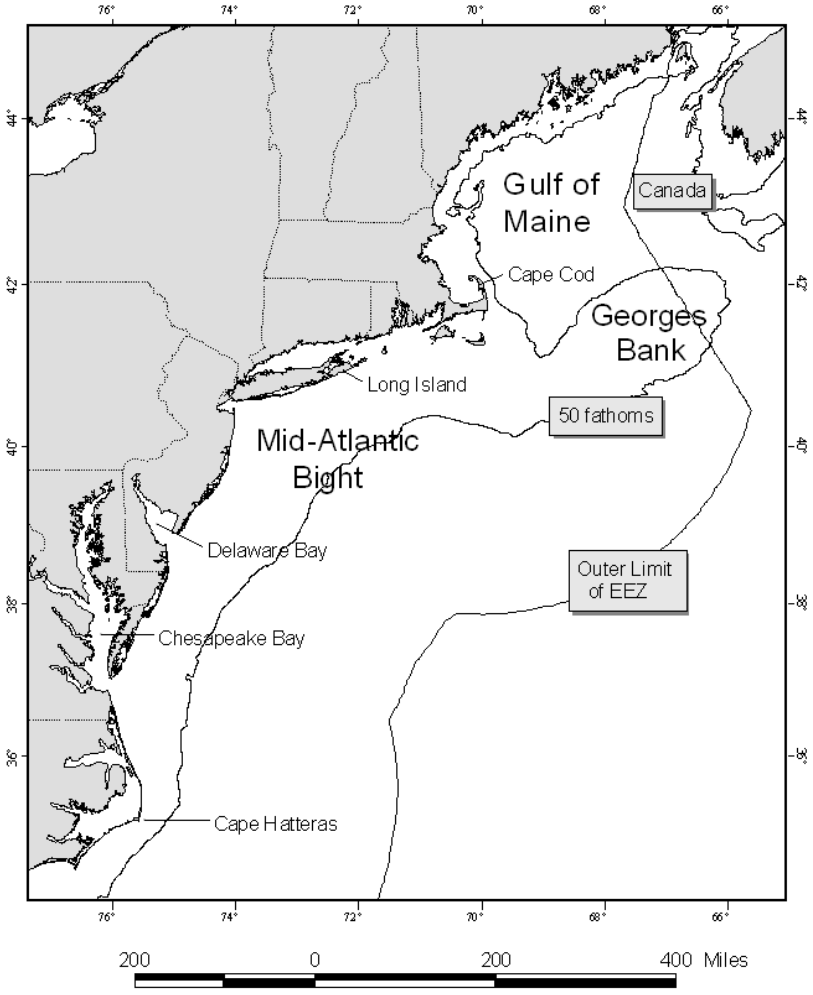
5.4 Physical Environment and EFH

5.4.1 Physical environment 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 (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. 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 small-mesh multispecies fishery occurs throughout the Mid-Atlantic Bight, the Gulf of Maine, and Georges Bank (Map 6). The following paragraphs contains additional habitat information about these regions.

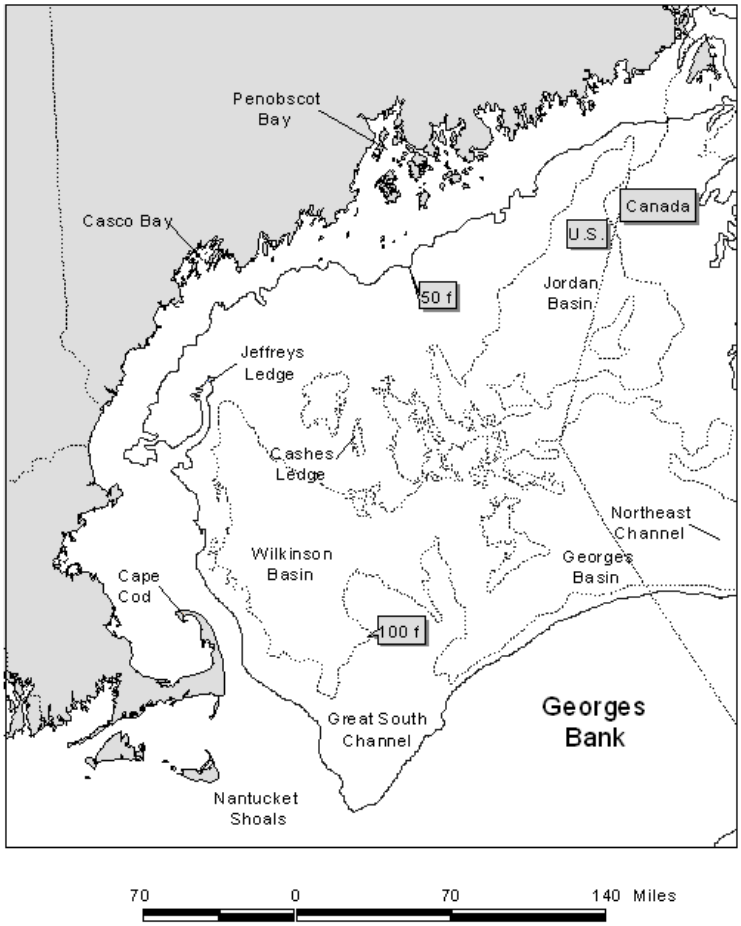
Map 6. Northeast U.S. Shelf.



5.4.1.1 Gulf of Maine

The Gulf of Maine is bounded on the east by Browns Bank, on the north by the Nova Scotia (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank (Map 7). The Gulf of Maine is a boreal environment characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. There are 21 distinct basins separated by ridges, banks, and swells. Depths in the basins exceed 820 ft. (250 m), with a maximum depth of 1,148 ft (350 m) in Georges Basin, just north of Georges Bank. High points within the Gulf of Maine include irregular ridges, such as Cashes Ledge, which peaks at 30 ft (9 m) below the surface.

Map 7. Gulf of Maine. Source: Stevenson et al. (2004).



The Gulf of Maine is an enclosed coastal sea that was glacially derived and contains a system of deep basins, moraines, and rocky protrusions. The Gulf of Maine is topographically diverse from the rest of the continental border of the U.S. Atlantic coast. Very fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the seafloor of the Gulf of Maine, particularly in its deep basins. These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains, although localized rocky features are present, for example in Jordan Basin (see the Council's Draft Deep-Sea Coral Amendment). In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, sand predominates on some high areas, and gravel, sometimes with boulders, predominates others. Bedrock is

the predominant substrate along the western edge of the Gulf of Maine, north of Cape Cod in a narrow band out to a water depth of about 197 ft. (60 m). Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Gravel, often mixed with shell, is common adjacent to bedrock outcrops and in fractures in the rock. Gravel is most abundant at depths of 66 - 131 ft. (20 - 40 m), except off eastern Maine where a gravel-covered plain exists to depths of at least 328 ft. (100 m). Sandy areas are relatively rare along the inner shelf of the western Gulf of Maine, but are more common south of Casco Bay, especially offshore of sandy beaches (Stevenson, et al. 2004).

The geologic features of the Gulf of Maine, coupled with the vertical variation in water properties (e.g., salinity, depth, temperature), provide a great diversity of habitat types that support a rich biological community. To illustrate this, a brief description of benthic invertebrates and demersal (i.e., bottom-dwelling) fish that occupy the Gulf of Maine is provided below. Additional information is provided in Stevenson et al. (2004), which is incorporated by reference.

The most common groups of benthic invertebrates in the Gulf of Maine reported by Theroux and Wigley (1998) in terms of numbers collected were annelid worms, bivalve mollusks, and amphipod crustaceans. Bivalves, sea cucumbers, sand dollars, annelids, and sea anemones dominated biomass. Watling (1998) identified seven different bottom assemblages that occur on the following habitat types:

1. Sandy offshore banks: fauna are characteristically sand dwellers with an abundant interstitial component;
2. Rocky offshore ledges: fauna are predominantly sponges, tunicates, bryozoans, hydroids, and other hard bottom dwellers;
3. Shallow [<197 ft. (60 m)] temperate bottoms with mixed substrate: fauna population is rich and diverse, primarily comprised of polychaetes and crustaceans;
4. Primarily fine muds at depths of 197 - 459 ft. (60 - 140 m) within cold Gulf of Maine Intermediate Water: fauna are dominated by polychaetes, shrimp, and cerianthid anemones;
5. Cold deep water, muddy bottom: fauna include species with wide temperature tolerances which are sparsely distributed, diversity low, dominated by a few polychaetes, with brittle stars, sea pens, shrimp, and cerianthids also present;
6. Deep basin, muddy bottom, overlaying water usually 45 - 46°F (7 - 8°C): fauna densities are not high, dominated by brittle stars and sea pens, and sporadically by tube-making amphipods; and
7. Upper slope, mixed sediment of either fine muds or mixture of mud and gravel, water temperatures always >46°F (8°C): upper slope fauna extending into the Northeast Channel.

Two studies (Gabriel 1992; Overholtz & Tyler 1985) reported common demersal fish species by assemblages in the Gulf of Maine and Georges Bank:

- Deepwater/Slope and Canyon: offshore hake, blackbelly rosefish, Gulf stream flounder;
- Intermediate/Combination of Deepwater Gulf of Maine-Georges Bank and Gulf of Maine-Georges Bank Transition: silver hake, red hake, goosefish (monkfish);
- Shallow/Gulf of Maine-Georges Bank Transition Zone: Atlantic cod, haddock, pollock;
- Shallow water Georges Bank-southern New England: yellowtail flounder, windowpane flounder, winter flounder, winter skate, little skate, longhorn sculpin;
- Deepwater Gulf of Maine-Georges Bank: white hake, American plaice, witch flounder, thorny skate; and
- Northeast Peak/Gulf of Maine-Georges Bank Transition: Atlantic cod, haddock, pollock.

5.4.1.2 Georges Bank

Georges Bank is a shallow (10 - 492 ft. [3 - 150 m]), elongated (100 mi.(161 km) wide by 20 mi (322 km) long) extension of the continental shelf that was formed during the Wisconsinian glacial episode. It has a steep slope on its northern edge, a broad, flat, gently sloping southern flank, and steep submarine canyons on its eastern and southeastern edges. It has highly productive, well-mixed waters and strong currents. The Great South Channel lies to the west. Natural processes continue to erode and rework the sediments on Georges Bank. Erosion and reworking of sediments by the action of rising sea level as well as tidal and storm currents may reduce the amount of sand and cause an overall coarsening of the bottom sediments (Valentine & Lough 1991).

Bottom topography on eastern Georges Bank consists of linear ridges in the western shoal areas; a relatively smooth, gently dipping seafloor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 m high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin. The central region of Georges Bank is shallow, and the bottom has shoals and troughs, with sand dunes superimposed within. The area west of the Great South Channel, known as Nantucket Shoals, is similar in nature to the central region of Georges Bank. Currents in these areas are strongest where water depth is shallower than 164 ft. (50 m). Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm-generated ripples, and scattered shell and mussel beds. Tidal and storm currents range from moderate to strong, depending upon location and storm activity.

Oceanographic frontal systems separate the water masses of the Gulf of Maine and Georges Bank from oceanic waters south of Georges Bank. These water masses differ in temperature, salinity, nutrient concentration, and planktonic communities. These differences influence productivity and may influence fish abundance and distribution.

Georges Bank has historically had high levels of both primary productivity and fish production. The most common groups of benthic invertebrates on Georges Bank in terms of numbers collected were amphipod crustaceans and annelid worms, while sand dollars and bivalves dominated the overall biomass (Theroux & Wigley 1998). Using the same database, Theroux and Grosslein (1987) identified four macrobenthic invertebrate assemblages that occur on similar habitat type:

1. The Western Basin assemblage is found in comparatively deep water (492 - 656 ft. [150 - 200 m]) with relatively slow currents and fine bottom sediments of silt, clay, and muddy sand. Fauna are comprised mainly of small burrowing detritivores and deposit feeders, and carnivorous scavengers.
2. The Northeast Peak assemblage is found in variable depths and current strength and includes coarse sediments, consisting mainly of gravel and coarse sand with interspersed boulders, cobbles, and pebbles. Fauna tend to be sessile (coelenterates, brachiopods, barnacles, and tubiferous annelids) or free-living (brittle stars, crustaceans, and polychaetes), with a characteristic absence of burrowing forms.
3. The Central Georges Bank assemblage occupies the greatest area, including the central and northern portions of Georges Bank in depths <328 ft. (100 m). Medium-grained shifting sands predominate this dynamic area of strong currents. Organisms tend to be small to moderately large with burrowing or motile habits. Sand dollars are most characteristic of this assemblage.
4. The Southern Georges Bank assemblage is found on the southern and southwestern flanks at depths from 262 - 656 ft. (80 - 200 m), where fine-grained sands and moderate currents predominate. Many southern species exist here at the northern limits of their range. Dominant fauna include amphipods, copepods, euphausiids, and starfish.

Common demersal fish species in Georges Bank are offshore hake, blackbelly rosefish, Gulf Stream flounder, silver hake, red hake, goosefish (monkfish), Atlantic cod, haddock, pollock, yellowtail flounder, windowpane flounder, winter flounder, winter skate, little skate, longhorn sculpin, white hake, American plaice, witch flounder, and thorny skate.

5.4.1.3 Southern New England/Mid-Atlantic Bight

The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank south to Cape Hatteras, and east to the Gulf Stream. The northern portion of the Mid-Atlantic Bight is sometimes referred to as southern New England. It generally includes the area of the continental shelf south of Cape Cod from the Great South Channel to Hudson Canyon. The Mid-Atlantic Bight consists of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, North Carolina. The shelf slopes gently from shore out to 62 - 124 ft (100 - 200 km) offshore, where it transforms to the slope (328 - 656 ft. [100 - 200 m water depth]) at the shelf break. In both the Mid-Atlantic Bight and on Georges Bank, numerous canyons incise the slope, and some cut up onto the shelf itself (Stevenson, et al. 2004). Like the rest of the continental shelf, sea level fluctuations during past ice ages largely shaped the topography of the Mid-Atlantic Bight. Since that time, currents and waves have modified this basic structure.

At Cape Hatteras, the shelf extends seaward approximately 33 km, then widens gradually to 113 km off New Jersey and Rhode Island. 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 sediment type covering most of the shelf in the Mid-Atlantic Bight is sand, with some relatively small, localized areas of sand-shell and sand-gravel. Silty sand, silt, and clay predominate on the slope. Permanent sand ridges occur in groups with heights of about 33 ft. (10 m), lengths of 6 - 31 mi (10 - 50 km), and spacing of 1 mi (2 km). The sand ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Sand waves are usually found in patches of 5 - 10 with heights of about 7 ft. (2 m), lengths of 164 - 328 ft. (50 - 100 m), and 0.6 - 1 mi (1 - 2 km) between patches. Sand waves are temporary features that form and re-form in different locations. They usually occur on the inner shelf, especially in areas like Nantucket Shoals where there are strong bottom currents. Because tidal currents southwest of Nantucket Shoals and southeast of Long Island and Rhode Island slow significantly, there is a large mud patch on the seafloor where silts and clays settle out.

Artificial reefs are another important Mid-Atlantic Bight habitat. Artificial reefs formed much more recently on the geologic time scale than other regional habitat types. These localized areas of hard structure have been formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle & Zetlin 2000). In general, reefs are important for attachment sites, shelter, and food for many species. In addition, fish predators, such as tunas, may be drawn by prey aggregations or may be behaviorally attracted to the reef structure. Estuarine reefs, such as blue mussel beds or oyster reefs, are dominated by epibenthic organisms, as well as crabs, lobsters, and sea stars. These reefs are hosts to a multitude of fish, including gobies, spot, bass (black sea and striped), perch, toadfish, and croaker. Coastal reefs consist of exposed rock, wrecks, kelp, or other hard material. Boring mollusks, algae, sponges, anemones, hydroids, and coral generally dominate these coastal reefs. These reef types also host lobsters, crabs, sea stars, and urchins, as well as a multitude of fish, including; black sea bass, pinfish, scup, cunner, red hake, gray triggerfish, black grouper, smooth dogfish, and summer flounder. These epibenthic organisms and fish assemblages are similar to the reefs farther offshore, which generally consist of rocks and boulders, wrecks, and other types of artificial reefs. There is less information available for reefs on the outer shelf, but the fish species associated with these reefs include tilefish, white hake, and conger eel.

In terms of numbers, amphipod crustaceans and bivalve mollusks dominate the benthic inhabitants of this primarily sandy environment. Mollusks (70%) dominate the biomass (Stevenson, et al. 2004). Pratt (1973) identified three broad faunal zones related to water depth and sediment type:

1. The "sand fauna" zone is dominated by polychaetes and was defined for sandy sediments (≤1% silt) that are at least occasionally disturbed by waves, from shore out to a depth of about 164 ft. (50 m).
2. The "silty sand fauna" zone is dominated by amphipods and polychaetes and occurs immediately offshore from the sand fauna zone, in stable sands containing a small amount of silt and organic material.
3. Silts and clays become predominant at the shelf break and line the Hudson Shelf Valley supporting the "silt-clay fauna."

While substrate is the primary factor influencing demersal species distribution in the Gulf of Maine and Georges Bank, latitude and water depth are the primary influence in the Mid-Atlantic Bight area.

Colvocoresses and Musick (1984) identified the following assemblages in the Mid-Atlantic sub region during spring and fall.

- Northern (boreal) portions: hake (white, silver, red), goosefish (monkfish), longhorn sculpin, winter flounder, little skate, and spiny dogfish;
- Warm temperate portions: black sea bass, summer flounder, butterfish, scup, spotted hake, and northern sea robin;
- Water of the inner shelf: windowpane flounder;
- Water of the outer shelf: fourspot flounder; and
- Water of the continental slope: shortnose greeneye, offshore hake, blackbelly rosefish, and white hake.

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.

5.4.2 Essential fish habitat

Essential Fish Habitat (EFH) includes those waters and substrate necessary for spawning, breeding, feeding, and growth to maturity. The 1998 Omnibus Essential Fish Habitat Amendment 1 (NEFMC 1998; also as Amendment 11 to the Northeast Multispecies FMP) described and identified the essential fish habitat (EFH) for silver and red hake. EFH Amendment 1 addressed all elements required by the EFH provisions of the 1996 Sustainable Fisheries Act. These include the description and identification EFH, the identification of threats to EFH from fishing and non-fishing activities, and the development of conservation and enhancement measures to protect EFH. EFH for offshore hake was described and identified in Amendment 12 to the Northeast Multispecies FMP in 2000. Amendment 13 to the Northeast Multispecies FMP (NEFMC 2004) updated the EFH conservation measures in the plan, but not the designations themselves.

In 2004, the Council initiated an update to the EFH Amendment, Omnibus EFH Amendment 2 (OHA2). This amendment was approved by the Council in June 2015. It includes revised EFH designations for all the species managed by the Council, an assessment of fishing and non-fishing impacts for all the gears used in NEFMC-managed fisheries, and updated management measures to conserve EFH. The new EFH designations were approved by NMFS on January 3 2018. The new EFH maps for silver and red hake are based on state and NEFSC trawl survey data through 2005 and data for a number of inshore estuaries, with juvenile distributions used as a proxy for the egg and larval lifestages. Offshore hake EFH for eggs and larvae are based on egg and larval survey data, and the combined juvenile and adult designation map includes areas with high catch rates in the trawl survey. Hake EFH designations also include the continental slope to a depth of 400 m (juvenile and adult silver hake) or 750 m (adult red hake, juvenile and adult offshore hake), beyond the depth covered by the trawl survey. Hake EFH includes both inshore and offshore areas, typically with soft sediments and some sort of structure such as biogenic depressions or sand waves. Depending on the lifestage, hakes may occur on the seabed, or in the water column. Interactive maps of EFH for each species and life stage are available on NOAA EFH Mapperhttp://www.habitat.noaa.gov/protection/efh/efhmapper/index.html. The mapper will be up-dated to reflect changes proposed in OHA2. Additional details are provided in Volume 2 (designations), Appendix A (designation methods), and Appendix B (supplementary information) of Omnibus Habitat Amendment 2 (http://www.nefmc.org/library/omnibus-habitat-amendment-2).

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[19]; Northeast Skate Complex; Atlantic Herring; Summer Flounder, Scup, and Black Sea Bass; Tilefish; Atlantic Mackerel, Squid, and Butterfish; Bluefish; Spiny Dogfish; and Atlantic Surfclam and Ocean Quahog Fishery Management Plans. EFH for many of the species managed under these FMPs includes a wide variety of benthic habitats in state and federal waters throughout the Northeast U.S. Shelf Ecosystem. For more information on the geographic area, depth, and EFH description for each applicable life stage of these species, the reader is referred to OHA2 for New England-managed species, and various Mid-Atlantic FMPs for summer flounder/scup/black sea bass, tilefish, mackerel/squid/butterfish, spiny dogfish, and clams.[20]

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

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

5.4.3 Gear impacts from the small-mesh multispecies fishery

The small-mesh multispecies fishery is primarily a trawl fishery. Omnibus EFH Amendment 2 and previous Council actions have found that bottom trawls can cause adverse, i.e. more than minimal and not temporary, impacts to EFH. Specifically, Omnibus EFH Amendment 1 (NEFMC 1999) found that "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". These findings were confirmed by the adverse effects assessment for Omnibus EFH Amendment 2 (NEFMC 2017).

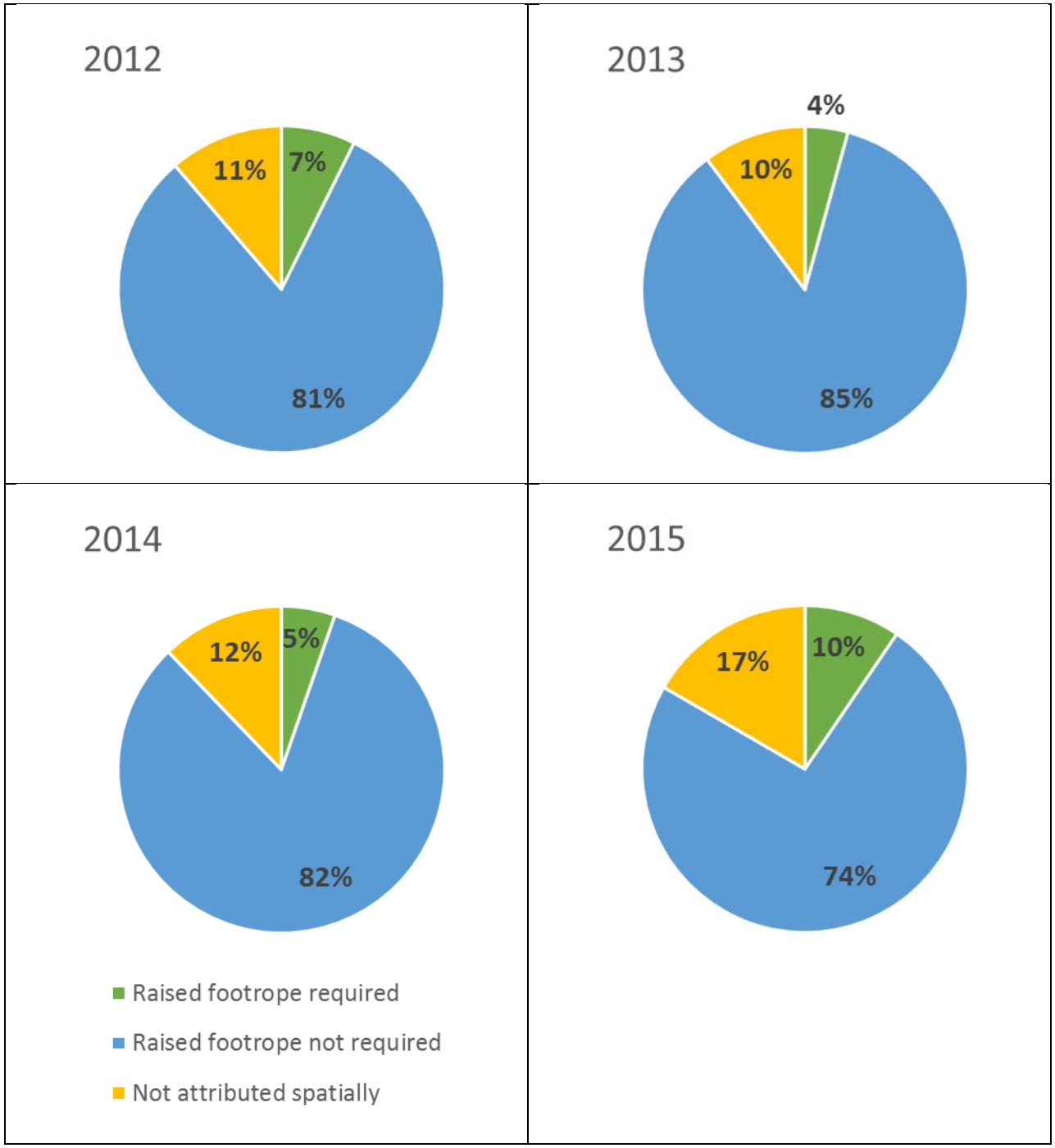
The Omnibus EFH Amendment 2 approach to evaluating adverse effects to EFH was based on two principles: (1) seabed habitat vulnerability to fishing effects varies spatially, due to variations in seabed substrates, energy regimes, living and non-living seabed structural features, etc., between areas and (2) the magnitude of habitat impacts is based on the amount of time that fishing gear spends in contact with the seabed. This seabed area swept (seabed contact time) is grossly related to the amount of time spent fishing, although it will of course vary depending on catch efficiency, gear type used, and other factors.

It is important to keep in mind that whiting fishing is spatially concentrated relative to some other fisheries, restricted by exemption area regulations and by availability of commercial concentrations of fish. It is likely that any changes in fishing effort will occur in the same general areas that are currently fished. While the intensity of fishing could change due to a limited entry program and any associated changes in possession limits and permit conditions, it is not likely that fishing will expand into new areas in the absence of other changes to the management program, specifically new or spatially expanded exemption areas.

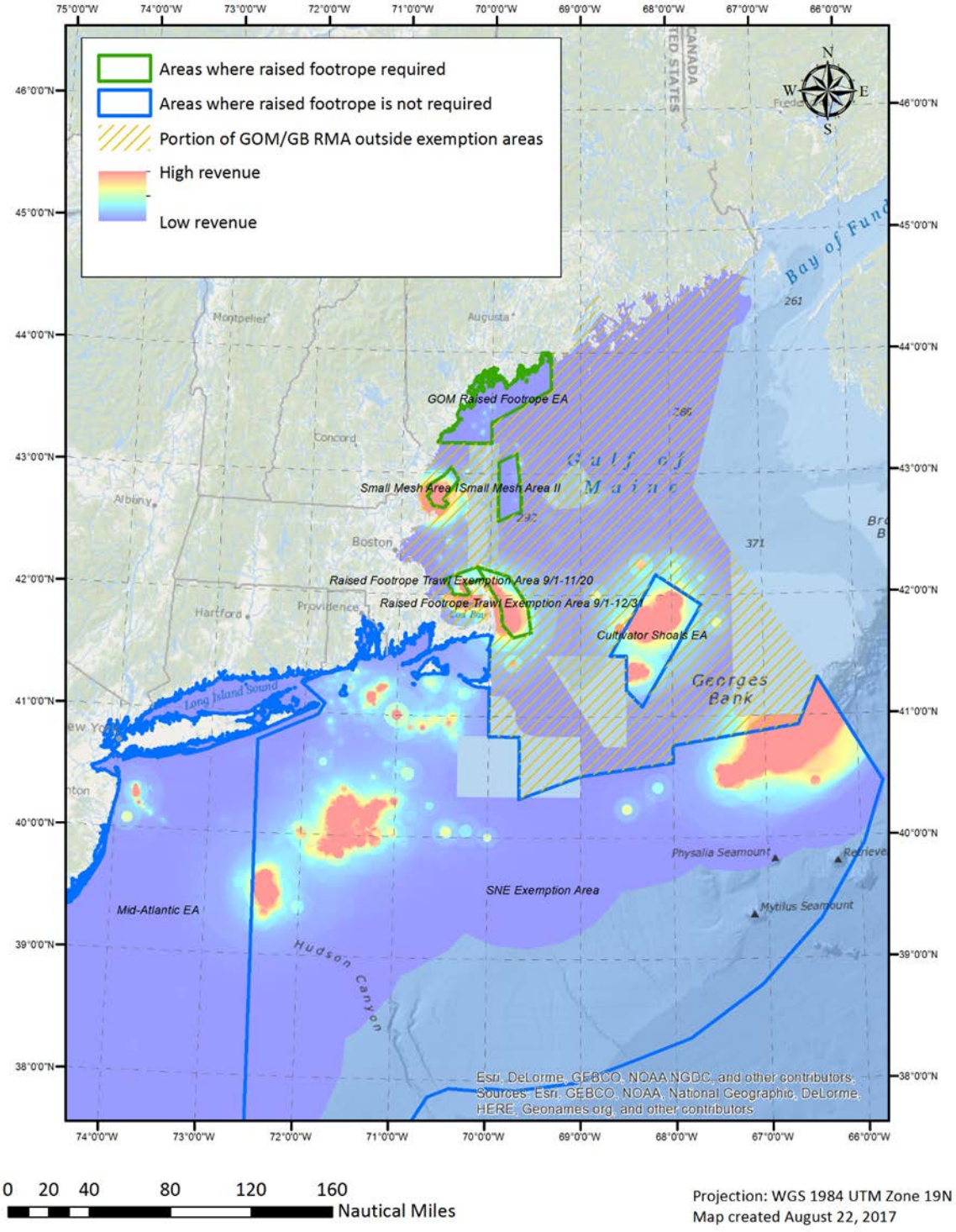
Use of small-mesh trawls to target whiting and red hake are restricted to specific exemption areas and seasons (see Map 1 and also Map 9 to Map 11), mostly to minimize the bycatch of regulated, large-mesh multispecies. Raised footropes are required on the bottom trawls used in the following exemption areas: GOM Grate Raised Footrope, Small Mesh Area 1, Small Mesh Area 2, and the two Raised Footrope Trawl Exempted Whiting Fishery Areas. Raised footropes are not required in the Cultivator Shoals Exemption Area, or in the Southern New England or Mid-Atlantic Regulated Mesh Areas. These raised footrope trawls minimize catches of flatfish (flounders, monkfish, and skates). As compared to bottom trawls outfitted with rollers or rockhoppers along the footrope, raised footrope trawls have less contact with the seabed along the sweep, and therefore have lower impacts to the seafloor. Even within the exemption areas, small-mesh multispecies fishing is usually confined to a specific area where whiting and red hake are most abundant, often over sand and muddy sand bottoms. Thus, gear impacts on EFH in the small-mesh multispecies fishery are likely to be considerably less problematic than for trawl fisheries operating in other areas to target groundfish, skates, and monkfish.

Most whiting revenues, and by extension, most whiting fishing effort and swept area, are from areas that do not require a raised footrope trawl (Figure 31). This conclusion was reached by summing fishery revenue within groups of exemption areas and regulated mesh areas using the Zonal Statistics by Table tool in the Spatial Analyst extension to ArcMap 10.5. Whiting revenues were attributed spatially according to a statistical model that combines vessel trip report positions with information about the spatial footprint of each trip, derived from at sea observer data (DePiper 2014). Vessel trip reports in the whiting fishery, as in other fisheries, report an average fishing location for each trip, and do not report fishing according to exemption area. Because these VTR positions are uncertain, and the statistical model is only an estimate, between 10-17% of annual revenues do not overlap any whiting exemption areas. Map 11 shows 2015 revenues relative to exemption areas as an example.

Figure 31. Whiting revenues from areas where raised footrope trawls are required (green), vs. not required (blue), calendar years 2012-2015. Some effort was not attributed to any exemption areas (yellow). See text for explanation of methods.



Map 8. Whiting revenue and small mesh exemption areas, calendar year 2015. Revenue approaches zero in the dark blue shaded areas. Exemption areas are color-coded by requirement for raised footrope trawl. Source: calendar year 2015 vessel trip report data.



5.5 Human Environment

Amendment 22 considers and evaluates the effect management alternatives may have on people's economy, way of life, traditions, and community. These social and economic impacts may be driven by changes in fishery flexibility, opportunity, stability, certainty, safety, and/or other factors. While it is possible that social and economic impacts could be solely experienced by individuals, it is more likely that impacts would be experienced across communities, gear types, and/or vessel size classes.

Summarized here are the fisheries and human communities most likely to be impacted by the Alternatives under Consideration. Social, economic and fishery information presented herein is useful in describing the response of the fishery to past management actions and predicting how the Amendment 22 alternatives may affect human communities. Additionally, this section establishes a descriptive baseline for the fishery with which to compare actual and predicted future changes that result from management actions.

5.5.1 Permits

5.5.1.1 Permit holdings

Vessels fishing for small-mesh multispecies in an exemption program must possess either an open access (Category K) or limited access (Categories A-F) NE multispecies permit. Small-mesh multispecies fishermen hold a range of other federal permits (Table 19).

Table 19. List of permits held by small-mesh multispecies fishermen

Permit Code/Description		Permit Code/Description	
Groundfish Permits		LOA1	AMERICAN LOBSTER-TRAP-AREA1-2001
A	Individual Limited Access	LOA2	AMERICAN LOBSTER-TRAP-AREA2-2001
B	Fleet Limited Access	LOA3	AMERICAN LOBSTER-TRAP-AREA3-2001
C	Small Vessel	LOA4	AMERICAN LOBSTER-TRAP-AREA4-2001
D	Hook	LOA5	AMERICAN LOBSTER-TRAP-AREA5-2001
E	Combination	LOA5W	LOBSTER AREA5 TRAP WAIVER - 2002
F	Individual Large Mesh	LOA6	AMERICAN LOBSTER-TRAP-AREA6-2001
G	Fleet Large Mesh	LOAOC	AMER LOB-TRAP-OUTER CAPE-2001
H	Open Handgear	MNKA	MONKFISH - CATEGORY A - 2000
I	Charter/Party	MNKB	MONKFISH - CATEGORY B - 2002
J	Possion limit for scallop Limited Access Permit	MNKC	MONKFISH - CATEGORY C - 2002
K	Non-regulated	MNKD	MONKFISH - CATEGORY D - 2002
HA	Open Handgear A	MNKE	MONKFISH - INCIDENTAL CAT E-2002
HB	Open Handgear B	MNKF	MONK-OFFSHORE-CAT F-2005
		MNKH	MONK-SO. 38 20' N-CAT H-2005
Other Permits		RCBA	RED CRAB - INCIDENTAL BYCATCH
FLS1	SUMMER FLOUNDER-COMMERCIAL-1996	SCP1	SCUP-COMMERCIAL MORATORIUM-2002
FLS2	SUMMER FLOUNDER-CHART/PARTY-1996	SCP2	SCUP - CHARTER/PARTY - 1999
HRGA	HERRING - ALL AREAS LIMITED ACCESS - 2007	SF1	SURF CLAM/OCEAN QUAHOG-1988
HRGB	HERRING-AREAS 2 AND 3 LIMITED ACCESS-2007	SMB1	SQUID/MACK/BUTT-COMMERCIAL-1995
HRGC	HERRING - LIMITED ACCESS INCIDENTAL -2007	SMB2	SQUID/MACK/BUTT-CHARTER-1988
HRGD	HERRING-OPEN ACCESS POSSESSION LIMIT-2007	SMB3	SQUID/BUTTERFSH-INCIDENTAL-2002
LO1	AMER LOBSTER-COMMERCIAL	SMB4	ATLANTIC MACKEREL - 2003
LO2	AMER LOBSTER-CHARTER/PARTY-1999	SMB5	SQUID/MACK/BUTT-CATCH/PROC-1988

5.5.2 Vessels

To land small-mesh multispecies, an open access (Category K) permit is required. The number of such permits issued in a year reflects the number of vessels potentially landing small-mesh multispecies. Since

1996, the number of open access (Category K) permits issued each year has ranged between 150 and 1,051, averaging 780 since 2012 (Table 20). Vessels landing small-mesh multispecies consists of all ranges of vessels, e.g., small (<50 GRT), medium (50-100 GRT), and large (>100 GRT).

Table 20. Number of open access (Category K) small-mesh multispecies issued annually, 1996-2017

Fishing year	Permits issued	Fishing year	Permits issued
1996	150	2007	1,022
1997	435	2008	998
1998	537	2009	948
1999	629	2010	904
2000	722	2011	815
2001	761	2012	806
2002	839	2013	777
2003	855	2014	774
2004	913	2015	781
2005	1,051	2016	794
2006	1,022	2017	747
Source: NEFSC VTR data, accessed 2017.			

5.5.3 Landings and revenue

5.5.3.1 Silver and offshore hake landings and revenue

Silver and offshore hake (collectively called as whiting) landings peaked in 1996 at 34 mil pounds, but the inflation adjusted real revenue (in 2016$) peaked in 1997 at $21 mil. In 2006, the smallest amount of silver hake was landed, about 12 mil pounds, coinciding with the lowest revenue earned from silver hake landings. Since then, silver hake landings and revenues have been generally increasing. However, the recent years (2014-2016) average annual landings have remained around 14 mil pounds (Table 21).

Peak landings in the Northern Management Area also occurred in 1996, at 8.9 mil lbs., which earned about $5 mil in real revenue. The lowest silver hake landings in the Northern Area occurred in 2005 with 1.69 mil lbs., earning $1.0 mil in real revenue. In recent years, landings in the Northern Area have averaged around 5 mil lbs., earning real revenue $3.7 to $4.7 mil (Table 21). Landings in the Southern Management Area used to account for two-thirds to nearly all landings until 2015, but the region's share has declined significantly at little over 50 percent in 2016. Southern landings have ranged from 6.8 mil lbs. to 25.9 mil pounds. Peak landings in the Southern area in 1997 were 25.9 mil lbs., earning $16.7 mil in real revenue. This was also the year with peak revenue from silver hake. The lowest landings occurred in 2016 and were 6.8 mil lbs, earning $5.2 mil real revenue.

Table 21. Silver hake landings (lbs.) and real revenue (in 2016$) by stock area.

Year	Northern Stock		Southern Stock	
	Landings (lbs.)	Real Revenue	Landings (lbs.)	Real Revenue
1996	8,897,537	$5,205,623	25,082,644	$14,674,935
1997	6,597,898	$4,261,894	25,847,569	$16,696,164
1998	4,941,691	$2,961,233	24,062,362	$14,419,005
1999	8,037,088	$5,262,414	19,550,376	$12,800,927
2000	6,899,595	$4,072,061	18,767,737	$11,076,500
2001	8,465,721	$5,414,987	18,301,397	$11,706,247
2002	6,003,694	$3,343,241	11,545,556	$6,429,304
2003	4,862,651	$3,021,475	13,224,516	$8,217,234
2004	2,542,059	$1,604,636	14,724,122	$9,294,376
2005	1,690,508	$966,303	14,890,106	$8,511,262
2006	2,058,312	$1,292,058	9,548,506	$5,993,856
2007	2,604,177	$1,672,709	11,744,654	$7,543,798
2008	1,780,815	$1,126,621	11,898,630	$7,527,594
2009	2,519,793	$1,390,782	14,346,639	$7,918,527
2010	3,664,364	$2,482,985	13,285,648	$9,002,398
2011	3,684,109	$2,512,159	12,760,759	$8,701,441
2012	3,496,552	$2,316,136	11,617,406	$7,695,436
2013	2,818,907	$1,845,326	10,167,854	$6,656,127
2014	5,178,960	$3,708,684	10,309,971	$7,383,032
2015	4,418,084	$3,307,214	9,211,141	$6,895,120
2016	6,262,859	$4,766,110	6,775,078	$5,155,914
Source: NEFSC VTR data, accessed 2017. *Note:* Revenues derived using an average price of silver hake in 2016.				

Over the past two decades, silver hake landings and revenues in the Southern Area fell substantially and is in a declining trend. Landings and revenues have saddled for the Northern Area, however. Landings in the Northern Area were stable around 6 mil lbs. until 2003, but declined during 2004-2013. The recent years, Northern Area landings have been around 5 mil lbs. compared to about 9 mil lbs. in 1996. In 2016, the Southern and Northern Areas have had similar silver hake landings and revenues.

Figure 32 presents silver hake landings by gear types. Nearly all landings were made with trawl gear. Other gears—gillnet, mid-water trawl and other gears landed very nominal amount of silver hake.

Figure 32. Silver hake landings (lbs.) by gear type, 1996-2016.

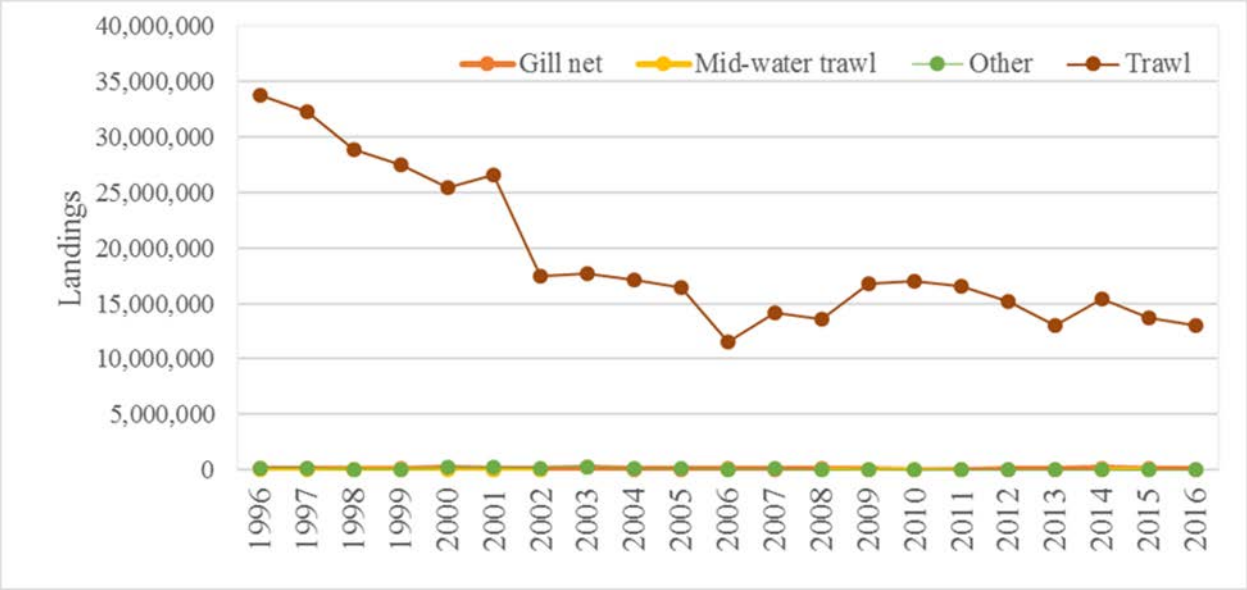
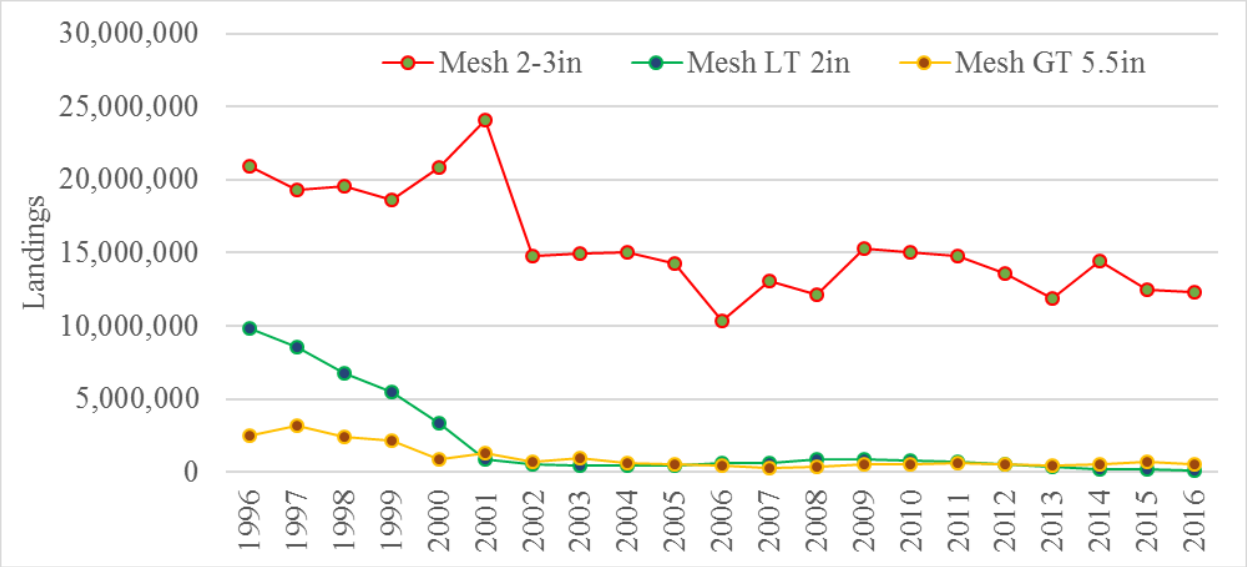


Figure 33 shows trends in silver hake landings for vessels fishing with trawls, by mesh size. Most landings were made with mesh size between 2" and 3". Before 2001, mesh sizes of less than 2" and greater than 5.5" were used to land a good volume of silver hake, but the landings by these mesh sizes declined sharply since 2001.

Figure 33. Silver hake landing (lbs.) by mesh sizes, 1996-2016



Red hake landings and revenue peaked at 4.18 mil lbs. and $2.675 mil in 2001 (Figure 34). However, they both declined sharply since 2002. Aggregate volume of red hake landings from the Southern Area is much higher relative to the landings from the Northern Area. Southern Area landings have ranged from 0.77 mil lbs. in 2016 to 3.17 mil lbs. in 2002. Northern Area landings have ranged from 0.144 mil lbs. in 2014 to 1.375 mil lbs. in 1996.

Figure 34. Red hake landings (lbs.) by management area and total red hake revenue (in 2016$).

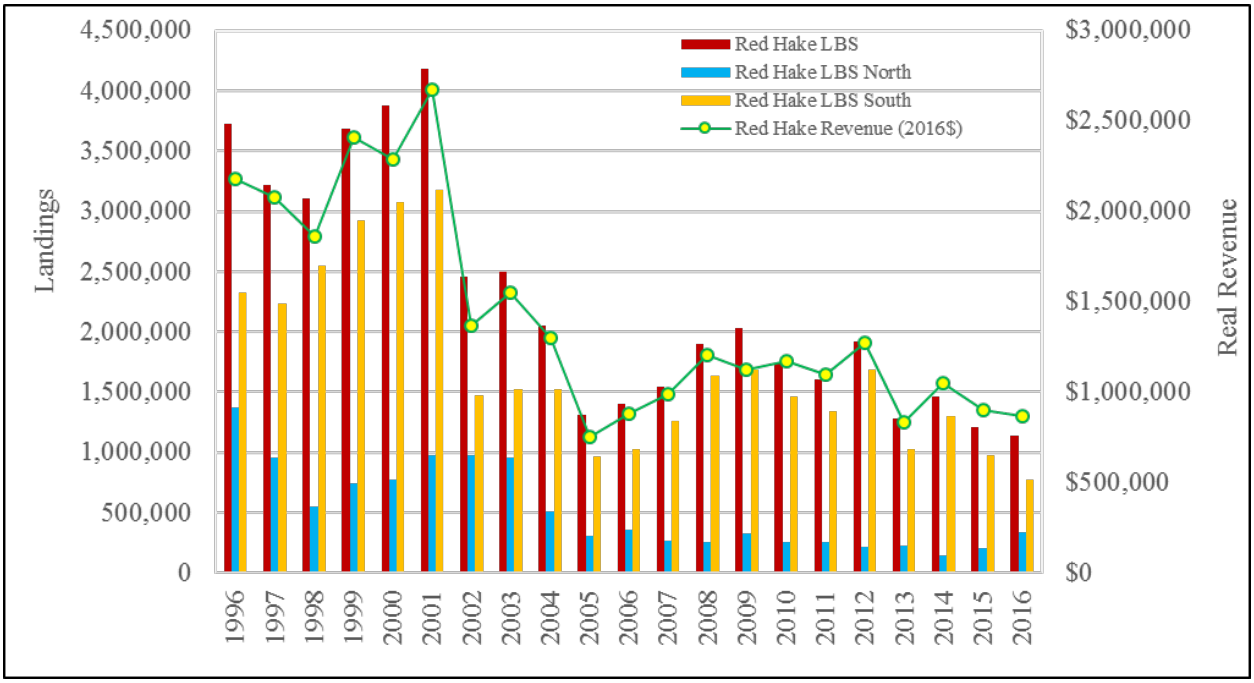


Figure 35. Red hake landing (lbs.) by gear type, 1996-2016.

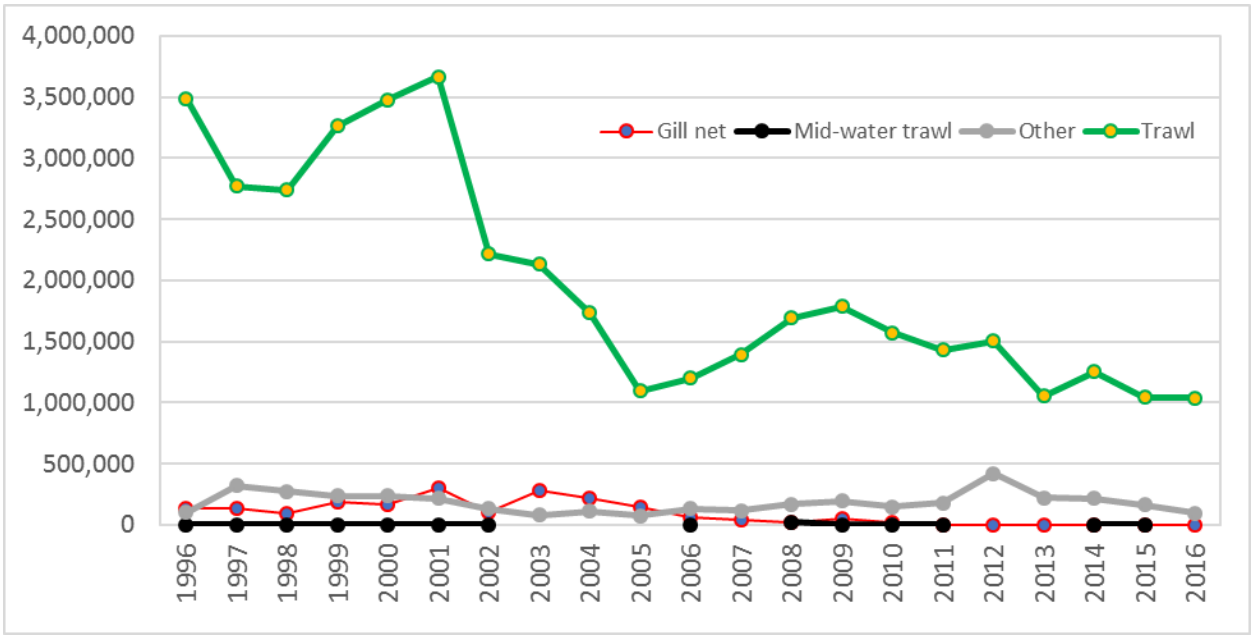


Figure 36 shows the trend in small-mesh multispecies landings from trips with 2,000 lbs. or more whiting. The number of trips with 2,000 lbs. or more have declined precipitously from about 3,100 trips in 1996 to around 800 trips in 2016 (Figure 36). Figure 37 presents small-mesh multispecies landings and effort levels by management area (w/ trips 2,000 lbs. or more whiting). Until 2015, about two thirds of hake landings used to come from the Southern Area, but the proportion of volumes are near equal in 2016. Figure 38 also examines the annual average CPUE levels (lbs./trip) by management area for the trips that

landed 2,000 lbs. or more whiting. In recent years, the annual average CPUE has been increasing in both management areas. Figure 39 and Figure 40 show annual silver hake landings and corresponding number of trips (w/ trips 2,000 lbs or more) by mesh sizes in northern and southern area, respectively.

Figure 36. Annual silver hake and small-mesh multispecies landings (w/ trips ≥ 2,000 lbs whiting) and effort levels (no. of trips), 1996-2016.

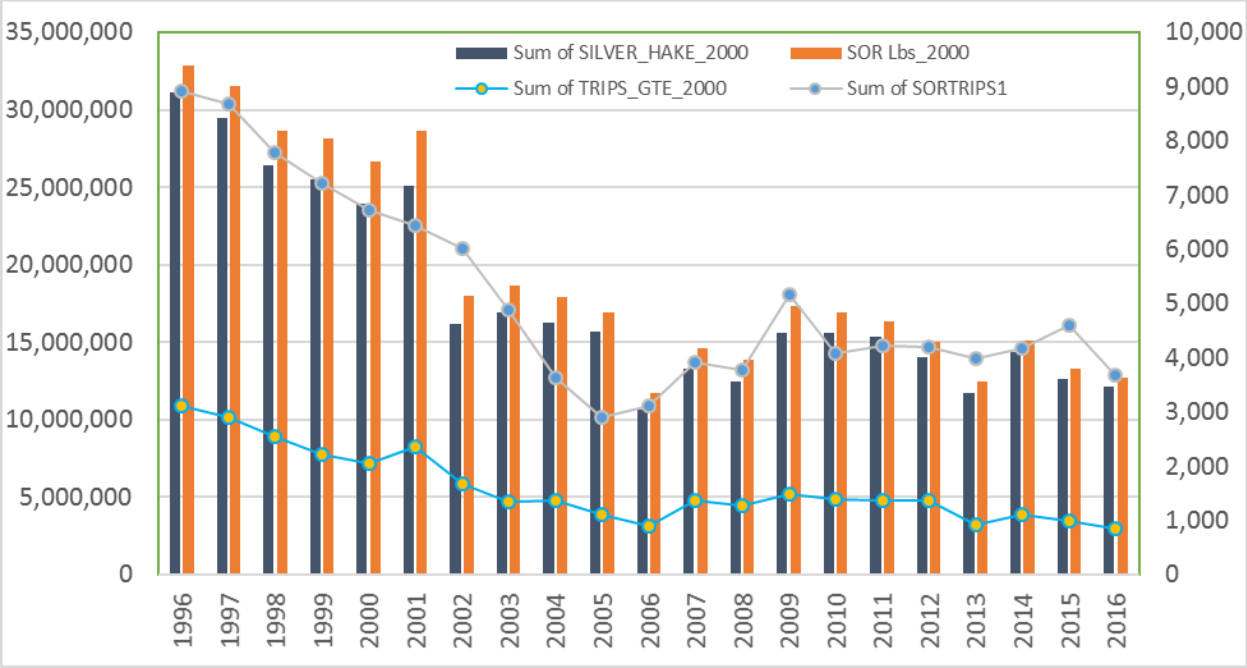


Figure 37. Small-mesh multispecies landings and effort levels by management area (w/ trips ≥ 2,000 lbs whiting), 1996-2016.

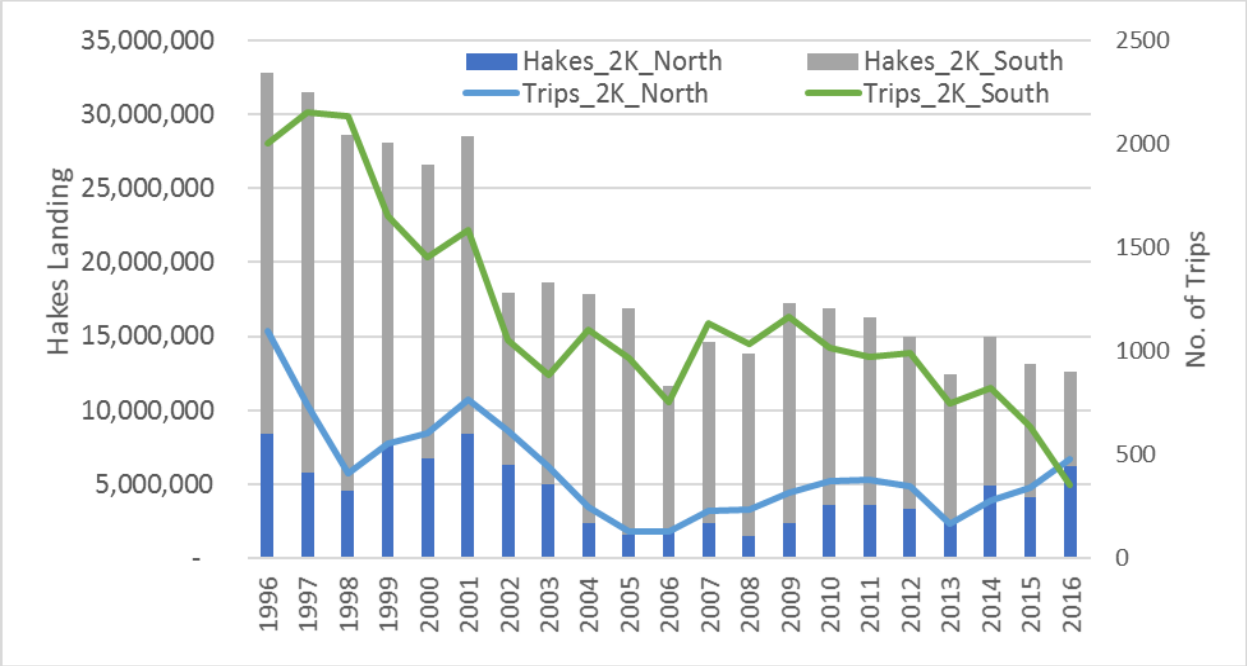


Figure 38. Small-mesh multispecies landings (lbs.) and CPUE levels (lbs./trip) by management area (w/ trips ≥ 2,000 lbs.), 1996-2016.

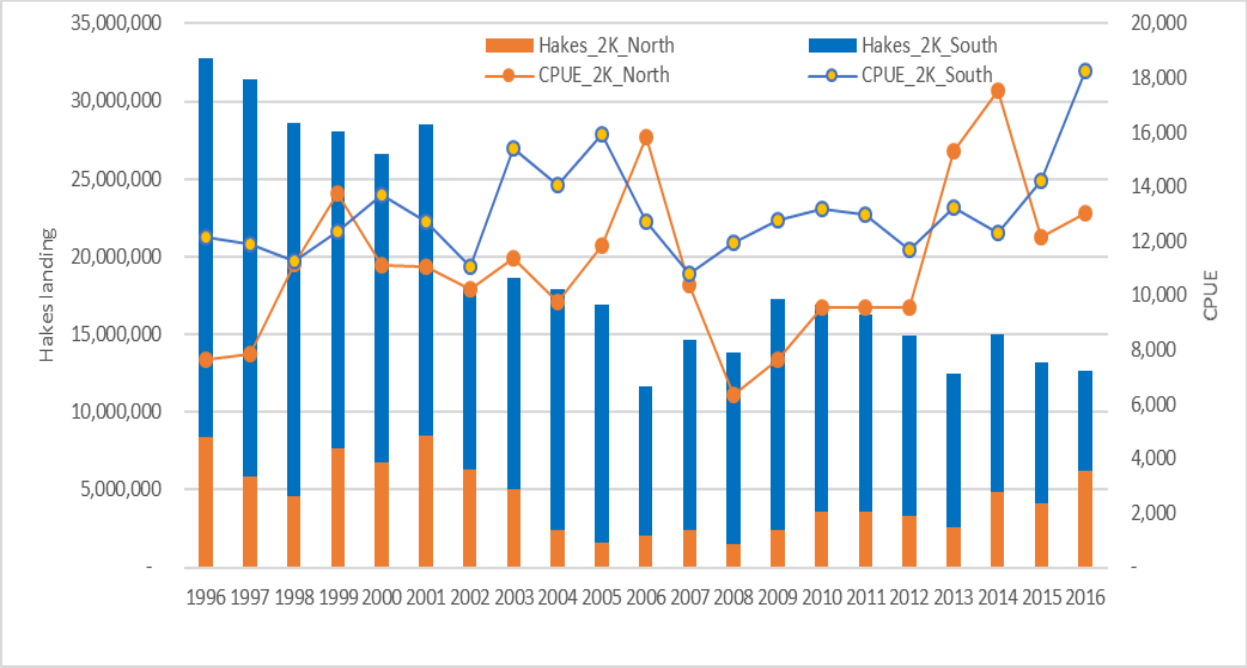


Figure 39. Silver hake landing (lbs.) and number of trips (w/ trips ≥ 2,000 lbs. whiting) by mesh size in the northern management area, 1996-2016.

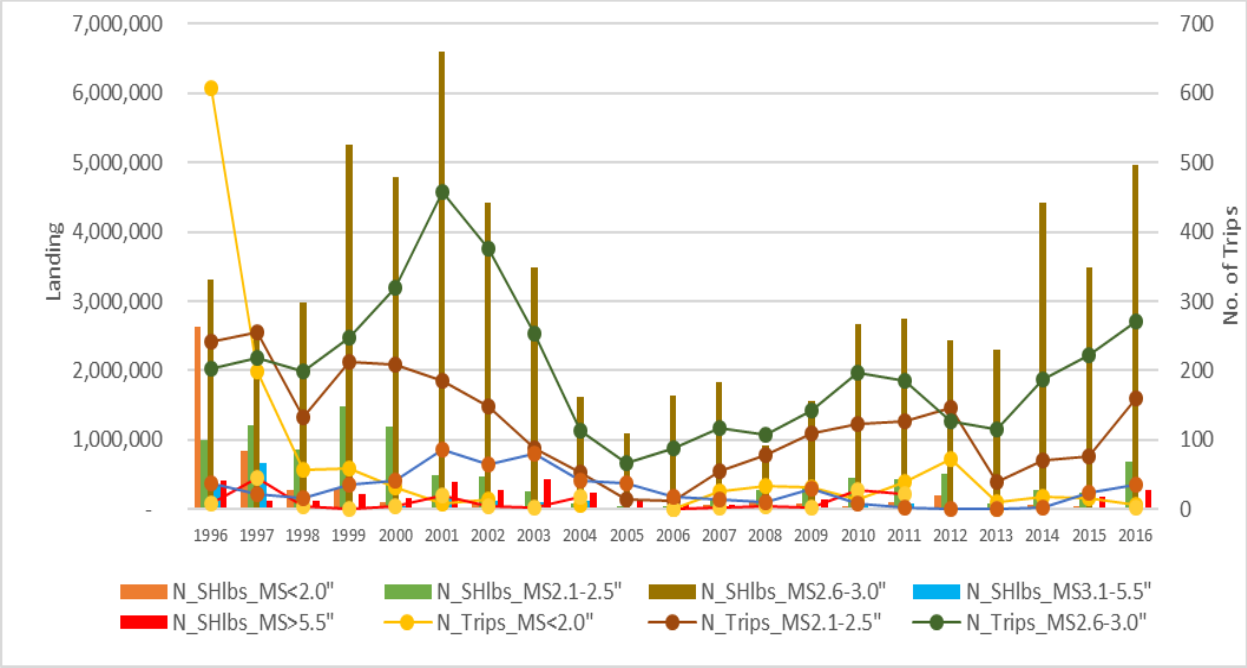
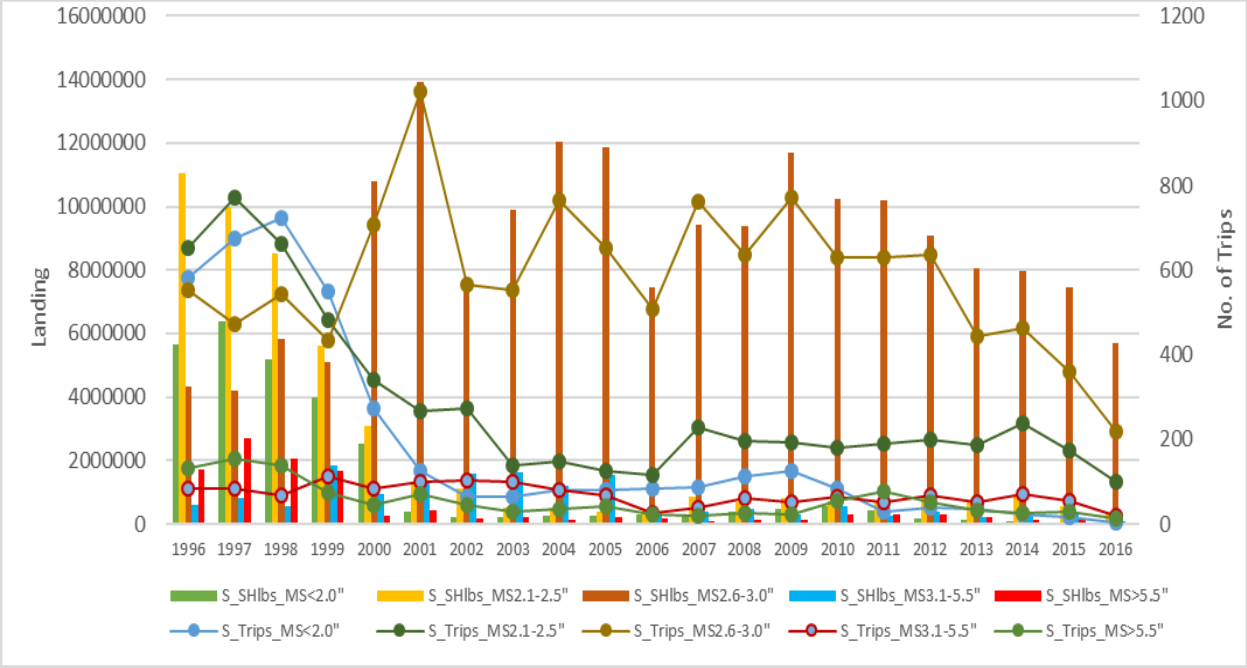


Figure 40. Silver hake landing (lbs.) and number of trips (with trips ≥ 2,000 lbs. whiting) by mesh sizes in the southern management area, 1996-2016.



Generally, silver hake prices are significantly higher than that of red hake. Both nominal (Figure 41) and real prices (Figure 42) of silver hake have risen since 2010. From 1996 to 2010, the real price of silver hake fluctuated around $0.60 per pound. The nominal price of red hake has also increased over the years, but has fluctuated less than that of silver hake price. In 2016, the average real prices of silver and red hake were $0.76 and $0.48 per lb., respectively.

Figure 41. Nominal prices of silver and red hake, 1996-2016.

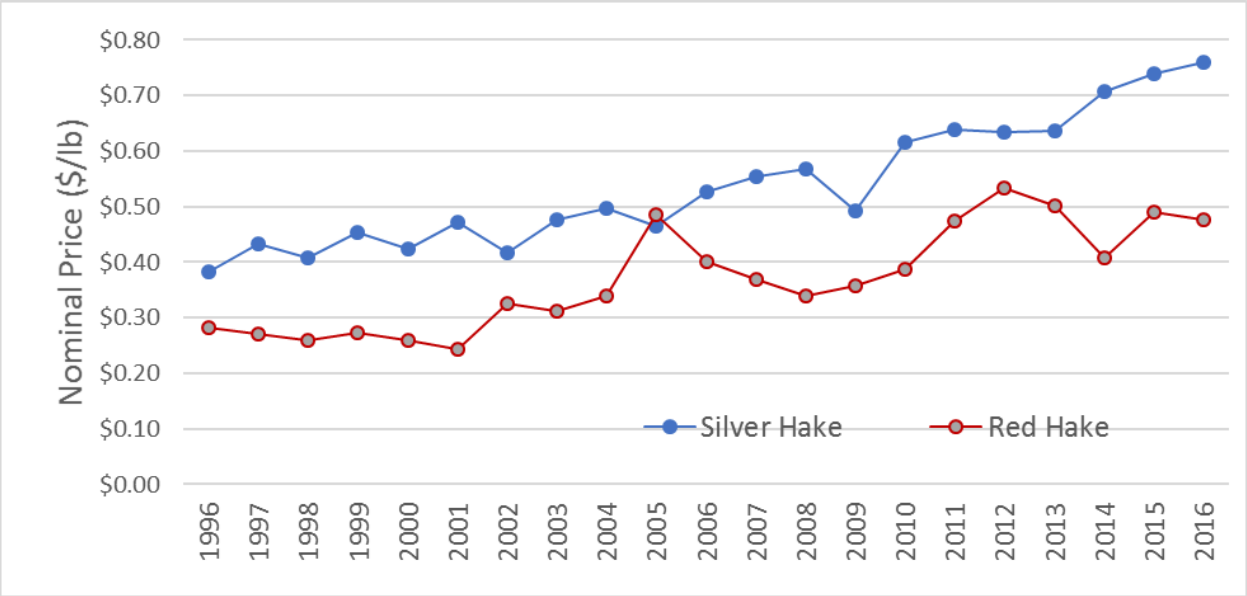
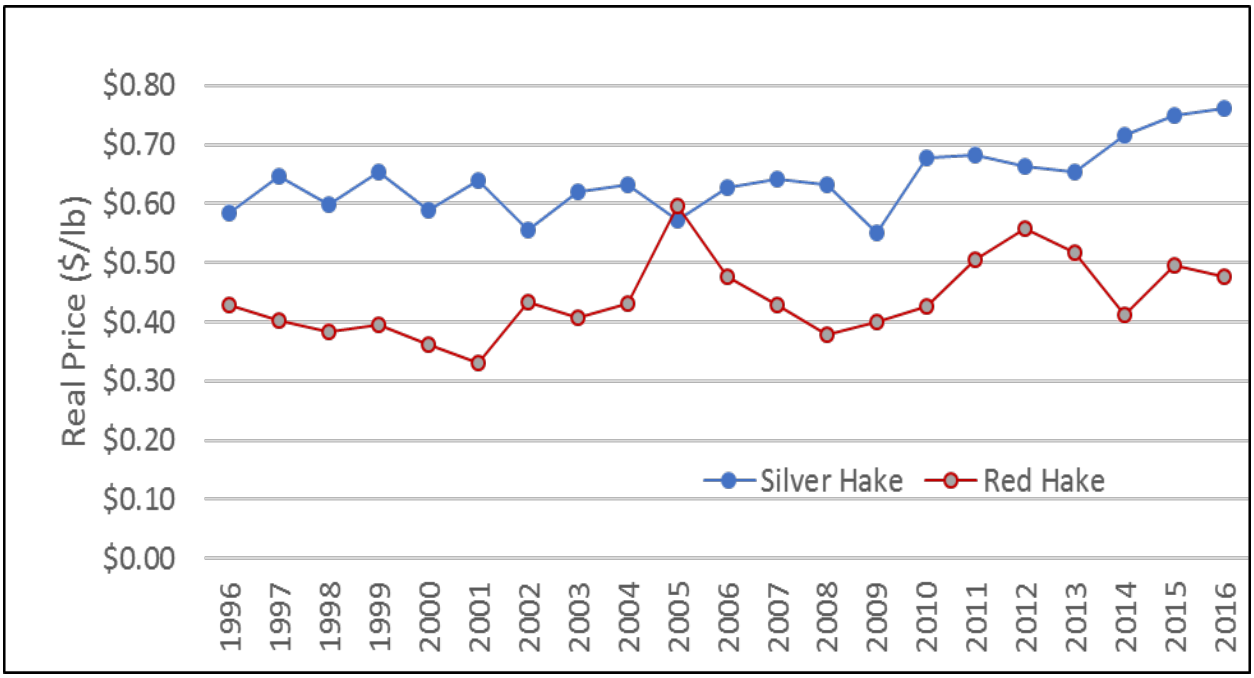
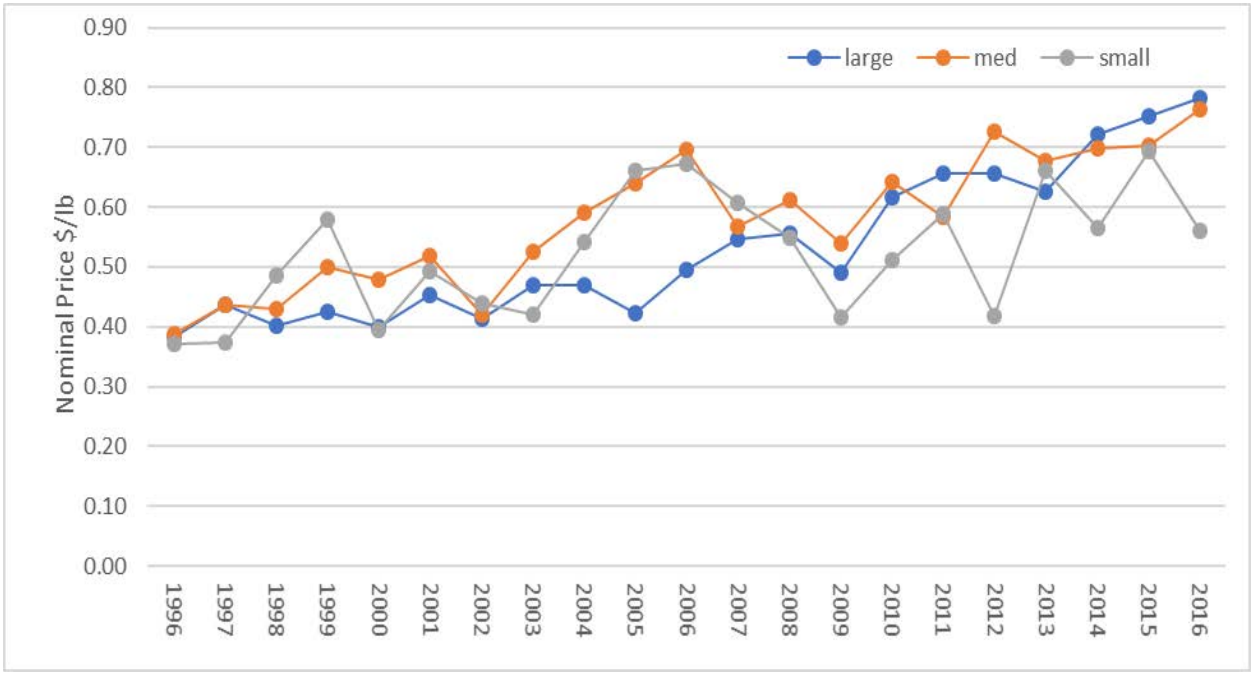


Figure 42. Inflation adjusted real prices (in 2016$) of silver and red hake, 1996-2016.



Nominal prices of silver hake were lowest for the landings of large size vessels (>100 GRT) for 57% of the years from 1996 to 2009. However, the prices have since been comparable with those of medium size vessels (50-100 GRT) and higher than those of small size vessels (<50 GRT). Since 2014, landings by large size vessels fetch the highest price (Figure 43).

Figure 43. Nominal price ($/lb) of silver hake by vessel size classes, 1996-2016

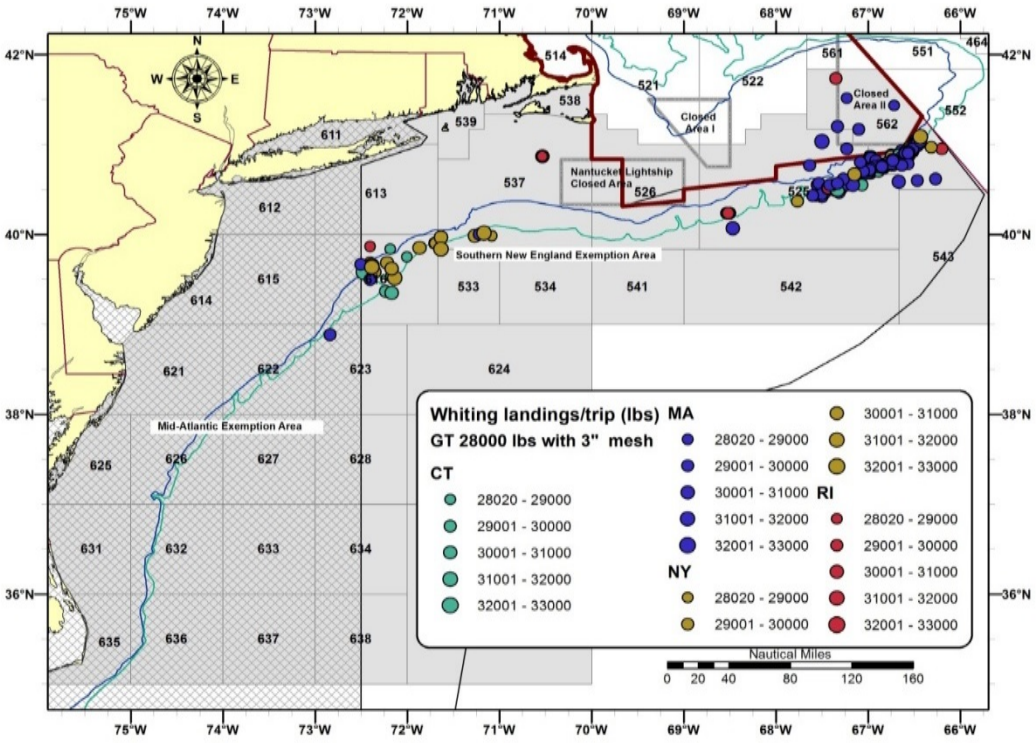


Whiting landings are regulated by possession limits that vary with the trawl mesh size and by stock area. These limits have helped maintain catches at or below sustainable levels since becoming effective in 2003. Since this amendment is considering increasing the Southern whiting possession limit, it 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 pounds of silver and offshore hake, while vessels using trawls with 2.5 to 3-inch mesh may not possess more than 7,500 pounds of silver and offshore hake. Vessels using larger mesh may possess up to 30,000 pounds of silver and offshore hake.

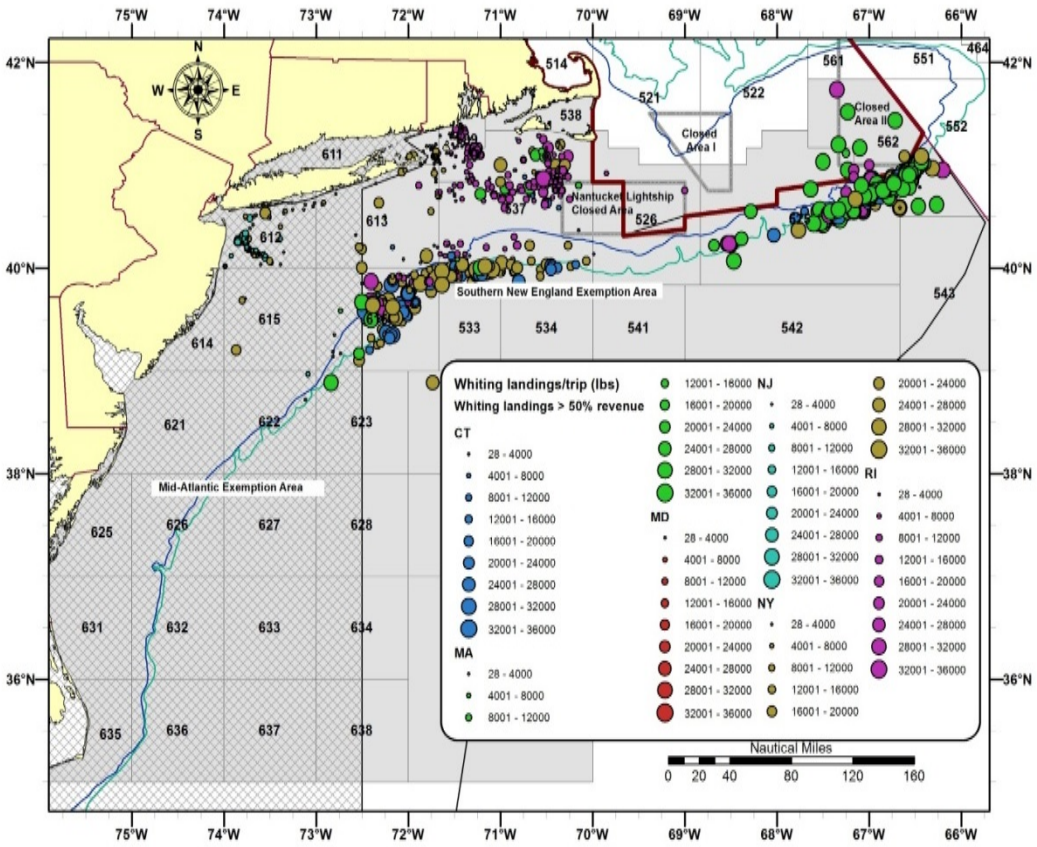
Vessels using 3 inch or larger mesh may possess and land up to 30,000 pounds of whiting in the northern management area and up to 40,000 lbs. of whiting in the southern management area. Nearly all of the high landings on trips targeting whiting are made by vessels fishing along the Mid-Atlantic continental shelf edge and along the Southern edge and eastern portion of Georges Bank (Map 9). Almost all trips landing more than 28,000 pounds 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). 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 9), 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 9. 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 pounds. Source: Dealer reported landings data matched to VTR data.



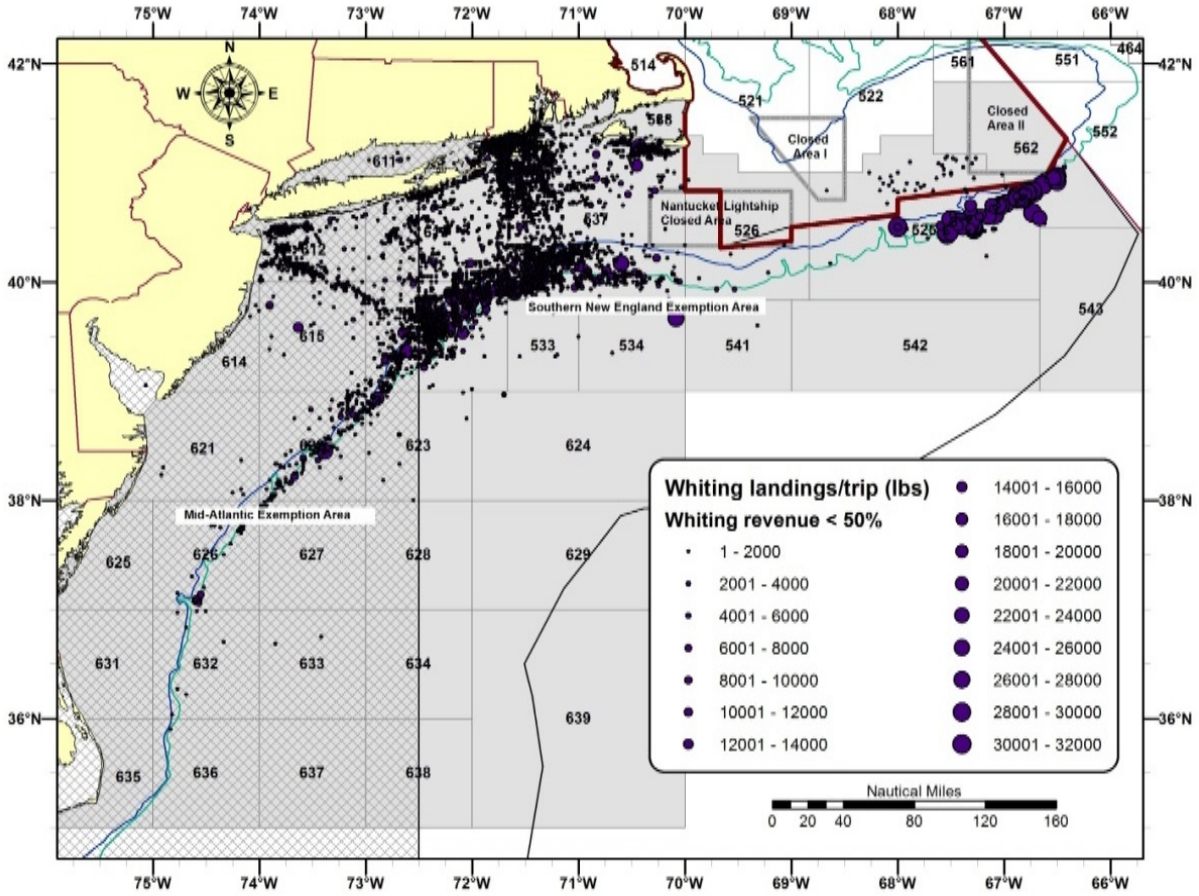
Trips targeting whiting but landing less than 28,000 pounds are more diversified, geographically (Map 10). In addition to the above trips, there are more trips spread out along the Southern New England shelf edge in statistical areas 537 and 616, some trips using 3-inch mesh and other trips using smaller 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 10. 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 11). 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 11. Reported fishing locations for 2009-2011 trips targeting species other than whiting while using trawls. Source: Dealer landings data matched to VTR data.

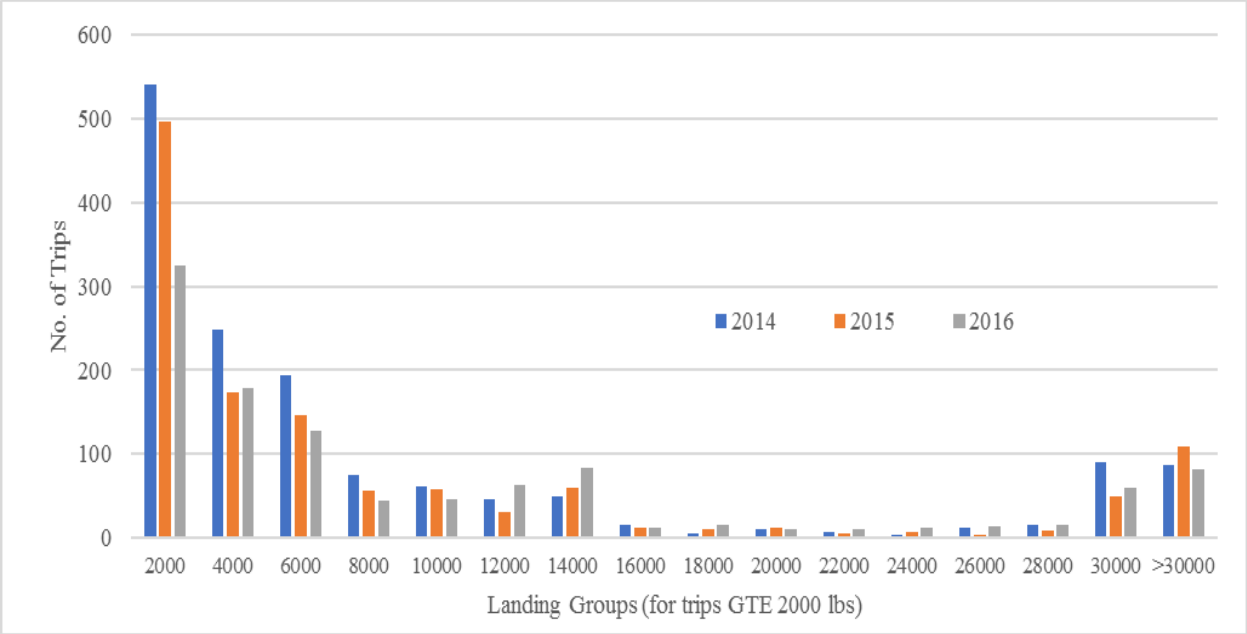


Frequency of trips landing in 2014-2016

For the trips that landed 2,000 or more pounds of whiting, majority of those trips landings below 8000 pounds in recent years (2014-2016). There were also trips that landed around 30,000 pounds and more. However, the maximum landing in a trip was around 43,000 pounds during the recent years.[21] Figure 44 presents the frequency of trips by landing volume in recent years and Figure 45 presents the cumulative number of trips for the landing volume. The nature of landings and corresponding trip numbers have similar patterns as in during 1999-2001 and 2009-2011.

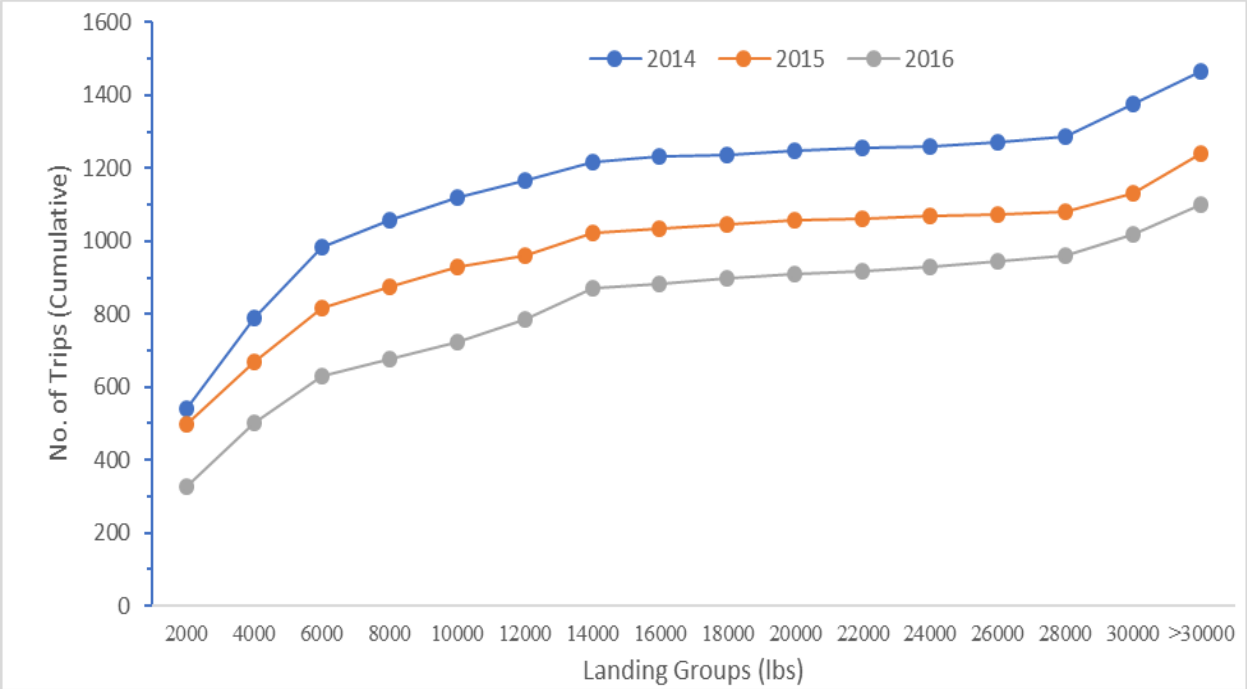
21 There are a few trips in this figure that appear to land more than 30,000 pounds of silver hake, more than the legal limit in the northern management area. This may reflect landings from different trips being reported as being landed in the same day for a permit or reporting mistakes by the dealer. However, the vast majority of trips are reported to land less than 30,000 pounds.

Figure 44. Frequency of silver hake landings per trip, 2014-2016.



Source: VTR landings with trips landings less than 2,000 pounds are excluded.
Note: Landing group example, i.e., 2,000= 2,000-4,000 pounds, 4,000=4,000-6,000, etc. The last two groups in X-axis is landing volume of 30,000 pounds and greater than 30,000 pounds.

Figure 45. Cumulative frequency of whiting landings per trip, 2014-2016.



Source: VTR landings with trips landings less than 2,000 pounds have been excluded from the figure.
Note: Landing group example, i.e., 2,000= 2,000-4,000 pounds, 4,000=4,000-6,000, etc. The last two groups in X-axis is the group of 30,000 pounds and greater than 30,000 pounds.

5.5.3.2 Red hake landings and revenue

Landings of red hake peaked in 2001 at 4.184 million lbs. and real revenue (inflation adjusted in 2016 $) was also the greatest ($2.7 mil) in this year (Table 22). The lowest red hake landings occurred in 2016; while in 2005, there was the least amount of revenue earned from red hake ($0.8 mil). Peak landings in the Northern management area were 1.4 mil pounds in 1996, which earned $0.9 mil in real revenue (Table 23). The lowest red hake landings in the Northern area occurred in 2008 with 0.21 mil pounds, earning $0.13 mil in real revenue. Landings in the Northern area have dropped significantly since 2005, earning real revenue ranged from $0.13 mil to $0.26 mil.

Landings of red hake in the Southern area also account for over two-thirds of the total red hake landings (Table 23). Peak landings in the Southern area were in 2001 and were 3.173 mil pounds, earning approximately $1.8 mil in real revenue. The lowest landings occurred in 2016 and were 0.774 mil pounds, earning approximately $0.510 mil (and is also the lowest revenue from red hake in the Southern stock area over the past two decades).

The distribution of trips that landed red hake is skewed in recent years (2014-2016), as considerable number of trips landed less than 400 pounds of red hake in a fishing trip (Figure 46). The cumulative distribution of trips with red hake landings indicate that majority of the trips had landings below 2,000 pounds although few trips had landings up to 11,000 pounds (Figure 47).

Table 22. Annual red hake landings (pounds) and real revenue (1996-2016).

Year	Red Hake (lbs.)	Real Revenue	Year	Red Hake (lbs.)	Real Revenue
1996	3,724,557	$2,179,102	**2006**	1,399,139	$878,277
1997	3,218,595	$2,079,042	**2007**	1,539,892	$989,100
1998	3,105,399	$1,860,863	**2008**	1,900,798	$1,202,528
1999	3,680,188	$2,409,663	**2009**	2,033,501	$1,122,377
2000	3,873,913	$2,286,338	**2010**	1,733,795	$1,174,825
2001	4,183,559	$2,675,958	**2011**	1,610,371	$1,098,097
2002	2,454,275	$1,366,697	**2012**	1,919,186	$1,271,280
2003	2,493,860	$1,549,594	**2013**	1,276,089	$835,359
2004	2,055,735	$1,297,651	**2014**	1,463,920	$1,048,322
2005	1,312,231	$750,078	**2015**	1,204,890	$901,936
			2016	1,136,298	$864,736
Source: NEFSC VTR data, accessed 2017.					

Table 23. Annual red hake landings (lbs.) and real revenue by Northern and Southern stock area.

Year	Management Area		Real Revenue (in 2016$)	
	Northern	Southern	Northern	Southern
1996	1,375,579	2,328,133	$866,253	$1,466,111
1997	958,034	2,234,905	$460,400	$1,074,024
1998	554,729	2,548,361	$404,636	$1,858,849
1999	738,533	2,924,662	$804,388	$3,185,453
2000	777,783	3,073,408	$644,964	$2,548,575
2001	978,333	3,173,806	$553,603	$1,795,942
2002	972,855	1,470,423	$368,041	$556,275
2003	959,220	1,522,054	$928,486	$1,473,287
2004	512,011	1,523,985	$315,496	$939,063
2005	304,297	962,503	$164,994	$521,882
2006	360,189	1,030,961	$226,499	$648,304
2007	271,366	1,263,629	$130,816	$609,150
2008	254,272	1,639,477	$147,734	$952,550
2009	328,889	1,689,948	$258,457	$1,328,046
2010	253,054	1,467,152	$156,646	$908,198
2011	256,937	1,338,382	$186,801	$973,047
2012	210,717	1,683,686	$262,423	$2,096,830
2013	225,039	1,027,289	$217,011	$990,641
2014	144,304	1,296,283	$140,541	$1,262,478
2015	209,078	972,686	$130,168	$605,576
2016	333,117	774,453	$219,660	$510,681

Source: NEFSC VTR data, accessed 2017.

Figure 46. Frequency of red hake landings per trip, 2014-2016.

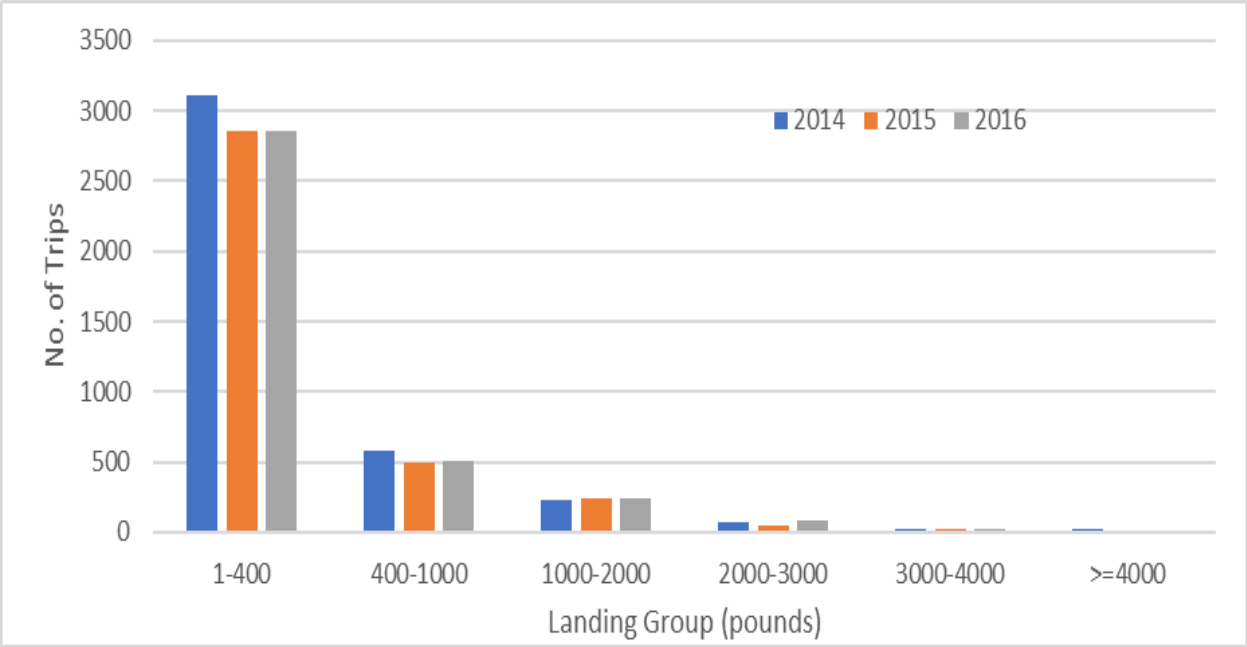
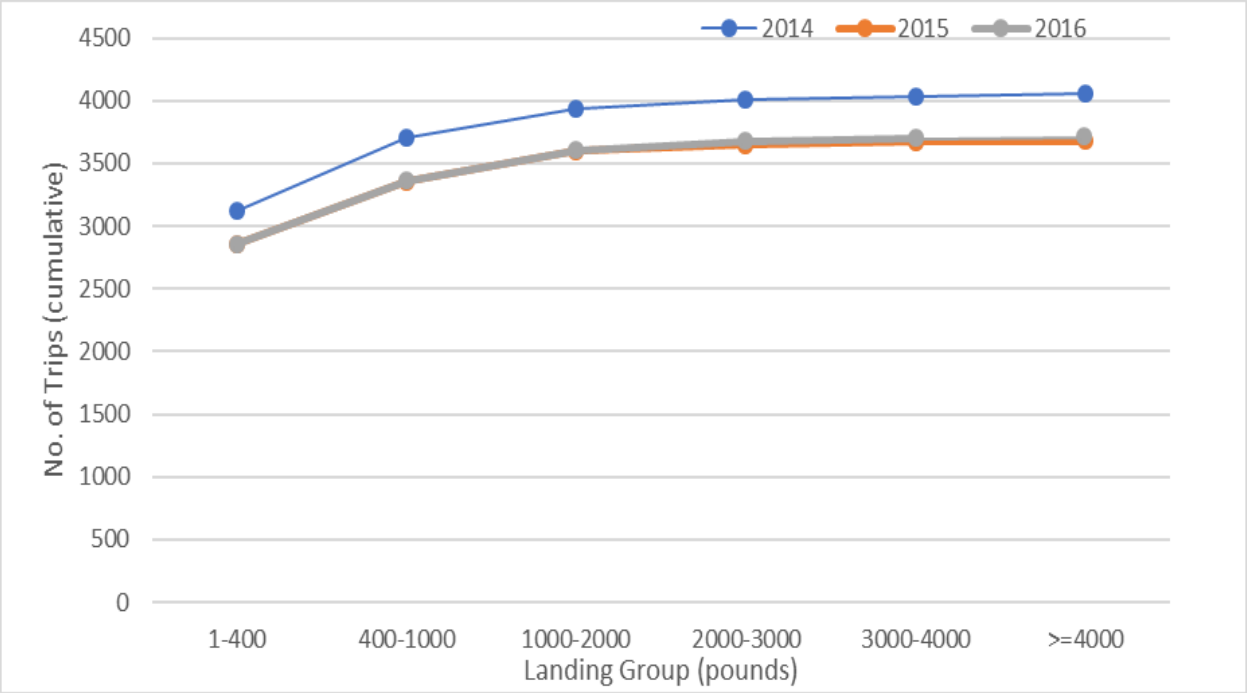


Figure 47. Cumulative frequency of red hake landings per trip, 2014-2016.



5.5.4 Price-Quantity Relationships

Over the past two decades, a simple regression analysis suggests an inverse relationship between the annual landings of small-mesh multispecies and annual average prices. Real price (in 2016$) decreased by about 0.01 cents for an increase in one metric ton of red hake landings. Similarly, real price of whiting decreased by about 0.0007 cents for an increase in a metric ton of whiting landings (Figure 48 and Figure 49).

Figure 48. Price – Quantity relationship for red hake, 1996-2016.

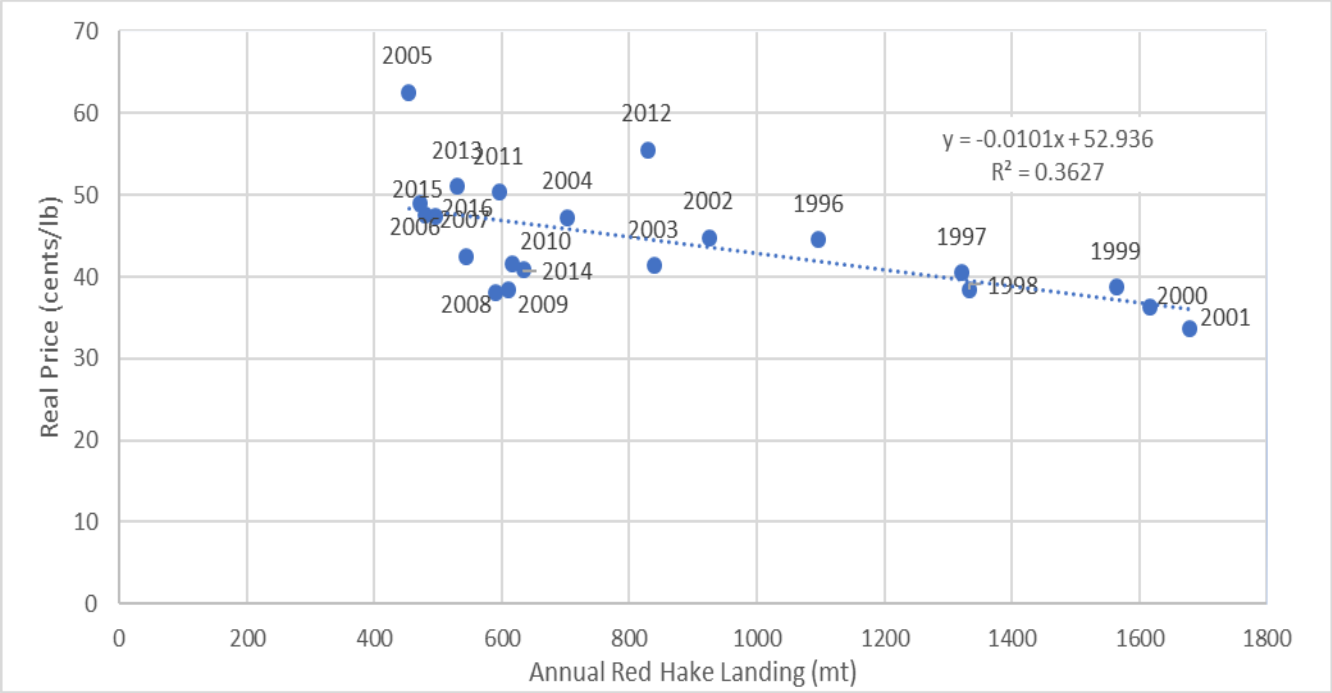
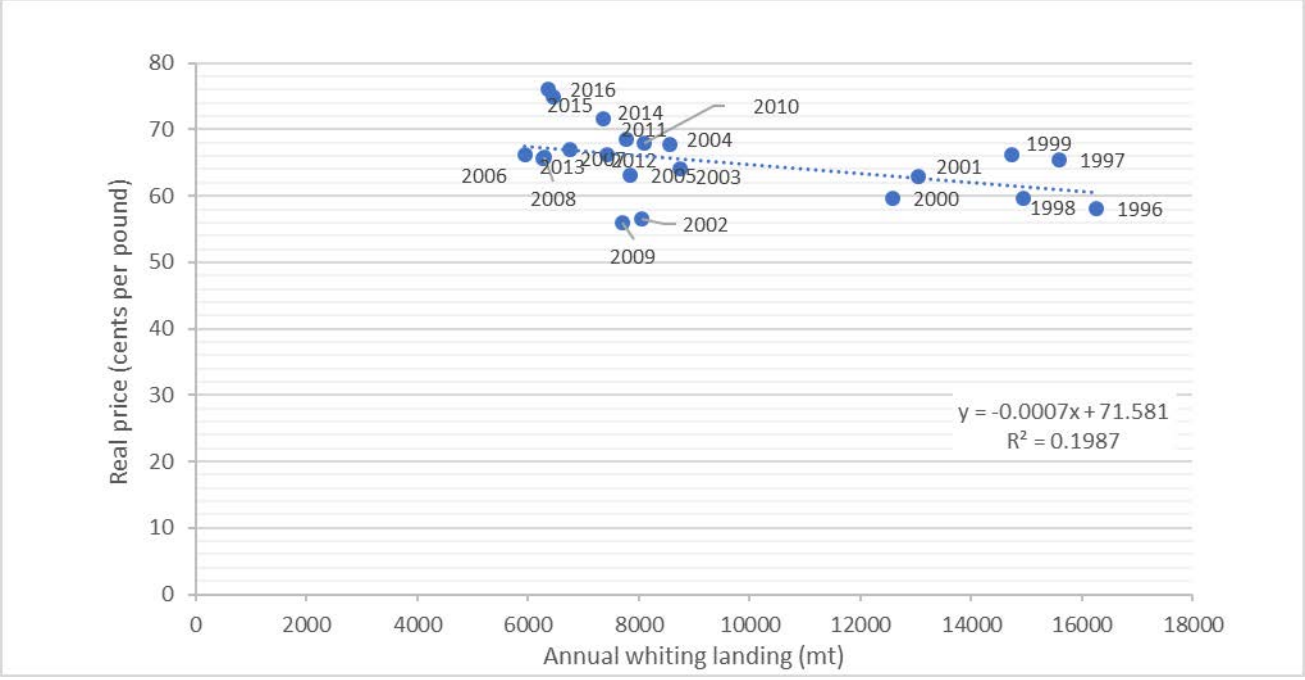


Figure 49. Price-Quantity relationship for whiting, 1996-2016.



5.5.5 Fishing Communities

5.5.5.1 Introduction

Consideration of the economic and social impacts on fishing communities from proposed fishery regulations is required by the National Environmental Policy Act (NEPA 1970) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA 2007). National Standard 8 of the MSFCMA (16 U.S.C. § 1851(a)(8)) stipulates that:

> *"Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities."*

A "fishing community" is defined in the MSFCMA (16 U.S.C. § 1802(17)), as:

> *"A community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community."*

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

To gain a better perspective on the nature of the small-mesh multispecies fishery and the character of the affected human environment, a broader interpretation of fishing community has been applied to include almost all communities with a substantial involvement in or dependence on the small-mesh multispecies fishery. In terms of National Standard 8 (NS 8), some of the communities identified in this section may not fit the strict interpretation of the criteria for substantial dependence on fishing. The fishing communities that meet the legal definition (as promulgated through NS 8) are likely to be considered a subset of the broader group of communities of interest that are engaged in the herring fishery and identified in this document.

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

5.5.5.2 Communities of Interest

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

Community of Interest Criteria. There are 17 *Communities of Interest* for the small mesh multispecies fishery, which meet at least one of the following criteria (Table 24):

1. Cumulative whiting and red hake landings of at least 5M pounds (2,300 mt) from 1996 to 2016.

2. Whiting and red hake landings of at least 200,000 pounds (91 mt) in 2016.

Table 24. *Communities of Interest* in the small mesh-multispecies fishery.

State	Community	Small-mesh multispecies landings				
		≥5M lbs., 1996-2016	≥200K lbs., 2016	≥500K lbs., 2016	≥1M lbs., 2016	≥3M lbs., 2016
ME	Portland	√				
NH	Seabrook	√	√			
MA	Gloucester	√	√	√	√	√
	Boston		√			
	Provincetown	√	√			
	New Bedford	√	√	√	√	√
RI	Newport	√				
	Point Judith	√	√	√	√	√
CT	Stonington	√				
	New London	√	√	√		
NY	Greenport	√				
	Montauk	√	√	√	√	
	Hampton Bays/Shinnecock	√				
	Point Lookout	√				
	New York City	√	√			
NJ	Belford	√				
	Point Pleasant	√				

Table 25 presents some economic characteristics of top nine ports in landing small-mesh multispecies in 2016 – a subset of the *Communities of Interest*. The value of small-mesh multispecies to total value of all fish landed in those ports range between 1 to 90%. The top port for landing whiting, New Bedford (MA) had about 1.1% of total port value of landing from hake species; Point Judith and Gloucester had 4% of fish value from small-mesh multispecies; Montauk had 7.6% of fish value from small-mesh multispecies; and New London had 15% of fish value from small-mesh multispecies.

Table 26 and Table 27 show participation of fishermen in terms of number of trips landing 2,000 lbs. or more small-mesh multispecies at various ports in 1996 and 2016. Many ports had begun to have few trips landed after 2001. Fishermen participation in landing silver hake in major ports have declined significantly over the past two decades, as only three ports in 2016 against nine in 1996 had over 100 trips that landed 2,000 lbs. or more silver hake. While many ports with trips 2,000 pounds or more have declined significantly in trip landings, only New Bedford and Seabrook experienced a rise of trips with landing volumes of 2,000 lbs. or more. While many ports had begun to have few landed small-mesh multispecies trips as early as 1997, about 25% of the ports have maintained relatively stable number of trips landing one or more pounds throughout 1996-2016 due to the port's participation in other fisheries with incidental small-mesh multispecies landings.

Table 25. Top nine ports for landing whiting and their other economic characteristics in 2016.

ST	Top Ports in 2016	Dealers	Whiting Live LB	Red Hake Live LB	Whiting Value	Red Hake Value	Whiting Target Trips	Whiting Trips	Sum of Landing Events, all trips	Landing Live LB (All Fish)	Total Value (All Fish)	Ratio
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(E+F)/ (K)
MA	New Bedford	86	3,789,176	65,357	$3,461,340	$38,829	125	294	10,834	410,820,837	$326,329,306	0.011
RI	Point Judith	50	3,669,765	391,709	$2,065,797	$138,336	117	2,558	23,823	58,789,078	$55,731,437	0.040
MA	Gloucester	74	2,980,214	172,797	$2,028,907	$54,072	339	1,750	21,753	66,414,851	$52,854,591	0.039
NY	Montauk	42	1,186,498	218,359	$1,169,698	$130,414	122	878	10,369	12,601,398	$17,068,995	0.076
CT	New London	19	678,790	81,412	$664,795	$65,422	115	242	1,626	9,072,205	$4,881,024	0.150
NY	New York City	6	483,810	12,425	$310,474	$6,478	36	36	139	534,226	$349,813	0.906
NH	Seabrook	4	302,998	22,248	$250,985	$10,189	118	387	2,871	1,689,660	$2,725,660	0.096
MA	Provincetown	22	217,325	268	$80,425	$116	39	43	3,475	7,587,021	$8,187,669	0.010
MA	Boston	18	216,497	-	$170,223	$0	18	201	2,578	12,810,968	$16,961,715	0.010

Source: NMFS dealer data, accessed 2017.

Table 26. Trips landing ≥ 2,000 pounds of small-mesh multispecies in Communities of Interest, 1996-2016.

Landed Port		1996		2016		Notes
		trips	rank	trips	rank	
ME	**Portland**	453	2	<12	>10	Peak in 1996; generally declined trend since 1996; minimal since 2008.
NH	**Seabrook**	<72	>10	66	4	Peak in 2012; generally increasing trend.
	Rye	<72	>10	<12	>10	None or minimal until 2009; peak in 2012.
MA	**Gloucester**	409	3	230	1	Peak in 1996; fluctuated, but generally declining trend.
	Boston	<72	>10	25	9	None until 1998; fluctuating since; peak in 2015.
	Provincetown	110	9	31	8	Peak in 2001; declining since 2011.
	New Bedford	<72	>10	145	3	Peak in 2003; generally increasing trend.
RI	**Newport**	72	10	<12	>10	Peak in 2001; decreasing trend; zero since 2012.
	Point Judith	801	1	179	2	Peak in 1998; decreasing trend.
CT	**Stonington**	<72	>10	12	10	Peak in 2001; fluctuating trend.
	New London	159	8	38	6	Peak in 1996; declining trend.
NY	**Greenport**	201	6	<12	>10	Peak in 1996; declining trend; zero since 2012.
	Montauk	217	5	57	5	Peak in 1998; generally declining trend.
	Hampton Bay/ Shinnecock	259	4	<12	>10	Peak in 1997-8; generally declining trend.
	New York	<72	>10	34	7	None or minimal until 2011, then increasing.
NJ	**Belford**	<72	>10	<12	>10	Peak in 2009; fluctuating trend.
	Point Pleasant	174	7	<12	>10	Peak in 1997; declining trend.
Total		**2,967**		**563**		

Note: Top 10 ports for 1996 and 2016 are shown.
Source: NEFSC VTR data, accessed 2017.

Table 27. Trips landing ≥ 1 pounds of small mesh multispecies in landing ports, 1996-2016.

Landed Ports		1996		2016		Notes
		Trips	Rank	Trips	Rank	
ME	Portland	793	3	175	7	Peak in 1996; generally decreasing.
NH	Portsmouth	566	5	<100	>11	Peak in 1996; generally decreasing.
	Rye	201	14	<100	>11	Peak in 1997; fluctuating
	Hampton	287	11	<100	>11	Peak in 1996, generally decreasing
	Seabrook	282	9	311	4	Peak in 2001; fluctuating.
MA	Newburyport	233	12	<100	>11	Peak in 1996, generally decreasing
	Gloucester	1,225	2	807	2	Peak in 1999; generally decreasing.
	Marblehead	164	19	<100	>11	Generally decreasing.
	Boston	<100	>21	150	9	Generally increasing.
	Scituate	195	16	159	8	Peak in 2012; fluctuating.
	Chatham	195	17	<100	>11	Peak in 1997, generally decreasing.
	Provincetown	220	13	<100	>11	Peak in 2001; decreasing since 2011.
	New Bedford	<100	>21	274	6	Increasing trend.
RI	Point Judith	1,736	1	1,735	1	Fluctuating; peak in 2013
	Newport	157	20	<100	>11	Decreasing trend.
CT	Stonington	196	15	277	5	Peak in 1999; fluctuating.
	New London	182	18	<100	>11	Peak in 1996; fluctuating.
NY	Greenport	251	10	<100	>11	Peak in 1996; minimal to none since 2001.
	Montauk	562	6	325	3	Peak in 2012; fluctuating trend.
	Shinnecock	516	7	<100	>11	Peak in 1998; generally decreasing.
	New York City	<100	>21	<100	>11	Fluctuating, generally low.
NJ	Brielle	<100	>21	<100	>11	Peak in 1997; fluctuating.
	Point Pleasant	629	4	109	11	Peak in 1997; generally decreasing.
	Belford	360	8	112	10	Peak in 1997; generally decreasing.
	Cape May	147	21	<100	>11	Peak in 1997, generally decreasing.
Total		10,360		5,498		*Source:* NEFSC VTR data, accessed 2017.

Table 28 presents cumulative landings of silver hake and red hake in major ports along with their share of landings to state's total landing of the species. New London and Stonington land nearly all (>95%) silver and red hake landings in Connecticut. Point Judith lands about 95% of Rhode Island's hake landings. New Bedford and Gloucester (MA) lands about 90% of the state's hake landings.

Table 28. Major landing ports with cumulative silver hake and red hake landings (pounds) and port's share landings to its corresponding state's landings for the species, 1996-2016.

State	Top Ports	Silver Hake (lbs.)	Red Hake (lbs.)	Percent of state landings	
				Silver hake	Red hake
ME	Portland	6,386,607	734,870	88%	79%
NH	Seabrook	4,233,393	1,233,921	73%	57%
MA	Gloucester	30,939,948	5,048,852	25%	54%
	New Bedford	77,886,117	3,071,112	64%	33%
	Provincetown	9,890,996	874,476	8%	9%
RI	Point Judith	91,435,748	11,851,279	95%	94%
	Newport	4,567,301	717,226	5%	6%
CT	New London	47,070,546	5,355,055	77%	78%
	Stonington	14,326,964	1,499,982	23%	22%
NY	Montauk	53,384,130	6,436,360	53%	65%
	Greenport	16,994,122	544,673	17%	6%
	Shinnecock	14,508,418	1,248,954	15%	13%
	Point Lookout	4,421,630	1,002,001	4%	10%
	Hampton Bay	9,119,913	223,728	9%	2%
NJ	Belford	4,776,479	1,076,711	34%	20%
	Point Pleasant	8,416,347	2,778,971	60%	52%
Source: NEFSC VTR data, accessed 2017.					

5.5.5.2.1 Small-mesh multispecies permits by state and port

In Maine, there has been an 81% decrease in the number of permits with landings of small mesh multispecies, from 113 in 1996 to 21 in 2016 (Table 29). There has also been a decrease in the number of ports landing small mesh multispecies, from 14 in 1996 to 3 in 2016. Portland has been the most active port in Maine throughout the time series; most other ports in Maine landing small mesh multispecies had ≤3 permits landing.

In New Hampshire, there has been a 73% decrease in the number of permits with landings of small mesh multispecies, from 67 in 1996 to 18 in 2016 (Table 29). Portsmouth had the most number of permits landing in 1996, at 36, but that port has had under four permits landing since 2014. Hampton, Seabrook, and Rye, have had active ports through most of the time series, and in 2016, Seabrook had the highest number of active permits landing small mesh multispecies, at 14.

In Massachusetts, there has been a 39% decrease in the number of permits with landings of small mesh multispecies, from 338 in 1996 to 207 in 2016 (Table 29). Apart from a few years in the mid-2000s, Massachusetts has been the state with the highest number of active permits. The number of ports landing small mesh multispecies has fluctuated between 8 and 18 through the time series, and was 14 in 2016.

Provincetown, and Gloucester had declines in the number of permits landing small-mesh multispecies, but that number increased in New Bedford and Boston during the time series.

In Rhode Island, there has been a 36% decrease in the number of permits with landings of small mesh multispecies, from 261 in 1996 to 166 in 2016 (Table 29). The number of ports landing small mesh multispecies has fluctuated between three and ten through the time series, and was three in 2016. The number of permits landing in Point Judith declined by about 25%; while there was a 91% decline in the number of permits reporting landings of these species in Newport that period.

In Connecticut, there has been a steady increase in the number of permits with landings of small mesh multispecies, from 3 in 1996 to 51 in 2016 (Table 29) – in contrast to other states. The number of ports landing small mesh multispecies has fluctuated between two and seven through the time series, and was five in 2016. Stonington had a near eight-fold increase in the number of permits reporting landing of small-mesh multispecies and the number of active permits in New London increased dramatically as well.

In New York, there has been a 48% decrease in the number of permits with landings of small mesh multispecies, from 235 in 1996 to 123 in 2016 (Table 29). The number of ports landing small mesh multispecies has fluctuated between eight and 18 through the time series, and was twelve in 2016. Montauk has had a stable number of permits landing small-mesh multispecies, but Hampton Bays experienced declines of 64% during 1996-2016.

In New Jersey, there has been a 41% decrease in the number of permits with landings of small mesh multispecies, from 170 in 1996 to 101 in 2016 (Table 29). The number of ports landing small mesh multispecies has fluctuated between four and 14 through the time series, and was nine in 2016. There were declines in permits landing small-mesh multispecies in Belford (40%) and Cape May (64%). However, the number of active permits in Barnegat and Point Pleasant have been fairly steady.

Table 29. Number of unique permits landing silver hake, offshore hake or red hake in each key port and state, 1996-2016

State/Port	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Maine	**113**	**103**	**59**	**65**	**79**	**80**	**58**	**23**	**20**	**10**	**14**	**19**	**12**	**18**	**16**	**23**	**32**	**30**	**27**	**26**	**21**
Portland	86	82	37	46	59	63	42	14	10	5	10	14	12	13	11	14	21	23	21	24	19
New Hampshire	**67**	**74**	**67**	**69**	**84**	**103**	**91**	**64**	**75**	**42**	**37**	**43**	**42**	**68**	**30**	**32**	**40**	**29**	**30**	**22**	**18**
Hampton/Seabrook	17	25	22	18	24	23	33	23	29	17	16	18	21	28	16	13	19	16	25	18	14
Massachusetts	**338**	**326**	**401**	**413**	**406**	**350**	**338**	**299**	**215**	**145**	**110**	**153**	**178**	**218**	**182**	**181**	**200**	**200**	**192**	**190**	**207**
Gloucester	144	139	183	195	190	159	141	122	95	75	49	67	88	101	74	76	85	85	86	75	81
Boston	7	8	3	5	5	7	9	12	7	4	7	5	9	10	4	7	11	9	17	18	20
Provincetown	42	42	41	38	42	42	38	20	11	c	c	10	11	13	14	17	12	12	4	5	4
New Bedford	30	20	42	46	44	42	44	58	49	35	36	28	33	43	52	43	33	39	41	41	67
Rhode Island	**261**	**232**	**295**	**286**	**294**	**253**	**265**	**231**	**192**	**182**	**200**	**180**	**188**	**177**	**168**	**177**	**181**	**182**	**176**	**161**	**166**
Newport	52	37	64	61	78	64	53	49	31	20	24	18	16	16	10	8	7	6	3	6	4
Point Judith	203	186	201	197	183	182	195	179	159	154	167	150	161	154	149	158	156	163	165	152	160
Connecticut	**3**	**9**	**7**	**8**	**8**	**12**	**7**	**10**	**5**	**7**	**7**	**35**	**42**	**45**	**49**	**58**	**61**	**52**	**51**	**52**	**51**
Stonington	c	c	4	4	5	4	c	4	c	c	c	22	31	29	31	30	34	30	27	28	31
New London	c	c	c	c	c	c	c	c	c	c	c	7	4	4	c	8	12	13	13	10	12
New York	**235**	**272**	**250**	**285**	**238**	**238**	**223**	**159**	**150**	**120**	**141**	**159**	**168**	**161**	**156**	**133**	**157**	**151**	**140**	**120**	**123**
Greenport	32	35	28	35	17	16	8	8	3	5	c	4	5	c	5	c	c	c	c	c	c
Montauk	65	71	89	101	98	78	78	59	60	50	54	57	59	59	65	62	75	72	69	63	71
Shinnecock	c	c	c	c	c	c	c	c	c	5	4	8	10	11	6	8	12	14	18	9	6
Hampton Bay	87	111	94	97	94	103	94	65	56	41	54	56	54	49	48	34	42	40	33	29	32
Point Lookout	c	c	c	c	c	c	c	c	5	5	8	11	9	12	11	9	11	9	6	3	c
New York City	c	c	c	c	c	c	c	c	12	6	6	6	4	c	5	c	c	c	c	c	c
New Jersey	**170**	**175**	**168**	**162**	**151**	**149**	**100**	**99**	**82**	**66**	**91**	**87**	**107**	**103**	**98**	**95**	**78**	**93**	**100**	**80**	**101**
Belford	45	39	34	38	35	33	35	23	27	22	34	31	25	23	16	22	21	17	18	15	27
Point Pleasant	35	52	52	50	41	53	35	39	33	32	44	33	51	43	52	44	36	44	48	34	33

Source: NMFS permit data. c = confidential
State totals include other small ports.

5.5.5.2.2 Small-mesh multispecies landings by state and port

Table 30 lists silver hake and red hake landings by state for 1996-2016 and the percentage of those landings compared to the state's entire fish landings. For the most part, silver hake is a small percentage of each state's fish 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 and NY have ranged from 2 to 16% of the state's total fish landings. The silver hake landings in RI have been 2-7% of the state's total fish landings. The proportion of silver hake landings to total fish landings in ME/NH/NJ combined has consistently been low. It dropped significantly since 1997 and the proportion has remained very low. The magnitude of silver hake landings is less in recent years than it had been during 1996-97. Red hake comprise an even smaller proportion of the state's landings for these states.

The proportion of silver hake to total fish landings has fluctuated much in all states over the past two decades. While landings in the last ten years have been some of the lowest amount of silver hake landings, this is apparent across all fisheries.

Table 30. Annual red and silver hake landings by state as percentage of total state landings.

State	Year	Landings (Live Pounds)			Percent of State Total	
		Red Hake	Silver Hake	State Total Fish	Red Hake	Silver Hake
ME, NH, NJ	1996	135,076	5,249,751	874,677,955	0.02%	0.60%
	1997	234,848	3,745,832	859,779,353	0.03%	0.44%
	1998	246,350	1,830,383	795,036,844	0.03%	0.23%
	1999	249,588	1,125,683	837,303,964	0.03%	0.13%
	2000	339,025	1,038,951	895,261,391	0.04%	0.12%
	2001	321,433	1,123,444	940,590,695	0.03%	0.12%
	2002	134,680	1,144,930	903,729,481	0.01%	0.13%
	2003	31,556	329,882	938,699,230	0.00%	0.04%
	2004	40,172	367,538	927,710,553	0.00%	0.04%
	2005	51,397	425,378	785,054,539	0.01%	0.05%
	2006	42,013	280,482	765,114,290	0.01%	0.04%
	2007	116,029	1,207,332	753,321,013	0.02%	0.16%
	2008	104,308	861,589	804,047,717	0.01%	0.11%
	2009	178,427	1,719,911	738,939,031	0.02%	0.23%
	2010	159,716	845,000	724,326,230	0.02%	0.12%
	2011	108,975	1,158,514	816,659,549	0.01%	0.14%
	2012	237,185	1,740,202	817,117,337	0.03%	0.21%
	2013	82,291	622,591	677,975,485	0.01%	0.09%
	2014	115,633	1,149,013	709,632,634	0.02%	0.16%
	2015	94,595	536,251	695,232,826	0.01%	0.08%
	2016	57,744	437,875	712,529,460	0.01%	0.06%
MA	1996	866,296	2,718,402	437,694,432	0.20%	0.62%
	1997	692,388	2,850,467	436,569,212	0.16%	0.65%
	1998	316,177	2,620,755	445,667,453	0.07%	0.59%
	1999	406,408	4,242,107	412,662,329	0.10%	1.03%
	2000	433,028	5,056,069	401,464,250	0.11%	1.26%
	2001	382,844	5,712,744	488,096,446	0.08%	1.17%
	2002	505,862	5,006,098	543,455,839	0.09%	0.92%
	2003	496,829	6,212,761	590,580,698	0.08%	1.05%
	2004	376,522	6,201,313	667,681,141	0.06%	0.93%
	2005	209,881	6,008,479	686,117,675	0.03%	0.88%

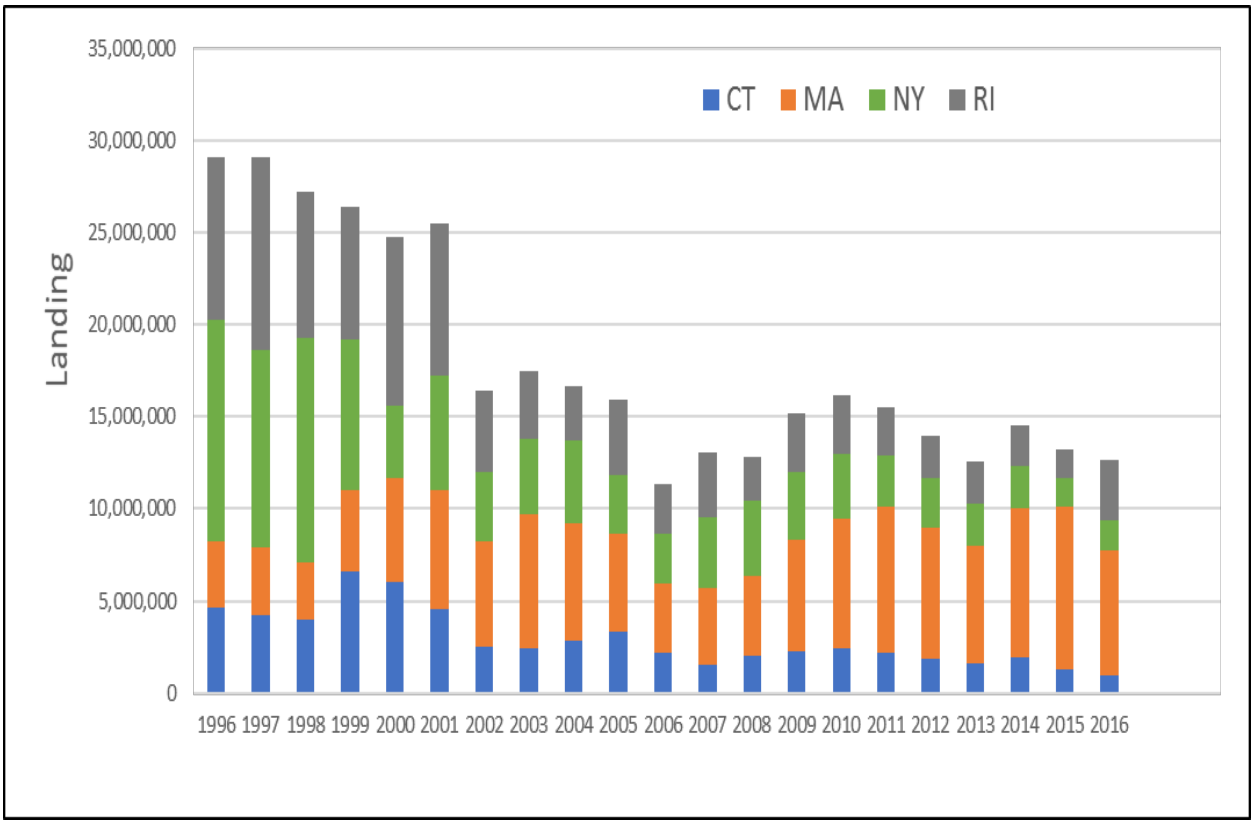
State	Year	Landings (Live Pounds)			Percent of State Total	
		Red Hake	Silver Hake	State Total Fish	Red Hake	Silver Hake
	2006	291,271	4,423,374	766,942,263	0.04%	0.58%
	2007	247,470	4,084,017	718,888,598	0.03%	0.57%
	2008	85,983	3,163,937	692,490,083	0.01%	0.46%
	2009	218,855	5,366,663	747,915,509	0.03%	0.72%
	2010	235,327	7,050,482	681,559,004	0.03%	1.03%
	2011	364,798	8,261,589	665,552,010	0.05%	1.24%
	2012	333,412	7,389,038	767,407,139	0.04%	0.96%
	2013	366,448	6,582,898	694,668,266	0.05%	0.95%
	2014	204,376	8,472,619	638,449,479	0.03%	1.33%
	2015	196,747	9,198,240	629,361,765	0.03%	1.46%
	2016	239,619	7,264,092	616,006,485	0.04%	1.18%
RI	1996	744,133	9,329,477	191,244,757	0.39%	4.88%
	1997	959,739	11,565,667	170,785,329	0.56%	6.77%
	1998	1,221,017	10,296,455	155,605,358	0.78%	6.62%
	1999	1,438,523	9,659,665	147,846,035	0.97%	6.53%
	2000	1,506,980	10,507,740	146,530,244	1.03%	7.17%
	2001	1,605,988	9,228,049	139,556,119	1.15%	6.61%
	2002	640,317	5,082,864	125,858,969	0.51%	4.04%
	2003	624,242	5,778,354	120,261,536	0.52%	4.80%
	2004	462,267	4,129,054	128,383,259	0.36%	3.22%
	2005	231,526	4,171,490	130,513,144	0.18%	3.20%
	2006	402,422	3,400,300	152,670,717	0.26%	2.23%
	2007	396,712	4,432,277	104,698,822	0.38%	4.23%
	2008	614,489	3,236,910	91,113,603	0.67%	3.55%
	2009	434,415	3,642,164	103,830,756	0.42%	3.51%
	2010	497,804	3,406,122	120,597,244	0.41%	2.82%
	2011	407,585	2,606,598	100,911,617	0.40%	2.58%
	2012	481,323	2,481,765	99,756,391	0.48%	2.49%
	2013	367,454	2,424,220	110,517,610	0.33%	2.19%
	2014	712,830	2,212,634	105,060,581	0.68%	2.11%
	2015	467,042	1,659,042	86,768,524	0.54%	1.91%
	2016	392,703	3,673,503	94,359,483	0.42%	3.89%
CT	1996	232,126	5,643,448	85,067,279	0.27%	6.63%
	1997	385,297	4,164,057	61,897,420	0.62%	6.73%
	1998	265,713	3,971,948	50,330,151	0.53%	7.89%
	1999	373,721	7,851,123	54,343,035	0.69%	14.45%
	2000	404,612	6,606,446	61,017,170	0.66%	10.83%
	2001	349,622	5,260,402	58,301,355	0.60%	9.02%
	2002	333,601	2,533,091	53,857,239	0.62%	4.70%
	2003	417,843	2,453,756	60,774,902	0.69%	4.04%
	2004	418,881	2,935,966	79,898,571	0.52%	3.67%
	2005	380,358	3,299,686	41,209,999	0.92%	8.01%
	2006	263,810	2,347,952	38,457,651	0.69%	6.11%
	2007	266,201	1,565,724	40,339,168	0.66%	3.88%
	2008	285,490	2,190,464	17,864,505	1.60%	12.26%
	2009	310,643	1,939,943	17,531,952	1.77%	11.07%
	2010	175,778	1,972,970	14,902,918	1.18%	13.24%
	2011	158,253	2,057,084	17,362,506	0.91%	11.85%
	2012	185,253	1,864,659	18,340,626	1.01%	10.17%
	2013	177,810	1,718,854	13,115,071	1.36%	13.11%
	2014	168,323	2,037,547	12,630,240	1.33%	16.13%

State	Year	Landings (Live Pounds)			Percent of State Total	
		Red Hake	Silver Hake	State Total Fish	Red Hake	Silver Hake
	2015	146,018	1,319,823	13,791,691	1.06%	9.57%
	2016	162,038	947,483	16,798,259	0.96%	5.64%
NY	1996	433,037	12,720,370	144,469,529	0.30%	8.80%
	1997	628,466	11,980,906	123,627,785	0.51%	9.69%
	1998	880,759	14,171,904	93,646,869	0.94%	15.13%
	1999	973,566	9,579,998	89,908,773	1.08%	10.66%
	2000	878,327	4,520,382	87,495,947	1.00%	5.17%
	2001	1,016,436	7,391,041	92,246,961	1.10%	8.01%
	2002	422,114	3,966,327	93,193,534	0.45%	4.26%
	2003	278,451	4,478,835	113,447,276	0.25%	3.95%
	2004	251,545	5,166,029	79,147,489	0.32%	6.53%
	2005	126,725	3,344,856	108,785,956	0.12%	3.07%
	2006	53,621	2,557,158	82,776,536	0.06%	3.09%
	2007	169,576	3,580,224	75,444,712	0.22%	4.75%
	2008	204,007	4,150,457	78,704,124	0.26%	5.27%
	2009	203,124	4,279,781	81,915,430	0.25%	5.22%
	2010	288,932	4,540,136	67,197,542	0.43%	6.76%
	2011	273,037	3,038,093	65,468,355	0.42%	4.64%
	2012	589,864	2,819,259	71,267,447	0.83%	3.96%
	2013	172,077	2,390,477	68,336,855	0.25%	3.50%
	2014	189,918	2,311,198	58,571,518	0.32%	3.95%
	2015	132,026	1,501,678	62,274,871	0.21%	2.41%
	2016	239,171	1,719,347	52,336,902	0.46%	3.29%

Source: NMFS dealer data, accessed 2017.

Figure 50 presents silver hake landings for four major states CT, MA, NY, and RI during 1996-2016. Landings have declined significantly for CT, NY, and RI, but it has increased in MA over the past two decades.

Figure 50. Annual silver hake landing (lbs.) for major states, 1996-2016.



Source: NEFSC VTR data

Table 31 presents cumulative landings of silver hake and red hake as well as landings of all fishes by those who landed small-mesh multispecies. Over the past two decades, the seven major states for small-mesh multispecies had ex-vessel revenue of about $330 M cumulatively from silver and red hakes. They cumulatively landed 404 M lbs. of silver hake and 46 M pounds of red hake during 1996-2016. The states of CT, MA and NY had relatively higher share of silver hake to total volume of all fishes. The share of silver hake to total fish landed ranged between 13 and 59% for silver hake, but it ranged between 3 and 7% for red hake.

Table 31. Small-mesh multispecies landings to total landed fish and real revenues from small-mesh multispecies during 1996-2016.

State Landed	Cumulative total landings (pounds), 1996 to 2016			Silver hake %	Red hake %	Cumulative total small-mesh multispecies revenue (in 2016$), 1996-2016
	Silver hake	Red hake	All Landings			
ME	7,222,442	928,770	36,431,971	20%	3%	$5,938,482
NH	5,785,746	2,173,208	43,283,055	13%	5%	$5,437,524
MA	122,158,823	9,414,785	299,480,845	41%	3%	$97,445,985
RI	96,181,561	12,582,948	380,917,239	25%	3%	$79,185,109
CT	61,400,882	6,887,390	103,385,398	59%	7%	$50,005,370
NY	99,872,171	9,901,463	245,856,488	41%	4%	$80,717,251
NJ	14,120,902	5,344,644	79,484,874	18%	7%	$13,290,361
Source: NEFSC VTR data, accessed 2017.						

Table 32 summarizes real revenue (in 2016$) from silver and red hake, as well as total revenue from all fishes per state. The proportion of total revenue that is made of silver hake and red hake is also displayed. In ME, there was about $1.8 mil in revenue from silver hake. These revenues comprised much less than 0.50 % of total state revenues. In 1996, silver hake landings made up approximately 0.46% of total state revenue. Following 1996, there has been a steady decline in revenue from silver hake landings; the revenue for red hake landings is only nominal. In NH, during the period 1996-2016, revenue from silver hake was less than $266,000 comprising less than 0.29-1.09% of total state fishing revenue. Revenue from red hake landings were $0-$11,000 during the past two decades. The greatest proportion of NH's revenue from silver hake was in 2012, at 1.09%. In 2016, the largest revenue from silver hake landings was about $265,000, representing approximately 0.79% of total state fishing revenues. Revenue from red hake landings are negligible.

Real revenue from silver hake landings in MA was $1.4 mil to $6.6 mil in 1996-2016; this was less than 1.25% of total state fishing revenues over the same time period. Revenue from red hake landings was $37,000 to $293,000, but this was less 0.10% of total MA fishing revenue. The largest revenue from silver hake on record in MA occurred in 2015; while, the greatest revenue from red hake landings occurred in 1996. Real revenue from silver hake landings in CT were $900,000-5.3M, approximately 1-11% of total state fishing revenue. The state has more dependency on silver hake than other states.

Revenue from red hake was less than 1% of total state fishing revenue. Revenue from silver hake was $1.0-6.7 million from 1996-2016 in RI; while revenue from red hake landings was $105,000-409,000 during this same time period. Revenue from silver hake ranged between 0.40% and 1.25% of total state fishing revenue; while revenue from red hake was 0.01-0.08% of total RI revenue for 1996-2016. In 1997, revenue of silver hake were highest in this time period, $6.7 million, representing about 5.74% of total state fishing revenues. In NJ during the period 1996-2016, revenue from silver hake was $58,000-1.3 mil, comprising less than 1 percent of total state fishing revenue. Revenue from red hake landings were $21,000-162,000 comprising less than 0.12% of total state fishing revenues. Revenue from silver hake landings in NY were $1.4– $9.5 mil for 1996-2016, representing approximately 0.14-7.68% of total state fishing revenue. Revenue from red hake landings were $33,000-501,000.

Table 32. Annual red and silver hake revenue by state as percentage of total state revenue from all species landed (in 2016$).

State	Year	Real Revenue$ (in 2016 $)			Percent of State Total	
		Red Hake	Silver Hake	State Total Fish	Red Hake %	Silver Hake %
ME, NH, NJ	1996	$83,579	$2,891,282	$553,053,627	0.02%	0.52%
	1997	114,346	2,001,919	578,689,931	0.02	0.35
	1998	118,869	1,059,039	568,180,403	0.02	0.19
	1999	116,141	666,413	625,570,725	0.02	0.11
	2000	162,950	634,001	657,039,015	0.02	0.10
	2001	123,379	723,669	579,729,866	0.02	0.12
	2002	72,796	664,077	582,620,901	0.01	0.11
	2003	21,062	232,211	588,608,956	0.00	0.04
	2004	30,242	208,576	712,881,191	0.00	0.03
	2005	40,731	249,314	733,522,509	0.01	0.03
	2006	30,620	209,161	616,346,979	0.00	0.03
	2007	68,611	720,453	631,959,574	0.01	0.11
	2008	48,714	539,200	960,811,301	0.01	0.06
	2009	77,813	801,619	559,233,930	0.01	0.14
	2010	76,936	463,688	718,530,582	0.01	0.06
	2011	61,285	682,858	729,203,935	0.01	0.09
	2012	118,760	753,037	787,305,310	0.02	0.10
	2013	49,492	466,987	645,395,862	0.01	0.07
	2014	48,269	686,408	784,781,525	0.01	0.09
	2015	60,977	409,205	839,025,432	0.01	0.05
	2016	33,687	367,246	953,902,085	0.00	0.04
MA	1996	$292,604	$ 1,423,336	$ 354,813,675	0.08%	0.40%
	1997	220,609	1,707,444	335,870,277	0.07	0.51
	1998	137,076	1,945,140	303,207,370	0.05	0.64
	1999	193,229	3,765,538	375,168,871	0.05	1.00
	2000	152,541	3,116,006	406,058,498	0.04	0.77
	2001	162,557	3,672,638	380,555,635	0.04	0.97
	2002	198,408	2,681,924	396,767,537	0.05	0.68
	2003	205,703	3,556,839	382,826,051	0.05	0.93
	2004	181,376	3,226,553	412,397,917	0.04	0.78
	2005	110,865	2,619,618	525,180,701	0.02	0.50
	2006	141,573	2,370,783	521,560,874	0.03	0.45
	2007	102,029	2,771,533	495,378,984	0.02	0.56
	2008	37,486	1,817,248	456,842,430	0.01	0.40
	2009	95,994	2,947,858	454,895,884	0.02	0.65
	2010	106,418	4,655,476	524,253,644	0.02	0.89
	2011	217,700	5,350,126	608,540,187	0.04	0.88
	2012	154,805	4,720,973	641,075,482	0.02	0.74
	2013	177,458	3,977,374	577,994,011	0.03	0.69
	2014	96,261	5,950,126	532,276,472	0.02	1.12

State	Year	Real Revenue$ (in 2016 $)			Percent of State Total	
		Red Hake	Silver Hake	State Total Fish	Red Hake %	Silver Hake %
	2015	80,641	6,641,748	531,934,004	0.02	1.25
	2016	93,606	5,789,679	551,682,865	0.02	1.05
CT	1996	$116,635	$2,972,749	$74,062,957	0.16%	4.01%
	1997	143,908	2,601,921	49,469,812	0.29	5.26
	1998	101,002	2,203,375	50,673,560	0.20	4.35
	1999	124,807	5,333,610	55,735,732	0.22	9.57
	2000	152,852	4,112,245	43,869,735	0.35	9.37
	2001	127,800	3,034,987	42,315,180	0.30	7.17
	2002	173,493	1,556,305	37,060,444	0.47	4.20
	2003	181,440	1,904,723	38,903,959	0.47	4.90
	2004	244,601	2,576,816	42,453,554	0.58	6.07
	2005	257,722	2,682,740	46,170,692	0.56	5.81
	2006	123,251	1,803,293	43,920,616	0.28	4.11
	2007	115,390	1,337,347	113,831,627	0.10	1.17
	2008	143,281	1,631,360	19,849,400	0.72	8.22
	2009	149,402	1,185,177	18,101,243	0.83	6.55
	2010	83,487	1,475,543	17,621,509	0.47	8.37
	2011	93,776	1,775,359	21,489,480	0.44	8.26
	2012	93,483	1,458,559	22,314,891	0.42	6.54
	2013	119,859	1,384,493	15,772,953	0.76	8.78
	2014	105,623	1,608,181	14,777,207	0.71	10.88
	2015	113,212	1,178,550	15,885,776	0.71	7.42
	2016	108,280	916,271	17,552,807	0.62	5.22
RI	1996	$290,002	$4,925,297	$107,737,784	0.27%	4.57%
	1997	351,074	6,705,025	116,771,745	0.30	5.74
	1998	322,893	5,134,234	106,001,668	0.30	4.84
	1999	409,229	5,009,342	123,953,123	0.33	4.04
	2000	374,198	5,072,685	112,847,004	0.33	4.50
	2001	356,784	4,888,249	93,044,759	0.38	5.25
	2002	217,938	2,271,329	86,341,056	0.25	2.63
	2003	199,315	2,656,768	86,204,277	0.23	3.08
	2004	133,489	2,335,531	90,365,851	0.15	2.58
	2005	123,411	2,277,910	112,524,612	0.11	2.02
	2006	172,630	2,021,788	116,499,501	0.15	1.74
	2007	131,258	2,485,517	89,120,387	0.15	2.79
	2008	170,525	2,057,383	94,725,109	0.18	2.17
	2009	105,341	1,734,468	73,005,442	0.14	2.38
	2010	155,479	2,149,914	66,480,286	0.23	3.23
	2011	153,475	1,539,593	87,788,026	0.17	1.75
	2012	145,889	1,502,363	92,577,343	0.16	1.62
	2013	125,140	1,172,182	89,087,625	0.14	1.32
	2014	201,379	1,401,353	87,571,112	0.23	1.60
	2015	167,116	1,035,256	83,079,048	0.20	1.25

State	Year	Real Revenue$ (in 2016 $)			Percent of State Total	
		Red Hake	Silver Hake	State Total Fish	Red Hake %	Silver Hake %
	2016	138,747	2,066,775	93,869,978	0.15	2.20
NY	1996	$ 290,356	$8,533,867	$132,577,474	0.22%	6.44%
	1997	347,708	9,476,900	134,007,315	0.26	7.07
	1998	447,511	9,261,065	120,519,848	0.37	7.68
	1999	490,463	6,714,212	107,883,701	0.45	6.22
	2000	449,489	3,610,342	85,190,382	0.53	4.24
	2001	455,536	5,716,788	74,634,612	0.61	7.66
	2002	251,495	2,838,853	68,392,698	0.37	4.15
	2003	155,935	3,985,483	67,310,567	0.23	5.92
	2004	142,469	4,374,076	58,898,394	0.24	7.43
	2005	92,543	3,048,590	69,332,543	0.13	4.40
	2006	33,214	2,209,247	68,798,442	0.05	3.21
	2007	90,815	2,631,610	178,768,749	0.05	1.47
	2008	91,741	2,902,670	163,776,138	0.06	1.77
	2009	88,098	2,813,426	92,720,876	0.10	3.03
	2010	141,561	3,377,231	54,741,356	0.26	6.17
	2011	134,017	2,380,544	73,728,506	0.18	3.23
	2012	501,343	2,350,640	981,627,657	0.05	0.24
	2013	122,804	1,981,182	273,397,523	0.04	0.72
	2014	118,963	1,953,728	111,758,203	0.11	1.75
	2015	84,951	1,386,133	1,021,745,226	0.01	0.14
	2016	142,356	1,522,726	171,153,810	0.08	0.89

Point Judith (RI) led all other ports in New England and the Mid-Atlantic in silver hake landings (cumulative) during 1996-2016 (Table 33). It ranked number one port for silver hake landing in 1996, but drops to the second in 2016. New Bedford (MA) has risen to number one port for silver hake landings in 2016. It also ranked 2nd for cumulative silver hake landings during 1996-2016. Gloucester (MA) ranked 3rd for silver hake landing in 2016 against 7th in 1996. New London (CT) was the second highest silver hake landings port in 1996, but it dropped to 5th rank in 2016. Hampton Bays (NY) used to be 3rd highest silver hake landing port in 1996, but the landings have significantly dropped over the recent past decade. Montauk (NY) had 6th in position in 1996 and it has risen to 4th in 2016. Portland (ME) was 5th in terms of silver hake landings in 1996, but now lands very nominal amount of silver hake. Over the past two decades, many ports declined significantly or had roller coaster landings of silver hake, but only few ports have risen such as New Bedford (MA).

Table 33. Silver hake landings (in metric tons) for major ports in a state and their rankings in 1996 and 2016.

State	CT		MA				ME	NH	NJ			NY						RI	
Port	New London	Stonington	New Bedford	Gloucester	Provincetown	Boston	Portland	Seabrook	Point Pleasant	Belford	Cape May	Montauk	Hampton Bays	Greenport	Freeport	New York City	Point Lookout	Point Judith	Newport
1996		N/A	53	862	265		1436				62	943	2310	2274	223	N/A	N/A	4010	
1997			10	805	424		561		617		144	1653	1721	1792	269	N/A	N/A	4913	
1998			28	836		0.28	75		418		75	1703	2232	2263	231	N/A	N/A	4417	237
1999			78	1004	759		63		239		24	1266	1187	1602	280		N/A	4172	163
2000			486	1081	633	0.58		89	223		8.86	1060	696	167	128	N/A	N/A	4296	381
2001			1182	619	711		13		297		33	2343	908	14	80	N/A		3609	577
2002			1196	489	564				289		7.46	1165	455	12	144	N/A		2149	156
2003			2417	232	71				32		1.98	1424	495	25	82	N/A	N/A	2372	249
2004			2536	227	22				57		5.14	1522	464		13	332.33	4.82	1724	
2005			2267	453					94		1.62	1216	200		N/A	26.68	49.39	1814	
2006			1875	126	N/A				45		4.69	736	212				94.74	1486	51
2007	254		1475	320	20		0.16		224		1.59	934	268	4.86			113.97	1937	49
2008	401	110	1142	123	134				162		10	1487	180	10			105.51	1418	
2009	321		1872	313	217				358		21	1590	189				52.96	1634	
2010	300	361	2542	293	240				181		6.80	1549	179	1.34			174.41	1530	
2011	315	276	2980	442	264	49			194		14	980	163				210.57	1163	
2012	513		2656	602	29				191		3.37	1044	111	N/A	N/A	N/A	99.07	1109	
2013	610	113	2456	444	41				104			1032	36		N/A	N/A	12.91	1093	2.84
2014			3120	687					153	152		919	86		N/A		14.60	1003	
2015	536		3000	863	142				57			614	43		N/A		13.87	752	0.35
2016	333	36	1719	1352					17	13	1.12	538	16	N/A	N/A			1665	
1996-2016	20286	6941	35093	12173	4943	492	2291	2020		2250	438	25717	12150	8201	1453	1271	956	48266	2687
Rank 1996	2			7	9		5		8			6	3	4	10			1	10
Rank 2016	5	10	1	3	8	9		7				4				6		2	
Rank 96-16	4	8	2	5	9				10			3	6	7				1	

Source: NMFS Dealer data

Note: Reporting by less than three dealers are masked in black for data confidentiality requirement.

5.5.5.3 Port descriptions

Described here are the 17 Communities of Interest for the small-mesh multispecies fishery. Information in this section is largely based on demographic data collected by the U.S. Census Bureau and fishery data collected by NMFS, much of which are available on the NEFSC website (NEFSC 2017). Clay *et al.* (2007) provides a detailed profile of each port, including important social and demographic information.

5.5.5.3.1 Maine and New Hampshire ports

Portland, ME

General: Portland is a fishing community in Cumberland County, ME. In 2016, Portland had a population of 66,649, a 0.7% increase from the year 2010 (66,194). In 2012-2016, 0.5% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Portland; the poverty rate was 19.2%; and the population was 82% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Portland are high and low, respectively (Jepson and Colburn 2013). In 2017, Portland was the homeport and primary landing port for 76 and 98 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Portland were valued at $38M (NMFS 2017c), 6% of the state-wide total ($636M); American

lobster was the highest value species ($18M; 47%), landed by 207 vessels and sold to 17 dealers (Table 34). Many of Portland's vessels are active in fisheries managed by the Atlantic States Marine Fisheries Commission (ASMFC; e.g., American lobster, menhaden).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Portland landed over 5M lbs. of whiting and red hake (Table 24). In terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies, Portland ranked 2nd in 1996, but over 10th in 2016 (Table 26). Portland landed 88% and 79% of the silver and red hake in Maine, respectively, during 1996-2016 (Table 28). It has been the most active port in Maine, though it had a 78% decline in the number of active permits, 86 to 19 (Table 29).

Table 34. Top five species landed by value in Portland, 2016

Species	Revenue ($)	Vessels	Dealers
American lobster	$18M	207	17
Atlantic herring	$10M	7	35
Pollock	$1.6M	39	3
Menhadens	$0.92M	5	5
White hake	$0.76M	29	3
***Source:* ACCSP, January 2018.**			

Seabrook, NH

General: Seabrook is a fishing community in Rockingham County, NH. In 2016, Seabrook had a population of 8,772, a 0.9% increase from the year 2010 (8,693). In 2012-2016, 0.0% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Seabrook (0.6% in Rockingham County); the poverty rate was 9.3%; and the population was 97% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Seabrook are medium-high and low, respectively (Jepson and Colburn 2013). In 2017, Seabrook was the homeport and primary landing port for 21 and 22 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Seabrook were valued at $2.7M (Table 25), 8% of the state-wide total ($33M); American lobster was the highest value species ($1.5M; 56%), landed by 60 vessels and sold to 12 dealers (Table 34). Many of Seabrook's vessels are also active in the lobster fishery, managed by the ASMFC.

Table 35. Top five species landed by value in Seabrook, 2016

Species	Revenue ($)	Vessels	Dealers
American lobster	$1.5M	60	12
Note: Data for four of the top five species landed are confidential.			
***Source:* ACCSP, January 2018.**			

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Seabrook landed over 5M lbs. of whiting and red hake, and over 200K lbs. in 2016 alone (Table 24). Seabrook was the 7th largest port in 2016 for whiting landings, and the value of whiting ($251K) and red hake ($10K) was 10% of the total landings revenue in Seabrook ($2.7M, Table 25). While the number of trips landing over 2,000 lbs. of small-mesh multispecies have declined in many ports, the number of these trips landing in Seabrook have generally increased. In terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies, Seabrook ranked over 10th in 1996, but 4th in 2016 (Table 26). Seabrook landed 73% and 57% of the silver and red hake in New Hampshire, respectively, during 1996-2016 (Table 28). In 2016, Seabrook had 14 active small mesh permits (Table 29).

5.5.5.3.2 Massachusetts ports

Gloucester, MA

General: Gloucester is a fishing community in Essex County, MA. In 2016, Gloucester had a population of 29,546, a 3% increase from the year 2010 (28,789). In 2012-2016, 2% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Gloucester; the poverty rate was 8.2%; and the population was 95% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Gloucester are high and medium, respectively (Jepson and Colburn 2013). In 2017, Gloucester was the homeport and primary landing port for 200 and 213 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Gloucester were valued at $53M (Table 25), 9% of the state-wide total ($551M); American lobster was the highest value species ($17M; 33%), landed by 175 vessels and sold to 23 dealers (Table 36). Many of Gloucester's vessels are also active in the lobster fishery, managed by the ASMFC.

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Gloucester landed over 5M lbs. of whiting and red hake, and over 3M lbs. in 2016 alone (Table 24). Gloucester was the 3rd largest port in 2016 for whiting landings, and the value of whiting ($2.0M) and red hake ($54K) was 4% of the total landings revenue in Gloucester ($53M, Table 25). Gloucester had the highest number of trips (n=339) whose revenues were >50% from whiting in 2016. Gloucester ranked 3rd in 1996, and 1st in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Gloucester landed 25% and 54% of the silver and red hake in Massachusetts, respectively, during 1996-2016 (Table 28). In both 1996 and 2016, Gloucester had the highest number of active small-mesh permits in the state, 144 and 81, respectively (Table 29).

Table 36. Top five species landed by value in Gloucester, 2016

Species	Revenue ($)	Vessels	Dealers
American lobster	$17M	175	23
Haddock	$5.3M	85	12
Atlantic herring	$5.1M	11	23
Goosefish (monkfish)	$3.1M	68	10
Acadian redfish	$2.8M	64	10
***Source:* ACCSP, January 2018.**			

Boston, MA

General: Boston is a fishing community in Suffolk County, MA. In 2016, Boston had a population of 658,279, a 6.6% increase from the year 2010 (617,594). In 2012-2016, 0.1% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Boston; the poverty rate was 21.1%; and the population was 45% white, non-Hispanic, 23% black or African American alone, and 19% Hispanic or Latino (of any race; U.S. Census 2018). The commercial fishing engagement and reliance indices for Boston are high and medium, respectively (Jepson and Colburn 2013). In 2017, Boston was the homeport and primary landing port for 112 and 55 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Gloucester were valued at $17M (Table 25), 3% of the state-wide total ($551M); American lobster was the highest value, non-confidential species ($2.6M; 15%), landed by 41 vessels and sold to 5 dealers (Table 37). Many of Boston's vessels are also active in the lobster fishery, managed by the ASMFC.

Small-mesh multispecies fishery: In 2016, Boston landed over 200K lbs. of whiting and red hake (Table 24) was the 9th largest port in 2016 for whiting landings, and the value of whiting ($170K) and red hake ($0) was 1% of the total landings revenue in Boston (Table 25). In terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies. Boston ranked over 10th in 1996, and 9th in 2016; there were virtually no trips until 1998, and the number of trips peaked in 2015 (Table 26). Boston landed ≤3% and ≤4% of the silver and red hake in Massachusetts, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Boston increased from 7 in 1996 to 20 in 2016 (Table 29).

Table 37. Top five species landed by value in Boston, 2016

Species	Revenue ($)	Vessels	Dealers
American lobster	$2.6M	41	5
Haddock	$2.1M	23	3
Pollock	$1.5M	20	3
Note: Data for four of the top five species landed are confidential.			
Source: ACCSP, January 2018.			

Provincetown, MA

General: Provincetown is a fishing community in Barnstable County, on Cape Cod, MA. In 2016, Provincetown had a population of 2,962, a 0.7% increase from the year 2010 (2,942). In 2012-2016, 0.7% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Provincetown; the poverty rate was 13.2%; and the population was 85% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Provincetown are medium-high and medium, respectively (Jepson and Colburn 2013). In 2017, Provincetown was the homeport and primary landing port for 13 and 15 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Provincetown were valued at $8.2M (Table 25), 1% of the state-wide total ($551M); American lobster was the highest value ($3.7M; 45%), landed by 58 vessels and sold to 12 dealers (Table 38). Of the top five species by value landed in Provincetown in 2016, only sea scallops are managed by the NEFMC.

Table 38. Top five species landed by value in Provincetown, 2016

Species	Revenue ($)	Vessels	Dealers
American lobster	$3.7M	58	12
Sea scallop	$3.3M	35	9
Sea mussel	$0.40M	5	4
Bluefin tuna	$0.22M	38	4
Eastern oyster	$0.10M	4	5
Source: ACCSP, January 2018.			

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Provincetown landed over 5M lbs. of whiting and red hake, and over 200K lbs. in 2016 alone (Table 24). Provincetown was the 8th largest port in 2016 for whiting landings, and the value of whiting ($80K) and red hake ($0.1K) was 1% of the total landings revenue in Provincetown ($8.2M, Table 25). Provincetown ranked 9th in 1996, and 8th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Provincetown landed 8% and 9% of the silver and red hake in Massachusetts, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Provincetown decreased from 42 in 1996 to 4 in 2016 (Table 29).

New Bedford, MA

General: New Bedford is a fishing community in Bristol County, MA. In 2016, New Bedford had a population of 94,988, a 0.1% decrease from the year 2010 (95,072). In 2012-2016, 2% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in New Bedford; the poverty rate was 23.5%; and the population was 65% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for New Bedford are high and medium, respectively (Jepson and Colburn 2013). In 2017, New Bedford was the homeport and primary landing port for 220 and 239 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in New Bedford were valued at $326M (Table 25), 59% of the state-wide total ($551M); sea scallops was the highest value species ($252M, 77%), landed by 269 vessels and sold to 28 dealers (Table 39). Many of New Bedford's vessels are active in fisheries managed by the MAFMC (e.g., Atlantic surfclam) and ASMFC (e.g., American lobster).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, New Bedford landed over 5M lbs. of whiting and red hake, and over 3M lbs. in 2016 alone (Table 24). New Bedford was the largest port in 2016 for whiting landings, and the value of whiting ($3.5M) and red hake ($39K) was 1% of the total landings revenue in New Bedford ($326M, Table 25). While the number of trips landing over 2000 lbs. of small-mesh multispecies have declined in many ports, the number of these trips landing in New Bedford have generally increased. New Bedford ranked over 10th in 1996, and 3rd in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). New Bedford landed 64% and 33% of the silver and red hake in Massachusetts, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in New Bedford increased from 30 in 1996 to 67 in 2016 (Table 29). In the small-mesh multispecies fishery, New Bedford serves as a primary landings port for vessels that are home ported elsewhere (including Montauk NY as well as RI and CT ports). Many vessels that land small-mesh multispecies in New Bedford also participate in other trawl fisheries, often targeting squids.

Table 39. Top five species landed by value in New Bedford, 2016

Species	Revenue ($)	Vessels	Dealers
Sea scallop	$252M	269	28
Atlantic surfclam	$13M	18	10
American lobster	$9.4M	101	20
Winter flounder	$5..5M	60	6
Haddock	$5.2M	41	7
***Source:* ACCSP, January 2018.**			

5.5.5.3.3 Rhode Island ports

Narragansett/Point Judith, RI

General: Point Judith is a fishing community in the town of Narragansett, in Washington County, RI. In 2016, Narragansett had a population of 15,672, a 1% decrease from the year 2010 (15,868). In 2012-2016, 2% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Narragansett; the poverty rate was 16.3%; and the population was 95% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Narragansett/Point Judith are high and medium, respectively (Jepson and Colburn 2013). In 2017, Point Judith was the homeport and primary landing port for 117 and 140 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Point Judith were valued at $56M (Table 25), 60% of the state-wide total ($94M); inshore longfin squid was the highest value species ($22M; 39%), landed by 99 vessels and sold to 20 dealers (Table 40). Of the top five species by value in 2016 landed in Point Judith, only sea scallops are managed by the NEFMC.
Many of Point Judith's vessels are active in fisheries managed by the MAFMC (e.g. squid, summer flounder, scup).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Point Judith landed over 5M lbs. of whiting and red hake, and over 3M lbs. in 2016 alone (Table 24). Point Judith was the 2nd largest port in 2016 for whiting landings, and the value of whiting ($2.1M) and red hake ($0.1M) was 4% of the total landings revenue in Point Judith ($56M, Table 25). Point Judith ranked 1st in 1996, and 2nd in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Point Judith landed 95% and 94% of the silver and red hake in Rhode Island, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Point Judith decreased from 203 in 1996 to 160 in 2016 (Table 29).

Table 40. Top five species landed by value in Point Judith, 2016

Species	Revenue ($)	Vessels	Dealers
Inshore longfin squid	$22M	99	20
Sea scallop	$7.9M	53	19
American lobster	$5.7M	106	36
Summer flounder	$4.8M	332	19
Scup	$3.6M	273	21
***Source:* ACCSP, January 2018.**			

Newport, RI

General: Newport is a fishing community in Newport County, RI. In 2016, Newport had a population of 24,570, a 0.4% increase from the year 2010 (24,672). In 2012-2016, 0.3% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Newport; the poverty rate was 13.5%; and the population was 77% white, non-Hispanic and 11% Hispanic or Latino (of any race; U.S. Census 2018). The commercial fishing engagement and reliance indices for Newport are high and low, respectively (Jepson and Colburn 2013). In 2017, Newport was the homeport and primary landing port for 29 and 31 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2015, total landings in Newport were valued at $7.5M, 9% of the state-wide total ($82M). In 2016, American lobster was the highest value species ($4.9M), landed by 30 vessels and sold to 23 dealers (Table 41). Many of Newport's vessels are active in fisheries managed by the ASMFC (e.g., American lobster, Jonah crab) or MAFMC (summer flounder).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Newport landed over 5M lbs. of whiting and red hake (Table 24). Newport ranked 10th in 1996, and over 10th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Newport landed 5% and 6% of the silver and red hake in Rhode Island, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Newport decreased from 52 in 1996 to 4 in 2016 (Table 29).

Table 41. Top five species landed by value in Newport, 2016

Species	Revenue ($)	Vessels	Dealers
American lobster	$4.9M	30	23
Jonah crab	$1.5M	15	14
Goosefish (monkfish)	$0.38M	10	8
Summer flounder	$0.20M	32	9
Winter skate	$0.12M	8	5
***Source:* ACCSP, January 2018.**			

5.5.5.3.4 Connecticut ports

Stonington, CT

General: Stonington is a fishing community in New London County, CT. In 2016, Stonington had a population of 18,477, a 0.4% decrease from the year 2010 (18,545). In 2012-2016, 0.2% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Stonington; the poverty rate was 8.5%; and the population was 91% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Stonington are high and low, respectively (Jepson and Colburn 2013). In 2017, Stonington was the homeport and primary landing port for 15 and 22 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings value in Stonington was at least $5.1M, 34% of the state-wide total ($15M); sea scallop was the highest value species ($3.2M), landed by 10 vessels and sold to 5 dealers (Table 42). Of the top five species by value in 2016 landed in Stonington, only sea scallops are managed by the NEFMC.

Table 42. Top five species landed by value in Stonington, 2016

Species	Revenue ($)	Vessels	Dealers
Sea scallop	$3.2M	10	5
Inshore longfin squid	$0.74M	21	6
Summer flounder	$0.47M	51	8
American lobster	$0.44M	31	3
Scup	$0.22M	47	8
***Source:* ACCSP, January 2018.**			

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Stonington landed over 5M lbs. of whiting and red hake (Table 24). Stonington ranked over 10th in 1996, and 10th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Stonington landed 23% and 22% of the silver and red hake in Connecticut, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Stonington increased from under 3 in 1996 to 31 in 2016 (Table 29).

New London, CT

General: New London is a fishing community in New London County, CT. In 2016, New London had a population of 27,218, a 1.5% decrease from the year 2010 (27,620). In 2012-2016, 0.07% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in New London; the poverty rate was 28.2%; and the population was 47% white, non-Hispanic and 32% Hispanic or Latino (of any race; U.S. Census 2018). The commercial fishing engagement and reliance indices for New London are medium-high and low, respectively (Jepson and Colburn 2013). In 2017, New London was the homeport and primary landing port for 15 federal fishing permits (i.e. vessels; GARFO 2018). In 2016, total landings value in New London was $4.9M (Table 24), 33% of the state-wide total ($15M); inshore longfin squid was the highest value species ($1.4M), landed by 8 vessels and sold to 10 dealers (Table 43). Many of New London's vessels are active in fisheries managed by the MAFMC (e.g., inshore longfin squid, scup).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, New London landed over 5M lbs. of whiting and red hake, and over 500K lbs. in 2016 alone (Table 24). Silver hake was the third highest valued species landed in New London in 2016 (Table 43). New London was the 5th largest port in 2016 for whiting landings, and the value of whiting ($0.66M) and red hake ($65K) was 15% of the total landings revenue in New London ($4.9M, Table 25). New London ranked 8th in 1996, and 6th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). New London landed 77% and 78% of the silver and red hake in Connecticut, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in New London increased from under 3 in 1996 to 12 in 2016 (Table 29).

Table 43. Top five species landed by value in New London, 2016

Species	Revenue ($)	Vessels	Dealers
Inshore longfin squid	$1.4M	8	11
Sea scallop	$0.94M	6	4
Silver hake	$0.66M	5	8
Scup	$0.45M	13	9
Goosefish (monkfish)	$0.43M	18	12
***Source:* ACCSP, January 2018.**			

5.5.5.3.5 New York ports

Greenport, NY

General: Greenport is a fishing community within the town of Southold, in Suffolk County, on Long Island, NY. In 2016, Greenport had a population of 2,073, a 5.6% decrease from the year 2010 (2,197). In 2012-2016, 3% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Greenport; the poverty rate was 18.2%; and the population was 62% white, non-Hispanic and 24% Hispanic or Latino (of any race; U.S. Census 2018). The commercial fishing engagement and reliance indices for Greenport are medium and low, respectively (Jepson and Colburn 2013). In 2017, Greenport was the homeport and primary landing port for 3 federal fishing permits (i.e. vessels; GARFO 2018). In 2016, total landings value in Greenport was at least $130K, 0.2% of the state-wide total ($53M); bluefish was the highest value species ($74K), landed by 8 vessels and sold to 4 dealers (Table 44). Of the top four non-confidential species by value in 2016 landed in Greenport, all are managed by entities other than the NEFMC.

Table 44. Top five species landed by value in Greenport, 2016

Species	Revenue ($)	Vessels	Dealers
Bluefish	$74K	8	4
Scup	$34K	7	3
Black sea bass	$21K	6	3
Tautog	$0.6K	4	3
Note: Data for one of the top five species landed are confidential.			
***Source:* ACCSP, January 2018.**			

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Greenport landed over 5M lbs. of whiting and red hake (Table 24). Greenport ranked 6th in 1996, and over 10th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Greenport landed 17% and 6% of the silver and red hake in New York, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Greenport decreased from 32 in 1996 to under 3 in 2016 (Table 29).

Montauk, NY

General: Montauk is a fishing community in the town of East Hampton in Suffolk County, on Long Island, New York. In 2016, Montauk had a population of 3,510, a 6% increase from the year 2010 (3,326). In 2012-2016, 4% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Montauk; the poverty rate was 11.5%; and the population was 81% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Montauk are both high (Jepson and Colburn 2013). In 2017, Montauk was the homeport and primary landing port for 122 and 136 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Montauk were valued at $17M, 32% of the state-wide total ($53M); inshore longfin squid was the highest value species ($4.5M; 26%), landed by 48 vessels and sold to 25 dealers (Table 45). Of the top five species by value in 2016 landed in Montauk, just silver hake is managed by the NEFMC. Many Montauk, NY vessels are active in fisheries managed by the MAFMC (e.g. squid, tilefish, scup, summer flounder).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Montauk landed over 5M lbs. of whiting and red hake, and over 1M lbs. in 2016 alone (Table 24). Silver hake was the 5th highest valued species landed in Montauk in 2016 (Table 43). Montauk was the 4th largest port in 2016 for whiting landings, and the value of whiting and red hake was 8% of the total landings revenue in Montauk (Table 25). In 2015, silver hake was the 5th highest value species landed in Montauk ($1.3M, 8%; Table 45). Montauk ranked 5th in 1996 and in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Montauk landed 53% and 65% of the silver and red hake in New York, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Montauk fluctuated, 65 in 1996 and 71 in 2016 (Table 29).

Table 45 - Top five species landed by value in Montauk, 2016

Species	Revenue ($)	Vessels	Dealers
Longfin inshore squid	$4.5M	48	25
Scup	$2.4M	112	22
Tilefish	$2.0M	14	12
Summer flounder	$1.6M	89	23
Silver hake	$1.2M	42	17
***Source:* ACCSP, January 2018.**			

Hampton Bays/Shinnecock, NY

General: Hampton Bays and Shinnecock are considered to be the same fishing community. Shinnecock is a fishing port in the hamlet of Hampton Bays in Suffolk County, on Long Island, NY. Shinnecock is on the barrier island next to Shinnecock Inlet, and does not actually refer to a geopolitical entity. Fishermen use either port name in reporting their catch, but they are considered to be the same physical place. In 2016, Hampton Bays had a population of 13,040, a 4% decrease from the year 2010 (13,603). In 2012-2016, 0.6% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Hampton Bays; the poverty rate was 7.5%; and the population was 68% white, non-Hispanic and 30% Hispanic or Latino (of any race; U.S. Census 2018). The commercial fishing engagement and reliance indices for Hampton Bays/Shinnecock are high and medium, respectively (Jepson and Colburn 2013). In 2017, Hampton Bays/Shinnecock was the homeport and primary landing port for 34 and 33 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Hampton Bays was valued at over $6.6M, 12% of the state-wide total ($53M); inshore longfin squid was the highest value species ($2.9M; 48%), landed by 44 vessels and sold to 17 dealers (Table 46). Many vessels landing in Hampton Bays/Shinnecock are active in fisheries managed by the MAFMC (e.g. squid, tilefish, summer flounder).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Hampton Bays/Shinnecock landed over 5M lbs. of whiting and red hake (Table 24). Hampton Bays/Shinnecock ranked 4th in 1996, and over 10th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Hampton Bays/Shinnecock landed 24% and 15% of the silver and red hake in NY, respectively, during this time period (Table 28). The number of active small-mesh permits in landing in Hampton Bays/Shinnecock decreased from just over 87 in 1996 to 38 in 2016 (Table 29).

Table 46 - Top five species landed by value in Hampton Bays, 2016

Species	Revenue ($)	Vessels	Dealers
Longfin inshore squid	$2.9M	44	17
Sea scallop	$1.5M	9	7
Goosefish (monkfish)	$0.94M	30	15
Tilefish	$0.89M	6	8
Summer flounder	$0.94M	39	19
***Source:* ACCSP, January 2018.**			

Point Lookout, NY

General: Point Lookout is a fishing community within the town of Hempstead, in Nassau County, on Long Island, NY. In 2016, Point Lookout had a population of 1,128, a 7.5% decrease from the year 2010 (1,219). In 2012-2016, 0.0% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Point Lookout (0.1% in Hempstead); the

poverty rate was 0.0%; and the population was 94% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Point Lookout are both medium (Jepson and Colburn 2013). In 2017, Point Lookout was the homeport and primary landing port for 0 and 2 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, of the top five species landed in Point Lookout, just bluefish is non-confidential, valued at $3.4K, 0.01% of the state-wide total ($53M), landed by 7 vessels and sold to 4 dealers (Table 47). Bluefish is managed by the MAFMC.

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Point Lookout landed over 5M lbs. of whiting and red hake (Table 24). Point Lookout ranked over 10th in 1996 and in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Point Lookout landed 4% and 10% of the silver and red hake in New York, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Point Lookout was under 3 in 1996 and in 2016, but peaked at 12 in 2009 (Table 29).

Table 47. Top five species landed by value in Point Lookout, 2016

Species	Revenue ($)	Vessels	Dealers
Bluefish	$3.4K	7	4
Note: Data for four of the top five species landed are confidential.			
***Source:* ACCSP, January 2018.**			

New York City, NY

General: New York City (NYC) is a fishing community in the State of New York. In 2016, NYC had a population of 8,461,961, a 3.5% increase from the year 2010 (8,175,133). In 2012-2016, 0.1% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in NYC; the poverty rate was 20.3%; and the population was 32% white, non-Hispanic, 29% Hispanic or Latino (of any race), and 22% black or African American alone (U.S. Census 2018). The commercial fishing engagement and reliance indices for Staten Island are both low, for Manhattan and Brooklyn are both medium, and for Bronx and Queens are medium and low, respectively (Jepson and Colburn 2013). In 2017, NYC (all boroughs combined) was the homeport and primary landing port for 73 and 41 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in New York City was valued at $350K (Table 25), 0.7% of the state-wide total ($53M); whiting (silver and offshore hake) was the highest value fishery ($310K; 89%), sold to 6 dealers (Table 25).

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, NYC landed over 5M lbs. of whiting and red hake, and over 200K lbs. in 2016 alone (Table 24). NYC was the 6th largest port in 2016 for whiting landings, and the value of whiting ($310K) and red hake ($6K) was 91% of the total landings revenue in New York City ($350K, Table 25). NYC ranked over 10th in 1996, and 7th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). NYC landed ≤2% and ≤4% of the silver and red hake in NY, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in NYC was under 3 in 1996 and in 2016, but peaked at 12 in 2004 (Table 29). A large amount of small-mesh multispecies landings in NE states are trucked to and sold in NY wholesale fish markets, mainly at businesses in and around the famed Fulton Fish Market. Some of these landings made directly to and reported by these NY businesses, although the actual offloading site may be elsewhere, such as Montauk, NY or Point Judith, RI.

5.5.5.3.6 New Jersey ports

Belford, NJ

General: Belford is a fishing community within Middletown Township, in Monmouth County, NJ. In 2016, Belford had a population of 1,573, an 11% decrease from the year 2010 (1,768). In 2012-2016, 0.0% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Belford (0.3% in Middletown); the poverty rate was 3.3%; and the population was 80% white, non-Hispanic and 14% Hispanic or Latino (of any race; U.S. Census 2018). The commercial fishing engagement and reliance indices for Belford are high and medium-high, respectively (Jepson and Colburn 2013). In 2017, Belford was the homeport and primary landing port for 18 federal fishing permits (i.e. vessels; GARFO 2018). In 2016, total landings in Belford was valued at over $2.7M, 1% of the state-wide total ($191M); summer flounder was the highest value species ($1.9M), landed by 24 vessels and sold to 8 dealers (Table 48). Of the top five valued species landed in Belford in 2016, all are managed by entities other than the NEFMC.

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Belford landed over 5M lbs. of whiting and red hake (Table 24). Belford ranked over 10th in 1996 and in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Belford landed 34% and 20% of the silver and red hake in New Jersey, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Belford decreased from 45 in 1996 to 27 in 2016 (Table 29).

Table 48 - Top five species landed by value in Belford, 2016

Species	Revenue ($)	Vessels	Dealers
Summer flounder	$1.9M	24	8
Scup	$0.31M	21	7
Inshore longfin squid	$0.25M	20	6
Black sea bass	$0.21M	20	5
Bluefish	$0.08M	17	5
***Source:* ACCSP, January 2018.**			

Point Pleasant, NJ

General: Point Pleasant is a fishing community in Ocean County, NJ. In 2016, Point Pleasant had a population of 18,464, a 0.4% increase from the year 2010 (18,392). In 2012-2016, 0.6% of the civilian employed population aged 16 years and over worked in agriculture, forestry, fishing, hunting, and mining occupations in Point Pleasant; the poverty rate was 6.3%; and the population was 95% white, non-Hispanic (U.S. Census 2018). The commercial fishing engagement and reliance indices for Point Pleasant are high and medium, respectively (Jepson and Colburn 2013). In 2017, Point Pleasant was the homeport and primary landing port for 48 and 53 federal fishing permits (i.e. vessels), respectively (GARFO 2018). In 2016, total landings in Point Pleasant was valued at $32M (NMFS 2017c), 17% of the state-wide total ($191M); sea scallop was the highest value species ($15M, 47%), landed by 69 vessels and sold to 16 dealers (Table 49). Of the top five valued species landed in Point Pleasant in 2016, just sea scallops is managed by the NEFMC.

Small-mesh multispecies fishery: Cumulatively from 1999 to 2016, Point Pleasant landed over 5M lbs. of whiting and red hake (Table 24). Point Pleasant ranked 7th in 1996 and over 10th in 2016, in terms of the number of trips landing over 2,000 lbs. of small-mesh multispecies (Table 26). Point Pleasant landed

60% and 52% of the silver and red hake in NJ, respectively, during 1996-2016 (Table 28). The number of active small-mesh permits in landing in Point Pleasant fluctuated, 35 in 1996 and 33 in 2016 (Table 29).

Table 49 - Top five species landed by value in Point Pleasant, 2016

Species	Revenue ($)	Vessels	Dealers
Sea scallop	$15M	69	16
Summer flounder	$2.1M	49	15
Scup	$1.2M	31	12
Black sea bass	$0.94M	40	15
American lobster	$0.85M	14	7
Source: **ACCSP, January 2018.**			

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6.0 ENVIRONMENTAL CONSEQUENCES (EIS)

6.1 Introduction and Methods; Analytic Approach and Limitations

6.1.1 Valued Ecosystem Components

To evaluate the estimated effects (direct, indirect, and cumulative) of the alternatives on the individual elements of the environment, expected changes in the fishery were evaluated with respect to:

- Biological impacts on the target species (red, silver, and offshore hakes)

  The amendment focuses on the small-mesh multispecies fishery, which uses trawl gears to fish seasonally in exemption areas. Most non-target fishing will not be affected by this amendment, because of a proposed 2,000 lbs. whiting and 400 lbs. red hake incidental limit.

- Biological impacts of the directed fishery on non-target species

  This analysis focuses only on fish bycatch while fishing with small-mesh trawls for small-mesh multispecies. It does not include fisheries using large-mesh trawls, other gears, or small-mesh trawls that target other species (e.g. squids and herring). These fisheries are not directly affected by the proposed alternatives, although some of them may absorb some fishing effort by non-qualifying small-mesh multispecies limited access permits (Category I or II). We discuss indirect effects by effort shifts, but predicting any quantitative effects is beyond our capability.

- Biological impacts on protected species

  The same considerations and approach as used for non-target species are applied here.

- Impacts on physical habitat and EFH

  Effects of alternatives on the magnitude and distribution of fishing effort by gear type, and thus on physical habitat and EFH, are qualitatively evaluated.

- Impacts on human communities

  Effects of possession limit alternatives on landings and revenue by qualifying vessels as well as impacts by vessels not qualifying for a Category I or II limited access permit are estimated. Effects on top ports as well as ports with a substantial reliance on the small-mesh multispecies fishery are estimated.

6.1.2 Methods and Evaluation Criteria

<u>Evaluation of effects</u>

In most cases, the evaluation of limited access alternatives focuses on balancing fleet capacity with sustainable yield from the target species. Evaluation of economic efficiency and capacity of qualifying vessels is of paramount concern. During an evaluation of limited access alternatives for the Pacific groundfish fishery, Huppart (1987) identified the following objectives and found that “No single system

of regulation could address all 9 of these objectives simultaneously and with equal success. A limited access system must be tailored to the specific objectives sought", which typically include:

1. Promote economic efficiency in harvesting
2. Establish stable and secure tenure to the fishery for licensed fishermen
3. Enhance the value of fishery products delivered to consumers
4. Increase and stabilize profitability of fishing fleet
5. Reduce the burden of management regulations on the industry
6. Reduce the cost of fisheries management born by public
7. Secure an equitable distribution of benefits from the fishery
8. Protect various segments of the fishing industry from other fishermen and non-commercial interests
9. Help restrain fishing effort and conserve fish stock.

The purpose and need of this amendment, however, differs from that usually associated with limited access. The primary target species of the small-mesh multispecies fishery is silver hake. Red and offshore hakes are targeted only occasionally. ACLs for northern silver hake and southern whiting have been and are likely to continue to be much higher than catches have been (see figure below). Thus, from this perspective, there is room for additional fishing capacity in the small-mesh multispecies fishery.

Instead, the primary focus of this amendment is on managing catches of non-target species, such as red hake, yellowtail flounder, and potentially haddock. Most catch of these species are discarded, either due to regulation (landings by the small-mesh multispecies fishery are strictly limited by species) or due to poor market demand for red hake. Current measures to manage non-target catch focus on seasonal restrictions (i.e. small-mesh exemption areas) and possession limits. While possession limits may influence whether the species, in this case red hake, are targeted or avoided, they have limited effect on bycatch. There is a sub-ACL for yellowtail flounder (primarily caught on Georges Bank by the small-mesh multispecies fishery) which triggers a requirement to use more selective gear.

Fishermen in the small-mesh fishery are concerned that excessive catches of these "choke" species could trigger more restrictive measures which would curtail access to whiting, limiting revenue and profitability of existing vessels in the fishery. New vessels entering the fishery would make existing measures to manage catch less effective and more restrictive measures more likely.

Catches of non-target species are however closer to their current and probably future biological limits. Catches of northern red hake have exceeded the ACL and overfishing has occurred for several years since 2012, triggering both in-season and post-season accountability measures (see figure below). Catches of southern red hake have been well below the annual ACLs, but biomass has been declining and the recommended 2018-2020 specifications are less than the 2016 estimated catch. Thus it is likely that when landings reach 90% of the TAL, in-season AMs will be triggered beginning in 2018 unless commercial landings also decline.

Figure 51. Annual specifications and estimated catches for silver hake.

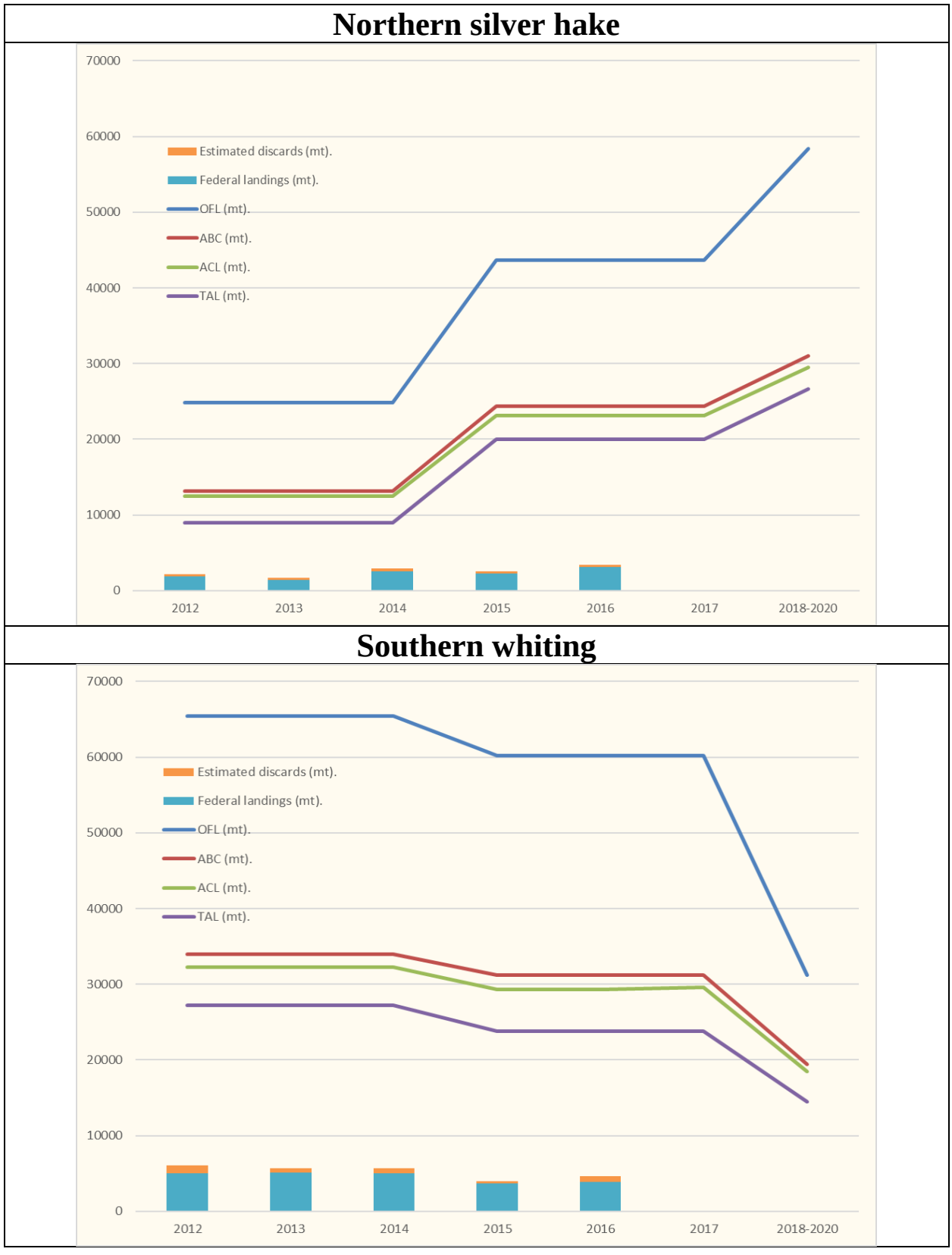
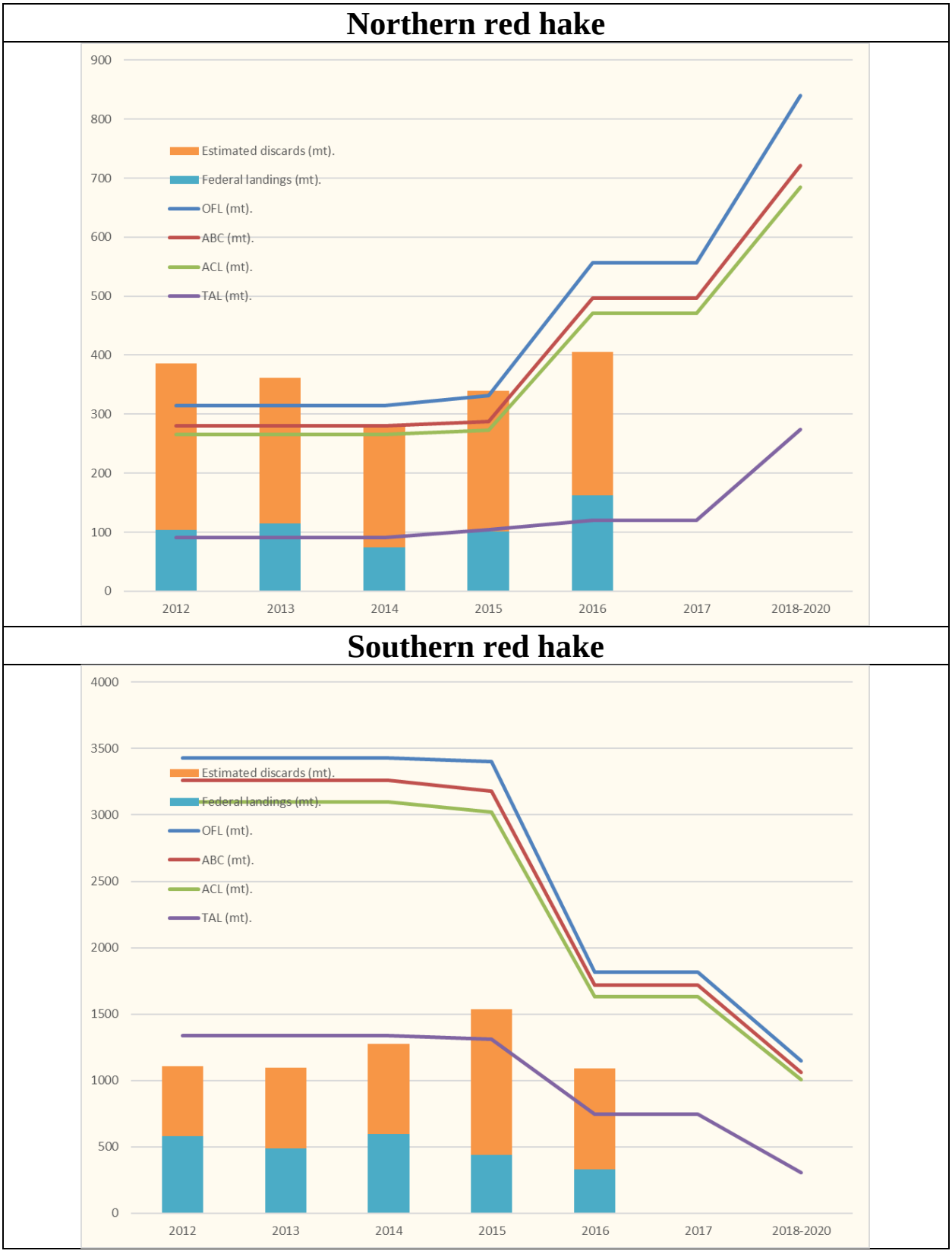


Figure 52. Annual specifications and estimated catches for red hake.



Because the primary concern is managing the fleet to control catches of choke species, the main benefit of limited access will be for regulatory and economic efficiency. With a fixed fleet size, more restrictive regulations will not be mitigated by new vessels targeting small-mesh multispecies and the economic efficiency of the current fleet will not be diluted. On the other hand, it would reduce the opportunity for additional vessels to enter or re-enter (in the case of a vessel that fished for small-mesh multispecies before the qualification period) to fish.

Out of the potential limited access objectives listed above, #2, #4, #5, #6, and especially #8 are most relevant to the purpose and need.

In other words, the major benefit of a small-mesh multispecies fishery limited access program is therefore regulatory and economic efficiency, balanced against potential opportunity to increase fishing for whiting. There is no evidence that qualifying vessels that fished for small-mesh multispecies in 2014-2016 cannot increase whiting fishing by themselves if there is sufficient market demand and opportunity. Choice of one of the Action 1 alternatives pivots on consideration of equitable access vs. the amount of latent fishing effort to allow.

Evaluation of qualification status

Potential qualification for a Category I and II limited access permit (see Action 1) was determined by compiling the landings history for each vessel that landed one or more pounds of whiting or red hake during calendar years 1996-2016. Some Action 1 alternatives use a qualification period that ends with the November 28, 2012 control date, but for simplification of the analysis the qualification period was rounded to December 31, 2012. The highest total landings of whiting and red hake for a qualification period were considered to be the 'best' source of data to qualify a vessel from the three sources listed below.

Table 50. Source data used to evaluate limited access qualification and data qualities.

Source	Attribute
Dealer/SAFIS (1996-2016)	• Considered most complete, but lack sales for bait • Price data are available • Landings are often split between dealers and mixed between trips • Area fished is not reported
Vessel trip reports (VTR) (1996-2016)	• Trips are identifiable • Includes landings sold over the rail for bait • Fishing area reported by statistical area • No price data
Data Matching Imputation System (DMIS) (2007-2015)	• Statistical combination of the above two sources • Includes price • Estimates or assigns area fished to all landings data • Landings are often split between dealers and mixed between trips • Includes over the side sales for bait

Also, for vessels that had another limited access permit and had been assigned a Moratorium Right ID (MRI) by NMFS, we assumed that the history stayed with the vessel upon sale or transfer, throughout the qualification period. Thus, in our analysis a vessel could qualify based on only one series of MRI-associated landings data. In some cases, this process omitted prior history if an MRI was applied to a vessel that had previous small-mesh multispecies fishery history.

During the automatic qualification and appeal process, NMFS may use only one source of data for automatic qualification and vessels may have made different arrangements for a vessel's history in their sale and transfer documents. Vessel owners are expected to be able to bring in additional documentation during an appeals period to justify their qualification.

As a result, in some cases, our analysis overestimates the number of automatically qualifying vessels (assuming that NMFS uses only dealer data for this purpose) and underestimates the number of vessels that may eventually qualify after the appeal process. Overall, we believe that the process to determine probable qualifiers was the most accurate and fair possible.

Fishing activity baseline

The baseline for evaluating effects of alternatives on the fishery was 2014-2016, a relatively stable period that included in-season accountability measures for northern red hake. Three years of data were used to smooth out some inter-annual variation.

Regardless of the alternative and qualification period, the effects of the alternatives were evaluated using ALL 2014-2016 landings data reported, usually on Vessel Trip Reports (VTR). Because dealer data for this fishery often contain split and partial trips, we decided that the VTR data was the most appropriate source. VTR data can also be accurately used to evaluate whether a trip exceeded the proposed incidental permit possession limits, 2,000 lbs. of whiting and 400 lbs. of red hake. None of the alternatives will directly affect fishing activity on trips that land less than these amounts, which are insufficient to target small-mesh multispecies.

VTR data do not, however, include price information. To fill this information gap, VTR landings were first associated with the dealer reported prices for trips with matching VTR serial and permit numbers. For trips that did not match dealer-reported landing data, dealer prices were associated with the VTR data by year, month, gear, and species/market category. If there was no match at this level, dealer prices were associated by year, month, and species/market category. This procedure was applied to landings of ALL species, not just whiting and red hake, and allowed for pricing of 99.8% of VTR-reported landings data.

Qualification effects (Action 1)

The effects of qualification on the 2014-2016 small-mesh multispecies fishery were estimated based on the qualification status of each vessel under each alternative. Trips by vessels that were expected to qualify for a Category I or II permit were expected to be unaffected, but no increases in fishing effort by qualifying vessels were estimated or projected. On the other hand, trips that exceeded the proposed incidental possession limit by non-qualifying vessels using small-mesh trawls were expected to not occur. Trips using other gears or targeting herrings or squids were expected to continue, discarding the excess whiting and red hake if the vessel did not qualify. Very few trips that were not targeting small-mesh multispecies exceeded the proposed incidental possession limits (Action 2).

Latent effort (Action 1)

Latent effort is generally considered to be associated with vessels having a permit and potential to increase fishing trips for the target species. With the qualification alternatives in Action 1, only vessels that had no 2014-2016 trips landings over 2,000 lbs. of whiting or 400 lbs. of red hake were considered to be latent effort in the fishery. It should be recognized however that vessels with trips not exceeding these amounts could increase fishing effort to target small-mesh multispecies, either by taking longer or more trips. This would be another form of latent effort, but it is beyond the scope of analysis to estimate this additional form of latent effort.

Presently, there are 747 vessels with a Category K groundfish permit, which allows them to target and/or land small-mesh multispecies. Although these permits were issued, only 20 vessels had one or more trips with over 2,000 lbs. of whiting or 400 lbs. of red hake and 60 vessels landed at least one pound of small-mesh multispecies during 2014-2016. Under No Action, any vessel with a Category K permit can either begin targeting small-mesh multispecies or increase fishing effort targeting small-mesh multispecies. Moreover, the existing Category K permit is open access and anyone with a commercial fishing boat may obtain one.

Possession limit effects (Action 2)

The number of trips, as well as landings and revenue from fish that exceed 2,000 lbs. (on non-qualifying vessels), 15,000 and 30,000 lbs. per trip were summarized to evaluate the effects of reducing possession limits. These data were evaluated by management area (N vs. S), because they could be applied differentially by area. For those alternatives that would reduce the whiting possession limit, it was assumed that the excess landings would not occur and the trip would be shorter. No attempt was made to estimate mitigating changes in fishing behavior (e.g. taking more trips). In addition, quantification of increasing the whiting possession limit to 50,000 is an out-of-data problem, because the possession limit has not been above 40,000 lbs. for over 20 years.

Permit allowance effects (Action 3)

Most of the alternatives in this action are administrative and would not affect the prosecution of the fishery. There may however be some administrative cost differentials between the alternatives, particularly when a vessel has permits with conflicting conditions and allowances. The vessel may be able to upgrade in one fishery, but not the other, for example. The analysis in this document evaluates and discusses these potential costs, but cannot quantify them due to insufficient information (about opportunity costs of upgrading a vessel or effort consolidation, for example).

Analytical limitations

It is very difficult to project future changes in fishing behavior. None were quantified, but qualitative evaluation was attempted where appropriate. Non-qualifying vessels would be unable to target small-mesh multispecies given the relatively low price for these species and regulatory constraints on fishing. These vessels could take fewer trips than they did in 2014-2016, or shift effort into other fisheries. It is most likely that the non-qualifying vessels would shift into familiar fisheries for which they have permits. We have quantified how much these vessels fish in other fisheries and the permits that they currently hold, but no attempt was made to reasonably forecast how much they would increase their effort in other fisheries. These potential changes have a bearing on the potential impact on non-target and protected species, as well as Essential Fish Habitat.

Missing landings data could contribute to additional qualifiers, when vessel owners are allowed to submit additional data to support their history in the fishery and qualification claim.

6.1.3 Constraints on fishing by market demand and regulation

The current small-mesh multispecies fishery lands a small fraction of the annual ACL. Landings and fishing effort are relatively constrained by regulation, primarily to minimize the fishery's impact on large-mesh groundfish species which are themselves under conservative management of the groundfish fleet. The small-mesh multispecies fishery is restricted to fishing in exemption areas during specific seasons, when data have shown that interactions with large-mesh groundfish are acceptably low. This situation is not expected to change anytime in the near future, although there has been a limited experiential fishery to open some areas early in response to gradually warming water temperatures and changing fish distributions.

Furthermore, the domestic market for whiting and red hake is limited, mostly due to relatively low demand (particularly for high volume landings) and short shelf-life. Fishermen report short-term effects on price when large quantities of whiting are landed in a short period, although previous analysis has been unable to detect this effect. Some fishermen have been reluctant to raise possession limits for this reason.

To land large quantities of whiting, a fisherman usually needs to have some sort of working relationship with dealers, both locally and in NY's Fulton Fish Market. Often dealers will indicate that they could use a quantity of whiting and a fisherman will make a trip, landing 10s of thousands of pounds of fish. If the fish from a new source reach the market at the wrong time, it often results in an unfavorable price, or the fish may even be refused.

Fishing is also specialized and requires fishermen to know where and especially when to set nets. Sufficient quantities of whiting are often localized in time and space.

Thus, it is not easy for a new vessel to successfully enter the fishery without the market connections and fishing knowledge. New fishermen can also be less knowledgeable about where and when to fish to avoid catching something else as bycatch, a key concern of existing fishermen in the small-mesh multispecies fishery. The bycatch analysis (Appendix I) did not reliably detect statistical differences in the catch rates of qualifying and non-qualifying vessels, but this may be due to the relatively low number of observed hauls on the few number of non-qualifying vessels. Most differences in catch rates arose from differences between the size of vessels, hold capacity, and how Category I and II vessels fish.

6.1.4 Qualification and 2014-2016 fishing overview

Much of the analysis of impacts in this section is reliant on our assessment of the vessels that are expected to qualify under one of the five Action 1 alternatives. Rather than repeat this information in the sub-sections for each VEC, the results of the qualification analysis are presented here.

For all the alternatives, potential qualification was determined by whether a vessel's reported landings were above each alternative's Category I or II thresholds, using the source of data with the highest landings. History was tracked by the assigned Moratorium Right ID (MRI) for vessels holding a limited access permit for the NE region that were sold or transferred. The history of a vessel was applied to qualify only one vessel. This analysis indicated that 20 (Alternative 2) to 84 (Alternative 5) vessels would qualify for a Category I permit, while 74 (Alternative 1) to 203 (Alternative 2) vessels would qualify for a Category II permit (Table 54). While there is a core set of vessels that would qualify for Category I or II (i.e. their history exceeds the highest threshold, considering amount and qualification

period), vessels that qualify for Category I in one alternative may be in Category II in another, and vice versa.

From the total of 344 qualifiers for ANY alternative, there were 188 vessels that made no trips with landings more than 2,000 lbs. of whiting or 400 lbs. of red hake during 2014-2016 (Table 51). Of these vessels, there were 148 that qualified for a Category II permit, but no Category I permit, plus 14 that qualified for a Category I permit, but no Category II permits. Across all five alternatives, one vessel qualified for a Category I permit and 11 vessels qualified for a Category II permit. Some of these vessels may be active in another fishery, associated with a confirmation of history permit, or retired.

Table 51. Cross tabulation of the number of alternatives that vessels would qualify for Category I and II permits. The values 0-5 indicate the number of alternatives under which a particular MRI (vessel) qualified. These vessels made no trips with more than 2,000 lbs. of whiting landings on any trip during 2014-2016.

	Category II						
Category I	0	1	2	3	4	5	Total
0		87	38	10	2	11	148
1	11	11	1		2		25
2	2	3		7			12
3			1				1
4		1					1
5	1						1
Total	14	102	40	17	4	11	188

From the total of 344 qualifiers for ANY alternative, there were 156 vessels that made one or more trips with landings more than 2,000 lbs. of whiting or 400 lbs. of red hake during 2014-2016 (Table 52). Of these vessels, there were 98 that qualified for a Category II permit, but no Category I permit, plus 21 that qualified for a Category I permit, but no Category II permits. Nineteen vessels qualified for a Category I permit and 26 vessels qualified for a Category II permit in all five alternatives. These vessels qualify for each Category across ALL action alternatives. Thus there are 111 vessels that fished for whiting during 2014-2016 whose qualification status would be different under the five alternatives.

Table 52. Cross tabulation of the number of alternatives that vessels would qualify for Category I and II permits. As above, the values 0-5 indicate the number of alternatives under which a particular MRI/permit qualified. These vessels made one or more trips with more than 2,000 lbs. of whiting landings during 2014-2016.

	Category II						
Category I	0	1	2	3	4	5	Total
0		42	10	12	8	26	98
1		2			9		11
2	2	1	1	7			11
3			7				7
4		10					10
5	19						19
Total	21	55	18	19	17	26	156

Figure 53 shows the potential limited access qualification status for all 344 vessels that would qualify for a limited access permit in ANY alternative. Each line represents a unique MRI or permit number and the figure is sorted by the number of alternatives that a vessel qualifies for a limited access permit (ones qualifying for a Category I or II permit in all five alternatives at the top). Category I qualifiers have a baby blue fill, Category II qualifiers have a yellow fill, vessels with whiting landings during the qualification period that do not exceed the Category II threshold are non-qualifiers have a pink fill, while vessels with no history during an alternative's qualification period have a red fill. Vessels that had one or more trips exceeding 2,000 lbs. of whiting or 400 lbs. of red hake would be affected by the Amendment 22 alternatives and are shaded.

Alternative 2 has the fewest Category I qualifiers (baby blue fill), but the most Category II qualifiers (yellow fill). Category I qualifiers are similar for Alternatives 1, 3, 4, and 5, but Alternatives 4 and particularly 5 qualify more vessels for Category I that were not fishing for whiting during 2014-2016 (unshaded). Some vessels would qualify for a Category II permit in Alternatives 4 and 5, but had no history in the fishery (red fill) during the qualification periods for Alternatives 1 to 3. Many of these vessels were not fishing for whiting during 2014-2016. There are a number of vessels toward the bottom of Figure 53 that fished for whiting in 2014-2016, but only qualify for a Category II permit for Alternative 2.

To determine effects, the 2014-2016 whiting and red hake landings on trips that exceeded the proposed incidental possession limits were summarized. This fishing activity table (Table 53) focuses on the whiting fishery, as the primary target species. The data in represents fishing activity by vessels that had one or more trips landing ≥2,000 lbs. of whiting. There would be additional vessels classified as 'fishing' if the filter also included vessels that also had one or more trips landing ≥400 lbs. of red hake (for comparison see table below).

The most recent three years was chosen to smooth inter-annual effects during a period when possession limits were relatively constant, since ABC management became effective. Only trips landing more than the proposed incidental possession limit were included, because trips having landings of lower amounts would not be affected by any alternative in this amendment.

For vessels that potentially would qualify for a Category I permit, the vessels generated between $23.3 and $25.6 million in revenue from landings of whiting (Table 54). This is equivalent to between $208 thousand (Alternative 3) to $423 thousand (Alternative 2) per vessel per year. These vessels also participate in other fisheries when they are not targeting small-mesh multispecies, but whiting and red hake landings are a significant source of the vessel's revenue, between 25 (Alternatives 4 and 5) and 32 percent (Alternative 2) (Table 55). During 2014-2016, these vessels made between 1,336 (Alternative 2) and 1,752 (Alternative 4) trips landing more than 2,000 lbs. of whiting (Table 54). Out of these trips targeting whiting, between 30 (657/1913 for Alternative 3) and 34 percent (618/1336 for Alternative 2) had landings exceeding 15,000 lbs., while between 7% (270/1913 for Alternative 3) and 8% (270/1336 for Alternative 2) exceeded 30,000 lbs. (Table 55). The latter trips occur in the southern management area, where the possession limit is 40,000 lbs. and the averages were 38,660 lbs. regardless of alternative (in other words the five alternatives qualified the same number of Category I vessels when those vessels landed more than 30,000 lbs. of whiting during 2014-2016).

Figure 53. Qualification by vessel and alternative, coded by color. Each line is a unique MRI or permit number (N=344) and the gray shading represents vessels that had one or more trips landing more than 2,000 lbs. of whiting during 2014-2016.

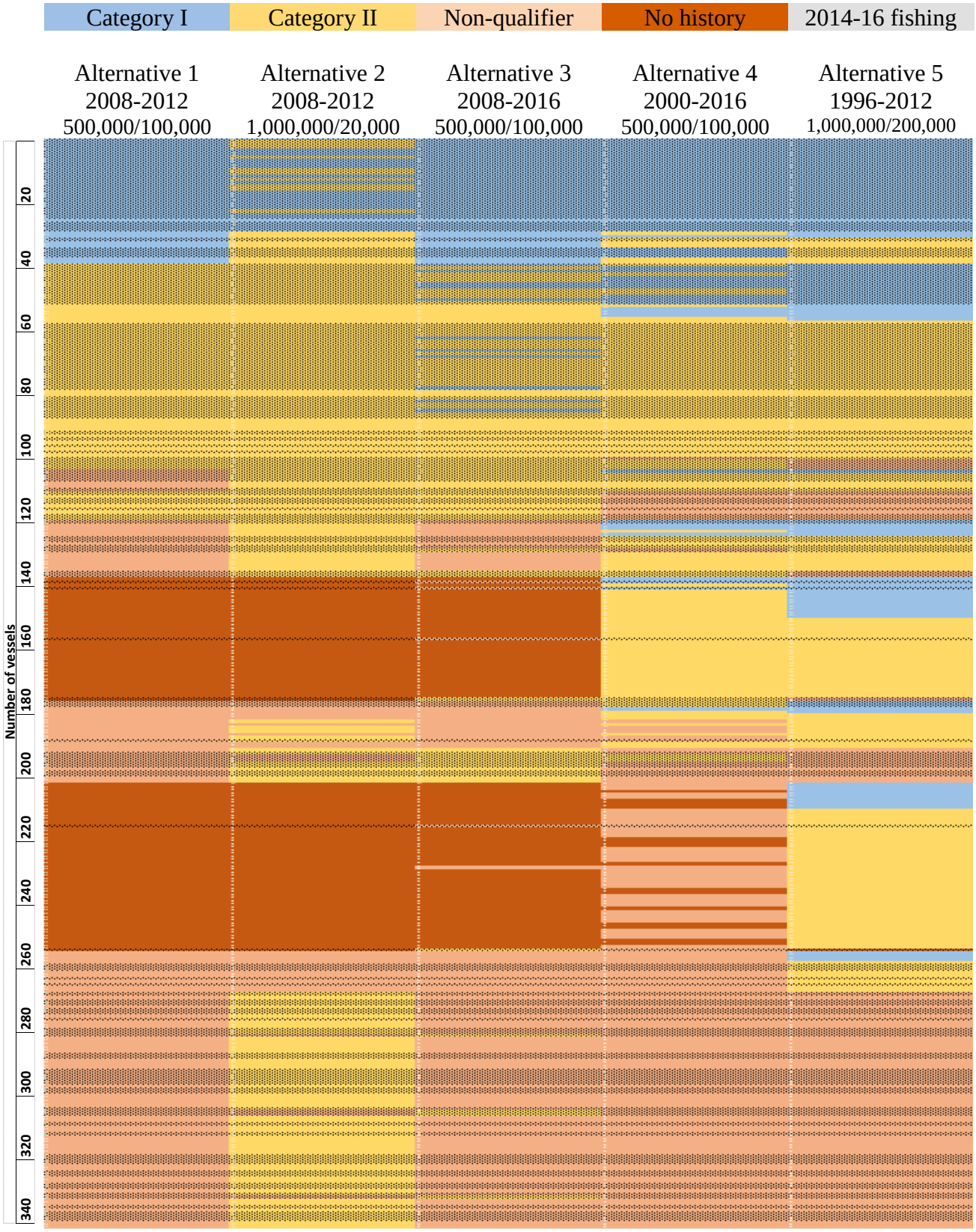


Table 53. Number of qualifying histories and the number fishing for whiting or whiting & red hake during 2014-2016, by alternative and qualification category.

	Category I			Category II			Non-qualifier	
Alternative	Qualifying histories	2,000 lbs. whiting or 400 lbs. red hake	2,000 lbs. whiting	Qualifying histories	2,000 lbs. whiting or 400 lbs. red hake	2,000 lbs. whiting	2,000 lbs. whiting or 400 lbs. red hake	2,000 lbs. whiting
1	40	33	33	74	44	38	35	26
2	20	19	19	203	83	68	10	10
3	51	44	44	90	53	46	15	7
4	55	42	42	124	44	39	26	17
5	84	43	43	159	36	31	33	23

For vessels that potentially would qualify for a Category II permit, the vessels generated between $1.7 and $4.4 million in revenue from landings of small-mesh multispecies (Table 54). This is equivalent to between $16 thousand (Alternative 3) to $24 thousand (Alternative 1) per vessel per year. Category II vessels do not participate as frequently in the small-mesh multispecies fishery as Category I vessels and on average whiting revenue contribute to a much lower percent of the vessel's annual revenue. Whiting revenue contributes between 6 (Alternative 5) and 9 percent (Alternative 1) (Table 55). During 2014-2016, these vessels made between 2,054 (Alternative 5) and 4,126 (Alternative 2) trips landing more than 2,000 lbs. of whiting (Table 54). Out of these trips targeting whiting, between 1 (Alternative 3) and 2 percent (Alternative 1) had landings exceeding 15,000 lbs., but only two trips by Category II vessels exceeded 30,000 lbs. (Table 55). For vessels fishing in the southern management area, there were between 5 (Alternative 5) and 8 (Alternative 3) trips that exceeded 15,000 lbs. of whiting landings, averaging 30,000 and 25,813 lbs. per trip, respectively.

For vessels that potentially do not qualify for small-mesh multispecies limited access, 4 (Alternative 3) to 26 (Alternative 5) vessels had trips that landed more than 2,000 lbs. of whiting (Table 54). Some vessels had no history during the qualifying period (entering the fishery after the control date) and/or had insufficient landings of small-mesh multispecies to qualify. About 30-71% (Alternatives 3 and 5, respectively) of trips landing more than 2,000 lbs. of whiting and 0-78% (Alternative 4 and Alternatives 1, 2, and 5, respectively) of trips landing more than 15,000 lbs. of whiting occur in the northern management area. About 6-59% (Alternatives 3 and 2, respectively) of whiting landings from trips by non-qualifying vessels landing more than 2,000 lbs. of whiting fished in the northern management area. Red hake trips exceeding 400 lbs. by non-qualifying vessels were 161 (42% from the northern management area, see Table 54 and Table 55) for Alternative 1, 93 (38%) for Alternative 2, 2 (0%) for Alternative 3, 91 (51%) for Alternative 4, and 138 (56%) for Alternative 5.

During 2014-2016, whiting landings by non-qualifying vessels that exceeded 2,000 lbs. ranged between 10 thousand (Alternative 3) to 927 thousand lbs. (Alternative 5) (landings on trips > 2,000 lbs. less the number of trips X 2,000 in (Table 54). The excess whiting landings for non-qualifying vessels accounted for 15 (Alternative 3) and 60 percent (Alternative 2) of the total whiting landings by non-qualifying vessels.

Table 54. Expected number of qualifiers for a proposed Category I and II permit with 2014-2016 fishing activity for vessels with trips landing more than 2,000 lbs. of whiting. All whiting and red hake landings (> 1 lb.) were considered to determine qualification. Vessels with no history or insufficient landings were grouped as "non-qualifiers". "Whiting lbs. on Trips" includes only whiting landings that exceeded the applicable limit: 2,000; 15,000; or 30,000 lbs. and does not include landings of red hake.

Limited access category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Category I					
Criteria, lbs.	500,000	1,000,000	500,000	500,000	1,000,000
Qualifying period	2008-2012	2008-2012	2008-2016	2000-2016	1996-2012
Permits	40	20	51	55	84
Vessels fishing (>2000 lbs. whiting)	33	19	44	41	42
Latent effort	7	1	7	14	42
Trip value, all species	$ 93,692,579	$ 73,927,609	$ 103,577,578	$ 103,582,157	$ 100,636,337
Whiting value	$ 24,791,261	$ 23,325,208	$ 26,431,598	$ 25,685,305	$ 25,572,585
Whiting, lbs.	33,196,804	30,934,696	35,688,153	34,347,037	34,141,420
Whiting, lbs. on Trips > 2,000 lbs.	26,744,851	25,717,715	28,458,419	27,539,234	27,460,294
Whiting, lbs. on Trips > 15,000 lbs.	10,488,651	10,483,651	10,732,551	10,617,331	10,617,331
Whiting, lbs. on Trips > 30,000 lbs.	2,339,868	2,339,868	2,339,868	2,339,868	2,339,868
Red hake value	$ 1,001,798	$ 787,398	$ 1,089,689	$ 1,028,693	$ 1,004,925
Red hake, lbs.	2,087,313	1,451,525	2,321,464	2,141,222	2,071,937
Red hake, lbs. on Trips > 400 lbs.	1,107,625	716,255	1,236,436	1,125,406	1,084,276
Red hake, lbs. on Trips > 1,500 lbs	311,185	159,280	356,285	318,285	310,285
Red hake, lbs. on Trips > 3,000 lbs	82,523	34,428	88,323	82,523	81,523
Red hake trips > 400 lbs.	1,149	755	1,278	1,177	1,125
All trips	6,622	3,830	8,330	7,235	6,763
Whiting trips	4,067	2,672	4,891	4,406	4,268
Trips > 2000 lbs. (hake trips)	1,658	1,336	1,913	1,752	1,735
Trips > 15,000 lbs.	619	618	656	640	640
Trips > 30,000 lbs.	270	270	270	270	270
Category II					
Criteria, lbs.	100,000	20,000	100,000	100,000	200,000
Permits	74	69	90	124	159
Vessels fishing (>2000 lbs. whiting)	38	68	46	39	31
Latent effort	36	1	44	85	128
Trip value, all species	$ 29,640,257	57,972,485	30,609,634	28,757,665	26,802,736
Whiting value	$ 2,559,993	4,426,151	2,053,833	2,370,756	1,735,719
Whiting, lbs.	3,944,874	6,857,865	3,129,410	3,717,712	2,948,810
Whiting, lbs. on Trips > 2,000 lbs.	2,336,187	3,555,867	1,463,212	2,045,265	1,544,691
Whiting, lbs. on Trips > 15,000 lbs.	322,900	327,900	134,500	247,220	194,220
Whiting, lbs. on Trips > 30,000 lbs.	20,000	20,000	20,000	20,000	20,000
Red hake value	$ 183,338.00	437,670	173,146	190,530	195,496
Red hake, lbs.	492,132	1,243,094	484,027	544,330	555,925
Red hake, lbs. on Trips > 400 lbs.	244,334	691,028	228,452	280,394	298,634
Red hake, lbs. on Trips > 1,500 lbs	76,375	238,181	50,686	78,476	84,176
Red hake, lbs. on Trips > 3,000 lbs	13,000	61,095	9,660	13,000	14,000
Red hake trips > 400 lbs.	305	767	335	347	352
All trips	4,687	9,054	5,151	4,878	4,627
Whiting trips	2,159	4,126	2,169	2,281	2,054
Trips > 2000 lbs.	454	890	463	488	377
Trips > 15,000 lbs.	43	44	15	30	22
Trips > 30,000 lbs.	Confidential	Confidential	Confidential	Confidential	Confidential
Non-qualifiers					
Permits	2,552	2489	1099	2035	2345
Vessels fishing (>2000 lbs. whiting)	26	10	7	17	24
Trip value, all species	$ 14,088,581	5521323	3234205	5081595	9982344
Whiting value	$ 1,182,831	782726.99	48654.04	478025	1225782.05
Whiting, lbs.	1,743,461	1,092,578	67,576	820,390	1,794,909
Whiting, lbs. on Trips > 2,000 lbs.	850,631	658,087	10,038	347,170	926,684
Whiting, lbs. on Trips > 15K lbs.	55,500	55,500	-	2,500	55,500
Whiting, lbs. on Trips > 30k lbs.	-	-	-	-	-
Red hake value	$ 79,973	$ 40,042	$ 2,274	$ 45,886	$ 64,689
Red hake, lbs.	231,227	116,053	5,181	125,120	182,810
Red hake, lbs. on Trips > 400 lbs.	113,779	58,455	850	59,938	82,828
Red hake, lbs. on Trips > 1,500 lbs	19,411	9,510	-	10,210	12,510
Red hake, lbs. on Trips > 3000 lbs.	2,460	2,460	-	2,460	2,460
Red hake trips > 400 lbs.	161	93	2	91	138
All trips	2,535	960	363	1,731	2,454
Whiting trips	943	371	109	482	847
Trips > 2000 lbs.	274	160	10	146	274
Trips > 15,000 lbs.	9	9	-	1	9
Trips > 30,000 lbs.	-	-	-	-	-

Table 55. Qualification summaries with 2014-2016 fishing activity data presented as a proportion of the total for vessels with trips landing more than 2,000 lbs. of whiting.

Limited access category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Category I					
Criteria, lbs.	**500,000**	**1,000,000**	**500,000**	**500,000**	**1,000,000**
Qualifying period	**2008-2012**	**2008-2012**	**2008-2016**	**2000-2016**	**1996-2012**
Permits	**40**	**20**	**51**	**55**	**84**
Vessels fishing (>2000 lbs. whiting)	**33**	**19**	**44**	**41**	**42**
Latent effort	**7**	**1**	**7**	**14**	**42**
Trip value, all species	$93,692,579	$73,927,609	$103,577,578	$103,582,157	$100,636,337
Whiting value	26%	32%	26%	25%	25%
Whiting, lbs.	33,196,804	30,934,696	35,688,153	34,347,037	34,141,420
Whiting, lbs. on Trips > 2,000 lbs.	81%	83%	80%	80%	80%
Whiting, lbs. on Trips > 15,000 lbs.	32%	34%	30%	31%	31%
Whiting, lbs. on Trips > 30,000 lbs.					
Red hake value	$1,001,798	$787,398	$1,089,689	$1,028,693	$1,004,925
Red hake, lbs.	2,087,313	1,451,525	2,321,464	2,141,222	2,071,937
Red hake, lbs. on Trips > 400 lbs.	53%	49%	53%	53%	52%
Red hake, lbs. on Trips > 1,500 lbs.	15%	11%	15%	15%	15%
Red hake, lbs. on Trips > 3,000 lbs.	4%	2%	4%	4%	4%
Red hake trips > 400 lbs.	1,149	755	1,278	1,177	1,125
All trips	6,622	3,830	8,330	7,235	6,763
Whiting trips	61%	70%	59%	61%	63%
Trips > 2000 lbs. (hake trips)	41%	50%	39%	40%	41%
Trips > 15,000 lbs.	15%	23%	13%	15%	15%
Trips > 30,000 lbs.	7%	10%	6%	6%	6%
Category II					
Criteria, lbs.	**100,000**	**20,000**	**100,000**	**100,000**	**200,000**
Permits	**74**	**69**	**90**	**124**	**159**
Vessels fishing (>2000 lbs. whiting)	**38**	**68**	**46**	**39**	**31**
Latent effort	**36**	**1**	**44**	**85**	**128**
Trip value, all species	$29,640,257	$57,972,485	$30,609,634	$28,757,665	$26,802,736
Whiting value	9%	8%	7%	8%	6%
Whiting, lbs.	3,944,874	6,857,865	3,129,410	3,717,712	2,948,810
Whiting, lbs. on Trips > 2,000 lbs.	59%	52%	47%	55%	52%
Whiting, lbs. on Trips > 15,000 lbs.	8%	5%	4%	7%	7%
Whiting, lbs. on Trips > 30,000 lbs.					
Red hake value	$183,338	$437,670	$173,146	$190,530	$195,496
Red hake, lbs.	492,132	1,243,094	484,027	544,330	555,925
Red hake, lbs. on Trips > 400 lbs.	50%	56%	47%	52%	54%
Red hake, lbs. on Trips > 1,500 lbs.	16%	19%	10%	14%	15%
Red hake, lbs. on Trips > 3,000 lbs.	3%	5%	2%	2%	3%
Red hake trips > 400 lbs.	305	767	335	347	352
All trips	4,687	9,054	5,151	4,878	4,627
Whiting trips	46%	46%	42%	47%	44%
Trips > 2000 lbs.	21%	22%	21%	21%	18%
Trips > 15,000 lbs.	2%	1%	1%	1%	1%
Trips > 30,000 lbs.					
Non-qualifiers					
Permits	**$2,552**	**$2,489**	**$1,099**	**$2,035**	**$2,345**
Vessels fishing (>2000 lbs. whiting)	**26**	**10**	**7**	**17**	**24**
Trip value, all species	$14,088,581	$5,521,323	$3,234,205	$5,081,595	$9,982,344
Whiting value	8%	14%	2%	9%	12%
Whiting, lbs.	1,743,461	1,092,578	67,576	820,390	1,794,909
Whiting, lbs. on Trips > 2,000 lbs.	49%	60%	15%	42%	52%
Whiting, lbs. on Trips > 15K lbs.	3%	5%	0%	0%	3%
Whiting, lbs. on Trips > 30k lbs.					
Red hake value	$79,973	$40,042	$2,274	$45,886	$64,689
Red hake, lbs.	231,227	116,053	5,181	125,120	182,810
Red hake, lbs. on Trips > 400 lbs.	49%	50%	16%	48%	45%
Red hake, lbs. on Trips > 1,500 lbs.	8%	8%	0%	8%	7%
Red hake, lbs. on Trips > 3000 lbs.	1%	2%	0%	2%	1%
Red hake trips > 400 lbs.	161	93	2	91	138
All trips	2,535	960	363	1,731	2,454
Whiting trips	37%	39%	30%	28%	35%
Trips > 2000 lbs.	29%	43%	9%	30%	32%
Trips > 15,000 lbs.	1%	2%	0%	0%	1%
Trips > 30,000 lbs.					

Table 56 to Table 59 summarize the 2014-2016 fishing activity by qualification category for the northern and southern areas, respectively. In general, the Category I and II vessels fishing in the northern area rely more heavily on landings of small-mesh multispecies than do qualifying vessels fishing in the southern area.

More Category I vessels fish for small-mesh multispecies in the southern area, regardless of the alternative. The percent of active Category I vessels fishing in the northern area ranges from 27 to 42%, with Alternatives 2 and 3 being the highest. In the southern area, the proportion of Category I vessels ranges from 94-98%, with Alternative 4 being the highest proportion of total active Category I vessels.

The higher proportion of Category II qualifiers also fish in the southern area. The proportion of active Category II vessels fishing in the northern area ranges from 5-46%, with Alternative 4 having the highest proportion. The proportion of Category II qualifiers in the southern area ranges from 77-87%, with Alternative 2 having the highest number of Category II qualifiers and the highest proportion fishing in the southern area.

Table 56. Expected number of qualifiers for a proposed Category I and II permit with 2014-2016 fishing activity for **NORTHERN AREA** vessels with trips landing more than 2,000 lbs. of whiting. All whiting and red hake landings (> 1 lb.) were considered to determine qualification. Vessels with no history or insufficient landings were grouped as "non-qualifiers". "Whiting lbs. on Trips" includes only whiting landings that exceeded the applicable limit: 2,000; 15,000; or 30,000 lbs. and does not include landings of red hake.

Limited access category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Category I					
Criteria, lbs.	**500,000**	**1,000,000**	**500,000**	**500,000**	**1,000,000**
Qualifying period	**2008-2012**	**2008-2012**	**2008-2016**	**2000-2016**	**1996-2012**
Permits	**40**	**20**	**51**	**55**	**84**
Vessels fishing (>2000 lbs. whiting)	**9**	**8**	**16**	**12**	**13**
Latent effort	NA	NA	NA	NA	NA
Trip value, all species	$ 14,044,030	$ 13,487,819	$ 16,780,533	$ 15,262,396	$ 16,072,211
Whiting value	$ 7,807,137	$ 7,684,849	$ 9,129,519	$ 8,399,117	$ 8,409,963
Whiting, lbs.	10,935,537	10,598,992	12,945,718	11,624,319	11,637,625
Whiting, lbs. on Trips > 2,000 lbs.	9,376,715	9,171,985	10,922,931	9,992,469	9,995,684
Whiting, lbs. on Trips > 15,000 lbs.	3,168,745	3,168,745	3,412,645	3,293,425	3,293,425
Whiting, lbs. on Trips > 30,000 lbs.	Confidential	19,000	19,000	19,000	19,000
Red hake value	$ 171,066	$ 160,277	$ 205,863	$ 171,633	$ 171,633
Red hake, lbs.	399,358	350,153	474,373	384,858	384,858
Red hake, lbs. on Trips > 400 lbs.	183,965	153,185	221,605	175,385	175,385
Red hake, lbs. on Trips > 1,500 lbs	29,800	24,100	42,500	32,900	32,900
Red hake, lbs. on Trips > 3,000 lbs	1,000	1,000	1,000	1,000	1,000
Red hake trips > 400 lbs.	195	160	227	173	173
All trips	1,064	836	1,484	996	1,030
Whiting trips	880	786	1,119	897	918
Trips > 2000 lbs. (hake trips)	517	460	697	539	540
Trips > 15,000 lbs.	232	232	269	252	252
Trips > 30,000 lbs.	Confidential	Confidential	Confidential	Confidential	Confidential
Category II					
Criteria, lbs.	**100,000**	**20,000**	**100,000**	**100,000**	**200,000**
Permits					
Vessels fishing (>2000 lbs. whiting)	**16**	**24**	**19**	**18**	**12**
Latent effort	NA	NA	NA	NA	NA
Trip value, all species	$ 3,935,622	5,716,819	4,403,859	5,985,967	3,024,196
Whiting value	$ 1,594,025	1,841,688	953,394	1,458,012	801,727
Whiting, lbs.	2,400,216	2,990,324	1,402,085	2,261,815	1,457,553
Whiting, lbs. on Trips > 2,000 lbs.	1,706,695	2,004,650	751,216	1,464,721	966,432
Whiting, lbs. on Trips > 15,000 lbs.	243,900	243,900	48,000	167,220	119,220
Whiting, lbs. on Trips > 30,000 lbs.	-	-	-	-	-
Red hake value	$ 44,247.61	65,753	34,629	48,704	41,079
Red hake, lbs.	97,576	201,296	121,661	143,661	124,711
Red hake, lbs. on Trips > 400 lbs.	43,230	108,660	61,085	74,160	68,770
Red hake, lbs. on Trips > 1,500 lbs	12,700	24,800	8,500	13,500	13,500
Red hake, lbs. on Trips > 3,000 lbs	-	-	-	-	-
Red hake trips > 400 lbs.	51	119	87	95	78
All trips	943	1,607	1,326	1,073	783
Whiting trips	451	730	534	568	376
Trips > 2000 lbs.	237	344	216	284	182
Trips > 15,000 lbs.	37	37	7	24	17
Trips > 30,000 lbs.	-	-	-	-	-
Non-qualifiers					
Permits					
Vessels fishing (>2000 lbs. whiting)	**14**	**7**	**4**	**9**	**14**
Trip value, all species	$ 4,943,465	3718479	1738725	1674754	3826710
Whiting value	$ 699,994	574619.16	18243.61	244026.59	889465.95
Whiting, lbs.	1,037,364	783,801	25,314	486,983	1,277,939
Whiting, lbs. on Trips > 2,000 lbs.	595,312	502,087	4,575	221,532	716,606
Whiting, lbs. on Trips > 15K lbs.	48,000	48,000	-	-	48,000
Whiting, lbs. on Trips > 30k lbs.	-	-	-	-	-
Red hake value	$ 25,263	$ 14,547	$ 84	$ 20,239	$ 27,864
Red hake, lbs.	99,405	44,890	305	67,820	86,770
Red hake, lbs. on Trips > 400 lbs.	55,495	20,845	-	33,145	38,535
Red hake, lbs. on Trips > 1,500 lbs	8,500	2,100	-	4,600	4,600
Red hake, lbs. on Trips > 3000 lbs.	-	-	-	-	-
Red hake trips > 400 lbs.	68	35	-	46	63
All trips	918	482	115	856	1,112
Whiting trips	375	190	53	241	412
Trips > 2000 lbs.	162	112	3	93	194
Trips > 15,000 lbs.	7	7	-	-	7
Trips > 30,000 lbs.	-	-	-	-	-

Table 57. Qualification summaries with 2014-2016 **NORTHERN AREA** fishing activity data presented as a proportion of the total for vessels with trips landing more than 2,000 lbs. of whiting.

Limited access category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Category I					
Criteria, lbs.	**500,000**	**1,000,000**	**500,000**	**500,000**	**1,000,000**
Qualifying period	**2008-2012**	**2008-2012**	**2008-2016**	**2000-2016**	**1996-2012**
Permits	**40**	**20**	**51**	**55**	**84**
Vessels fishing (>2000 lbs. whiting)	**9**	**8**	**16**	**12**	**13**
Latent effort	NA	NA	NA	NA	NA
Trip value, all species	$14,044,030	$13,487,819	$16,780,533	$15,262,396	$16,072,211
Whiting value	56%	57%	54%	55%	52%
Whiting, lbs.	10,935,537	10,598,992	12,945,718	11,624,319	11,637,625
Whiting, lbs. on Trips > 2,000 lbs.	86%	87%	84%	86%	86%
Whiting, lbs. on Trips > 15,000 lbs.	29%	30%	26%	28%	28%
Whiting, lbs. on Trips > 30,000 lbs.					
Red hake value	$171,066	$160,277	$205,863	$171,633	$171,633
Red hake, lbs.	399,358	350,153	474,373	384,858	384,858
Red hake, lbs. on Trips > 400 lbs.	46%	44%	47%	46%	46%
Red hake, lbs. on Trips > 1,500 lbs.	7%	7%	9%	9%	9%
Red hake, lbs. on Trips > 3,000 lbs.	0%	0%	0%	0%	0%
Red hake trips > 400 lbs.	195	160	227	173	173
All trips	1,064	836	1,484	996	1,030
Whiting trips	83%	94%	75%	90%	89%
Trips > 2000 lbs. (hake trips)	59%	59%	62%	60%	59%
Trips > 15,000 lbs.	26%	30%	24%	28%	27%
Trips > 30,000 lbs.					
Category II					
Criteria, lbs.	**100,000**	**20,000**	**100,000**	**100,000**	**200,000**
Permits					
Vessels fishing (>2000 lbs. whiting)	**16**	**24**	**19**	**18**	**12**
Latent effort	NA	NA	NA	NA	NA
Trip value, all species	$3,935,622	$5,716,819	$4,403,859	$5,985,967	$3,024,196
Whiting value	41%	32%	22%	24%	27%
Whiting, lbs.	2,400,216	2,990,324	1,402,085	2,261,815	1,457,553
Whiting, lbs. on Trips > 2,000 lbs.	71%	67%	54%	65%	66%
Whiting, lbs. on Trips > 15,000 lbs.	10%	8%	3%	7%	8%
Whiting, lbs. on Trips > 30,000 lbs.					
Red hake value	$44,248	$65,753	$34,629	$48,704	$41,079
Red hake, lbs.	97,576	201,296	121,661	143,661	124,711
Red hake, lbs. on Trips > 400 lbs.	44%	54%	50%	52%	55%
Red hake, lbs. on Trips > 1,500 lbs.	13%	12%	7%	9%	11%
Red hake, lbs. on Trips > 3,000 lbs.	0%	0%	0%	0%	0%
Red hake trips > 400 lbs.	51	119	87	95	78
All trips	943	1,607	1,326	1,073	783
Whiting trips	48%	45%	40%	53%	48%
Trips > 2000 lbs.	53%	47%	40%	50%	48%
Trips > 15,000 lbs.	8%	5%	1%	4%	5%
Trips > 30,000 lbs.					
Non-qualifiers					
Permits					
Vessels fishing (>2000 lbs. whiting)	**14**	**7**	**4**	**9**	**14**
Trip value, all species	$4,943,465	$3,718,479	$1,738,725	$1,674,754	$3,826,710
Whiting value	14%	15%	1%	15%	23%
Whiting, lbs.	1,037,364	783,801	25,314	486,983	1,277,939
Whiting, lbs. on Trips > 2,000 lbs.	57%	64%	18%	45%	56%
Whiting, lbs. on Trips > 15K lbs.	5%	6%	0%	0%	4%
Whiting, lbs. on Trips > 30k lbs.					
Red hake value	$25,263	$14,547	$84	$20,239	$27,864
Red hake, lbs.	99,405	44,890	305	67,820	86,770
Red hake, lbs. on Trips > 400 lbs.	56%	46%	0%	49%	44%
Red hake, lbs. on Trips > 1,500 lbs.	9%	5%	0%	7%	5%
Red hake, lbs. on Trips > 3000 lbs.	0%	0%	0%	0%	0%
Red hake trips > 400 lbs.	68	35	0	46	63
All trips	918	482	115	856	1,112
Whiting trips	41%	39%	46%	28%	37%
Trips > 2000 lbs.	43%	59%	6%	39%	47%
Trips > 15,000 lbs.	2%	4%	0%	0%	2%
Trips > 30,000 lbs.					

Table 58. Expected number of qualifiers for a proposed Category I and II permit with 2014-2016 fishing activity for **SOUTHERN AREA** vessels with trips landing more than 2,000 lbs. of whiting. All whiting and red hake landings (> 1 lb.) were considered to determine qualification. Vessels with no history or insufficient landings were grouped as "non-qualifiers". "Whiting lbs. on Trips" includes only whiting landings that exceeded the applicable limit: 2,000; 15,000; or 30,000 lbs. and does not include landings of red hake.

Limited access category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Category I					
Criteria, lbs.	**500,000**	**1,000,000**	**500,000**	**500,000**	**1,000,000**
Qualifying period	**2008-2012**	**2008-2012**	**2008-2016**	**2000-2016**	**1996-2012**
Permits	**40**	**20**	**51**	**55**	**84**
Vessels fishing (>2000 lbs. whiting)	**31**	**18**	**41**	**40**	**40**
Latent effort	**NA**	**NA**	**NA**	**NA**	**NA**
Trip value, all species	$ 79,648,549	$ 60,439,790	$ 86,797,045	$ 88,319,761	$ 84,564,126
Whiting value	$ 16,984,125	$ 15,640,359	$ 17,302,080	$ 17,286,188	$ 17,162,621
Whiting, lbs.	22,261,267	20,335,704	22,742,435	22,722,718	22,503,795
Whiting, lbs. on Trips > 2,000 lbs.	17,368,136	16,545,730	17,535,488	17,546,765	17,464,610
Whiting, lbs. on Trips > 15,000 lbs.	7,319,906	7,314,906	7,319,906	7,323,906	7,323,906
Whiting, lbs. on Trips > 30,000 lbs.	2,320,868	2,320,868	2,320,868	2,320,868	2,320,868
Red hake value	$ 830,733	$ 627,122	$ 883,826	$ 857,060	$ 833,291
Red hake, lbs.	1,687,955	1,101,372	1,847,091	1,756,364	1,687,079
Red hake, lbs. on Trips > 400 lbs.	923,660	563,070	1,014,831	950,021	908,891
Red hake, lbs. on Trips > 1,500 lbs	281,385	135,180	313,785	285,385	277,385
Red hake, lbs. on Trips > 3,000 lbs	81,523	33,428	87,323	81,523	80,523
Red hake trips > 400 lbs.	954	595	1,051	1,004	952
All trips	5,558	2,994	6,846	6,239	5,733
Whiting trips	3,187	1,886	3,772	3,509	3,350
Trips > 2000 lbs. (hake trips)	1,141	876	1,216	1,213	1,195
Trips > 15,000 lbs.	387	386	387	388	388
Trips > 30,000 lbs.	268	268	268	268	268
Category II					
Criteria, lbs.	**100,000**	**20,000**	**100,000**	**100,000**	**200,000**
Permits					
Vessels fishing (>2000 lbs. whiting)	**32**	**59**	**37**	**30**	**25**
Latent effort	**NA**	**NA**	**NA**	**NA**	**NA**
Trip value, all species	$ 25,704,635	52,255,666	26,205,775	22,771,698	23,778,540
Whiting value	$ 965,968	2,584,463	1,100,440	912,744	933,992
Whiting, lbs.	1,544,658	3,867,541	1,727,325	1,455,897	1,491,257
Whiting, lbs. on Trips > 2,000 lbs.	629,492	1,551,217	711,996	580,544	578,259
Whiting, lbs. on Trips > 15,000 lbs.	79,000	84,000	86,500	80,000	75,000
Whiting, lbs. on Trips > 30,000 lbs.	20,000	20,000	20,000	20,000	20,000
Red hake value	$ 139,090.39	371,917	138,518	141,826	154,417
Red hake, lbs.	394,556	1,041,798	362,366	400,669	431,214
Red hake, lbs. on Trips > 400 lbs.	201,104	582,368	167,367	206,234	229,864
Red hake, lbs. on Trips > 1,500 lbs	63,675	213,381	42,186	64,976	70,676
Red hake, lbs. on Trips > 3,000 lbs	13,000	61,095	9,660	13,000	14,000
Red hake trips > 400 lbs.	254	648	248	252	274
All trips	3,744	7,447	3,825	3,805	3,844
Whiting trips	1,708	3,396	1,635	1,713	1,678
Trips > 2000 lbs.	217	546	247	204	195
Trips > 15,000 lbs.	6	7	8	6	5
Trips > 30,000 lbs.	Confidential	Confidential	Confidential	Confidential	Confidential
Non-qualifiers					
Permits					
Vessels fishing (>2000 lbs. whiting)	**19**	**5**	**4**	**12**	**17**
Trip value, all species	$ 9,145,116	1802844	1495480	3406841	6155634
Whiting value	$ 482,837	208107.83	30410.43	233998.41	336316.1
Whiting, lbs.	706,097	308,777	42,262	333,407	516,970
Whiting, lbs. on Trips > 2,000 lbs.	255,319	156,000	5,463	125,638	210,078
Whiting, lbs. on Trips > 15K lbs.	7,500	7,500	-	2,500	7,500
Whiting, lbs. on Trips > 30k lbs.	-	-	-	-	-
Red hake value	$ 54,710	$ 25,495	$ 2,190	$ 25,647	$ 36,825
Red hake, lbs.	131,822	71,163	4,876	57,300	96,040
Red hake, lbs. on Trips > 400 lbs.	58,284	37,610	850	26,793	44,293
Red hake, lbs. on Trips > 1,500 lbs	10,911	7,410	-	5,610	7,910
Red hake, lbs. on Trips > 3000 lbs.	2,460	2,460	-	2,460	2,460
Red hake trips > 400 lbs.	93	58	2	45	75
All trips	1,617	478	248	875	1,342
Whiting trips	568	181	56	241	435
Trips > 2000 lbs.	112	48	7	53	80
Trips > 15,000 lbs.	2	2	-	1	2
Trips > 30,000 lbs.	-	-	-	-	-

Table 59. Qualification summaries with 2014-2016 **SOUTHERN AREA** fishing activity data presented as a proportion of the total for vessels with trips landing more than 2,000 lbs. of whiting.

Limited access category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Category I					
Criteria, lbs.	**500,000**	**1,000,000**	**500,000**	**500,000**	**1,000,000**
Qualifying period	**2008-2012**	**2008-2012**	**2008-2016**	**2000-2016**	**1996-2012**
Permits	**40**	**20**	**51**	**55**	**84**
Vessels fishing (>2000 lbs. whiting)	**31**	**18**	**41**	**40**	**40**
Latent effort	**NA**	**NA**	**NA**	**NA**	**NA**
Trip value, all species	$79,648,549	$60,439,790	$86,797,045	$88,319,761	$84,564,126
Whiting value	21%	26%	20%	20%	20%
Whiting, lbs.	22,261,267	20,335,704	22,742,435	22,722,718	22,503,795
Whiting, lbs. on Trips > 2,000 lbs.	78%	81%	77%	77%	78%
Whiting, lbs. on Trips > 15,000 lbs.	33%	36%	32%	32%	33%
Whiting, lbs. on Trips > 30,000 lbs.					
Red hake value	$830,733	$627,122	$883,826	$857,060	$833,291
Red hake, lbs.	1,687,955	1,101,372	1,847,091	1,756,364	1,687,079
Red hake, lbs. on Trips > 400 lbs.	55%	51%	55%	54%	54%
Red hake, lbs. on Trips > 1,500 lbs.	17%	12%	17%	16%	16%
Red hake, lbs. on Trips > 3,000 lbs.	5%	3%	5%	5%	5%
Red hake trips > 400 lbs.	954	595	1,051	1,004	952
All trips	5,558	2,994	6,846	6,239	5,733
Whiting trips	57%	63%	55%	56%	58%
Trips > 2000 lbs. (hake trips)	36%	46%	32%	35%	36%
Trips > 15,000 lbs.	12%	20%	10%	11%	12%
Trips > 30,000 lbs.	8%	14%	7%	8%	8%
Category II					
Criteria, lbs.	**100,000**	**20,000**	**100,000**	**100,000**	**200,000**
Permits					
Vessels fishing (>2000 lbs. whiting)	**32**	**59**	**37**	**30**	**25**
Latent effort	**NA**	**NA**	**NA**	**NA**	**NA**
Trip value, all species	$25,704,635	$52,255,666	$26,205,775	$22,771,698	$23,778,540
Whiting value	4%	5%	4%	4%	4%
Whiting, lbs.	1,544,658	3,867,541	1,727,325	1,455,897	1,491,257
Whiting, lbs. on Trips > 2,000 lbs.	41%	40%	41%	40%	39%
Whiting, lbs. on Trips > 15,000 lbs.	5%	2%	5%	5%	5%
Whiting, lbs. on Trips > 30,000 lbs.					
Red hake value	$139,090	$371,917	$138,518	$141,826	$154,417
Red hake, lbs.	394,556	1,041,798	362,366	400,669	431,214
Red hake, lbs. on Trips > 400 lbs.	51%	56%	46%	51%	53%
Red hake, lbs. on Trips > 1,500 lbs.	16%	20%	12%	16%	16%
Red hake, lbs. on Trips > 3,000 lbs.	3%	6%	3%	3%	3%
Red hake trips > 400 lbs.	254	648	248	252	274
All trips	3,744	7,447	3,825	3,805	3,844
Whiting trips	46%	46%	43%	45%	44%
Trips > 2000 lbs.	13%	16%	15%	12%	12%
Trips > 15,000 lbs.	0%	0%	0%	0%	0%
Trips > 30,000 lbs.					
Non-qualifiers					
Permits					
Vessels fishing (>2000 lbs. whiting)	**19**	**5**	**4**	**12**	**17**
Trip value, all species	$9,145,116	$1,802,844	$1,495,480	$3,406,841	$6,155,634
Whiting value	5%	12%	2%	7%	5%
Whiting, lbs.	706,097	308,777	42,262	333,407	516,970
Whiting, lbs. on Trips > 2,000 lbs.	36%	51%	13%	38%	41%
Whiting, lbs. on Trips > 15K lbs.	1%	2%	0%	1%	1%
Whiting, lbs. on Trips > 30k lbs.					
Red hake value	$54,710	$25,495	$2,190	$25,647	$36,825
Red hake, lbs.	131,822	71,163	4,876	57,300	96,040
Red hake, lbs. on Trips > 400 lbs.	44%	53%	17%	47%	46%
Red hake, lbs. on Trips > 1,500 lbs.	8%	10%	0%	10%	8%
Red hake, lbs. on Trips > 3000 lbs.	2%	3%	0%	4%	3%
Red hake trips > 400 lbs.	93	58	2	45	75
All trips	1,617	478	248	875	1,342
Whiting trips	35%	38%	23%	28%	32%
Trips > 2000 lbs.	20%	27%	13%	22%	18%
Trips > 15,000 lbs.	0%	1%	0%	0%	0%
Trips > 30,000 lbs.					

Vessels that would qualify for a Category I permit tend to be larger vessels (132 to 190 GRT), taking a greater proportion of trips targeting small-mesh multispecies (26-39%), and have a greater economic dependence on the small-mesh multispecies fishery (29.2-42.3%) during 2014-2016 than Category II or non-qualifying vessels (Table 60). The annual per-vessel revenue from small-mesh multispecies ranges from $207 (Alternative 5) to $419 thousand (Alternative 2) per year. Alternative 2 with the highest qualification threshold qualifies the lowest number of vessels, but these vessels are more focused on the small-mesh multispecies fishery than the Category I vessels in the other four alternatives. Dependence (i.e. percentage of total annual landings) on small-mesh multispecies revenue ranged from 29.2% (Alternative 5) to 42.3% (Alternative 2). Many of these vessels also use small-mesh trawls to target squids. The whiting revenue when more than 2,000 lbs. of whiting are landed averaged $12,455 (Alternative 3) to $15,997 per trip (Alternative 2).

Vessels that would qualify for a Category II permit tend to be smaller vessels (65-71 GRT) than those that qualify for Category I, taking a smaller proportion of trips targeting small-mesh multispecies (10-12%), and having a lower economic dependence on the small-mesh multispecies fishery (5.2-7.3%) during 2014-2016 than Category I or non-qualifying vessels (Table 60). The annual revenue from small-mesh multispecies ranges from $19 (Alternative 3) to $29 thousand (Alternative 2) per year. Alternative 2 with the lowest qualification threshold qualifies the most number of vessels, many of which were making small-mesh multispecies trips in 2014-2016, but would not qualify with the other alternatives. Dependence on small-mesh multispecies revenue ranged from 5.2% (Alternative 3) to 7.3% (Alternative 1). Many of these vessels also use small-mesh trawls to target squids, large-mesh trawls targeting groundfish, monkfish, and skates, or gillnets targeting groundfish. The whiting revenue when more than 2,000 lbs. of whiting are landed averaged $6,501 (Alternative 1) to $5,020 per trip (Alternative 2).

Many more vessels that landed one or more lbs. of small-mesh multispecies had no history during an alternative's qualification period, or did not have landings exceeding the alternative's threshold. The number of MRI/permits that did not qualify varied with the different qualification periods for each alternative (Table 60), but the number of non-qualifying vessels having one or more trips above the incidental whiting and red hake limits ranged from 25 (Alternative 2) to 48 (Alternative 4), almost the same number of vessels that would qualify for a Category II permit. Non-qualifying vessels tend to be somewhat smaller (33-49 GRT) than vessels that would qualify for a Category II permit, but have much higher total revenue derived from other fisheries targeting other species (99.1-99.8%). The average whiting landings per trip ranged from 234 (Alternative 3) to 324 (Alternative 2) lbs./trip, contributing revenue of $170 (Alternative 3) to $235 (Alternative 2) per trip. If we only consider trips that landed over 2,000 lbs. of whiting or 400 lbs. of red hake, the revenue from whiting landings jumps to $4,682 (Alternative 1) to $5,777 (Alternative 3) per trip, actually a little higher than the average revenue per trip for vessels that would qualify for a Category II permit ($3,435-$4,675).

Table 60. Economic characteristics of small-mesh multispecies and other 2014-2016 fishing activity, by qualification category and alternative. Notable high or low values are highlighted in yellow.

Alternative	Category	Qualifying fleet (w/ trips ≥ 1 lb hakes)	Currently active fleet (w/ trips ≥ 2000 lbs hakes)	Latent Effort	Hakes Trips/yr (2014-2016)	Share of hakes trips (%)	Hakes/Fish trips ratio	Annual Average Hakes landing (lbs)	Share of hakes landings (%)	Hakes/Fish landed ratio	Ave GRT	Annual CPUE lbs/GRT	Annual fish revenue per boat (nominal $)	Annual hakes revenue per boat (in 2016$)	Revenue Ratio Hakes/Fish	Whiting lbs. per trip	Whiting revenue per trip	Whiting revenue per trip (trips > inc limits)	Annual total fleet hakes revenue (2016$)
1	I	40	33	17%	1780	66	30%	11,712,196	0.83	0.39	151	2343	$754,879	$262,637	34.8%	16,062	$5,624	$13,495	$8.67 mil
2	I	20	19	5%	1413	52	39%	10,763,803	77	0.44	190	2979	$991,505	$419,222	42.3%	19,210	$7,921	$15,997	$7.97 mil
3	I	51	44	14%	2054	76	26%	12,628,196	90	0.38	132	2181	$635,486	$212,383	33.4%	14,807	$4,878	$12,455	$9.34 mil
4	I	55	42	24%	1887	70	29%	12,109,019	86	0.37	143	2015	$698,415	$213,349	30.6%	15,656	$5,298	$13,209	$8.96 mil
5	I	84	43	49%	1860	69	30%	12,034,712	86	0.38	187	1495	$708,479	$207,109	29.2%	15,763	$5,219	$13,315	$8.91 mil
1	II	74	38	49%	505	19	11%	1,478,780	11	0.15	66	590	$393,040	$28,797	7.3%	5,112	$580	$4,675	$1.09 mil
2	II	203	69	66%	1016	38	12%	2,692,883	19	0.14	71	553	$430,525	$28,880	6.7%	3,972	$526	$3,896	$1.99 mil
3	II	90	46	49%	532	20	11%	1,202,882	9	0.12	65	401	$371,506	$19,351	5.2%	3,149	$456	$3,435	$0.89 mil
4	II	124	38	69%	535	20	11%	1,422,681	10	0.14	65	577	$401,221	$27,705	6.9%	4,166	$527	$3,997	$1.05 mil
5	II	159	30	81%	427	16	10%	1,154,175	8	0.14	68	562	$422,330	$28,470	6.7%	4,065	$426	$3,622	$0.85 mil
1	NQ	971	42	NA	345	13	14%	670,184	5	0.13	43	370	$1,382,931	$11,808	0.9%	319	$ 227	$ 4,682	$0.50 mil
2	NQ	908	25	NA	201	7	17%	404,474	3	0.16	33	488	$1,753,219	$11,972	0.7%	324	$ 235	$ 5,355	$0.30 mil
3	NQ	1,099	38	NA	119	4	9%	235,964	2	0.12	49	127	$1,937,445	$4,595	0.2%	234	$ 170	$ 5,777	$0.17 mil
4	NQ	2,035	48	NA	283	10	11%	535,341	4	0.14	45	247	$1,543,620	$8,253	0.5%	271	$ 190	$ 4,749	$0.40 mil
5	NQ	2,341	45	NA	367	14	14%	760,729	5	0.14	40	421	$1,373,438	$12,510	0.9%	323	$ 231	$ 4,796	$0.56 mil

6.2 Biological Impacts of Fishing on Target Species

Small-mesh multispecies fishing currently is managed by a mix of seasons, area restrictions, mesh, and possession limits. Landings and catches are constrained by these regulations, plus market factors. As discussed in Section 6.1.3, catches of northern silver hake and southern whiting have been a small percent of the ABC and have been well below the overfishing threshold. Most of the catch is landed. More details about trends in small-mesh multispecies catches is given in Section 5.2.5.

Northern stock hake stock biomass has been increasing and catch specifications have been raised. More older and larger silver hake are appearing in the survey and commercial catches. Southern silver hake biomass however has been declining and the recommended catch specifications for 2018-2020 are likewise lower, about double the 2016 catch estimate. Section 5.2.2 provides more details about stock status and the recommended whiting specifications.

Catches of northern red hake have often exceeded the ABC and overfishing has occurred, but the update assessment estimates that the 2016 catches did not exceed the ABC (which was raised in 2016) and overfishing was not occurring. In contrast, the catches of southern red hake have remained relatively stable while stock biomass has been declining. The assessment update estimates that the southern red hake stock status has changed, the stock has become overfished and overfishing occurred in 2016. With lower 2018-2020 specifications and catch limits, it is likely that at least in-season AMs will be triggered in 2018 unless landings decline and overfishing could continue. Unlike whiting, the majority of the red hake catches are discarded. Most discards in the southern management area occur in the small-mesh fishery, while discards in the northern management area are split evenly between the small- and large-mesh fisheries.

It is important to keep in mind that whiting fishing is relatively concentrated, restricted either by exemption area regulations and/or by availability of commercial concentrations of fish. It is likely that any changes in fishing effort will occur in the same areas that are currently fished. Increases in fishing effort are likely to occur in areas currently fished and the intensity of fishing will change, but would not expand into new areas.

6.2.1 No Action (Preferred)

This alternative, described in Section 4.1, would continue the existing open access small-mesh multispecies fishery. Any vessel would be able to obtain a Category K multispecies permit and target small-mesh multispecies in exemption areas.

This alternative would allow more vessels to enter the fishery to target whiting and red hake using small-mesh trawls. It could make existing regulations less effective to manage small-mesh multispecies catches, than they would otherwise be with limited access in effect. Moderate increases in whiting catches would not cause overfishing, but increases in red hake catches could cause overfishing in the northern management area and exacerbate overfishing in the southern management area.

If the Council does not implement limited access through this amendment, it will need to take more drastic actions later to respond when overfishing occurs, or catches exceed specifications. Several general measures could be applied, depending on the type and severity of the problem. Measures that could reduce non-target catches include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest).

It is difficult to assess the severity of impacts on red hake, because we cannot forecast the effectiveness of these measures (which are currently unknown). It does however take time to identify the problem (at least during the next annual monitoring report) and prepare a framework action or amendment to address it. Furthermore, increases in small-mesh multispecies fishing effort by new entrants could dilute the effectiveness of technical measures to limit catches of red hake. Also, if the catches of whiting increase or if future specifications decline, the Council would be forced to cut small-mesh multispecies fishing effort, either by reducing whiting possession limits, shortening seasons, or by initiating other measures. Again, these other measures would be less effective if new entrants enter the fishery.

Therefore, relative to any limited access alternative in Action 1, this alternative would have a neutral to small negative impact on whiting and a negative impact on red hake and other incidental species (see Section 5.2.6 for a list of species that are frequently observed as bycatch).

6.2.2 Whiting Possession Limit for Vessels Using 3-inch and larger Cod-End Mesh Trawls

The possession limits in this set of three alternatives would apply to any vessel Using 3-inch and larger mesh to target small-mesh multispecies in all areas, including areas that are exempt from the large-mesh Northeast Multispecies regulations.

6.2.2.1 Alternative 1 (Preferred; No Action) – Existing small-mesh multispecies possession limits apply

This alternative would retain the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lbs. in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area. In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger.

The current limits and other measures have prevented overfishing of whiting, but overfishing of northern red hake has occurred for a few recent years and for southern red hake began in 2016. Since these occurrences, the specifications have been adjusted to account for changes in stock biomass and accountability measures have been adjusted to prevent future overfishing. New specifications for southern red hake are expected to take effect in fishing year 2018 and current landings are likely to trigger the in-season accountably measure, reducing the red hake possession limit to 400 lbs.

Thus, the status quo/No Action alternative is likely to have a neutral impact on whiting stocks and a small negative impact on red hake stocks.

6.2.2.2 Alternative 2 – Raise the Whiting possession limit from 40,000 to 50,000 lbs., January 1 to June 14 in the Southern New England and Mid-Atlantic exemption areas

This alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Because the whiting possession limit has not been more than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects.

Because the Alternative 2 possession limits exceed No Action, vessels could land similar amounts of whiting as they do now. Vessels might also land the higher possession limit, up to 50,000 lbs., lengthening their fishing trips and increasing effort per trip. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit, or they might take fewer trips, and keep total landings the same. This alternative could provide an incentive to fish in the southern area during January 1-June 14.

Vessels in the southern management area could, as a result of the higher possession limit, land more whiting and red hake (at least that is the intent). Northern red hake and southern whiting are not overfished and overfishing is not occurring. In the past several years, landings have been well below the TAL and catch well below the ABC. Although the higher catch would increase mortality compared to Alternative 1 and Alternative 3, but is not expected to have a negative impact on northern red hake and southern whiting. With respect to whiting, this alternative is therefore expected to have a neutral effect.

For red hake, increases in catch associated with more fishing effort (but without a change in the red hake possession limits) could also happen. Northern red hake biomass is above the target and overfishing is not occurring. Landings have however exceeded the TAL, triggering in-season accountability measures. According to the assessment update for 2016, southern red hake is overfished and overfishing is occurring. The proposed 2018-2020 specifications are close to current landings and catch. Any increases in catch associated with this alternative would have a negative impact on red hake (target species).

6.2.2.3 Alternative 3 – Lower the Whiting possession limit from 40,000 to 30,000 lbs., June 15 to December 31 in the Southern New England and Mid-Atlantic exemption areas

Alternative 3 would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. It is intended to reduce the effect of southern area landings on market prices for whiting in all areas.

This alternative has several types of potential impacts, changing the number of trips taken or changing the location or season when small-mesh multispecies trips are taken. It may induce more vessels to fish additional trips to catch and land the same amount as they do under the existing limit. In this case, total fishing effort would probably remain the same as it is now.

Trips during the summer and fall would be less profitable than they are presently, thus potentially causing vessels to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for the vessel to do so. The most likely impact of a seasonal whiting possession limit reduction is to change the distribution of trips, either seasonally within the southern management area or spatially, to the northern area.

This alternative would could decrease effort and catches of the target species to have a lower impact on price during the summer and fall. This alternative is unlikely to have a negative effect on whiting in either area, and would therefore have a neutral impact. Due to potential changes in the distribution of fishing effort, catches of northern red hake would probably increase having a small negative impact and catches of southern red hake would probably decrease, having a small positive impact.

6.2.3 Limited Access Alternatives

6.2.3.1 Action 1 – Qualification criteria

All limited access action alternatives are unlikely to substantially reduce capacity, but could reduce the potential for rapid increases in fishing effort by vessels entering the fishery. The primary tool to manage catches of target species in the small-mesh multispecies fishery are possession limits, which have been and can be adjusted to achieve biological objectives. Limited access will make management tools more effective, because new vessels would be unable to enter the fishery mitigating the effect of the regulations.

The discussion in this section mainly focuses on whiting, which is the primary target of the fishery. Most of red hake catch is discarded due to poor market demand. Thus the potential effect on red hake is discussed in Section 6.3 (Biological Impacts of the Directed Fishery on Non-target Species), where differences in bycatch by vessels qualifying for limited access are evaluated. Nonetheless, changes in a red hake possession limit would be more effective with limited access than it would with open access to the fishery (i.e. No Action).

It is important to keep in mind that whiting fishing is relatively concentrated, restricted either by exemption area regulations and/or by availability of commercial concentrations of fish. It is likely that any changes in fishing effort will occur in the same areas that are currently fished. Increases in fishing effort are likely to occur in areas currently fished and the intensity of fishing will change, but would not expand into new areas.

The alternatives in Action 1 consider establishing a limited access program for the small-mesh multispecies fishery, targeting whiting and red hake using 3-inch or smaller mesh in areas that are exempt from the large-mesh groundfish regulations. In addition to No Action, there are five alternatives with different qualification criteria and periods. In addition to a core set of vessels that would qualify for all alternatives (20 Category I and 37 Category II), each alternative qualifies a different set of vessels that landed whiting or red hake at various times. The qualification period for Alternatives 1, 2, and 5 ends at the control date, but the qualification period for Alternative 3 and 4 extend to the end of calendar year 2016. For all alternatives, qualifiers would be able to fish in the small mesh multispecies exemption areas, subject to the possession limits specified in Section 4.3.2 and the permit allowances specified in Section 4.3.3. Depending on the alternatives selected in Action 3 (Section 4.3.3), the vessels may not be able to use small mesh in the exemption areas, unless they are permitted to fish for other small-mesh species, such as squid and herring. Non-qualifying vessels would no longer be allowed to land more than 2,000 lbs. of whiting and 400 lbs. of red hake.

6.2.3.1.1 Alternative 1

There are 40 Category I and 74 Category II vessels that are expected to qualify under Alternative 1, 33 and 38 are currently fishing for whiting. Thus, there would be 7 Category I and 36 Category II permits that would be latent and could later enter the fishery. Additionally, there were 42 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016. For non-qualifying vessels, whiting landings that exceed the 2,000 lbs. incidental possession limit contribute to 3.2% of total whiting landings. Red hake landings proportions are similar, because whiting is usually the main target.

Compared to No Action, Alternative 1 is expected to have a positive impact on target species, because regulations to control catch would be more effective. Alternative 1 has the least amount of latent effort

compared to the other action alternatives and therefore would have a positive impact on the target species, compared to Alternatives 1-4.

6.2.3.1.2 Alternative 2

There are 20 Category I and 203 Category II vessels that are expected to qualify under Alternative 2, 19 and 69 are currently fishing for whiting. Thus, there would be one Category I and 134 Category II permits that would be latent and could later enter the fishery. Additionally, there were 25 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016. For non-qualifying vessels, whiting landings that exceed the 2,000 lbs. incidental possession limit contribute to 3.2% of total whiting landings. Red hake landings proportions are similar, because whiting is usually the main target.

Compared to No Action, Alternative 2 is expected to have a positive impact on target species, because regulations to control catch would be more effective. Alternative 2 ranks second behind Alternative 5 in the amount of latent effort, but would qualify more Category II vessels and include more that are currently fishing. With a 30,000/40,000 lbs. whiting possession limit, there probably isn't much difference with Alternative 5 in this regard, but with a proposed alternative with a 15,000 lbs. whiting possession limit that is a closer fit to the status quo for these vessels, latent effort would be less than for Alternative 5.

Because of the above considerations, Alternative 2 would have a positive impact on the target species compared to No Action and Alternative 5, but a negative impact compared with Alternatives 1, 3, and 4.

6.2.3.1.3 Alternative 3

There are 51 Category I and 90 Category II vessels that are expected to qualify under Alternative 3, 44 and 44 are currently fishing for whiting. Thus, there would be 7 Category I and 134 Category II permits that would be latent and could later enter the fishery. Additionally, there were 38 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016. For non-qualifying vessels, whiting landings that exceed the 2,000 lbs. incidental possession limit contribute to 2.4% of total whiting landings. Red hake landings proportions are similar, because whiting is the main target.

Compared to No Action, Alternative 3 is expected to have a positive impact on target species, because regulations to control catch would be more effective. Alternative 3 appears to have more latent effort than Alternative 1, but less than the other action alternatives. Thus Alternative 3 would have a positive impact on the target species compared to Alternatives 2, 4, and 5, but a negative impact compared to Alternative 1.

6.2.3.1.4 Alternative 4

There are 55 Category I and 124 Category II vessels that are expected to qualify under Alternative 4, 42 and 38 are currently fishing for whiting. Thus, there would be 13 Category I and 86 Category II permits that would be latent and could later enter the fishery. Additionally, there were 48 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016. For non-qualifying vessels, whiting landings that exceed the 2,000 lbs. incidental possession limit contribute to 2.6% of total whiting landings. Red hake landings proportions are similar, because whiting is the main target.

Compared to No Action, Alternative 4 is expected to have a positive impact on target species, because regulations to control catch would be more effective. Alternative 4 appears to have less latent effort than

Alternatives 2 and 5, but more than Alternatives 1 and 3. Thus Alternative 4 would have a positive impact on target species compared to Alternatives 2 and 5, but a negative impact compared to Alternatives 1 and 3.

6.2.3.1.5 Alternative 5

There are 84 Category I and 159 Category II vessels that are expected to qualify under Alternative 2, 43 and 30 are currently fishing for whiting. Thus, there would be 41 Category I and 129 Category II permits that would be latent and could later enter the fishery. Additionally, there were 55 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016. For non-qualifying vessels, whiting landings that exceed the 2,000 lbs. incidental possession limit contribute to 2.6% of total whiting landings. Red hake landings proportions are similar, because whiting is the main target.

Compared to No Action, Alternative 5 is expected to have a positive impact on target species, because regulations to control catch would be more effective. Alternative 5 would qualify more vessels than any other action alternative and has the most latent effort (vessels with limited access qualification that did not land more than 2,000 lbs. during 2014-2016). Thus, Alternative 5 has a negative impact on target species compared to Alternatives 1 to 4.

6.2.3.2 Action 2 - Possession limit alternatives

The alternatives in Action 2 propose adjustments to the whiting possession limits, primarily to adjust the capacity of the small-mesh multispecies fleet to land whiting and to minimize negative effects on price. These possession limits would apply to either vessels qualifying for a Category I or II permit, or to both (i.e. the same possession limit would apply to both permit categories.

In addition, Action 2 includes an alternative that would establish an incidental possession limit for whiting and an incidental limit for red hake. These incidental possession limits would apply to all fishing activity by vessels that do not have a Category I or II permit, regardless of mesh or gear in use. Depending on the final alternatives selected in Action 3 (Section 4.3.3), vessels with an incidental permit may be able to exceed the incidental possession limits if they are participating in another limited access small-mesh fishery, such as herring or squid.

6.2.3.2.1 Whiting[22] Possession Limit for Vessels with a Category I Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category I limited access permit.

6.2.3.2.1.1 Alternative 1 (Status quo)

For vessels holding a Category I limited access permit, this alternative would not change the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lbs. in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area.

[22] Whiting includes silver and offshore hakes.

In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger

Applying to a smaller fleet of vessels than might exist without limited access, this alternative is likely to have a neutral impact on whiting (catches are currently well below specifications) and a low positive impact on red hake.

6.2.3.2.1.2 Alternative 2

For vessels holding a Category I limited access permit, this alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Because the whiting possession limit has not been more than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects.

Because the Alternative 2 possession limits exceed No Action, vessels could land similar amounts of whiting as they do currently. Vessels might land the higher possession limit, up to 50,000 lbs., lengthening their fishing trips and increasing effort per trip. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit, or they might take fewer trips, and keep total landings the same. This alternative could provide an incentive to fish in the southern area during January 1-June 14.

Vessels in the southern management area could as a result of the higher possession limit could land more whiting and red hake (at least that is the intent). Northern red hake and southern whiting are not overfished and overfishing is not occurring. In the past several years, landings have been well below the TAL and catch well below the ABC. Although the higher catch would increase mortality compared to Alternative 1 and Alternative 2, it is not expected to have a negative impact on northern red hake and southern whiting. With respect to whiting, this alternative is therefore expected to have a neutral effect.

For red hake, increases in catch associated with more fishing effort (but without a change in the red hake possession limits) could happen. Northern red hake biomass is above the target and overfishing is not occurring. Landings have however exceeded the TAL, triggering in-season accountability measures. According to the assessment update for 2016, southern red hake is overfished and overfishing is occurring. The proposed 2018-2020 specifications are close to current landings and catch. Any increases in catch associated with this alternative would have a negative impact on red hake (target species), but this could be mitigated by choosing limited access qualification in Action 1. **Therefore, this alternative which increases the southern whiting possession limit while limiting the number of vessels in the fishery is expected to have a neutral to small negative impact on whiting and red hake, compared to No Action.**

6.2.3.2.1.3 Alternative 3

For vessels holding a Category I limited access permit, this alternative would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. It is intended to reduce the effect of southern area landings on market prices for whiting in all areas.

This alternative has several types of potential impacts, changing the number of trips taken or changing the location or season when small-mesh multispecies trips are taken. It may induce more vessels to fish

additional trips to catch and land the same amount as they do under the existing limit. In this case, total fishing effort are expected to remain near current levels.

Trips during the summer and fall would be less profitable than they are presently, thus potentially causing vessels to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for the vessel to do so. In this case, the most likely impact is to change the distribution of trips, either seasonally within the southern management area or spatially, to the northern area.

This alternative would could decrease effort and catches of the target species to have a lower impact on price during the summer and fall. **Whether coupled with a qualification alternative in Action 1 and using the same rational for Alternative 2, this alternative would have a neutral impact on whiting and northern red hake, while having a slight positive impact on southern red hake, compared to No Action.**

Table 61. Action 2 summary (Category I) - Potential impact of the action alternatives on the target species.

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category I permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential impact of the action alternatives on the target species.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs. • Accountability Measures at 2,000 lbs. (whiting) and 400 lbs. (red hake).		Cat I	All	• Coupled with fewer number of vessels than would be present without limited access • Neutral impact on whiting and low positive impact on red hake.
2	Increase whiting possession limit from 40,000 lbs. to 50,000 lbs.	South	Cat I	Winter, Spring	Neutral to small negative impact on whiting and red hake
3	Decrease whiting possession limit to 30,000 lbs.	South	Cat I	Summer, Fall (Jun 15-Dec 31)	Neutral impact on whiting and northern red hake, while having a slight positive impact on southern red hake

6.2.3.2.2 Whiting[23] Possession Limit for Vessels with a Category II Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category II limited access permit.

6.2.3.2.2.1 Alternative 1 (Status quo)

For vessels holding a Category II limited access permit, this alternative would not change the existing small-mesh multispecies possession limits. These limits are summarized under Alternative 1 in the previous section.

Although potentially applying to a smaller number of vessels than are currently fishing, if an Action 1 alternative is chosen this possession limit alternative would not change the amount of fishing effort by vessels that qualify for Category II, but there could be less effort than if there is no limited access to the fishery. **This alternative therefore has a neutral to small positive impact on the target species.**

6.2.3.2.2.2 Alternative 2

This alternative would decrease the whiting possession limit in all management areas from 30,000 lbs. to 15,000 lbs. It is intended to create a whiting possession limit that is more consistent with the usual catches made by Category II vessels (see Section 6.6.3.2.2 analysis of landings per trip). During 2014-2016, only 9% of trips by vessels that are expected to qualify for a Category II permit had whiting landings that exceeded 15,000 lbs.

For a substantial majority of vessels, this alternative would have no effect on their fishing activity. They would fish as they previously did, but would be unable to make longer trips to capture more whiting than they currently do. Some vessels however would make shorter trips, possibly closer to shore in areas where whiting are available.

For whiting and northern red hake, modest increases in catch could be tolerated and it would not cause overfishing. For these stocks, the impact of this alternative is expected to be neutral. Southern red hake, on the other hand, is overfished and overfishing is occurring. Changes in the whiting possession limit could cause changes in fishing behavior, but if the limit is consistent with vessel activity in the fishery, it could prevent increases in fishing effort. **Using the same rationale about increases in effort for Action 1 alternatives, compared to No Action, this alternative would have a neutral impact on whiting and northern red hake and positive impact on southern red hake.**

[23] Whiting includes silver and offshore hakes.

Table 62. Action 2 summary (Category II) - Potential impact of the action alternatives on target species.

Action 2 Alts.	Whiting possession limit alternatives for vessels with a Category II permit	Affected areas	Affected categories	Affected seasons	Potential impact of the action alternatives on target species.
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40,000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs.		Cat II	All	• Coupled with fewer number of vessels than would be present without limited access • Neutral to small positive impact on the target species
2	15,0000 whiting possession limit and no change to the red hake possession limits.	All	Cat II	All	Neutral impact on whiting and northern red hake and positive impact on southern red hake

6.2.3.2.3 Incidental possession limits

Vessels that did not qualify for a Category I or II limited access permit would be regulated by the possession limits in the two alternatives below, regardless of the type of gear in use or the species that the vessel is targeting.

6.2.3.2.3.1 Alternative 1 (No Action)

This alternative would retain the existing whiting possession limits, even if an action alternative was chosen in Action 1 (limited access qualification). It might seem counter-intuitive at first, but choosing this alternative with a limited access qualification alternative would allow whiting and red hake possession limits to be adjusted by permit category when needed in the future.

The direct impact on whiting and red hake would be unchanged from the status quo, but it could reduce the potential for increases in small-mesh multispecies fishing effort by additional non-qualified vessels. Indirectly, **this alternative would have a neutral impact on whiting and northern red hake, but a negative impact on southern red hake.**

6.2.3.2.3.2 Alternative 2

This alternative would reduce the whiting and red hake possession limits to 2,000 lbs. and 400 lbs., respectively, for vessels that do not qualify for a small-mesh multispecies limited access permit (see Action 1). Due to relatively low prices for whiting and red hake, it is highly unlikely that non-qualifying vessels would take trips to target small-mesh multispecies. They may, however, continue or increase fishing effort into other fisheries.

The alternative would make the limited access qualification alternatives effective, but implementing a lower incidental possession limit for non-qualifying vessels. As such, compared to No Action, **it would have a neutral to positive impact on the target species.**

Table 63. Action 2 summary (non-qualifiers) - Potential impact of the action alternatives on the target species.

Action 2 Alts.	Whiting possession limit alternatives	Affected areas	Affected categories	Affected seasons	Potential impact of the action alternatives on the target species.
1	Retain existing whiting and red hake possession limits for non-qualifying vessels in Action 1	All	Non-qualifiers	All	• Potential to continue overfishing of southern red hake • Neutral impact on whiting and northern red hake, but a negative impact on southern red hake
2	Reduce possession limit for whiting at 2,000 lbs. and red hake at 400 lbs. for non-qualifiers in Action 1.	All	Non-qualifier	All	Neutral to positive impact on the target species

6.2.3.3 Action 3 – Permit allowances

Alternatives in Action 3 only apply if an action alternative in Action 1 is chosen. Thus there is no No Action alternative specifically for Action 3.

6.2.3.3.1 Limited access permit characteristics and conditions

The alternatives in Action 3 would affect the characteristics and allowances of a small-mesh multispecies limited access permit. In most cases, the effects are purely administrative but could change compliance costs for vessels that have limited access permits in other fisheries. Small-mesh multispecies limited access permits that are most consistent with the existing permits held by the vessel would minimize costs and maximize opportunity. Many vessels that would potentially qualify for a Category I or II permit in the Action 1 alternatives have one or more of a large-mesh groundfish, an Atlantic herring permit, or a squid/mackerel/butterfish limited access permit (see Section 6.6.3 summarizing permits held by qualifying vessels). Table 2 summarizes the similarities and differences among other limited access permits frequently held by vessels currently targeting small-mesh multispecies.

Because they potentially affect the quality or number of vessels and/or fishing effort, Alternatives 2, 4, and 5 could have an effect on target species

6.2.3.3.1.1 Alternative 1

Alternative 1 would apply the limited access permit characteristics for the Northeast (large mesh) Multispecies fishery to Category I and II permits for the small-mesh multispecies fishery (see Table 2). These include limits for permit accumulation, upgrade restrictions, and consideration of construction during the last year of a qualification period.

Alternative 1 is considered here to be a baseline to compare effects of other alternatives in Action 3. Although there is no existing limited access small-mesh multispecies permit, Alternative 1 serves as a proxy for status quo for analytical comparison since it is difficult to evaluate effects with respect to an open access Category K groundfish permit.

Thus Alternative 1 would have the same effects on target species that applies to any action alternative in Action 1.

6.2.3.3.1.2 Alternative 2

This alternative would not establish any limits on holdings of limited access permits for the small-mesh multispecies fishery.

Although potentially reducing ownership costs, with respect to impacts on target species the number and diversity of ownership is not expected to have a meaningful, or neutral, impact on target species.

6.2.3.3.1.3 Alternative 3

This alternative would not allow consideration of construction or repair of vessels for the year preceding the end of the qualification period. It could therefore reduce the number of limited access permits for the small-mesh multispecies, potentially reducing effort in the fishery.

Compared to Alternative 1, this alternative would qualify fewer vessels and therefore would have a positive effect on target species.

6.2.3.3.1.4 Alternative 4

This alternative would allow only one vessel to qualify based on a single history. In other words, a history could not be transferred to a replacement vessel AND qualify the original vessel (which may have been sold or transferred to a new owner). Thus, this alternative would qualify fewer vessels than the Alternative 1 baseline.

Like Alternative 3, this alternative would qualify fewer vessels and therefore would have a positive effect on target species.

6.2.3.3.1.5 Alternative 5

This alternative would allow upgrades of vessels that hold a limited access small-mesh multispecies fishery permit. It could allow, for example, a vessel to be more capable of fishing offshore or take more frequent trips (vessel becomes more seaworthy), increase hold capacity to take longer trips, or to tow larger trawls.

Although the fishery is limited by ACLs, there is room for increases in whiting catches and more fishing effort by qualifying vessels. Fishing offshore could affect the types of bottom where fishing occurs or the type and amount of bycatch. Fishing longer or more frequent trips implies an increase in fishing effort.

For target species, this alternative is expected to have a neutral to negative impact through increases in catch of the target species, although the magnitude is difficult to quantify depending on a variety of economic and regulatory effects. Vessels that upgrade would presumably be able to pack and land more fish, taking longer and more frequent trips in variety of conditions. Vessels holding a Northeast (large-mesh) Multispecies permit would be prohibited from upgrading at the present time.

Table 64. Action 3 limited access permit alternatives summary (permit allowances) - Potential impact of the action alternatives on the target species.

Alts.	Permit allowances	Potential impact of the action alternatives on the target species.
1	Status quo. 5% cap on permits + upgrade restriction + consideration for construction at t_{-1} of qualification period.	Depends on choice of Action 1 alternatives
2	No limits on holdings of limited access permits for the small-mesh multispecies.	Neutral, or no meaningful impact.
3	No consideration for construction or repair of vessels for the year preceding the qualification period.	Positive
4	Only one vessel based on single history, i.e., history couldn't be transferred to a replacement vessel AND qualify the original vessel.	Positive
5	Allow upgrade of vessels that hold limited access multi-species fishery permit. (Upgrading is intended for distant fishing, fish frequently, more hold capacity, longer duration trips, and capability for taking more/large tows).	Neutral to negative

6.2.3.3.2 Incidental permit conditions

Vessels holding an incidental permit would be able to land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, regardless of the type of gear in use or species targeted, unless one of the following alternatives is chosen. These alternatives only apply if an action alternative is selected from Action 1, hence there is no relevant status quo for Action 3.

6.2.3.3.2.1 Alternative 1

In addition to the incidental small-mesh multispecies fishery possession limits, vessels with an incidental possession limit permit would be prohibited from using small mesh trawls in small-mesh multispecies exemption areas.

This alternative could limit discards of whiting and red hake, in exemption areas where they are usually more prevalent. Thus, this alternative is expected to have a positive impact on the target species.

It is impossible to quantify the potential to target small-mesh multispecies with an incidental permit under current or future regulatory or market conditions. This potential is thought to be currently limited by the relatively low whiting and red hake prices, although some vessels may otherwise use the incidental permit to fish for bait and sell the catch through the transfer at sea provision.

6.2.3.3.2.2 Alternative 2a

This alternative would allow vessels using large mesh on a groundfish or monkfish DAS to exceed the proposed incidental whiting and red hake possession limits.

This alternative would allow vessels on a groundfish DAS to land the whiting and red hake they catch using large mesh trawls or gillnets during trips targeting large-mesh groundfish. It would reduce discarding of whiting and red hake that would otherwise occur. This alternative would have a positive effect on target species by reducing discards.

6.2.3.3.2.3 Alternative 2b

This alternative would prohibit fishing for small-mesh multispecies on a groundfish DAS. While fishing on a groundfish DAS, the vessel could land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, even if the vessel holds a small-mesh multispecies fishery limited access permit.

For the reasons given for Alternative 2a, this alternative would have the opposite effect and have a negative impact on the target species, because it would increase discards.

6.2.3.3.2.4 Alternative 3

Similar to Alternative 2a, this alternative would allow vessels fishing for Atlantic herring or squid with a limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.

This alternative has the same effect as Alternative 2b, but applied to small-mesh trawl herring and squid fisheries. Typically vessels in these fisheries catch and land large volumes of their target species. If there is sufficient catch, some whiting and red hake may also be landed. This alternative could reduce discards of whiting and red hake, but is more likely to have negligible or neutral impact on the target species (in this case, whiting and red hake).

6.2.3.3.2.5 Alternative 4

This alternative would exempt vessels using small-mesh trawls in specific exemption areas from the Incidental Permit possession limits, allowing the vessels to land the same amounts of whiting and red hake as vessels that hold limited access permits. These any exemption areas require the use a more selective raised footrope trawl.

The catch rates of non-target species are somewhat lower in raised footrope trawls than in standard 2- and 4-seam trawls that have the same cod-end mesh (see analysis in Section 5.2.6). This is particularly true for benthic species, e.g. flounders, skates, and monkfish but there are few differences in bycatch of roundfish (cod, haddock, pollock, etc) and red hake. Because these nets are used in different exemption areas and in different seasons, it is difficult to say how much of the reduction is due to net configuration and how much is due to other factors (i.e. where and when fishing occurs). There are no recent paired trawl or side-by-side comparisons in the same season and area (some vessels are known to voluntarily use a raised footrope trawl in Cultivator Shoals, but there are no such observations in the sea sampling or at-sea monitoring data sets. Direct catch comparisons using an experimental rope trawl were conducted by Cornell University researchers in the Cultivator Shoals Area, but the gear is not currently required in an exemption area and does not apply to this alternative.

While the catch rates (discards to total kept, or $\sum D/\sum Kall$) are lower when a raised footrope trawl is used than a for standard trawl for benthic species, the catch rates for roundfish and red hake are at comparable levels. Thus, the measure is unlikely to reduce red hake catch and may even increase it if the fishery continues to expand in the northern exemption areas where the raised footrope trawl is required.

Compared to Alternative 1 and No Action, Alternative 4 is likely to have a neutral to slightly negative impact on northern silver hake and a small negative impact on northern red hake, while having a neutral impact to southern whiting and red hake (because it is unlikely to cause an effort shift and there are no areas in the southern management area that require a raised footrope trawl.

Table 65. Action 3 incidental permit alternatives summary (permit conditions) - Potential impact of the action alternatives on the target species.

Alts.	Permit allowances	Potential impact of the action alternatives on the target species.
1	Prevents vessels that do not qualify for limited access from targeting whiting and red hake in the exemption areas.	Positive • Limits discards of whiting and red hake,
2a	Allow large-mesh on monkfish DAS or groundfish to exceed incidental whiting and red hake possession limits.	Positive impact • Reduces discards of target species
2b	Prohibit fishing for small-mesh multispecies on groundfish DAS. If fishing on groundfish DAS, the possession limit be 2,000 lbs. (whiting) and 400 lbs. (red hake).	Negative impact • Increases discards of target species
3	Allow fishing for Atlantic herring or squids with limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.	Positive impact • Reduces discards of target species
4	Allows vessels to fish in exemption areas requiring a raised footrope trawl.	Neutral to slightly negative impact on northern silver hake and a small negative impact on northern red hake, while having a neutral impact to southern whiting and red hake • Potential to increase effort on northern silver hake • Gear does not appear to be more selective to reduce red hake catch • No raised footrope trawl areas are in the southern management area

6.3 Biological Impacts of the Directed Fishery on Non-target Species

Our analysis of bycatch (discard to kept-all, D/Kall) ratios during 2014-2016 for 21 discarded species for the small-mesh whiting fishery (vessels using small-mesh trawls on trips landing more than 2,000 lbs. of whiting or 400 lbs. of red hake) was unable to detect a reliable difference in catch rates for vessels that would potentially qualify for a small-mesh multispecies fishery limited access permit and potential non-qualifiers. A formal Analysis of Variance was conducted on the D/Kall ratios (including hauls where no catch for a species was observed) was conducted on red hake, haddock, and yellowtail flounder (see Appendix B). The PDT also examined box-whisker plots for these three and 18 other discarded species D/Kall rates to detect if it was likely that there would be differences for qualifying and non-qualifying vessels.

More apparent were differences in discard rates by trawl type, with catch rates for the raised footrope trawl being much lower than a standard 2- or 4-seam trawl. These differences were however confounded by the use of various types of gear being associated with specific exemption areas and seasons, Small-Mesh Area I (raised footrope trawl required) vs. the Cultivator Shoals Area (no selective trawl gear required), for example. There were no observed tows in the Cultivator Shoals Area on vessels that were voluntarily using the raised footrope trawl. Differences in catch rates by gear type may have been associated with bycatch rates from different areas and season. Therefore, no further evaluation of discards by trawl type were conducted.

Average annual discard estimates and the proportion of discards associated with qualifying and non-qualifying vessels are summarized in the following two tables. Because the PDT could not detect a reliable difference in discard rates by qualification category, the discard rate was applied to total landings on whiting trips by year, quarter, and small-mesh multispecies management area (north vs. south).

Bycatch estimates in the northern management area

In the northern management area, the top five discarded species by estimated weight were haddock (709 mt), spiny dogfish (346 mt), red hake (360 mt), winter skate (210 mt), and Atlantic herring (202 mt). Red hake have their own ACL and have been overfished. Yellowtail flounder has a sub-ACL assigned to it for the Cultivator Shoals Area and small-mesh catches had exceeded it in 2013. Haddock has no sub-ACL for the small-mesh multispecies fishery, but has become an issue as discards increased following the appearance of a very large 2013 year class. The third quarter haddock discard rate increased from 0.125 on 223 tows in 2014 to 0.192 on 172 tows in 2015, and to 0.282 on 123 tows in 2016.

Overall, potentially qualifying vessels are estimated to account for 89 to 98% of the total discards of 21 species for the northern management area (see table below). Haddock discards are estimated to be an annual average of 709 mt (0.248 lbs. discard/1 lb. kept; 90-98% by qualifying vessels), followed by 346 mt of spiny dogfish (0.170 lbs. discard/1 lb. kept; 88-98% by qualifying vessels), 360 mt of red hake (0.091 lbs. discard/1 lb. kept; 87-99% by qualifying vessels), 210 mt of winter skate (0.066 lbs. discard/1 lb. kept; 89-97% by qualifying vessels), and 202 mt of Atlantic herring (0.051 lbs. discard/1 lb. kept; 85->99% by qualifying vessels). There are important differences between the proportion of discards by qualifying vessels for Atlantic herring, although this is not a stock with concerns about discards. The estimated yellowtail flounder discards average 8 mt/yr (0.004 lbs. discard/1 lb. kept; 81 to 92%) by qualifying vessels.

Table 66. Estimated **northern management area** discards for the 2014-2016 small-mesh multispecies fishery, by Action 1 limited access alternative, does not total to 100% due to rounding.

	Alternative				
Species	**1**	**2**	**3**	**4**	**5**
All species					
Category I	68%	67%	86%	86%	60%
Category II	22%	26%	12%	12%	28%
Non-qualifiers	10%	7%	2%	2%	11%
Haddock	**709**	**mt/yr**			
Category I	73%	71%	87%	87%	64%
Category II	20%	23%	11%	11%	25%
Non-qualifiers	8%	6%	2%	2%	10%
Spiny dogfish	**346**	**mt/yr**			
Category I	71%	70%	85%	85%	59%
Category II	20%	23%	12%	12%	29%
Non-qualifiers	10%	7%	2%	2%	12%
Red hake	**360**	**mt/yr**			
Category I	61%	60%	84%	84%	57%
Category II	26%	30%	15%	15%	29%
Non-qualifiers	12%	10%	1%	1%	13%
Winter skate	**210**	**mt/yr**			
Category I	69%	67%	85%	85%	62%
Category II	23%	26%	12%	12%	28%
Non-qualifiers	9%	6%	3%	3%	11%
Atlantic herring	**202**	**mt/yr**			
Category I	58%	58%	84%	84%	55%
Category II	27%	31%	16%	16%	31%
Non-qualifiers	15%	12%	0%	0%	14%
Silver hake	**164**	**mt/yr**			
Category I	69%	68%	88%	88%	60%
Category II	24%	28%	11%	11%	32%
Non-qualifiers	7%	4%	2%	2%	8%
Little skate	**87**	**mt/yr**			
Category I	69%	67%	85%	85%	60%
Category II	22%	26%	12%	12%	29%
Non-qualifiers	9%	7%	3%	3%	11%
American plaice	**16**	**mt/yr**			
Category I	70%	69%	87%	87%	63%
Category II	22%	25%	11%	11%	27%
Non-qualifiers	8%	6%	2%	2%	10%

Continuation of table on previous page

Species	Alternative 1	2	3	4	5
Witch flounder	**16**	**mt/yr**			
Category I	57%	57%	84%	84%	53%
Category II	31%	35%	15%	15%	36%
Non-qualifiers	11%	8%	1%	1%	11%
Barndoor skate	**12**	**mt/yr**			
Category I	70%	69%	85%	85%	62%
Category II	19%	23%	13%	13%	25%
Non-qualifiers	11%	9%	2%	2%	13%
White hake	**10**	**mt/yr**			
Category I	54%	53%	82%	82%	53%
Category II	31%	35%	17%	17%	33%
Non-qualifiers	14%	12%	1%	1%	14%
Yellowtail flounder	**8**	**mt/yr**			
Category I	73%	72%	86%	86%	63%
Category II	17%	20%	11%	11%	24%
Non-qualifiers	10%	8%	2%	2%	12%
Summer flounder	**7**	**mt/yr**			
Category I	81%	80%	93%	93%	70%
Category II	13%	16%	6%	6%	21%
Non-qualifiers	6%	4%	1%	1%	9%
Winter flounder	**5**	**mt/yr**			
Category I	82%	80%	91%	91%	69%
Category II	11%	14%	7%	7%	20%
Non-qualifiers	7%	6%	2%	2%	11%
Monkfish	**4**	**mt/yr**			
Category I	72%	70%	86%	86%	60%
Category II	20%	23%	12%	12%	29%
Non-qualifiers	9%	6%	2%	2%	11%
Windowpane flounder	**3**	**mt/yr**			
Category I	79%	78%	88%	88%	67%
Category II	12%	15%	10%	10%	22%
Non-qualifiers	9%	7%	2%	2%	12%
Butterfish	**3**	**mt/yr**			
Category I	79%	77%	89%	89%	68%
Category II	13%	16%	9%	9%	21%
Non-qualifiers	8%	6%	2%	2%	12%

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Species	Alternative 1	2	3	4	5
Cod	**1**	**mt/yr**			
Category I	79%	78%	90%	90%	68%
Category II	14%	17%	8%	8%	23%
Non-qualifiers	6%	5%	2%	2%	8%
Thorny skate	**1**	**mt/yr**			
Category I	87%	87%	95%	95%	70%
Category II	10%	12%	5%	5%	26%
Non-qualifiers	3%	2%	1%	1%	3%
Ocean pout	**1**	**mt/yr**			
Category I	71%	69%	84%	84%	59%
Category II	18%	22%	13%	13%	26%
Non-qualifiers	11%	9%	3%	3%	14%
Smooth skate	**0**	**mt/yr**			
Category I	98%	98%	100%	100%	68%
Category II	2%	2%	0%	0%	32%
Non-qualifiers	0%	0%	0%	0%	0%

Bycatch estimates in the southern management area

In the southern area, the ranking of discarded species is different and the amounts are much larger than in the northern management area. Additionally, the proportion of total estimated discards is generally higher for non-qualifying vessels than it is in the northern management area.

In the southern management area (see table below), the top five discarded species are 2,656 mt/yr of spiny dogfish (0.271 lbs. discard/1 lb. kept; 81 to 91% by qualifying vessels, followed by 2,432 mt/yr of red hake (0.241 lbs. discard/1 lb. kept ; 82 to 92% by qualifying vessels), 1300 mt of silver hake (0.104 lbs. discard/1 lb. kept; 83 to 93% by qualifying vessels), 996 mt of butterfish (0.088 lbs. discard/1 lb. kept; 80 to 91% by qualifying vessels), and 909 mt of little skate (0.085 lbs. discard/1 lb. kept; 80 to 91% by qualifying vessels). The estimated yellowtail flounder discards average 30 mt/yr (0.003 lbs. discard/1 lb. kept; 81 to 92%) by qualifying vessels.

Table 67. Estimated **southern management area** discards for the 2014-2016 small-mesh multispecies fishery, by Action 1 limited access alternative, does not total to 100% due to rounding.

	Alternative				
Species	**1**	**2**	**3**	**4**	**5**
All species					
Category I	65%	51%	67%	67%	57%
Category II	17%	41%	22%	22%	24%
Non-qualifiers	18%	8%	12%	10%	19%
Spiny dogfish	**2,656**	**mt/yr**			
Category I	66%	53%	67%	67%	58%
Category II	15%	38%	21%	22%	23%
Non-qualifiers	19%	9%	12%	11%	19%
Red hake	**2,432**	**mt/yr**			
Category I	66%	52%	68%	68%	58%
Category II	17%	40%	21%	22%	24%
Non-qualifiers	17%	8%	11%	10%	18%
Silver hake	**1,308**	**mt/yr**			
Category I	63%	49%	67%	69%	56%
Category II	21%	44%	22%	22%	27%
Non-qualifiers	16%	7%	11%	10%	17%
Butterfish	**996**	**mt/yr**			
Category I	65%	50%	67%	67%	57%
Category II	18%	42%	22%	22%	25%
Non-qualifiers	17%	8%	11%	10%	18%
Little skate	**909**	**mt/yr**			
Category I	61%	46%	64%	65%	53%
Category II	20%	45%	22%	23%	27%
Non-qualifiers	19%	9%	13%	12%	20%
Summer flounder	**410**	**mt/yr**			
Category I	66%	52%	67%	67%	58%
Category II	15%	39%	21%	22%	23%
Non-qualifiers	18%	9%	12%	11%	19%
Haddock	**328**	**mt/yr**			
Category I	66%	53%	67%	68%	58%
Category II	16%	39%	21%	22%	23%
Non-qualifiers	18%	8%	11%	10%	18%
Barndoor skate	**327**	**mt/yr**			
Category I	65%	51%	66%	66%	57%
Category II	16%	40%	22%	23%	24%
Non-qualifiers	19%	9%	12%	10%	20%

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	Alternative				
Species	**1**	**2**	**3**	**4**	**5**
Winter skate	**326**	**mt/yr**			
Category I	64%	49%	65%	66%	55%
Category II	17%	42%	22%	22%	25%
Non-qualifiers	19%	9%	13%	12%	19%
Monkfish	**223**	**mt/yr**			
Category I	63%	49%	65%	66%	55%
Category II	17%	41%	21%	21%	24%
Non-qualifiers	20%	10%	14%	13%	21%
Ocean pout	**72**	**mt/yr**			
Category I	67%	55%	68%	68%	59%
Category II	17%	36%	24%	25%	23%
Non-qualifiers	17%	9%	8%	7%	18%
Witch flounder	**66**	**mt/yr**			
Category I	69%	55%	69%	70%	61%
Category II	15%	37%	20%	21%	22%
Non-qualifiers	16%	8%	11%	10%	17%
Atlantic herring	**40**	**mt/yr**			
Category I	69%	59%	70%	70%	63%
Category II	13%	32%	20%	21%	19%
Non-qualifiers	18%	9%	10%	9%	18%
Winter flounder	**40**	**mt/yr**			
Category I	59%	41%	63%	64%	50%
Category II	24%	51%	24%	24%	30%
Non-qualifiers	17%	8%	12%	11%	20%
Yellowtail flounder	**30**	**mt/yr**			
Category I	60%	44%	64%	66%	52%
Category II	22%	48%	24%	23%	28%
Non-qualifiers	18%	8%	12%	11%	19%
Windowpane flounder	**24**	**mt/yr**			
Category I	62%	46%	65%	67%	54%
Category II	21%	47%	24%	23%	28%
Non-qualifiers	17%	8%	11%	10%	18%
White hake	**4**	**mt/yr**			
Category I	65%	48%	67%	66%	56%
Category II	18%	45%	21%	23%	26%
Non-qualifiers	17%	8%	12%	11%	18%

Continuation of table on previous page

Species	Alternative 1	2	3	4	5
Cod	**3**	**mt/yr**			
Category I	63%	50%	63%	64%	54%
Category II	15%	39%	23%	23%	24%
Non-qualifiers	22%	11%	14%	13%	22%
American plaice	**0**	**mt/yr**			
Category I	65%	49%	67%	67%	55%
Category II	18%	45%	23%	23%	28%
Non-qualifiers	17%	6%	10%	9%	17%

It is important to keep in mind that whiting fishing is relatively concentrated, restricted either by exemption area regulations and/or by availability of commercial concentrations of fish. It is likely that any changes in fishing effort will occur in the same areas that are currently fished. Increases in fishing effort are likely to occur in areas currently fished and the intensity of fishing will change, but would not expand into new areas.

6.3.1 No Action (Preferred)

This alternative, described in Section 4.1, would continue the existing open access small-mesh multispecies fishery. Any vessel would be able to obtain a Category K multispecies permit and target small-mesh multispecies in exemption areas.

This alternative would allow more vessels to enter the fishery to target whiting and red hake using small-mesh trawls. It could make existing regulations less effective to manage small-mesh multispecies catches, than they would otherwise be with limited access in effect. Moderate increases in whiting catches would not cause overfishing, but increases in red hake catches could cause overfishing in the northern management area and exacerbate overfishing in the southern management area.

If the Council does not implement limited access through this amendment, it will need to take more drastic actions later to respond when overfishing occurs, or catches exceed specifications. Several general measures could be applied, depending on the type and severity of the problem. Measures that could reduce non-target catches include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest). It is difficult to assess the severity of impacts on red hake, because we cannot forecast the effectiveness of these measures (which are currently unknown). It does however take time to identify the problem (at least during the next annual monitoring report) and prepare a framework action or amendment to address it. Furthermore, increases in small-mesh multispecies fishing effort by new entrants could dilute the effectiveness of technical measures to limit catches of red hake. Also, if the catches of whiting increase or if future specifications decline, the Council would be forced to cut small-mesh multispecies fishing effort, either by reducing whiting possession limits, shortening seasons, or by initiating other measures. Again, these other measures would be less effective if new entrants enter the fishery.

Due to the higher difficulty of managing bycatch, particularly the catches of choke species, this alternative is expected to have a low negative impact on non-target species in the short term and a

potential large impact on non-target species in the long term if the catches cannot be effectively controlled.

6.3.2 Whiting Possession Limit for Vessels Using 3-inch and larger Cod-End Mesh Trawls

The possession limits in this set of three alternatives would apply to any vessel Using 3-inch and larger mesh to target small-mesh multispecies in all areas, including areas that are exempt from the large-mesh Northeast Multispecies regulations.

6.3.2.1 Alternative 1 (Preferred; No Action) – Existing small-mesh multispecies possession limits apply

This alternative would retain the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lbs. in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area.

In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger

The current limits and other measures have prevented overfishing of whiting, but overfishing of northern red hake has occurred for a few recent years and for southern red hake began in 2016. Since these occurrences, the specifications have been adjusted to account for changes in stock biomass and accountability measures have been adjusted to prevent future overfishing. New specifications for southern red hake are expected to take effect in fishing year 2018 and current landings are likely to trigger the in-season accountably measure, reducing the red hake possession limit to 400 lbs.

Particularly in an open access fishery, this No Action alternative is expected to have a low negative effect on non-target species. On one hand, any removals have a negative effect on bycatch species and on the other hand increasing fishing effort as has been observed lately in the northern management area could increase bycatch.

6.3.2.2 Alternative 2 – Raise the Whiting possession limit from 40,000 to 50,000 lbs., January 1 to June 14 in the Southern New England and Mid-Atlantic exemption areas

This alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Because the whiting possession limit has not been more than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects.

Because the Alternative 2 possession limits exceed No Action, vessels could land similar amounts of whiting as they do now. Vessels might also land the higher possession limit, up to 50,000 lbs., lengthening their fishing trips and increasing effort per trip. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit, or they might take fewer trips, and keep total landings the same. This alternative could provide an incentive to fish in the southern area during January 1-June 14.

Vessels in the southern management area could, as a result of the higher possession limit, land more whiting and red hake (at least that is the intent). Northern red hake, northern silver hake, and southern whiting are not overfished and overfishing is not occurring. In the past several years, landings have been well below the silver hake and whiting TALs and their catch has been well below the ABC. Although a higher catch of southern whiting would increase mortality compared to Alternative 1 and Alternative 3, it is not expected to have a negative impact on northern red hake.

On the other hand, southern red hake is often not a target species in the fishery and recent red hake landings have been 9% more than the expected 2018-2020 TAL. Southern red hake catch also caused overfishing in 2016. Any increases in small-mesh multispecies fishing effort in the southern management area could cause increases in southern red hake catch and bycatch of other species such as yellowtail flounder (Georges Bank yellowtail flounder is overfished and a sub-ACL is allocated to the small-mesh multispecies fishery). **These potential increases in southern red hake catch and bycatch of other species means that Alternative 2 is, compared to No Action, expected to have a negative effect on non-target species in the southern management area and a low positive impact on non-target species in the northern management area due to a small potential effort shift.**

6.3.2.3 Alternative 3 – Lower the Whiting possession limit from 40,000 to 30,000 lbs., June 15 to December 31 in the Southern New England and Mid-Atlantic exemption areas

Alternative 3 would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. It is intended to reduce the effect of southern area landings on market prices for whiting in all areas.

This alternative has several types of potential impacts, changing the number of trips taken or changing the location or season when small-mesh multispecies trips are taken. It may induce more vessels to fish additional trips to catch and land the same amount as they do under the existing limit. In this case, total fishing effort would probably remain the same as it is now.

Trips during the summer and fall would be less profitable than they are presently, thus potentially causing vessels to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for the vessel to do so. The most likely impact of a seasonal whiting possession limit reduction is to change the distribution of trips, either seasonally within the southern management area or spatially, to the northern area.

It is possible that reducing the southern management area whiting possession limit could reduce fishing pressure on red hake and other non-target species, with a small potential for shifting effort into the northern management area, particularly during the summer and fall. **Thus, compared to No Action, this alternatives is expected to have a low positive impact on red hake and bycatch species in the southern management area and a low negative impact on non-target species in the northern management area.**

6.3.3 Limited Access Alternatives

6.3.3.1 Action 1 – Qualification criteria

The alternatives in Action 1 consider establishing a limited access program for the small-mesh multispecies fishery, targeting whiting and red hake using 3-inch or smaller mesh in areas that are exempt

from the large-mesh groundfish regulations. In addition to No Action, there are five alternatives with different qualification criteria and periods. In addition to a cores set of vessels that would qualify for all alternatives (20 Category I and 37 Category II), each alternative qualifies a different set of vessels that landed whiting or red hake at various times. The qualification period for Alternatives 1, 2, and 5 ends at the control date, but the qualification period for Alternative 3 and 4 extend to the end of calendar year 2016. For all alternatives, qualifiers would be able to fish in the small mesh multispecies exemption areas, subject to the possession limits specified in Section 4.3.2 and the permit allowances specified in Section 4.3.3. Depending on the alternatives selected in Action 3 (Section 4.3.3), the vessels may not be able to use small mesh in the exemption areas, unless they are permitted to fish for other small-mesh species, such as squid and herring. Non-qualifying vessels would no longer be allowed to land more than 2,000 lbs. of whiting and 400 lbs. of red hake.

6.3.3.1.1 No Action

This alternative, described in Section 4.1, would continue the existing open access small-mesh multispecies fishery. Any vessel would be able to obtain a Category K multispecies permit and target small-mesh multispecies in exemption areas.

Compared to any of the action alternatives, No Action is expected to have a negative impact on non-target species, because it would not put a cap on fishing effort (other than that created by the whiting and red hake ACLs), more vessels could enter the fishery, and regulations to control bycatch could be much less effective than if a limited access program existed.

6.3.3.1.2 Alternative 1

This alternative is expected to quality 40 Category I and 74 Category II vessels. Thirty-three (33) Category I and 38 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 42 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

This alternative is expected to have a more positive impact on non-target species than all alternatives except for Alternative 5. For all estimated species, the proportion of bycatch associated with qualifying vessel is estimated to be 90% in the northern management area and 82% in the southern management area. The proportions by species are very like the total, except for herring in the northern management area, which ranked lowest in qualifier catches than any alternative. Details by species and alternative are in Table 66 and Table 67.

6.3.3.1.3 Alternative 2

This alternative is expected to qualify 20 Category I and 203 Category II vessels. Nineteen (19) Category I and 69 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 25 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

In the northern management area, this alternative is expected to have a more positive impact on non-target species than No Action and Alternatives 3 and 4, but a less positive impact than Alternatives 1 and 5. For all estimated species, the proportion of bycatch associated with qualifying vessel is estimated to be 93% in the northern management area. The proportions by species are very like the total, including for herring.

In the southern management area, this alternative ranked less positive than any alternative except No Action. This is because Alternative 2 would qualify more Category II vessels than any other alternative, and most of those vessels fish for whiting in the southern management area. Details by species and alternative are in Table 66 and Table 67, respectively.

6.3.3.1.4 Alternative 3

This alternative is expected to quality 51 Category I and 90 Category II vessels. Nineteen (44) Category I and 46 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 48 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

In the northern management area, this alternative is expected to have a more positive impact on non-target species than all alternatives except for No Action, but equal to Alternative 4. For all estimated species, the proportion of bycatch associated with qualifying vessel is estimated to be 98% in the northern management area. The proportions by species are very like the total, except for herring where qualifying vessels account for 100% of the estimated bycatch.

In the southern management area, this alternative ranked more positive than Alternatives 2 and 4, but less positive than Alternatives 1 and 5. The proportion of discards by qualifying vessels is estimated to be 88% and individual species have similar proportions by qualifying vessels. Details by species and alternative are in Table 66 and Table 67, respectively.

6.3.3.1.5 Alternative 4

This alternative is expected to quality 55 Category I and 124 Category II vessels. Forty-two (42) Category I and 38 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 48 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

In the northern management area, this alternative is expected to have a more positive impact on non-target species than all alternatives except for No Action, but equal to Alternative 3. For all estimated species, the proportion of bycatch associated with qualifying vessel is estimated to be 98% in the northern management area. The proportions by species are very like the total, except for herring where qualifying vessels account for 100% of the estimated bycatch.

In the southern management area, this alternative ranked more positive than Alternatives 2 and 4, but less positive than Alternatives 1 and 5. The proportion of discards by qualifying vessels is estimated to be 88% and individual species have similar proportions by qualifying vessels. Details by species and alternative are in Table 66 and Table 67, respectively.

6.3.3.1.6 Alternative 5

This alternative is expected to quality 84 Category I and 159 Category II vessels. Forty-three (43) Category I and 30 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 45 non-qualifying vessels and 10 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

In the northern and management areas, this alternative is expected to have the most positive impact on non-target species than any alternative. For all estimated species, the proportion of bycatch associated with qualifying vessel is estimated to be 81% in both areas, with proportions of estimated discards for qualifiers about the same level for all the discarded species in the small-mesh multispecies fishery. Details by species and alternative are in Table 66 and Table 67, respectively.

The positive impact of this alternative is however mitigated by the fact that it is associated with much more latent effort than the other qualification alternatives. It is not possible to quantify this consideration and compare it to the estimated proportion of discards by qualifying vessels. One could apply the same discards for non-qualifying vessels that were fishing in 2014-2016 to vessels that fished during the qualification period but not since. Doing this would be a bit unfair and inaccurate because we cannot evaluate whether those vessels would re-enter the fishery. Some of those permits may have been retired by buy-out, vessel transfer, or loss of business.

6.3.3.2 Action 2 - Possession limit alternatives

The alternatives in Action 2 propose adjustments to the whiting possession limits, primarily to adjust the capacity of the small-mesh multispecies fleet to land whiting and to minimize negative effects on price. These possession limits would apply to either vessels qualifying for a Category I or II permit, or to both (i.e. the same possession limit would apply to both permit categories.

In addition, Action 2 includes an alternative that would establish an incidental possession limit for whiting and an incidental limit for red hake. These incidental possession limits would apply to all fishing activity by vessels that do not have a Category I or II permit, regardless of mesh or gear in use. Depending on the final alternatives selected in Action 3 (Section 4.3.3), vessels with an incidental permit may be able to exceed the incidental possession limits if they are participating in another limited access small-mesh fishery, such as herring or squid.

6.3.3.2.1 Whiting[24] Possession Limit for Vessels with a Category I Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category I limited access permit. It is not possible to quantify the effect of changing a whiting possession limit on non-target species, but a qualitative evaluation is possible depending on how vessels would react to the change in the whiting possession limit associated with Alternatives 2 and 3.

6.3.3.2.1.1 Alternative 1 (Status quo)

For vessels holding a Category I limited access permit, this alternative would not change the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lb in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area.

In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger

[24] Whiting includes silver and offshore hakes.

Although potentially applying to a smaller number of vessels than are currently fishing, if an action alternative is selection under Action 1 this alternative would not change the amount of fishing effort by these vessels.

Thus, no matter which alternative is chosen for Action 1, this alternative by itself would have a neutral impact on non-target species, but when combined with one of the limited access qualification alternatives in Action 1, it would have a positive impact on non-target species.

6.3.3.2.1.2 Alternative 2

For vessels holding a Category I limited access permit, this alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Because the whiting possession limit has not been more than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects. This alternative may also be selected if No Action for Action 1 is chosen.

Because the Alternative 2 possession limits exceed No Action, vessels could land similar amounts of whiting as they do currently. Vessels might land the higher possession limit, up to 50,000 lbs., lengthening their fishing trips and increasing effort per trip. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit, or they might take fewer trips, and keep total landings the same. This alternative could provide an incentive to fish in the southern area during January 1-June 14.

If vessels take more trips, because trips are more profitable with the higher whiting possession limit, this alternative is likely to have a negative impact on non-target species relative to Alternatives 1 and 3. This is particularly true for non-target species in the southern management area, because some vessel may take more trips there with the higher limit than elsewhere. In this case, in could have a small positive impact on non-target species in the northern management area. If on the other hand, vessels take fewer trips to land the same amount of whiting during the year, this alternative would have no effect on non-target species, or a neutral impact relative to status quo.

6.3.3.2.1.3 Alternative 3

For vessels holding a Category I limited access permit, this alternative would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. It is intended to reduce the effect of southern area landings on market prices for whiting in all areas. This alternative may also be selected if No Action for Action 1 is chosen.

This alternative has several types of potential impacts, changing the number of trips taken or changing the location or season when small-mesh multispecies trips are taken. It may induce more vessels to fish additional trips to catch and land the same amount as they do under the existing limit. In this case, total fishing effort would remain the same as it is now.

Trips during the summer and fall would be less profitable than they are presently, thus potentially causing vessels to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for the vessel to do so.
In this case, the most likely impact is to change the distribution of trips, either seasonally within the southern management area or spatially, to the northern area.

This alternative would have the opposite effect as Alternative 2, reducing the duration or number of trips, depending on how fishermen react to the lower possession limit in the summer and fall. Therefore this alternative could have a neutral impact relative to status quo, or a neutral or positive impact relative to Alternative 2. Some vessels may be more likely to take small-mesh multispecies trips in the northern management area during the summer and fall, when the whiting possession limits would be equal in both areas. Relative to status quo, this alternative could have a slight negative impact on non-target species in the northern management area.

Table 68. Action 2 summary (Category I) - Potential impact of the action alternatives on non-target species.

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category I permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential impact of the action alternatives on non-target species.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs. • Accountability Measures at 2,000 lbs. (whiting) and 400 lbs. (red hake).		Cat I	All	Positive impact when combined with an Action 1 alternative.
2	Increase whiting possession limit from 40,000 lbs. to 50,000 lbs.	South	Cat I	Winter, Spring	• Negative impact, particularly in the northern management area • Small positive impact in the southern management area
3	Decrease whiting possession limit to 30,000 lbs.	South	Cat I	Summer, Fall (Jun 15-Dec 31)	• Low positive impact in the southern management area • Low negative impact in the northern management area

6.3.3.2.2 Whiting[25] Possession Limit for Vessels with a Category II Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category II limited access permit. None of these alternatives would be applicable if No Action for Action 1 is chosen.

It is also not possible to quantify the effect of changing a whiting possession limit on non-target species, but a qualitative evaluation is possible depending on how vessels would react to the change in the whiting

[25] Whiting includes silver and offshore hakes.

possession limit associated with Alternative 2. It is however less likely for an effort shift between northern and southern management areas for smaller vessels that would qualify for a Category II permit (see Section 6.6.3for a discussion about vessel size), particularly since most Category II vessels land less than 15,000 lbs. of whiting.

6.3.3.2.2.1 Alternative 1 (Status quo)

For vessels holding a Category II limited access permit, this alternative would not change the existing small-mesh multispecies possession limits. These limits are summarized under Alternative 1 in the previous section.

Although potentially applying to a smaller number of vessels than are currently fishing, if an action alternative is selection under Action 1 this alternative would not change the amount of fishing effort by these vessels.

Thus, no matter which alternative is chosen for Action 1, this alternative by itself would have a neutral impact on non-target species, but when combined with one of the limited access qualification alternatives in Action 1, it would have a positive impact on non-target species.

6.3.3.2.2.2 Alternative 2

This alternative would decrease the whiting possession limit in all management areas from 30,000 lbs. to 15,000 lbs. It is intended to create a whiting possession limit that is more consistent with the usual catches made by Category II vessels (see Section 6.6.3 analysis of landings per trip). During 2014-2016, only 9% of trips by vessels that are expected to qualify for a Category II permit had whiting landings that exceeded 15,000 lbs.

The proposed 15,000 lbs. whiting possession limit for this alternative is rarely exceeded by vessels that would qualify for Category II and they are typically smaller and less mobile than vessels with a Category I permit. It is therefore likely that this alternative will have a neutral impact on non-target species.

Table 69. Action 2 summary (Category II) - Potential impact of the action alternatives on non-target species.

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category II permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential impact of the action alternatives on non-target species.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40,000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs.		Cat II	All	Positive impact when combined with an Action 1 alternative.
2	15,0000 whiting possession limit and no change to the red hake possession limits.	All	Cat II	All	Neutral impact

6.3.3.2.3 Incidental possession limits

Vessels that did not qualify for a Category I or II limited access permit would be regulated by the possession limits in the two alternatives below, regardless of the type of gear in use or the species that the vessel is targeting.

6.3.3.2.3.1 Alternative 1 (No Action)

This alternative would retain the existing whiting possession limits, even if an action alternative was chosen in Action 1 (limited access qualification). It might seem counter-intuitive at first, but choosing this alternative with a limited access qualification alternative would allow whiting and red hake possession limits to be adjusted by permit category when needed in the future.

The direct impact on non-target species would be unchanged from the status quo, but it could reduce the potential for increases in small-mesh multispecies fishing effort by additional non-qualified vessels. If an action alternative is chosen in Action 1, this alternative would have an indirect positive effect on non-target species because it is expected to limit increases in fishing effort, even though non-qualifying vessels would be able to continue targeting small-mesh multispecies. On the other hand, if new vessels begin fishing for small-mesh multispecies or increase their trips targeting whiting and red hake, this Alternative would have a negative effect on non-target species depending on the characteristics of fisheries that they reduced their effort. Therefore, this alternative would have a neutral to negative effect on non-target species.

6.3.3.2.3.2 Alternative 2

This alternative would reduce the whiting and red hake possession limits to 2,000 lbs. and 400 lbs., respectively, for vessels that do not qualify for a small-mesh multispecies limited access permit (see Action 1). Due to relatively low prices for whiting and red hake, it is highly unlikely that non-qualifying vessels would take trips to target small-mesh multispecies. They may, however, continue or increase fishing effort into other fisheries.

Many non-qualifying vessels have permits for and experience with alternative fisheries (see Section 6.6.3 analysis of 2014-2016 fishing activity by non-qualifying vessels). Most fish in another trawl fishery for squids or herring, large-mesh groundfish, monkfish, or skates. Some also participated in the groundfish gillnet fishery.

With respect to effects on non-target species, these potential shifts in fishing effort could mitigate or reverse the effect of small-mesh multispecies limited access. Large-mesh trawl gears targeting groundfish, monkfish, and skates is thought to have a positive or negative effect on non-target species, relative to the same amount of fishing effort targeting small-mesh multispecies. Groundfish gillnet gear is thought to have a negative effect on non-target species, relative to the same amount of fishing effort targeting small-mesh multispecies. Small-mesh trawls used to target herrings and squids is likely to have a neutral impact on non-target species but there may be some redistribution of effort in time or space that could have a positive or negative effect.

Therefore, this alternative could have a positive or negative effect through a reduction of small-mesh multispecies possession limits for non-qualifying vessels. It depends on whether and how they react to not being able to target small-mesh multispecies.

Table 70. Action 2 summary (non-qualifiers) - Potential impact of the action alternatives on non-target species.

Action 2 Alts.	Whiting possession limit alternatives	Affected areas	Affected categories	Affected seasons	Potential impact of the action alternatives on non-target species.
1	Retain existing whiting and red hake possession limits for non-qualifying vessels in Action 1	All	Non-qualifiers	All	Neutral to negative
2	Reduce possession limit for whiting at 2,000 lbs. and red hake at 400 lbs. for non-qualifiers in Action 1.	All	Non-qualifier	All	Positive or negative • Depends on whether and how non-qualifying vessels react to not being able to target small-mesh multispecies

6.3.3.3 Action 3 – Permit allowances

Alternatives in Action 3 only apply if an action alternative in Action 1 is chosen. Thus there is no No Action alternative specifically for Action 3.

6.3.3.3.1 Limited access permit characteristics and conditions

The alternatives in Action 3 would affect the characteristics and allowances of a small-mesh multispecies limited access permit. In most cases, the effects are purely administrative but could change compliance costs for vessels that have limited access permits in other fisheries. Small-mesh multispecies limited access permits that are most consistent with the existing permits held by the vessel would minimize costs and maximize opportunity. Many vessels that would potentially qualify for a Category I or II permit in the Action 1 alternatives have one or more of a large-mesh groundfish, an Atlantic herring permit, or a squid/mackerel/butterfish limited access permit (see Section 6.1.4summarizing permits held by qualifying vessels). Table 2 summarizes the similarities and differences among other limited access permits frequently held by vessels currently targeting small-mesh multispecies.

Because they potentially affect the quality or amount of vessels and/or fishing effort, Alternatives 2, 4, and 5 could have an effect on non-target species.

6.3.3.3.1.1 Alternative 1

Alternative 1 would apply the limited access permit characteristics for the Northeast (large mesh) Multispecies fishery to Category I and II permits for the small-mesh multispecies fishery (see Table 2). These include limits for permit accumulation, upgrade restrictions, and consideration of construction during the last year of a qualification period.

Alternative 1 is considered here to be a baseline to compare effects of other alternatives in Action 3. Although there is no existing limited access small-mesh multispecies permit, Alternative 1 serves as a proxy for status quo for analytical comparison since it is difficult to evaluate effects with respect to an open access Category K groundfish permit.

Thus Alternative 1 would have the same effects on non-target species that would apply to any action alternative in Action 1.

6.3.3.3.1.2 Alternative 2

This alternative would not establish any limits on holdings of limited access permits for the small-mesh multispecies fishery.

Although potentially reducing ownership costs, with respect to impacts on non-target species, the number and diversity of ownership is not expected to have a meaningful impact (i.e. neutral impact).

6.3.3.3.1.3 Alternative 3

This alternative would not allow consideration of construction or repair of vessels for the year preceding the end of the qualification period. It could therefore reduce the number of limited access permits for the small-mesh multispecies, potentially reducing effort in the fishery.

If non-qualifying vessels do not fish or shift to fisheries that have less impact on non-target species, this alternative would have a positive impact. Conversely, if they shift to fisheries that have a greater impact, this alternative would have a negative impact. Increase in fishing effort by qualifying vessels could mitigate the effects. Overall, this alternative is expected to have a neutral to positive impact on non-target species, because fewer vessels would qualify than they would under Alternative 1.

6.3.3.3.1.4 Alternative 4

This alternative would allow only one vessel to qualify based on a single history. In other words, a history could not be transferred to a replacement vessel AND qualify the original vessel (which may have been sold or transferred to a new owner). Thus, this alternative would qualify fewer vessels than the Alternative 1 baseline.

Because it has the same directional effect on qualification as Alternative 3 it would have similar but somewhat larger impacts to that alternative. If non-qualifying vessels do not fish or shift to fisheries that have less impact on non-target species, this alternative would have a positive impact. Conversely, if they shift to fisheries that have a greater impact, this alternative would have a negative impact. Increase in fishing effort by qualifying vessels could mitigate the effects. Overall, this alternative is expected to have a neutral to positive impact on non-target species, because fewer vessels would qualify than they would under Alternative 1.

6.3.3.3.1.5 Alternative 5

This alternative would allow upgrades of vessels that hold a limited access small-mesh multispecies fishery permit. It could allow, for example, a vessel to be more capable of fishing offshore or take more frequent trips (vessel becomes more seaworthy), increase hold capacity to take longer trips, or to tow larger trawls.

Although the fishery is limited by ACLs, there is room for increases in whiting catches and more fishing effort by qualifying vessels. Fishing offshore could affect the types of bottom where fishing occurs or the type and amount of bycatch. Fishing longer or more frequent trips implies an increase in fishing effort.

This alternative is expected to have a positive impact on non-target species found inshore, and a negative impact on non-target species offshore. Vessels holding a Northeast (large-mesh) Multispecies permit would however be prohibited from upgrading at the present time.

Table 71. Action 3 limited access permit alternatives summary (permit allowances) - Potential impact of the action alternatives on non-target species.

Alts.	Permit allowances	Potential impact of the action alternatives on non-target species.
1	Status quo. 5% cap on permits + upgrade restriction + consideration for construction at t_{-1} of qualification period.	Same as impacts associated with the selected Action 1 alternative
2	No limits on holdings of limited access permits for the small-mesh multispecies.	Neutral or no meaningful impact
3	No consideration for construction or repair of vessels for the year preceding the qualification period.	Neutral to positive impact • Fewer vessels would qualify for limited access
4	Only one vessel based on single history, i.e., history couldn't be transferred to a replacement vessel AND qualify the original vessel.	Neutral to positive impact • Fewer vessels would qualify for limited access
5	Allow upgrade of vessels that hold limited access multi-species fishery permit. (Upgrading is intended for distant fishing, fish frequently, more hold capacity, longer duration trips, and capability for taking more/large tows).	Positive impact for non-target species inshore Negative impact for non-target species offshore

6.3.3.3.2 Incidental permit conditions

Vessels holding an incidental permit would be able to land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, regardless of the type of gear in use or species targeted, unless one of the following alternatives is chosen. These alternatives only apply if an action alternative is selected from Action 1, hence there is no relevant status quo for Action 3.

6.3.3.3.2.1 Alternative 1

In addition to the incidental small-mesh multispecies fishery possession limits, vessels with an incidental possession limit permit would be prohibited from using small mesh trawls in small-mesh multispecies exemption areas.

This alternative would prevent vessels from targeting small-mesh multispecies on short, inshore trips despite not having a limited access small-mesh multispecies permit. As such, it potential has a positive impact on these non-target species.

It is impossible to quantify the potential to target small-mesh multispecies with an incidental permit under current or future regulatory or market conditions. This potential is thought to be currently limited by the relatively low whiting and red hake prices, although some vessels may otherwise use the incidental permit to fish for bait and sell the catch through the transfer at sea provision.

6.3.3.3.2.2 Alternative 2a

This alternative would allow vessels using large mesh on a groundfish or monkfish DAS to exceed the proposed incidental whiting and red hake possession limits.

This alternative is likely to have a positive impact on non-target species, because vessels would be able to land allowable limits of whiting and red hake without taking a special trip to target them, thus reducing overall effort.

6.3.3.3.2.3 Alternative 2b

This alternative would prohibit fishing for small-mesh multispecies on a groundfish DAS. While fishing on a groundfish DAS, the vessel could land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, even if the vessel holds a small-mesh multispecies fishery limited access permit.

This alternative could have a potential negative effect on non-target species, particularly if the vessels compensate for the prohibited landings by taking longer or more trips to target groundfish or other species (including small-mesh multispecies if they qualify for a limited access permit).

6.3.3.3.2.4 Alternative 3

Similar to Alternative 2a, this alternative would allow vessels fishing for Atlantic herring or squid with a limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.

This alternative is likely to have a positive impact on non-target species, because vessels would be able to land allowable limits of whiting and red hake without taking a special trip to target them, thus reducing overall effort.

6.3.3.3.2.5 Alternative 4

This alternative would exempt vessels using small-mesh trawls in specific exemption areas from the Incidental Permit possession limits, allowing the vessels to land the same amounts of whiting and red hake as vessels that hold limited access permits. These any exemption areas require the use a more selective raised footrope trawl.

This alternative could allow continued expansion of the fishery in the Gulf of Maine, where the exemption areas require vessels to use a raised footrope trawl, designed to be more selective particularly effective for excluding flatfish (flounders, skates, and monkfish). Vessels that do not qualify for a limited access permit may travel to these specific exemption areas to target whiting and red hake, depending on the potential economic return and fishing opportunities that exist elsewhere. Not only could non-qualifying vessels shift fishing effort from other areas, but total small-mesh multispecies fishing in the Gulf of Maine could increase from entry by new or existing vessels that target other species.

Depending on how fishermen react to the opportunity, this alternative could increase catches of non-target roundfish (particularly haddock) and other non-flatfish species in areas that require a raised footrope trawl in the Gulf of Maine and around Cape Cod. It would not be very effective either to reduce the catches of red hake, because the raised footrope trawl does not appear to catch fewer red hake. Thus, depending on the species, this alternative is expected to have a low positive effect on flatfish species and a low negative effect on roundfish species and red hake.

Table 72. Action 3 incidental permit alternatives summary (permit conditions) - Potential impact of the action alternatives on non-target species.

Alts.	Permit allowances	Potential impact of the action alternatives on non-target species.
1	Prevents vessels that do not qualify for limited access from targeting whiting and red hake in the exemption areas.	Low positive impact on non-target species that are in exemption areas
2a	Allow large-mesh on monkfish DAS or groundfish to exceed incidental whiting and red hake possession limits.	Positive impact on non-target species • Vessels would be able to land allowable limits of whiting and red hake without taking a special trip to target them, thus reducing overall effort.
2b	Prohibit fishing for small-mesh multispecies on groundfish DAS. If fishing on groundfish DAS, the possession limit be 2,000 lbs. (whiting) and 400 lbs. (red hake).	Potential negative effect on non-target species • Vessels might compensate for the prohibited landings by taking longer or more trips to target groundfish or other species
3	Allow fishing for Atlantic herring or squids with limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.	Same as Alternative 2a
4	Allows vessels to fish in exemption areas requiring a raised footrope trawl.	Low positive effect on flatfish species and a low negative effect on roundfish species and red hake

6.4 Biological Impacts on Protected Resources

Description of how impacts to protected resources were evaluated

It is important to keep in mind that whiting fishing is relatively concentrated relative to other fisheries having fewer gear, seasonal, and area restrictions. It is likely that any changes in fishing effort will occur in the same areas that are currently fished. If and when they occur, increases in fishing effort are likely to occur in areas currently fished and the intensity of fishing will change, but would not expand into new areas.

Increases in fishing effort could arise from two of three possible causes. Without limited access (i.e. "No Action"), more vessels could enter the small-mesh multispecies over time which would add to the total number of trips and total fishing effort. Increasing number of fishing vessels targeting small-mesh multispecies has been occurring since 2014 in the northern management area, particularly in Small-mesh Area 1 (Ipswich Bay), as the availability of silver and red hakes has increased. No increases in the number of small-mesh multispecies fishery vessels has been observed in the southern management area. A second source of increasing fishing effort could come from vessels that are already operating in the small-mesh multispecies fishery and would likely qualify for a limited access permit under several of the Action 1 alternatives. Although some vessels primarily target small-mesh multispecies during the year, they also participate in other fisheries such as those targeting large-mesh groundfish, skates, monkfish, and squid. These vessels could shift effort into the small-mesh multispecies, subject to seasonal restrictions for the exemption areas where they may fish for small-mesh multispecies. This change in effort may or may not happened, regardless of whether there is a limited access program in effect. Lastly,

fishing effort could increase due to vessels increasing tow duration. Because of the way the fishery is conducted in response to diurnal vertical migration of silver hake, limits on the length of trips due to perishability of red hake and whiting, and because vessels do not sit idly not towing trawl gear, we consider changes in tow times to be highly unlikely.

Section 5.3.4.1 summarizes the number of observed takes of protected species on trips using small-mesh trawls to target small-mesh multispecies (defined as trips landing at least 2000 lbs. of whiting or 400 lbs. of red hake). Of the 24 observed takes in 2007-2016, 20 (83%) are from catches of common dolphin (protected but not threatened or endangered). The remaining protected species were pilot whale (spp.), Risso's dolphin, Atlantic sturgeon (threatened), and a loggerhead sea turtle (threatened). The Atlantic sturgeon take was observed in the Cape Cod raised footrope trawl area, at the tip of Cape Cod where whiting fishing effort is infrequent. The loggerhead sea turtle take occurred between the southern tip of Long Island, NY and Block Island, RI, where there is some inshore whiting fishing activity. The pilot whale take was observed in the Cultivator Shoals Area, where whiting fishing regularly occurs. All other observed takes were scattered off of Southern New England and the SE edge of Georges Bank.

The impacts of the whiting fishery on protected species is slightly negative, especially compared with fisheries using fixed and other gears. In this context, alternatives that are expected to allow increases in fishing effort in the southern management area are assessed as being slightly negative (and vice versa) relative to No Action, while impacts that allow increases in fishing effort in the northern management area are assessed as being neutral relative to No Action. It is not possible to quantify the amount of interactions with the whiting fishery under the various alternatives, because some of the impacts depend on market prices and fishing behavior that cannot be reliably predicted. The following factors were considered to determine whether impacts of an alternative were more positive (i.e. less effort) or more negative (i.e. more effort) than No Action:

- Amount of gear – mainly related to the number of vessels in the small-mesh multispecies fishery
- Duration of use – is the gear fished for a longer period during trips without a reduction in the number or duration of trips?
- Shifts in fishing effort – does the alternative tend to increase (or decrease) small-mesh multispecies fishing effort in areas where protected species are more prevalent?
- Total fishing effort – do the number of trips increase or do trips become longer when the number of trips remains constant?

Although the direct impacts on protected species is generally positive when effort or permitted vessels is reduced or limited by an alternative, it is likely that non-qualifying vessels that have been in the small-mesh multispecies fishery may redirect effort onto other species, provided that they have a permit to do so. These vessels could target squid or herring, which probably have about the same low degree of protected species impacts that is associated with the small-mesh multispecies fishery. On the other hand, some vessels also hold groundfish or lobster permits and may use gears that have a larger negative impact on protected species. Thus effort shifts caused by limited access and/or reduced opportunity to target small-mesh multispecies could have a small negative indirect protected species impact. The reason that the proposed alternatives would have a small negative indirect protected species impact is because the number of non-qualifying vessels that have been active in the small-mesh multispecies fishery has been relatively low, accounting for only two to five percent of small-mesh multispecies landings.

NMFS initiated a Section 7 consultation to examine the risk to right whales (an endangered species with a recent population decline), which could affect the small-mesh multispecies fishery. Directly, measures could be required to reduce interactions with right whales, but this is unlikely because no interactions between small-mesh multispecies fishing and right whales have been observed. It may be possible

however that areas where small-mesh multispecies fishing occurs overlap areas of critical right whale habitat, which could trigger action. Indirectly, measures taken in other fisheries to protect right whales could cause more vessels to enter the small-mesh multispecies fishery as an alternative source of income. If more vessels enter the small-mesh multispecies fishery, it could have a negative impact on other protected species and make it more difficult to manage the small-mesh multispecies fishery without significant effects on existing fishery participants.

6.4.1 No Action (Preferred)

This alternative, described in Section 4.1, would continue the existing open access small-mesh multispecies fishery. Any vessel would be able to obtain a Category K multispecies permit and target small-mesh multispecies in exemption areas.

This alternative would have no limit on the number of vessels fishing for small-mesh multispecies, allowing new entrants when availability of fish increases, prices improve, or regulations in this and other fisheries change. It could make existing regulations less effective to manage small-mesh multispecies catches, than they would otherwise be with limited access in effect. Moderate increases in whiting catches would not cause overfishing, but increases in red hake catches could cause overfishing in the northern management area and exacerbate overfishing in the southern management area.

If the Council does not implement limited access through this amendment, it will need to take more drastic actions later to respond when overfishing occurs, or catches exceed specifications. Several general measures could be applied, depending on the type and severity of the problem. Measures that could reduce non-target catches include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest).

It is difficult to assess the severity of impacts on protected species, because we cannot forecast the effectiveness of these measures (which are currently unknown) or when and where such measures would be in force. Furthermore, increases in small-mesh multispecies fishing effort by new entrants could dilute the effectiveness of technical measures to limit catches of red hake or other species that require catch reductions. Also, if the catches of whiting increase or if future specifications decline, the Council would be forced to cut small-mesh multispecies fishing effort, either by reducing whiting possession limits, shortening seasons, or by initiating other measures. Again, these other measures would be less effective if new entrants enter the fishery.

With respect to protected species, No Action would at face value allow more vessels to enter the fishery and increase the number of trips targeting whiting. The recent trend is an increasing number of vessels and trips fishing in the northern management area, where only one take of a protected species has been observed during the 17-year time series[26]. But increases in small-mesh multispecies fishing effort in the southern management area are also possible because the specifications (see Section 5.2.2.6) are higher than recent catch of whiting.

If effort does not increase with No Action, this alternative would have a slightly negative impact on protected species. If the number of vessels targeting whiting and red hake increases, then No Action

[26] N.B. The frequency of observed trips in the small-mesh multispecies has been much lower than they have been since 2013.

would likely have a more negative impact[27], but still minor compared to impacts caused by other fisheries. Thus it is possible that vessels entering the small-mesh multispecies fishery may reduce trips targeting other species with gears and fishing methods that have a higher impact on protected species.

6.4.2 Whiting Possession Limit for Vessels Using 3-inch and larger Cod-End Mesh Trawls

The possession limits in this set of three alternatives would apply to any vessel using 3-inch or larger mesh to target small-mesh multispecies in all areas, including areas that are exempt from the large-mesh Northeast Multispecies regulations.

6.4.2.1 Alternative 1 (Preferred; No Action) – Existing small-mesh multispecies possession limits apply

This alternative would retain the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lbs. in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area.

In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger

The current limits and other measures have prevented overfishing of whiting, but overfishing of northern red hake has occurred for a few recent years and for southern red hake began in 2016. Since these occurrences, the specifications have been adjusted to account for changes in stock biomass and accountability measures have been adjusted to prevent future overfishing. New specifications for southern red hake are expected to take effect in fishing year 2018 and current landings are likely to trigger the in-season accountably measure, reducing the red hake possession limit to 400 lbs.

With respect to protected species, this alternative would have the same impact as the No Action alternative in Section 6.4.1. Some increases in fishing effort could be expected because recent catches are well below the whiting specifications. This alternative thus has a slight negative impact on protected species.

6.4.2.2 Alternative 2 – Raise the Whiting possession limit from 40,000 to 50,000 lbs., January 1 to June 14 in the Southern New England and Mid-Atlantic exemption areas

This alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Because the whiting possession limit has not been more than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects.

[27] N.B. Under No Action or any of the Action alternatives, existing vessels in the fishery (presuming they qualify for a limited access permit) could increase the amount or duration of trips targeting small-mesh multispecies. Although there are some vessels that primarily target small-mesh multispecies, many also target large-mesh groundfish or squid and could thus shift effort into the small-mesh multispecies fishery.

Because the Alternative 2 possession limits exceed No Action, vessels could land similar amounts of whiting as they do now. Vessels might also land the higher possession limit, up to 50,000 lbs., lengthening their fishing trips and increasing effort per trip. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit, or they might take fewer trips, and keep total landings the same. This alternative could provide an incentive to fish in the southern area during January 1-June 14.

Vessels in the southern management area could, as a result of the higher possession limit, land more whiting and red hake (at least that is the intent). Northern red hake and southern whiting are not overfished and overfishing is not occurring. In the past several years, landings have been well below the TAL and catch well below the ABC.

Because this alternative is expected to increase fishing effort (via number of trips, duration of trips, effort shifts from the northern management area), it will have a slight negative impact on protected species and a more negative impact on protected species (particularly on common dolphin) than No Action would have.

6.4.2.3 Alternative 3 – Lower the Whiting possession limit from 40,000 to 30,000 lbs., June 15 to December 31 in the Southern New England and Mid-Atlantic exemption areas

Alternative 3 would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. It is intended to reduce the effect of southern area landings on market prices for whiting in all areas.

This alternative has several types of potential impacts, changing the number of trips taken or changing the location or season when small-mesh multispecies trips are taken. It may induce more vessels to fish additional trips to catch and land the same amount as they do under the existing limit. In this case, total fishing effort would probably remain the same as it is now.

Trips during the summer and fall would be less profitable than they are presently, thus potentially causing vessels to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for the vessel to do so. The most likely impact of a seasonal whiting possession limit reduction is to change the distribution of trips, either seasonally within the southern management area or spatially, to the northern area.

Therefore, this alternative could reduce the number of trips and amount of fishing effort in the southern management area, where more takes of protected species have been observed. The fishery would still have a slight negative impact on protected species, but relative to No Action the alternative would have a positive impact on protected species.

6.4.3 Limited Access Alternatives

6.4.3.1 Action 1 – Qualification criteria

The alternatives in Action 1 consider establishing a limited access program for the small-mesh multispecies fishery, targeting whiting and red hake using 3-inch or smaller mesh in areas that are exempt from the large-mesh groundfish regulations. In addition to No Action, there are five alternatives with different qualification criteria and periods. In addition to a cores set of vessels that would qualify for all

alternatives (20 Category I and 37 Category II), each alternative qualifies a different set of vessels that landed whiting or red hake at various times. The qualification period for Alternatives 1, 2, and 5 ends at the control date, but the qualification period for Alternative 3 and 4 extend to the end of calendar year 2016. For all alternatives, qualifiers would be able to fish in the small mesh multispecies exemption areas, subject to the possession limits specified in Section 4.3.2 and the permit allowances specified in Section 4.3.3. Depending on the alternatives selected in Action 3 (Section 4.3.3), the vessels may not be able to use small mesh in the exemption areas, unless they are permitted to fish for other small-mesh species, such as squid and herring. Non-qualifying vessels would no longer be allowed to land more than 2,000 lbs. of whiting and 400 lbs. of red hake.

6.4.3.1.1 Alternative 1

This alternative is expected to quality 40 Category I and 74 Category II vessels. Thirty-three (33) Category I and 38 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 42 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

This alternative is expected to reduce the potential for increases in the number of vessels in the fishery. The amount of fishing effort could still increase because there is no regulatory restriction on the amount of trips a qualifying vessel may take and the whiting catches have been well below the ABC in both northern and southern management areas.

Thus, this alternative will still have a low negative impact on protected species, but have a less negative impact than No Action. It would qualify more Category I vessels than Alternative 2, but less than the other alternatives. Vessels that would qualify for a Category II permit tend to be less active in the fishery than Category I vessels, but depending on the possession limits chosen for Category II may have more opportunity to increase small-mesh multispecies fishing effort. Alternative 1 qualifies fewer vessels than any other action alternative. On the basis of 2014-2016 fishing activity, vessels that qualify under Alternative 1 accounted for 94% of the small-mesh multispecies landings (Table 84). This amount is equal to the landings by qualifiers in Alternative 5 and less than the amount landed in all other alternatives.

All other choices for Actions 2 and 3 being equal, Alternative 1 has more positive impacts (i.e. reduces effort) than Alternatives 2 to 4, but equal to the protected species impacts for Alternative 5. It should however be kept in mind that Alternatives 4 and 5 are associated with more latent effort (i.e. qualifiers not currently fishing in the small-mesh multispecies fishery) than any other alternative.

6.4.3.1.2 Alternative 2

This alternative is expected to qualify 20 Category I and 203 Category II vessels. Nineteen (19) Category I and 69 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 25 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

This alternative is expected to reduce the potential for increases in the number of vessels in the fishery. The amount of fishing effort could still increase because there is no regulatory restriction on the number of trips a qualifying vessel may take and the whiting catches have been well below the ABC in both northern and southern management areas.

Thus, this alternative will still have a slight negative impact on protected species, but have a less negative impact than No Action. It would qualify for Category I the least number of vessels (accounting for 77% of 2014-2016 landings, Table 85) than any other alternative. On the other hand, the alternative would qualify the most vessels for Category II, which accounted for 29% of the landings. On the basis of 2014-2016 fishing activity, vessels that qualify under Alternative 2 accounted for 96% of the small-mesh multispecies landings (Table 85). This amount is more than Alternatives 1 and 5, equal to Alternative 4 (which is associated with more latent effort), and less than Alternative 3.

All other choices for Actions 2 and 3 being equal, Alternative 2 has more positive impacts (i.e. reduces effort) than Alternatives 3 to 5, but would have a negative impact relative to Alternative 1.

6.4.3.1.3 Alternative 3

This alternative is expected to quality 51 Category I and 90 Category II vessels. Nineteen (44) Category I and 46 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 48 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

This alternative is expected to reduce the potential for increases in the number of vessels in the fishery. The amount of fishing effort could still increase because there is no regulatory restriction on the number of trips a qualifying vessel may take and the whiting catches have been well below the ABC in both northern and southern management areas.

Thus, this alternative will still have a slight negative impact on protected species, but have a less negative impact than No Action. It would qualify more Category I vessels than Alternatives 1 and 2, but less than the other alternatives. Vessels that would qualify for a Category II permit tend to be less active in the fishery than Category I vessels, but depending on the possession limits chosen for Category II may have more opportunity to increase small-mesh multispecies fishing effort. Alternative 2 qualifies fewer vessels than any other action alternative, except Alternative 1, but more of the qualifying vessels have been active in the 2014-2016 small-mesh multispecies fishery. On the basis of 2014-2016 fishing activity, vessels that qualify under Alternative 2 accounted for 99% of the small-mesh multispecies landings (Table 85). This amount is more than all other alternatives, except for No Action.

All other choices for Actions 2 and 3 being equal, Alternative 3 has more negative impacts (i.e. reduces effort) than any other action alternative. It should however be kept in mind that Alternatives 4 and 5 are associated with more latent effort (i.e. qualifiers not currently fishing in the small-mesh multispecies fishery) than any other alternative.

6.4.3.1.4 Alternative 4

This alternative is expected to quality 55 Category I and 124 Category II vessels. Forty-two (42) Category I and 38 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 48 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

This alternative is expected to reduce the potential for increases in the number of vessels in the fishery. The amount of fishing effort could still increase because there is no regulatory restriction on the number of trips a qualifying vessel may take and the whiting catches have been well below the ABC in both northern and southern management areas.

Thus, this alternative will still have a slight negative impact on protected species, but have less impact than No Action. It would qualify more Category I vessels than any alternative except for Alternative 5. Vessels that would qualify for a Category II permit tend to be less active in the fishery than Category I vessels, but depending on the possession limits chosen for Category II may have more opportunity to increase small-mesh multispecies fishing effort. Alternative 4 qualifies more vessels than any other action alternative, except for Alternative 5, and is associated with more latent effort than Alternatives 1 to 3. On the basis of 2014-2016 fishing activity, vessels that qualify under Alternative 4 accounted for 96% of the small-mesh multispecies landings (Table 85). This amount is more than the landings by qualifiers in any alternative except for Alternative 3.

All other choices for Actions 2 and 3 being equal, Alternative 3 has more positive impacts (i.e. reduces effort) than Alternative 5, but more negative than the protected species impacts for Alternatives 1 to 3.

6.4.3.1.5 Alternative 5

This alternative is expected to quality 84 Category I and 159 Category II vessels. Forty-three (43) Category I and 30 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 45 non-qualifying vessels and 10 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

This alternative is expected to reduce the potential for increases in the number of vessels in the fishery. The amount of fishing effort could still increase because there is no regulatory restriction on the number of trips a qualifying vessel may take and the whiting catches have been well below the ABC in both northern and southern management areas.

Thus, this alternative will still have a slight negative impact on protected species, but have less impact than No Action. It would qualify more Category I vessels than any other alternative and is associated with the most latent effort (creating an opportunity for more vessels to enter the small-mesh multispecies fishery). Vessels that would qualify for a Category II permit tend to be less active in the fishery than Category I vessels, but depending on the possession limits chosen for Category II may have more opportunity to increase small-mesh multispecies fishing effort. Alternative 5 qualifies more vessels than any other action alternative. On the basis of 2014-2016 fishing activity, vessels that qualify under Alternative 5 accounted for 94% of the small-mesh multispecies landings (Table 85). This amount is equal to the landings by qualifiers in Alternative 1 and less than the amount landed in all other alternatives.

All other choices for Actions 2 and 3 being equal, Alternative 5 has less positive impacts (i.e. reduces effort) than Alternatives 1 to 4.

6.4.3.2 Action 2 - Possession limit alternatives

The alternatives in Action 2 propose adjustments to the whiting possession limits, primarily to adjust the capacity of the small-mesh multispecies fleet to land whiting and to minimize negative effects on price. These possession limits would apply to either vessels qualifying for a Category I or II permit, or to both (i.e. the same possession limit would apply to both permit categories.

In addition, Action 2 includes an alternative that would establish an incidental possession limit for whiting and an incidental limit for red hake. These incidental possession limits would apply to all fishing

activity by vessels that do not have a Category I or II permit, regardless of mesh or gear in use. Depending on the final alternatives selected in Action 3 (Section 4.3.3), vessels with an incidental permit may be able to exceed the incidental possession limits if they are participating in another limited access small-mesh fishery, such as herring or squid.

6.4.3.2.1 Whiting[28] Possession Limit for Vessels with a Category I Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category I limited access permit.

6.4.3.2.1.1 Alternative 1 (Preferred; Status quo)

For vessels holding a Category I limited access permit, this alternative would not change the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lb in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area.

In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger

Although potentially applying to a smaller number of vessels than are currently fishing, if an action alternative is selection under Action 1, this alternative would not change the amount of fishing effort by these vessels. Coupled with an Action 1 alternative, this alternative would have a slight negative impact on protected species, but more positive than No Action because fewer vessels would be permitted to target small-mesh multispecies. It would have a small positive impact on protected species relative to Alternative 2 and a small negative impact relative to Alternative 3.

6.4.3.2.1.2 Alternative 2

For vessels holding a Category I limited access permit, this alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Because the whiting possession limit has not been more than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects. This alternative may also be selected if No Action for Action 1 is chosen.

Because the Alternative 2 possession limits exceed No Action, vessels could land similar amounts of whiting as they do currently. Vessels might land the higher possession limit, up to 50,000 lbs., lengthening their fishing trips and increasing effort per trip. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit, or they might take fewer trips, and keep total landings the same. This alternative could provide an incentive to fish in the southern area during January 1-June 14.

Because this alternative is intended to encourage fishing in the southern management area by either increasing fishing effort or causing an effort shift from the northern management area, it is expected to

[28] Whiting includes silver and offshore hakes.

have a small negative impact relative to Alternatives 1 and 3. When coupled with one of the Action 1 limited access alternatives, it is expected to have a neutral impact on protected species relative to No Action.

The 2016 update assessment (NEFMC 2017) showed that silver hake biomass has been increasing in the northern management area and decreasing in the southern management area, which would also affect catch per unit effort. Under present conditions, an increase in the whiting possession limit from 40,000 to 50,000 lbs. is less likely to attract more fishing effort. It could, however, increase the duration and fishing time per trip (possibly offset by vessels making fewer trips). On the other hand, if silver hake abundance in the southern management area increases, a higher possession limit could attract more fishing effort to the southern management area. This increase in effort could come from vessels that normally fish in the northern management area and/or vessels that fish in other fisheries. In the former case, the effort shift from the north could have a low negative impact on protected species relative to Alternatives 1 and 3, because observed protected species interactions have been greater in the southern management area. In the latter case, the effect on protected species relative to Alternatives 1 and 3 could be low negative, neutral, or low positive depending on the relative level of interaction in the other fishery. Or if the possession limit is not associated with a limited access program, the higher possession limit could attract new vessels into the fishery, which would have a low negative impact on protected species.

6.4.3.2.1.3 Alternative 3

For vessels holding a Category I limited access permit, this alternative would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. This alternative may also be selected if No Action for Action 1 is chosen.

It is intended to reduce the effect of southern area landings on market prices for whiting in all areas. The alternative is expected to reduce whiting fishing effort in the southern management area during the summer and early fall, possibly with a shift of small-mesh multispecies fishing effort into the winter and spring. Because more observed protected species interaction occur during the summer and fall, there could be a marginal decrease in negative impacts on protected species. The total number of trips and fishing effort could change due to other factors, but this alternative is unlikely to change the total number of small-mesh multispecies trips taken.

This alternative has several types of potential impacts, changing the number of trips taken or changing the location or season when small-mesh multispecies trips are taken. It may induce more vessels to fish additional trips to catch and land the same amount as they do under the existing limit. In this case, total fishing effort would remain the same as it is now.

Trips during the summer and fall would be less profitable than they are presently, thus potentially causing vessels to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for the vessel to do so.
In this case, the most likely impact is to change the distribution of trips, either seasonally within the southern management area or spatially, to the northern area.

Because it has the potential to reduce effort in the southern management area where takes of protected species have been observed and reduce or limit the number of vessels targeting small-mesh multispecies, it has a small positive impact on protected species relative to Alternatives 1 and 2, as well as No Action.

Table 73. Action 2 summary (Category I) - Potential impact of the action alternatives on protected species.

Action 2 Alts.	Whiting possession limit alternatives for vessels with a Category I permit	Affected areas	Affected categories	Affected seasons	Potential impact of the action alternatives on protected species.
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs. • Accountability Measures at 2,000 lbs. (whiting) and 400 lbs. (red hake).	All	Cat I	All	• Slight negative impact on protected species, but more positive than No Action because fewer vessels would be permitted to target small-mesh multispecies
2	Increase whiting possession limit from 40,000 lbs. to 50,000 lbs.	South	Cat I	Winter, Spring	• Small negative impact relative to Alternatives 1 and 3. • When coupled with one of the Action 1 limited access alternatives, it is expected to have a neutral impact on protected species relative to No Action
3	Decrease whiting possession limit to 30,000 lbs.	South	Cat I	Summer, Fall (Jun 15-Dec 31)	• Because it has the potential to reduce effort in the southern management area where takes of protected species have been observed and reduce or limit the number of vessels targeting small-mesh multispecies, it has a small positive impact on protected species relative to Alternatives 1 and 2, as well as No Action.

6.4.3.2.2 Whiting[29] Possession Limit for Vessels with a Category II Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category II limited access permit. None of these alternatives would be applicable if No Action is chosen.

[29] Whiting includes silver and offshore hakes.

6.4.3.2.2.1 Alternative 1 (Status quo)

For vessels holding a Category II limited access permit, this alternative would not change the existing small-mesh multispecies possession limits. These limits are summarized under Alternative 1 in the previous section.

Although applying to a smaller number of vessels than are currently fishing, this alternative would not change the amount of fishing effort by these vessels.

Therefore, Alternative 1 would have a low negative effect on protected species. Coupled with an Action 1 alternative, this alternative would have a small positive protected species impact because fewer vessels would be allowed to target small-mesh multispecies. On the other hand, vessels with Category II permits typically have lower landings per trip than a 30,000 or 40,000 lbs. limit and could increase fishing effort. This is particularly true in the southern management area for Action 1, Alternative 2 which would qualify 203 vessels. So compared to Alternative 2 below, Alternative 1 would have a small negative protected species impact, but a more positive impact than No Action.

6.4.3.2.2.2 Alternative 2

This alternative would decrease the whiting possession limit in all management areas from 30,000 lbs. to 15,000 lbs. It is intended to create a whiting possession limit that is more consistent with the usual catches made by Category II vessels (see Section 6.6.3.2.2 analysis of landings per trip). During 2014-2016, only 9% of trips by vessels that are expected to qualify for a Category II permit had whiting landings that exceeded 15,000 lbs.

For most vessels, this alternative would have no effect on their fishing activity, but reduce the potential for taking longer trips, further offshore to land more whiting. They would fish as they previously did. Some vessels however would make shorter trips, possibly closer to shore in areas where whiting are available. It is unlikely that effort would shift from the northern management area to the southern management area, or vice versa if the 15,000 lbs. possession limit applied in both areas.

Thus, coupled with an Action 1 limited access alternative, Alternative 2 would have a small positive impact relative to No Action and relative to Alternative 1 above.

Table 74. Action 2 summary (Category II) - Potential impact of the action alternatives on protected species.

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category II permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential impact of the action alternatives on protected species.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40,000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs.		Cat II	All	• Low negative effect on protected species. • Coupled with an Action 1 alternative, this alternative would have a small positive protected species impact because fewer vessels would be allowed to target small-mesh multispecies. • Compared to Alternative 2 below, Alternative 1 would have a small negative protected species impact, but a more positive impact than No Action

Action 2 Alts.	Whiting possession limit alternatives for vessels with a Category II permit	Affected areas	Affected categories	Affected seasons	Potential impact of the action alternatives on protected species.
2	15,0000 whiting possession limit and no change to the red hake possession limits.	All	Cat II	All	• Coupled with an Action 1 limited access alternative, Alternative 2 would have a small positive impact relative to No Action and relative to Alternative 1 above

6.4.3.2.3 Incidental possession limits

Vessels that did not qualify for a Category I or II limited access permit would be regulated by the possession limits in the three alternatives below, regardless of the type of gear in use or the species that the vessel is targeting.

6.4.3.2.3.1 Alternative 1 (No Action)

This alternative would retain the existing whiting possession limits, even if an action alternative was chosen in Action 1 (limited access qualification). It might seem counter-intuitive at first, but choosing this alternative with a limited access qualification alternative would allow whiting and red hake possession limits to be adjusted by permit category when needed in the future.

Because it is equivalent to No Action, i.e. vessels that qualify would initially have the same possession limit as qualifying vessels, Alternative 1 would have a neutral protected species impact (i.e. small negative) relative to No Action and a small negative impact relative to Alternative 2.

6.4.3.2.3.2 Alternative 2

This alternative would reduce the whiting and red hake possession limits to 2,000 lbs. and 400 lbs., respectively, for vessels that do not qualify for a small-mesh multispecies limited access permit (see Action 1). Due to relatively low prices for whiting and red hake, it is highly unlikely that non-qualifying vessels would take trips to target small-mesh multispecies. They may, however, continue or increase fishing effort into other fisheries.

Many non-qualifying vessels have permits for and experience with alternative fisheries (see Section 6.6.3 analysis of 2014-2016 fishing activity by non-qualifying vessels). Most fish in another trawl fishery for squids or herring, large-mesh groundfish, monkfish, or skates. Some also participated in the groundfish gillnet fishery.

In 2014-2016, non-qualifying vessels that targeted small-mesh multispecies accounted for two to five percent of small-mesh multispecies landings (and an equivalent amount of fishing effort). Thus relative to No Action and Alternative 1 above, this alternative would have a small positive protected species impact. If non-qualifying vessels have a permit (see Section 6.6.3.1 that summarizes other permits held by non-qualifying vessels) and shift effort into other fisheries (squid, herring, butterfish, groundfish, skate, lobster, etc.), this alternative could have a small negative protected species impact relative to No Action.

Table 75. Action 2 summary (non-qualifiers) - Potential impact of the action alternatives on protected species.

Action 2 Alts.	Whiting possession limit alternatives	Affected areas	Affected categories	Affected seasons	Potential impact of the action alternatives on protected species.
1	Retain existing whiting and red hake possession limits for non-qualifying vessels in Action 1	All	Non-qualifiers	All	• Alternative 1 would have a neutral protected species impact (i.e. small negative) relative to No Action and a small negative impact relative to Alternative 2
2	Reduce possession limit for whiting at 2,000 lbs. and red hake at 400 lbs. for non-qualifiers in Action 1.	All	Non-qualifier	All	• Relative to No Action and Alternative 1 above, this alternative would have a small positive protected species impact. • If non-qualifying vessels have a permit and shift effort into other fisheries (squid, herring, butterfish, groundfish, skate, lobster, etc.), this alternative could have a small negative protected species impact relative to No Action

6.4.3.3 Action 3 – Permit allowances

Alternatives in Action 3 only apply if an action alternative in Action 1 is chosen. Thus, there is no No Action alternative specifically for Action 3.

6.4.3.3.1 Limited access permit characteristics and conditions

The alternatives in Action 3 would affect the characteristics and allowances of a small-mesh multispecies limited access permit. In most cases, the effects are purely administrative but could change compliance costs for vessels that have limited access permits in other fisheries. Small-mesh multispecies limited access permits that are most consistent with the existing permits held by the vessel would minimize costs and maximize opportunity. Many vessels that would potentially qualify for a Category I or II permit in the Action 1 alternatives have one or more of a large-mesh groundfish, an Atlantic herring permit, or a squid/mackerel/butterfish limited access permit (see Section 5.5.5.2.1 summarizing permits held by qualifying vessels). Table 2 summarizes the similarities and differences among other limited access permits frequently held by vessels currently targeting small-mesh multispecies.

Because they potentially affect the quality or number of vessels and/or fishing effort, Alternatives 3 to 5 could have a positive or negative impact on protected species, depending on whether they reduce or increase the number of potential vessels that qualify, relative to Alternative 1.

6.4.3.3.1.1 Alternative 1 (Preferred)

Alternative 1 would apply the limited access permit characteristics for the Northeast (large mesh) Multispecies fishery to Category I and II permits for the small-mesh multispecies fishery (see Table 2). These include limits for permit accumulation, upgrade restrictions, and consideration of construction during the last year of a qualification period.

Alternative 1 is considered here to be a baseline to compare effects of other alternatives in Action 3. Although there is no existing limited access small-mesh multispecies permit, Alternative 1 serves as a

proxy for status quo for analytical comparison since it is difficult to evaluate effects with respect to an open access Category K groundfish permit.

Alternative 1 is largely administrative, associating a Category I and II limited access permit with the conditions that apply to existing multispecies limited access permits, which many small-mesh multispecies vessels already possess. Thus, coupled with an Action 1 limited access alternative, Alternative 1 would have a small positive protected species impact. Alternatives 3 and 5 could increase the number of qualifying vessels compared to Alternative 1 and Alternative 3 could reduce them. Thus, relative to Alternative 3 and 5, Alternative 1 would have a small positive protected species impact and would have a small negative protected species impact relative to Alternative 4.

6.4.3.3.1.2 Alternative 2

This alternative would not establish any limits on holdings of limited access permits for the small-mesh multispecies fishery.

Although potentially reducing ownership costs, with respect to protected species impacts the number and diversity of ownership is not expected to have a meaningful impact on total fishing effort. Thus, this alternative has a small positive impact relative to No Action (because of limits on the number of vessels in the fishery) and a neutral impact relative to other Action 3 alternatives.

6.4.3.3.1.3 Alternative 3

This alternative would not allow consideration of construction or repair of vessels for the year preceding the end of the qualification period. Compared to Alternative 1, it could therefore reduce the number of limited access permits for the small-mesh multispecies, potentially reducing effort in the fishery. There are no data available about how many vessels that participate in the small-mesh multispecies fishery that were under construction or re-construction during the year after the qualification periods in Action 1. Estimating the number of vessels that would qualify under Alternative 1 (which has this provision) and Alternative 3 (which could exclude some vessels under construction with fewer landings than the limited access qualification thresholds) is impossible.

Coupled with an Action 1 limited access alternative, this alternative would make a limited access program more conservative and effective. Compared to No Action and Alternative 1 above, this alternative is therefore expected to have a small positive protected species impact.

6.4.3.3.1.4 Alternative 4 (Preferred)

This alternative would allow only one vessel to qualify based on a single history. In other words, a history could not be transferred to a replacement vessel AND qualify the original vessel (which may have been sold or transferred to a new owner). Thus, this alternative would qualify fewer vessels than the Alternative 1 baseline.

As with Alternative 3, this measure is expected to make limited access more conservative and effective, qualifying fewer vessels than would qualify with Alternative 1. As such, it is expected to have a small positive protected species impact compared to No Action and Alternative 1.

6.4.3.3.1.5 Alternative 5

This alternative would allow upgrades of vessels that hold a limited access small-mesh multispecies fishery permit. It could allow, for example, a vessel to be more capable of fishing offshore or take more frequent trips (vessel becomes more seaworthy), increase hold capacity to take longer trips, or to tow larger trawls.

Although the fishery is limited by ACLs, there is room for increases in whiting catches and more fishing effort by qualifying vessels. Fishing offshore could affect the types of bottom where fishing occurs or the type and amount of bycatch. Fishing longer or more frequent trips implies an increase in fishing effort.

Because vessels that upgrade could take longer trips and fish further offshore where more protected species takes were observed, the alternative is expected to have a small negative protected species impact compared to Alternative 1, but a small positive protected species impact compared to No Action because any vessel could enter the fishery and upgrade with no limited access program in place subject to upgrade restrictions for other permits the vessel may hold. The degree to which vessels might upgrade with this alternative is subject to many individual business decisions and is therefore impossible to quantify. Some vessels hold other fishing permits that have existing upgrade restrictions, while others do not. Decisions on whether to upgrade could depend on future whiting prices or a vessel's requirements when fishing for other species.

Table 76. Action 3 limited access permit alternatives summary (permit allowances) - Potential impact of the action alternatives on protected species.

Alts.	Permit allowances	Potential impact of the action alternatives on protected species.
1	Status quo. 5% cap on permits + upgrade restriction + consideration for construction at t_{-1} of qualification period.	• Alternative 1 would have a small positive protected species impact. • Alternatives 3 and 5 could increase the number of qualifying vessels compared to Alternative 1 and Alternative 3 could reduce them. • Relative to Alternative 3 and 5, Alternative 1 would have a small positive protected species impact and would have a small negative protected species impact relative to Alternative 4
2	No limits on holdings of limited access permits for the small-mesh multispecies.	• Small positive impact relative to No Action and a neutral impact relative to other Action 3 alternatives
3	No consideration for construction or repair of vessels for the year preceding the qualification period.	• Coupled with an Action 1 limited access alternative, this alternative would make a limited access program more conservative and effective. • Compared to No Action and Alternative 1 above, this alternative is therefore expected to have a small positive protected species impact
4	Only one vessel based on single history, i.e., history couldn't be transferred to a replacement vessel AND qualify the original vessel.	• As with Alternative 3, this measure is expected to make limited access more conservative and effective, qualifying fewer vessels than would qualify with Alternative 1. • It is expected to have a small positive protected species impact compared to No Action and Alternative 1

Alts.	Permit allowances	Potential impact of the action alternatives on protected species.
5	Allow upgrade of vessels that hold limited access multi-species fishery permit. (Upgrading is intended for distant fishing, fish frequently, more hold capacity, longer duration trips, and capability for taking more/large tows).	• Expected to have a small negative protected species impact compared to Alternative 1, but a small positive protected species impact compared to No Action. • The degree to which vessels might upgrade with this alternative is subject to many individual business decisions and is therefore impossible to quantify.

6.4.3.3.2 Incidental permit conditions

Coupled with Alternative 2 in Action 2, vessels holding an incidental permit would be able to land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, regardless of the type of gear in use or species targeted. If Alternatives 1 or 3 are chosen of Action 2, the whiting and red hake possession limits would not initially change from the status quo. The following Action 3 alternatives only apply if an action alternative is selected from Action 1. Thus, there is no relevant status quo for Action 3.

6.4.3.3.2.1 Alternative 1

In addition to the incidental small-mesh multispecies fishery possession limits, vessels with an incidental possession limit permit would be prohibited from using small mesh trawls in small-mesh multispecies exemption areas.

It is impossible to quantify the potential to target small-mesh multispecies with an incidental permit under current or future regulatory or market conditions. This potential is thought to be currently limited by the relatively low whiting and red hake prices, although some vessels may otherwise use the incidental permit to fish for bait and sell the catch through the transfer at sea provision.

This alternative has the potential to restrict small-mesh fishing for whiting and red hake on day trips, or for bait in the exemption areas. Because there have been only one observed takes in the Gulf of Maine exemption areas, this alternative would have a neutral protected species impact from this perspective. It is unlikely to have any effect on small-mesh multispecies fishing activity offshore when coupled with low incidental possession limits. There are some exemption areas in inshore portions of Southern New England that could be affected by this alternative. In this respect, the alternative could have a small positive protected species impact relative to No Action or allowing vessels with incidental permits to use small-mesh in exemption areas.

6.4.3.3.2.2 Alternative 2a

This alternative would allow vessels using large mesh on a groundfish or monkfish DAS to exceed the proposed incidental whiting and red hake possession limits. The alternative is intended to minimize discards of whiting and red hake while fishing for groundfish, skates, and monkfish using large-mesh trawls.

Because this alternative is not expected to influence fishing behavior or change the duration or location of fishing, it is expected to have a small positive protected species impact compared to No Action and a neutral impact relative to Alternative 2b.

6.4.3.3.2.3 Alternative 2b

This alternative would prohibit fishing for small-mesh multispecies on a groundfish DAS. While fishing on a groundfish DAS, the vessel could land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, even if the vessel holds a small-mesh multispecies fishery limited access permit.

This alternative is the inverse of Alternative 2a, applying an incidental whiting and red hake possession limit when a vessel is (presumably fishing with large-mesh trawls or gillnets) on a groundfish DAS. It is not expected to change fishing behavior, but it could cause some additional discards of whiting and red hake.

Coupled with a limited access alternative in Action 1, this alternative is expected to have a small positive protected species impact and a neutral impact relative to Alternative 2a.

6.4.3.3.2.4 Alternative 3 (Preferred)

Similar to Alternative 2a, this alternative would allow vessels fishing for Atlantic herring or squid with a limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.

This alternative is intended to reduce whiting and red hake discards when vessels are fishing for herring or squid, using small-mesh trawls. It is not expected to change fishing behavior or the duration of fishing, but it could cause slight changes in where vessels fish. With this measure, a vessel may be less likely to avoid catches of whiting and red hake, although the effect is expected to be minor if their target is really herring or squid. Coupled with a limited access alternative for Action 1, Alternative 3 is expected to have a small positive protected species impact and a neutral impact compared to not allowing squid and herring vessels to exceed the incidental whiting and red hake possession limits.

6.4.3.3.2.5 Alternative 4

This alternative would exempt vessels using small-mesh trawls in specific exemption areas from the Incidental Permit possession limits, allowing the vessels to land the same amounts of whiting and red hake as vessels that hold limited access permits. These any exemption areas require the use a more selective raised footrope trawl.

This alternative could allow continued expansion of the fishery in the Gulf of Maine, where the exemption areas require vessels to use a raised footrope trawl, designed to be more selective particularly effective for excluding flounders, skates, and monkfish. Vessels that do not qualify for a limited access permit may travel to these specific exemption areas to target whiting and red hake, depending on the potential economic return and fishing opportunities that exist elsewhere. Not only could non-qualifying vessels shift fishing effort from other areas, but total small-mesh multispecies fishing in the Gulf of Maine could increase from entry by new or existing vessels that target other species.

Some fishermen with vessels that do not qualify for limited access may take small-mesh multispecies trips in the Gulf of Maine exemption areas, where the raised footrope trawl is a required gear. If they previously fished in the Cultivator Shoals Area or in the Mid-Atlantic/Southern New England exemption areas (where the raised footrope trawl is not required), this alternative could shift fishing effort away from areas where protected species takes have been observed. Therefore, coupled with a limited access alternative and compared to not applying this alternative, Alternative 4 is expected to have a small positive protected species impact.

Table 77. Action 3 incidental permit alternatives summary (permit conditions) - Potential impact of the action alternatives on protected species.

Alts.	Permit allowances	Potential impact of the action alternatives on protected species.
1	Prevents vessels that do not qualify for limited access from targeting whiting and red hake in the exemption areas.	• Could have a small positive protected species impact relative to No Action or allowing vessels with incidental permits to use small-mesh in exemption areas.
2a	Allow large-mesh on monkfish DAS or groundfish to exceed incidental whiting and red hake possession limits.	• Expected to have a small positive protected species impact compared to No Action and a neutral impact relative to Alternative 2b
2b	Prohibit fishing for small-mesh multispecies on groundfish DAS. If fishing on groundfish DAS, the possession limit be 2,000 lbs. (whiting) and 400 lbs. (red hake).	• Coupled with a limited access alternative in Action 1, this alternative is expected to have a small positive protected species impact and a neutral impact relative to Alternative 2a
3	Allow fishing for Atlantic herring or squids with limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.	• Coupled with a limited access alternative for Action 1, Alternative 3 is expected to have a small positive protected species impact and a neutral impact compared to not allowing squid and herring vessels to exceed the incidental whiting and red hake possession limits
4	Allows vessels to fish in exemption areas requiring a raised footrope trawl.	• Coupled with a limited access alternative and compared to not applying this alternative, Alternative 4 is expected to have a small positive protected species impact

6.5 Impacts of the Physical Environment and Essential Fish Habitat

The Essential Fish Habitat (EFH) impacts discussion below focuses on changes in the amount or location of fishing that might occur due to the implementation of the various alternatives in this amendment. This approach to evaluating adverse effects to EFH is based on two principles: (1) seabed habitat vulnerability to fishing effects varies spatially, due to variations in seabed substrates, energy regimes, living and non-living seabed structural features, etc., between areas and (2) the magnitude of habitat impacts is based on the amount of time that fishing gear spends in contact with the seabed. This seabed area swept (seabed contact time) is grossly related to the amount of time spent fishing, although it will of course vary depending on catch efficiency, gear type used, and other factors.

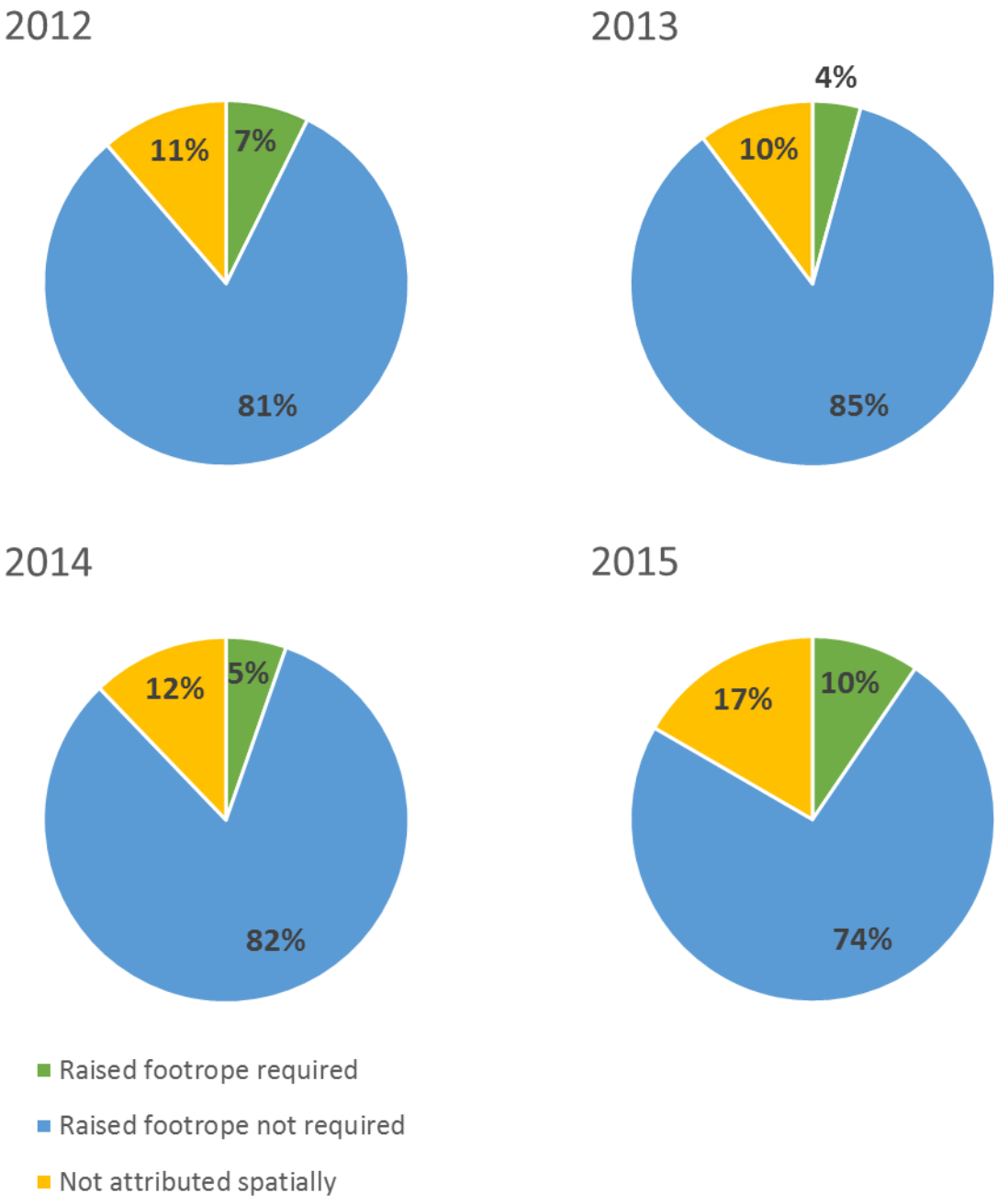
It is important to keep in mind that whiting fishing is spatially concentrated relative to some other fisheries, restricted by exemption area regulations and by availability of commercial concentrations of fish. It is likely that any changes in fishing effort will occur in the same general areas that are currently fished. While the intensity of fishing could change due to a limited entry program and any associated changes in possession limits and permit conditions, it is not likely that fishing will expand into new areas in the absence of other changes to the management program, specifically new or spatially expanded exemption areas.

Most fishing activity for whiting (over 97% of landings during 2014-2016) occurs with bottom trawls, and some of these trawls are required to have raised footropes. As compared to bottom trawls outfitted with rollers or rockhoppers along the footrope, raised footrope trawls have less contact with the seabed along the sweep, and therefore has lower impacts to the seafloor. Raised footropes are required in the following exemption areas: GOM Grate Raised Footrope, Small Mesh Area 1, Small Mesh Area 2, and the two Raised Footrope Trawl Exempted Whiting Fishery Areas. Raised footropes are not required in the Cultivator Shoals Exemption Area, or in the Southern New England or Mid-Atlantic Regulated Mesh Areas.

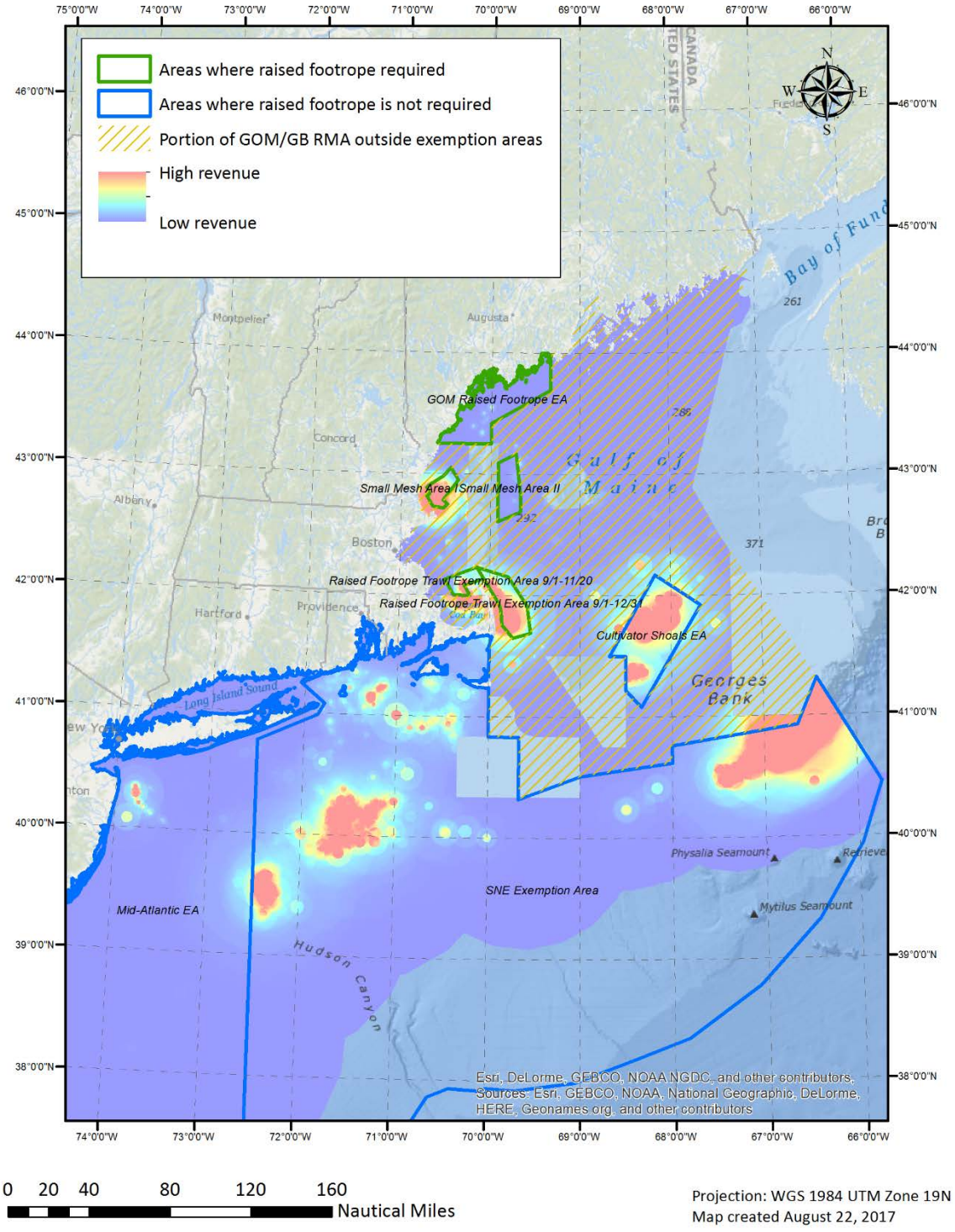
Most whiting revenues, and by extension, most whiting fishing effort and swept area, are from areas that do not require a raised footrope trawl (Figure 54). This conclusion was reached by summing fishery revenue within groups of exemption areas and regulated mesh areas using the Zonal Statistics by Table tool in the Spatial Analyst extension to ArcMap 10.5. Whiting revenues were attributed spatially according to a statistical model that combines vessel trip report positions with information about the spatial footprint of each trip, derived from at sea observer data (DePiper 2014). Vessel trip reports in the whiting fishery, as in other fisheries, report an average fishing location for each trip, and do not report fishing according to exemption area. Because these VTR positions are uncertain, and the statistical model is only an estimate, between 10-17% of annual revenues do not overlap any whiting exemption areas. Map 12 shows 2015 revenues relative to exemption areas as an example.

In terms of estimating impacts to EFH, the key questions are whether the alternatives will increase or decrease effort in the fishery overall, and if the alternatives will affect the relative use of each trawl gear type. If effort increases overall, impacts to EFH would increase; if effort decreases, impacts would decrease. If effort shifts into areas where raised footropes are required, from the Cultivator Shoals, Southern New England, or Mid-Atlantic exemption areas, impacts would also decrease. Change in the magnitude of effort as well as the relative use of different gear types could occur in combination.

Figure 54. Whiting revenues from areas where raised footrope trawls are required (green), vs. not required (blue), calendar years 2012-2015. Some effort was not attributed to any exemption areas (yellow). See text for explanation of methods.



Map 12. Whiting revenue and small mesh exemption areas, calendar year 2015. Revenue approaches zero in the dark blue shaded areas. Exemption areas are color-coded by requirement for raised footrope trawl. Source: calendar year 2015 vessel trip report data.



6.5.1 No Action (Preferred)

This alternative, described in Section 4.1, would continue the existing open access small-mesh multispecies fishery. Any vessel would be able to obtain a Category K multispecies permit and target small-mesh multispecies in exemption areas.

This alternative would allow more vessels to enter the fishery in the future to target whiting and red hake using small-mesh trawls. Additional entrants could make existing small-mesh multispecies regulations less effective to manage catches than they would otherwise be with limited access in effect. Moderate increases in whiting catches are unlikely to cause overfishing in the short term on silver hake, but increases in red hake catches could cause overfishing on that stock in the northern management area and exacerbate overfishing in the southern management area.

If the Council does not implement limited access through this amendment, it will need to take more drastic actions later to respond if overfishing occurs, or if catches exceed specifications. Several general measures could be applied, depending on the type and severity of the problem. Measures that could reduce non-target catches include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest). It is difficult to assess the severity of impacts on red hake, because we cannot forecast the effectiveness of these measures (which are currently unknown). It does however take time to identify the problem (at least during the next annual monitoring report) and prepare a framework action or amendment to address it. Furthermore, increases in small-mesh multispecies fishing effort by new entrants could dilute the effectiveness of technical measures to limit catches of red hake. Also, if the catches of whiting increase or if future specifications decline, the Council would be forced to cut small-mesh multispecies fishing effort, either by reducing whiting possession limits, shortening seasons, or by initiating other measures. Any of these measures would be less effective in controlling catches if new entrants enter the fishery.

Whiting fishery landings have been relatively consistent over the previous ten or so years (Table 21 and Table 22), and landings of whiting remain well below catch limits (Figure 51, Figure 52). In the absence of a limited access program, the potential exists to increase fishing effort and therefore increase impacts to fish habitat, but this potential exists under the various limited entry approaches as well. In this sense, the impacts of the fishery to habitat under No Action are unlikely to increase or decrease relative to current conditions. However, bycatch issues are likely to affect effort in the small mesh multispecies fishery in the coming years given relatively restrictive catch limits for bycatch species. **If catches of red hake and yellowtail flounder exceed allowable limits, then fishing activity and therefore habitat impacts would decrease as accountability measures including gear restrictions and incidental catch limits are triggered.** Limited entry is expected to have positive effects on bycatch management, in the sense that utilization of whiting quota is maintained or even improved. Thus, the absence of a limited entry program under No Action could increase effort in the fishery, and have a small negative impact on EFH.

6.5.2 Whiting Possession Limit for Vessels Using 3-inch and larger Cod-End Mesh Trawls

The possession limits in this set of three alternatives would apply to any vessel using 3-inch and larger mesh to target small-mesh multispecies in all areas, including areas that are exempt from the large-mesh Northeast Multispecies regulations.

6.5.2.1 Alternative 1 (Preferred; No Action) – Existing small-mesh multispecies possession limits apply

This alternative would retain the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lbs. in the southern area. Whiting possession limits are lower when vessels use trawls with mesh less than 3-inches, usually to target other species like herrings, squids, and butterfish. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area. In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger.

The current limits and other measures have prevented overfishing of whiting, but overfishing of northern red hake has occurred for a few recent years and for southern red hake began in 2016. Since these occurrences, the specifications have been adjusted to account for changes in stock biomass and accountability measures have been adjusted to prevent future overfishing. New specifications for southern red hake are expected to take effect in fishing year 2018 and current landings are likely to trigger the in-season accountably measure, reducing the red hake possession limit to 400 lbs.

With respect to EFH, despite recent adjustments to the specifications and accountability measures, overall increases in fishing effort could still be expected under the existing possession limits, because recent catches of whiting remain well below specifications. Increases in effort would increase impacts to EFH. However, the magnitude of potential increases will be limited by the factors discussed in Section 6.1.3. **Thus, this alternative is expected to have neutral to slight negative impacts on EFH.**

6.5.2.2 Alternative 2 – Raise the Whiting possession limit from 40,000 to 50,000 lbs., January 1 to June 14 in the Southern New England and Mid-Atlantic exemption areas

This alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Vessels in the southern management area could, as a result of the higher possession limit, land more whiting and red hake (at least that is the intent). This alternative could provide an incentive to fish in the southern area during January 1-June 14. Because the whiting possession limit has not been more than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects.

The Alternative 2 whiting possession limits exceed No Action limits. Thus, vessels could land similar amounts of whiting per trip as they do now, resulting in neutral impacts to EFH. Or, vessels might also land the higher possession limit, up to 50,000 lbs., lengthening their fishing trips and increasing effort per trip. This would increase impacts to EFH. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit, increasing effort and thereby increasing habitat impacts, or they might take fewer trips, and keep total landings the same, resulting in neutral impacts. As noted above, the magnitude of potential increases will be limited by the factors discussed in Section 6.1.3. Overall, the impacts of a possession limit increase in these two exemption areas is likely to have neutral to slightly negative impacts to EFH, depending on how the fishery responds to these changes.

6.5.2.3 Alternative 3 – Lower the Whiting possession limit from 40,000 to 30,000 lbs., June 15 to December 31 in the Southern New England and Mid-Atlantic exemption areas

Alternative 3 would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. It is intended to reduce the negative effects of southern area landings on market prices for whiting in all areas.

This alternative would have several types of potential effects on fishing behavior, depending on how the fleet responds. Under a lower possession limit, southern area trips taken during the summer and fall would be less profitable than they are presently, at least in cases where more than 30,000 lb. of whiting would have been landed. To make up for these losses, this alternative may induce vessels to fish additional trips during this season to catch and land the same amount as they do under the existing limit. In this case, total fishing effort would remain the same as it is now, resulting in neutral impacts to EFH. Alternatively, and more likely than an increase in southern area trips, some vessel operators might opt to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for the vessel to do so. Such spatial and temporal shifts are not expected to change the impacts of the fishery on EFH. Thus, the overall impacts of this alternative to EFH are likely neutral.

6.5.3 Limited Access Alternatives

6.5.3.1 Action 1 – Qualification criteria

The alternatives in Action 1 consider establishing a limited access program for the small-mesh multispecies fishery, targeting whiting and red hake using 3-inch or smaller mesh in areas that are exempt from the large-mesh groundfish regulations. In addition to No Action, there are five alternatives with different qualification criteria and periods. In addition to a core set of vessels that would qualify for all alternatives (20 Category I and 37 Category II), each alternative qualifies a different set of vessels that have landed whiting or red hake at various times. The qualification period for Alternatives 1, 2, and 5 ends at the control date, but the qualification period for Alternative 3 and 4 extend to the end of calendar year 2016. For all alternatives, qualifiers would be able to fish in the small mesh multispecies exemption areas, subject to the possession limits specified in Section 4.3.2 and the permit allowances specified in Section 4.3.3. Depending on the permit allowance alternatives selected in Action 3 (Section 4.3.3), the vessels may not be able to use small mesh in the exemption areas, unless they are permitted to fish for other small-mesh species, such as squid and herring. Under any of Alternatives 1-5, non-qualifying vessels would no longer be allowed to land more than 2,000 lbs. of whiting and 400 lbs. of red hake per trip.

As described in Section 6.1.3, market demand for whiting, combined with low quotas for red hake and certain other stocks and a high degree of market and fishery knowledge required to be successful in the fishery, limit the amount of effort. At present, whiting catches are well below targets and limits. Because none of the qualification alternatives in the range represent a substantial departure from the current number of active participants, the other factors listed above are expected to have a greater influence on the amount of effort in the fishery, and therefore on the fishery's impacts to habitat. Differences in terms of the number of qualifiers could have slight effects on the overall magnitude of fishing effort and therefore on impacts to habitat. Impacts are expected to track the impacts of the qualification criteria alternatives on the target species, as described in Section 6.2.3. Alternatives that reduce fishing effort whiting and therefore have positive biological impacts on the target stock are likely to reduce impacts on

EFH as well. Reductions in impacts to habitat could be mitigated if vessels shift their effort into other fisheries.

6.5.3.1.1 No Action

This alternative, described in Section 4.1, would continue the existing open access small-mesh multispecies fishery. Any vessel would be able to obtain a Category K multispecies permit and target small-mesh multispecies in exemption areas.

Assuming market- and bycatch-related limits on effort do not change substantially (see Section 6.1.3), fishing effort and therefore impacts to EFH are unlikely to change in magnitude if the exiting open access management system is continued under No Action.

6.5.3.1.2 Alternative 1

This alternative is expected to qualify 40 Category I and 74 Category II vessels. Thirty-three (33) Category I and 38 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 42 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

Like No Action, market- and bycatch-related factors are expected to by the dominant influences on the magnitude of effort in the whiting fishery under Alternative 1. Assuming present market-based limits on the fishery continue, **Alternative 1 is expected to have neutral to slightly positive impacts on EFH relative to No Action**, because some vessels will continue their present fishing behaviors, and others would not qualify to land more than the incidental limit. If conditions in the fishery change, for example if the market for whiting expands, or bycatch sub-ACLs are no longer constraining, Alternative 1 would diverge further from No Action, and could have larger positive impacts relative to the existing open access system, which does not place any constraints on the number of entrants.

6.5.3.1.3 Alternative 2

This alternative is expected to qualify 20 Category I and 203 Category II vessels. Nineteen (19) Category I and 69 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 25 non-qualifying vessels and 15 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

Assuming present market-based limits on the fishery continue, **Alternative 2 is expected to have neutral to slightly positive impacts on EFH relative to No Action**, because some vessels will continue their present fishing behaviors, and others would not qualify to land more than the incidental limit. If conditions in the fishery change, for example if the market for whiting expands, or bycatch sub-ACLs are no longer constraining, Alternative 1 would diverge further from No Action, and could have larger positive impacts relative to the existing open access system, which does not place any constraints on the number of entrants. Because the number of Category I vessels in Alternative 2 is low, and includes only one vessel without recent history, latent effort, and thus the possibility for large increases in target species and EFH impacts, is reduced.

6.5.3.1.4 Alternative 3

This alternative is expected to qualify 51 Category I and 90 Category II vessels. Forty-four (44) Category I and 46 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 48 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

Alternatives 3 through 5 would qualify increasingly larger numbers of vessels in each of the two categories. Like No Action, market- and bycatch-related factors are expected to be the dominant influences on the magnitude of effort in the whiting fishery under Alternative 3. If these conditions continue, Alternative 3 is expected to have neutral to slightly positive impacts on EFH relative to No Action, because some vessels will continue their present fishing behaviors, and others would not qualify to land more than the incidental limit. If conditions in the fishery change, for example if the market for whiting expands, or bycatch sub-ACLs are no longer constraining, there remain many Category I and II qualifiers without recent landings that could become more active in the fishery, thereby increasing landings and impacts to EFH. Under these conditions, **Alternative 3 could still have positive impacts relative to No Action, which does not place any constraints on the number of entrants, but Alternative 3 allows effort in the fishery to expand considerably from the number of presently active vessels**.

6.5.3.1.5 Alternative 4

This alternative is expected to qualify 55 Category I and 124 Category II vessels. Forty-two (42) Category I and 38 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 48 non-qualifying vessels that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

Like No Action, market- and bycatch-related factors are expected to by the dominant influences on the magnitude of effort in the whiting fishery under Alternative 4. If these conditions continue, Alternative 4 is expected to have neutral to slightly positive impacts on EFH relative to No Action, because some vessels will continue their present fishing behaviors, and others would not qualify to land more than the incidental limit. If conditions in the fishery change, for example if the market for whiting expands, or bycatch sub-ACLs are no longer constraining, there remain a large number of Category I and II qualifiers without recent landings that could become more active in the fishery, thereby increasing landings and impacts to EFH. Under these conditions, **Alternative 4 could still have positive impacts relative to No Action, which does not place any constraints on the number of entrants, but Alternative 4 allows effort in the fishery to expand considerably from the number of presently active vessels**. Because more vessels qualify under Alternative 4 as compared to Alternative 3, Alternative 4 is expected to be closer to No Action if market demand increases. Alternative 4 is more restrictive than Alternative 5.

6.5.3.1.6 Alternative 5

This alternative is expected to quality 84 Category I and 159 Category II vessels. Forty-three (43) Category I and 30 Category II vessels landed more than 2,000 lbs. of whiting or 400 lbs. of red hake on one or more trips in 2014-2016. Additionally, there were 45 non-qualifying vessels and 10 vessels with no history during the qualification period that landed more than 2,000 lbs. of whiting or 400 lbs. of red hake in 2014-2016.

Like No Action, market- and bycatch-related factors are expected to by the dominant influences on the magnitude of effort in the whiting fishery under Alternative 5. If these conditions continue, Alternative 5

is expected to have neutral to slightly positive impacts on EFH relative to No Action, because some vessels will continue their present fishing behaviors, and others would not qualify to land more than the incidental limit. If conditions in the fishery change, for example if the market for whiting expands, or bycatch sub-ACLs are no longer constraining, there remain a very large number of Category I and II qualifiers without recent landings that could become more active in the fishery, thereby increasing landings and impacts to EFH. Under these conditions, **Alternative 5 could still have positive impacts relative to No Action, which does not place any constraints on the number of entrants, but Alternative 5 allows effort in the fishery to expand considerably from the number of presently active vessels.** Alternative 5 qualifies the greatest number of vessels, and thus the impacts are expected to be the most like No Action open access.

6.5.3.2 Action 2 - Possession limit alternatives

The alternatives in Action 2 propose adjustments to the whiting possession limits, primarily to adjust the capacity of the small-mesh multispecies fleet to land whiting and to minimize negative effects on price. These possession limits would apply to either vessels qualifying for a Category I or II permit, or to both (i.e. the same possession limit would apply to both permit categories.

In addition, Action 2 includes an alternative that would establish an incidental possession limit for whiting and an incidental limit for red hake. These incidental possession limits would apply to all fishing activity by vessels that do not have a Category I or II permit, regardless of mesh or gear in use. Depending on the final alternatives selected in Action 3 (Section 4.3.3), vessels with an incidental permit may be able to exceed the incidental possession limits if they are participating in another limited access small-mesh fishery, such as herring or squid.

6.5.3.2.1 Whiting[30] Possession Limit for Vessels with a Category I Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category I limited access permit. If No Action is selected under Action 1, the impacts of these alternatives will be as discussed in section 6.5.2.

6.5.3.2.1.1 Alternative 1 (Status quo)

For vessels holding a Category I limited access permit, this alternative would not change the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lbs. in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area.

In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger.

In the absence of a limited access system, No Action possession limits are expected to have neutral to slight negative impacts on EFH (see Section 6.5.2.1). If an action alternative is selected under Action 1, these possession limits would apply to a smaller number of vessels, and others would be subject to lower

[30] Whiting includes silver and offshore hakes.

Category II or incidental limits. **No Action possession limits combined with a limited access permit system is expected to reduce impacts to EFH relative to current conditions**.

6.5.3.2.1.2 Alternative 2

For vessels holding a Category I limited access permit, this alternative would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. This alternative could provide an incentive to fish in the southern area during January 1-June 14. Because the whiting possession limit has not been greater than 40,000 lbs. in almost two decades, there is little quantitative information about the potential effects. Note that this alternative can be selected even if the fishery remains open access (see Section 6.5.2.2). As described in that section, the impacts of a possession limit increase in these two exemption areas is likely to have neutral to slightly negative impacts to EFH, depending on how the fishery responds to these changes. If a limited entry permit system is adopted, the magnitude of any negative impacts could be reduced, if only Category I qualifiers are able to land the higher limits. Overall, **impacts of this alternative to EFH could range from neutral, if the magnitude of effort is unchanged, to slightly negative, if effort increases.**

6.5.3.2.1.3 Alternative 3

For vessels holding a Category I limited access permit, this alternative would decrease the whiting possession limit for about half of the year in the southern management area. During the summer and fall, a 30,000 lbs. whiting possession limit would be in effect in both management areas. It is intended to reduce the effect of southern area landings on market prices for whiting in all areas. Note that this alternative can be selected even if the fishery remains open access (see Section 6.5.2.3). The conclusion reached in this section is that the overall impacts to EFH of reducing the southern area possession limit during the summer and fall are likely neutral. If a limited entry system is adopted, this reduced possession limit would apply to fewer vessels, assuming possession limits vary by qualification tier. **It is therefore unlikely that this alternative would have a meaningful impact on the physical environment**.

Table 78. Action 2 summary (Category I) - Potential impact of the action alternatives on the physical environment and EFH.

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category I permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential impact of the action alternatives on the physical environment and EFH.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs. • Accountability Measures at 2,000 lbs. (whiting) and 400 lbs. (red hake).	North and south	Cat I	All	Neutral to slight negative. Magnitude of any negative effects reduced if a limited entry system is adopted and possession limits are applied by qualification tier.

Action 2 Alts.	Whiting possession limit alternatives for vessels with a Category I permit	Affected areas	Affected categories	Affected seasons	Potential impact of the action alternatives on the physical environment and EFH.
2	Increase whiting possession limit from 40,000 lbs. to 50,000 lbs.	South	Cat I	Winter, Spring	Neutral, if the magnitude of effort is unchanged, to slightly negative, if effort increases.
3	Decrease whiting possession limit to 30,000 lbs.	South	Cat I	Summer, Fall (Jun 15-Dec 31)	Unlikely that this alternative would have a meaningful impact on the physical environment.

6.5.3.2.2 Whiting[31] Possession Limit for Vessels with a Category II Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category II limited access permit. None of these alternatives would be applicable if No Action for Action 1 is chosen.

6.5.3.2.2.1 Alternative 1 (Status quo)

For vessels holding a Category II limited access permit, this alternative would not change the existing small-mesh multispecies possession limits, which are summarized under Alternative 1 in the previous section. Thus, for any Category II qualifiers, this alternative would not change the amount of fishing effort by these vessels. Therefore, Alternative 1 would have no direct or indirect effect on the physical environment.

6.5.3.2.2.2 Alternative 2

This alternative would decrease the whiting possession limit in all management areas from 30,000 lbs. to 15,000 lbs. It is intended to create a whiting possession limit that is more consistent with the usual catches made by Category II vessels (see Section 6.6.3.2.2 analysis of landings per trip). During 2014-2016, only 9% of trips by vessels that are expected to qualify for a Category II permit had whiting landings that exceeded 15,000 lbs.

Given this low percentage, for most vessels, this lower 15,000 lb possession limit would have no effect on their fishing activity, and they would fish as they previously did, resulting in neutral effects on physical habitat and EFH. The small number of Category II vessels that presently land more than 15,000 lb of whiting per trips would reduce their effort per trip, perhaps making shorter trips, possibly closer to shore in areas where whiting are available. This reduction in effort would have positive effects on EFH, albeit slight given the small number of vessels affected. These positive effects would be mitigated if vessels simply increase the number of trips taken to make up the lost catches.

[31] Whiting includes silver and offshore hakes.

Table 79. Action 2 summary (Category II) – Potential impact of the action alternatives on the physical environment and EFH.

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category II permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential impact of the action alternatives on the physical environment and EFH.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40,000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs.	North and south	Cat II	All	Alternative 1 would have no direct or indirect effects as compared to current conditions
2	15,0000 whiting possession limit and no change to the red hake possession limits.	All	Cat II	All	Neutral to slightly positive as compared to current conditions

6.5.3.2.3 Incidental possession limits

Vessels that did not qualify for a Category I or II limited access permit would be regulated by the possession limits in the two alternatives below, regardless of the type of gear in use or the species that the vessel is targeting.

6.5.3.2.3.1 Alternative 1 (No Action)

This alternative would retain the existing whiting possession limits, even if an action alternative was chosen in Action 1 (limited access qualification). Choosing this alternative with a limited access qualification alternative is not equivalent to an open entry system with the current possession limits, because the limited entry system would allow whiting and red hake possession limits to be adjusted by permit category if needed in the future.

The direct impact on physical habitat and EFH would be unchanged from the status quo, but it could reduce the potential for increases in small-mesh multispecies fishing effort by vessels that do not qualify under limited entry. Indirectly, this alternative could have a positive effect on EFH in the future, because could be used to reduce fishing effort by non-qualifiers if needed later.

6.5.3.2.3.2 Alternative 2

This alternative would reduce the whiting and red hake possession limits to 2,000 lbs. and 400 lbs., respectively, for vessels that do not qualify for a small-mesh multispecies limited access permit (see Action 1). Due to relatively low prices for whiting and red hake, it is highly unlikely that non-qualifying vessels would take trips to target small-mesh multispecies. In this way, implementing incidental possession limits for non-qualifiers would have positive impacts on EFH, increasing as the number of non-qualifiers increases (see sections 6.5.3.1.2 through 6.5.3.1.6 for discussion).

These non-qualifiers may, however, continue or increase fishing effort into other fisheries (See Section 6.6.3.2.3 analysis of 2014-2016 fishing activity by non-qualifying vessels). Most fish in another trawl

fishery for squids or herring, large-mesh groundfish, monkfish, or skates. Some also participated in the groundfish gillnet fishery. With respect to effects on habitat, these potential shifts in fishing effort could mitigate or reverse the effect of small-mesh multispecies limited access. Large-mesh trawl gears targeting groundfish, monkfish, and skates is thought to have neutral to negative effects on EFH, relative to the same amount of fishing effort targeting small-mesh multispecies. This is because raised footrope trawls used on some small-mesh multispecies trips have lower bottom contact than other types of trawls. Groundfish gillnet gear is thought to have a positive effect on EFH relative to the same amount of fishing effort targeting small-mesh multispecies. Small-mesh trawls used to target herrings and squids is likely to have a neutral impact on EFH relative to fishing for whiting, but there may be some redistribution of effort in time or space given the different distributions of these species. Overall the effects of effort shifts into other fisheries could range from slight negative to slight positive.

Table 80. Action 2 summary (non-qualifiers) - Potential impact of the action alternatives on the physical environment and EFH.

Action 2 Alts.	**Whiting possession limit alternatives**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential impact of the action alternatives on the physical environment and EFH.**
1	Retain existing whiting and red hake possession limits for non-qualifying vessels in Action 1	All	Non-qualifiers	All	Neutral at present, potentially positive in the future if more restrictive trip limits are adopted.
2	Reduce possession limit for whiting at 2,000 lbs. and red hake at 400 lbs. for non-qualifiers in Action 1.	All	Non-qualifier	All	Slightly negative to slightly positive, depending on effort shifts to mitigate lower possession limits for non-qualifying vessels.

6.5.3.3 Action 3 – Permit allowances

Alternatives in Action 3 only apply if an action alternative in Action 1 is chosen. Thus, there is not a No Action alternative for Action 3.

6.5.3.3.1 Limited access permit characteristics and conditions

The alternatives in Action 3 would affect the characteristics and allowances of a small-mesh multispecies limited access permit. In most cases, the effects are purely administrative but could change compliance costs for vessels that have limited access permits in other fisheries. Small-mesh multispecies limited access permits that are most consistent with the existing permits held by the vessel would minimize costs and maximize opportunity. Many vessels that would potentially qualify for a Category I or II permit in the Action 1 alternatives have one or more of a large-mesh groundfish, an Atlantic herring permit, or a squid/mackerel/butterfish limited access permit (see Section 5.5.1). Table 2 summarizes the similarities and differences among other limited access permits frequently held by vessels currently targeting small-mesh multispecies.

6.5.3.3.1.1 Alternative 1

Alternative 1 would apply the limited access permit characteristics for the Northeast (large mesh) Multispecies fishery to Category I and II permits for the small-mesh multispecies fishery. These include

limits for permit accumulation, upgrade restrictions, and consideration of construction during the last year of a qualification period (Table 2). These types of permit restrictions serve to contain increases in fishing power in the large mesh fishery and would likely have similar effects here. Therefore, Alternative 1 is expected to have positive impacts to EFH.

6.5.3.3.1.2 Alternative 2

This alternative would not establish any limits on holdings of limited access permits for the small-mesh multispecies fishery. Although potentially reducing ownership costs, with respect to physical habitat and EFH the number and diversity of ownership is not expected to have a meaningful impact.

6.5.3.3.1.3 Alternative 3

This alternative would not allow consideration of construction or repair of vessels for the year preceding the end of the qualification period. It could therefore reduce the number of limited access permits for small-mesh multispecies, potentially reducing effort in the fishery and reducing impacts to EFH, if these non-qualifying vessels do not fish or shift to fisheries that have less impact on EFH. Conversely, if non-qualifiers shift to fisheries that have a greater impact, this alternative would have a negative impact. Increase in fishing effort by qualifying vessels could mitigate any effects of this alternative. Overall, the number of vessels that might not qualify because of construction-related reductions in landings is expected to be small, and therefore any impacts of this alternative will be slight.

6.5.3.3.1.4 Alternative 4

This alternative would allow only one vessel to qualify based on a single history. In other words, a history could not be transferred to a replacement vessel AND qualify the original vessel (which may have been sold or transferred to a new owner). Thus, this alternative would qualify fewer vessels than the Alternative 1 baseline (see Section 6.6.3.3.1.1). Changes in how history is considered could also place a vessel in Category II instead of Category I. Resulting impacts to EFH will depend on what possession limits are adopted for each category, what these non-qualifiers do if they are not able to target whiting.

If non-qualifying vessels do not fish or shift to fisheries that have fewer habitat impacts, this alternative would have a positive impact. Conversely, if these vessels shift to fisheries that have a greater impact, this alternative would have a negative impact. Increases in fishing effort by vessels that do qualify for a limited entry permit could mitigate these effects, but effort in the fishery is constrained by various factors. Overall, the number of vessels that would be affected by these history transfers is low, such that any impacts of this alternative will be slight.

6.5.3.3.1.5 Alternative 5

This alternative would allow upgrades of vessels that hold a limited access small-mesh multispecies fishery permit. It could allow, for example, a vessel to be more capable of fishing offshore or take more frequent trips (vessel becomes more seaworthy), increase hold capacity to take longer trips, or to tow larger trawls.

Although the fishery is limited by ACLs, if vessel upgrades are permitted, there is room for increases in whiting catches and therefore more fishing effort by qualifying vessels. If trips lengthen or become more frequent, or if gear size increases, this implies an increase in fishing effort. Thus, for habitat and EFH, this alternative is expected to have a negative impact, in that increases in fishing effort will increase negative

impacts to EFH. The magnitude of this change is difficult to quantify depending on a variety of economic and regulatory effects.

Table 81. Action 3 limited access permit alternatives summary (permit allowances) - Potential impact of the action alternatives on the physical environment and EFH.

Alts.	Permit allowances	Potential impact of the action alternatives on the physical environment and EFH.
1	Status quo. 5% cap on permits + upgrade restriction + consideration for construction at t_{-1} of qualification period.	Positive
2	No limits on holdings of limited access permits for the small-mesh multispecies.	No effect
3	No consideration for construction or repair of vessels for the year preceding the qualification period.	Slight; positive or negative depending on actions of non-qualifiers.
4	Only one vessel based on single history, i.e., history couldn't be transferred to a replacement vessel AND qualify the original vessel.	Slight; positive or negative depending on actions of non-qualifiers.
5	Allow upgrade of vessels that hold limited access multi-species fishery permit. (Upgrading is intended for distant fishing, fish frequently, more hold capacity, longer duration trips, and capability for taking more/large tows).	Negative; magnitude slight since large mesh multispecies vessels are restricted from making these types of upgrades at present.

6.5.3.3.2 Incidental permit conditions

Vessels holding an incidental permit would be able to land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, regardless of the type of gear in use or species targeted, unless one of the following alternatives is chosen. These alternatives only apply if an action alternative is selected from Action 1, hence there is no relevant status quo for Action 3.

6.5.3.3.2.1 Alternative 1

In addition to the incidental small-mesh multispecies fishery possession limits, vessels with an incidental permit would be prohibited from using small mesh trawls in small-mesh multispecies exemption areas. This alternative would prevent vessels from targeting small-mesh multispecies on short, inshore trips using this incidental possession limit. As such, **it potentially has a positive impact to EFH,** depending on what these vessels fish for instead, and where they choose to fish.

It is impossible to quantify the potential to target small-mesh multispecies with an incidental permit under current or future regulatory or market conditions. This potential is thought to be currently limited by the relatively low whiting and red hake prices, although some vessels may otherwise use the incidental permit to fish for bait and sell the catch through the transfer at sea provision.

6.5.3.3.2.2 Alternative 2a

This alternative would allow vessels using large mesh on a groundfish or monkfish DAS to exceed the proposed incidental whiting and red hake possession limits Retention of small whiting and red hake in large-mesh gear is expected to be low, but this alternative could allow vessels that encounter large numbers of larger sized whiting to land those fish, rather than discarding them. **This could increase effort and therefore habitat impacts associated with these trips** if they extend the trip to target large whiting for a time. However, the net effects of these shifts in fishing practices are not expected to be substantial.

6.5.3.3.2.3 Alternative 2b

This alternative specifies that a vessel fishing for small-mesh multispecies may not be on a groundfish day-at-sea and must be declared out of the groundfish fishery, and would therefore prohibit targeting small-mesh multispecies on a groundfish DAS. While fishing on a groundfish DAS, the vessel could land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, even if the vessel holds a small-mesh multispecies fishery limited access permit. Retention of small whiting and red hake in large-mesh gear is expected to be low, but this alternative could lead to discards of larger sized whiting if they are abundant. **Since there would not be an incentive to target whiting on these trips, there could be a slight reduction in fishing time and therefore impacts to EFH.** As above, the net effects of these shifts in fishing practices are not expected to be substantial.

6.5.3.3.2.4 Alternative 3

Vessels fishing in a small-mesh multispecies exemption area while targeting Atlantic herring or squid with a limited access permit issued for those fisheries would be able to exceed the incidental possession limit for whiting and red hake. Vessels would be able to retain and land whiting and red hake up to the limits that apply to vessels with a Category I limited access small-mesh multispecies permit, but not exceed the lower whiting exemption area possession limits that apply to vessels using trawls with mesh less than 3-inches. This allowance would minimize discards of whiting and red hake in other small-mesh fisheries (namely in the herring, northern shrimp, and squid/mackerel/butterfish fisheries), regardless of whether the vessel qualified for a small-mesh multispecies limited access permit. **This alternative is likely to have negligible or neutral impacts on effort, and therefore negligible impacts to EFH.**

6.5.3.3.2.5 Alternative 4

This alternative would exempt vessels using small-mesh trawls in specific exemption areas from the Incidental Permit possession limits, allowing the vessels to land the same amounts of whiting and red hake as vessels that hold limited access permits. These any exemption areas require the use a more selective raised footrope trawl.

This alternative could allow continued expansion of the fishery in the Gulf of Maine, where the exemption areas require vessels to use a raised footrope trawl, designed to be more selective particularly effective for excluding flounders, skates, and monkfish. Vessels that do not qualify for a limited access permit may travel to these specific exemption areas to target whiting and red hake, depending on the potential economic return and fishing opportunities that exist elsewhere. Not only could non-qualifying vessels shift fishing effort from other areas, but total small-mesh multispecies fishing in the Gulf of Maine could increase from entry by new or existing vessels that target other species. The effects depend on what the vessels would be used for if they are not targeting whiting in the exemption areas. If they would otherwise not be fishing, negative impacts to EFH would increase. If the vessel would be fishing

elsewhere with a regular fish trawl, shifting to the use of a raised footrope trawl could have positive impacts to EFH.

Table 82. Action 3 incidental permit alternatives summary (permit conditions) - Potential impact of the action alternatives on the physical environment and EFH.

Alts.	Permit allowances	Potential impact of the action alternatives on the physical environment and EFH.
1	Prevents vessels that do not qualify for limited access from targeting whiting and red hake in the exemption areas.	Slight positive, uncertain
2a	Allow large-mesh on monkfish DAS or groundfish to exceed incidental whiting and red hake possession limits.	Slight negative
2b	Prohibit fishing for small-mesh multispecies on groundfish DAS. If fishing on groundfish DAS, the possession limit be 2,000 lbs. (whiting) and 400 lbs. (red hake).	Slight positive
3	Allow fishing for Atlantic herring or squids with limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.	Neutral
4	Allows vessels to fish in exemption areas requiring a raised footrope trawl.	Negative (net increase in effort) to positive (shift to raised footrope trawl but effort similar)

6.6 Impacts on the Human Environment (Economic and Fishery-Dependent Community Impacts)

The analysis of impacts on the human environment characterizes the magnitude and extent of the economic and social impacts likely to result from the alternatives considered, individually and in relation to each other. National Standard 8 requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. Thus, continued overall access to fishery resources is a consideration, but not a guarantee that fishermen will be able to use a particular gear type, harvest a particular species of fish, fish in a particular area, or fish during a certain time of the year.

Description of how impacts to the human environment were evaluated

A fundamental difficulty exists in forecasting economic and social change relative to fishery management alternatives when communities or other societal groups are constantly evolving in response to numerous external factors, such as market conditions, technology, alternate uses of waterfront, and tourism. Certainly, management regulations influence the direction and magnitude of economic and social change, but attribution is difficult with the tools and data available. While this analysis focuses generally on the economic and social impacts of the proposed fishing regulations, external factors may also influence change, both positive and negative, in the affected communities. In many cases, these factors contribute to a community's vulnerability and ability to adapt to new or different fishing regulations.

When examining potential economic and social impacts of management measures, it is important to consider impacts on the following: the fishing fleet (vessels grouped by fishery, primary gear type, and/or size); vessel owners and employees (captains and crew); dealers and processors; fish consumers; community cooperatives; fishing industry associations; cultural components of the community; and fishing families. While some management measures may have a short term negative impact on some communities, this should be weighed against potential long-term benefits to all communities which can be derived from sustainable fisheries.

In general, the economic effects of regulations can be categorized into regulations that change costs (including transactions costs such as search, information, bargaining, and enforcement costs) or change revenues (by changing quantities supplied or by influencing market prices). These economic effects may be felt by the directly regulated entities. They may also be felt by related industries.

The social impact factors outlined below can be used to describe the fishery, its sociocultural and community context, and its participants. These factors or variables are considered relative to the management alternatives and used as a basis for comparison between alternatives. Use of these kinds of factors in social impact assessment is based on NMFS guidance (NMFS 2007) and other texts (e.g. Burdge 1998). Longitudinal data describing these social factors region-wide and in comparable terms is limited. While this analysis does not quantify the impacts of the management alternatives relative to the social impact factors, qualitative discussion of the potential changes to the factors characterizes the likely direction and magnitude of the impacts.

The factors fit into five categories:

1. *Size and Demographic Characteristics* of the fishery-related workforce residing in the area; these determine demographic, income, and employment effects in relation to the workforce as a whole, by community and region.
2. The *Attitudes, Beliefs, and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding the behavior of fishermen on the fishing grounds and in their communities.
3. The effects of the proposed action on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities.
4. The *Non-Economic Social Aspects* of the proposed action; these include lifestyle, health, and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.
5. The *Historical Dependence on and Participation in* the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights (NMFS 2007).

For this action, it is important to keep in mind that whiting fishing is relatively concentrated, restricted either by exemption area regulations and/or by availability of commercial concentrations of fish. It is likely that any increases in fishing effort are likely to occur in areas currently fished; the intensity of fishing would change, but fishing would not expand into new areas.

6.6.1 No Action (Preferred)

No Action (Section 4.1) would continue the existing open access small-mesh multispecies fishery. Any vessel would be able to obtain a Category K multispecies permit and target small-mesh multispecies in exemption areas. Vessels would continue to be allowed to enter the fishery to target whiting and red hake using small-mesh trawls.

Relative to establishing a limited access program, there would likely be more active vessels under No Action. It could make existing regulations less effective to manage small-mesh multispecies catch and bycatch than they would otherwise be with a limited access program in effect. Moderate increases in whiting catches would not cause overfishing, but increases in red hake catches could cause overfishing in the northern management area and exacerbate overfishing in the southern management area.

If the Council does not implement limited access through this amendment, it will need to take more drastic actions later to respond when overfishing occurs, or catches exceed specifications. Several general measures could be applied, depending on the type and severity of the problem. Measures that could reduce non-target catches include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest). It is difficult to assess the severity of economic and community impacts, because we cannot forecast the effectiveness of these measures (which are currently unknown) to manage small-mesh multispecies catch and bycatch in a future open access fishery. It does however take time to identify the problem (at least during the next annual monitoring report) and prepare a framework action or amendment to address it. Furthermore, increases in small-mesh multispecies fishing effort by new entrants could dilute the effectiveness of technical measures to limit catches of red hake. Also, if the catches of whiting increase or if future specifications decline, the Council would be forced to cut small-mesh multispecies fishing effort, either by reducing whiting possession limits, shortening seasons, or by initiating other measures. Again, these other measures would be less effective if new entrants enter the fishery.

The impacts of No Action, relative to establishing a limited access program (Alternatives 1-5), are expected to be ***neutral to low negative for the small-mesh multispecies fishery***. In the short term, the *Size and Demographic Characteristics* of the fishery would continue to depend on market forces, possession limits and other measures to keep the fishery within its catch limits. Prices of whiting and red hake have been rising steeply in recent years compared to earlier years (Figure 41 and Figure 42). If this continues, new participants may be attracted to the fishery, resulting in higher landings. Should the fisheries attract new entrants, No Action has potential to increase whiting landings from the recent 3-yr average of about 14 M lbs., with $10.5 M in real ($2016) revenue. Increased landings may slightly depress whiting prices in short term, however, increased revenue from higher landings may outweigh any negative price effect. On the other hand, higher whiting landings may be constrained by the catch of nontarget species with low ACLs.

In the long term, No Action could lead to more regulatory burden if additional measures are needed to ensure catches remain within ACLs. If due to increased fishery participation, possession limits were reduced or exemption areas were closed to limit non-target species landings and bycatch, No Action could have a negative impact on the more historically active fishery participants relative to establishing a limited access program. Additional constraints may result in a negative impact on the *Attitudes, Beliefs, and Values* of fishermen towards management. With a limited access program, other fishery measures may be less necessary. However, No Action would have positive impacts on the fishermen who have been less active, as well as new entrants, as they would have future opportunities to participate in the directed fishery. The fishery has declined substantially over the past two decades, with a big gap between whiting landings and the ACL over the past several years, an opportunity for new entrants if not for actions to address catches of choke species. However, there is inadequate information about the degree to which new entrants would target small-mesh multispecies and remain in the fishery permanently. No Action could have higher administrative costs in the long term relative to establishing having a limited access program, which would likely reduce (or prevent an increase in) the number of fishery participants.

On one hand, there could be negative economic and community impacts from No Action caused by more restrictive regulations on existing fishery participants to address excessive catches of choke

species. On the other hand, positive economic and community impacts could occur from greater utilization of the whiting resource and greater economic activity from the higher landings and more fishing effort, as long as overfishing can be prevented through other means.

6.6.2 Whiting Possession Limit for Vessels Using 3-inch and larger Cod-End Mesh Trawls

The possession limits in this set of three alternatives would apply to any vessel using 3-inch and larger mesh to target small-mesh multispecies in all areas, including areas that are exempt from the large-mesh Northeast Multispecies regulations.

6.6.2.1 Alternative 1 (Preferred; No Action) – Existing small-mesh multispecies possession limits apply

Alternative 1 (No Action) would retain the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the whiting possession limit is 30,000 lbs. in the northern area and 40,000 lbs. in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species (i.e. squids and herring). Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area. In-season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger.

Alternative 1 is expected to have a positive impact on economics and communities, as there would be no change to the possession limits. With the in-season accountability measure trigger, landings of small-mesh multispecies would continue per the accountability measure. The current limits and other measures have prevented overfishing of whiting, but overfishing of northern red hake has occurred for a few recent years and for southern red hake beginning in 2016. In response, the specifications have been adjusted to account for changes in stock biomass and accountability measures have been adjusted to prevent future overfishing. New specifications for southern red hake are expected to take effect in fishing year 2018 and current landings are likely to trigger the in-season accountably measure, reducing the red hake possession limit to 400 lbs.

6.6.2.2 Alternative 2 – Raise the Whiting possession limit from 40,000 to 50,000 lbs., January 1 to June 14 in the Southern New England and Mid-Atlantic exemption areas

Alternative 2 would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. from January 1 to June 14 in the southern management area.

The impacts of Alternative 2 on the small-mesh multispecies fishery is expected to be **neutral to positive relative to Alternative 1, and positive relative to Alternative 3**. Because the Alternative 2 possession limit is higher in the southern area relative to No Action during winter/spring, vessels would be able to increase their trip landings (i.e., effort per trip), up to 50,000 lbs. if operationally feasible. Vessels may take the same number of trips of longer duration than they would with a 40,000 lbs. possession limit. This could potentially increase total landings per vessel. Alternatively, vessels could take fewer, longer trips, keeping total annual landings the same. Because the whiting possession limit has not been over 40,000 lbs. in almost two decades, there is little quantitative information to help identify how fishing behavior might actually change.

Alternative 2 could provide an incentive to fish in the southern area during winter/spring (January 1-June 14, an area and season that could absorb more fishing without threatening the whiting resource or impacting prices). Southern whiting is not overfished and overfishing is not occurring. In the past several years, catch has been well below the ABC and landings have been well below the TAL. Thus, Alternative 2 may help the fishery achieve Optimum Yield more readily than under Alternative 1, a positive impact on the fishery and its fishing communities.

Alternative 2 is expected to have a positive impact on the vessels of very large capacities relative to Alternative 1, because they could land more whiting when there are opportunities to catch very high volume of whiting while avoiding bycatch. There would be an incentive to fish in southern management area during winter and spring. Increasing the whiting possession limit may lower price slightly in the short run, if vessels land increased volumes within the same timeframe and space (port). Longer trips may deteriorate fish quality, potentially lowering market price.

6.6.2.3 Alternative 3 – Lower the Whiting possession limit from 40,000 to 30,000 lbs., June 15 to December 31 in the Southern New England and Mid-Atlantic exemption areas

Alternative 3 would decrease the whiting possession limit from 40,000 lbs. to 30,000 lbs. from June 15 to December 31 in the southern management area. As a result, both management areas would have the same whiting possession limit (30,000 lbs.) during the summer and fall. The intent is to reduce the negative effect of high southern area landings on market prices for whiting in all areas during the spring and fall when the northern management area exemption areas are open.

The economic and community impacts of Alternative 3 are expected to be ***neutral to negative relative to Alternatives 1 and 2***. Recently, up to 340,000 lbs. of whiting (valued at about $289,000) has been landed during this season and area in excess of the Alternative 3 possession limit. These landings have been from about 45 to 106 trips per vessel by the larger capacity vessels. By reducing the possession limit, vessels may take more, shorter trips to keep landings the same as under the existing limit. If so, total fishing effort would be unchanged.

The most likely impact of a seasonal whiting possession limit reduction is to change the distribution of trips, either seasonally within the southern management area or spatially, to the northern area. As trips during the summer and fall in the southern management area would be less profitable than they are presently, vessels may shift effort to take more trips during the winter when a higher possession limit applies or shift some fishing activity to the northern area, if it is advantageous for vessels to do so. A reduction in trip possession limit will have a negative impact on landings and income from whiting unless any loss in landing is compensated by increasing trip frequencies. Further, taking frequent trips for the same landing volume of whiting is also inefficient affecting the profitability unless the increased cost of fishing operation is offset by an increase in price.

6.6.3 Limited Access Alternatives

General impacts of establishing a limited access program

Implementing a limited access permit program for the small mesh multispecies fishery would be a substantial change from the current open access permit approach. Future participation in the directed fishery would be limited to vessels/permits with historic participation, according to the permit qualification criteria. Some general economic and social impacts of establishing such programs should be considered.

Relative to No Action, the impacts of establishing a limited access permit are expected to be neutral to positive for the fishery component that qualifies for the limited access program, as these vessels would continue their participation in the directed fishery. Qualifying vessel owners would bear administrative costs in applying for new permits, and NMFS may recover costs from permit recipients. Impacts to the remainder of the fishery would be neutral to negative relative to No Action, as vessels would continue to have a low level of participation and the opportunities to expand participation (for less active vessels as well as new entrants) would be limited. Fishery participation may also become constrained by the cost of purchasing a limited access permit, which is expected to increase relative to the current open access permits (in limited supply). With limited access, other measures to constrain fishing may be less necessary, a positive impact on the *Attitudes, Beliefs, and Values* of fishermen towards management. The traditional flexibility of the fishery would become restrained under limited access, such that it may be more difficult to adapt to changing conditions (e.g. resiliency declines). Using recorded fishing history, particularly far back in time, as eligibility to obtain a limited access permit may be onerous for fishermen, if they believe that their history does not match official NMFS records of their catch. Fishermen would need sufficiently detailed receipts from buyers to prove their history and work with NMFS to reconcile any differences in records. The decision to transition to limited access is contentious, because such a decision is often perceived as being very difficult to change or reverse. In contrast, fishermen who seek business and planning stability want management decisions that are not constantly undergoing examination or change.

6.6.3.1 Action 1 – Qualification criteria

Table 83 characterizes the five limited access permit alternatives under consideration, including the number of vessels qualifying under Categories I and II, the number of non-qualifying vessels (active vessels during the qualifying period whose landings were below the Category II threshold), and those vessels with no history (vessels with landings in 2014-2016, but no landings during the qualifying period).

Table 83. Summary of potentially qualifying vessels under each alternative (w/ trips landing ≥ 1 lb. small-mesh multispecies)

Alt.	Qualifying Period	# of Years	Cat I Threshold	Cat II Threshold	Cat I	Cat II	No history	Non-qualifier	Total	Remarks
1	2008-2012	5	500k (100k/yr)	100k (20k/yr)	40	74	1,581	971	**2,666**	• Smallest Cat II fleet. • Hardest to qualify for Cat II.
2	2008-2012	5	1,000k (200k/yr)	20k (4k/yr)	20	203	1,581	908	**2,712**	▪ Smallest Cat I fleet. ▪ Largest Cat II ▪ Relative to Alt 1, half of the no. of Cat I vessels ▪ Hardest to qualify for Cat I; easiest for Cat II.
3	2008-2016	9	500k (56k/yr)	100k (11k/yr)	51	90	1447	1,099	**2,687**	▪ Relative to Alt 1, Cat I & II adds 11 & 16 more vessels, respectively ▪ Relative to Alt 2, Cat I adds 31 more vessels, but has 113 less Cat II vessels
4	2000-2016	17	500k (29k/yr)	100k (6k/yr)	55	124	464	2,035	**2,678**	• Relative to Alt 1, Cat I & II adds 15 & 50 more vessels, respectively • Relative to Alt 3, Cat I & II adds 4 & 34 more vessels, respectively • Easiest to qualify for Cat II.
5	1996-2012	17	1,000k (59k/yr)	200k (12k/yr)	84	159	91	2,345	**2,679**	• Largest Cat I fleet • Relative to Alt 1, Cat I & II have 44 & 85 more vessels, respectively • Relative to Alt 4, Cat I & II adds 29 & 35 more vessels, respectively

Table 84 characterizes a subset of vessels identified in Table 23, those which had directed fishing effort for small-mesh multispecies (i.e., ≥2,000 lbs. of small-mesh multispecies landings in a trip) during the baseline period, 2014-2016.

Table 84. Summary of vessels under each alternative which had trips landing ≥ 2,000 lbs. small-mesh multispecies during the baseline period, 2014-2016.

Alt.	Cat I	Cat II	No History	Non-Qualifier	Remarks
1	33 (83%)	38 (51%)	15 (1%)	42 (4%)	
2	19 (95%)	69 (34%)	15 (1%)	25 (3%)	• Least Cat I fleet, but largest Cat II • Highest current effort on Cat I • Relative to Alt 1, Cat I fleet 38% lesser
3	44 (86%)	46 (51%)	0	38 (3%)	• Relative to Alt 1, Cat I & II adds 11 & 8 more vessels, respectively • Relative to Alt 2, Cat I adds 25 more vessels, but 23 less Cat II vessels
4	42 (76%)	38 (31%)	0	48 (2%)	• Relative to Alt 1, Cat I adds 9 more vessels, same size Cat II fleet • Relative to Alt 2, Cat I adds 23 more vessels, but 31 less Cat II vessels • Relative to Alt3, Cat I & II have 4 & 8 less vessels, respectively.
5	43 (51%)	30 (19%)	10 (11%)	45 (2%)	• Least Current Efforts (%) for both Cat I & Cat II o Cat I: CE5<CE4<CE3<CE2 o Cat II: CE5<CE4<(CE1=CE3) • Relative to Alt 1, Cat I adds 10 more, but 8 less Cat II vessels • Relative to Alt 2, Cat I & II adds 24 but 39 less Cat II vessels • Relative to Alt 3, Cat I has 1 less vessel and 16 fewer Cat II vessels • Relative to Alt 4, Cat I adds 1 more but 8 less Cat II vessels
Note: Percentages are small-mesh directed current effort level (Current Effort% = 100% – Latent Effort% in recent years (2014-16). Current effort is defined as an active vessel that had at least a trip landing ≥ 2,000 lbs. small-mesh multispecies.					

Table 85. Summary of economic performance of alternatives based on recent participation in the fishery. Evaluation of alternatives is based on effort and output data with trips landing ≥ 2,000 lbs. small-mesh multispecies in recent years (2014-2016).

Alt	Cat	Avg. GTON	Qualifying fleet (w/ trips ≥ 1 lb. hakes)	Current active fleet (w/ trips ≥ 2000 lbs hakes)	Latent Effort	Hakes trips (2014-16)		Hakes trips (%)	Hakes/ Fish trips ratio	Annual average hakes landing (lbs)	Share of hakes landings (%)	Hakes/ Fish landed ratio	Annual CPUE lbs/ GTON	Annual Fish revenue/ boat (nominal $)*	Annual Hakes revenue/ boat (in 2016$)	Revenue Ratio Hakes/ Fish	Hakes lbs./ trip	Hakes revenue/ trip (in 2016$)	Annual total fleet hakes revenue (in 2016$)
						3-yr total	Annual / boat												
1	I	151	40	33	17%	1780	18	66%	0.30	11,712,196	83%	0.39	2343	$847,869	$262,637	31%	19,740	$14,607	$8.67 mil
	II	66	74	38	49%	505	4	19	0.11	1,478,780	11	0.15	590	350,653	28,797	8%	8,785	6,501	1.09 mil
	NQ	43	971	42	NA	345	3	13	0.14	670,184	5	0.13	370	303,182	11,808	4%	5,828	4,312	0.50 mil
2	I	190	20	19	5%	1413	25	52	0.39	10,763,803	77	0.44	2979	1,098,180	$419,222	38%	22,853	16,911	7.97 mil
	II	71	203	69	66%	1016	5	38	0.12	2,692,883	19	0.14	553	339,692	$28,880	9%	7,951	5,884	1.99 mil
	NQ	33	908	25	NA	201	3	7	0.17	404,474	3	0.16	488	390,909	$11,972	3%	6,037	4,467	0.30 mil
3	I	132	51	44	14%	2054	16	76	0.26	12,628,196	90	0.38	2181	733,297	$212,383	29%	18,444	13,649	9.34 mil
	II	65	90	46	49%	532	4	20	0.11	1,202,882	9	0.12	401	351,631	$19,351	6%	6,784	5,020	0.89 mil
	NQ	49	1,099	38	NA	119	1	4	0.09	235,964	2	0.12	127	276,692	$4,595	2%	5,949	4,402	0.17 mil
4	I	143	55	42	24%	1887	15	70	0.29	12,109,019	86	0.37	2015	774,067	$213,349	28%	19,251	14,246	8.96 mil
	II	65	124	38	69%	535	5	20	0.11	1,422,681	10	0.14	577	349,584	$27,705	8%	7,978	5,903	1.05 mil
	NQ	45	2,035	48	NA	283	2	10	0.11	535,341	4	0.14	247	253,762	$8,253	3%	5,675	4,199	0.40 mil
5	I	139	84	43	49%	1860	14	69	0.30	12,034,712	86	0.38	1495	748,695	$207,109	28%	19,411	14,364	8.91 mil
	II	68	159	30	81%	427	5	16	0.10	1,154,175	8	0.14	562	332,318	$28,470	9%	8,110	6,001	0.85 mil
	NQ	40	2,341	45	NA	367	3	14	0.14	760,729	5	0.14	421	271,882	$12,510	5%	6,218	4,602	0.56 mil

Note: Hakes in this table refers to small-mesh multispecies (silver hake, offshore hake, and red hake)

*Annual fish revenue and non-qualifiers in Alternative 1, 2 and 5 include revenue for no-history vessels (for 15, 15, and 10 vessels, respectively).

Table 86. Characteristics of whiting landings in the Northern and Southern Management Areas, during 2014-2016.

Limited Access Category	Description		Northern					Southern				
			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Category I	Vessels fishing (>2000 lbs. whiting)	A	9	8	16	12	13	31	18	41	40	40
	Trip value, all species	B	$14,044,030	$13,487,819	$16,780,533	$15,262,396	$16,072,211	$79,648,549	$60,439,790	$86,797,045	$88,319,761	$84,564,126
	Whiting value	C	$7,807,137	$7,684,849	$9,129,519	$8,399,117	$8,409,963	$16,984,125	$15,640,359	$17,302,080	$17,286,188	$17,162,621
	Whiting, lbs.	D	10,935,537	10,598,992	12,945,718	11,624,319	11,637,625	22,261,267	20,335,704	22,742,435	22,722,718	22,503,795
	Whiting, lbs. on Trips > 2,000 lbs.	E	9,376,715	9,171,985	10,922,931	9,992,469	9,995,684	17,368,136	16,545,730	17,535,488	17,546,765	17,464,610
	Whiting trips	F	880	786	1,119	897	918	3,187	1,886	3,772	3,509	3,350
	Trips > 2000 lbs. (hake trips)	G	517	460	697	539	540	1,141	876	1,216	1,213	1,195
	Whiting lbs/boat/yr (on trips >2000 lbs.)	E/A/3	347,286	382,166	227,561	277,569	256,300	186,754	306,402	142,565	146,223	145,538
	Whiting lbs/trip (on trips >2000 lbs.)	E/G	18,137	19,939	15,671	18,539	18,511	15,222	18,888	14,421	14,466	14,615
	Trip value/trip, all species	B/F	$15,959	$17,160	$14,996	$17,015	$17,508	$24,992	$32,047	$23,011	$25,169	$25,243
Category II	Vessels fishing (>2000 lbs. whiting)	H	16	24	19	18	12	32	59	37	30	25
	Trip value, all species	I	$3,935,622	$5,716,819	$4,403,859	$5,985,967	$3,024,196	$25,704,635	$52,255,666	$26,205,775	$22,771,698	$23,778,540
	Whiting value	J	$1,594,025	$1,841,688	$953,394	$1,458,012	$801,727	$965,968	$2,584,463	$1,100,440	$912,744	$933,992
	Whiting, lbs.	K	2,400,216	2,990,324	1,402,085	2,261,815	1,457,553	1,544,658	3,867,541	1,727,325	1,455,897	1,491,257
	Whiting, lbs. on Trips > 2,000 lbs.	L	1,706,695	2,004,650	751,216	1,464,721	966,432	629,492	1,551,217	711,996	580,544	578,259
	Whiting trips	M	451	730	534	568	376	1,708	3,396	1,635	1,713	1,678
	Trips > 2000 lbs.	N	237	344	216	284	182	217	546	247	204	195
	Whiting lbs/boat/yr (on trips >2000 lbs.)	L/H/3	35,556	27,842	13,179	27,124	26,845	6,557	8,764	6,414	6,450	7,710
	Whiting lbs/trip (on trips >2000 lbs.)	L/N	7,201	5,827	3,478	5,157	5,310	2,901	2,841	2,883	2,846	2,965
	Trip value/trip, all species	I/M	$8,726	$7,831	$8,247	$10,539	$8,043	$15,050	$15,387	$16,028	$13,293	$14,171
Non-qualifier	Vessels fishing (>2000 lbs. whiting)	O	14	7	4	9	14	19	5	4	12	17
	Trip value, all species	P	$4,943,465	$3,718,479	$1,738,725	$1,674,754	$3,826,710	$9,145,116	$1,802,844	$1,495,480	$3,406,841	$6,155,634
	Whiting value	Q	$699,994	$574,619	$18,244	$244,027	$889,466	$482,837	$208,108	$30,410	$233,998	$336,316
	Whiting, lbs.	R	1,037,364	783,801	25,314	486,983	1,277,939	706,097	308,777	42,262	333,407	516,970
	Whiting, lbs. on Trips > 2,000 lbs.	S	595,312	502,087	4,575	221,532	716,606	255,319	156,000	5,463	125,638	210,078
	Whiting trips	T	375	190	53	241	412	568	181	56	241	435
	Trips > 2000 lbs.	U	162	112	3	93	194	112	48	7	53	80
	Whiting lbs/boat/yr (on trips >2000 lbs.)	S/O/3	14,174	23,909	381	8,205	17,062	4,479	10,400	455	3,490	4,119
	Whiting lbs/trip (on trips >2000 lbs.)	S/U	3,675	4,483	1,525	2,382	3,694	2,280	3,250	780	2,371	2,626
	Trip value/trip, all species	P/T	$13,183	$19,571	$32,806	$6,949	$9,288	$16,101	$9,960	$26,705	$14,136	$14,151

Table 87. Annual number of vessels under different revenue dependency classes by alternatives and qualifying categories in 2014-2016.

Alternatives and Categories	Revenue Dependency Percent (Small-mesh multispecies$/All Fish$)									
	0-10%	10 - 20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-100%
Category I										
1	15	6	3	2	0	1	2	2	1	0
2	7	3	1	1	0	1	2	2	1	0
3	21	6	3	2	0	1	3	3	1	0
4	24	7	3	1	0	1	2	3	1	0
5	27	6	3	1	0	1	2	3	1	0
Category II										
1	37	5	2	1	0	1	0	1	0	1
2	82	9	5	3	0	1	0	1	1	2
3	45	6	3	1	0	1	0	0	0	1
4	38	4	2	2	0	1	0	1	1	1
5	36	4	1	1	0	1	0	1	1	1
Non-qualifier										
1	47	2	3	0	0	1	0	0	1	1
2	10	1	1	0	0	0	0	0	0	0
3	34	1	1	0	0	0	0	0	0	0
4	38	2	2	1	0	0	0	0	0	1
5	37	3	3	1	0	0	0	0	0	1

Table 88. Annual number of vessels under different revenue dependency classes by alternatives and qualifying categories (on landings w/ trips >2,000 lbs.) in 2014-2016.

Categories	Alternatives	Revenue Dependency (No. of Boats)			Revenue Dependency (% of Boats)		
		0-10%	10-50%	50-100%	0-10%	10-50%	50-100%
Category I	**1**	15	10	6	48%	33%	19%
	2	7	5	6	38%	29%	33%
	3	21	12	9	50%	29%	21%
	4	24	11	7	58%	26%	16%
	5	27	11	7	60%	25%	15%
Category II	**1**	37	8	4	76%	17%	7%
	2	82	16	6	79%	16%	5%
	3	45	10	3	78%	17%	5%
	4	38	8	4	75%	16%	9%
	5	36	6	4	79%	13%	8%
Non-qualifiers	**1**	47	5	2	86%	10%	4%
	2	10	2	0	79%	18%	3%
	3	34	2	1	93%	5%	2%
	4	38	5	1	86%	11%	2%
	5	37	7	2	80%	16%	4%
Note: revenue dependency percentages =Small-mesh multispecies$/All Fish$							

Table 89. Non-qualifiers' fisheries characteristics by management area in recent years, 2014-2016

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
Description	**North**	**South**	**North**	**South**	**North**	**South**	**North**	**South**	**North**	**South**
Trips.	2,522	2,975	2,037	1,235	1,702	1,368	2,534	2,413	2,725	2,808
Species landings lbs.										
Northern shrimp	0	467,600	0	467,600	0	467,600	0	467,600	0	467,600
Atlantic herring	3,421,800	2,754,520	3,310,715	1,469,000	3,378,750	2,754,545	3,422,000	2,754,770	3,422,000	2,754,545
Illex squid	[redacted]	157,250	[redacted]	59,400	[redacted]	155,750	[redacted]	155,750	[redacted]	155,750
Loligo squid	[redacted]	2,817,366	[redacted]	1,135,650	[redacted]	2,613,271	[redacted]	2,807,186	[redacted]	2,387,326
Haddock	4,061,495	87,505	3,899,878	70,130	3,532,443	108,885	3,010,753	83,035	3,490,061	87,335
Yellowtail flounder	260,655	181,459	267,526	103,971	139,278	104,817	239,590	104,517	279,489	153,230
Monkfish	310,832	166,953	308,186	155,109	293,111	156,030	280,654	14,749	293,884	167,573
Skates	511,975	2,025,042	228,186	1,104,823	453,651	1,121,417	430,253	1,284,928	436,695	5,681,596
Other large mesh groundfish	16,087,837	225,247	15,687,760	126,304	14,273,717	179,453	12,967,308	146,082	14,554,917	242,568
Landings, all species	32,647,693	16,492,498	31,222,481	8,755,302	29,114,056	11,746,040	26,386,322	13,488,457	29,102,518	18,775,504
Value (Nominal $)										
Trip value	$33,457,741	$15,954,959	$31,532,073	$8,554,103	$29,122,579	$10,436,325	$26,177,658	$12,812,552	$29,051,371	$14,927,615
Value per trip	$13,266	$5,363	$15,480	$6,926	$17,111	$7,629	$10,331	$5,310	$10,661	$5,316

Table 90. Non-qualifiers' fisheries characteristics with shares of landings by management area in recent years, 2014-2016

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
Description	**North**	**South**	**North**	**South**	**North**	**South**	**North**	**South**	**North**	**South**
Northern shrimp	0.00%	2.84%	0.00%	5.34%	0.00%	3.98%	0.00%	3.47%	0.00%	2.49%
Atlantic herring	10.48%	16.70%	10.60%	16.78%	11.61%	23.45%	12.97%	20.42%	11.76%	14.67%
Illex squid	[redacted]	0.95%	[redacted]	0.68%	[redacted]	1.33%	[redacted]	1.15%	[redacted]	0.83%
Loligo squid	[redacted]	17.08%	[redacted]	12.97%	[redacted]	22.25%	[redacted]	20.81%	[redacted]	12.72%
Haddock	12.44%	0.53%	12.49%	0.80%	12.13%	0.93%	11.41%	0.62%	11.99%	0.47%
Yellowtail flounder	0.80%	1.10%	0.86%	1.19%	0.48%	0.89%	0.91%	0.77%	0.96%	0.82%
Monkfish	0.95%	1.01%	0.99%	1.77%	1.01%	1.33%	1.06%	0.11%	1.01%	0.89%
Skates	1.57%	12.28%	0.73%	12.62%	1.56%	9.55%	1.63%	9.53%	1.50%	30.26%
Other large mesh groundfish	49.28%	1.37%	50.25%	1.44%	49.03%	1.53%	49.14%	1.08%	50.01%	1.29%
Other species (including small-mesh multispecies)	24.43%	46.14%	24.03%	46.41%	24.14%	34.77%	22.85%	42.03%	22.76%	35.57%
Landings, all species	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 91. Non-qualifiers' fisheries characteristics with shares of whiting and red hake landings by management area, 2014-2016

Area	Alternative	Whiting value $	Red hake value $	All fish, lbs.	All fish value $	Whiting value %	Red hake value %
		(A)	(B)	(C)	(D)	(E=A/D)	(F=B/D)
Northern	1	$358,379	$2,576	8,873,935	$10,875,909	3.295%	0.024%
	2	$344,428	$1,375	8,453,632	$10,247,423	3.361%	0.013%
	3	$193,673	$1,383	7,701,751	$9,251,914	2.093%	0.015%
	4	$195,178	$2,576	7,093,307	$8,571,399	2.277%	0.030%
	5	$354,054	$2,576	7,897,159	$9,440,986	3.750%	0.027%
Southern	1	$54,333	$12,693	5,572,227	$6,530,632	0.832%	0.194%
	2	$35,400	$7,308	2,982,436	$3,550,968	0.997%	0.206%
	3	$36,599	$8,078	3,814,669	$4,545,080	0.805%	0.178%
	4	$37,762	$8,432	4,750,001	$5,384,722	0.701%	0.157%
	5	$39,178	$8,956	7,765,935	$6,511,514	0.602%	0.138%

Table 92. Number of vessels landing ≥ 2,000 lbs. small-mesh multispecies by home port, 2014-2016

State	Home Port	Category I					Category II					No history					Non-qualifier				
		Alternatives					Alternatives					Alternatives					Alternatives				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
CT	Mystic, New London, Stonington	3	c	3	3	4	3	4	3	3	c						c	c	c	c	c
MA	Gloucester	c	c	5	c	3	4	6	5	5	3	c	c				10	9	8	11	12
	New Bedford, Fairhaven				c	c		4	4	c		6	6			5	6	c	8	9	6
	Provincetown, Boston			c	c	c	4	5	3	4	3	3	3			c	5	4	7	7	6
ME/ NH	Portland, Rockland, Hampton, Portsmouth, Rye, Seabrook	c	c	c	c	c	4	6	4	3	3	c	c				c		c	3	3
NJ	Belford, Cape May, Pt. Pleasant, Tom's River	c	c	3	c	3	3	8	6	4	3	c	c			c	4		c	5	4
NY	Montauk	10	6	10	11	11	c	7	4	c	c						3	c	c	c	c
	Greenport, Hampton Bays, Islip, New York, Pt. Lookout, Shinnecock	c		c	c		4	7	4	4	5						3	c	c	3	3
RI	Point Judith	15	9	18	19	18	15	23	14	13	13	c	c			c	3	c	c	c	c
	Narragansett and Newport			c	c	c	c	c	c	c											c
Note: c = confidential																					

Table 93. Balance sheet or flow of small-mesh multispecies (SMS) landing in major landing and home ports, 2014-16

State	Ports (Landing or Home)	SMS lbs. in Landing Ports			SMS lbs. by vessels with different Home Ports		Differences between landing port and home port SMS lbs.	Remarks-- SMS flows or landing balance
		on landings ≥ 1 lb.	on landings ≥ 2,000 lbs.	on landings ≥ 2,000 lbs.	on landings ≥ 2,000 lbs.	on landings ≥ 2,000 lbs.		
		3-yr total	3-yr total	Annual avg.	3-yr total	Annual avg.	Annual	
		A	B	C	D	E	C-E	
CT	**New London**	4,112,455	4,104,218	1,368,073	3,892,784	1,297,595	70,478	**Inflow**-- home port vessels mostly land in the same port, but the home port receives some SMS lbs. from elsewhere.
MA	**New Bedford**	17,347,000	17,328,613	5,776,204	1,460,727	486,909	5,289,295	**Inflow**-- home port vessels mostly land in the same port plus the port receives huge SMS lbs. from Montauk and Point Judith.
	Gloucester	6,102,637	6,023,060	2,007,687	6,416,240	2,138,747	(131,060)	**Outflow**-- home port vessels land mostly land in the same port, but a small volume is landed elsewhere.
NY/RI	**Montauk and Point Judith**	13,205,454	13,111,867	4,370,622	27,596,924	9,198,975	(4,828,352)	**Outflow**-- home port vessels land significant volume of SMS catches in New Bedford.

Table 94. Home ports of small-mesh multispecies directed vessels, by limited access alternatives in 2014-2016.

Communities by Alternatives			Total Fish		Qualifiers (Cat I & II)			Non-qualifiers (NH+NQ)			Qualifier's SMS Revenue	
	Home States	Home Ports	Fish lbs.	Fish Revenue $	SMS lbs.	SMS Revenue $	No. of Vessels	SMS lbs.	SMS Revenue $	No. of Vessels	as % of Total Fish $	as % of Total SMS $
			a	b	c	d	e	f	g	h	d/b	d/(d+g)
Alternative 1	CT	New London	7,449,955	$5,732,389	3,892,784	$2,880,660	3	-	-	-	50%	100%
		Other Ports	2,637,261	$2,943,556	316,609	$234,291	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	MA	Gloucester	3,312,523	$12,821,039	5,796,413	$4,289,346	6	619,827	$458,672	12	33%	90%
		Other Ports	5,219,805	$16,152,740	453,068	$335,270	4	1,007,659	$745,668	20	2%	31%
	ME/NH/ NJ	Portland, Seabrook, etc.	13,762,322	$11,271,439	1,423,856	$1,053,653	10	414,665	$306,852	9	9%	77%
	NY	Montauk	30,462,676	$28,139,327	12,553,520	$9,289,605	12	140,163	$103,721	3	33%	99%
		Other Ports	4,654,091	$3,809,683	455,543	$337,102	6	57,151	$42,292	4	9%	89%
	RI	Point Judith	58,814,562	$46,614,328	14,648,249	$10,839,704	30	254,992	$188,694	4	23%	98%
		Other Ports	1,145,202	$528,356	29,410	$21,763	2	-	-	-	4%	100%
Alternative 2	CT	New London	7,449,955	$5,732,389	3,892,784	$2,880,660	3	-	-	-	50%	100%
		Other Ports	2,637,261	$2,943,556	316,609	$234,291	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	MA	Gloucester	33,312,523	$12,821,039	5,873,753	$4,346,577	7	542,487	$401,440	11	34%	92%
		Other Ports	15,219,805	$16,152,740	720,202	$532,949	9	740,525	$547,989	15	3%	49%
	ME/NH/ NJ	Portland, Seabrook, etc.	13,762,322	$11,271,439	1,711,217	$1,266,301	16	127,304	$94,205	3	11%	93%
	NY	Montauk	30,462,676	$28,139,327	12,593,938	$9,319,514	13	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
		Other Ports	4,654,091	$3,809,683	497,799	$368,371	9	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	RI	Point Judith	58,814,562	$46,614,328	14,692,240	$10,872,258	32	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
		Other Ports	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	-	-	-	4%	100%

Communities by Alternatives			Total Fish		Qualifiers (Cat I & II)			Non-qualifiers (NH+NQ)			Qualifier's SMS Revenue	
	Home States	Home Ports	Fish lbs.	Fish Revenue $	SMS lbs.	SMS Revenue $	No. of Vessels	SMS lbs.	SMS Revenue $	No. of Vessels	as % of Total Fish $	as % of Total SMS $
			a	b	c	d	e	f	g	h	d/b	d/(d+g)
Alternative 3	CT	New London	7,449,955	$5,732,389	3,892,784	$2,880,660	3	-	-	-	50%	100%
		Other Ports	2,637,261	$2,943,556	316,609	$234,291	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	MA	Gloucester	33,312,523	$12,821,039	6,253,686	$4,627,728	10	162,554	$120,290	8	36%	97%
		Other Ports	15,219,805	$16,152,740	1,126,268	$833,438	9	334,459	$247,500	15	5%	77%
	ME/NH/ NJ	Portland, Seabrook, etc.	13,762,322	$11,271,439	1,817,777	$1,345,155	15	20,744	$15,351	4	12%	99%
	NY	Montauk	30,462,676	$28,139,327	2,674,433	$9,379,080	14	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
		Other Ports	4,654,091	$3,809,683	477,044	$353,013	8	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	RI	Point Judith	58,814,562	$46,614,328	14,843,520	$10,984,205	32	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
		Other Ports	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	-	-	-	4%	100%
Alternative 4	CT	New London	7,449,955	$5,732,389	3,892,784	$2,880,660	3	-	-	-	50%	100%
		Other Ports	2,637,261	$2,943,556	316,609	$234,291	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	MA	Gloucester	33,312,523	$12,821,039	5,809,819	$4,299,266	7	606,421	$448,752	11	34%	91%
		Other Ports	15,219,805	$16,152,740	1,065,788	$788,683	8	394,939	$292,255	16	5%	73%
	ME/NH/ NJ	Portland, Seabrook, etc.	13,762,322	$11,271,439	1,568,783	$1,160,899	11	269,738	$199,606	8	10%	85%
	NY	Montauk	30,462,676	$28,139,327	12,593,938	$9,319,514	13	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
		Other Ports	4,654,091	$3,809,683	470,974	$348,521	7	41,720	$30,873	3	9%	92%
	RI	Point Judith	58,814,562	$46,614,328	14,843,520	$10,984,205	32	59,721	$44,194	2	24%	100%
		Other Ports	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	4%	100%
Alternative 5	CT	New London	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	49%	97%
		Other Ports	2,637,261	$2,943,556	316,609	$234,291	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	MA	Gloucester	33,312,523	$12,821,039	5,649,517	$4,180,643	6	766,723	$567,375	12	33%	88%
		Other Ports	15,219,805	$16,152,740	529,218	$391,621	5	931,509	$689,317	19	2%	36%
	ME/NH/ NJ	Portland, Seabrook, etc.	13,762,322	$11,271,439	1,527,631	$1,130,447	11	310,890	$230,059	8	10%	83%
	NY	Montauk	0,462,676	$28,139,327	12,593,938	$9,319,514	13	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
		Other Ports	4,654,091	$3,809,683	470,974	$348,521	7	41,720	$30,873	3	9%	92%
	RI	Pt. Judith	58,814,562	$46,614,328	4,681,790	$10,864,525	31	221,451	$163,874	3	23%	99%
		Other Ports	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	3%	71%

6.6.3.1.1 Alternative 1

Alternative 1 would establish a limited access program, with vessels having ≥500,000 lbs. of whiting and/or red hake landings from 2008 to 2012 qualifying for a Category I permit and those landing ≥100,000 lbs. qualifying for a Category II permit.

Qualifying vessels. Alternative 1 is expected to qualify 40 Category I and 74 Category II vessels (Table 83). It has the smallest Category II fleet relative to Alternatives 2-5, due to its more restrictive qualifying threshold requirement. For the same reason, the Category I fleet is larger than under Alternative 2, but smaller than Alternatives 3-5. In 2014-2016, 33 Category I and 38 Category II vessels had at least one trip that landed ≥ 2,000 lbs. of small-mesh multispecies. There would be 57 non-qualifying vessels, including 15 no-history vessels that had at least one trip that landed ≥ 2,000 lbs. small-mesh multispecies in 2014-2016 (Table 84)

Active and latent vessels. Alternative 1 would qualify the lowest number of limited access permits (n=114) relative to Alternatives 2-5 (range = 114-243), and the second to lowest number of Category I permits (n=40; range = 20-84; Table 83). Under Alternative 1, a lower percentage of vessels that would qualify for Category I permits are currently latent compared to Alternatives 4 and 5, but more compared to Alternatives 2 and 3.

Vessel size. Vessels that would qualify for Category I permits under Alternative 1 have an average vessel size of 151 GRT, which is higher than for Alternatives 3 and 4, but lower than for Alternatives 2 and 5 (Table 85). For the Category II vessels, the average vessel size is lower, 66 GRT, and range in vessel size is much narrower across alternatives (65-71 GRT) than for Category I.

Landings. Under Alternative 1, the recent annual average small-mesh multispecies landings for Category I and II vessels (11.71M and 1.48M lbs., respectively) is higher than Alternative 5, but less than the other alternatives (Table 85). Category I vessels in Alternative 1 landed about 83% of total recent small-mesh multispecies landings, which is higher than Alternative 2, but lower than the other alternatives. In contrast, Category II vessels in Alternative 1 landed about 11% of total recent small-mesh multispecies, which is lower than Alternative 2, and higher than the other alternatives.

Table 86 characterizes whiting landings in the Northern and Southern Management Areas in 2014-2016. For all limited access categories across all alternatives, annual and per trip whiting landings per boat on whiting directed trips are generally higher in the Northern management area than in the Southern area. However, aggregate volume of whiting landings and trip value (revenue from all species) per trip are higher in the Southern management area. Vessels in the northern management area have a higher dependency on revenue from whiting.

Revenue. Compared to Alternatives 2-5, the recently active vessels (w/ trips landing 2,000 lbs. or more small-mesh multispecies) under Alternative 1 are expected to generate similar aggregate landings and revenues, though there are differences in landing by qualifying categories across alternatives (Table 85).

Per boat revenue. Annual per boat revenue from small-mesh multispecies for the Category I vessels in Alternative 1 is $262,637, higher than Alternatives 3, 4 and 5, but lower than that of Alternative 2. Similarly, annual per boat revenue from small-mesh multispecies for the Category II vessels in Alternative 1 is at $28,797, which is second highest compared to all other alternatives except for Alternative 2.

Per trip revenue*[32]*. Per trip revenue from small-mesh multispecies directed trips for the Category I vessels in Alternative 1 is at $14,607. Per trip revenue from small-mesh multispecies is higher than Alternatives 3, 4 and 5, but lower than that of Alternative 2. Similarly, per trip revenue from hake for the Category II vessels in Alternative 1 is highest compared to all other alternatives.

Dependence on small-mesh multispecies. The Alternative 1, Category I vessels had a landings ratio of small-mesh multispecies to total fish of 0.39. Thus, the dependency on small-mesh multispecies is lower than under Alternative 2, but marginally higher than Alternatives 3, 4, and 5.

Revenue dependency on small-mesh multispecies. Table 87 and Table 88 detail the distribution of boats that derived different levels of revenues from small-mesh multispecies. In Alternative 1, majority of boats (i.e., 48% of Category I boats, 76% of Category II boats, and 86% of non-qualifiers) had less than 10% of revenue derived from small mesh multispecies. About 33% of Category I boats, 17% of Category II boats, and 10% of non-qualifiers had their 10-50% of revenue derived from small-mesh multispecies. Likewise, 19% of Category I boats, 7% of Category II boats, and 4% of non-qualifiers had over 50% of fish revenue derived from small mesh multispecies

Non-qualifiers' fisheries characteristics. Table 89 to Table 91 present the characteristics of non-qualifiers' fisheries by alternatives and management area. The types of fisheries that non-qualifiers vary by management areas, but are similar across alternatives. Non-qualifiers in the Northern management are primarily into other large-mesh groundfish fishery (about 50%) followed by Haddock (about 12%) and Atlantic herring (about 10-13%) fisheries. In the other hand, Non-qualifiers in the Southern management are primarily into Loligo squid (about 13-21%), Atlantic herring (about 15-23%), skates (about 10-30%) and northern shrimp (about 2-5%) fisheries. They also catch yellowtail flounder and monkfish in both management areas in small quantities (about 1% each). The landings of these species, however, varies with landing ports. In Alternative 1, the share of whiting value relative to all fish value is 3.3% in the Northern area and <1% in Southern area. Share of red hake value to total fish value is negligible in both management areas. Non-qualifiers' per trip fishing revenue averaged to about $13,266 in the Northern Area and $5,363 in the Southern Area recently in Alternative 1. Revenues per trip for both management area are lesser than of Alternative 3 and 2, but higher than Alternative 4, and 5.

Community impacts on major ports. Across the Action 1 limited access alternatives, the vessels in Category I account for 77 to 90% of the small-mesh multispecies landings. A core set of 20 vessels would qualify for a Category I permit under any of the five alternatives and account for 85 to 100% of small-mesh multispecies landings by Category I vessels in other alternatives, in 2014-2016.[33] The remainder of landings have been by vessels that would qualify for a Category I permit under a subset of alternatives, Category II vessels, and non-qualifiers. The 20 core vessels have home ports mainly in Point Judith, RI (45%) and Montauk, NY (30%).

Table 93 presents a balance sheet or flow of small-mesh multispecies landing in major landing and home ports during 2014-2016. New Bedford, Point Judith, Gloucester, Montauk, and New London are the top landing ports in recent years. Vessels with home ports in Gloucester, New London, and New Bedford land nearly all of their small-mesh multispecies catches in the same ports. Some vessels from Point Judith and Montauk take their catches to New Bedford, i.e., New Bedford receives very large volume of small-mesh multispecies from vessels whose home ports are in Point Judith and Montauk. Thus, in the short-term, impacts to landing ports across the five alternatives are likely neutral to very minor, in terms

[32] Trip lengths are assumed to be homogenous within a category in an alternative.

[33] Alternative 2 has 20 Category I vessels. They are also the core set of Category I vessels which represent about 85% to 92% of small-mesh multispecies landings by Category I fleet in other alternatives (Alt 1, 3-5).

of disrupting current port economics. In the long-term, transitioning to a limited access program would preclude non-qualifiers from the directed fishery. Non-qualifying vessels have landing ports across the region.

A few home ports (particularly Gloucester, MA) may be affected by the choice of this limited access alternative in a way that they will have fewer Category I vessels had it chosen another limited access alternative (Table 92). However, that wouldn't affect the home port economies either. In Alternative 1, Point Judith (RI) and Montauk (NY) are the major ports that are home to the largest number of Category I vessels. Similarly, Point Judith (RI) is the single port that home to a large number of Category II vessels followed by Gloucester (MA), Provincetown (MA). Many non-qualifiers have home ports in Gloucester, New Bedford and Boston in MA compared to other ports in Alternative 1. Under Alternative 1, the non-qualifying "no history" vessels (those with landings in 2014-2016, but no landings during the qualifying period) are largely from New Bedford, Boston, and Gloucester, Massachusetts. Gloucester has the largest number of non-qualifiers than in other home ports.

Table 94 presents community impacts in home ports from the small-mesh multispecies directed landings by vessels in the limited access alternatives during 2014-16. The impacts are assessed in terms of landing, ex-vessel revenues from small-mesh multispecies as well as revenue dependencies from these species relative to all landed fishes by qualifier (Category I and II) and non-qualifier (non-qualifier and no-history) vessels. Qualifiers across home ports have varying degrees of revenue dependencies. In Alternative 1, the qualifier vessels in New London (CT), Gloucester (MA), Montauk (NY) and Point Judith (RI) have revenue dependencies from small-mesh multispecies relative to all fish landings at about 50%, 33%, 33% and 23%, respectively. But for other home ports, the dependencies ranged from 2 to 9%. Also, the revenue share from small-multispecies is overwhelmingly large for qualifiers compared to non-qualifiers' except in Massachusetts's other home ports.

6.6.3.1.2 Alternative 2

Alternative 2 would establish a limited access program, with vessels having ≥ 1,000,000 lbs. of whiting and/or red hake landings from 2008 to 2012 qualifying for a Category I permit and those landing ≥ 20,000 lbs. qualifying for a Category II permit.

Qualifying vessels. Alternative 2 is expected to qualify 20 Category I and 203 Category II vessels. It has the smallest Category I fleet relative to all alternatives, due to its more restrictive qualifying threshold requirement. But, has largest Category II fleet due to least restrictive qualifying threshold requirement. In 2014-2016, 19 Category I and 69 Category II vessels had at least one trip that landed 2,000 lbs. or more small-mesh multispecies. Under Alternative 2, there would be 40 non-qualifying vessels, including 15 no-history vessels that had at least one trip that landed 2,000 lbs. or more of small-mesh multispecies in 2014-2016.

Active and latent vessels. Alternative 2 has largest number of Category II vessels, but least number of Category I vessels. Category I in Alternative 2 has least latent effort compared to all other alternatives in the category. The latent effort for Category II vessels in Alternative 2 is lower than that of Alternative 4 and 5, but higher than that of Alternative 1 and 3.

Vessel size. Vessels that would qualifying for Category I permits under Alternative 2 have the highest average vessel size of 190 GRT relative to the other alternatives. For the Category II vessels, the average vessel size is also highest, at 71 GRT, though the range in vessel size is much narrower across alternatives (65-71 GRT) than for Category I.

Landings. Category I vessels in Alternative 2 landed least amount of small-mesh multispecies compared to Category I vessels in the other alternatives. However, Category II vessels in Alternative 2 landed more small-mesh multispecies compared to Category II vessels in other alternatives. The average annual landing of small-mesh multispecies in recent years by Category I and Category II vessels in Alternative 2 were 10.8 M and 2.7 M lbs., respectively. Category I vessels in Alternative 2 landed about 77% of total landed small-mesh multispecies, lowest of all alternatives. Similarly, Category II vessels in Alternative 2 landed about 19% of total landed small-mesh multispecies, which is higher than all other alternatives.

Table 86 characterizes whiting landings in the Northern and Southern Management Areas in 2014-2016. For all limited access categories across all alternatives, annual and per trip whiting landings per boat on whiting directed trips are generally higher in the Northern management area than in the Southern area. However, aggregate volume of whiting landings and trip value (revenue from all species) per trip are higher in the Southern management area. Vessels in the northern management area have a higher dependency on revenue from whiting.

Revenues. Compared to Alternatives 1 and 3-5, the currently active vessels (w/ trips landing 2,000 lbs. or more small-mesh multispecies) under Alternative 2 expected to generate similar aggregate landings and revenues although there are differences in landings by qualifying categories across alternatives.

Per boat revenue. Annual per boat revenue from small-mesh multispecies for the Category I and Category II vessels in Alternative 2 are highest than rest other alternatives. Per boat revenue from small-mesh multispecies averaged at about $419,222 and $28,880 for Category I and Category II vessels, respectively, from small-mesh multispecies directed trips.

Per trip revenue. Per trip revenue from small-mesh multispecies for the Category I vessels in Alternative 2 highest than rest other alternatives. Similarly, per trip revenue from small-mesh multispecies for the Category II vessels in Alternative 2 is higher than Alternative 3, but slightly lower than all other alternatives. Per trip revenue from small-mesh multispecies averaged at about $16,911 and $5,884 for Category I and Category II vessels, respectively, from small-mesh multispecies directed trips.

Dependence on small-mesh multispecies. The Alternative 2, Category I vessels had a ratio of small-mesh multispecies to total fish pound of 0.44. Thus, the dependency on small-mesh multispecies is highest compared to all other alternatives.

Revenue dependency on small-mesh multispecies. Table 87 and Table 88 detail the distribution of boats that derived different levels of revenues from small-mesh multispecies. In Alternative 2, majority of boats (i.e., 38% of Category I boats, 79% of Category II boats, and 79% of non-qualifiers) had less than 10% of revenue derived from small mesh multispecies. About 29% of Category I boats, 16% of Category II boats, and 18% of non-qualifiers had their 10-50% of revenue derived from small-mesh multispecies. Likewise, 33% of Category I boats, 5% of Category II boats, and 3% of non-qualifiers had over 50% of fish revenue derived from small mesh multispecies.

Non-qualifiers' fisheries characteristics. Table 89 to Table 91 present the characteristics of non-qualifiers' fisheries by alternatives and management area. The types of fisheries that non-qualifiers vary by management areas, but are similar across alternatives. Non-qualifiers in the Northern management are primarily into other large-mesh groundfish fishery (about 50%) followed by Haddock (about 12%) and Atlantic herring (about 10-13%) fisheries. In the other hand, Non-qualifiers in the Southern management are primarily into Loligo squid (about 13-21%), Atlantic herring (about 15-23%), skates (about 10-30%) and northern shrimp (about 2-5%) fisheries. They also catch Yellowtail flounder and Monkfish in both management areas in small quantities (about 1% each). In Alternative 2, the share of whiting value relative to all fish value is 3.4% in the Northern area and <1% in Southern area. Share of red hake value

to total fish value is negligible in both management area. Non-qualifiers' per trip fishing revenue averaged to about $15,480 in the Northern area and $6,926 in the Southern area recently in Alternative 2. Revenues per trip for both management area are lesser than of Alternative 3, but higher than Alternative 1, 4, and 5.

Community impacts on major ports. Across the Action 1 limited access alternatives, the vessels in Category I account for 77 to 90% of the small-mesh multispecies landings. A core set of 20 vessels would qualify for a Category I permit under any of the five alternatives and account for 85 to 100% of small-mesh multispecies landings by Category I vessels in other alternatives, in 2014-2016. The remainder of landings have been by vessels that would qualify for a Category I permit under a subset of alternatives, Category II vessels, and non-qualifiers. The 20 core vessels have home ports mainly in Point Judith, RI (45%) and Montauk, NY (30%).

Table 93 presents a balance sheet or flow of small-mesh multispecies landing in major landing and home ports during 2014-2016. New Bedford, Point Judith, Gloucester, Montauk, and New London are the top landing ports in recent years. While vessels with home ports in Gloucester, New London, and New Bedford land nearly all of their small-mesh multispecies catches in the same ports, but some vessels from Point Judith and Montauk take their catches to New Bedford, i.e., New Bedford receives very large volume of small-mesh multispecies from vessels whose home ports are in Point Judith and Montauk. Thus, in the short-term, impacts to landing ports across the five alternatives are likely neutral to very minor, in terms of disrupting current port economics. In the long-term, transitioning to a limited access program would preclude non-qualifiers from the directed fishery.

A few home ports (particularly Gloucester, MA) may be affected by the choice of this limited access alternative in a way that they will have fewer Category I vessels had it chosen another limited access alternative (Table 92). However, that wouldn't affect the home port economies either. In Alternative 2, Point Judith (RI) and Montauk (NY) are the major ports that are home to the largest number of Category I vessels although they also experience significant decline in Category I vessels in Alternative 2 relative to other alternatives. Similarly, Point Judith (RI) is the single port that home to a large number of Category II vessels followed by Montauk (NY) and Gloucester (MA). Many non-qualifiers have home ports in Gloucester, New Bedford and Boston in MA compared to other ports in Alternative 2. Under Alternative 2, the non-qualifying "no history" vessels (those with landings in 2014-2016, but no landings during the qualifying period) are largely from New Bedford, Boston, and Gloucester, Massachusetts. Gloucester has the largest number of non-qualifiers than in other home ports.

Table 94 presents community impacts in home ports from the small-mesh multispecies directed landings by vessels in the limited access alternatives during 2014-16. The impacts are assessed in terms of landing, ex-vessel revenues from small-mesh multispecies as well as revenue dependencies from these species relative to all landed fishes by qualifier (Category I and II) and non-qualifier (non-qualifier and no-history) vessels. Qualifiers across home ports have varying degrees of revenue dependencies. In Alternative 2, the qualifier vessels in New London (CT), Gloucester (MA), Montauk (NY) and Point Judith (RI) have revenue dependencies from small-mesh multispecies relative to all fish landings at about 50%, 34%, 33% and 23%, respectively. But for other home ports, the dependencies ranged from 4 to 11%. Also, the revenue share from small-multispecies is overwhelmingly large for qualifiers compared to non-qualifiers, except in Massachusetts's other home ports.

6.6.3.1.3 Alternative 3

Alternative 3 would establish a limited access program, with vessels having >500,000 lbs. of whiting and/or red hake landings from 2008 to 2016 qualifying for a Category I permit and those landing ≥100,000 lbs. qualifying for a Category II permit.

Qualifying vessels. Alternative 2 is expected to quality 51 Category I and 90 Category II vessels. Nineteen (44) Category I and 46 Category II vessels had at least one trip that landed 2,000 lbs. or more small-mesh multispecies in 2014-2016 (the current incidental limits). Under Alternative 3, there were 38 non-qualifying vessels that had at least one trip that landed 2,000 lbs. or more of small-mesh multispecies in 2014-2016.

Active and latent vessels. Alternate 3 has highest number of Category I vessels, but moderate number of Category II vessels. Alternative 3 has lesser degree of latent effort under the Category I compared Alternatives 1, 4 and 5. In the other hand, Alternative 3 has least latent effort on Category II fleet compared to all other alternatives in Category II.

Vessel size. Vessels that would qualifying for Category I permits under Alternative 3 have the lowest vessel size of 132 GRT relative to the other alternatives. For the Category II vessels, the average vessel size is also at lowest range at 65 GRT, though the range in vessel size is much narrower across alternatives (65-71 GRT) than for Category I.

Landings. Under Alternative 3, Category I vessels landed largest volume of small-mesh multispecies compared to rest other alternatives. However, Category II vessels in Alternative 3 landed less volume of small-mesh multispecies compared to Alternatives 1, 2, and 4. Including the landing by non-qualifier vessels, Alternative 3 landed highest volume of small-mesh multispecies compared to all other alternatives. The recent annual average landing of small-mesh multispecies by Category I and Category II vessels in Alternative 3 were 12.6 M and 1.2 M lbs., respectively. Category I vessels in Alternative 3 landed about 90% of total landed small-mesh multispecies, which is highest compared to all other alternatives. Similarly, Category II vessels in Alternative 3 landed about 9% of total landed small-mesh multispecies, which is lowest compared to all other alternatives.

Table 86 characterizes whiting landings in the Northern and Southern Management Areas in 2014-2016. For all limited access categories across all alternatives, annual and per trip whiting landings per boat on whiting directed trips are generally higher in the Northern management area than in the Southern area. However, aggregate volume of whiting landings and trip value (revenue from all species) per trip are higher in the Southern management area. Vessels fishing in the northern management area typically have a higher dependency on revenue from whiting.

Revenue. Compared to other alternatives, the currently active vessels (w/ trips landing 2,000 lbs. or more whiting) under Alternative 3 is expected to generate similar aggregate landings and revenues although there are differences in landing by qualifying categories across alternatives.

Per boat revenue. For the trips that landed 2,000 lbs. or more of small-mesh multispecies, annual per boat revenue from small-mesh multispecies for the Category I vessels in Alternative 3 is at $21,2383, which is higher than Alternative 5, but lower than Alternative 1, 2, and 4. Similarly, annual per boat revenue from small-mesh multispecies for the Category II vessels in Alternative 3 is lowest ($19,351) than all other alternatives.

Per trip revenue. Per trip revenue from small-mesh multispecies for the Category I and Category II vessels in Alternative 3 is lowest at $212,383 and $19,351, respectively, than all other alternatives in the same categories.

Dependence on small-mesh multispecies. The vessels in Category I in Alternative 3 had a ratio of small-mesh multispecies to total fish pound at 0.38. The dependency on small-mesh multispecies is lower compared to the Alt 1 and 2, but marginally higher than Alt 4.

Revenue dependency on small-mesh multispecies. Table 87 and Table 88 detail the distribution of boats that derived different levels of revenues from small-mesh multispecies. In Alternative 3, majority of boats (i.e., 50% of Category I boats, 78% of Category II boats, and 93% of non-qualifiers) had less than 10% of revenue derived from small mesh multispecies. About 29% of Category I boats, 17% of Category II boats, and 5% of non-qualifiers had their 10-50% of revenue derived from small-mesh multispecies. Likewise, 21% of Category I boats, 5% of Category II boats, and 2% of non-qualifiers had over 50% of fish revenue derived from small mesh multispecies.

Non-qualifiers' fisheries characteristics. Table 89 and Table 91 present the characteristics of non-qualifiers' fisheries by alternatives and management area. The types of fisheries that non-qualifiers vary by management areas, but are similar across alternatives. Non-qualifiers in the Northern management are primarily into other large-mesh groundfish fishery (about 50%) followed by Haddock (about 12%) and Atlantic herring (about 10-13%) fisheries. In the other hand, Non-qualifiers in the Southern management are primarily into Loligo squid (about 13-21%), Atlantic herring (about 15-23%), skates (about 10-30%) and northern shrimp (about 2-5%) fisheries. They also catch Yellowtail flounder and Monkfish in both management areas in small quantities (about 1% each). In Alternative 3, the share of whiting value relative to all fish value is 2.1% in the Northern area and <1% in Southern area. Share of red hake value to total fish value is negligible in both management area. Non-qualifiers' per trip fishing revenue averaged to about $17,111 in the Northern area and $7,629 in the Southern area recently in Alternative 3. Revenues per trip for both management area are most with Alternative 3.

Community impacts on major ports. Across the Action 1 limited access alternatives, the vessels in Category I account for 77 to 90% of the small-mesh multispecies landings. A core set of 20 vessels would qualify for a Category I permit under any of the five alternatives and account for 85 to 100% of small-mesh multispecies landings by Category I vessels in other alternatives, in 2014-16. The remainder of landings have been by vessels that would qualify for a Category I permit under a subset of alternatives, Category II vessels, and non-qualifiers. The 20 core vessels have home ports mainly in Point Judith, RI (45%) and Montauk, NY (30%).

Table 93 presents a balance sheet or flow of small-mesh multispecies landing in major landing and home ports during 2014-2016. New Bedford, Point Judith, Gloucester, Montauk, and New London are the top landing ports in recent years. While vessels with home ports in Gloucester, New London, and New Bedford land nearly all of their small-mesh multispecies catches in the same ports, but some vessels from Point Judith and Montauk take their catches to New Bedford, i.e., New Bedford receives very large volume of small-mesh multispecies from vessels whose home ports are in Point Judith and Montauk. Thus, in the short-term, impacts to landing ports across the five alternatives are likely neutral to very minor, in terms of disrupting current port economics. In the long-term, transitioning to a limited access program would preclude non-qualifiers from the directed fishery.

A few home ports (particularly Gloucester, MA) may be affected by the choice of this limited access alternative in a way that they will have fewer Category I vessels had it chosen another limited access alternative (Table 92). However, that wouldn't affect the home port economies either. Moreover, Alternative 3 has the most number of currently active Category I vessels. In Alternative 3, Point Judith

(RI) and Montauk (NY) are the major ports that are home to the largest number of Category I vessels followed by Gloucester (MA). Similarly, Point Judith (RI) is the single port that home to a large number of Category II vessels followed by Gloucester (MA) and Montauk (NY). Many non-qualifiers have home ports in Gloucester, New Bedford and Boston in MA compared to other ports in Alternative 3. Gloucester has the largest number of non-qualifiers than in other home ports.

Table 94 presents community impacts in home ports from the small-mesh multispecies directed landings by vessels in the limited access alternatives during 2014-16. The impacts are assessed in terms of landing, ex-vessel revenues from small-mesh multispecies as well as revenue dependencies from these species relative to all landed fishes by qualifier (Category I and II) and non-qualifier (non-qualifier and no-history) vessels. Qualifiers across home ports have varying degrees of revenue dependencies. In Alternative 3, the qualifier vessels in New London (CT), Gloucester (MA), Montauk (NY) and Point Judith (RI) have revenue dependencies from small-mesh multispecies relative to all fish landings at about 50%, 36%, 33% and 24%, respectively. But for other home ports, the dependencies ranged from 4 to 12%. Also, the revenue share from small-multispecies is overwhelmingly large for qualifiers compared to non-qualifiers.

6.6.3.1.4 Alternative 4

Alternative 4 would establish a limited access program, with vessels having >500,000 lbs. of whiting and/or red hake landings from 2000 to 2016 qualifying for a Category I permit and those landing ≥100,000 lbs. qualifying for a Category II permit.

Qualifying vessels. Alternative 4 is expected to quality 55 Category I and 124 Category II vessels. Forty-two (42) Category I and 38 Category II vessels had at least one trip that landed 2,000 lbs. or more small-mesh multispecies in 2014-16. Under Alternative 4, there were 48 non-qualifying vessels that had at least one trip that landed more than 2,000 lbs. of small-mesh multispecies in 2014-2016.

Active and latent vessels. Alternative 4 has lesser degree of latent effort under the Category I and Category II compared Alternatives 5, but higher than Alt 1, 2 and 3.

Vessel size. Vessels that would qualifying for Category I permits under Alternative 4 have the average vessel size of 143 GRT and is lower than Alternative 2 and Alternative 1. For the Category II vessels, the average vessel size is at lower range at 65 GRT, though the range in vessel size is much narrower across alternatives (65-71 GRT) than for Category I.

Landings. In Alternative 4, the average annual landing of small-mesh multispecies in recent years by Category I and Category II vessels in Alternative 4 were 12.1 M and 1.4 M lbs., respectively. Category I vessels in Alternative 4 landed about 86% of total landed small-mesh multispecies, which is higher than Alternative 2, but is lower than Alternative 1 and 3. Similarly, Category II vessels in Alternative 4 landed about 10% of total landed small-mesh multispecies, which is higher than Alternative 4 but is lower than Alternative 2.

Table 86 characterizes whiting landings in the Northern and Southern Management Areas in 2014-2016. For all limited access categories across all alternatives, annual and per trip whiting landings per boat on whiting directed trips are generally higher in the Northern management area than in the Southern area. However, aggregate volume of whiting landings and trip value (revenue from all species) per trip are higher in the Southern management area. Vessels fishing in the northern management area typically have a higher dependency on revenue from whiting.

Revenues. Compared to other alternatives, the currently active vessels (w/ trips landing 2,000 lbs. or more of small-mesh multispecies) under Alternative 4 is expected to generate similar aggregate landings and revenues, although there are differences in landing by qualifying categories across alternatives.

Per boat revenues. Annual per boat revenue from small-mesh multispecies for the Category I vessels in Alternative 4 is $213,349 and is higher than Alternative 3 and 5, but lower than Alternative 1, and 2. Similarly, annual per boat revenue from small-mesh multispecies for the Category II vessels in Alternative 4 is $27,705 and is higher than Alternative 3 but less than Alternative 1, 2, and 5.

Per trip revenues. Per trip revenue from small-mesh multispecies for the Category I vessels in Alternative 3 is higher than Alternative 3, but lower than Alternative 1, 2 and 5. Similarly, per trip revenue from hake for the Category II vessels in Alternative 4 is higher than Alternatives 2 and 3 but less than Alternatives 1 and 5.

Dependence on small-mesh multispecies. The vessels in Category I in Alternative 4 had a ratio of small-mesh multispecies to total fish pound at 0.37. The dependency on small-mesh multispecies is lowest compared to other alternatives.

Revenue dependency on small-mesh multispecies. Table 87 and Table 88 detail the distribution of boats that derived different levels of revenues from small-mesh multispecies. In Alternative 4, majority of boats (i.e., 58% of Category I boats, 75% of Category II boats, and 86% of non-qualifiers) had less than 10% of revenue derived from small mesh multispecies. About 26% of Category I boats, 16% of Category II boats, and 11% of non-qualifiers had their 10-50% of revenue derived from small-mesh multispecies. Likewise, 16% of Category I boats, 9% of Category II boats, and 2% of non-qualifiers had over 50% of fish revenue derived from small mesh multispecies

Non-qualifiers' fisheries characteristics. Table 89 and Table 91 present the characteristics of non-qualifiers' fisheries by alternatives and management area. The types of fisheries that non-qualifiers vary by management areas, but are similar across alternatives. Non-qualifiers in the Northern management are primarily into other large-mesh groundfish fishery (about 50%) followed by Haddock (about 12%) and Atlantic herring (about 10-13%) fisheries. In the other hand, Non-qualifiers in the Southern management are primarily into Loligo squid (about 13-21%), Atlantic herring (about 15-23%), skates (about 10-30%) and northern shrimp (about 2-5%) fisheries. They also catch Yellowtail flounder and Monkfish in both management areas in small quantities (about 1% each). In Alternative 4, the share of whiting value relative to all fish value is 2.3% in the Northern area and <1% in Southern area. Share of red hake value to total fish value is negligible in both management area. Non-qualifiers' per trip fishing revenue averaged to about $10,331 in the Northern area and $5,310 in the Southern area recently in Alternative 4. Revenues per trips for both management area are least and is similar to Alternative 5.

Community impacts on major ports. Across the Action 1 limited access alternatives, the vessels in Category I account for 77 to 90% of the small-mesh multispecies landings. A core set of 20 vessels would qualify for a Category I permit under any of the five alternatives and account for 85 to 100% of small-mesh multispecies landings by Category I vessels in other alternatives, in 2014-16. The remainder of landings have been by vessels that would qualify for a Category I permit under a subset of alternatives, Category II vessels, and non-qualifiers. The 20 core vessels have home ports mainly in Point Judith, RI (45%) and Montauk, NY (30%).

Table 93 presents a balance sheet or flow of small-mesh multispecies landing in major landing and home ports during 2014-2016. New Bedford, Point Judith, Gloucester, Montauk, and New London are the top landing ports in recent years. While vessels with home ports in Gloucester, New London, and New Bedford land nearly all of their small-mesh multispecies catches in the same ports, but some vessels from

Point Judith and Montauk take their catches to New Bedford, i.e., New Bedford receives very large volume of small-mesh multispecies from vessels whose home ports are in Point Judith and Montauk. Thus, in the short-term, impacts to landing ports across the five alternatives are likely neutral to very minor, in terms of disrupting current port economics. In the long-term, transitioning to a limited access program would preclude non-qualifiers from the directed fishery.

A few home ports (particularly Gloucester, MA) may be affected by the choice of this limited access alternative in a way that they will have fewer Category I vessels had it chosen another limited access alternative (Table 92). However, that wouldn't affect the home port economies either. In Alternative 4, Point Judith (RI) and Montauk (NY) are the major ports that are home to the largest number of Category I vessels. Similarly, Point Judith (RI) and Montauk (NY) are the major ports that home to large number of Category II vessels followed by Gloucester (MA). Many non-qualifiers have home ports in Gloucester, New Bedford and Boston in MA compared to other ports in Alternative 4. Gloucester has the largest number of non-qualifiers than in other home ports.

Table 94 presents community impacts in home ports from the small-mesh multispecies directed landings by vessels in the limited access alternatives during 2014-16. The impacts are assessed in terms of landing, ex-vessel revenues from small-mesh multispecies as well as revenue dependencies from these species relative to all landed fishes by qualifier (Category I and II) and non-qualifier (non-qualifier and no-history) vessels. Qualifiers across home ports have varying degrees of revenue dependencies. In Alternative 4, the qualifier vessels in New London (CT), Gloucester (MA), Montauk (NY) and Point Judith (RI) have revenue dependencies from small-mesh multispecies relative to all fish landings at about 50%, 34%, 33% and 24%, respectively. But for other home ports, the dependencies ranged from 4 to 10%. Also, the revenue share from small-multispecies is overwhelmingly large for qualifiers compared to non-qualifiers'.

6.6.3.1.5 Alternative 5

Alternative 5 would establish a limited access program, with vessels having >1,000,000 lbs. of whiting and/or red hake landings from 1996-2012 qualifying for a Category I permit and those landing ≥200,000 lbs. qualifying for a Category II permit.

Qualifying vessels. Alternative 5 is expected to quality 84 Category I and 159 Category II vessels. Forty-three (43) Category I and 30 Category II had at least one trip that landed 2,000 lbs. or more small-mesh multispecies in 2014-2016. Additionally, there were 45 non-qualifying vessels and 10 vessels with no history during the qualification period that had at least one trip that landed 2,000 lbs. or more of small-mesh multispecies in 2014-2016.

Active and latent vessels. Alternative 5 would qualify the largest number of limited access permits (n=243) relative to other alternatives. Alternative 5 also has the most latent effort under the Category I and Category II compared other alternatives.

Vessel size. Vessels that would qualifying for Category I permits under Alternative 5 have an average vessel size of 139 GRT is higher than Alternative 3 but smaller relative to rest other alternatives. For the Category II vessels, the average vessel size is at lower range at 68 GRT, though the range in vessel size is much narrower across alternatives (65-71 GRT) than for Category I.

Landings. The average annual landing of small-mesh multispecies in recent years by Category I and Category II vessels in Alternative 5 were 12.0 M and 1.2 M lbs., respectively. Category I vessels in Alternative 5 landed about 86% of total landed small-mesh multispecies, which is higher than Alternative

2, but is lower than Alternative 1 and 3. Similarly, Category II vessels in Alternative 5 landed about 8% of total landed small-mesh multispecies, higher than Alternative 3, but lower than Alternative 2.

Table 86 characterizes whiting landings in the Northern and Southern Management Areas in 2014-2016. For all limited access categories across all alternatives, annual and per trip whiting landings per boat on whiting directed trips are generally higher in the Northern management area than in the Southern area. However, aggregate volume of whiting landings and trip value (revenue from all species) per trip are higher in the Southern management area. Vessels fishing in the northern management area typically have a higher dependency on revenue from whiting.

Revenues. Compared to other alternatives, the recently active vessels (w/ trips landing ≥ 2,000 lbs. of whiting) under Alternative 5 are expected to generate similar aggregate landings and revenues though there are differences in landing by qualifying categories across alternatives.

Per boat revenue. Annual per boat revenue from small-mesh multispecies for the Category I vessels in Alternative 5 is $207,109 and is lowest than all other alternatives. Similarly, per boat revenue from small-mesh multispecies for the Category II vessels in Alternative 5 is $28,470, higher than Alternative 2 and 3, but lower than Alternative 1 and 2.

Per trip revenues. Per trip revenue from small-mesh multispecies for the Category I vessels in Alternative 5 is higher than Alternative 4, but lower than Alternative 1, 2, and 3. Similarly, per trip revenue from hake for the Category II vessels in Alternative 5 is higher than Alternative 2, 3 and 4, but lower than Alternative 1.

Dependence on small-mesh multispecies. The vessels in Category I in Alternative 5 had a ratio of small-mesh multispecies to total fish pound at 0.38. The dependency on small-mesh multispecies is lower compared to the Alternative 1 and 2, but marginally higher than Alternative 4.

Revenue dependency on small-mesh multispecies. Table 87 and Table 88 detail the distribution of boats that derived different levels of revenues from small-mesh multispecies. In Alternative 5, majority of boats (i.e., 60% of Category I boats, 79% of Category II boats, and 80% of non-qualifiers) had less than 10% of revenue derived from small mesh multispecies. About 25% of Category I boats, 13% of Category II boats, and 16% of non-qualifiers had their 10-50% of revenue derived from small-mesh multispecies. Likewise, 15% of Category I boats, 8% of Category II boats, and 4% of non-qualifiers had over 50% of fish revenue derived from small mesh multispecies.

Non-qualifiers' fisheries characteristics. Table 89 and Table 91 present the characteristics of non-qualifiers' fisheries by alternatives and management area. The types of fisheries that non-qualifiers vary by management areas, but are similar across alternatives. Non-qualifiers in the Northern management are primarily into other large-mesh groundfish fishery (about 50%) followed by haddock (about 12%) and Atlantic herring (about 10-13%) fisheries. In the other hand, Non-qualifiers in the Southern management are primarily into Loligo squid (about 13-21%), Atlantic herring (about 15-23%), skates (about 10-30%) and northern shrimp (about 2-5%) fisheries. They also catch Yellowtail flounder and Monkfish in both management areas in small quantities (about 1% each). In Alternative 5, the share of whiting value relative to all fish value is 3.8% in the Northern area and <1% in Southern area. Share of red hake value to total fish value is negligible in both management area. Non-qualifiers' per trip fishing revenue averaged to about $10,661 in the Northern area and $5,316 in the Southern area recently in Alternative 5. Revenues per trips for both management area are least and is similar to Alternative 4.

Community impacts on major ports. Across the Action 1 limited access alternatives, the vessels in Category I account for 77 to 90% of the small-mesh multispecies landings. A core set of 20 vessels

would qualify for a Category I permit under any of the five alternatives and account for 85 to 100% of small-mesh multispecies landings by Category I vessels in other alternatives. The remainder of landings have been by vessels that would qualify for a Category I permit under a subset of alternatives, Category II vessels, and non-qualifiers. The 20 core vessels have home ports mainly in Point Judith, RI (45%) and Montauk, NY (30%).

Table 93 presents a balance sheet or flow of small-mesh multispecies landing in major landing and home ports during 2014-2016. New Bedford, Point Judith, Gloucester, Montauk, and New London are the top landing ports in recent years. While vessels with home ports in Gloucester, New London, and New Bedford land nearly all of their small-mesh multispecies catches in the same ports, but some vessels from Point Judith and Montauk take their catches to New Bedford, i.e., New Bedford receives very large volume of small-mesh multispecies from vessels whose home ports are in Point Judith and Montauk. Thus, in the short-term, impacts to landing ports across the five alternatives are likely neutral to very minor, in terms of disrupting current port economics. In the long-term, transitioning to a limited access program would preclude non-qualifiers from the directed fishery.

A few home ports (particularly Gloucester, MA) may be affected by the choice of this limited access alternative in a way that they will have fewer Category I vessels had it chosen another limited access alternative (Table 92). However, that wouldn't affect the home port economies either. In Alternative 5, Point Judith (RI) and Montauk (NY) are the major ports that are home to the largest number of Category I vessels followed by Gloucester (MA). Similarly, Point Judith (RI) is the single most major port that homes to large number of Category II vessels. Many non-qualifiers have home ports in Gloucester, New Bedford and Boston in MA compared to other ports in Alternative 5. Gloucester has the largest number of non-qualifiers than in other home ports.

Table 93 presents community impacts in home ports from the small-mesh multispecies directed landings by vessels in the limited access alternatives during 2014-16. The impacts are assessed in terms of landing, ex-vessel revenues from small-mesh multispecies as well as revenue dependencies from these species relative to all landed fishes by qualifier (Category I and II) and non-qualifier (non-qualifier and no-history) vessels. Qualifiers across home ports have varying degrees of revenue dependencies. In Alternative 5, the qualifier vessels in New London (CT), Gloucester (MA), Montauk (NY) and Point Judith (RI) have revenue dependencies from small-mesh multispecies relative to all fish landings at about 49%, 33%, 33% and 23%, respectively. But for other home ports, the dependencies ranged from 2 to 9%. Also, the revenue share from small-multispecies is overwhelmingly large for qualifiers compared to non-qualifiers'.

6.6.3.2 Action 2 - Possession limit alternatives

The alternatives in Action 2 propose adjustments to the whiting possession limits, primarily to adjust the capacity of the small-mesh multispecies fleet to land whiting and to minimize negative effects on price. These possession limits would apply to either vessels qualifying for a Category I or II permit, or to both (i.e. the same possession limit would apply to both permit categories.

In addition, Action 2 includes an alternative that would establish an incidental possession limit for whiting and an incidental limit for red hake. These incidental possession limits would apply to all fishing activity by vessels that do not have a Category I or II permit, regardless of mesh or gear in use. Depending on the final alternatives selected in Action 3 (Section 4.3.3), vessels with an incidental permit may be able to exceed the incidental possession limits if they are participating in another limited access small-mesh fishery, such as herring or squid.

6.6.3.2.1 Whiting Possession Limit for Vessels with a Category I Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category I limited access permit.

6.6.3.2.1.1 Alternative 1 (Preferred; Status quo)

For vessels holding a Category I limited access permit, Alternative 1 would not change the existing small-mesh multispecies possession limits. When fishing with 3-inch mesh trawls, the current whiting possession limits are 30,000 lbs. in the northern area and 40,000 lb. in the southern area. Whiting possession limits are less when vessels use trawls with mesh less than 3-inches, usually to target other species. Possession limits for red hake are 3,000 lbs. in the northern area and 5,000 lb. in the southern area. In season accountability measures reduce these limits to 2,000 lbs. for whiting and 400 lbs. for red hake when landings exceed the in-season accountability measure trigger.

The impacts of Alternative 1 on the vessels that qualify for a Category I permit under Action 1 are expected to be neutral, as there would be no change to the possession limits for these vessels (although potentially applying to a smaller number of vessels than are currently fishing, depending on the Action 1 alternative selected). Fishing effort for these vessels is not expected to change under Alternative 1. With in-season accountability measure trigger, landings of small-mesh multispecies would continue per the accountability measure.

6.6.3.2.1.2 Alternative 2

For vessels holding a Category I limited access permit, Alternative 2 would increase the whiting possession limit from 40,000 lbs. to 50,000 lbs. during the winter/spring season, only in the southern management area. Alternative 2 may be selected if No Action for Action 1 is chosen.

The impacts of Alternative 2 on the vessels that qualify for a Category I permit under Action 1 are expected to be ***neutral to positive relative to Alternative 1, and positive relative to Alternative 3***. Because the Alternative 2 possession limit is higher in the southern area relative to No Action, vessels would be able to increase their trip landings, if operationally feasible. Vessels may do so by taking the same number of trips, but of longer duration. This could potentially increase total landings per vessel. Alternatively, vessels could take fewer, longer trips, keeping total annual landings the same. Because the whiting possession limit has not been over 40,000 lbs. in almost two decades, there is little quantitative information to further identify how fishing behavior might change.

Alternative 2 could provide an incentive to fish in the southern area during January 1-June 14, and fish in the area and season that has been underutilized. Thus, Alternative 2 may help the fishery achieve Optimum Yield more readily than under Alternative 1, a positive impact on the fishery and its fishing communities.

Alternative 2 is expected to have a positive impact on the Category I vessels of very large capacities relative to Alternative 1, because they could land more whiting when there are opportunities to catch very high volume of whiting while avoiding bycatch. There will be an incentive to fish in southern management area during winter and spring. An increase in the volume of whiting landings due to higher possession limit may potentially lower price slightly in the short run, however, when many vessels land increased volume of landing around same time and space (port).

6.6.3.2.1.3 Alternative 3

For vessels holding a Category I limited access permit, Alternative 3 would decrease the whiting possession limit for about half of the year in the southern management area. From June 15 – December 31, a 30,000 lbs. whiting possession limit would be in effect in both management areas. The intent is to reduce the effect of southern area landings on market prices for whiting in all areas. Alternative 3 may also be selected if No Action for Action 1 is chosen.

The impact of Alternative 3 on the vessels that qualify for a Category I permit under Action 1 are expected to be ***neutral relative to Alternative 1, and negative relative to Alternative 2***. Landings could be reduced by as much as 340,000 lbs. of whiting catch (valued at about $289,000) by Category I vessels when a limited access alternative in Action 1 is chosen together with this possession limit. About 45 trips in Alternative 1-3 to 106 trips in Alternative 4-5 by Category I vessels in Action 1 could, thus, be affected annually. Alternative 3 has several potential impacts, changing the number and duration of trips taken or changing the location or season when small-mesh multispecies trips are taken. It may induce more vessels to fish additional trips to catch and land the same amount as they do under the existing limit. In this case, total fishing effort would remain the same as it is now.

Trips during the summer and fall would be less profitable than they are presently, thus potentially causing vessels to take more trips during the winter when a higher possession limit applies if it is advantageous for the vessel to do so. A reduction in trip possession limit will have a negative impact on landing and income from whiting unless any loss in landing is compensated by increasing trip frequencies. Further, taking frequent trips for the same landing volume of whiting is also inefficient affecting the profitability unless rise in cost of fishing operation is offset by an increase in price.

Table 95 summarizes the characteristics of Action 2 (Category I) alternatives and their potential economic impacts.

Table 95. Action 2 summary (Category I)

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category I permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential economic impact of the action alternatives.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs. • Accountability Measures at 2,000 lbs. (whiting) and 400 lbs. (red hake).		Cat I	All	Neutral

Action 2 Alts.	Whiting possession limit alternatives for vessels with a Category I permit	Affected areas	Affected categories	Affected seasons	Potential economic impact of the action alternatives.
2	Increase whiting possession limit from 40,000 lbs. to 50,000 lbs.	South	Cat I	Winter, Spring	Neutral to positive re. Alternative 1. Positive re. Alternative 3. • May reduce the number of trips, making trips be more cost effective. • Incentive to fish in South in Winter/Spring. • Whiting price may go lower when many vessels land increased volumes of landings as a result of higher possession limit.
3	Decrease whiting possession limit to 30,000 lbs.	South	Cat I	Summer, Fall (Jun 15-Dec 31)	Negative for Cat I boats fishing in South. • Landings could be reduced by as much as 340,000 lbs. of whiting catch (valued at about $289,000) unless vessels take more frequent trips to compensate for reduced possession limit in a trip during the seasons. Depending upon the alternative in Action 1 chosen, about 45 trips in Alt 1-3 to 106 trips in Alt 4-5 could be affected annually by Cat I vessels when Alternative 3 is implemented. • The decreased supply may increase whiting prices (decreased CS). • Potential to increase trip freq. in South during summer and fall. • May stabilize price for vessels fishing in northern areas. • Negative for vessels fishing offshore in GB and SNE.

6.6.3.2.2 Whiting Possession Limit for Vessels with a Category II Limited Access Small-Mesh Multispecies Permit

The possession limits in this set of three alternatives would apply to any vessel with a Category II limited access permit. None of these alternatives would be applicable if No Action for Action 1 is chosen.

6.6.3.2.2.1 Alternative 1 (Status quo)

For vessels holding a Category II limited access permit, Alternative 1 would not change the existing small-mesh multispecies possession limits. These limits are summarized under Alternative 1 in the previous section.

The impacts of Alternative 1 on the vessels that would qualify for a Category II permit under Action 1 are expected to be ***neutral***, as there would be no change to the possession limits for these vessels (although potentially applying to a smaller number of vessels than are currently fishing, depending on the Action 1 alternative selected). Fishing effort for these vessels is not expected to change under Alternative 1.

6.6.3.2.2.2 Alternative 2

Alternative 2 would decrease the whiting possession limit in all management areas from 30,000 lbs. to 15,000 lbs. It is intended to create a whiting possession limit that is more consistent with the usual catches made by Category II vessels (Table 85). During 2014-2016, no trips by vessels that are expected to qualify for a Category II permit had whiting landings that exceeded 15,000 lbs.

The impacts of Alternative 2 on the vessels that would qualify for a Category II permit under Action 1 are expected to be ***neutral to low negative***. For most vessels, Alternative 2 would have no effect on their fishing activity. They would fish as they previously did. The alternative may have a neutral effect on Category II vessels since many of them land less than 15,000 lbs. in a trip, and any effect from the reduced possession limit may be overcome by taking few more frequent trips by the affected vessels.

Table 96 summarizes the characteristics of Action 2 (Category II) alternatives and their potential economic impacts.

Table 96. Action 2 summary (Category II)

Action 2 Alts.	**Whiting possession limit alternatives for vessels with a Category II permit**	**Affected areas**	**Affected categories**	**Affected seasons**	**Potential economic impact of the action alternatives.**
1	Status quo— • Whiting possession limit in North at 30,000 lbs. and in South at 40,000 lbs. • Red hake possession limit in North at 3,000 lbs. and in South at 5,000 lbs.		Cat II	All	Neutral
2	15,0000 whiting possession limit and no change to the red hake possession limits.	All	Cat II	All	Neutral. Many Cat II vessels land <15,000 lbs. • Depending on the choice of Action 1 limited access alternative, it would result in a potential loss of landings of about 45,000 to 109,300 lbs. whiting annually, unless more trips are taken to compensate. • About 5 to 15 trips for the fleet annually could be affected with Alternative 2 depending upon the choice of Action 1 limited access alternative. • The alternative may have a neutral effect on Cat II vessels since many Cat II vessels land <15,000 lbs. and any reduction in landing due to the reduced possession limit may be reconciled by taking few more frequent trips by the affected vessels.

6.6.3.2.3 Incidental possession limits

Vessels that did not qualify for a Category I or II limited access permit would be regulated by the possession limits in the two alternatives below, regardless of the type of gear in use or the species that the vessel is targeting.

6.6.3.2.3.1 Alternative 1 (Status quo)

Alternative 1 would retain the existing whiting possession limits, even if an action alternative was chosen in Action 1 (limited access qualification). It might seem counter-intuitive at first, but choosing Alternative 1 with a limited access qualification alternative would allow whiting and red hake possession limits to be adjusted by permit category when needed in the future.

The impacts of Alternative 1 on the vessels that would not qualify for a Category I or II permit under Action 1 are expected to be ***neutral to low negative***. The direct impact on non-qualifiers vessels would be unchanged from the status quo, but it could reduce the potential for increases in small-mesh multispecies fishing effort by additional non-qualified vessels. Indirectly, Alternative 1 would have a positive effect on Category I and Category II vessels, because it is expected to limit increases in fishing effort by new entrants.

6.6.3.2.3.2 Alternative 2

Alternative 2 would reduce the whiting and red hake possession limits to 2,000 lbs. and 400 lbs., respectively, for vessels that do not qualify for a small-mesh multispecies limited access permit (see Action 1).

The impacts of Alternative 2 on the vessels that would not qualify for a Category I or II permit under Action 1 are expected to be ***low negative***. Due to relatively low prices for whiting and red hake, it is highly unlikely that non-qualifying vessels would take trips to target small-mesh multispecies. They may, however, continue or increase fishing effort into other fisheries. Many non-qualifying vessels have permits for and experience with alternative fisheries (Table 89 to Table 91). Most fish in another trawl fishery for squids or herring, large-mesh groundfish, monkfish, or skates. Some also participated in the groundfish gillnet fishery.

This alternative would affect only non-qualifying vessels that land over 2,000 lbs. whiting and affects less than 1% of the trips by non-qualifiers. Some of these trips are however targeting whiting and red hake, affecting a small number of vessels much more than the average. Depending on the choice of Action 1 limited access alternative, Alternative 2 could increase discards of about 3,346 to 312,228 lbs. whiting and 283 to 37,926 lbs. red hake, annually, by non-qualifiers. Thus, about 3 to 91 whiting trips in a fleet potentially could be affected annually. However, the alternative may have a neutral effect on non-qualifiers, as they will redirect to other fisheries to make up the loss due to such discards. While non-qualifying vessels will potentially be able to make up income loss from discards of whiting from other targets, any discards in excess of 2,000 lbs. possession limit will likely to have some positive effect on human communities.

Alternative 2 is expected to have a positive effect on Human Communities, because the incidental limits of 2,000 lbs. of whiting and 400 lbs. of red hake will allow vessels to land most or all of their normal catches of these species when they are targeting other species.

Table 97 summarizes the characteristics of Action 2 (Non-qualifiers) alternatives and their potential economic impacts.

Table 97. Action 2 summary (non-qualifiers)

Action 2 Alts.	Whiting possession limit alternatives	Affected areas	Affected categories	Affected seasons	Potential economic impact of the action alternatives.
1	Retain existing whiting and red hake possession limits for non-qualifying vessels in Action 1	All	Non-qualifiers	All	Neutral
2	Reduce possession limit for whiting at 2,000 lbs. and red hake at 400 lbs. for non-qualifiers in Action 1.	All	Non-qualifier	All	Neutral on Cat I and Cat II, and negative on non-qualifiers. • Depending on the choice of Action 1 limited access alternative, Alternative 2 would result in a potential loss of landings of about 3,300 to 312,000 lbs. whiting and 283 to 38,000 lbs. red hake, annually, by non-qualifiers. Annually, about 3 to 91 whiting trips in a fleet potentially affected. • May have a neutral effect on non-qualifiers, if they redirect to other fisheries and fishermen's income not affected.

6.6.3.3 Action 3 – Permit allowances

Alternatives in Action 3 only apply if an action alternative in Action 1 is chosen. Thus, there is not a No Action alternative specifically for Action 3.

6.6.3.3.1 Limited access permit characteristics and conditions

The alternatives in Action 3 would affect the characteristics and allowances of a small-mesh multispecies limited access permit. In most cases, the effects are purely administrative but could change compliance costs for vessels that have limited access permits in other fisheries. Small-mesh multispecies limited access permits that are most consistent with the existing permits held by the vessel would minimize costs and maximize opportunity. Limited access permits were linked and linked to a vessel by an omnibus consistency amendment in the late 1990s (NMFS 1999). Many vessels that would potentially qualify for a Category I or II permit in the Action 1 alternatives have one or more of a large-mesh groundfish, an Atlantic herring permit, or a squid/mackerel/butterfish limited access permit (Table 98). Table 2 summarizes the similarities and differences among other limited access permits frequently held by vessels currently targeting small-mesh multispecies.

Table 98. Most frequently held permit types by different categories of small mesh vessels

Category I & II	Non-qualifiers	No History
A	A	A, B, D, H
FLS-1	FLS-1, FLS-2	FLS-1, FLS-2
-	HB	HB
HRG-D	HRG-D,	HRG-D,
-	I	I
-	K	K
LO-1	LO-1, LO-A1, LO-A2, LO-A4	LO-1, LO-(A1 to A4), LO-AOC
RCB-A	RCB-A	RCB-A
-	MNK-C, MNK-D, MNK-E	MNK-C, MNK-D, MNK-E
SCP-1	SCP-1, SCP-2	SCP-1, SCP-2
SF-1	SF-1	SF-1
SMB(1 to 4)	SMB (1 to 4)	SMB (1 to 4)

A Individual Limited Access; **B** Fleet Limited Access; **D** Hook; **H** Open hand gear;
HB
FLS Summer Flounder (1=comm 2=charter party); **HRG-D** Herring Open Access
LO Lobster (1=comm, 2=charter party); **LO** Lobster (Trap Area A1-A5; AOC Outer Cape)
RCBA (Red Crap Incidental Bycatch); **MNK** Monkfish (Category A-H)
SCP Scup (1=comm 2=charter party); **SF1** Surf Calm/Ocean Quahog
SMB Squid Mackerel Butterfish (1=comm 2= charter 3=incidental 4=Atlantic mack)

6.6.3.3.1.1 Alternative 1 (Preferred)

Alternative 1 would apply the limited access permit characteristics of the Northeast (large mesh) Multispecies fishery to Category I and II permits for the small-mesh multispecies fishery (see Table 2). These include a 5% permit accumulation limit, upgrade restrictions, and consideration of construction during the last year of a qualification period. Although there is no existing limited access small-mesh multispecies permit, Alternative 1 serves as a proxy for status quo for analytical comparison, since it is difficult to evaluate effects with respect to an open access Category K groundfish permit.

General impacts of accumulation limits. An accumulation limit is a management tool used to prevent consolidation within a fishery, thereby sustaining opportunities to participate in the fishery for more participants than market efficiency alone might enable. Limits on consolidation can be used to ensure adequate levels of market competition, facilitate entry to the fishery, protect labor markets, and ensure that the resource supports several participants. It is typically the participation of smaller-scale, part-time, and/or entry-level fishermen that is reduced without an accumulation limit in place.

While consolidation might be favorable for economic efficiency (e.g. for exploiting economies of scale), concentration of shareholdings by relatively few individuals or entities can result in market power. Exercising market power can affect working conditions, prices, and wages, and can harm smaller-scale participants in a fishery. Although accumulation limits on shareholdings are generally viewed as means to prevent excessive concentration, the level of caps vary among fisheries depending on the particular nature of the fishery and objectives of the cap. To date, an analysis of excessive shares has not been performed for the small-mesh multispecies fishery.

There are many social and economic studies around the world that can help provide a full picture of potential consequences from consolidation (see Olson 2011 for literature review). The primary social impacts documented in empirical cases include employment loss, decreased income, decreased quality of life, changing relations of production, structural disadvantages to smaller vessels and firms, dependency and debt patronage, concentration of capital and market power, inequitable gains, reduced stewardship,

decreased community stability, and loss of cultural values (e.g. Brandt & Ding 2008; Carothers *et al.* 2010; Copes & Charles 2004). Assuming that these impacts are negative, the social impacts of establishing accumulation limits are expected to generally be positive for the fishery as a whole, to the degree that the accumulation limit mitigates these impacts. Negative impacts may be acute to any larger-scale fishery participants that may be constrained by the specific accumulation limit established. The tradeoffs between social objectives and market efficiency are common dilemmas for fishery managers.

Permit holdings data. In developing Amendment 18 to the Northeast Multispecies FMP, through which a 5% permit cap was established on Northeast multispecies limited access permits (in addition to a cap on Potential Sector Contribution), the ability to query the permit holdings data has improved substantially.

There continues to be forward progress on improving the data provided. Much effort has been spent to troubleshoot queries and provide the Council with robust data. Absolute determinations of permit holdings are ultimately the responsibility of the Analysis and Program Support Division (APSD) at the NMFS Greater Atlantic Fisheries Office (GARFO). Just as limited entry programs estimate potential permit qualifications, until those records are scrutinized after final action, often including a multiphase appeals process, there are changes in the data. The PDT is confident that the data herein portray the holdings in the fishery to within 1-2% of the true values.

Because the alternatives considered in this action would apply an accumulation limit to individuals, permit banks, or other entities, the fishery holdings data in this section are presented at the individual person ("Person_ID") and business ("Business_ID") levels. Each permit has at least one person and one business associated with it. NMFS does not have data on percent interest in fishery permits of the individuals associated with them. Thus, partial or proportional ownership is counted as if it were whole ownership for the purposes of determining compliance (i.e., it is assumed that each individual has 100% interest in a given permit).

The DRAFT data in this document are the PDT's best estimate of small-mesh multispecies permit holdings by an individual or entity as of October 27, 2017. However, given that the intent is to mirror the permit cap for the limited access multispecies permits, GARFO would likely enforce the cap by using the permit holdings as of the date that permit applications are received by NMFS.

There are 344 permits that qualify for at least one small-mesh multispecies limited access permit. As of October 27, 2017, these permits were held by 294 individual people (Person IDs) associated with 215 businesses (Business IDs; Table 99). Of the 215 businesses, 111 have qualifying permits held by just one person. Thus, it is assumed that 52% of these businesses have sole ownership. Of the 104 multi-person businesses, most (86%) consist of two people, but they range to having up to 25 people. The last names of the people were also examined. Of the multi-person businesses, most (72%) have only people with the same last name associated with it, likely indicating that the business is owned by a family. Of the 215 total businesses, 205 (95%) hold one qualifying permit, and the most any business holds is three (Table 100). Of the 294 total people, 256 (87%) hold one qualifying permit, and the most any person holds is 11 (Table 100).

Table 99. Permit holdings of the permits qualifying for a limited access small-mesh permit under any alternative

	Business IDs	
	Count	**Percent**
Business ID	215	100%
1 person	111	52%
Multi-person	104	48%
2 people	90	86%
3 people	8	8%
4 people	4	4%
5-25 people	2	2%
Multi-families	29	28%
In-family	74	72%

Table 100. Number of qualifying permits held by businesses

	Permits							**Total**
	1	**2**	**3**	**4**	**7**	**8**	**11**	
Businesses	205 (95%)	9 (4%)	1 (0.5%)	0	0	0	0	**215 (100%)**
People	256 (87%)	29 (10%)	4 (1%)	2 (1%)	1 (0.3%)	1 (0.3%)	1 (0.3%)	**294 (100%)**

Impacts of a 5% permit cap on small mesh limited access permits. The holdings data were examined, for the 344 permits that would qualify for a limited access small-mesh permit under at least one alternative, to identify, under any alternative, if and how a 5% permit cap would constrain any individual person ("Person_ID") or business ("Business_ID"). Alternative 1 qualifies the least number of permits, 114, and a 5% permit cap (5.7) would constrain holdings to no more than 5 permits (Table 101). Alternative 5 qualifies the greatest number of permits, 243, and a 5% (12.15) permit cap would constrain holdings to no more than 12 permits.

For the businesses, since the most any one business holds is three qualifying permits (Table 100), there would be no businesses constrained by a 5% permit cap, since the most constraining alternative (Alternative 1) would limit holdings to five permits.

For individual people, since the most any one person holds is eleven qualifying permits (Table 100), the permit holdings data needed to be examined further to determine if and how the holdings of individual people may be constrained. Under Alternative 1, one person would hold six qualifying permits, which is greater than the permit cap of five permits (Table 101). ***Therefore, Alternative 1 would constrain current holdings for one person. For Alternatives 2 to 5, the greatest number of permits held by any one person is less than or equal to the permit cap, so the current holdings of any person would not be constrained.***

Table 101 - Number of qualifying permits under each alternative

	Alternative				
	1	**2**	**3**	**4**	**5**
# qualifying permits	114	224	141	179	243
5% cap	5.7	11.2	7.05	8.95	12.15
Most permits held by person	6	7	6	8	8

In the short-term, the economic and social impacts of Alternative 1 are expected to be ***neutral***. It is likely that divestiture would only be required under Qualification Criteria Alternative 1. There would be substantial opportunity for permit consolidation, which would eventually be limited by the cap.

The long-term economic impacts of the accumulation limit on fishery-related businesses and communities are expected to be ***neutral***. The permit cap would restrain fishing activity of certain permit holders, but the benefits would be distributed across the fishery. The social impacts are expected to be ***positive*** for the fishery as a whole relative to No Action, because consolidation would be constrained. This would help retain the *Size and Demographic Characteristics*, as well as its *Historical Dependence on and Participation* in the fishery. Given that there are 114-243 qualifying permits under each alternative, a 5% permit cap could, in theory, allow permit consolidation down substantially fewer permit holders, 20-30, negatively impacting the *Size and Demographic Characteristics* of the fishery. Consolidation may be considered by some stakeholders to be a negative impact on the *Attitudes, Beliefs, and Values* of stakeholders towards management. Practically, it would be very difficult to consolidate down to just 20-25 individuals or entities holding permits.

The rationale for a cap of 5% is to be consistent with the large-mesh multispecies limited access permit cap. Given that there are about 1,300-1,400 large-mesh permits, a 5% permit cap is far less constraining for the groundfish fishery (65-70 permits) than it would be for the 114-243 small-mesh limited access fishery (6-8 permits).

Since a given vessel can have permits in multiple fisheries linked to it, the small-mesh permit cap might impose constraints on the accumulation of permits in other fisheries as well. Individuals or entities could only hold small-mesh limited access permits up to the 5% cap. Additional permit(s) in other fisheries could not be acquired if the permit(s) has a small-mesh limited access permit linked with it. In terms of current holdings, as explained above, the draft data used here indicate that the cap imposed by Alternative 1 would constrain the holdings of one person. .

6.6.3.3.1.2 Alternative 2

Alternative 2 would not establish any limits on holdings of limited access permits for the small-mesh multispecies fishery.

The economic and social impacts of Alternative 2 are expected to be neutral in the short-term. All individuals and entities would continue to not be restrained in their ability to accumulate permits. However, the possibility exists for negative long-term economic and social impacts as the accumulation of excessive shares would not be prevented. On one hand, Alternative 2 would allow consolidation in the fishery, generally having a negative social impact because it could crowd out and exclude small-scale fishermen. On the other hand, many vessels in the fishery hold other limited access permits which are

subject to caps to permit ownership in the other fisheries. For example, an owner with a vessel holding a small-mesh multispecies and large-mesh groundfish limited access permit could only purchase and own another vessel with the same permits if the combination would not exceed the caps on permit ownership under the Northeast Multispecies FMP. The owner could purchase and own other vessels without such a permit ownership cap when the other vessels did not hold a large-mesh groundfish limited access permit under the Northeast Multispecies FMP.

The long-term impacts of Alternative 2 on fishery-related businesses and communities are therefore expected to be ***low negative*** for the fishery as a whole relative to No Action, because consolidation would not be constrained. All individuals and entities would continue to not be restrained in their ability to accumulate permits, with potentially short-term neutral impact. However, the possibility of high negative impacts exists in the long-term. Alternative 2 does not implement any safeguard from the negative scenarios described above in the discussion of *General socioeconomic impacts of accumulation limits*. Without an accumulation limit, there may be negative long-term social impacts if the industry consolidates without restraint. The *Size and Demographic Characteristics* of the fishery-related workforce and fishing communities may change if permit holdings become more concentrated.

6.6.3.3.1.3 Alternative 3

Alternative 3 would not allow consideration of construction or repair of vessels for the year preceding the end of the qualification period. Relative to Alternative 1, the number of vessels that qualify for small-mesh multispecies limited access permits could be lower, if due to construction/repair, the landings of a vessel(s) did not meet the qualification threshold.

The impacts of Alternative 3 relative to Alternative 1 are expected to be ***negative*** for the fishery-related businesses and communities, because fewer vessels would be active in the fishery and there could be less revenue generated from the target species. The ability to achieve the TALs would not be impacted, as having fewer vessels in the directed fishery may enable effort to increase for the qualifying vessels - a positive impact for the fishery component that qualifies for limited access. Alternative 3 is expected to have negative impacts for the individual vessel(s) that do not meet the qualification criteria due to vessel construction/repair. They would not be able to participate in the directed small-mesh fishery, and may direct more effort into other fisheries.

6.6.3.3.1.4 Alternative 4 (Preferred)

Alternative 4 would allow only one vessel to qualify based on a single history. In other words, a history could not be transferred to a replacement vessel AND qualify the original vessel (which may have been sold or transferred to a new owner). Thus, this alternative would qualify fewer vessels than the Alternative 1 baseline.

The impacts of Alternative 4 relative to Alternative 1 are expected to be ***neutral*** for fishery-related businesses and communities. The ability to achieve the TALs would not be impacted, as having fewer vessels in the directed fishery may enable effort to increase for the qualifying vessels - a positive impact for the fishery component that qualifies for limited access. Alternative 4 is expected to have negative impacts for the individual vessel(s) that do not meet the qualification criteria. They would not be able to participate in the directed small-mesh fishery, and may direct more effort into other fisheries.

6.6.3.3.1.5 Alternative 5

Alternative 5 would allow upgrades of vessels that hold a limited access small-mesh multispecies fishery permit. It could allow, for example, a vessel to be more capable of fishing offshore or take more frequent trips (vessel becomes more seaworthy), increase hold capacity to take longer trips, or to tow larger trawls.

Although the fishery is limited by ACLs, there is room for increases in whiting catches and more fishing effort by qualifying vessels. Fishing offshore could affect the types of bottom where fishing occurs or the type and amount of bycatch. Fishing longer or more frequent trips implies an increase in fishing effort.

The impacts of Alternative 5 relative to Alternative 1 are expected to be ***low positive*** for fishery-related businesses and communities. This may increase capacity to achieve the TALs and allow for more flexibility in business planning decisions. Vessels holding a Northeast (large-mesh) Multispecies permit would be prohibited from upgrading at the present time, so the benefits of Alternative 5 would be limited.

Table 102 summarizes the limited access permit characteristics of the Action 3 alternatives and their potential economic impacts.

Table 102. Action 3 limited access permit alternatives summary (permit allowances)

Alts.	Permit allowances	Potential economic impact
1	Status quo. 5% cap on permits + upgrade restriction + consideration for construction at t_{-1} of qualification period.	Neutral to positive. Permit cap has neutral economic impacts, but generally positive social impacts. Upgrade restrictions could have a negative economic impact. Consideration for construction has a positive impact.
2	No limits on holdings of limited access permits for the small-mesh multispecies.	Neutral to negative. Consolidation and excessive shares would not be prevented.
3	No consideration for construction or repair of vessels for the year preceding the qualification period.	Negative. If there are many vessels under construction, resulting in reduced effort level. This would allow fewer vessels to qualify for limited access relative to status quo. • Fewer vessels would be active in the fishery and there could be less revenue generated from the target species
4	Only one vessel based on single history, i.e., history couldn't be transferred to a replacement vessel AND qualify the original vessel.	Negative. This would allow fewer vessels to qualify for limited access relative to status quo, but potentially more than Alternative 3.
5	Allow upgrade of vessels that hold limited access multi-species fishery permit. (Upgrading is intended for distant fishing, fish frequently, more hold capacity, longer duration trips, and capability for taking more/large tows).	Low Positive. Any provisions of upgrades will help achieve higher ACL utilization.

6.6.3.3.2 Incidental permit conditions

Vessels holding an incidental permit would be able to land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, regardless of the type of gear in use or species targeted, unless one of the following

alternatives is chosen. These alternatives only apply if an action alternative is selected from Action 1, hence there is no relevant status quo for Action 3.

6.6.3.3.2.1 Alternative 1

In addition to the incidental small-mesh multispecies fishery possession limits, vessels with an incidental possession limit permit would be prohibited from using small mesh trawls in small-mesh multispecies exemption areas.

The impacts of Alternative 1 are expected to be negative for incidental permit vessels, as it would prevent them from targeting small-mesh multispecies on short, inshore trips despite not having a limited access small-mesh multispecies permit. Non-qualifiers may have to relinquish any excess catches above the possession limit. They could potentially have discards of about 3,346 to 308,895 lbs. whiting and 283 to 37,926 lbs. red hake, annually, depending on the choice of Action 1 limited access alternative. About 3 to 91 whiting trips annually would, thus, be affected. However, non-qualifying vessels would be likely to replenish the loss in value by targeting other species.

It is impossible to quantify the potential to target small-mesh multispecies with an incidental permit under current or future regulatory or market conditions. This potential is thought to be currently limited by the relatively low whiting and red hake prices, although some vessels may otherwise use the incidental permit to fish for bait and sell the catch through the transfer at sea provision.

6.6.3.3.2.2 Alternative 2a (Preferred)

Alternative 2a would allow vessels using large mesh on a groundfish or monkfish DAS to exceed the proposed incidental whiting and red hake possession limits. The impacts of Alternative 2a are expected to be ***positive*** for incidental permit vessels, as this provision will reduce the potential for regulatory discards to some degree while non-qualifying vessels are using large-mesh trawls to target groundfish.

6.6.3.3.2.3 Alternative 2b

Alternative 2b would prohibit fishing for small-mesh multispecies on a groundfish DAS. While fishing on a groundfish DAS, the vessel could land no more than 2,000 lbs. of whiting and 400 lbs. of red hake, even if the vessel holds a small-mesh multispecies fishery limited access permit. The impacts of Alternative 2b are expected to be ***negative*** for incidental permit vessels, as that could lead to some degree of regulatory discards of whiting and red hake on a groundfish DAS.

6.6.3.3.2.4 Alternative 3

Like Alternative 2a, Alternative 3 would allow vessels fishing for Atlantic herring or squid with a limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits. The impacts of Alternative 3 are expected to be ***positive*** for incidental permit vessels, as the alternative allows to continue landings that are in excess of possession limits in these fisheries (Atlantic herring and squids).

6.6.3.3.2.5 Alternative 4

Alternative 4 would exempt vessels using small-mesh trawls in specific exemption areas from the Incidental Permit possession limits. The existing whiting and red hake possession limits would therefore

apply in these areas, or any that apply to a vessel with a Category II limited access permit. These exemption areas require the use a more selective raised footrope trawl.

The impacts of Alternative 4 on the small-mesh multispecies fishery are expected to be ***neutral to positive***. For vessels that qualify for an incidental permit, there could be positive impacts, as they would continue to be able to fish in certain exemption areas under the current possession limits, rather than the more constraining incidental possession limit considered in this action This alternative could allow continued expansion of the fishery in the Gulf of Maine, where the exemption areas require vessels to use a raised footrope trawl, designed to be more selective particularly effective for excluding flounders, skates, and monkfish. Vessels that do not qualify for a limited access permit may travel to these specific exemption areas to target whiting and red hake, depending on the potential economic return and fishing opportunities that exist elsewhere. Not only could non-qualifying vessels shift fishing effort from other areas, but total small-mesh multispecies fishing in the Gulf of Maine could increase from entry by new or existing vessels that target other species.

Table 103 summarizes the incidental permit characteristics of the Action 3 alternatives and their potential economic impacts.

Table 103. Action 3 incidental permit alternatives summary (permit conditions)

Alts.	Permit allowances	Economic impact
1	Prevents vessels that do not qualify for limited access from targeting whiting and red hake in the exemption areas.	Negative. • Lead to a potential loss of landings of about 6,913 to 187,111 lbs. whiting, annually, by non-qualifiers depending on the choice of Action 1 limited access alternative. About 17 to 73 whiting trips annually would, thus, be affected in the northern area.
2a	Allow large-mesh on monkfish DAS or groundfish to exceed incidental whiting and red hake possession limits.	Positive. • Reduces potential regulatory discards of whiting and red hake on a groundfish or monkfish DAS, and potentially increases revenue per trip.
2b	Prohibit fishing for small-mesh multispecies on groundfish DAS. If fishing on groundfish DAS, the possession limit be 2,000 lbs. (whiting) and 400 lbs. (red hake).	Negative. • May lead to regulatory discards on a groundfish or monkfish DAS, potentially resulting in less revenue per trip.
3	Allow fishing for Atlantic herring or squids with limited access permit issued for those fisheries to exceed the proposed incidental whiting and red hake possession limits.	Positive. • Avoids regulatory discards of whiting and red hake in the Atlantic herring and squid fisheries, potentially resulting in more revenue per trip.
4	Allows vessels to fish in exemption areas requiring a raised footrope trawl.	Neutral to Positive. • Continued participation for limited access vessels. Same to higher landing with a minimal effect on red hake bycatches.

6.7 Cumulative Effects (FEIS)

Acumulative effects analysis (CEA) is required by the Council on Environmental Quality (CEQ) (40 CFR part 1508.7). The purpose of CEA is to consider the combined effects of many actions on the human environment over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective, 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 remarks address the significance of the expected cumulative impacts as they relate to the federally-managed small-mesh multispecies fishery.

6.7.1 Consideration of VECs

In Section 5.0 (Environmental Consequences), 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. Target species: i.e. Red, Silver, and Offshore Hake Stocks
2. Non-target species and Bycatch
3. Physical Environment and Essential Fish Habitat
4. Protected Resources
5. Human Communities

6.7.2 Geographic Boundaries

The analysis of impacts focuses on actions related to the small-mesh multispecies fishery, which targets red, silver, and offshore hakes. The core geographic scope for each of the VECs is focused on the Western Atlantic Ocean (Section 5.0). The core geographic scopes for the managed resources are the range of the management units (Section 5.1). 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 red, silver, and offshore hakes and other non-target species in the Western Atlantic Ocean. The core geographic scope for protected resources can be considered the overall range of these VECs in the Western Atlantic Ocean. For fishery-related businesses and 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 5.4).

6.7.3 Temporal Boundaries

The temporal scope of past and present actions for VECs is primarily focused on actions that have occurred after FMP implementation (Section 5.1). For endangered and other protected resources, the scope of past and present actions is on a species-by-species basis (Section 5.3) 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. The temporal scope of future actions for all five VECs extends to the end of the 2017 fishing year, when specifications would be re-evaluated. This period was chosen because it is the effective length of the action, and because the dynamic nature of resource management for these three species and lack of information on projects that may occur in the future make it very difficult to predict impacts beyond this timeframe with any certainty.

6.7.4 Actions Other Than Those Proposed by this Plan Amendment

The impacts of each of the alternatives considered in this specifications document are given in Sections 6.2 through 6.6. Table 104 presents meaningful past (P), present (Pr), or reasonably foreseeable future (RFF) actions to be considered other than those actions being considered in this specifications 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.

Table 104. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the five VECs (not including those actions considered in this specifications document).

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
P, Pr Original FMP and subsequent Amendments and Frameworks to the FMP	Established commercial 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 Amendment 12 (2000)	Defined overfishing thresholds and optimum yield (OY). Established the Cultivator Shoals Area, possession limits and gear specifications	**Direct Positive** Measures prevent overfishing and produce MSY.	**Direct Positive** Specific area, seasonal, and gear measures to minimize bycatch, particularly of regulated groundfish.	**Direct Positive** Measures limit the amount and extent of fishing effort.	**Direct Positive** Measures limit the amount and extent of fishing effort	**Direct Positive** Allows a fishery to continue by minimizing bycatch of regulated multispecies.
P, Pr Framework Adjustment 38 (2000)	Establishes an exempted small mesh fishery in the inshore Gulf of Maine, from Jul 1 to Nov 30; requires exempted grate or raised footrope trawl gear; includes incidental catch restrictions.	**Neutral** Measures do not regulate catches of target species.	**Direct Positive** Specific area, seasonal, and gear measures to minimize bycatch, particularly of regulated groundfish.	**Direct Positive** Measures limit the amount and extent of fishing effort. Raised footrope trawl reduces bottom impacts.	**Direct Positive** Measures limit the amount and extent of fishing effort	**Direct Positive** Allows a fishery to continue by minimizing bycatch of regulated multispecies.

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
[P, Pr] Amendment 19 (2013)	Revised overfishing definitions and established specification and catch monitoring framework and accountability measures.	**Direct Positive** Specifications and adjustments change in response to stock biomass and discarding to prevent overfishing and produce MSY.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Direct Positive** Ensures that overfishing does not occur or becomes persistent, producing OY.
[P] 2015-2017 Specifications Package (2015)	Adjusted catch specifications to be consistent with recent changes in stock biomass and discarding.	**Direct Positive** Prevents overfishing and produces MSY.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Direct Positive** Ensures that overfishing does not occur or becomes persistent, producing OY.
[P] 2016-2017 Specifications Package for red hake (2016)	Adjusted catch specifications to be consistent with large year class of northern red hake and a decline in southern red hake biomass.	**Direct Positive** Reduces discarding of northern red hake and prevents catch of southern red hake from causing overfishing.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Direct Positive** Ensures that overfishing does not occur or becomes persistent, producing OY. Allows higher landings of northern red hake.
[P, Pr] 2018-2020 Specifications Package (2018)	Adjusted catch specifications to be consistent with recent changes in stock biomass and discarding.	**Direct Positive** Prevents overfishing and produces MSY.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Direct Positive** Ensures that overfishing does not occur or becomes persistent, producing OY.

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
P, Pr Summer Flounder, Scup, and Black Sea Bass Specifications	Establish quotas, RHLs, other fishery regulations (commercial and recreational)	**Indirect Positive** Regulatory tool to specify catch limits, and other regulation; allows response to annual stock updates	**Indirect Positive** Reduced effort levels; gear requirements	**Indirect Positive** Reduced effort levels; gear requirements	**Indirect Positive** Reduced effort levels; gear requirements	**Indirect Positive** Benefited domestic businesses
P, Pr Squid, Mackerel, and Butterfish Amendments (5 to 15) and Specifications	Establish limited access, seasonal quotas and accountability measures, other fishery regulations	**Indirect Negative** Potentially increased fishing effort on southern whiting and red hakes.	**Indirect Positive** Reduced effort levels; gear requirements	**Indirect Positive** Reduced effort levels; gear requirements	**Indirect Positive** Reduced effort levels; gear requirements	**Indirect Negative** Seasonal closures and redirected effort can depress whiting prices.
P, Pr, RFF Development, Application, and Revision of Standardized Bycatch Reporting Methodology	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 and will not affect distribution of effort	**Potentially Indirect Negative** May impose an inconvenience on vessel operations
P,Pr Omnibus Amendment ACLs/AMs Implemented	Establish and apply ACLs and AMs for all three plan species	**Potentially Indirect Positive** Pending full analysis	**Potentially Indirect Positive** Pending full analysis	**Potentially Indirect Positive** Pending full analysis	**Potentially Indirect Positive** Pending full analysis	**Potentially Indirect Positive** Pending full analysis
P Multispecies Amendment 13 (2003), Framework Adjustments 40A, 40B, 41, and 42	Splits and allocates Category A and B DAS to allow fishing on healthy stocks while rebuilding other stocks; adopted Georges Bank yellowtail flounder rebuilding strategy.	**Indirect Negative** Greater restrictions on groundfish fishing makes small-mesh multispecies an attractive option, potentially increasing mortality.	**Indirect Positive** Addresses mortality and bycatch of depleted groundfish stocks, but no specific measures for the small-mesh multispecies fishery.	**Indirect Positive** Small-mesh fishery typically occurs in areas with less vulnerable substrate than that where groundfishing occurs.	**Neutral** May shift effort into the small-mesh multispecies fishery, but could increase or decrease protected species interactions.	**Indirect Positive** Potentially allows the Georges Bank small-mesh multispecies fishery to continue, accounting for bycatch of a regulated species.

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
[P,Pr] Multispecies Amendment 16 (2009)	Implementation of sector management catch shares and monitoring. Groundfish catches of sector vessels declared out of the fishery attributed to the "Other" fishery category. Many small-mesh multispecies vessels are also enrolled in a groundfish sector.	**Indirect positive** Sector vessels without a groundfish allocation may not fish if they cannot account for their bycatch.	**Direct Positive** Bycatch of regulated groundfish are monitored. Catches count against a sector Annual Catch Entitlement (ACE).	**Indirect Positive** Sector vessels without a groundfish allocation may not fish if they cannot account for their bycatch.	**Indirect Positive** Sector vessels without a groundfish allocation may not fish if they cannot account for their bycatch.	**Indirect Negative** Potentially increases small-mesh fishing costs.
[P,Pr] Multispecies FMP Framework 48 (2013)	Established a Georges Bank yellowtail flounder sub-ACL for the small-mesh multispecies and other fisheries, as a fixed percentage of the US ABC.	**Neutral** Does not change mortality of small-mesh multispecies stocks.	**Direct Positive** Limits bycatch of Georges Bank yellowtail flounder in the fishery.	**Neutral** Unlikely to change fishing effort amount or distribution.	**Neutral** Unlikely to change fishing effort amount or distribution.	**Indirect Positive** Potentially allows the Georges Bank small-mesh multispecies fishery to continue, accounting for bycatch of a regulated species.
[P,Pr] Multispecies FMP Framework 51 (2014)	Established a gear-based reactive accountability measure (AM) for GB yellowtail flounder require a small-mesh vessel to use approved selective trawl gear; implemented Gulf of Maine cod rebuilding strategy.	**Potentially Indirect Negative** Restrictions on Gulf of Maine cod fishing causing effort shift into the small-mesh multispecies fishery.	**Direct Positive** Requires more selective gear when GB yellowtail flounder bycatch exceeds acceptable level.	**Indirect Negative** May reduce effort in Cultivator Shoals Area and Georges Bank, shifting to areas with more vulnerable habitat.	**Neutral** Could shift effort to areas with higher or lower protected species interactions.	**Indirect Positive or Direct Negative** Measure allows fishery to operate without a payback provision, but increases gear costs.

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
[P,Pr] Monkfish Amendment 2/MSB Amendment 9 Areas	Prohibits fishing for monkfish, squid, mackerel, and butterfish in Lydonia and Oceanographer Canyons (Map 13). Does not apply to trips targeting only small-mesh multispecies	**Neutral** Curtails effort in some areas but effort shifts occur. Some prohibited trips target both squid and small-mesh multispecies.	**Potentially Direct Positive or Direct Negative** Area closures may reduce bycatch of some species, while effort shifts may increase bycatch of other species	**Direct Positive** Reduces impacts of bottom-tending small-mesh multispecies trawls on deep-sea corals and other benthos.	**Neutral** Trips partially targeting small-mesh multispecies may shift to locations where protected species are equally vulnerable.	**Direct Negative and Indirect Positive** Increases fishing costs by causing effort shifts to potentially sub-optimal locations, but long-term benefits accrue from undisturbed habitat.
[P,Pr] Tilefish Amendment 1 Areas	Prohibits the use of bottom-tending mobile gear around tilefish habitat and clay outcrops of Lydonia, Oceanographer, Veatch, and Norfolk Canyons (Map 13).	**Neutral** Curtails effort in some areas but effort shifts occur.	**Potentially Direct Positive or Direct Negative** Same as above.	**Direct Positive** Reduces impacts on clay outcrops associated with Tilefish HAPCs.	**Neutral** Same as above.	**Direct Negative** Increases fishing costs by causing effort shifts to potentially sub-optimal locations.
[P,Pr] Northeast Canyons and Seamounts Marine National Monument	Closes to fishing the shelf-slope region from Oceanographer to Lydonia Canyons and an area surrounding four deep-sea seamounts (Map 13).	**Neutral** Small-mesh multispecies fishing trips occur in the Canyons portion and relocated to the east and west along the shelf edge.	**Potentially Direct Positive or Direct Negative** Same as above.	**Direct Positive** Reduces impacts on a broad range of corals and other benthos for about 40 miles of the shelf edge.	**Neutral** Same as above.	**Direct Negative** Increases fishing costs by causing effort shifts to potentially sub-optimal locations. Some increase in steaming costs

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
RFF Potential changes to Northeast Canyons and Seamounts Marine National Monument	Authority over fishing activity in the Monument is proposed to be turned back over to the FMCs.	**Neutral** Fishing trips that were dislocated by the designation could return, but increases in fishing mortality are not expected.	**Potentially Direct Positive or Direct Negative** Opposite as above.	**Direct Positive** NEFMC is considering closing a larger area (Map 13) to mobile-tending gears that would have less impact on certain types of fishing.	**Neutral** Opposite as above.	**Direct Positive** Reduces costs by allowing more fishing in optimum locations. Some reduction in steaming costs.
RFF Small Mesh Multispecies – Action to address overfished condition of southern red hake	A framework action or amendment to rebuild southern red hake, possibly including seasonal or area restrictions, selective fishing gear or other measures.	**Direct Positive or Indirect Negative** Measures would be chosen to reduce catches of southern red hake. They may increase fishing effort on northern stocks.	**Direct Positive or Negative** Measures to reduce bycatch of southern red hake are likely to limit bycatch of other stocks, but higher catches for some stocks may also occur.	**Potentially Indirect Positive or Negative** Measures to reduce catches of southern red hake could reduce effort overall or shift fishing to areas with more vulnerable habitat.	**Potentially Indirect Positive or Negative** Measures to reduce catches of southern red hake could reduce effort in the southern management area but could increase effort in other fisheries with higher levels of protected species interactions.	**Direct Negative** Measures to reduce catches of southern red hake could be costly to fishermen or reduce the ability to fish for other species.
RFF Multispecies FMP Framework 57	Specifies 2018 Georges Bank yellowtail flounder sub-ACL and prohibits possession of Atlantic halibut	**Neutral** Unlikely to change effort and fishing mortality on target species	**Potentially Direct Positive** Limits mortality on overfished stocks.	**Neutral** Unlikely to change the amount or distribution of small-mesh fishing	**Neutral** Unlikely to change the amount or distribution of small-mesh fishing	**Potentially Indirect Negative** Measures to reduce mortality on bycatch species could increase fishing cost.

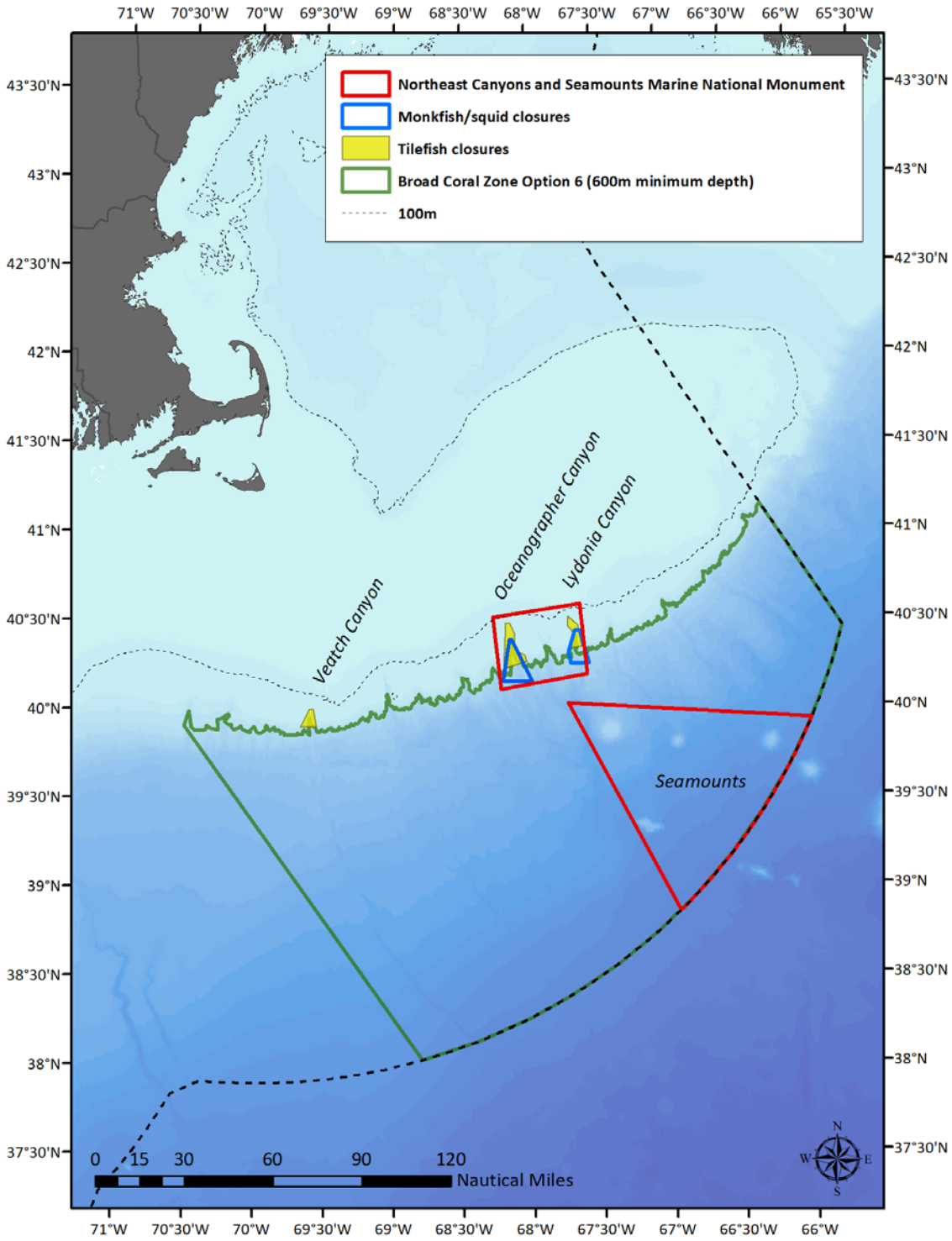
Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
[RFF] Amendment 8 to the Atlantic Herring FMP.	Harvest control rule alternatives and measures to address potential for localized depletion of herring and conflicts between the herring fishery and other uses (predator fisheries and ecotourism). Reducing herring ABCs and/or prohibiting the use of midwater trawl gear could increase fishing for herring and whiting using bottom trawls in small-mesh exemption areas.	**Neutral to Low Negative** Whiting and red hake catches by all gears are counted, but the measure could increase discards if the AMs trigger reduced whiting and red hake possession limits. More restrictive herring measures could cause effort shifts into the small-mesh multispecies fishery and higher catches whiting and red hake.	**Neutral to low negative** More fishing activity in exemption areas could increase bycatch, especially for species caught by bottom-tending trawls. Catches of non-target species could increase or decrease depending on whether non-target species catches are comparatively higher or lower in the herring and small-mesh multispecies fishery.	**Neutral to low negative** More fishing using bottom-tending trawls instead of purse seines or mid-water trawls could increase effects on bottom habitat. Whiting fishing generally occurs on less-vulnerable sand and muddy-sand bottom, so the changes in impacts on EFH are expected to be minor.	**Low negative to low positive** Amendment 8 could result in higher forage availability to some protected species (a low positive impact), but could also shift effort from herring mid-water trawls (Category II, NMFS 2018a) to small-mesh bottom trawls (Category II) in the small-mesh multispecies exemption areas (potentially a low negative impact).	**Negative to Low negative** If herring vessels are faced with large closures, they may shift effort to other fisheries such as whiting to capture some lost revenue. This could have negative impacts on price and current participants in the whiting fishery.
[RFF] 2018-2020 Specifications Package	Adjusts catch specifications to be consistent with recent changes in resource conditions and overfishing of southern red hake.	**Direct Positive** Prevents overfishing and produces MSY.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Neutral** Measures do not reduce effort or require more selective gear and do not change exemption areas.	**Direct Positive** Ensures that overfishing does not occur or becomes persistent, producing OY.

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
RFF MAFMC Squid, Mackerel, and Butterfish Amendment 20	Removes latent limited access permits from the directed fishery and allows vessels to qualify for an incidental permit with a 5,000 pound longfin squid limit. Reduces the trimester closure from 2,500 to 250 pounds per day.	**Indirect Negative** Non-qualifying vessels may increase fishing effort on small-mesh multispecies.	**Direct Positive** Shifts in effort will use larger, more selective mesh to fish for whiting, which has a graduated possession limit.	**Neutral** Measures are unlikely to increase total small-mesh trawl effort, but only change the target species. Gears used in squid and whiting fisheries are similar but use different size mesh.	**Direct Positive** May reduce squid fishing in summer in favor of winter/spring whiting fishing when protected species are less available.	**Potentially Direct Negative** Minor increase in fishing costs to target a difference species. Some boats may need modification, or larger boats may be required in the winter/spring whiting fishery. Negative impact on whiting prices when Squid Trimester 2 closes.
RFF MAFMC Squid Specifications for 2018-2020	Adjustments to specifications to prevent overfishing and achieve OY. The proposed DAH is 2% higher than 2015-2017 because of lower squid discards.	**Indirect Negative** Squid effort in the summer (during Trimester 2) may be redirected to target southern whiting.	**Indirect Positive** Effort shifts into the whiting fishery would mean that most vessels would be using more selective (i.e. 3-inch instead of 2-inch) mesh.	**Neutral** Shifts in effort into the whiting fishery are unlikely to encounter more vulnerable habitat or change impacts of gear on habitat.	**Neutral to Low Positive** Squid and whiting fishery often occurs in the same area, but some vessels may fish on Georges Bank rather than Southern New England waters.	**Potentially Indirect Negative** Earlier closure of the Trimester 2 squid fishery could increase landings of southern whiting when vessels redirect, reducing prices for whiting from the northern exemption areas.
RFF Deep-sea Coral Amendment	Considers closure of broad zones to mobile-tending bottom gears to protect deep-sea corals and other species	**Neutral** Analysis shows a very low impact on small-mesh multispecies fishing.	**Potentially Direct Negative** Minor increase in bycatch of continental shelf species like yellowtail flounder.	**Direct Positive** NEFMC is considering closing a larger area (Map 13) to mobile-tending gears that would have less impact on certain types of fishing.	**Neutral** Effects are uncertain.	**Neutral** Analysis shows a very low impact on small-mesh multispecies fishing.

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
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	**Direct and Indirect Negative** Potential interactions with protected species; reduced habitat quality/availability; dependent on mitigation efforts	**Uncertain – Likely Mixed** Dependent on mitigation effects
P, Pr, RFF Beach nourishment	Offshore mining of sand for beaches; 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	**Direct and Indirect Negative** Reduced habitat quality; dredge interactions; dependent on mitigation efforts	**Mixed** Positive for mining companies, possibly negative for fishing industry; Beachgoers like sand; positive for tourism
P, Pr, RFF Marine transportation including a potential major dredging project for Boston Harbor.	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	**Direct and Indirect Negative** Reduced habitat quality/availability; potential for interactions (ship strikes) with protected species	**Mixed** Positive for some interests, potential displacement for others
P, Pr, RFF Installation of pipelines, utility lines and cables, including the Atlantic Link cable bringing hydro-generated electricity from Canada into Plymouth, MA.	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** Reduced habitat quality; Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects

Action	Description	Impacts on Red, Silver, and Offshore Hake Stocks	Impacts on Non-target Species and Bycatch	Impacts on the Physical Environment and EFH	Impacts on Protected Species	Impacts on Fishery-related Businesses and Communities
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
RFF Offshore Wind Energy Facilities (within 3 years)	Construction of wind turbines to harness electrical power (Several proposed from ME through NC, including NY/NJ, DE, and VA)	**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 (within 3 years)	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	**Direct and Indirect Negative** Reduced habitat quality; ship strikes; sound exposure (physical injury or behavioral harassment); dependent on mitigation efforts	**Uncertain – Likely Mixed** Dependent on mitigation effects

Map 13. Relationship between Present and Reasonable Foreseeable Future actions that close or would close areas to small-mesh multispecies fishing. Option 6 is the NEFMC's preferred alternative in the Deep-sea Corals Amendment.



6.7.4.1 Past and Present Actions

The historical management practices of the Council have resulted in positive impacts on the health of the red, silver, and offshore hakes stocks (Sections 6.1 to 6.6). Numerous actions have been taken to manage the commercial and recreational fisheries for these three species through amendment and framework adjustment actions. In addition, the specifications 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 MSA. 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, and as such, should, in the long-term, promote positive effects on human communities, especially those that are economically dependent upon the small-mesh multispecies and other related fisheries that have incidental catches of red, silver, and offshore hakes.

Non-fishing activities were considered when determining the combined effects from past, present, and reasonably foreseeable future actions. Each activity that has been considered as part of this cumulative impact analysis is weighted the same as any other. We lack the resources to quantify whether any one non-fishing activity would result in greater impacts to a particular VEC versus any other (this includes global climate change). 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 near-shore 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, as such, 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.

Global climate change will affect all components of marine ecosystems, including human communities. Physical changes that are occurring and will continue to occur to these systems include sea-level rise, changes in sediment deposition, changes in ocean circulation, increased frequency, intensity and duration of extreme climate events, changing ocean chemistry, and warming ocean temperatures. Emerging evidence suggests that these physical changes may have direct and indirect ecological responses within marine ecosystems which may alter the fundamental production characteristics of marine systems (Stenseth et al. 2002). Climate change could potentially exacerbate the stresses imposed by fishing and other non-fishing human activities and stressors (described in this section).

Results from the Northeast Fisheries Climate Vulnerability Assessment (Hare et al., 2016) indicate that climate change could have overall directional impacts on all VECs that range from negative to positive depending on the species, their climate vulnerability, potential for distribution change, and other factors. However, future mitigation and adaptation strategies to climate change may mitigate some of these

impacts as more information becomes available to predict, evaluate, monitor, and categorize these changes.

In addition to guidelines mandated by the MSA, 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 riverine and marine habitats.

6.7.4.2 Reasonably foreseeable future actions

In fishing year 2012, ACLs and AMs were first implemented for red, silver, and offshore hake stocks (as well as other Council managed species) to ensure that catch and landings limits are not exceeded and overfishing does not occur. Monitoring of catch since 2012 was completed and summarized in NEFMC 2014 and NEFMC 2017, indicating that catches of red, silver, and offshore hakes stocks were generally well below the ABCs and overfishing was not occurring.

In the 2016 assessment update (summarized in NEFMC 2017), the southern red hake stock biomass has been declining and stable catches appear to have caused overfishing for the first time in 2016. Also the biomass has sunk below the threshold and the stock has appeared to have become overfished. If this finding does not change, the Council will initiate an amendment to address the overfished status and begin a rebuilding program. Measures to rebuild southern red hake are likely going to be difficult to develop because around 70% of the catch comes from estimated discards in both the whiting and squid fisheries.

In 2014 catches of northern red hake were 27.5% above the ABC and the in-season AM (a reduction in possession limit to discourage targeting and encourage fishing where red hake are less abundant) was adjusted post hoc to reduce future risk of overfishing. Since then, the northern red hake catches also exceeded the ACL and the TAL trigger was lowered to 37.9% of the TAL to account for those overages. These in-season AMs applied to the 2014-2016 fishing years and will continue into the future subject to future revisions, if needed.

In 2016, the northern red hake catches did not exceed the ACL, possibly indicating that the most recent TAL trigger adjustment from 45% of the TAL to 37.9% of the TAL was not needed to prevent the catch from exceeding the ACL. Coupled with the increase in the proposed northern red hake specifications for 2018-2020, the low TAL trigger may not be needed in the near future either. If the northern red hake catch remains below the ACL, the Council may include an appropriate adjustment to raise the northern red hake TAL trigger in a future action.

Northern silver hake catch in 2016 was only 14% of the ABC (Table 105), which was raised from 24,282 mt in 2015-2017 to 31,030 mt in 2018-2020 (Table 106). Northern silver hake biomass has been increasing and overfishing is not occurring. Unlike in some previous years, the catches of northern red hake did not exceed the ABC (82% of the ABC) and overfishing was not occurring. Due to changes in stock biomass, the ABC was raised from 496 mt to 721 mt for the 2018-2020 fishing years. Southern whiting catch has been well below the ABCs since 2012 and was only 15% of the ABC in 2016. Nonetheless, stock biomass has been falling and the Specifications Document will reduce the ABC by 35%, from 31,180 to 19,395 mt. This new southern whiting specification is still above the 4,677 mt caught in 2016.

Although the southern red hake catch in 2016 was 64% of the ABC, the 2016 assessment update found that overfishing was occurring (i.e. the mortality rate was above the threshold) and the stock biomass had fallen below the minimum biomass threshold and was therefore overfished. To address the overfishing,

the Specifications Document reduced the ABC from 1,717 mt in 2016-2017 to 1,060 mt in 2018-2020. This limit is slightly below the 1,099 mt caught in 2016. The Council is beginning to take up an action (it has not yet been determined whether this action will be an amendment or a framework adjustment) to begin rebuilding southern red hake stock biomass because the stock has become overfished.

Table 105. Small-mesh multispecies catch accounting for the 2016 fishing year, comparing landings and discards to the Allowable Biological Catch (ABC).

Stock	OFL (mt)	ABC (mt)	ACL (mt)	2016 Catch % of ABC	TAL (mt)	2016 landings % of TAL	2016 Landings
Northern silver hake	43608	24383	23161	14%	19949	15%	3085
Northern red hake	556	496	471	82%	120	135%	162
Southern whiting	60148	31180	29261	15%	23833	16%	3843
Southern red hake	1816	1717	1631	64%	746	45%	332

Table 106. Proposed Specifications for 2018-2020 fishing years.

Stock	OFL (mt)	ABC (mt)	ACL (mt)	Change from SQ	TAL (mt)	Change from SQ
Northern silver hake	58,350	31,030	29,475	27%	26,604	33%
Northern red hake	840	721	685	45%	274	128%
Southern whiting	31,180	19,395	18,425	-35%	14,465	-39%
Southern red hake	1,150	1,060	1,007	-38%	305	-59%

OFL = Overfishing Limit
ABC = Acceptable Biological Catch
TAL = Total Allowable Landings

As a result, the Reasonably Foreseeable Future Actions over the next three years may include the adjusted northern red hake AM and potential implementation or adjustment of accountability measures and other Council recommended adaptive adjustments to the way this new system of catch limits and accountability functions and interacts with the fishery regulations in place.

The Council has submitted a final 2018-2020 Specifications Document and new catch specifications were implemented early in the 2018 fishing year. Part of a regular procedure, this change in 3-year specifications responds to changes in resource conditions (i.e. changes in stock biomass) and fishing practices (i.e. those that result in resource utilization and discarding). The new specifications are not expected to have a large impact on the amount or distribution of small-mesh multispecies fishing effort mainly because the existing landings and discards are below the respective proposed specifications of Allowable Biological Catches (ABCs), Annual Catch Limits (ACLs), and Total Allowable Landings (TALs). The proposed specifications are expected to have positive effects on the Target Species and on the Human Environment, with low negative impacts on Non-target Species, Protected Species, and on the Physical Environment and Essential Fish Habitat.

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 MSA (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.

6.7.5 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.

6.7.5.1 Red, silver, and offshore hake stocks

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 104. The indirectly negative actions described in this table are localized in near-shore 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 6.7.4.2), 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.

Climate change is already impacting fishery resources by shifting distributions, abundances, and phenology of species and the communities that depend on them. For example, cold water species are shifting northward. Some of these shifts are in response to warming waters and some are in response to changes in population abundance and age-structure. Water temperatures are known to exert significant influence different life stages, on reproductive and developmental processes, growth rates, and increase the likelihood of disease. Shifts in red and silver hake distribution in surveyed areas was evaluated and documented by Nye *et al.* 2009 and Nye *et al.* 2011. With shifting species distribution, loss of habitat, and changes in mortality, the ability of some fish stocks to respond to harvesting pressure may be reduced, while the ability of other fish stocks may be increased.

These impacts are expected to intensify in the future, increasing the need for a better understanding of which fishery resources are the most vulnerable. NMFS has developed a tool for rapidly assessing and indexing the vulnerability of fish stocks to climate change. The index can help fishery managers identify high vulnerability stocks and more effectively target limited research and assessment resources on stocks of highest concern. The methodology combines a stock's exposure and sensitivity (which includes adaptive capacity) to estimate overall vulnerability. Pilot tests have found the methodology to be robust across temperate and tropical ecosystems. A full assessment has been developed in the northeast U.S. for all managed fish and shellfish species in the spring of 2014 (Hare et al. 2016).

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on the managed resources. It is anticipated that the future management actions, described in Table 107, 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 red, silver, and offshore hakes productivity depends. The 2012 fishing year was the first year of implementation for an amendment which requires specification of ACLs/AMs and catch accountability (77 FR 19138 and 78 FR 20260) and this process has been carried forward into the 2015-2017 proposed measures. Implementation of ACLs and AMs represents a major change to the current management program and is expected to lead to improvements in resource sustainability over the long-term. These impacts could be broad in scope, but the impacts were evaluated in the EIS for Amendment 19 (NEFMC 2013). Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to red, silver, and offshore hakes have had a positive cumulative effect.

Catch limits for each of the managed resources have been specified to ensure these stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The impacts from annual specification of management measures established in previous years on the managed resources are largely dependent on how effective those measures were in meeting their intended objectives (i.e., preventing overfishing, achieve OY) and the extent to which mitigating measures were effective. The proposed action in this document would positively reinforce the past and anticipated positive cumulative effects on the red, silver, and offshore hakes stocks, 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 (see the table below).

Table 107. Summary of the effects of past, present, and reasonably foreseeable future actions on red, silver, and offshore hake stocks.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments and Frameworks to the FMP	**Direct Positive**		
Red, Silver, and Offshore Hakes Specifications	**Direct Positive**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Indirect Neutral**		
Amendment to address ACLs/AMs implemented	**Direct Positive**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Uncertain – Likely Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment	**Indirect Negative**		
Marine transportation	**Indirect Negative**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Indirect Negative**		
National Offshore Aquaculture Act of 2007	**Potentially Indirect Negative**		
Offshore Wind Energy Facilities (within 3 years)			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Uncertain – Likely Indirect Negative**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this specifications document	**Overall, actions have had, or will have, positive impacts on red, silver, and offshore hakes stocks**		

6.7.5.2 Non-target species and Bycatch

Those past, present, and reasonably foreseeable future actions, whose effects may impact non-target species and bycatch and the direction of those potential impacts, are summarized in Table 104. The effects of indirectly negative actions described in this table are localized in nears-shore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on non-target species and bycatch 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 6.7.4.2), 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 and bycatch (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 and annual specification process have had a positive cumulative effect on non-target species and bycatch. In particular, the small-mesh multispecies fishery is managed through specific exemptions from large-mesh multispecies regulations in such a way to minimize interactions with non-target species and bycatch. Specifically, these regulations include exemption areas and seasons in the northern management area that through prior experimental fishing permits have been shown to have acceptably low bycatch rates of large-mesh groundfish. In the southern management area, vessels may target red, silver, and offshore hakes year round, but operate in areas where large-mesh multispecies catches are low. Concern about these species is however changing, particularly for distressed or overfished species like yellowtail and windowpane flounders.

Implementation and application of a standardized bycatch reporting methodology (SBRM) 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. The redevelopment of the SBRM will result in better assessment of potential bycatch issues and allow more effective and specific management measures to be developed to address a bycatch problem. On-going research is being conducted through cooperative research and other programs to improve selectivity characteristics of small-mesh nets used by vessels targeting whiting and squids, particularly focused on reducing bycatch of yellowtail and windowpane flounders, species with sub-ACLs and subject to AMs. Use of these gears may be approved as an AM or as a technical measure in future management actions if they are shown to be effective.

It is anticipated that future management actions, described in Table 108, 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.

Catch limits for each of the managed resources have been specified to ensure these rebuilt stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The proposed actions in this document have impacts that range from neutral to positive or negative impacts, and would not change the past and anticipated positive cumulative effects on non-target species and thus, would not have any significant effect on these species individually or in conjunction with other anthropogenic activities (see table below).

Table 108. Summary of the effects of past, present, and reasonably foreseeable future actions on the non-target species and bycatch.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments and Frameworks to the FMP	**Direct Positive**		
Red, Silver, and Offshore Hakes Specifications	**Indirect Positive**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Neutral**		
Amendment to address ACLs/AMs implemented	**Potentially Indirect Positive**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Uncertain – Likely Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment	**Indirect Negative**		
Marine transportation	**Indirect Negative**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Indirect Negative**		
Offshore Wind Energy Facilities (within 3 years)			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Uncertain – Likely Indirect Negative**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this specifications document	**Overall, actions have had, or will have, positive impacts on the non-target species.**		

6.7.5.3 Physical Environment and Essential Fish Habitat

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 104. The direct and indirect negative actions described in this table are localized in near-shore 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 6.7.4.2), 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.

Climate change is expected to have an impact on the physical characteristics and essential fish habitat aspects of marine ecosystems, and possibly change the very nature of these ecosystems. Increased frequency and intensity of extreme weather events, like hurricanes, may change the physical structure of coastal areas. Water circulation, currents, and the proportion of source waters/freshwater intrusion have been observed to be changing (Ecosystem Assessment Program, NEFSC, 2012) which influences salinity, water column stratification, transport of nutrients, and food web processes. All of these factors, in addition to others like ocean acidification and changes to water chemistry (Rebuck *et al.* in prep), threaten living elements of the marine environment, such as corals and shellfish, and may be related to the observed shifts in the planktonic community structure that forms the basis of the marine food web.

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on habitat and EFH. The actions have constrained fishing effort at a large scale and locally, and have implemented gear requirements, which may reduce habitat impacts. As required under these FMP actions, EFH and HAPCs were designated for the managed resources. It is anticipated that the future management actions, described in Table 109, 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.

Catch limits for each of the managed resources have been specified to ensure that red, silver, and offshore hakes stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The proposed actions 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 (see table below).

Table 109. Summary of the effects of past, present, and reasonably foreseeable future actions on the physical environment and EFH.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments and Frameworks to the FMP	**Indirect Positive**		
Red, Silver, and Offshore Hakes Specifications	**Indirect Positive**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Neutral**		
Amendment to address ACLs/AMs implemented	**Potentially Indirect Positive**		
Agricultural runoff	**Direct Negative**		
Port maintenance	**Uncertain – Likely Direct Negative**		
Offshore disposal of dredged materials	**Direct Negative**		
Beach nourishment	**Direct Negative**		
Marine transportation	**Direct Negative**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Direct Negative**		
National Offshore Aquaculture Act of 2007	**Direct Negative**		
Offshore Wind Energy Facilities (within 3 years)			**Potentially Direct Negative**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Potentially Direct Negative**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this specifications document	**Overall, actions have had, or will have, direct negative to indirect positive impacts on the physical environment and EFH.**		

6.7.5.4 Protected Resources

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 104. The indirectly negative actions described in this table are localized in near-shore 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 6.7.4.2), 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.

Past fishery management actions taken through the FMP and annual specification 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 restrictions, open seasons, and exemption areas. It is anticipated that the future management actions, specifically those recommended by the ALWTRP and the development of strategies for sea turtle conservation described in Table 104, will result in additional indirect positive effects on the 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.

Catch limits for each of the managed resources have been specified to ensure that red, silver, and offshore hakes stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The proposed actions 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 110).

For sea turtles, changes to both their marine and terrestrial environment due to climate change pose a challenge. Recent studies suggest that warming temperatures at nesting beaches could have the strongest impacts on sea turtle populations due to reduced nest success and recruitment (Santidrian-Tomillo *et al.* 2012; Saba *et al.* 2012). Additionally, increased severity of extreme weather events may create erosion and damage to turtle nest and nesting sites (Goldenberg et al 2001; Webster et al 2005, IPCC 2013), resulting in a further reduction in nest success and recruitment. These potential declines in the success of nesting could have profound effects on the abundance and distribution of sea turtles. Moreover, warming air temperature can also affect the demography of sea turtle populations because the sex ratio of hatchling sea turtles is determined by the temperature during incubation in nesting beaches. Female offspring are produced at warmer temperatures and thus climate change could lead to a lower ratio of males in the population. Changes in water circulation near nesting beaches could affect the early life history stages of sea turtles by transporting passively-drifting hatchlings to waters that may have increased predation rates (Shillinger *et al.* 2012). Furthermore, prey availability and quality may also be affected by climate change but these projections are far less certain.

Marine mammals are subject to impacts from global climate change through climate variability, water temperature changes, changes to ocean currents, changes in impact primary productivity and prey species availability. For example, shifts in zooplankton patch formation, which have already been observed, could affect the feeding opportunities and therefore populations of North Atlantic Right Whales

(http://www.nmfs.noaa.gov/pr/species/mammals/whales/north-atlantic-right-whale.html). Susceptibility to disease, changes in toxicant exposure, and decreased reproductive success with rising ocean temperatures and related climate-ecosystem changes is also of concern (Burek et. al, 2008). Species that migrate to feeding grounds in polar regions (including many baleen whale populations) may be more susceptible to climate change in the near-term since conditions in the polar regions are changing more rapidly than in temperate regions.

Climate-induced environmental changes [warming water temperatures, increased precipitation and/or drought, decreasing pH, changes in stream flow or salinity, changes in seasonal distribution of spawners, prey mismatch, and/or increases in nutrient and toxic chemical concentrations (Murdoch et al. 2000)] have the potential to reduce the amount and quality of habitat for early life stages of Atlantic sturgeon and Atlantic salmon. Past, present, and future effects caused by agriculture, industrialization, urbanization, and the potential adaptations of human activity to respond to climate change through water extraction and power use could add to these stresses. Friedland (1998) found that juvenile salmon growth and habitat were affected by temperature regimes and flow conditions that are likely to be influenced by climate change. Adult sturgeon and salmon usually feed in estuarine and coastal marine habitats, consuming a variety of small crustaceans and small fish, which in turn rely on a diet including zooplankton. Crustaceans and zooplankton form their shells and skeletons from carbonate availability which is reduced by ocean acidification (Wood et. al. 2008). Spawning and rearing habitat could also be affected and restricted by the anticipated climate change effects, reducing productivity or survivability of Atlantic salmon and Atlantic sturgeon distinct population segments.

For additional information on potential climate change effects to Atlantic sturgeon and Atlantic salmon, please refer to the Endangered Species Act Section 7 Consultation for the Tappan Zee Bridge Replacement (NMFS 2017d). and the Worumbo Project (NMFS 2017e), respectively.

Table 110. 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 and Frameworks to the FMP	**Indirect Positive**		
Red, Silver, and Offshore Hakes Specifications	**Neutral**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Indirect positive**		
Amendment to address ACLs/AMs implemented	**Potentially Indirect Positive**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Direct and Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Direct and Indirect Negative**		
Marine transportation	**Direct and Indirect Negative**		
Installation of pipelines, utility lines and cables	**Potentially Direct Negative**		
Offshore Wind Energy Facilities (within 3 years)			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Direct and Indirect Negative**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this specifications document	**Overall, actions have had, or will have, indirect positive to direct and indirect negative on protected resources.**		

6.7.5.5 Fishery-related businesses and 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 104. The indirectly negative actions described in this table are localized in near-shore 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 6.7.4.2), 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.

As both the physical and ecological elements of the coastal and marine environments change through the impacts described in this section, there will be increasing challenges for the communities and individuals that depend on healthy and productive coasts and marine fisheries. The dynamics of certain fisheries may change entirely. Fishing-related businesses and communities also face a variety of other threats from changing climate including to human health concerns, energy, transportation, water resources, and food production.

Past fishery management actions taken through the FMP and annual specification 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 111, will result in positive effects for fishing-related businesses and communities due to sustainable management practices, although additional indirect negative effects on some businesses and 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 fishing-related businesses and communities have had an overall positive cumulative effect.

Catch limits and possession limits for each of the managed resources have been specified to ensure these rebuilt stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The impacts from annual specification measures established in previous years on the managed resources are largely dependent on how effective those measures were in meeting their intended objectives and the extent to which mitigating measures were effective. Overages may alter the timing of commercial fishery revenues (revenues realized a year earlier), and there may be impacts on some fishermen caused by unexpected reductions in their opportunities to earn revenues in the commercial fisheries in the year during which the overages are mitigated.

Despite the potential for negative short-term effects on fishing-related businesses and communities, the expectation is that there would be a positive long-term effect on them due to the long-term sustainability of red, silver, and offshore hake stocks. Overall, the proposed actions in this document would not change the past and anticipated cumulative effects on fishing-related businesses and communities and thus, would not have any significant effect on them individually, or in conjunction with other anthropogenic activities (see table below).

Table 111. Summary of the effects of past, present, and reasonably foreseeable future actions on fishing-related businesses and communities.

Action	**Past to the Present**		**Reasonably Foreseeable Future**
Original FMP and subsequent Amendments and Frameworks to the FMP	**Direct Positive**		
Red, Silver, and Offshore Hakes Specifications	**Direct Positive**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Potentially Indirect Negative**		
Amendment to address ACL/AMs implemented	**Potentially Direct Positive**		
Agricultural runoff	**Indirect Negative**		
Port maintenance	**Uncertain – Likely Mixed**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishmen	**Mixed**		
Marine transportation	**Mixed**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Mixed**		
Offshore Wind Energy Facilities (within 3 years)			**Uncertain – Likely Mixed**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Uncertain – Likely Mixed**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Negative**
Summary of past, present, and future actions excluding those proposed in this specifications document	**Overall, actions have had, or will have, positive impacts on fishing-related businesses and communities.**		

6.7.6 Summary of Cumulative Effects of the Preferred Action

The Council has identified its preferred action alternatives in Section 4.0. No Action has been chosen as the preferred alternative to address the issues identified in the Purpose and Need (Section 3.1s) for the reasons given in the Alternative (Section 4.0) and in the Executive Summary (Section 1.0) 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 alternatives. The direct and indirect impacts of the proposed action on the VECs are described in Section 6.0. The magnitude and significance of the cumulative effects, which include the additive and synergistic effects of the preferred alternatives, as well as past, present, and future actions, have been taken into account throughout Section 6.7.4 The action proposed in this annual specifications document builds off action taken in the original FMP and subsequent amendments and framework documents. 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 preferred alternatives in this document (Table 112).

Table 112. Magnitude and significance of the cumulative effects; the additive and synergistic effects of the preferred alternatives, as well as past, present, and future actions.

VEC	Status in 2013 (for greater detail also see NEFMC 2014)	Net Impact of P, Pr, and RFF Actions	Impact of the Preferred Alternatives (i.e. No Action)	Significant Cumulative Effects
Target species: Red, Silver, and Offshore Hake Stocks	Complex and variable (Section 6.2)	Direct positive (Section 6.7.5.1)	Low negative (Section ???)	**None**
Non-target Species and Bycatch	Complex and variable (Section 6.3)	Direct positive (Section 6.7.5.2)	Negative (Section ???)	**None**
Physical Environment and EFH	Complex and variable (Section 6.5)	Indirect positive (Section6.7.5.3)	Low negative (Section ???)	**None**
Protected Resources	Complex and variable (Section 6.4)	Indirect positive to direct and indirect negative (Section6.7.5.4)	Low negative to low positive (Section ???)	**None**
Fishery-related Businesses and Communities	Complex and variable (Section 6.6)	Direct positive (Section6.7.5.5)	Low negative to vessels in the fishery; Positive to new entrants to the fishery (Section ???)	**None**

7.0 RELATIONSHIP TO APPLICABLE LAWS (To Be Updated and Modified)

7.1 Magnuson-Stevens Fishery Conservation and Management Act - Consistency with National Standards

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; Public Law 94-265; http://www.nmfs.noaa.gov/sfa/laws_policies/msa/msa_2007.html) requires that regulations implementing any fishery management plan or amendment be consistent with the ten national standards and required provisions listed below.

At the present time, the preferred alternative is No Action (described in Section 4.1). The Council has chosen No Action as the preferred alternative because many believe that the lost opportunity cost created by limited access is too high and that current and future vessels in the fishery would not be able to achieve optimum yield. Many believe that there are or will be more effective and less costly means to control bycatch and prevent choke species from shutting down the fishery through measures such as more selective gears or changes to open fishing seasons and/or area boundaries.

On the other hand, this amendment presents several alternatives that would create a limited access program, including qualification criteria and measures that would apply to two limited access permit categories and an incidental permit for vessels that do not qualify.

The text that follows is written to describe how the existing management plan, enhanced by limited access, would address the 10 National Standards and required provisions described in the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the National Standard guidelines (http://www.nmfs.noaa.gov/sfa/laws_policies/national_standards/index.html). Obviously, if after public hearings the proposed action is in fact No Action, this section would need to be revised based on better evidence that limited access would not be needed to achieve the purpose and need (Section 3.1), prevent overfishing, while being less costly and more efficient.

7.1.1 National Standard 1

Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The proposed action is compliant with MSA National Standard 1 requirements for an acceptable biological catch (ABC) and interim ABC control rule, and ACL, and accountability measures (AMs). These primary measures are used to ensure that the risk of overfishing is low while producing optimum yield from the red, silver, and offshore hake stocks. The effects and risk of overfishing is analyzed and summarized in Section 6.2.

The proposed alternatives in this amendment are intended to make those and other measures more effective to achieve National Standard 1 for both target and non-target species (i.e. those managed by other FMPs), while minimizing potential regulatory costs on existing fishermen that target whiting and red hake. Changes in the whiting possession limits are proposed to improve the ability of the fishery to achieve optimum yield, by reducing negative impacts on prices when the northern exemption areas are open to small-mesh fishing and by increasing the possession limit in the southern management area. The latter measure is expected to benefit larger vessels that fish offshore on Georges Bank and the edge of the

continental shelf. It would improve profitability of these trips and increase the proportion of the ACL that is landed.

7.1.2 National Standard 2

Conservation and management measures shall be based on the best scientific information available.

The measures in this action are based on the best and most recent scientific information available including the red and silver hake stock assessments (NEFSC 2017), which includes an independent peer review, as updated by the NEFSC in NEFMC 2014, and recommendations from the Council's Science and Statistical Committee for setting ABCs for northern red and silver hake and southern red hake and whiting. Specifications for 2018-2020 are being adjusted in a companion action to take effect on May 1, 2018.

A broad array of fishery and economic data are used in this document to analyze and evaluate the effects of limited access and possession limit alternatives. These data include the most up to date information on vessel history and fishing activity through 2016. These data come from dealer reports (1996-2016), vessel trip reports (1996-2016), and the Data Matching Imputation System (2007-2012) which combines the first two reports as accurately as possible. For analysis, vessel history during each of the three qualification periods in the alternatives was determined from the highest landings in the qualification period. The effects of the proposed alternatives on the fishing activity, landings, revenue, and communities were analyzed using 2014-2016 vessel trip report data[34]. These data are broken out by fishing community which would be affected by 1) a profitable fleet of vessels that target small-mesh multispecies and 2) the amount of current fishery participants that would not qualifying under the proposed qualification criteria alternatives. Data on fishery employment and revenues for communities were updated through 2016 by the NEFSC Social Science Branch.

It is very difficult to estimate risk to the industry from additional vessels entering the fishery, because it depends on a variety of unpredictable factors. The effects of a wide range of limited access qualification alternatives were analyzed however, but the true degree of risk from new fishery entrants is difficult to assess without knowing the type and costs of measures that would be required to address bycatch issues caused by fishery catches exceeding ACLs.

Bycatch estimates were made by analyzing all observed trips from 1989 to 2016 landing more than 2000 lbs. whiting or 400 lbs. red hake, which would be the affected entities for any alternative in this amendment. Trips from both NE Fishery Observer Program and the At-sea Monitoring program were used. The analyses were conducted much the same way as estimates for other fisheries were made using standardized and peer reviewed procedures (applying the total discard to total kept ratio for observed trips in a stratum to total landings on all trips landing more than 2000 lbs. whiting or 400 lbs. of red hake), but in this case had been re-stratified to be more consistent with how the whiting fishery operates. A full detailed analysis of this analysis is provided in Appendix I.

[34] Dealer data were not used for this purpose because whiting trips are often split or combined when trucking product and selling to sometimes remotely located dealers that handle large volumes of fish. Frequently, reports by dealers do not represent an entire trip or represent multiple trips that have been combined.

To evaluate the effect of an alternative that exempts non-qualifying vessels from an incidental possession limit when fishing in an exemption area that requires a raised footrope trawl, we analyzed all available data, starting with the initial 1995 gear trials that compared catches with a standard small-mesh trawl. We could not attribute differences in discard to kept ratios on observed trips to the gear per se, because groundfish and other species availability to the gears vary over space and time. There are no paired gear comparisons that are available to accurately assess the effect of the alternative in Section 4.3.3.2.5 an No Action to meet the purpose and need of the amendment (Section 3.1). A comparison of bycatch rates between areas requiring a raised footrope trawl and those that do not have this requirement was performed using observer data, but the interpretation of the gear effect is compromised by the areas having different boundaries and seasons.

All analyses were developed and reviewed by the Council's Whiting Plan Development Team, a committee of professional scientists and analysts.

7.1.3 National Standard 3

To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The proposed action manages each small-mesh multispecies stock as a unit throughout its range. Management measures applied to one stock typically apply to the entire range of the stock. To the extent possible while achieving the management objectives and preventing overfishing on individual stocks, management measures in the proposed action and that exist in the FMP apply throughout the range and often throughout both stock areas (northern [Gulf of Maine and northern Georges Bank] and southern [southern Georges Bank, Southern New England, and the Mid-Atlantic] management areas). This consistency improves understanding, compliance and enforceability, which minimizes costs to the government.

The proposed limited access alternatives would apply a single set of qualification thresholds to the entire fishery and vessels so qualified would be able to fish for whiting and red hake throughout the range. The sole exception to this would be an alternative that would allow non-qualifying vessels to fish in exemption areas that require a raised footrope trawl (see Section 4.3.3.2.5). This requirement applies to specific exemption areas are in the Gulf of Maine and near Cape Cod, all in the northern management area.

7.1.4 National Standard 4

Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be: (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The proposed measures are the same for all vessels in the small-mesh multispecies fishery regardless of the state of residence of the owner or operator of the vessels. Although any fishing mortality control (including possession limits, quotas, and exemption areas where small-mesh multispecies fishing is allowed) result in the allocation of fishery resources, the measures in the proposed action are reasonably expected to promote conservation by continuing to prevent overfishing and rebuild overfished stocks.

The limited access alternatives in Section 4.3 encompass a broad range of qualification criteria that could qualify historic as well as more recent participants in the fishery. Furthermore, the alternatives propose two qualification categories, a Category I permit that would have a higher qualification threshold for more active vessels in the fishery and a Category II permit with a lower qualification threshold for less active or smaller vessels. Alternatives in Sections 4.3.2 and 4.3.3 include measures that are intended to be consistent with the typical operation of qualifying vessels. These measures would also promote conservation by reducing the incentive for a Category II vessel to upgrade or fish longer, offshore trips like a Category I vessel would often do. The benefits and costs of the proposed limited access alternatives is analyzed extensively in Section 6.4.3, including the effects on fishing communities that serve as primary ports in the fishery.

The amendment includes alternatives in Section 4.3.3.1 that would limit upgrading and an accumulation limit. These measures, if adopted, would limit the ability of a person or business entity from acquiring excessive shares and fishery permits. It is very complex to estimate the potential economic effects of acquiring excessive shares in this fishery, but Section 6.4.3.3.1 provides a qualitative evaluation of those effects on the economy and on communities.

The proposed limited access alternatives would apply a single set of qualification thresholds to the entire fishery and vessels so qualified would be able to fish for whiting and red hake throughout the range. The sole exception to this would be an alternative that would allow non-qualifying vessels to fish in exemption areas that require a raised footrope trawl. These areas are in the Gulf of Maine and near Cape Cod, all in the northern management area. This alternative (see Section 4.3.3.2.5) could be advantageous to non-qualifying vessels operating from neighboring states (i.e. ME, NH, and MA), but the raised footrope trawl requirement that applies to specific areas is intended to minimize regulated groundfish bycatch to acceptable levels, not as a method to allocate or redistribute catch of small-mesh multispecies.

A vessel from any state could qualify for limited access and fish in any area that is open to small-mesh fishing. Furthermore, owners and fishermen of vessels that qualify for limited access would benefit from successful and more efficient management of the fishery.

7.1.5 National Standard 5

Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

While the catches of whiting have been well below the existing Annual Catch Limits, limiting and managing the catches of non-target species in this fishery have been and could be costly and inefficient. Measures needed to control catch without limited access would be less effective and could be much costlier if the effects could be mitigated by additional vessels entering the fishery.

Future actions to control bycatch would be more conservative when the risks of increasing effort are taken into account, then they would be if increases in effort were limited by a fixed number of qualified vessels that are permitted by high possession limits to target whiting and red hake. Although non-qualifying vessels with incidental permits could target whiting and red hake, incidental possession limits would make increases in fishing effort by new entrants very unlikely.

If and when the Council needs to take action to limit non-target catch to keep the fishery from exceeding annual catch limits for red hake, yellowtail flounder, and possibly other species, it would consider measures such as low possession limits to discourage targeting, area and/or seasonal closures, and more

selective gear (if such gear reduces bycatch of the problematic stock). These measures would probably be applied over a longer time or broader area if there is a substantial risk of increasing fishing effort by vessels entering the fishery to target whiting. By the same token, increasing fishing effort by vessels entering the fishery to target whiting would increase the risk that catches of non-target species would exceed their annual catch limits. In either case, the management cost would be greater and the fishery would be less efficient without controls on the number of vessels in the fishery through a limited access program.

A related issue under Section 303(b)(6) of the Magnuson-Stevens Act and in §600.325(c)(3) is the manner of allocation, also addressed above for National Standard 4. All issues and effects concerning current and historic harvesting, fishery employment, investment and dependence, and current and historic participation of communities in the community have been considered and analyzed in Section 6.2.3.1. The amendment has considered and offers alternatives that address participation of small vessels and communities that depend on them, as well as accumulation of excessive shares, with limited access permits that are scaled to past and current participation levels in the fishery.

There are five limited access qualification alternatives that offer a range of choices, considering a tradeoff between equitable allocation and efficiency (i.e. permits that qualify but have not recently fished for whiting or red hake).

7.1.6 National Standard 6

Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The Northeast Multispecies FMP includes precautionary ACL specifications for whiting (silver and offshore hakes) and red hake stocks because of the relatively high level of uncertainty about proxy reference points and potential consequences of depletion from the important role of silver hake in the ecosystem. The fishery also serves as an important source of income for a variety of trawl fishing vessels, both large and small vessels fishing inshore and offshore. Because of these factors the effects of overfishing and resource depletion could be severe and long-lasting. Facing this potential outcome with existing management measures could be difficult with an open access fishery and the potential for new commercial effort entering the fishery.

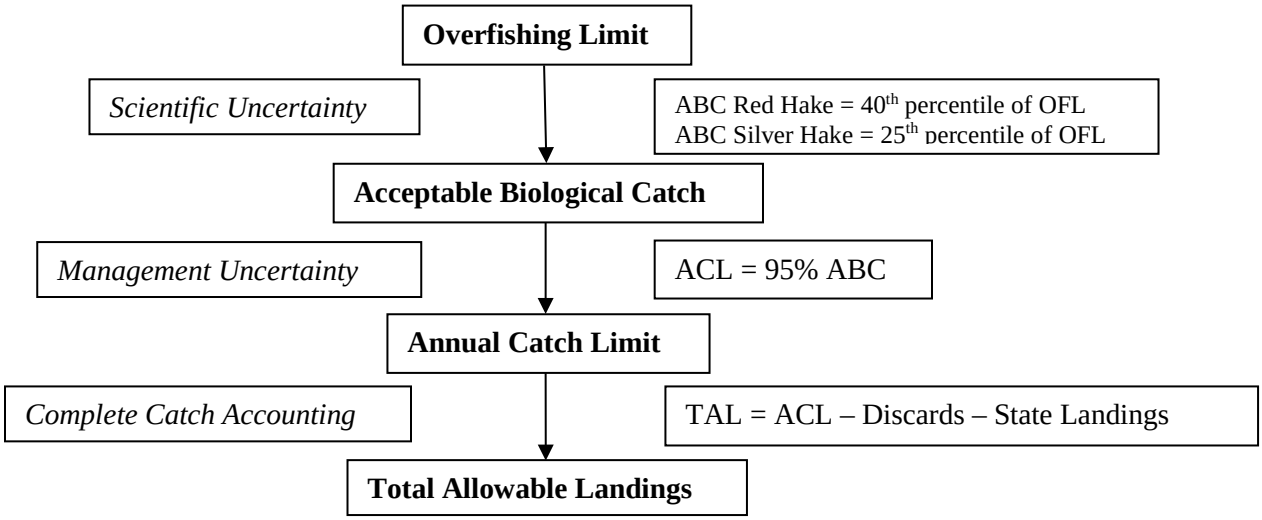
Taking these considerations into account, the Council has set a fairly wide buffer between the Overfishing Level (OFL) and the Allowable Biological Catch (ABC). For red hake, the Council chose an uncertainty level known as P*=40%[35]. Taking uncertainty in the biomass estimates and reference points into account, the estimated risk of overfishing by a catch equal to the ABC is 0% (NEFMC 2017a). Silver hake is a more valuable target species and serves as an important prey species for a variety of important predators. Hence the Council chose an uncertainty level of P*=25%. If the 2018 catch equals the ABC, the estimated risk of overfishing is estimated to be 0% (NEFMC 2017a). There is some added uncertainty about how well the accountability measures (AMs) would control catch when the landings reach the Total Allowable Landings (TAL) level (see figure below). This source of uncertainty comes from the amount of discards and the amount of landings by state-permitted vessels fishing in state waters.

Increasing effort by existing and new vessels could increase this uncertainty, requiring a larger buffer between allowable landings and catch, and the overfishing limit. It could require the Council to increase the buffer to account for uncertainty and/or increase the severity of regulations to ensure that catch

[35] P*=50% is considered to be risk-neutral and P*=0% would allow no catch.

remains below these limits. Both actions could be costly to industry, to the economy, and to dependent fishing communities.

Figure 55. Diagram of ACL specifications for whiting and red hake.



Limited access could reduce the risk and cost associated with new vessels entering the fishery when more restrictive regulations are needed to prevent overfishing. Increases in demand for whiting for food and/or red hake for bait and food could make it more attractive to new vessels entering the fishery. Increasingly restrictive regulations in other fisheries, particularly trawl fisheries for groundfish, monkfish, skates, squid, butterfish, and herring, could drive more vessels to seek an alternative source of income from the open access whiting fishery. The ABCs for whiting and red hake have and could vary considerably as well, requiring measures to limit target catch.

In all the above outcomes, these restrictions would be more conservative and costly in an open access fishery, potentially harming both existing fishermen and future fishermen that would purchase a vessel with a limited access permit. In essence, a limited access program would address the uncertainties in the resource conditions and in the fishery, but the cost of doing so would arise from lost potential if the qualified vessels are unable to catch optimum yield.

7.1.7 National Standard 7

Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Limited access would not duplicate regulations in other FMPs or cause increases in compliance and enforcement costs. In fact, with a fixed number of vessels, it could be easier to identify who should be fishing for small-mesh multispecies and what rules apply to them. All other vessels would be subject to a 2000 lbs. whiting and 400 lbs. red hake possession limit. Although it is difficult to forecast the type of measures that might be needed if bycatch exceeds limits or the stocks in the fishery become overfished, these measures are very likely to be more severe and potentially more complicated with an open access fishery than they would be without. Because as of 2016, southern red hake became overfished, the Council is likely to initiate an amendment to address the overfished condition and begin rebuilding. Much of the catch of southern red hake is composed of discards in the small-mesh fisheries for whiting and squid.

7.1.8 National Standard 8

Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse impacts on such communities.

The limited access alternatives were developed with the support and active participation of industry advisors. Because the qualification period focuses on a range of years (1996-2016) and the criteria are set at reasonable amounts for vessels that target small-mesh multispecies, the measures are expected to benefit existing fishing communities that support and rely on these vessels. Without limited access, many more vessels from larger ports could enter the fishery and make it more difficult for small communities to compete, particularly if more stringent regulations are required. An extensive analysis of community participation by vessels that potentially qualify for limited access under the five alternatives, plus participation by vessels that would not qualify (because they made very few trips, participated in the fishery over 15 years ago, or did not target whiting) is provided in Section 6.6. Since the intention of the limited access qualification alternatives in Section 4.3 is to 'freeze the footprint of the fishery', the proposed alternatives would sustain participation of fishing communities that depend on whiting landings and fishing activity.

7.1.9 National Standard 9

Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

The fishing industry is very concerned that increasing fishing effort by new entrants to the whiting fishery could increase bycatch to unacceptable levels. Some experienced fishermen claim that the more experienced fishermen can avoid and minimize bycatch while targeting whiting, particularly when using the raised footrope trawl. This gear is very sensitive to fine tuning to enable it to catch whiting while minimizing the bycatch of flatfish and other species. The analysis (see Section 6.3.3 and Appendix I) of bycatch rates for qualifying and non-qualifying vessels did not reveal any consistent significant differences, however. Nonetheless, limited access would restrict the number of vessels in the fishery and the potential for increases in bycatch.

The fishery is regulated through a series of exemption areas and gear restrictions, both intended to minimize bycatch, particularly of regulated multispecies. The exemption areas were evaluated through a series of experimental fisheries before implementation. Some changes in catch and bycatch rates may have occurred through the seasonal redistribution of whiting and other species in response to trends in water temperature. Massachusetts Division of Marine Fisheries is currently conducting an experimental fishery to determine whether seasonal adjustments are necessary and justified.

Most vessels in the fishery are required to document discards on Vessel Trip Reports and many are sampled by at-sea observers on randomly selected trips. These data allow documentation and estimation of bycatch. An extensive analysis of historic and recent bycatch rates is provided in Section 6.3.3 and Appendix I of this document.

7.1.10 National Standard 10

Conservation and management measures shall, to the extent practicable, promote safety of human life at sea.

The existing exemption area seasons reflect the historic patterns of small-mesh fishing before the implementation of the regulated mesh areas in 1994, while also minimizing bycatch of regulated multispecies. Existing possession limits and regulations, it do not appear to place vessels and fishermen in riskier situations than would occur in the absence of these regulations.

With limited access, it is more likely that existing fishing areas and seasons would continue and not place any undue hardship or risk to vessels and fishermen. Without limited access, these regulations would be more likely to change in response to increases in fishing effort and bycatch. The changes could reduce operational flexibility making it more difficult to avoid adverse weather conditions.

7.1.11 Magnuson-Stevens Act FMP Requirements

Section 303 (a) of FCMA contains 15 required provisions for FMPs that are listed below. The requirement applies to the FMP, and in some cases, the FMP as amended, and not the submission document for the proposed action.

(1) Contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States;

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

(2) Contain a description of the fishery;

An updated description of the fishery is included in the SAFE Report for Fishing Year 2016 (NEFMC 2017).

(3) Assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

The alternatives in this amendment are intended to balance the fishing capacity of the fishery with the current and probably future catch limits for target and particularly non-target species. The recent whiting catch limits were well above landings and catch, indicating that allowance for increasing fishing capacity is warranted. Silver hake populations have however varied over time and the recent high productivity of silver hake could be short-lived. Catches of offshore hake (the other target whiting species) have also varied quite a bit over the time series, but the status is unknown due to insufficient data. Offshore hake catches appear to vary as a function of availability on the continental shelf than as a function of population trends.

Various factors constrain the ability to fish for whiting, including fishing restrictions to keep non-target catches of groundfish at acceptable levels, limits on market demand, and the special fishing knowledge needed to successfully target whiting. Limits on non-target species catches are the primary issue addressed by this amendment. If new vessels enter the fishery, non-target catches could increase and require more restrictive regulations, such as shorter seasons, fewer open

fishing areas, and more selective fishing gears (if they reduce catch of the problem species). Such a response would negatively affect existing small-mesh multispecies fishing vessels and the communities that derive benefits from their landings and supply purchases.

Although the proposed 2018-2020 specifications increased the catch limit for northern red hake, the fishery has exceeded the Total Allowable Landings limit several times, triggering in-season accountability measures. More importantly, catches have exceeded the Allowable Biological Catch (ABC), causing overfishing. Meanwhile, the southern red hake catches exceeded the 2016 ABC and overfishing occurred. The proposed 2018-2020 specifications are lower than the 2017 limits by 35% for southern whiting and by 38% for southern red hake. If landings remain constant, in-season accountability measures are unlikely to be triggered due to whiting landings, but are likely to be triggered for red hake landings (with the intention of reducing catch and preventing overfishing).

Also, catches of Georges Bank yellowtail flounder have been a concern, due in part from a low sub-ACL allocated to the small-mesh multispecies fishery. If Georges Bank yellowtail flounder catch exceeds the sub-ACL, it would automatically trigger a requirement to use more selective trawls, which could also reduce whiting catches and negatively affect vessel profits. Analysis of bycatch in this document shows a large increase in haddock bycatch, which may require a future action if unchecked. Currently, the high haddock bycatch appears to be a function of several large year classes of haddock, which may be a transitory event as the haddock age and become disassociated with silver hake.

Thus, although increases in silver hake catches may be warranted at present, variations in biomass have been observed before and could decline so that existing catches would be capped. This change may be happening for southern whiting. Catches of red hake are at or near capacitiy, while bycatch of groundfish and potentially other species may be limited, unable to absorb increases in small-mesh multispecies fishing effort.

(4) Assess and specify – (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3); (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing; and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

Vessels operating in the fishery and those that have been permitted to fish for small-mesh multispecies have the capacity to harvest optimum yield. Existing regulatory restrictions to manage large-mesh multispecies bycatch and limits on domestic and foreign market demand are factors that control landings.

(5) Specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used;

Vessels on small-mesh multispecies trips must submit Vessel Trip Reports (VTRs) for each fishing trip. Dealers are also required to submit reports on the purchases of small-mesh multispecies from permitted vessels. Many vessels in the fishery also report their vessel activity through a Vessel Monitoring System, owing to their participation in the Northeast Multispecies or

other fisheries that require the vessel to use this reporting equipment. Vessels are also subject to sampling by the Northeast Fishery Observer Program that provides detailed information about the trip, vessel, catch, and discarding on a significant subsample of randomly selected trips, following procedures in the Standardized Bycatch Reporting Monitoring program. Current reporting requirements are detailed in 50 CFR 648.7.

(6) Consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery;

The proposed action does not contain any measures that would penalize vessels that were prevented from harvesting small-mesh multispecies because of weather of other ocean conditions. More specifically, this amendment's alternatives propose a limited access program that will cap the number of vessels in the fishery. Potentially, these alternatives would lengthen the time that the fishery is open and maximize areas where fishing may occur. On the other hand, No Action would allow new vessels to enter the fishery and potentially shorten the season, particularly if accountability measures and other technical measures are triggered to control bycatch.

(7) Describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305 (b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

Essential fish habitat for red, silver, and offshore hakes was defined in the Omnibus Essential Fish Habitat (EFH) Amendment 1 (NEFMC 1998, implemented in 1999). The designations were updated via Omnibus EFH Amendment 2 and will go into effect in January 2018[36]. Differences between the original and updated EFH designations are explained in Section 2.2.2 of Volume 2 of the Omnibus EFH Amendment 2 FEIS (NEFMC 2017). This action does not change the EFH designations.

(8) In the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

Scientific needs are continuously reviewed and revised by the Council's Research Steering Committee and the Northeast Stock Assessment Workshop, which consult with NMFS, the Council and its Plan Development Teams, Science and Statistical Committee and species oversight committees about scientific data needs.

(9) Include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and

[36] Note that the EFH designations will be effective with the ROD on the amendment (1/4/2018) but the spatial management measures will not take effect until April or May with the final rule.

management measures on – (A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

Impacts on fishing communities affected by this action can be found in Section 6.6 and 6.7.5.

(10) Specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

The Amendment 19 to the Northeast Multispecies FMP (NEFMC 2011) established criteria to determine whether the small-mesh multispecies stocks were either in an overfished condition, subject to overfishing, or both. The overfishing definitions are described in Section 5.2.2. This action does not change those criteria.

(11) Establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority – (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided;

This action does not include changes to the current Standardized Bycatch Reporting Methodology implemented under the Standardized Bycatch Reporting Methodology Omnibus Amendment (Amendment 15 to the Northeast Multispecies FMP; NEFMC 2007) implemented in February 2008 and the second Standardized Bycatch Reporting Methodology Omnibus Amendment (Amendment 20 to the Northeast Multispecies FMP; NEFMC 2015) implemented in June 2015 (CFR 80:125 p 37182-37199). This methodology is expected to assess the amount and type of bycatch in the small-mesh multispecies fishery and help identify ways the fishery can minimize bycatch and mortality of bycatch which cannot be avoided.

(12) Assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

Recreational catches are a very small proportion of total catches of red and silver hakes and are almost non-existent for offshore hake. As such, the catches are accounted for within the 5% allowance for management uncertainty, but were estimated in the SAFE Report for Fishing Year 2016 (NEFMC 2017).

(13) Include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors;

Amendment 19 as updated by the SAFE Report (NEFMC 2014) provides a description of the commercial small-mesh multispecies fishery. The information about the commercial fishery and recent trends are analyzed and discussed in Sections 5.2.5 and 5.4 of this document. There is no recreational or charter fishing that target small-mesh multispecies, but red and silver hake are often captured for bait, particularly in the fishery that targets bluefin tuna.

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

Catches are not allocated among the commercial, recreational, and charter fishing sectors. Recreational and charter catches of whiting and red hake are described in Section 5.2.5 . These two sectors rarely target silver or red hake, but there are minor recreational catches in the Mid-Atlantic and Gulf of Maine groundfish hook and line fishery. Catches in these two sectors are not limited.

This amendment proposes limited access alternatives that will fix the number of vessels in the fishery, based on past participation in the fishery. Thus, any benefits that accrue from this and future management actions is likely to benefit the existing fishery participants. On the other hand, No Action will allow new vessels to enter the fishery which may have negative consequences for existing vessels.

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

The proposed action maintains an ABC, annual catch limit, total allowable landings and accountability measures that would prevent overfishing and ensure accountability.

7.2 National Environmental Policy Act of 1969 (NEPA)

NEPA provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. This document is designed to meet the requirements of both the M-S Act and NEPA. The Council on Environmental Quality (CEQ) has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508) and NOAA's agency policy and procedures for NEPA are found in NOAA Administrative Order 216-6. All of those requirements are addressed in this document, as referenced below.

The required elements of an Environmental Impact Statement Assessment (EIS) are specified in 40 CFR 1508.9(b) and NAO 216-6 Section 5.04b.1. They are included in this document as follows:

- The need for this action is described in Section 3.1;
- The alternatives that were considered are described in Section 4.0;
- The environmental impacts of the Proposed Action are described in Section 6.0;
- The agencies and persons consulted on this action are listed in Section 7.2.5.

This document includes the following additional sections that are based on requirements for an Environmental Impact Statement (EIS).

- An Executive Summary can be found in Section 1.0.
- A table of contents can be found in Section 2.0.
- Background and purpose are described in Section 3.0.
- A brief description of the affected environment is in Section 5.0.
- Cumulative impacts of the alternatives are described in Section 6.7.
- A list of preparers is in Section 7.2.4.
- The index is in Section 9.0.

7.2.1 Scoping Summary

The Council announced its intent to prepare Amendment 22 and an Environmental Impact Statement (EIS) on November 23, 2015 (80 Federal Register 72951; URL: https://www.federalregister.gov/documents/2015/11/23/2015-29795/fisheries-of-the-northeastern-united-states-northeast-multispecies-fishery-management-plan-notice-of). The scoping period extended from that date until January 7, 2016. Hearings were held in six locations, including a supplemental hearing held on January 20, 2016 in Warwick, RI at the request of the fishing industry. Hearing summaries for these six meetings are available on the NEFMC website (https://www.nefmc.org/library/amendment-22) and reproduced in Appendix II (Section 12.0). Written comments from 11 people were also received and are reproduced in Appendix II. The scoping document that was distributed before and during these hearings is available at: http://s3.amazonaws.com/nefmc.org/a-22-whiting-Scoping-document-4.pdf.

Hearing comments focused on the need to implement a small-mesh multispecies limited access program, focusing on the following issues:

1. Limited access qualification criteria
2. Limited access permit characteristics and conditions
3. Permit categories and associated measures (Multi-tiered limited access and incidental permits)

The public scoping hearings were lightly to moderately attended by fishermen and other interested parties. The comments fell into four broad categories, which were more or less equally represented.

One group was currently active, full-time whiting fishermen. Many of these people were in support of a limited access program to lessen the potential burden and cost of addressing choke species (species whose bycatch was higher than acceptable amounts) catch through untested gears and/or technical measures such as closed areas and seasons. They feared that open access would allow new entrants to the fishery which would cause bycatch to increase above acceptable amounts. Others, however, supported a broader application of the raised footrope trawl which they felt was effective at reducing bycatch as well as limited access to control expansion of the fleet and increases in fishing effort.

A second group was composed of less-active whiting fishermen who occasionally targeted whiting on a seasonal basis. Many of these people were concerned that a high qualification criterion would shut them out of the whiting fishery. Some opposed limited access for this reason, while others suggested setting a low qualification criterion coupled with a whiting possession limit that was consistent with their fishery. Many of these fishermen operated from Southern New England ports.

A third group was composed of fishermen that were active in the whiting fishery many years ago, who feared losing potential access due to the duration of the qualification period or a high qualification

threshold that they could not meet. Some fished for small-mesh multispecies before the regulated mesh areas were adopted in the Northeast Multispecies FMP in 1995. Some advocated starting the qualification period as early as possible into the mid-1990s or earlier. Some have entered the small-mesh multispecies fishery after the 2012 control date, as large-mesh groundfish regulations became more restrictive and whiting abundance increased. Many of these fishermen operated from Gloucester, Boston, and New Bedford. They did not feel that limited access should be considered because the fishery had been harvesting a small fraction of recent annual catch limits and not achieving optimum yield.

Other people opposed limited access on the principle that it would not be the most efficient means to limit catches of groundfish and other species. They felt that the raised footrope trawl and other gears or technical measures would be more effective at limiting catch of choke species, despite potential expansion of effort without limited access.

7.2.2 Document Distribution

The draft document is available on the NEFMC web page, www.nefmc.org. Copies were provided to all Council members. Announcements of the documents availability will be made in the Federal Register and to the interested parties' mailing list. In addition, copies were distributed to the following:

Division Chief
F/PR3; Endangered Species Division
National Marine Fisheries Service

Division Chief
F/EN; Enforcement Division
National Marine Fisheries Service

Division Chief
F/SF3; Domestic Fisheries Division
National Marine Fisheries Service

U.S. EPA, Region 1
1 Congress St., 11th Floor
Boston, MA 02203-0001

U.S. EPA, Region 2
290 Broadway, 25th Floor
New York, NY 10007

U.S. EPA, Region 3
1650 Arch Street
Philadelphia, PA 19106

U.S. EPA, Region 4
61 Forsyth Street
Atlanta, GA 30303

District Commander
First U.S. Coast Guard District
408 Atlantic Avenue
Boston, MA 02210-2209

Director, Office of Marine Conservation
Department of State
2201 "C" Street, NW
Washington, DC 20520

Executive Director
Marine Mammal Commission
4340 East-West Highway
Bethesda, MD 20814

Director, Office of Environmental Policy and Compliance
U.S. Department of Interior
Main Interior Building (MS 2462)
1849 "C" Street, NW
Washington, DC 20520

7.2.3 Areas of Controversy

The primary controversy is the tradeoff between maintaining a healthy and profitable fishery for existing small-mesh multispecies fishermen and allowing additional fishermen the opportunity to catch optimum yield of whiting, particularly when biomass increases as it has recently in the northern management area (Gulf of Maine and northern Georges Bank). Also some fishermen had a history of fishing for whiting over 20 years ago before the Northeast Multispecies Fishery Management Plan created the Regulated Large Mesh (Management) Areas in 1995. There was a hiatus in small-mesh fishing from 1995 until 1998 in the northern management area, until small-mesh fishing was allowed again but only in specific exemption areas. During this time, many vessels focused on large-mesh fishing for groundfish and did not re-enter the small-mesh multispecies fishery when the exemption areas opened.

Other fishermen targeting whiting inshore on short trips during specific seasons, making a few trips per year and landing smaller amounts of fish. These fishermen expressed concern about a limited access program for which they might be unlikely to qualify. To address this concern, the Council developed alternatives with two limited access categories. Category II would have a low qualification threshold and could have possession limits that would be more consistent with the normal small-mesh multispecies fishing activity of qualifiers using smaller boats while fishing inshore. Alternative 2 (Section 4.3.1.2) has the lowest threshold, only 20,000 lbs. total for a five-year period (2008-2012). Alternatives 3 (Section 4.3.1.3) and 4 (Section 4.3.1.4) allow vessels to qualify with landings history through 2016, potentially qualifying more recent entrants in the fishery (e.g. vessels that entered the fishery after the 2012 control date).

Some fishermen (particularly recent entrants to the fishery and others that want to preserve the opportunity to enter the fishery) believe that technical measures should be applied to address non-target catch and bycatch problems, rather than limiting the number of vessels to cap fishing effort. They believe that the lost opportunity costs of a limited access program will be greater than the costs associated with other measures (i.e. closed seasons, smaller or modified open areas, or selective gears) to address the purpose and need of this amendment.

Many fishermen also believe that the raised footrope trawl satisfactorily addresses the concerns about bycatch being a choke on the fishery, because the gear is more selective than unmodified small-mesh trawls. While true for flatfish species (e.g. flounders, monkfish, skates), the raised footrope trawl gear does not appear to reduce catches of other potential choke species (e.g. red hake and haddock) (see Sections 5.2.6, 6.3.3.3.2.5, and 11.0 for this analysis). Nonetheless, the Council added an alternative (Section 4.3.3.2.5) that would exempt non-qualifying vessels from the incidental possession limits (2,000 lbs. whiting and 400 lbs. red hake) when fishing in exemption areas that require a raised footrope trawl. These vessels would therefore not need to qualify for limited access to continue fishing for small-mesh multispecies in these areas. Through a future action, a raised footrope trawl could also be required in other areas that do not now require it.

7.2.4 List of Preparers

In addition to the members of the Council's Scientific and Statistical Committee and the Whiting Advisory Panel, the following individuals contributed to material in this document or were consulted during the preparation of this action and drafting of this document:

Dr. Olanrewaju Alade, Population Dynamics Branch, Northeast Fisheries Science Center, NMFS, 166 Water St., Woods Hole MA 02543. Email: larry.alade@noaa.gov .

Mr. Andrew Applegate, New England Fishery Management Council, 50 Water St., Newburyport MA 01950. Email: aapplegate@nefmc.org.

Mr. Timothy Cardiasmenos, Greater Atlantic Regional Office, 55 Great Republic Drive, Gloucester . timothy.cardiasmenos@noaa.gov.

Mr. Peter Burns, Sustainable Fisheries Division, Greater Atlantic Regional Office, 55 Great Republic Drive, Gloucester. peter.burns@noaa.gov.

Dr. Naresh Pradhan, New England Fishery Management Council, 50 Water St., Newburyport MA 01950.

Dr. Rachel Feeney, New England Fishery Management Council, 50 Water St., Newburyport MA 01950.

Mrs. Michelle Bachman, New England Fishery Management Council, 50 Water St., Newburyport MA 01950.

Ms. Danielle Palmer, Protected Resources Division, Greater Atlantic Regional Office, 55 Great Republic Drive, Gloucester . danielle.palmer@noaa.gov .

7.2.5 Agencies Consulted

The following agencies were consulted in the preparation of this document:

- Mid-Atlantic Fishery Management Council
- New England Fishery Management Council, which includes representatives from the following additional organizations:
- Connecticut Department of Environmental Protection
- Rhode Island Department of Environmental Management
- Massachusetts Division of Marine Fisheries
- New Hampshire Fish and Game
- Maine Department of Marine Resources
- National Marine Fisheries Service, NOAA, Department of Commerce
- United States Coast Guard, Department of Homeland Security

7.2.6 Opportunity for Public Comment

The Proposed Action was developed during the period November 2006 through September 2009 and was discussed at the following meetings. Opportunities for public comment were provided at Advisory Panel, Committee, and Council meetings. There are limited opportunities to comment at PDT meetings and conference calls. The meeting notices, agendas and public documents can be accessed at https://www.nefmc.org/management-plans/meetings/small-mesh-multispecies and https://www.nefmc.org/council-meetings/meetings/councilmeeting#past.

Table 113. Date and location of scoping hearings and meetings when Draft Amendment 22 was developed.

Date	Meeting type	Location
September 10, 2015	Joint Whiting Committee and Advisory Panel	Warwick, RI

Date	Meeting type	Location
September 29 - October 1, 2015	Council	Plymouth, MA
December 1, 2015	Public scoping hearing	Portland, ME
December 8, 2015	Public scoping hearing	Gloucester, MA
December 14, 2015	Public scoping hearing	New Bedford, MA
December 17, 2015	Public scoping hearing	Via Online Webinar
December 21, 2015	Public scoping hearing	Montauk, NY
January 20, 2016	Supplemental Public scoping hearing	Warwick, RI
January 21, 2016	Whiting Committee	Warwick, RI
January 26-28, 2016	Council	Portsmouth, NH
March 14, 2016	Whiting Plan Development Team (PDT)	Rockland, MA
April 5, 2016	Whiting Committee	Warwick, RI
May 20, 2016	PDT	Public conference call
June 14, 2016	PDT	Public conference call
June 20, 2016	Whiting Committee	Portland, ME
June 21-23, 2016	Council	Portland, ME
July 13, 2016	PDT	Public conference call
August 23, 2016	PDT	Public conference call
Octobe3r 13, 2016	Joint Advisory Panel and PDT	Mansfield, MA
January 6, 2017	PDT	Public conference call
March 13, 2017	Joint Whiting Committee and Advisory Panel	New Bedford, MA
April 11, 2017	PDT	Public conference call
April 18-20, 2017	Council	Mystic, CT
April 28, 2017	PDT	Public conference call
May 25, 2017	PDT	Taunton, MA
July 19-20, 2017	PDT	Taunton, MA
August 15, 2017	PDT	Taunton, MA
August 29, 2017	Joint Whiting Committee and Advisory Panel	Warwick, RI
September 26-28, 2017	Council	Gloucester, MA
October 10, 2017	PDT	Public conference call
October 30, 2017	Joint Whiting Committee and Advisory Panel	Warwick, RI
December 5-7, 2017	Council	Newport, RI

7.3 Marine Mammal Protection Act (MMPA)

None of the specifications proposed in this document are expected to alter fishing methods or activities. Therefore, this action is not expected to affect marine mammals or critical habitat in any manner not considered in previous consultations on the fisheries.

For further information on the potential impacts of the fishery and the proposed management action on marine mammals, see Sections 5.3 and 6.4.

7.4 Endangered Species Act (ESA)

Section 7 of the Endangered Species Act requires Federal agencies conducting, authorizing, or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The batched fisheries Biological Opinion completed on December 16, 2013, concluded that the actions considered would not jeopardize the continued existence of any listed species. On October 17, 2017, NMFS reinitiated consultation on the batched Biological Opinion due to updated information on the decline of Atlantic right whale abundance.

Section 7(d) of the ESA prohibits Federal agencies from making any irreversible or irretrievable commitment of resources with respect to the agency action that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives during the consultation period. This prohibition is in force until the requirements of section 7(a)(2) have been satisfied. Section 7(d) does not prohibit all aspects of an agency action from proceeding during consultation; non-jeopardizing activities may proceed as long as their implementation would not violate section 7(d). Per the October 17, 2017, memo, it was concluded that allowing those fisheries specified in the batched Biological Opinion to continue during the reinitiation period will not increase the likelihood of interactions with ESA listed species above the amount that would otherwise occur if consultation had not been reinitiated. Based on this, the memo concluded that the continuation of these fisheries during the reinitiation period would not be likely to jeopardize the continued existence of any ESA listed species. Taking this, as well as our analysis of the proposed action into consideration, we do not expect the proposed action, in conjunction with other activities, to result in jeopardy to any ESA listed species.

This action does not represent any irreversible or irretrievable commitment of resources with respect to the FMP that would affect the development or implementation of reasonable and prudent measures during the consultation period. NMFS has discretion to amend its Magnuson-Stevens Act and ESA regulations and may do so at any time subject to the Administrative Procedure Act and other applicable laws. As a result, the Council has preliminarily determined that fishing activities conducted pursuant to this action will not affect endangered and threatened species or critical habitat in any manner beyond what has been considered in prior consultations on this fishery.

7.5 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the Coastal Zone Management Act (CZMA) of 1972, as amended, requires that all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The CZMA provides measures for ensuring stability of productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals. The Council has developed this specification package and will submit it to NMFS; NMFS must determine whether this action is consistent to the maximum extent practicable with the CZM programs for each state (Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina). Letters documenting NMFS' determination will be sent to the coastal zone management program offices of each state.

7.6 Administrative Procedure Act (APA)

Section 553 of the APA establishes procedural requirements applicable to informal rulemaking by Federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process,

and to give the public adequate notice and opportunity for comment. At this time, the NEFMC is not requesting any abridgement of the rulemaking process for this action.

7.7 Information Quality Act (IQA)

Utility of Information Product

The information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the measures proposed, and the impacts of those measures. A discussion of the reasons for selecting the proposed action is included so that intended users may have a full understanding of the proposed action and its implications. The intended users of the information contained in this document include individuals involved in the small-mesh multispecies fishery, (e.g. fishing vessels, processors, fishery managers), and other individuals interested in the management of the small-mesh multispecies fishery. The information contained in this document will be helpful and beneficial to owners of vessels holding limited access small-mesh multispecies permits since it will notify these individuals of the measures contained in this specification package. This information will enable these individuals to adjust their management practices and make appropriate business decisions. Until a proposed rule is prepared and published, this document is the principal means by which the information contained herein is available to the public. The information provided in this document is based on the most recent available information from the relevant data sources. The information contained in this document includes detailed and relatively recent information on the small-mesh multispecies resource and, therefore, represents an improvement over previously available information. This document will be subject to public comment through proposed rulemaking, as required under the Administrative Procedure Act and, therefore, may be improved based on comments received.

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

Integrity of Information Product

The information product meets the standards for integrity under the following types of documents:

Other/Discussion (e.g. Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.)

Prior to dissemination, information associated with this action, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information. All electronic information disseminated by NMFS adheres to the standards set out in Appendix III, "Security of Automated Information Resources," of OMB Circular A-130; the Computer Security Act; and the Government Information Security Act. All confidential information (e.g. dealer purchase reports) is safeguarded pursuant to the Privacy Act; Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business, and financial information); the

Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity of Information Product

For purposes of the Pre-Dissemination Review, this document is considered to be a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act. This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Several sources of data were used in the development of the specification package. These data sources included, but were not limited to, historical and current landings data from the Commercial Dealer database, vessel trip report (VTR) data, and fisheries independent data collected through the NMFS bottom trawl surveys. The analyses contained in this document were prepared using data from accepted sources. These analyses have been reviewed by members of the Whiting Plan Development Team (see Section 7.2.4) and by the SSC where appropriate.

Despite current data limitations, the conservation and management measures considered for this action were selected based upon the best scientific information available. The analyses important to this decision used information from the most recent complete calendar years, generally through 2016. The data used in the analyses provide the best available information on the number of permits, both active and inactive, in the fishery, the catch (including landings and discards) by those vessels, the landings per unit of effort (LPUE), and the revenue produced by the sale of those landings to dealers, as well as data about catch, bycatch, gear, and fishing effort from a subset of trips sampled at sea by government observers. Specialists (including professional members of plan development teams, technical teams, committees, and Council staff) who worked with these data are familiar with the most current analytical techniques and with the available data and information relevant to the small-mesh multispecies fishery. The policy choice is clearly articulated in Section 4.0 that being the management alternatives considered in this action.

The supporting science and analyses, upon which the policy choice was based, are summarized and described in the SAFE Report for Fishing Year 2016 (NEFMC 2017), Sections 3.2.2.1 of this document, and in the Amendment 19 EA. All supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency. The review process used in preparation of this document involves the responsible Council, the Northeast Fisheries Science Center, the Greater Atlantic Regional Fisheries Office, and NOAA Fisheries Service Headquarters. The Center's technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment methods, population biology, and the social sciences.

The Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the document. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. The Council also utilizes its Scientific and Statistical Committee to review the background science and assessment to approve the Overfishing Limits (OFLs) and Allocable Biological Catch (ABCs), including the effects those limits would have on other specifications in this document. The Scientific and Statistical Committee, or SSC, serves as the primary scientific and technical advisory body to the Council and is made up of scientists that are independent of the Council. A list of current

committee members can be found at https://www.nefmc.org/committees/scientific-and-statistical-committee.

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

7.8 Paperwork Reduction Act (PRA)

The Paperwork Reduction Act (PRA) concerns the collection of information. The intent of the PRA is to minimize the Federal paperwork burden for individuals, small businesses, state and local governments, and other persons, as well as to maximize the usefulness of information collected by the Federal government. There are no changes to the existing reporting requirements previously approved under this FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of PRA.

7.9 Regulatory Impact Review

7.9.1 Background

In compliance with Executive Order (E.O.) 12866, NMFS requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions or for significant policy changes that are of public interest. E.O. 12866 was signed on September 30, 1993, and established guidelines for Federal agencies promulgating new regulations and reviewing existing regulations.

An RIR is a required component of the process of preparing and reviewing fishery management plans (FMPs) or amendments and provides a comprehensive review of the economic impacts associated with the proposed regulatory action. An RIR addresses many of the concerns posed by the regulatory philosophy and principles of E.O. 12866. An RIR also serves as the basis for assessing whether or not any proposed regulation is a "significant regulatory action" under criteria specified in E.O. 12866. According to the "Guidelines for Economic Analyses of Fishery Management Actions," published by NMFS in August 2000, an RIR must include the following elements: (1) A description of the management objectives of the regulatory action; (2) a description of the fishery affected by the regulatory action; (3) a statement of the problem the regulatory action is intended to address; (4) a description of each selected alternative, including the "no action" alternative; and (5) an economic analysis of the expected effects of each selected alternative relative to the baseline.

7.9.2 Statement of the Problem and Management Objectives of the Regulatory Action

The objectives of the Northeast Multispecies FMP, as they relate to small-mesh multispecies, are to manage fisheries catching red, silver, and offshore hake that maintain stock size at levels capable of sustaining MSY on a continuing basis. In addition to existing restrictions on fishing through exemption areas and seasons to minimize groundfish bycatch, other measures are intended to optimize size selectivity and keep landings from temporarily flooding limited market demand. These measures include red and silver hake possession limits. The silver hake possession limits are higher when a vessel uses

large-mesh, providing an incentive to avoid catching juvenile or small silver hake. Amendment 19 (NEFMC 2013) established and specified catch and landings limits which are deemed to be sustainable, including 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.

Nonetheless, catches of non-target species and bycatch could increase to unacceptable levels if new entrants to the fishery are not capped by limited access. It could become difficult and very costly to existing fishermen to address bycatch of choke species through technical measures (such as more selective gear, closed seasons, and closed areas) to accommodate more vessels in the small-mesh multispecies fishery. Thus, the problem is to promote more effective management of non-target catch and bycatch by preventing new entrant vessels into the fishery and limit increases in fishing effort thereby.

The purpose of this action is to implement measures through limited access that would prevent unrestrained increases in fishing effort by new entrants to the fishery. Limited access would establish a maximum number of vessels in the small-mesh multispecies fishery, improving the effectiveness of regulations that reduce or cap catches of species with sub-ACL or choke species (i.e. species with catches that equal or exceed their annual catch limits). This is explained in more detail in Section 3.1 – Purpose and need of action.

7.9.3 Description of the Affected Fishery

See Section 5.4 - Human Environment (Description of the Fishery) and Section 7.9.7- Directly regulated small-mesh multispecies fishing entities.

7.9.4 Description of the Management Measure Alternatives

See Section 4.0 for a complete description of the proposed management measures and the alternatives that were considered by NMFS for this Amendment.

7.9.5 Expected Economic Effects of the Proposed Action

Executive Order 12866 mandates that proposed measures be analyzed below in terms of: (1) changes in net benefits and costs to stakeholders, (2) changes to the distribution of benefits and costs within the industry, (3) changes in income and employment, (4) cumulative impacts of the regulation, and (5) changes in other social concerns. As described in Section 6.5, the proposed action should lead to neutral to low positive impacts to stakeholders, specifically people who fish for small-mesh multispecies and any businesses that support that activity. There should not be substantial distributional issues, and low positive impacts on income and employment related to slightly increased fishing opportunities. The cumulative impacts of management and regulations are not expected to be significant and are analyzed and discussed in Section 6.7.

7.9.6 Executive Order 12866 (Regulatory Planning and Review)

Introduction

Executive Order 12866 requires a Regulatory Impact Review (RIR) in order to enhance planning and coordination with respect to new and existing regulations. This Executive Order requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be "significant."

A "significant" regulatory action for E.O. 12866 purposes is one that may:

1. Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

A regulatory program is "economically significant" if it is likely to result in the effects described above. The RIR is designed to provide information to determine whether the proposed regulation is likely to be "economically significant."

Section 6.0 assesses of the costs and benefits of the proposed actions. The analysis included in this RIR and the IRFA above further demonstrates that the proposed actions are not "significant" because they will not have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy or a sector of the economy, productivity, jobs, the environment, public health, or safety, or State, local, or tribal governments or communities.

Determination of Executive Order 12866 significance

The value of changes or differences among the alternatives for the three actions - - Limited access qualification criteria (described in Section 4.3.1), possession limit by permit type (described in Sections 4.2 and 4.3.2), and permit allowances (described in Section 4.3.3) are nominal and will not be "significant". Any alternative individually or for all three actions taken together will not have an annual effect on the economy of $100 million or more whether beneficially or adversely, as the size of the small-mesh multispecies fishing industry is only around $15 million. The basis for the significance determination here is inferred from the economic analyses in the Section 6.6.

The proposed actions are not expected to have any adverse impact on fishing vessels, purchasers of seafood products, ports, recreational anglers, and operators of party/charter businesses. The proposed actions are expected to have neutral to low positive, but not significant, impacts for commercial fishermen and associated businesses. In addition, there should be no interactions with activities of other agencies and no impacts on entitlements, grants, user fees, or loan programs. The proposed actions are also similar to limited access programs that apply to other NEFMC-managed fisheries or NE region fisheries, and as such do not raise novel legal or policy issues. As such, the proposed actions are not considered significant as defined by Executive Order 12866.

7.9.7 Initial Regulatory Flexibility Act (IRFA)

The purpose of the Regulatory Flexibility Analysis (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of various alternatives contained in the FMP or amendment (including framework management measures and other

regulatory actions) and to ensure the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct an Initial Regulatory Flexibility Analysis (IRFA) for each proposed rule. The IRFA is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. An IRFA is conducted to primarily determine whether the proposed action would have a "significant economic impact on a substantial number of small entities." In addition to analyses conducted for the RIR, the IRFA provides:

1) A description of the reasons why action by the agency is being considered;
2) A succinct statement of the objectives of, and legal basis for, the proposed rule;
3) A description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;
4) A description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; and,
5) An identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule.

If it is clear that an action would not have adverse or disproportional impacts to small entities, the RFA allows Federal agencies to certify the proposed action(s) as not having a "significant impact on a substantial number of small entities", rather than preparing an IRFA. The agency must then prepare a certification memo to the Small Business Administration (SBA) that documents:

1) A statement of basis and purpose of the rule;
2) A description and estimate of the number of small entities to which the rule applies;
3) A description and estimate of economic impacts by size and industry;
4) An explanation of the criteria used to evaluate whether the rule would impose significant economic impacts;
5) An explanation of the criteria used to evaluate whether the rule would impose impacts on a substantial number of small entities; and,
6) A description of, and explanation of the basis for, assumptions used.

The decision on whether or not to certify is generally made after the final decision on the preferred alternatives for the action and may be documented at either the proposed rule or the final rule stage.

Description of reasons why action by the agency is being considered

The purpose of the actions and need for management is described in Section 3.1. Briefly, the purpose of this action is to implement measures through limited access that would prevent unrestrained increases in fishing effort by new entrants to the fishery. Limited access would establish a maximum number of vessels in the small-mesh multispecies fishery, improving the effectiveness of regulations that reduce or cap catches of species with sub-ACL or choke species (i.e. species with catches that equal or exceed their annual catch limits). The action may also change the whiting possession limits that would apply to either limited access permit or open access permits (if limited access is not chosen as the preferred alternative).

Statement of the objectives of, and legal basis for, the proposed actions

The objective of the preferred alternatives and other alternatives, including No Action, are described in Section 4.0.

Description and estimate of the number of small entities to which the proposed rule will apply

Effective from July 1 2016 (80 FR 81194) [37] , NMFS' small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing is $11 million in annual gross receipts. This standard applies to all businesses classified under North American Industry Classification System (NAICS) code 11411 for commercial fishing, including all businesses classified as commercial finfish fishing (NAICS 114111), commercial shellfish fishing (NAICS 114112), and other commercial marine fishing (NAICS 114119) businesses.

The proposed actions regulate commercial fish harvesting entities engaged in the Northeast multispecies limited access fishery and the small-mesh multispecies fishery. For the purposes of the RFA analysis, the ownership entities, not the individual vessels, are considered as regulated entities.

Ownership entities in regulated commercial harvesting businesses

Individually-permitted vessels may hold permits for several fisheries, harvesting species of fish that are regulated by several different fishery management plans, even beyond those impacted by the proposed actions. Furthermore, multiple permitted vessels and/or permits may be owned by entities affiliated by stock ownership, common management, identity of interest, contractual relationships, or economic dependency. For the purposes of this analysis, ownership entities are defined by those entities with common ownership personnel as listed on permit application documentation. Only permits with identical ownership personnel are categorized as an ownership entity. For example, if five permits have the same seven personnel listed as co-owners on their application paperwork, those seven personnel form one ownership entity, covering those five permits. If one or several of the seven owners also own additional vessels, with sub-sets of the original seven personnel or with new co-owners, those ownership arrangements are deemed to be separate ownership entities for the purpose of this analysis.

Ownership entities are identified on June 1st of each year based on the list of all permit numbers, for the most recent complete calendar year, that have applied for any type of Northeast Federal fishing permit. The current ownership data set is based on calendar year 2014-2016 permits and contains gross sales associated with those permits for calendar years 2014 through 2016. The determination as to whether the entity is large or small is based on the average revenue from 2014 through 2016 with the benchmark threshold value of $11 million in sales revenue from commercial fisheries (80 FR 81194). Although not a requirement, but ownership entities are further categorized as finfish or shellfish based on which activity generated the greatest gross revenue (50% or more) during 2014 to 2016.

Directly regulated small-mesh multispecies fishing entities

The small-mesh exempted fishery allows vessels to harvest species in designated areas using mesh sizes smaller than the minimum mesh size required by Regulated Mesh Area (RMA) regulations. To participate in the small-mesh multispecies (whiting) exempted fishery, vessels must hold either a limited access multispecies permit (categories A, C, D, E or F) or an open access multispecies permit (category K). Note that a vessel cannot hold more than one of these Northeast multispecies permits at a time, but that a business entity that holds may hold multiple numbers of these permits. The current red hake possession limit at the start of the fishing season is 3,000 lbs. in the northern management area and 5,000

[37] https://www.federalregister.gov/documents/2015/12/29/2015-32564/establish-a-single-small-business-size-standard-for-commercial-fishing-businesses

lbs. elsewhere. Initial possession limits for silver and offshore hake combined vary by exemption area, management area (north or south) and mesh size used.

Limited access multispecies permit holders can target small-mesh multispecies with mesh smaller than the minimum regulated mesh size when not fishing under a DAS and while declared out of the fishery using VMS. Limited access multispecies permit holders may land whiting or red hake on any DAS or sector trip, up to the possession limits for vessels using mesh greater than 3-inches specified at §648.86(d)(1)(iii), or the incidental possession limit specified at §648.86(d)(4), if triggered for that stock.

An open access, Category K permit holder may fish for small-mesh multispecies when participating in an exempted fishing program. This category includes all gear types. These permits are required to submit VTRs, but are not subject to VMS requirements. Vessels with open access category K permits are subject to the same possession limits and accountability measures for small-mesh multispecies that limited access permit holders are.

Therefore, entities holding one or more limited access multispecies permits or one or more open access Category K multispecies permits (i.e., permit type A, C-F, K) are the entities holding permits that are directly regulated by the proposed action – these are the permits that have the potential to land small-mesh multispecies for commercial sale. These include entities that could not be classified into a business type because they did not earn revenue from landing and selling fish in 2014-2016 and so are considered to be small.

There were 853 distinct ownership entities based on business entities' participation during 2014-2016 permits that could potentially target small-mesh multispecies. Of these, 844 are small business entities and 9 are large per the SBA guidelines in support of NMFS' regulatory actions for commercial fishing businesses (see tables below).

Table 114. Description of directly regulated small-mesh multispecies fishing entities by business type and size (2014-2016)[38]

Business Type	Major revenue source	No. of Entities	No. of Small Entities
Fishing	▪ Finfish	345	345
	▪ Shellfish	442	433
	Sub-total	*787*	*778*
For-hire		43	43
Not classified (no revenue)		23	23
	Total	**853**	**844**

Table 115. Description of directly regulated (A, C, D, E, F, K permit holders) small-mesh multispecies fishing entities by gross sales (2014-2016 averages)[39].

Business Class	Major revenue source	Sales category (US$ mil)	Mean gross sales	No. of entities	Mean permits per entity
Small	Finfish	<0.05 m	$13,860	100	10
		0.05-0.1 m	$77,707	35	12
		0.1-0.5 m	$259,590	126	13
		0.5-1 m	$752,349	43	15
		1-5.5 m	$2,035,051	41	14
		Mean or Total (small finfish)	***$442,325***	***345***	***13***
Small	Shellfish	<0.05 m	$23,165	53	9
		0.05-0.1 m	$76,243	34	10
		0.1-0.5 m	$233,526	167	10
		0.5-1 m	$744,756	60	14
		1-5.5 m	$1,903,899	109	15
		5.5-11 m	$7,111,561	10	16
		Mean or Total (small shellfish)	***$845,600***	***433***	***12***
		Mean or Total (small business)	***$666,770***	***778***	***12***
Large	Shellfish	>20.5 m	$22,820,573	3	16
		11-20.5 m	$17,753,241	6	15
		Mean or Total (large shellfish)	***$19,442,352***	***9***	***15***
All Business	Fishing	*Mean or Total (All business)*	***$881,484***	***787***	***12***

[38] Data filters (Permits (A, C, D, E, F, K) =1); All numbers are distinct counts of business entities that were in operation during 2014-16.
[39] Data Filters (Fishing=1; Permits (A, C, D, E, F, K) =1)

Directly regulated, active small-mesh multispecies fishing entities impacted

While 853 commercial entities are directly regulated by the proposed action, not all of these entities land small-mesh multispecies for commercial sale. Commercial entities that do not land small-mesh multispecies for sale, while regulated by the proposed action, will not be impacted by the proposed action. Commercial fishing harvesting entities that land small-mesh multispecies for sale are both directly regulated and possibly impacted by the proposed actions.

To estimate the number of commercial entities that may experience impacts from the proposed action, active small-mesh multispecies entities are defined as those entities containing permits that are directly regulated and that landed any silver hake or red hake during 2014-16 for commercial sale. These active small-mesh multispecies entities are described in the following three tables, and are a subset of those entities described in the tables above. There are 407 potentially impacted, directly regulated commercial entities, 405 (99.5%) of which are classified as small entities. Only couple of large entities had very negligible value of revenues (i.e., about 0.5 percent) from incidental landings of small-mesh multispecies in recent years. However, by considering the small-mesh multispecies directed trips that landed either 2000 lbs. of whiting or 400 lbs. of red hake, there are only 132 potentially impacted, directly regulated commercial entities, 131 (99.24%) of which are classified as small entities in 2016. Only one large entity had negligible revenue from the small-mesh multispecies targeted trips' landings (Table 119).

Table 116. Description of potentially impacted, directly regulated active small-mesh multispecies fishing, by business type and size (2014-2016).

Business Type	Major revenue source	No. of entities	No. of small entities
Fishing	▪ Finfish	282	282
	▪ Shellfish	124	122
	Sub-total	***406***	***404***
For-hire		1	1
All		***407***	***405***

Note: Data Filters (Revenues from small-mesh multispecies ≠ 0). All numbers are distinct counts of business entities.

Table 117. Description of directly impacted (with SMS landing >0 lbs.) small-mesh multispecies fishing entities by gross sales (2014-2016 averages)[40].

Business Size	Major revenue source	Sales category (US$ mil)	Mean gross sales	No. of entities	Mean permits per entity
Small	Finfish	<0.05 m	$18,000	68	3
		0.05-0.1 m	$75,405	43	7
		0.1-0.5 m	$260,062	108	11
		0.5-1 m	$736,627	31	13
		1-5.5 m	$2,024,492	32	14
		Mean & sub-total	***$426,143***	***282***	***9***
	Shellfish	<0.05 m	$22,993	23	3
		0.05-0.1 m	$72,238	15	3
		0.1-0.5 m	$210,648	36	8
		0.5-1 m	$704,909	23	15
		1-5.5 m	$2,110,716	23	16
		5.5-11 m	$7,306,913	2	15
		Mean & sub-total	***$725,975***	***122***	***9***
		Mean & sub-total (small)	***$516,686***	***404***	***9***
Large	Shellfish	11-20.5 m	$19,254,773	2	15
		Mean & sub-total	***$19,254,773***	***2***	***15***
All Business	Fishing	*Mean or total (all business)*	***$608,992***	***406***	***9***

Table 118. Total number of potentially impacted, directly regulated entities landing small-mesh multispecies (with SMS landing >0 lbs.) by business class (2014-2016)[41].

Business size	Year	Whiting Value	Red Hake Value	No. of Entities
Large	2014	$3,553	$16	2
	2015	$39,925	$0	2
	2016	$54,113	$463	2
			2014-16 (large)	***2***
Small	2014	$11,389,148	$557,637	314
	2015	$10,419,860	$499,264	300
	2016	$10,596,071	$515,185	309
			2014-16 (small)	***404***
All Business			***2014-16 (All business)***	***406***

[40] Data Filters (Fishing=1; Revenues from small-mesh multispecies ≠ 0). All numbers are distinct counts of business entities.

[41] Data Filters (Fishing=1; Revenues from small-mesh multispecies ≠ 0). All numbers are distinct counts of business entities.

Table 119. Total number of potentially impacted, directly regulated entities (with whiting ≥2000 lbs. OR red hake ≥400 lbs.) landing small-mesh multispecies by business class (2014-2016) [42]

Landing Types	Business Size	2014	2015	2016
Only Whiting ≥2000 lbs.	Large	0	1	1
	Small	116	113	111
Only Red Hake ≥400 lbs.	Large	0	0	1
	Small	90	89	95
Whiting ≥ 2000 lbs. **OR** Red Hake ≥ 400 lbs.	Large	0	1	1
	Small	129	127	131

Description of the projected reporting, record-keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records

The proposed actions do not introduce any new reporting, record keeping, or other compliance requirements.

Identification of all relevant Federal rules, which may duplicate, overlap or conflict with the proposed rule

The proposed actions do not duplicate, overlap or conflict with any other Federal Rules.

Significance of economic impacts on small entities

Substantial Number Criterion

In colloquial terms, substantial number refers to "more than a few." The vast majority of the regulated entities impacted by this action (99%) are considered small, and therefore preferred alternative will have impacts on a substantial number of small entities.

Significant Economic Impacts

The outcome of "significant economic impact" can be ascertained by examining two factors: disproportionality and profitability. Disproportionality refers to whether or not the regulations place small commercial entities at a significant competitive disadvantage to large commercial entities. Profitability refers to whether or not the regulations significantly reduce profits for a substantial number of small commercial entities.

Description of impacts on small entities

The proposed actions will impact all commercial entities, large and small, harvesting silver or red hake, in both the northern and southern management area. This section estimates impacts to all these entities-large

[42]Data Filters (Fishing=1; Revenues from small-mesh multispecies ≠ 0; Whiting landing ≥ 2000 lbs. or Red Hake landing ≥ 400 lbs.). All numbers are distinct counts of business entities.

and small; an analysis that was based only on small entities was not possible. However, 404 of 406 (787) of directly regulated commercial fishing entities potentially impacted by the proposed action are small business entities. Small commercial entities are not placed at a significantly competitive disadvantage by No Action preferred alternative. It will not displace any vessels of the small-mesh multispecies fisheries. Instead it will leave open vessels to fish to attain achieving higher ACL utilization. No Action was chosen as the "preferred alternative" because the small-mesh multispecies fishery is catching a small fraction of the current and future ACLs. A limited access program would impede the ability of new and existing vessels to increase catches of whiting, possibly more costly than other means of limiting and potentially reducing non-target catches. Measures that could reduce non-target catches include requiring more selective gears (although no gear has yet been identified to separate red hake and whiting catch), closed seasons (e.g. when the bycatch rate relative to the target species is highest), and closed areas (e.g. where the bycatch rate relative to the target species is highest). There are only two large commercial fishing entities that had incidental landing of red hake, but the value of landing was none to less than $500 during 2014-2016.

Overall, the net impact on profits from the preferred No Action alternative is expected to be neutral to low positive. The preferred alternative is expected to be more cost effective to address the purpose and need through catch limitations and other technical measures that would restrain catch of non-target species and minimize bycatch.

Impacts from the proposed actions are summarized separately below for 1) alternatives for the 2018-2020 ACLs for northern and southern stocks of silver and red hake. Detailed discussion of the analyses that estimated the economic and community impacts of the limited access alternatives is included in Section 6.5

8.0 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).

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). 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 non-target species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program; target species in directed fisheries which occurs because fishing gear and methods are not selective enough to catch only target species; (n.) fish which are harvested in a fishery but are not sold or kept for personal use, including economic discards and regulatory discards but not fish released alive under a recreational catch and release fishery management program.

Capacity – the level of output a fishing fleet is able to produce given specified conditions and constraints. Maximum fishing capacity results when all fishing capital is applied over the maximum amount of available (or permitted) fishing time, assuming that all variable inputs are utilized efficiently.

Catch – The sum total of fish killed in a fishery in a given period. Catch is given in either weight or number of fish and may include landings, unreported landings, discards, and incidental deaths.

Coarse sediment – Sediment generally of the sand and gravel classes; not sediment composed primarily of mud; but the meaning depends on the context, e.g. within the mud class, silt is coarser than clay.

Continental shelf waters – The waters overlying the continental shelf, which extends seaward from the shoreline and deepens gradually to the point where the sea floor begins a slightly steeper descent

to the deep ocean floor; the depth of the shelf edge varies, but is approximately 200 meters in many regions.

Council – New England Fishery Management Council (NEFMC).

CPUE – Catch per unit effort. This measure includes landings and discards (live and dead), often expressed per hour of fishing time, per day fished, or per day-at-sea.

DAS – A day-at-sea is an allocation of time that a vessel may be at-sea on a fishing trip. For vessels with VMS equipment, it is the cumulative time that a vessel is seaward of the VMS demarcation line. For vessels without VMS equipment, it is the cumulative time between when a fisherman calls in to leave port to the time that the fisherman calls in to report that the vessel has returned to port.

Demersal species – Most often refers to fish that live on or near the ocean bottom. They are often called benthic fish, groundfish, or bottom fish.

Discards – animals returned to sea after being caught; see Bycatch (n.)

Environmental Assessment (EA) – an analysis of the expected impacts of a fishery management plan (or some other proposed federal action) on the environment and on people, initially prepared as a "Draft" (DEA) for public comment. The Final EA is referred to as the Final Environmental Assessment (FEA).

Essential Fish Habitat – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998).Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The EFH designation for most managed species in this region is based on a legal text definition and geographical area that are described in the Habitat Omnibus Amendment (1998).

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.

Final preferred alternative – The management alternative chosen by the Council in the final amendment, submitted to the Secretary of Commerce for approval and if approved publication as a proposed rule.

Fishing effort – the amount of time and fishing power used to harvest fish. Fishing power is a function of gear size, boat size and horsepower.

Fishing Mortality (F) – (see also exploitation rate) a measurement of the rate of removal of fish from a population by fishing. F is that rate at which fish are harvested at any given point in time. ("Exploitation rate" is an annual rate of removal, "F" is an instantaneous rate.)

F_{MSY} – a fishing mortality rate that would produce the maximum sustainable yield from a stock when the stock biomass is at a level capable of producing MSY on a continuing basis.

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.

$F_{threshold}$ – 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.

Non-preferred alternative - All alternatives in the final amendment that were not chosen as a "final preferred alternative" are by definition non-preferred alternatives.

Northeast Shelf Ecosystem – The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream.

Northern stock area – for red and silver hake, fish are assumed to be in the southern stock area when the catches originate from fishing in statistical areas 464 to 515, or area 561. See map at http://www.nero.noaa.gov/nero/fishermen/charts/stat1.html.

Observer – Any person required or authorized to be carried on a vessel for conservation and management purposes by regulations or permits under this Act

OFL – "Overfishing limit" means the annual amount of catch that corresponds to the estimate of the maximum fishing mortality threshold applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish.

Open access – Describes a fishery or permit for which there is no qualification criteria to participate. Open-access permits may be issued with restrictions on fishing (for example, the type of gear that may be used or the amount of fish that may be caught).

Optimum Yield (OY) – the amount of fish which-

(a) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of 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.

Preferred alternative – An alternative that was favored by the Council in the draft amendment document and DEA based on analysis available at that time and based on input from the Whiting Advisory Panel.

Proposed Rule – a federal regulation is often published in the Federal Register as a proposed rule with a time period for public comment. After the comment period closes, the proposed regulation may be changed or withdrawn before it is published as a final rule, along with its date of implementation and response to comments.

Rebuilding Plan – a plan designed to increase stock biomass to the 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 yearclasses 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 whiting 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.

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11.0 Appendix I: Bycatch Analysis

Observer (sea sampling; NE Fisheries Observer Program) and At-Sea Monitoring data were analyzed for trends in and differences between bycatch rates of 20 species commonly caught in the small-mesh multispecies fishery. These species include (from most to least amounts) silver hake, red hake, haddock, winter skate, spiny dogfish, butterfish, little skate, barndoor skate, Atlantic herring, monkfish, summer flounder, yellowtail flounder, witch flounder, winter flounder, ocean pout, American plaice, cod, windowpane flounder, smooth skate, and thorny skate. Trips in the data set included only those using small-mesh otter trawls (SBRM fleets 5 and 7) that landed at least 2000 lbs. of whiting or 400 lbs. of red hake, large-mesh otter trawls (SBRM fleets 6 and 8), haddock separator trawls (SBRM fleet 18), shrimp trawls (SBRM fleet 19), sink, anchor, and drift gillnets (SBRM fleet 27), purse seine (SBRM fleet 30), and mid-water paired and single trawls (SBRM fleet 42).

These observed trips were sampled from the fishery that would be affected by proposed alternatives in Amendment 22 and therefore the bycatch estimates will vary from those estimated for SBRM fleets 5 and 7 which were analyzed for a greater range of target species using small-mesh trawls using the trip as the basic sampling unit. In addition, the data were stratified based on small-mesh multispecies management units which do not correspond exactly with the New England and Mid-Atlantic stratification that was applied for SBRM-based estimation. As with other discard estimators for assessments, the data were stratified by calendar quarter.

An added layer of post-stratification, i.e. qualification for a Category I and II, was also applied to evaluate whether qualifying vessels in either category have different bycatch rates between them and from vessels that are not expected to qualify for a limited access permit. Some qualification classes, particularly non-

qualifiers, were not present in the observed haul data because no trips by such vessels were observed for a specific management area/qualification status qualification, particularly for non-qualifiers.

Trends in bycatch rates were compiled and plotted from 1989 to 2016, but significant differences were examined by gear and qualification status (for each of five qualification alternatives) for observed hauls during 2014-2016. The haul was treated as the sampling frame (trips are used to estimate discards in assessments) and hauls with no catch for a species were assigned a 'zero' such that standard statistical treatment could be applied to estimate standard deviations, variances, and coefficients of variation. Control variables included small-mesh multispecies management area (north or south) and quarter. This post-stratification and treatment differs from that used for estimating total discards in assessments, but has many similarities in that the statistic of interest is the biomass of discards divided by the biomass of kept fish (aka "D/Kall"). Because this analysis retains the variation in catch rates between hauls made on a trip and includes zero catches when a species was not observed, the total variance is likewise likely to be higher but the number of observations will be higher (hauls vs. trips sampled) than that calculated to estimate total discards. All observed hauls in SBRM fleets 5 and 7 were included in the data set, even hauls with no catch.

The Plan Development Team (PDT) first visually examined box plots of the data summarized in Table 120 to evaluate trends and outliers. Total D/Kall ratios by haul for the 20 most common discarded species were plotted by whiting management area, quarter, and gear, showing the median, 95% confidence interval and interquartile range. The ratio data were $\log_{10}$ transformed due to the highly skewed ratios.

In the northern management area (Table 120), most observed hauls occurred during quarters 3 and 4, when the exemption areas are open to fishing with small-mesh trawls. Total discards for small-mesh trawls trips (SBRM fleet 7) averaged 0.786±2.832 pounds per pound of landings in quarter 3 on 398 observed hauls and 0.734±1.128 pounds per pound of landing in quarter 4 on 113 observed hauls.

In the southern management area (Table 120), small-mesh trawls trips occur during the winter and spring along the southern edge of Georges Bank (SBRM fleet 7) and in the Mid-Atlantic primarily during all year (SBRM fleet 5). The total bycatch rate for Fleet 7 trips in the southern management area ranged were 2.718±4.143 in quarter 1 on 65 observed hauls and 1.157±1.737 in quarter 2 on 94 observed hauls. In the Mid-Atlantic (Fleet 5), the total bycatch rate was 1.578±1.793 in quarter 1 on 142 observed hauls, 1.578±6.648 in quarter 2 on 138 observed hauls, 1.156±1.796 in quarter 3 on 124 observed hauls, 1.456±3.919 in quarter 4 on 172 observed hauls.

Table 120. Discard to kept ratio (D/Kall) statistics (average and standard deviation) and number of sampled hauls for trips fishing with otter trawls and other gears on trips landing greater than or equal to 2000 lbs. of whiting or 400 lbs. of red hake.

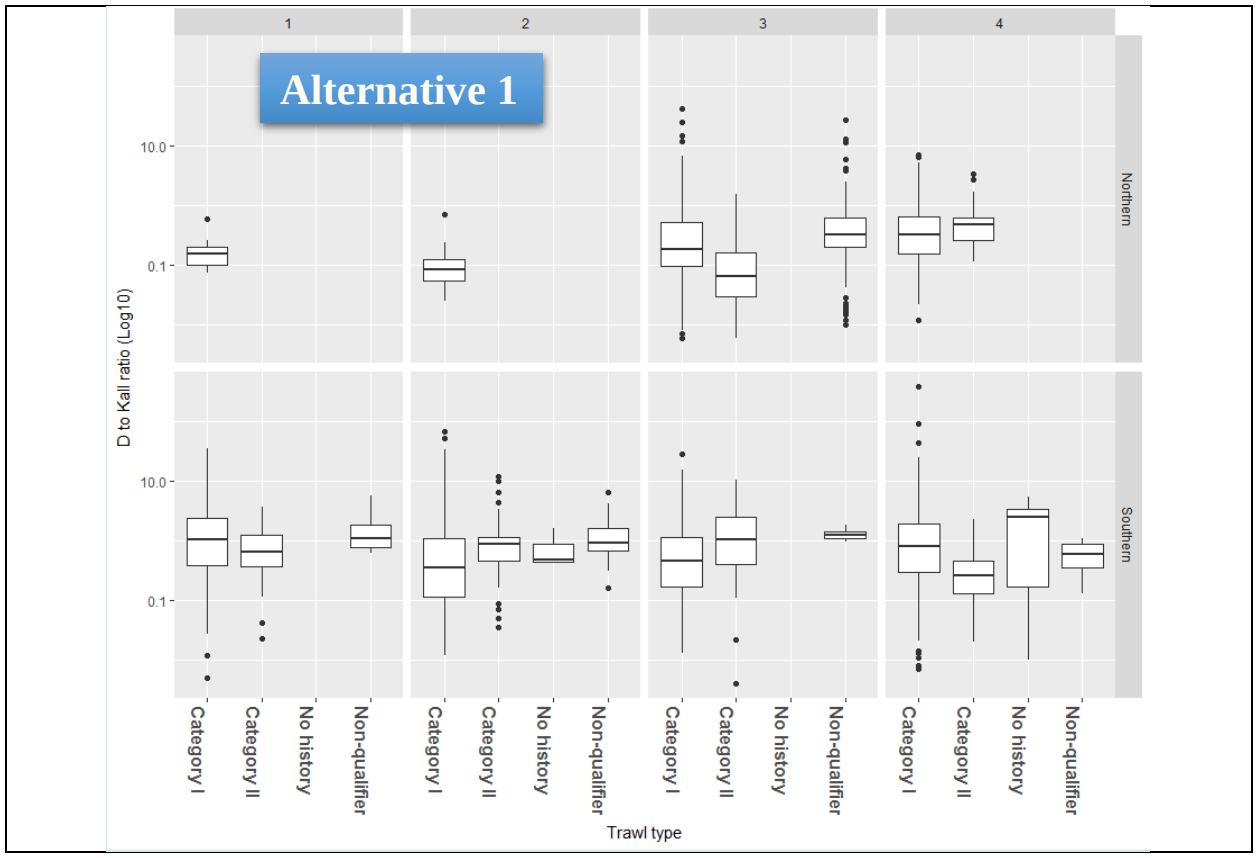
QTR	SBRM_FLEE	MESH_GROU	GEAR_TYPE	MGMT_AR Values Northern			Southern			Total Hauls	Total Ave D/I	Total Stddev
				Hauls	Ave D/Kall	Stddev	Hauls	Ave D/Kall	Stddev			
1	5	sm	Otter Trawl				65	2.718	4.143	65	2.718	4.143
	6	lg	Otter Trawl				12	1.331	1.006	12	1.331	1.006
		unk	Otter Trawl				18	0.577	0.610	18	0.577	0.610
	7	sm	Otter Trawl	7	0.205	0.181	142	1.578	1.793	149	1.514	1.775
	8	lg	Otter Trawl	58	1.036	2.009	41	1.735	1.966	99	1.326	2.011
1 Total				65	0.947	1.915	278	1.792	2.560	343	1.632	2.471
2	5	sm	Otter Trawl				94	1.157	1.737	94	1.157	1.737
	6	lg	Otter Trawl				34	1.843	2.194	34	1.843	2.194
	7	sm	Otter Trawl				138	1.423	6.648	138	1.423	6.648
	8	lg	Otter Trawl	77	0.363	0.499	19	4.493	4.286	96	1.180	2.533
		unk	Otter Trawl				1	0.157		1	0.157	
	18	lg	Otter Trawl, Haddock Separator	2	0.805	0.459				2	0.805	0.459
	19	lg	Shrimp Trawl				7	1.374	0.435	7	1.374	0.435
		sm	Shrimp Trawl				11	0.574	0.288	11	0.574	0.288
	27	lg	Sink, Anchor, Drift Gillnet	18	0.541	0.413				18	0.541	0.413
	42	unk	Mid-water Paired and Single Trawl	3	0.000	0.001				3	0.000	0.001
2 Total				100	0.393	0.485	304	1.544	4.815	404	1.259	4.211
3	5	sm	Otter Trawl				38	0.505	0.346	38	0.505	0.346
	6	unk	Otter Trawl				6	0.681	0.339	6	0.681	0.339
	7	sm	Otter Trawl	398	0.786	2.832	124	1.156	1.796	522	0.874	2.626
	8	lg	Otter Trawl	110	0.187	0.265	38	4.261	11.714	148	1.233	6.147
		unk	Otter Trawl	23	0.808	0.995	9	0.639	0.591	32	0.760	0.894
	19	lg	Otter Trawl				8	1.699	0.685	8	1.699	0.685
	30	unk	Purse Seine	4	0.001	0.001				4	0.001	0.001
	42	unk	Mid-water Paired and Single Trawl	46	0.060	0.404				46	0.060	0.404
3 Total				581	0.611	2.374	223	1.560	5.128	804	0.874	3.394
4	5	sm	Otter Trawl				24	1.119	1.166	24	1.119	1.166
	7	sm	Otter Trawl	113	0.734	1.128	172	1.456	3.919	285	1.170	3.142
	8	lg	Otter Trawl	59	0.301	0.409	38	2.319	2.527	97	1.092	1.882
		unk	Otter Trawl	23	0.427	0.703	2	0.216	0.146	25	0.410	0.676
	42	unk	Mid-water Paired and Single Trawl	10	0.153	0.473				10	0.153	0.473
4 Total				205	0.546	0.925	236	1.550	3.528	441	1.084	2.701
Grand Total				**951**	**0.597**	**1.977**	**1041**	**1.615**	**4.115**	**1992**	**1.129**	**3.312**

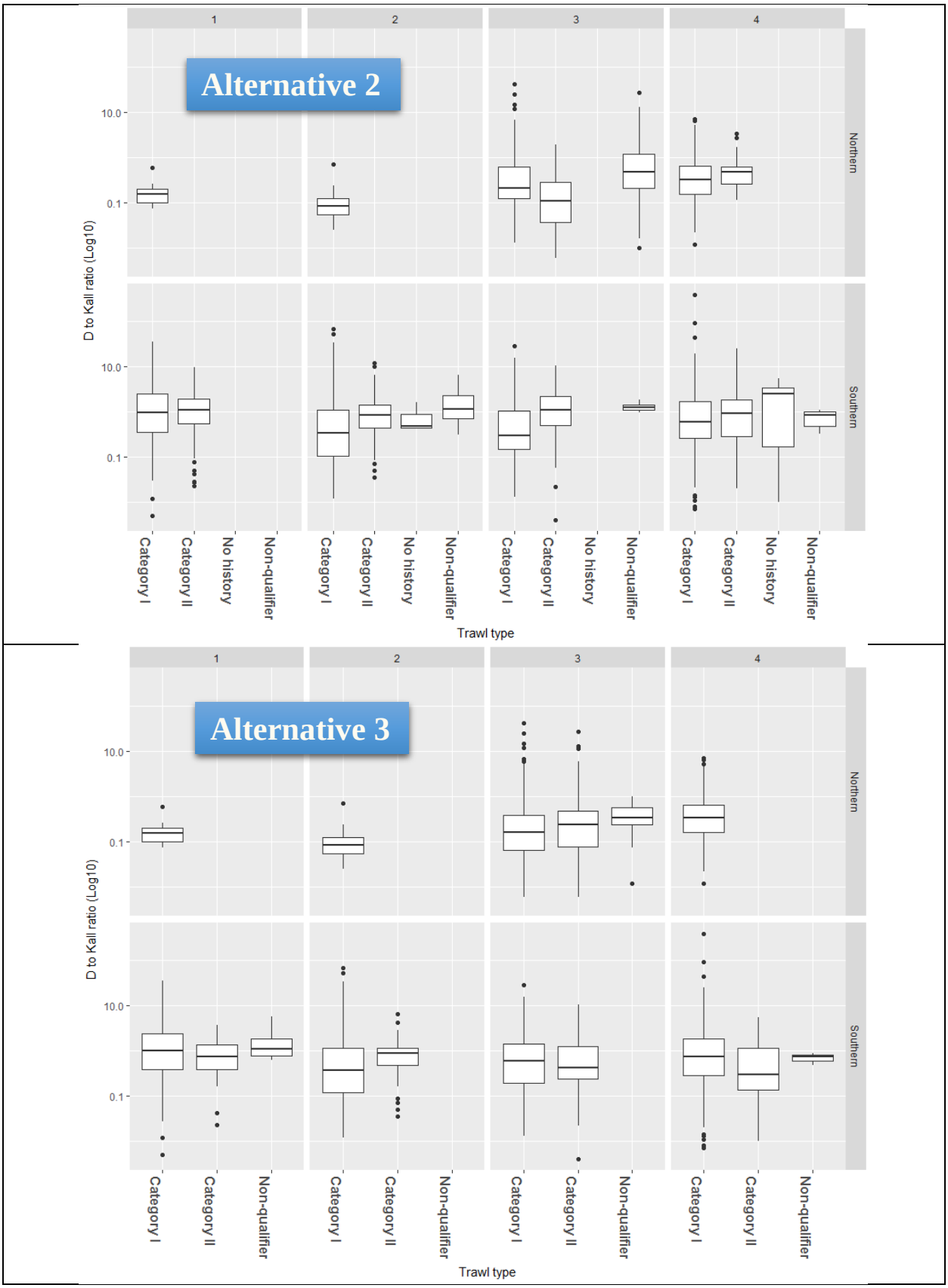
11.1 Bycatch rates by qualification status

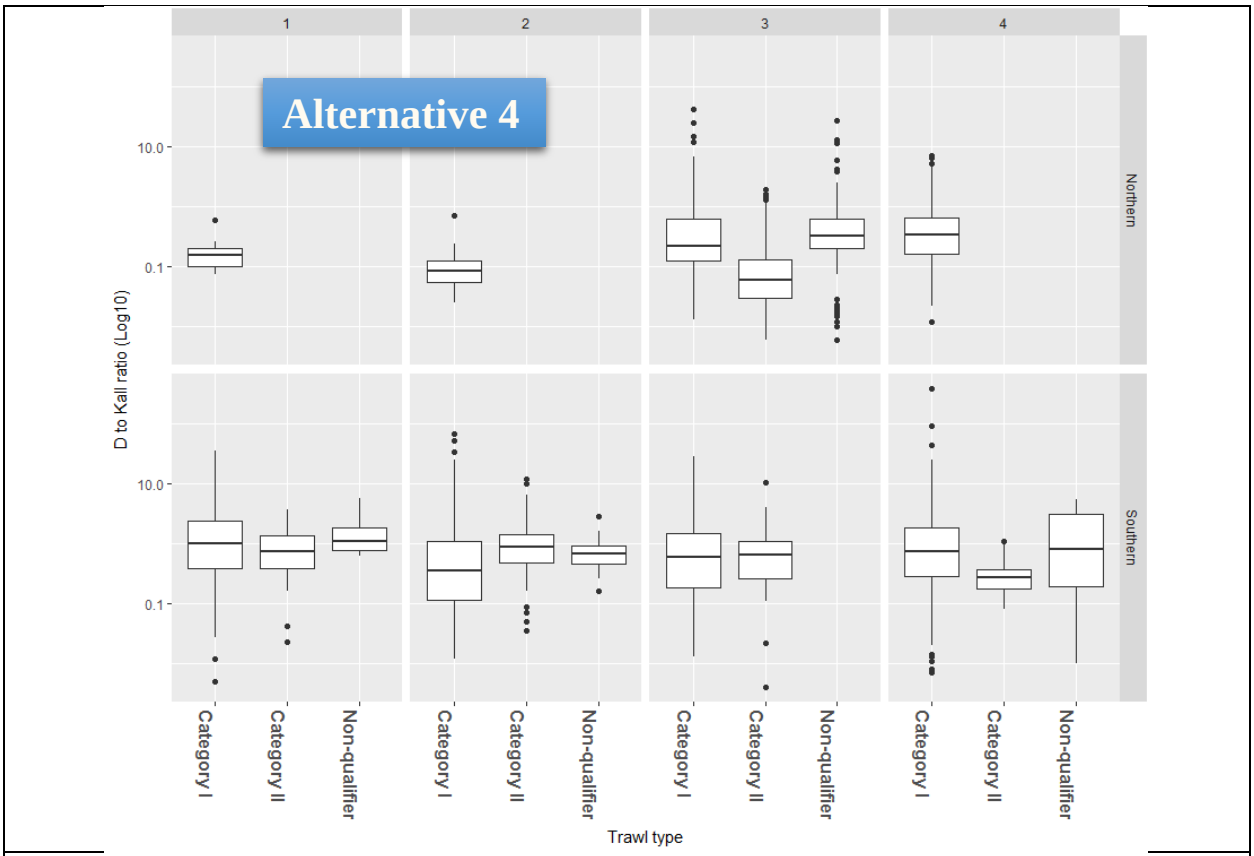
The PDT also examined total bycatch rates by alternative and potential qualification status on trips landing greater than or equal to 2000 lbs. of whiting or 400 lbs. of red hake (see Figure 56). For each alternative, vessels with permits or MRIs were classified according to whether the permit or MRI history exceeded the qualification threshold for Category I or Category II, did not have landings that exceeded the Category II threshold (and would not qualify), or had no whiting or red hake landings during the applicable qualification period.

Except for the northern management area in quarter 3, the total bycatch rates did not appear to vary by qualification status. In quarter 3, the total bycatch rates of vessels qualifying for a Category II permit in alternatives 1, 2, 4, and 5 appeared to be significantly lower than those for non-qualifying vessels and Category I vessels. There does not appear to be any cogent rationale for the lower rates for Category II vessels, but the differences here were confirmed by an ANOVA test of significance.

Figure 56. Total discard rate (D/Kall) on using small mesh otter trawls to target whiting and red hake in 2014-2016 by limited access alternative and qualification category for the Northern (Top) and Southern (Bottom) management areas by quarter. All box and whisker plots were prepared using standard ggplot routines developed by the R Core Team (2017).




Alternative 2
1
2
3
4
Northern
Southern
10.0
0.1
D to Kall ratio (Log10)
Category I
Category II
No history
Non-qualifier
Trawl type
Alternative 3
1
2
3
4
Northern
Southern
10.0
0.1
D to Kall ratio (Log10)
Category I
Category II
Non-qualifier
Trawl type


Alternative 4
1
2
3
4
Northern
Southern
10.0
0.1
D to Kall ratio (Log10)
Category I
Category II
Non-qualifier
Trawl type

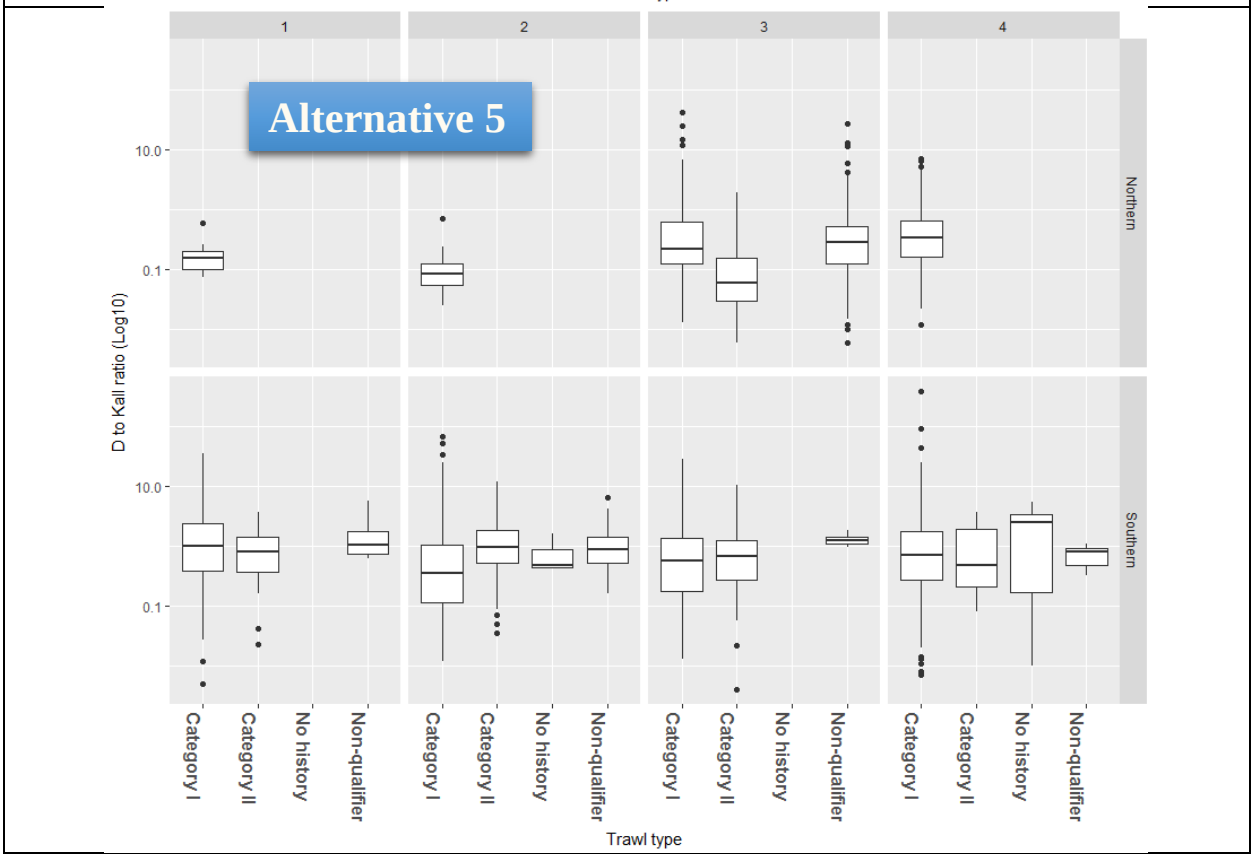
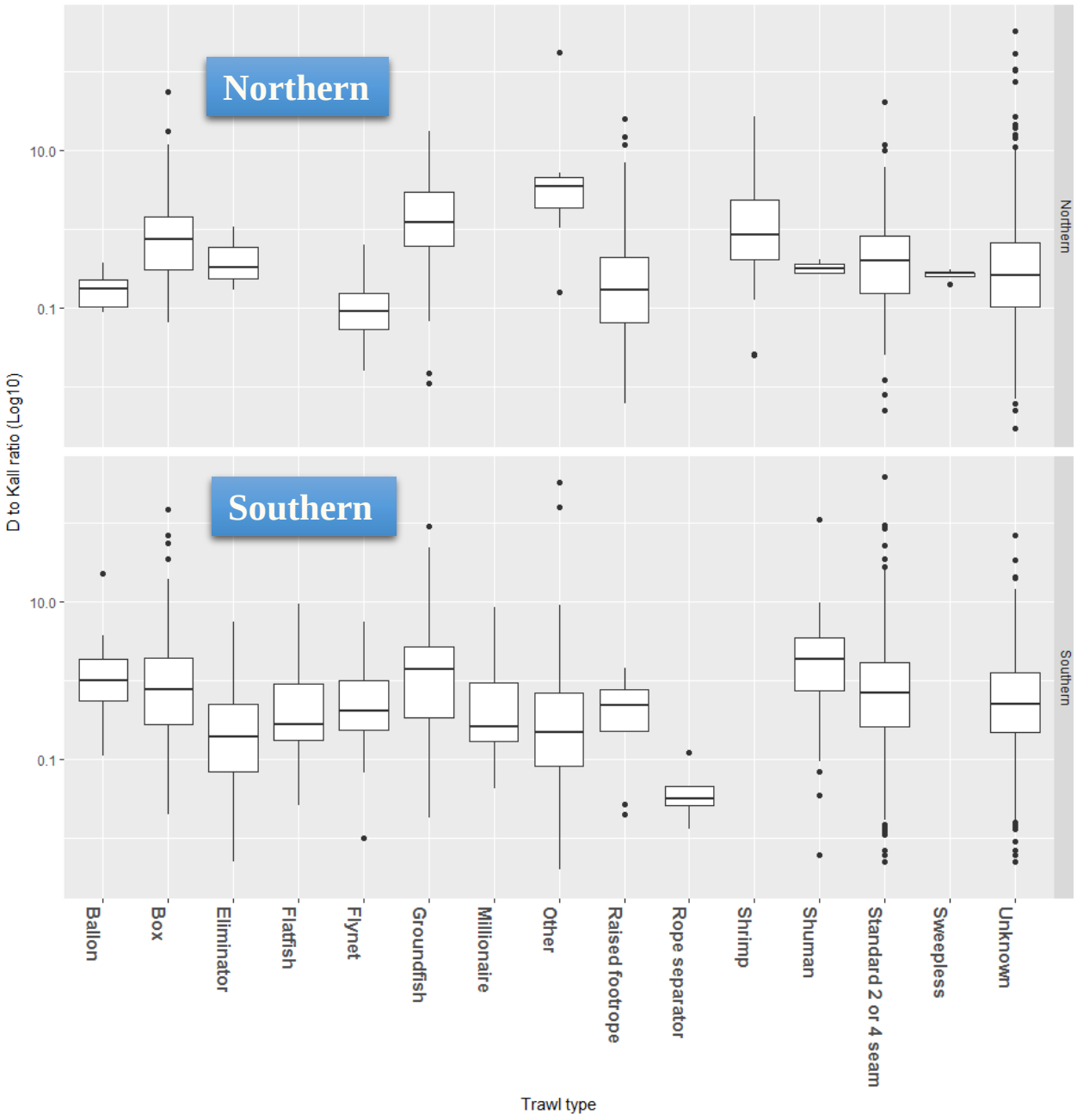

Alternative 5
1
2
3
4
Northern
Southern
10.0
0.1
D to Kall ratio (Log10)
Category I
Category II
No history
Non-qualifier
Trawl type

Figure 57. Total bycatch rate by management area (Top – Northern; Bottom – Southern) small-mesh trawl configuration for all observed species.



11.2 Bycatch rates by species and gear

Trends in bycatch rates were observed in some species, but others varied without trend through the time series. Likewise, the bycatch rates for a variety of small-mesh trawls types (balloon, box, eliminator, flynet, groundfish, millionaire, other, raised footrope, rope separator, shrimp, Shuman, standard 2 and 4 seam, sweepless, and unknown) also varied for some species and not others. The largest differences by

gear were apparent with the raised footrope trawl, particularly for benthic species like flounders, skates, and monkfish. Drawing conclusions from these differences by gear are however difficult (or inappropriate) because the gears are used (sometimes infrequently) in different exemption areas and seasons. Differences in bycatch rates could be more related to bycatch availability in the observed areas and seasons than due to the use of selective gear.

Table 121. Mean bycatch rate (D/Kall) by small-mesh multispecies management area during 2014-2016 weighted by number of observed hauls

	Northern		Southern	
Species	Mean D/Kall	Rank	Mean D/Kall	Rank
American plaice	0.005	9	0.000	19
Atlantic herring	0.051	6	0.005	13
Barndoor skate	0.005	8	0.030	9
Butterfish	0.001	17	0.088	4
Cod	0.001	18	0.000	18
Haddock	0.248	1	0.039	6
Little skate	0.033	7	0.085	5
Monkfish	0.002	15	0.019	10
Ocean pout	0.000	20	0.006	11
Red hake	0.091	3	0.241	2
Silver hake	0.052	5	0.104	3
Smooth skate	0.000	21	-	20
Spiny dogfish	0.170	2	0.271	1
Summer flounder	0.003	12	0.035	7
Thorny skate	0.000	19	-	20
White hake	0.002	16	0.000	17
Windowpane flounder	0.002	14	0.002	16
Winter flounder	0.003	13	0.004	14
Winter skate	0.066	4	0.031	8
Witch flounder	0.004	10	0.005	12
Yellowtail flounder	0.004	11	0.003	15
All	0.035		0.046	

Table 122. Observed 2014-2016 D/Kall bycatch statistics by species and quarter for the northern management area.

	2014			2014 Total	2015		2015 Total	2016		2016 Total
Species	1	3	4		3	4		3	4	
Haddock										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.002	0.279	0.095	0.125	0.217	0.167	0.192	0.456	0.109	0.282
CV	0.654	2.398	0.827	1.293	3.451	1.279	2.365	4.554	1.985	3.269
Red hake										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.002	0.069	0.017	0.029	0.091	0.692	0.391	0.140	0.046	0.093
CV	2.236	1.725	1.843	1.935	1.790	1.593	1.691	3.393	4.701	4.047
Spiny dogfish										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.092	0.027	0.115	0.078	0.378	0.014	0.196	0.016	0.374	0.195
CV	0.707	2.138	2.293	1.713	6.516	2.070	4.293	3.676	1.898	2.787
Atlantic herring										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.010	0.166	0.059	0.040	0.640	0.340	0.001	0.010	0.006
CV		7.078	4.825	5.952	7.153	1.468	4.311	4.117	2.588	3.353
Silver hake										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.068	0.069	0.021	0.053	0.008	0.032	0.020	0.079	0.178	0.128
CV	2.440	2.512	1.432	2.128	5.922	1.310	3.616	6.392	3.608	5.000
Winter skate										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.002	0.014	0.005	0.085	0.005	0.045	0.185	0.075	0.130
CV		6.230	2.249	4.239	4.261	2.239	3.250	9.030	2.554	5.792
Little skate										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.006	0.007	0.004	0.059	0.004	0.032	0.044	0.065	0.054
CV		3.648	2.724	3.186	3.908	2.250	3.079	8.761	4.060	6.410
Witch flounder										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.001	0.002	0.001	0.003	0.028	0.015	0.003	0.021	0.012
CV	1.708	2.749	3.598	2.685	2.126	1.973	2.049	2.122	2.010	2.066
White hake										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.004	0.000	0.002	0.002	0.000	0.029	0.015	0.003	0.002	0.002
CV	1.083	5.241	3.503	3.276		2.346	2.346	9.366	3.464	6.415
American plaice										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.002	0.004	0.002	0.003	0.003	0.006	0.004	0.012	0.003	0.008
CV	0.654	1.960	2.863	1.826	1.900	2.151	2.026	2.770	2.485	2.628
Barndoor skate										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.001	0.001	0.003	0.002	0.009	0.007	0.008	0.005	0.001	0.003
CV	2.646	7.988	1.986	4.207	8.412	3.162	5.787	6.798	5.831	6.314
Yellowtail flounder										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.002	0.005	0.002	0.006	0.005	0.006	0.003	0.000	0.001
CV		4.461	1.712	3.087	3.522	1.392	2.457	1.968	5.831	3.899
Monkfish										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.006	0.000	0.001	0.003	0.003	0.000	0.002	0.001	0.003	0.002
CV	0.847	3.273	3.519	2.546	2.876		2.876	2.308	2.384	2.346
Summer flounder										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.010	0.000	0.003	0.000	0.004	0.002	0.000	0.000	0.000
CV		6.891	3.509	5.200	8.187	3.162	5.675	7.524		7.524
Winter flounder										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.005	0.001	0.002	0.003	0.000	0.002	0.000	0.000	0.000
CV		4.008	2.996	3.502	2.506		2.506	4.678	5.831	5.255
Windowpane flounder										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.001	0.003	0.001	0.003	0.000	0.002	0.001	0.000	0.000
CV		10.853	2.718	6.785	7.038		7.038	6.463		6.463
Butterfish										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.002	0.000	0.001	0.002	0.000	0.001	0.001	0.000	0.000
CV		5.752	3.338	4.545	7.417		7.417	5.118		5.118
Cod										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
CV		4.072	3.127	3.600	3.224		3.224	4.764		4.764
Thorny skate										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000
CV		12.124	4.028	8.076	12.728		12.728	4.485	5.831	5.158
Ocean pout										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000
CV		4.769		4.769	3.335		3.335	5.384	3.420	4.402
Smooth skate										
Number of observed hauls	7	147	69	223	162	10	172	89	34	123
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CV	2.646		8.307	5.476						
Total Number of observed hauls	147	3,087	1,449	4,683	3,402	210	3,612	1,869	714	2,583
Total Mean	0.008	0.023	0.022	0.018	0.043	0.078	0.061	0.045	0.042	0.044
Total CV	1.562	4.994	3.070	3.538	5.067	2.030	3.833	5.184	3.655	4.504

Table 123. Observed 2014-2016 D/Kall bycatch statistics by species and quarter for the southern management area.

	2014				2014 Total	2015				2015 Total	2016				2016 Total
Species	1	2	3	4		1	2	3	4		1	2	3	4	
Spiny dogfish															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.307	0.209	0.038	0.074	0.157	0.576	0.231	0.006	0.411	0.306	0.811	0.035	0.029	0.014	0.222
CV	3.301	3.686	2.670	1.567	2.806	2.163	4.690	3.625	6.753	4.308	4.014	5.640	3.119	3.667	4.110
Red hake															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.093	0.060	0.273	0.055	0.120	0.411	0.185	0.229	0.408	0.308	0.550	0.348	0.025	0.098	0.255
CV	2.393	2.572	1.400	2.089	2.113	1.669	5.734	3.329	1.761	3.123	1.367	4.593	1.328	2.367	2.414
Silver hake															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.027	0.102	0.369	0.063	0.140	0.016	0.022	0.140	0.060	0.060	0.011	0.439	0.054	0.234	0.184
CV	5.512	1.592	1.362	2.025	2.623	1.769	3.425	3.735	3.383	3.078	2.292	6.124	2.630	1.320	3.092
Little skate															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.001	0.056	0.144	0.117	0.080	0.032	0.106	0.193	0.059	0.097	0.030	0.021	0.141	0.226	0.104
CV	4.034	2.410	2.107	1.278	2.457	4.034	5.980	3.234	4.835	4.521	2.114	1.994	1.263	3.702	2.268
Butterfish															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.152	0.076	0.099	0.093	0.105	0.197	0.021	0.106	0.075	0.100	0.085	0.079	0.077	0.046	0.072
CV	2.198	3.342	2.195	2.204	2.485	4.347	3.923	1.609	7.752	4.408	1.958	3.778	5.074	2.583	3.348
Summer flounder															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.034	0.025	0.001	0.015	0.019	0.169	0.012	0.020	0.000	0.050	0.112	0.002	0.007	0.029	0.037
CV	2.360	7.577	7.141	2.409	4.872	2.175	3.681	2.652		2.836	3.225	3.374	2.042	2.810	2.863
Haddock															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.003	0.014	0.069	0.027	0.028	0.001	0.113	0.047	0.066	0.057	0.044	0.004	0.002	0.001	0.013
CV	5.993	4.690	1.692	2.574	3.737	5.708	3.381	1.936	4.506	3.883	2.614	5.572	3.437	3.139	3.690
Winter skate															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.032	0.000	0.085	0.001	0.029	0.057	0.014	0.010	0.000	0.020	0.155	0.003	0.010	0.000	0.042
CV	5.791	9.165	2.497	4.867	5.580	5.750	4.499	5.569		5.272	2.734	5.753	3.563		4.017
Barndoor skate															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.048	0.047	0.005	0.031	0.033	0.034	0.018	0.020	0.026	0.025	0.093	0.008	0.004	0.001	0.027
CV	6.371	3.985	3.692	2.488	4.134	2.558	3.416	4.820	2.841	3.409	1.961	2.811	4.800	4.506	3.520
Monkfish															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.004	0.004	0.000	0.003	0.003	0.035	0.006	0.003	0.013	0.014	0.082	0.016	0.008	0.062	0.042
CV	2.565	3.848	7.141	2.409	3.991	2.242	4.004	2.929	3.243	3.104	2.299	4.480	1.741	2.953	2.868
Ocean pout															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.000	0.040	0.000	0.000	0.010	0.002	0.005	0.000	0.000	0.002	0.004	0.015	0.000	0.000	0.005
CV		3.557			3.557	7.019	4.865	6.059	6.948	6.223	2.860	2.599	4.963		3.474
Witch flounder															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.009	0.004	0.000	0.000	0.003	0.034	0.004	0.001	0.000	0.010	0.008	0.005	0.000	0.000	0.003
CV	4.378	2.569	5.746	5.416	4.527	1.529	5.706	4.559		3.931	3.858	2.464	5.320	4.840	4.121
Winter flounder															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.000	0.002	0.012	0.001	0.004	0.000	0.001	0.006	0.000	0.002	0.000	0.007	0.022	0.003	0.008
CV		2.957	3.053	5.873	3.961		7.210	4.404		5.807		3.398	2.518	6.691	4.202
Atlantic herring															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.001	0.007	0.000	0.000	0.002	0.002	0.022	0.003	0.006	0.008	0.000	0.000	0.000	0.000	0.000
CV	8.367	3.574		6.000	5.980	7.746	9.291	4.708	9.821	7.892					
Yellowtail flounder															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.010	0.000	0.016	0.005	0.008	0.000	0.000	0.003	0.000	0.001	0.000	0.000	0.004	0.001	0.001
CV	8.205	6.442	3.078	2.198	4.981			3.564		3.564			2.128	5.096	3.612
Windowpane flounder															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.007	0.001	0.009	0.000	0.004	0.000	0.000	0.009	0.000	0.002	0.000	0.001	0.005	0.000	0.001
CV	8.190	2.239	3.693	6.000	5.031		4.555	4.482		4.518	8.775	4.311	1.938		5.008
White hake															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.001
CV						4.982		3.847	8.669	5.832	8.775		5.616		7.195
Cod															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.001
CV		6.913			6.913		10.149		10.677	10.413	6.823				6.823
American plaice															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CV			7.141		7.141			6.708	10.677	8.693	8.775				8.775
Thorny skate															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CV															
Smooth skate															
Number of observed hauls	70	84	51	36	241	60	103	45	114	322	77	45	66	46	234
Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CV															
Total Number of observed hauls	1,470	1,764	1,071	756	5,061	1,260	2,163	945	2,394	6,762	1,617	945	1,386	966	4,914
Total Mean	0.035	0.031	0.053	0.023	0.035	0.075	0.036	0.038	0.054	0.051	0.095	0.047	0.019	0.034	0.049
Total CV	4.976	4.183	3.641	3.293	4.013	3.835	5.282	3.987	6.297	4.784	4.028	4.064	3.217	3.640	3.733

11.3 Total bycatch estimates

The observed discard to kept ratios (D/Kall) by quarter, year, and small-mesh multispecies management area were applied total landings data supplied by dealers (CFDBS) for trips using small-mesh trawls and landing more than 2000 lbs. of whiting or 400 lbs. of red hake, giving the total discard estimates shown in Table 124. Combined across management areas, haddock, spiny dogfish, silver hake, little skate, and winter skate were the highest discards during 2014-2016.

In the northern area, the red hake discard estimates increased to 91 mt in 2014 to 224 mt in 2015 and declined slightly to 210 mt in 2016, consistent with a very large 2013 year class entering the fishery. Estimated red hake discards in the southern management area were considerably higher, increasing from 657 mt in 2014 to 1099 mt in 2015 and 1401 mt in 2016.

In the northern area, haddock were the highest of all discarded species, decreasing from 477 mt in 2014 to 353 mt in 2016. In the southern area, haddock discards peaked at 233 mt in 2015 and declined to 76 mt in 2016. These estimates are consistent with a very large 2013 year-class of haddock becoming vulnerable to small-mesh trawls then moving out of areas where whiting occur.

Both management areas combined, our estimates of yellowtail flounder discards declined from 4.5 mt in 2014 to 8.7 mt ion 2016. It should be noted that the estimates provided here do not correspond directly with the Georges Bank yellowtail flounder stock area and include yellowtail flounder caught in the Mid-Atlantic, Southern New England, and Gulf of Maine waters. The estimates only apply to small-mesh multispecies trips landing 2000 lbs. of whiting or 400 lbs. of red hake while using small-mesh trawls.

Table 124. Total estimated bycatch (mt) by species for the small-mesh multispecies fishery.

Species	2014	2015	2016	3-year average	20142	20153	20164	3-year average
Red hake	91.4	224.1	209.6	175.1	657.0	1099.0	1400.6	1,052.2
Haddock	476.8	241.0	353.0	356.9	199.9	233.7	76.0	169.9
Winter skate	6.8	114.9	98.4	73.4	29.7	13.4	285.2	109.4
Spiny dogfish	98.3	90.7	399.2	196.1	534.9	376.3	130.8	347.3
Butterfish	4.0	4.2	1.5	3.2	376.5	260.4	161.2	266.0
Little skate	12.3	29.1	44.6	28.7	140.2	66.6	171.1	126.0
Silver hake	175.2	34.5	133.5	114.4	619.0	101.5	231.5	317.3
Barndoor skate	2.9	4.0	7.5	4.8	37.2	51.7	151.9	80.3
Atlantic herring	20.2	77.3	4.6	34.0	1.5	11.4	0.0	4.3
Monkfish	0.9	2.6	5.7	3.1	4.4	24.5	135.6	54.8
Summer flounder	4.8	1.5	1.5	2.6	21.7	129.5	93.4	81.5
.Yellowtail flounder	3.0	13.7	7.9	8.2	1.5	0.0	0.8	0.8
Witch flounder	1.5	4.9	14.0	6.8	9.6	57.2	9.7	25.5
.Winter flounder	5.6	2.3	1.5	3.1	15.1	0.2	25.6	13.6
Ocean pout	0.1	0.7	0.6	0.4	58.3	5.2	13.3	25.6
American plaice	4.0	3.2	10.5	5.9	0.0	0.0	0.1	0.0
Cod	0.7	0.8	1.4	1.0	0.3	0.0	1.1	0.5
Windowpane	1.1	0.2	5.6	2.3	2.3	0.0	2.0	1.5
White hake	1.3	2.6	1.4	1.8	0.0	0.1	1.1	0.4
Smooth skate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thorny skate	0.4	0.0	0.4	0.2	0.0	0.0	0.0	0.0
Pollock	0.9	0.1	0.2	0.4	0.1	0.0	0.5	0.2
Redfish	0.7	1.4	0.1	0.7	0.0	0.0	0.0	0.0
Total estimated bycatch	913.0	853.8	1,302.6	1,023.1	2,709.3	2,430.9	2,891.5	2,677.2

11.4 Bycatch summaries for the small-mesh multispecies fishery by species

11.4.1 Red hake

Red hake bycatch rates were the second highest of the observed discards in the small-mesh multispecies fishery, ranking 3rd (0.091 lbs/lbs. kept) in the northern and 2nd (0.241 lbs/lbs. kept) in the southern management area.

Red hake bycatch rates (generally the most frequent discarded species in the small-mesh multispecies fishery, were relatively stable from 1989 to 2016 in both the northern and southern management areas (Figure 58). This is a bit surprising because red hake abundance markedly increased in the northern management area from a very large 2013 year-class. Although there is no minimum size or apparent price differential with size, these fish would have been very small in 2014 and 2015. Conversely, red hake biomass in the spring surveys has substantially declined in 2015 and 2016, yet the observed bycatch rate held steady. Bycatch rates by gear type did not appear to be lower for the raised footrope trawl than for other gear types.

Figure 58. Red hake bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

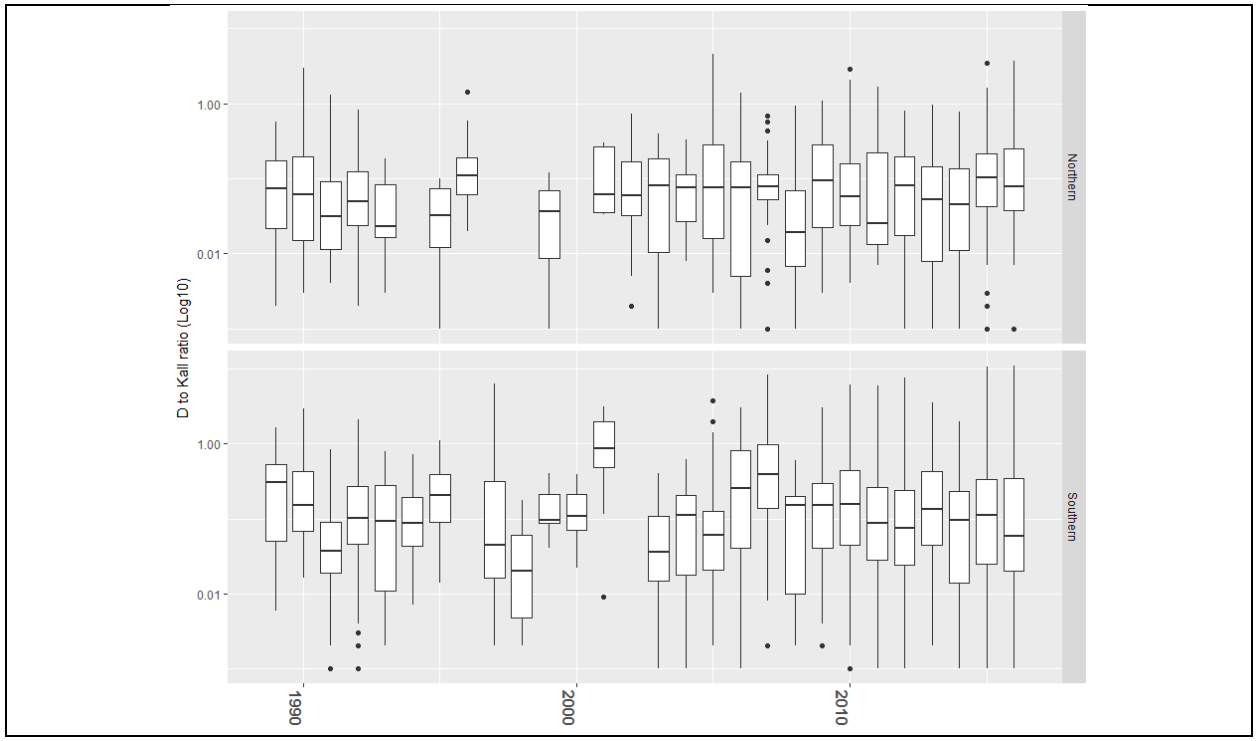
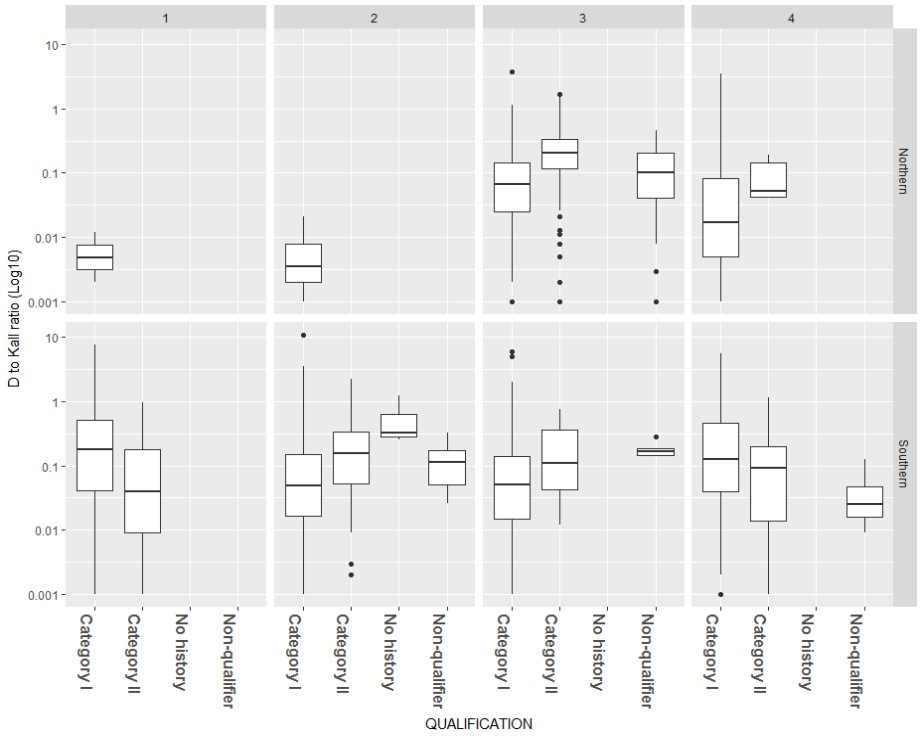


Figure 59. Red hake bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.



Bycatch rates for red hake also did not appear to vary by qualification status. Figure 68 shows the bycatch rates by Alternative 2 qualification. Bycatch rates amongst qualification categories for other alternatives showed similar patterns and thus were not shown in this document. A test of significance confirmed that the qualification effect was not a significant factor in either the northern or southern management areas (Table 125). There were significant differences ($P<0.05$) in red hake catch rates in the southern management area for Alternatives 2 and 3 (Table 126). For Alternative 2, the standardized effect was negative (i.e. less bycatch) for Category II vessels and positive for non-qualifying vessels. For Alternative 3, the standardized effect was positive (i.e. more bycatch) for Category II vessels.

Figure 60. 2014-2016 bycatch rates (D/Kall) for red hake by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.

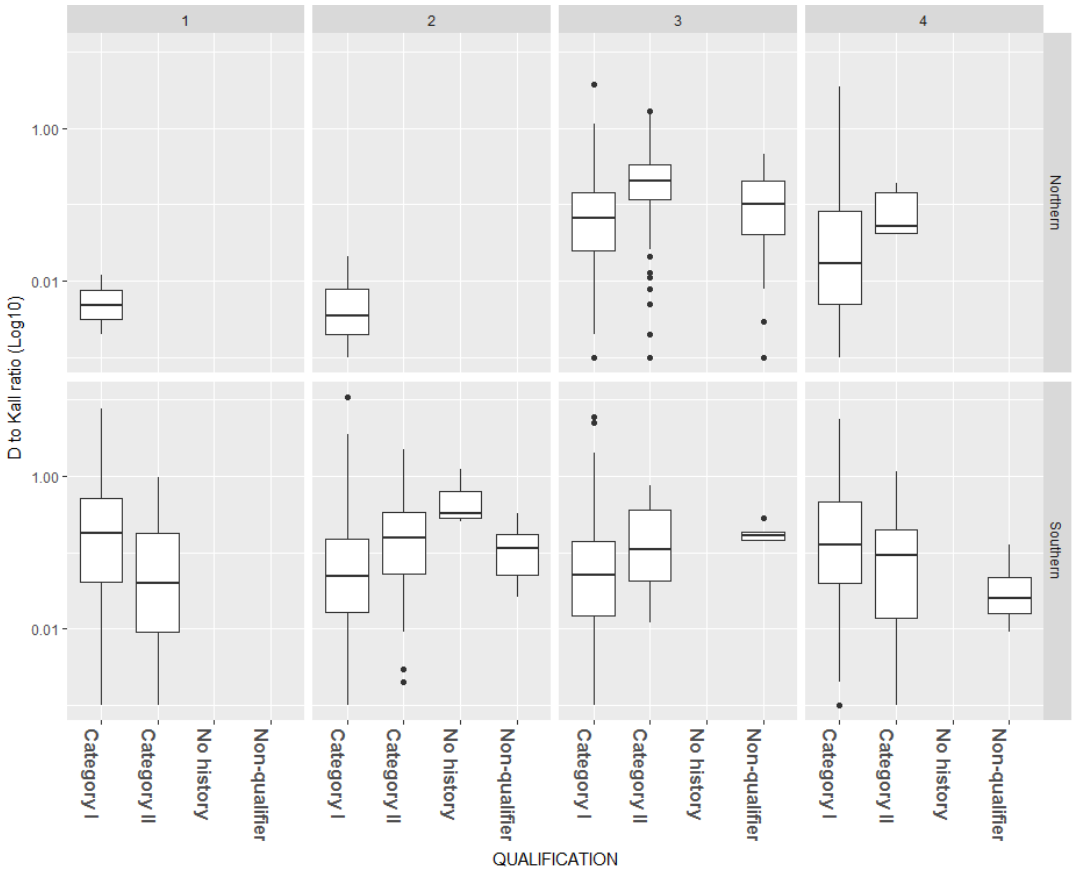


Table 125. Analysis of variance of significant differences in 2014-2016 red hake bycatch rates by management area for Alternative 1 qualification status.

- Red hake
- Northern area
- Alternative 1
- Qualification effect is not significant (p>0.05)

Variables	Levels			
QUALIFICATION$ (3 levels)	Category I	Category II	Non-qualifier	

11 case(s) are deleted due to missing data.

Dependent Variable	D_KALL_RED_HAKE
N	507
Multiple R	0.051
Squared Multiple R	0.003

Estimates of Effects B = (X'X)⁻¹X'Y

Factor	Level	D_KALL_RED_HAKE
CONSTANT		0.084
QUALIFICATION$	Category I	0.020
QUALIFICATION$	Category II	-0.014

Analysis of Variance

Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
QUALIFICATION$	0.112	2	0.056	0.661	0.517
Error	42.793	504	0.085		

Test for Normality

	Test Statistic	p-Value
K-S Test (Lilliefors)	0.361	0.000
Shapiro-Wilk Test	0.125	0.000

Durbin-Watson D-Statistic	1.614
First Order Autocorrelation	0.193

Information Criteria

AIC	193.431
AIC (Corrected)	193.511
Schwarz's BIC	210.345

- Red hake
- Southern area
- Alternative 1
- Qualification effect is not significant (p>0.05)

Variables	Levels			
QUALIFICATION$ (4 levels)	Category I	Category II	No history	Non-qualifier

16 case(s) are deleted due to missing data.

Dependent Variable	D_KALL_RED_HAKE
N	781
Multiple R	0.085
Squared Multiple R	0.007

Estimates of Effects B = (X'X)⁻¹X'Y

Factor	Level	D_KALL_RED_HAKE
CONSTANT		0.272
QUALIFICATION$	Category I	-0.002
QUALIFICATION$	Category II	-0.155
QUALIFICATION$	No history	0.325

Analysis of Variance

Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
QUALIFICATION$	3.024	3	1.008	1.878	0.132
Error	416.989	777	0.537		

Test for Normality

	Test Statistic	p-Value
K-S Test (Lilliefors)	0.353	0.000
Shapiro-Wilk Test	0.120	0.000

Durbin-Watson D-Statistic	1.723
First Order Autocorrelation	0.138

Information Criteria

AIC	1,736.292
AIC (Corrected)	1,736.370
Schwarz's BIC	1,759.595

Table 126. **Red hake:** Analysis of variance results, testing significant differences by qualification category for red hake discards to kept of all species ratios on 2014-2016 observed trips. Significant differences are indicated with '**' when p<0.01 and '*' when p<0.05.

Northern		Standardized effect			
N=507 hauls	P-value	Category I	Category II	No history	Non-qualifier
Alternative 1	0.517	0.020	-0.014		0.084
Alternative 2	0.276	0.029	0.007		0.078
Alternative 3	0.892	0.035	0.024		0.060
Alternative 4	0.546	0.019	-0.013		0.085
Alternative 5	0.552	0.019	-0.011		0.085
Southern		Standardized effect			
N=781 hauls	P-value	Category I	Category II	No history	Non-qualifier
Alternative 1	0.132	-0.002	-0.155	0.325	0.272
Alternative 2	0.001 **	0.037	-0.188	0.317	0.280
Alternative 3	0.035 *	0.090	0.175		
Alternative 4	0.120	0.077	-0.089		0.190
Alternative 5	0.101	0.004	-0.171	0.330	0.267

11.4.2 Spiny dogfish

Spiny dogfish bycatch ranked high in the northern (0.173 lbs/lbs. kept; rank 2) and southern (0.271 lbs/lbs. kept; rank 1) management areas. Bycatch rates in both management areas (Figure 61) appeared to be relatively stable through time with no trend. There were variations in the bycatch rate for various trawl configurations (Figure 62), but there did not appear to be much difference in the catch rates for the raised footrope trawl and for groundfish or 2/4 seam standard trawls. Likewise, the spiny dogfish bycatch rates by qualification category (Figure 63) were very similar to one another, but the spiny dogfish bycatch rate for Category II vessels fishing in the northern area in quarter 3 was lower than for Category I or for non-qualifying vessels.

Figure 61. Spiny dogfish bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

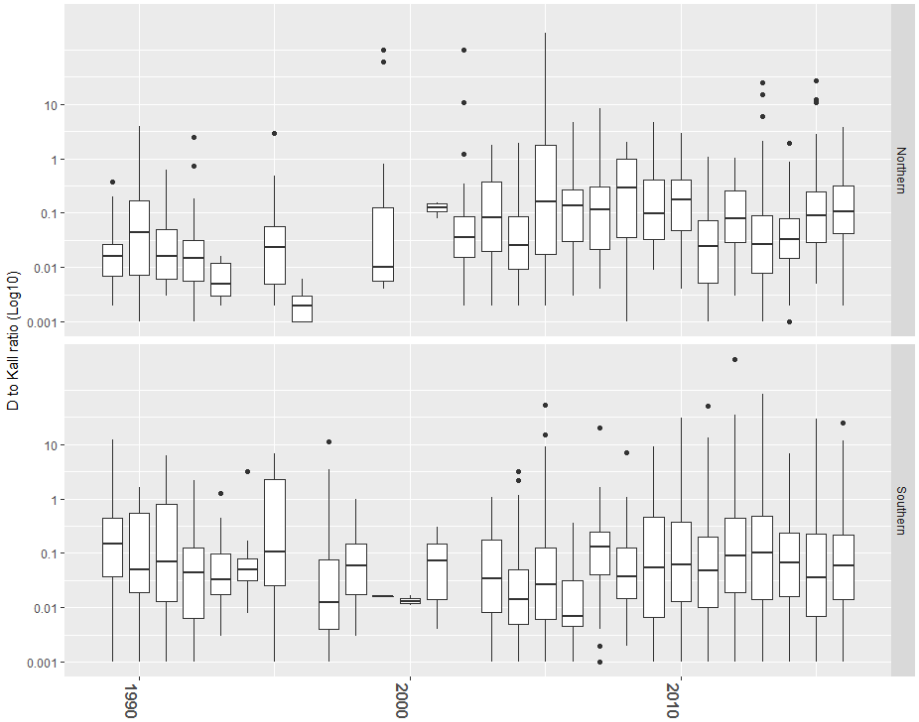


Figure 62. Spiny dogfish bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

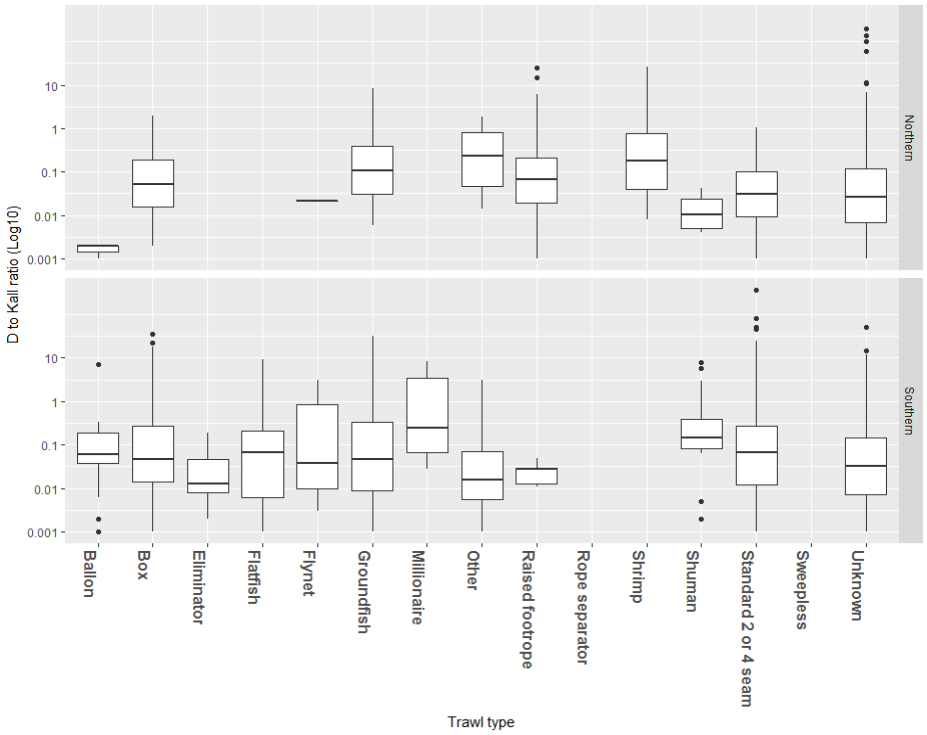
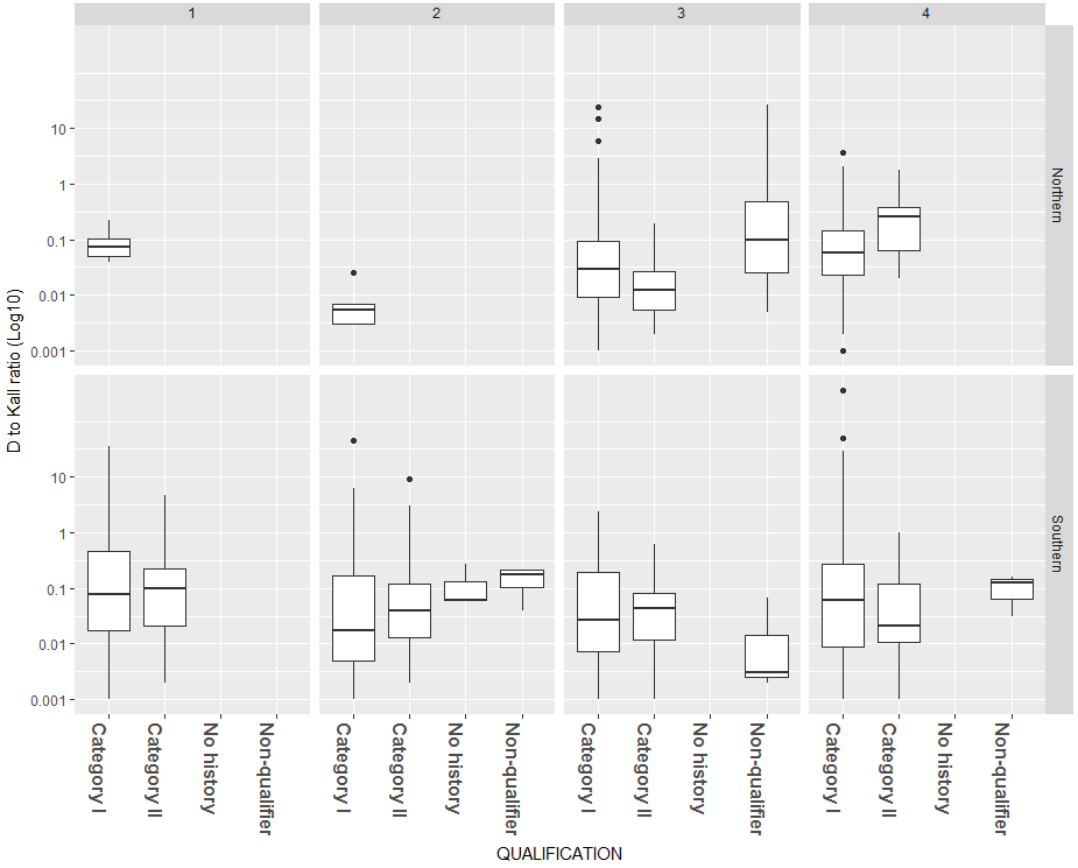


Figure 63. 2014-2016 bycatch rates (D/Kall) for spiny dogfish by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.3 Silver hake

Silver hake bycatch rates were the fourth highest of the observed discards in the small-mesh multispecies fishery, ranking 5th (0.052 lbs/lbs. kept) in the northern and 3rd (0.104 lbs/lbs. kept) in the southern management area.

Bycatch rates in both management areas (Figure 64) appeared to be relatively stable through time with no trend. Because silver hake are the major target species in the small-mesh multispecies fishery, this result should be expected. Variations in bycatch of silver hake may arise due to marketing or other reasons, since there is no regulatory size limit. For similar reasons, the silver hake bycatch rate also does not vary much by trawl configuration (Figure 65) or qualification status (Figure 66).

Figure 64. Silver hake bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

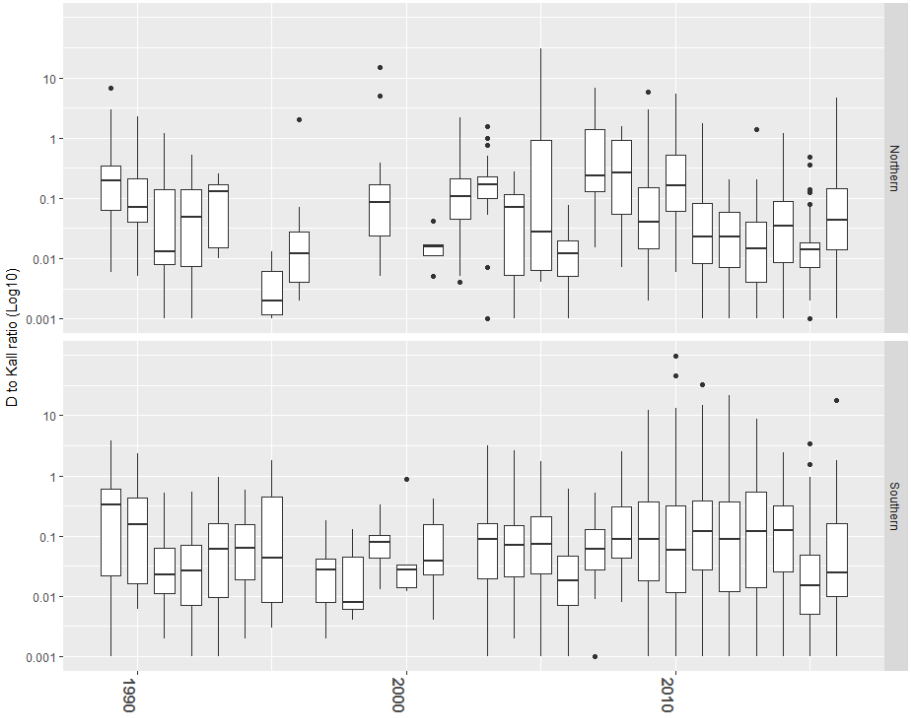


Figure 65. Silver hake bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

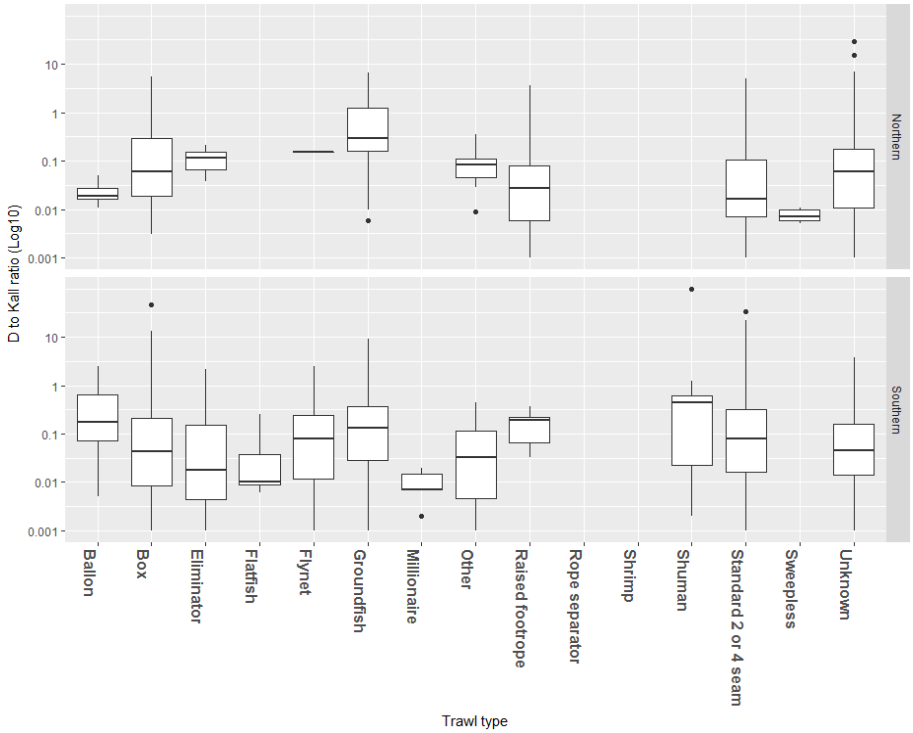
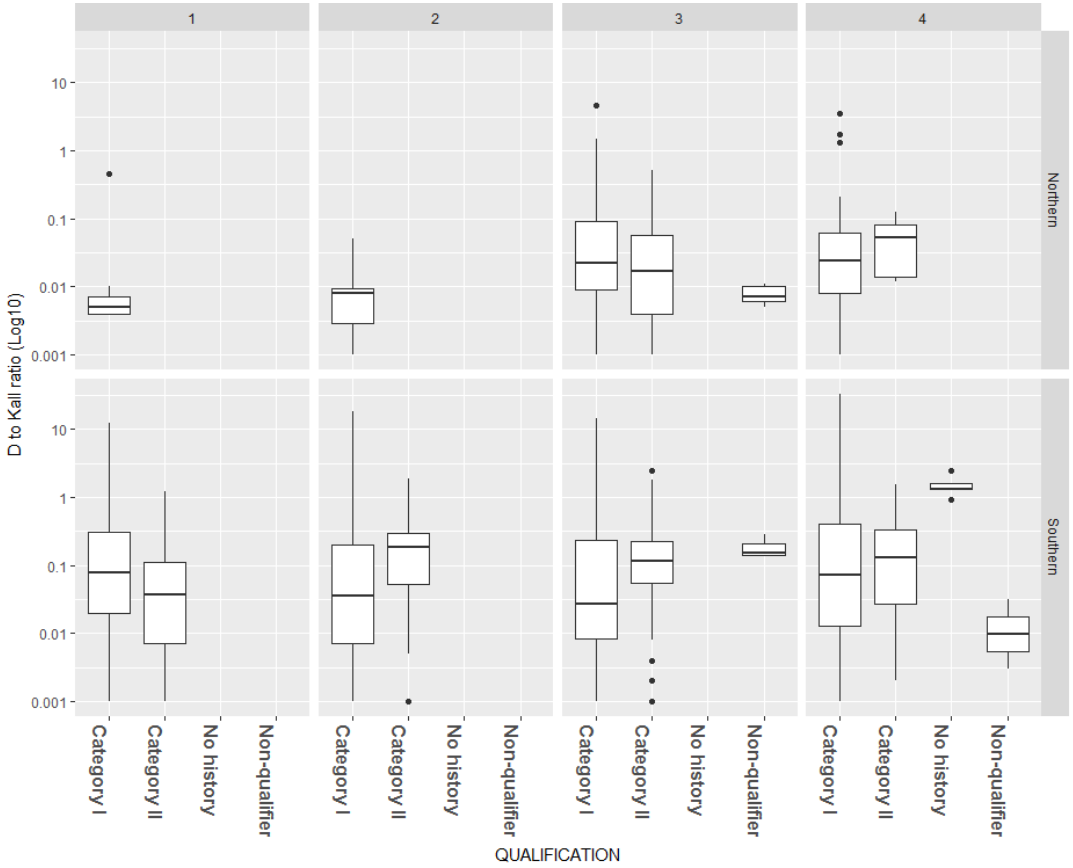


Figure 66. 2014-2016 bycatch rates (D/Kall) for silver hake by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.4 Haddock

Haddock bycatch rates were the third highest of the observed discards overall in the small-mesh multispecies fishery, but ranked 1st (0.248 lbs/lbs. kept) in the northern area. Haddock are less prevalent in the southern management area and ranked 6th (0.039 lbs/lbs. kept).

Haddock was the second most frequent observed bycatch species, particularly in the Gulf of Maine and the Cultivator Shoals Area. Haddock bycatch rates have increased by a substantial amount in recent years (Figure 67), since 2014 in the northern management area and since 2012 in the southern management area. This increase is consistent with changes in haddock biomass in both areas due to exceptionally large recent year classes. Like red hake, bycatch rates by gear type (Figure 67) do not appear to be substantially different. Bycatch by shrimp nets were higher than other gears, but the number of samples for this gear were very low and are probably not significant.

Figure 67. Haddock bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

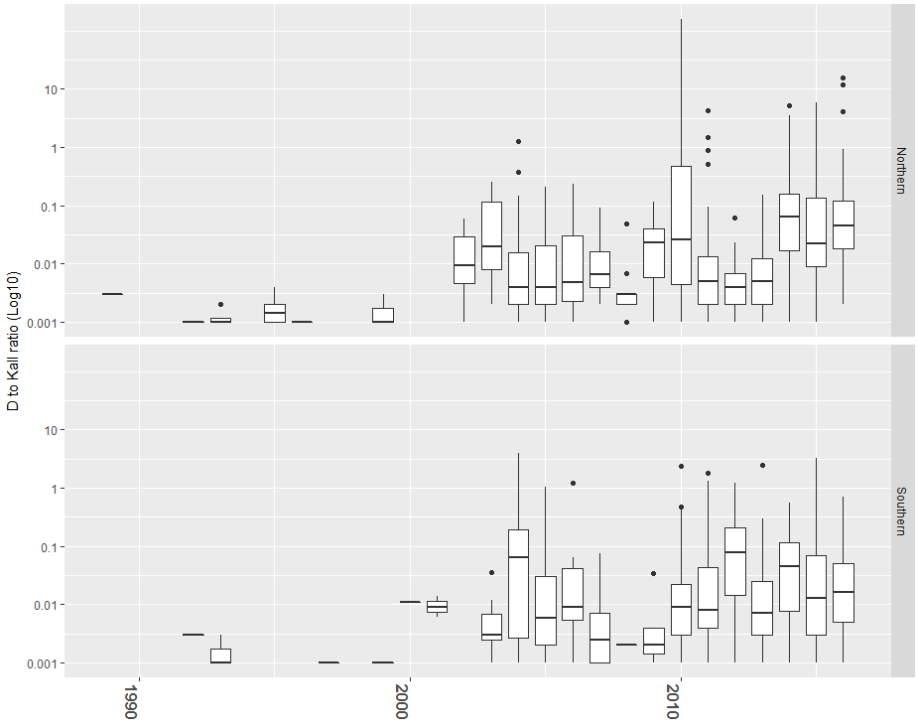
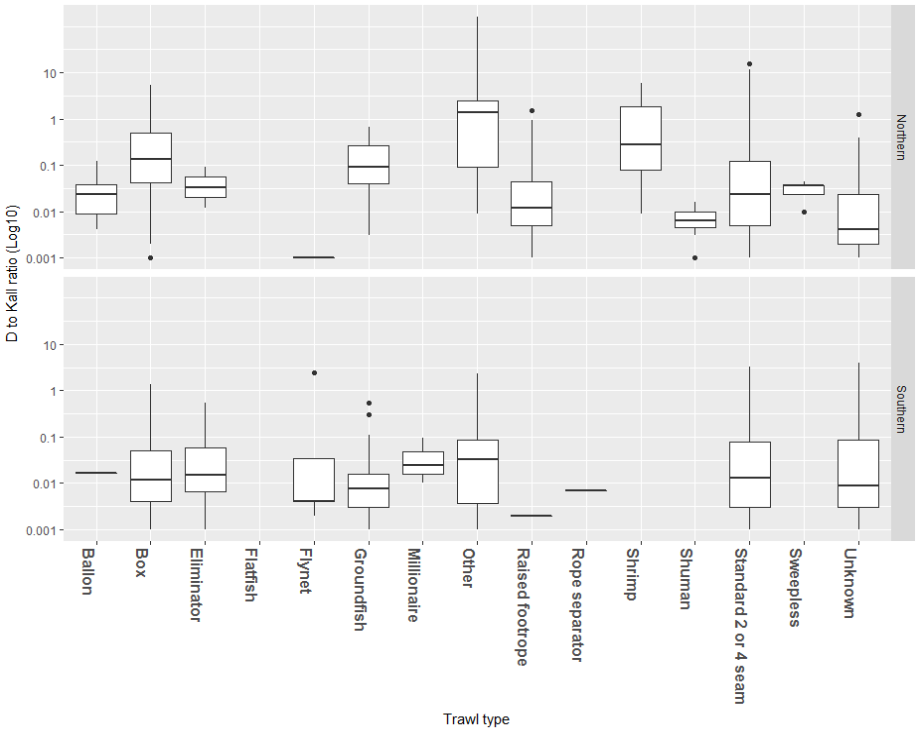


Figure 68. Red hake bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.



In the northern area, there was a significant difference in haddock bycatch rates (P<0.1 for Alternative 1; Table 127). This difference was mainly caused by lower bycatch rates for vessels that would qualify for a Category II permit. This significant difference was also significant for Alternatives 2 and 5 (Table 128), but the standardized effect for Alternative 4 was positive (i.e. higher bycatch than for other qualification classes). In the southern management area, the haddock bycatch rates were lower for vessels qualifying for a Category II permit in quarters 2 and 3 (Figure 69), but this was only significant for Alternative 2 (Table 128).

Figure 69. 2014-2016 bycatch rates (D/Kall) for haddock by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.

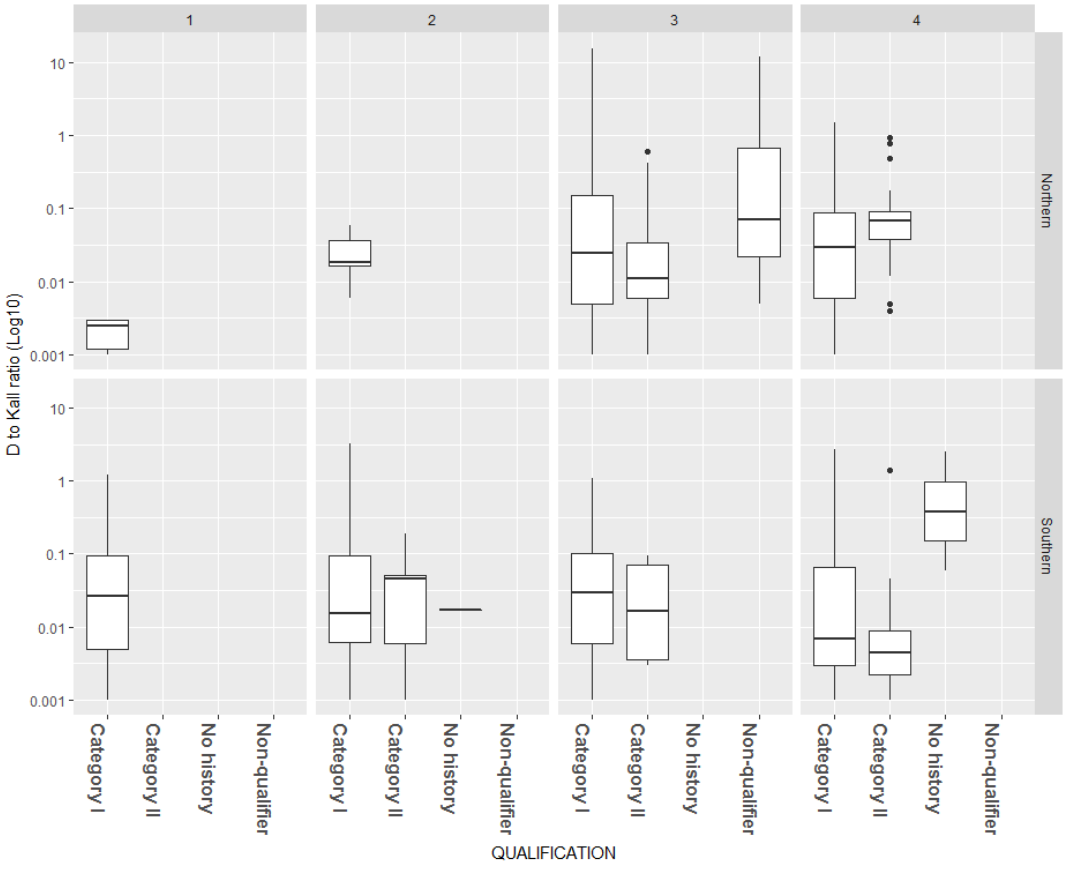


Table 127. Analysis of variance of significant differences in 2014-2016 red hake bycatch rates by management area for Alternative 1 qualification status.

- **Haddock**
- **Northern area**
- **Alternative 1**

Variables	Levels		
QUALIFICATIONS (3 levels)	Category I	Category II	Non-qualifier

11 case(s) are deleted due to missing data.

Dependent Variable	D_KALL_HADDOCK
N	507
Multiple R	0.146
Squared Multiple R	0.021

Estimates of Effects B = $(X'X)^{-1}X'Y$

Factor	Level	D_KALL_HADDOCK
CONSTANT		0.284
QUALIFICATIONS	Category I	-0.046
QUALIFICATIONS	Category II	-0.223

Analysis of Variance

Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
QUALIFICATIONS	11.637	2	5.819	5.512	0.004
Error	532.041	504	1.056		

Test for Normality

	Test Statistic	p-Value
K-S Test (Lilliefors)	0.345	0.000
Shapiro-Wilk Test	0.125	0.000

Durbin-Watson D-Statistic	1.558
First Order Autocorrelation	0.221

Information Criteria

AIC	1,471.246
AIC (Corrected)	1,471.325
Schwarz's BIC	1,488.160

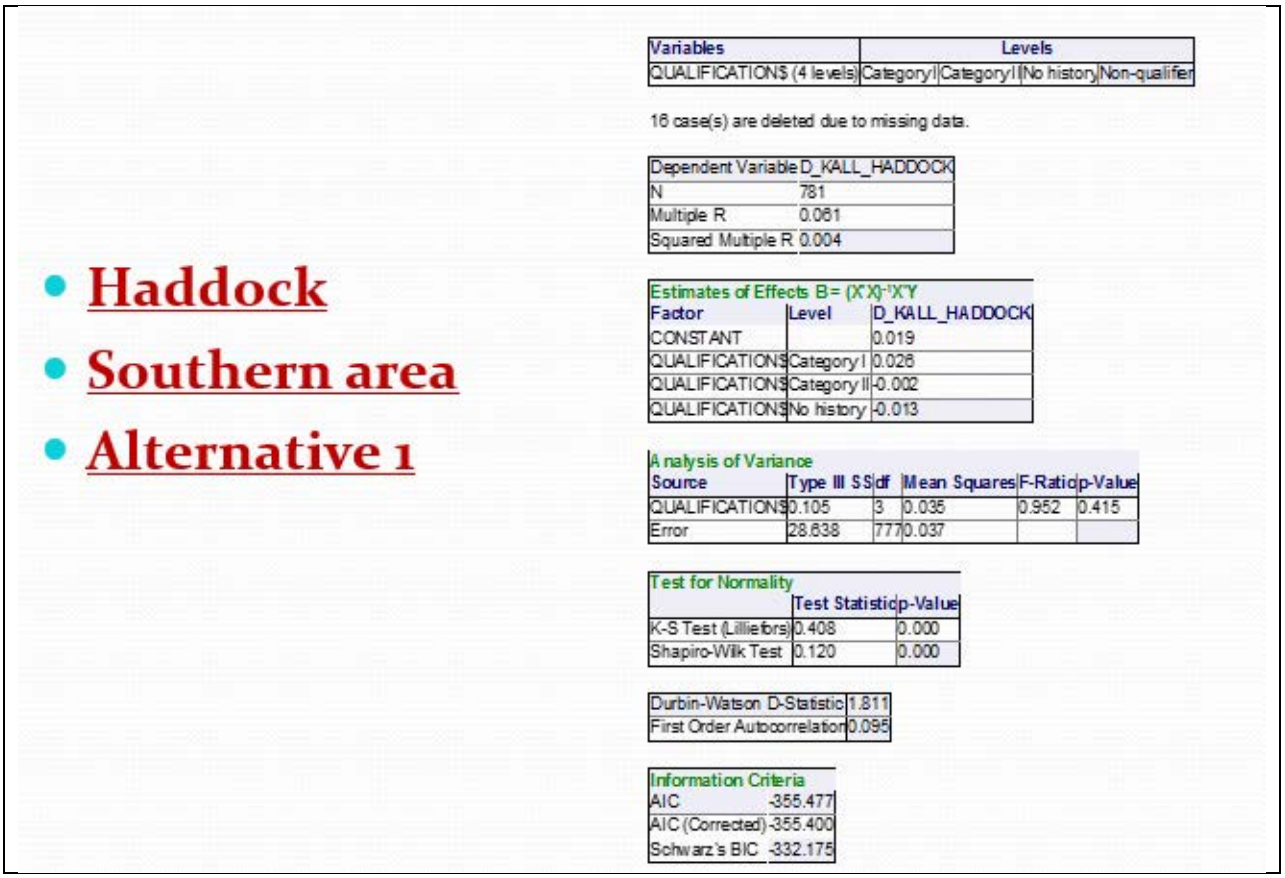


Table 128. **Haddock:** Analysis of variance results, testing significant differences by qualification category for haddock discards to kept of all species ratios on 2014-2016 observed trips. Significant differences are indicated with '**' when p<0.01 and '*' when p<0.05.

Northern		Standardized effect			
N=507 hauls	P-value	Category I	Category II	No history	Non-qualifier
Alternative 1	0.004 **	-0.046	-0.223		0.284
Alternative 2	<0.001 **	-0.101	-0.306		0.365
Alternative 3	0.121	-0.010	0.218		0.214
Alternative 4	0.002 **	-0.038	0.249		0.294
Alternative 5	0.007 **	-0.014	-0.223		0.270
Southern		Standardized effect			
N=781 hauls	P-value	Category I	Category II	No history	Non-qualifier
Alternative 1	0.415	0.026	-0.002	-0.013	0.019
Alternative 2	0.018 *	0.037	-0.008	-0.012	0.017
Alternative 3	0.070	0.020	0.024		
Alternative 4	0.098	0.023	-0.022		0.022
Alternative 5	0.184	0.031	-0.013	-0.010	0.015

11.4.5 Butterfish

Butterfish appear in the observed small-mesh multispecies fishery bycatch more frequently in the southern area than they do in the northern area. Butterfish bycatch rates ranked 17 (0.001 lbs/lbs. kept) in the northern and 4th (0.088 lbs/lbs. kept) in the southern management area.

The butterfish bycatch rate appears to have declined in the northern area since a peak in 2010-2011 (Figure 70). In the southern management area, butterfish bycatch has remained relatively stable since 2009. Bycatch rates for various trawl configurations (Figure 71) show some variation, most notably with a much lower bycatch rate for vessels using a 'millionaire' net in the southern management area. Caution should be exercised before reaching any conclusions, because the bycatch rate can also be affected by where and when the hauls were observed.

Butterfish bycatch catch rates between Alternative 2 qualification categories appear to be very similar (Figure 72), except that in quarters 1, 3, and 4 vessels fishing in the southern management area that are likely to qualify for Category II and non-qualifying vessels had a higher bycatch rate than vessels that would qualify for Category I. Before reaching conclusions about this outcome, it would be wise to evaluate whether many of these vessels were mixed species trips, targeting whiting, squid, and/or butterfish.

Figure 70. Butterfish bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

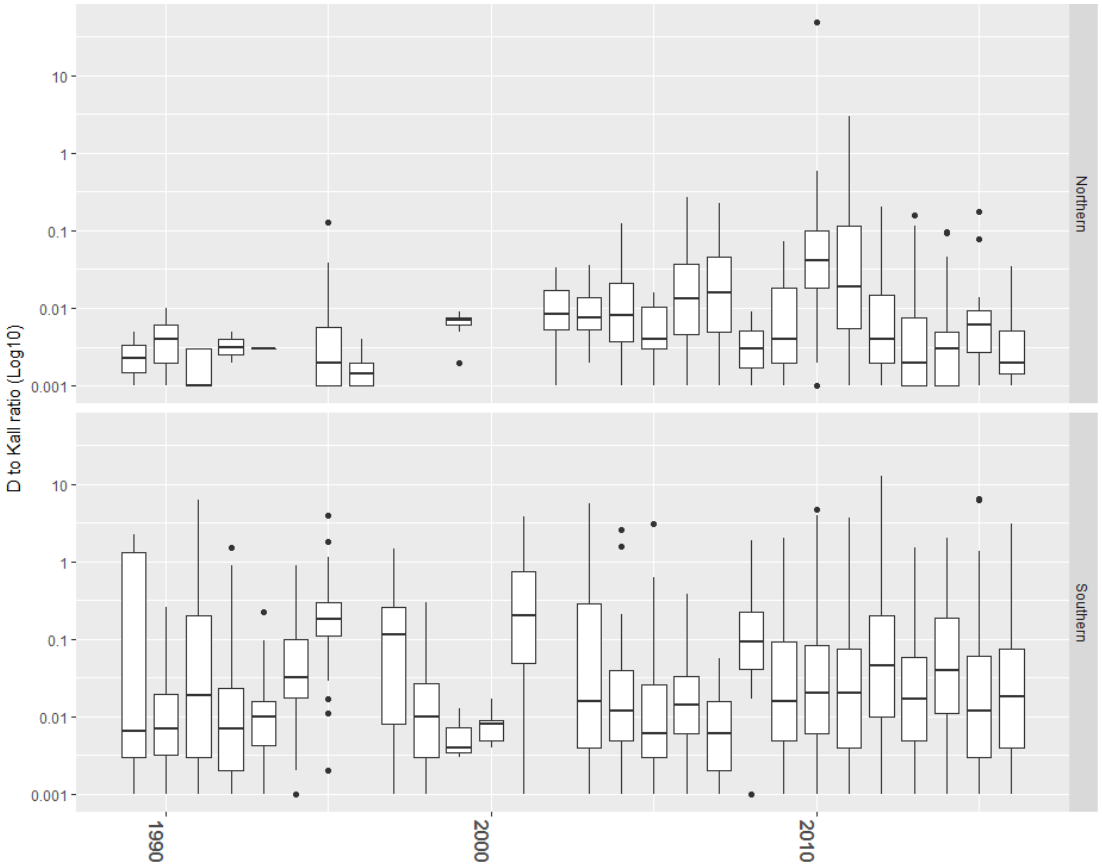


Figure 71. Butterfish bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

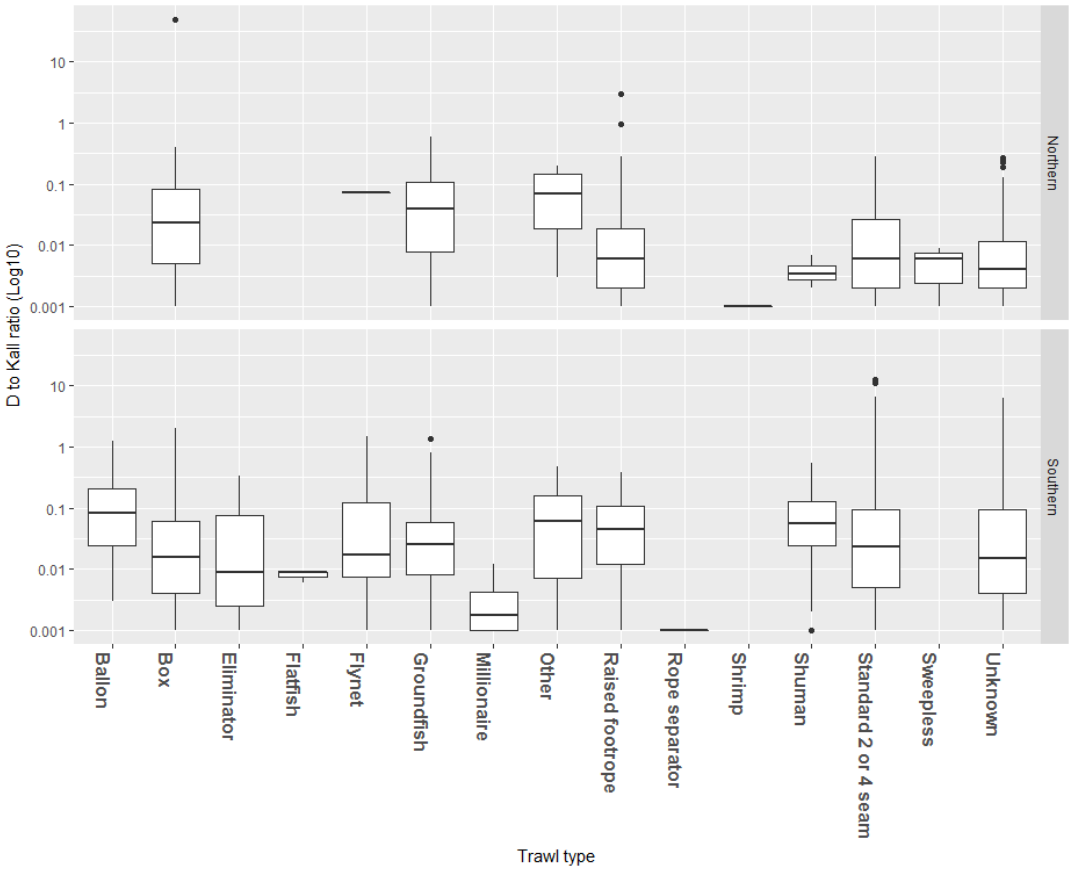
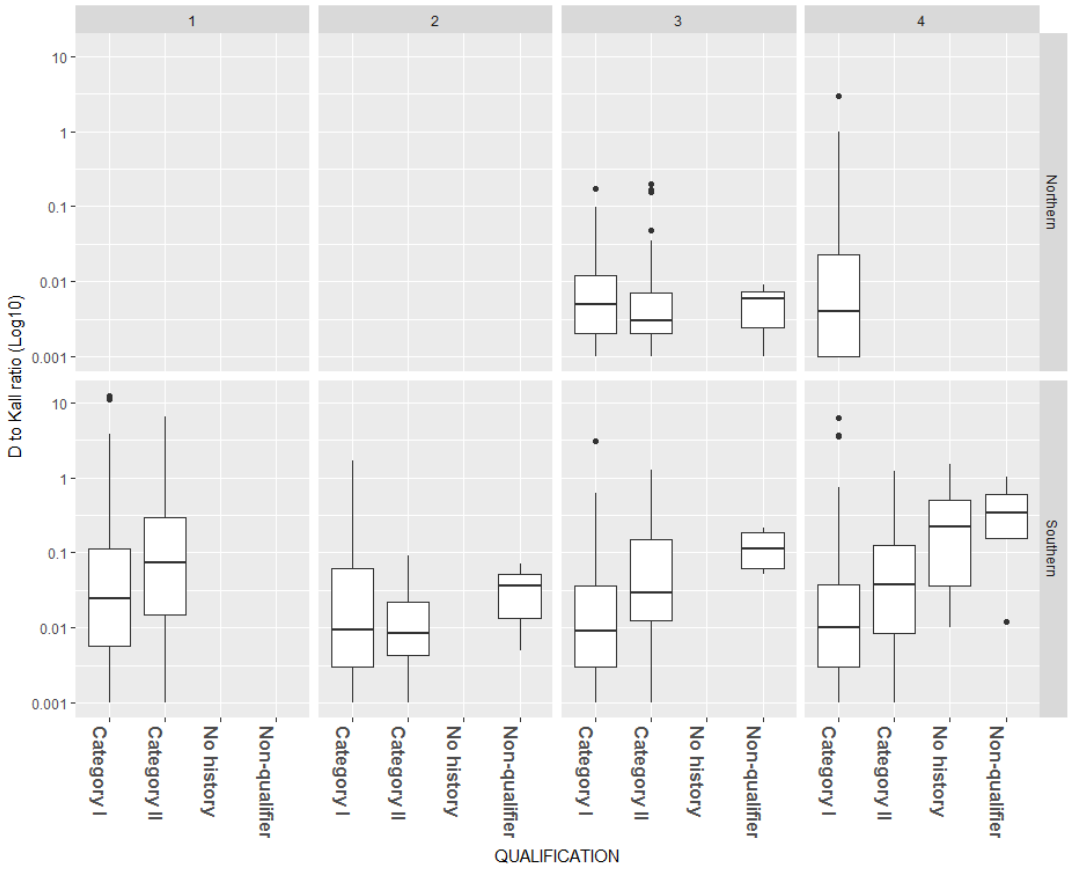


Figure 72. 2014-2016 bycatch rates (D/Kall) for butterfish by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.6 Little skate

Little skate bycatch rates were the next highest of the observed discards in the small-mesh multispecies fishery, ranking 7th (0.033 lbs/lbs. kept) in the northern and 5th (0.085 lbs/lbs. kept) in the southern management area.

Little skate bycatch rate appears to have declined somewhat betwwen2003 and 2016 (Figure 73) in the northern management area, but remained steady without trend in the southern management area. Although it would be expected that the little skate bycatch rate for the raised footrope trawl would be lower than that when vessels use a standard groundfish or 2/4 seam trawl, this does not appear to be the case for little skate (Figure 74). It does however appear that vessels using the 'millionaire' trawl had a much lower little skate bycatch rate. Again, this result may be caused by the time and location where the observed hauls occurred than from selectivity of the net itself.

In the northern management area, the little skate bycatch appears to be higher for Category II vessels in quarter 3 and for non-qualifying vessels in quarter 4 (Figure 75), than for vessels that would qualify for a Category I permit with limited access qualification Alternative 2. This also appears to be the case in the southern management area during quarters 2, 3, and 4.

Figure 73. Little skate bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

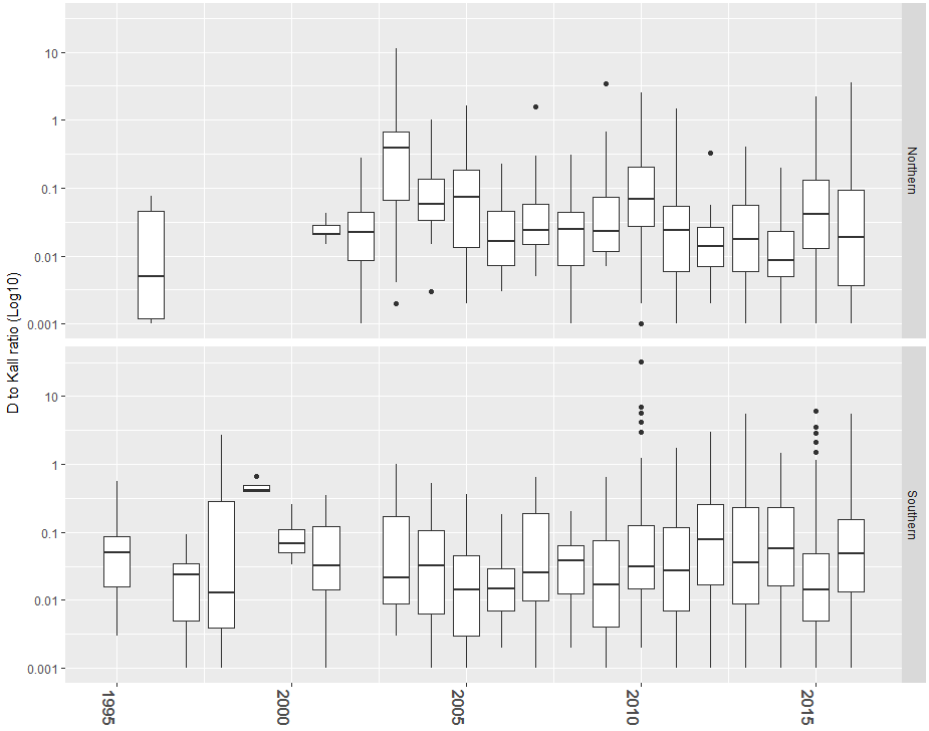


Figure 74. Little skate bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

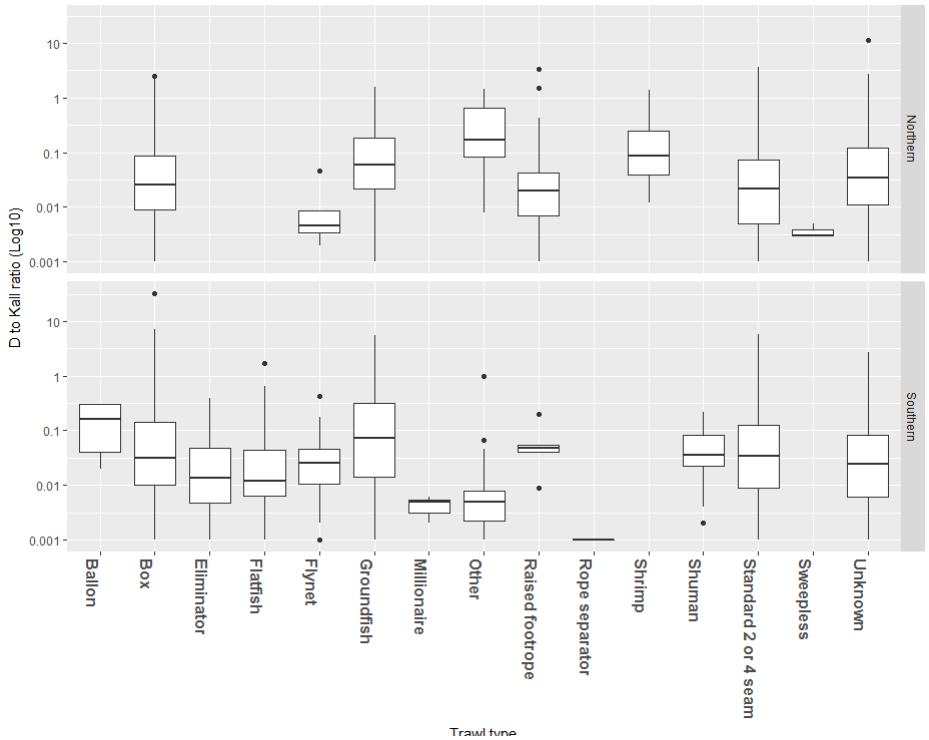
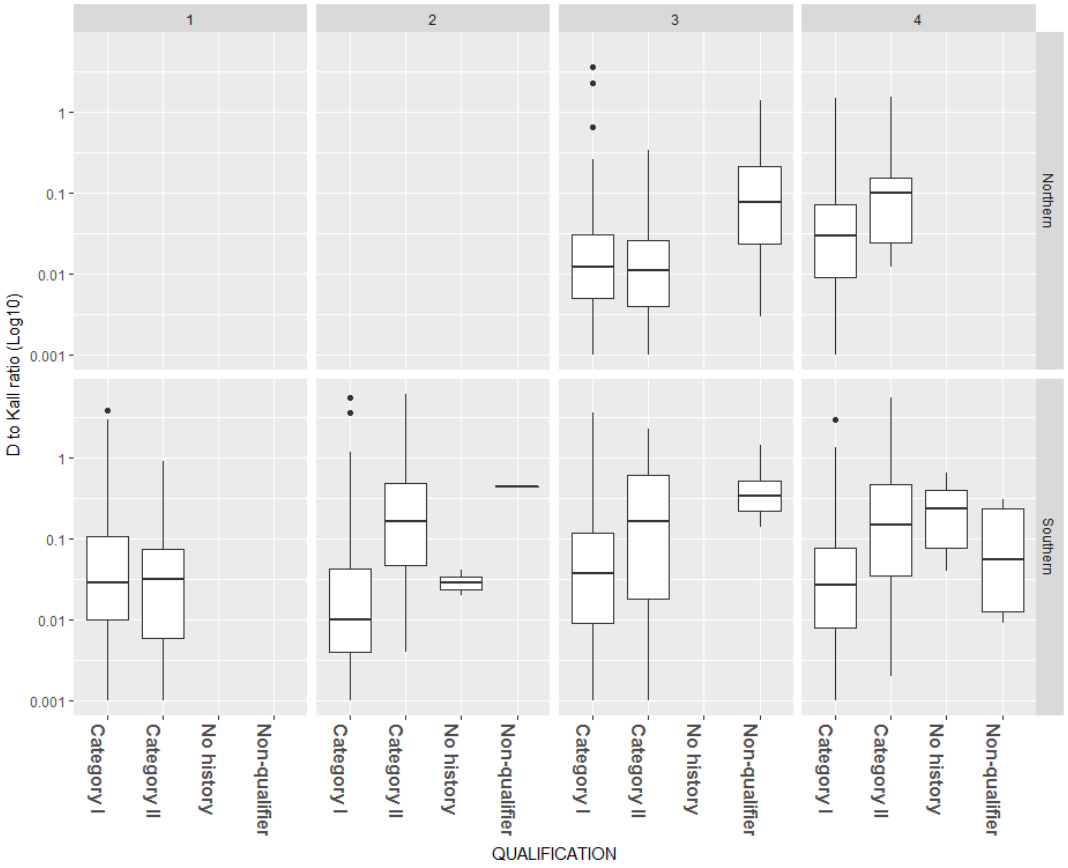


Figure 75. 2014-2016 bycatch rates (D/Kall) for little skate by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.7 Winter skate

Winter skate bycatch rates were the fourth highest of the observed discards in the small-mesh multispecies fishery, ranking 4th (0.066 lbs/lbs. kept) in the northern and 8th (0.031 lbs/lbs. kept) in the southern management area. The winter skate bycatch rate in the northern management area was highly variable between years (Figure 76), but there does not appear to be a trend. It seems less variable in the southern management area, but there appears to be an increasing trend in the bycatch rate since a 2005 low.

As a flatfish type species, it would be expected that the bycatch rate for the raised footrope trawl would be lower than for a standard groundfish or 2/4 seam trawl. This does not appear to be the case in the northern management area (Figure 77) where the raised footrope trawl is used, however. It is lower in the southern management area, but the gear is not required here and there are few samples for hauls with a raised footrope trawl in this area. It should be noted that there was no observed winter skate catch in the southern management area using the 'millionaire' trawl.

Except for quarter 3 in the southern management area, there does not appear to be a difference between winter skate bycatch rates by qualification category (Figure 78). In quarter 3 the winter skate bycatch rate appears to be much higher for vessels that would qualify for a Category II permit and for non-qualifiers, than for vessels qualifying for Category I.

Figure 76. Winter skate bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

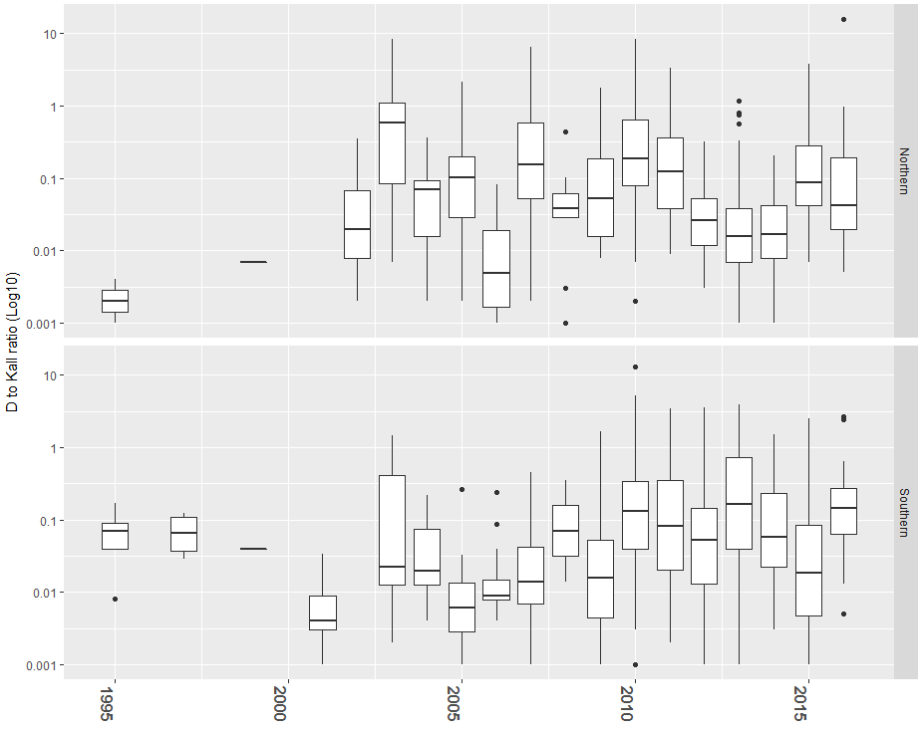


Figure 77. Winter skate bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

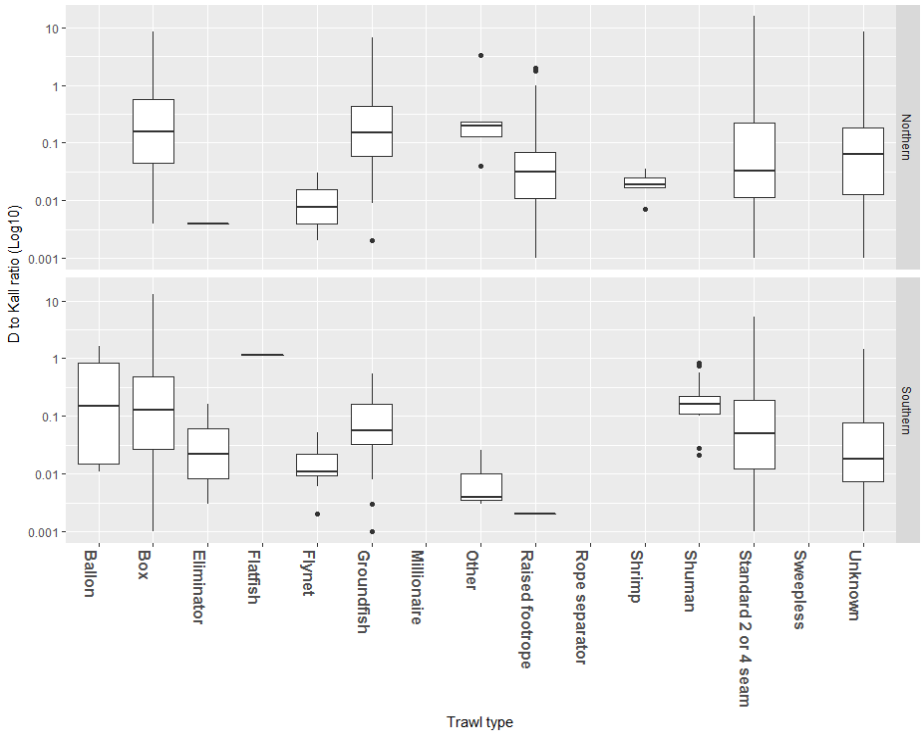
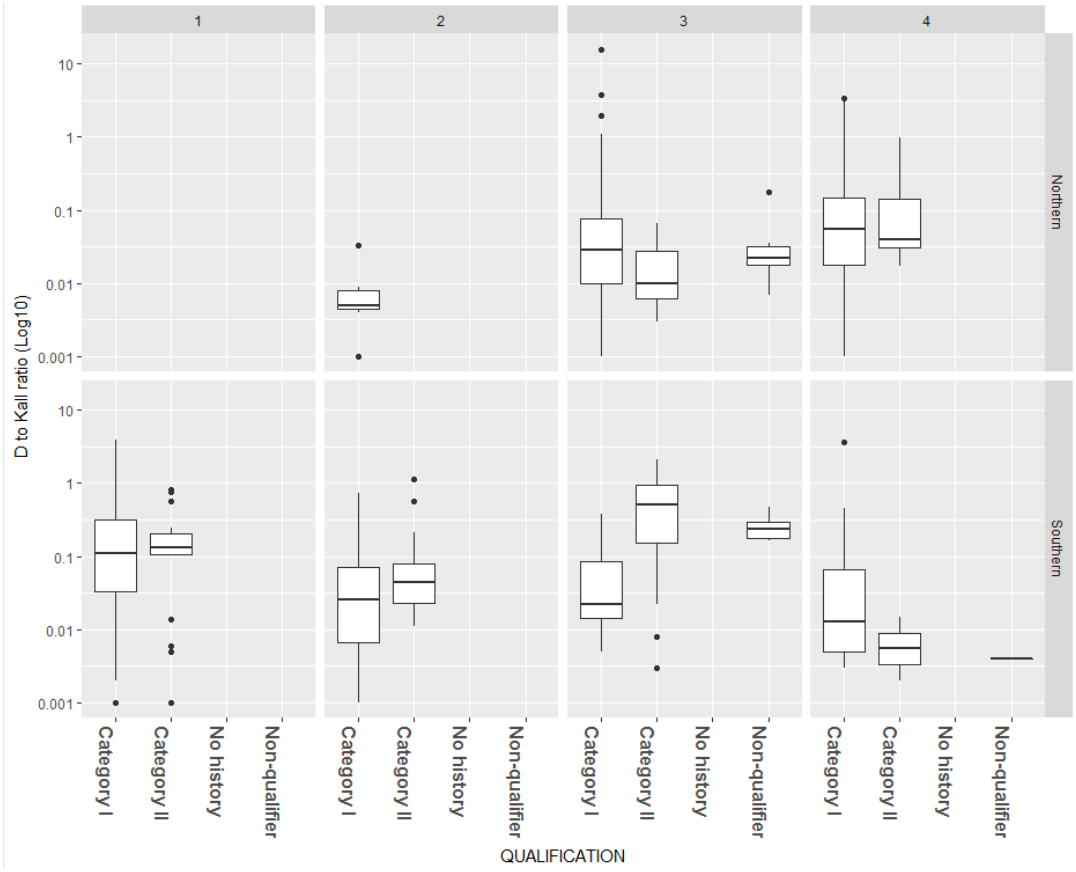


Figure 78. 2014-2016 bycatch rates (D/Kall) for winter skate by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.8 Summer flounder

Summer flounder appear in the observed small-mesh multispecies fishery bycatch more frequently in the southern area than they do in the northern area (Figure 79). Bycatch in the southern area does however appear to be increasing, possibly linked to warming water temperatures and northeastern expansion of the summer flounder distribution to areas where the small-mesh multispecies fishery occurs on eastern Georges Bank. Summer flounder bycatch rates ranked 12th (0.003 lbs/lbs. kept) in the northern and 7th (0.035 lbs/lbs. kept) in the southern management area.

In the northern management area, summer flounder bycatch on observed hauls appears to be higher for a standard groundfish trawl than for a raised footrope trawl or 2/4 seam net (Figure 80).

Bycatch rates by Alternative 2 qualification status do not appear to be different among qualification categories (Figure 81). Otherwise, differences in summer flounder bycatch rates among trawl configurations appears to be unremarkable.

Figure 79. Summer flounder bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

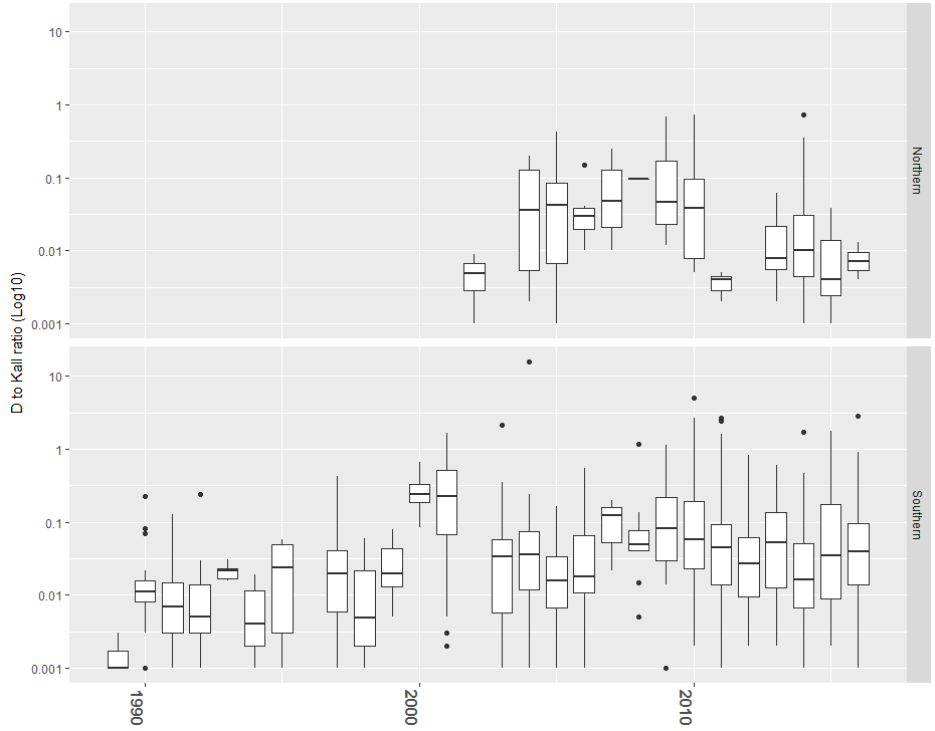


Figure 80. Summer flounder bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

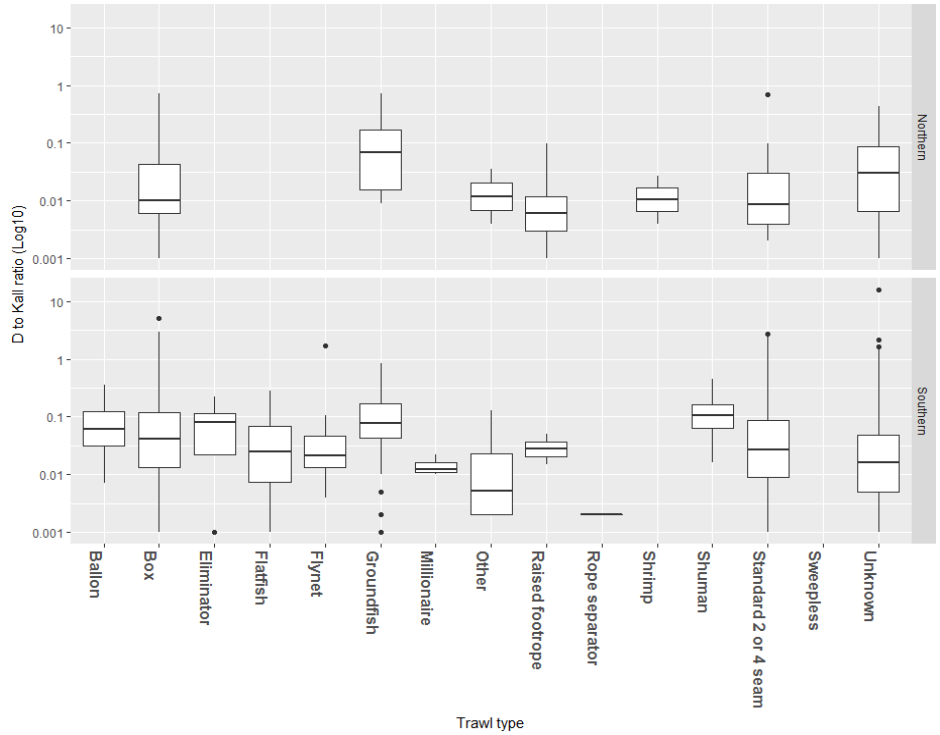
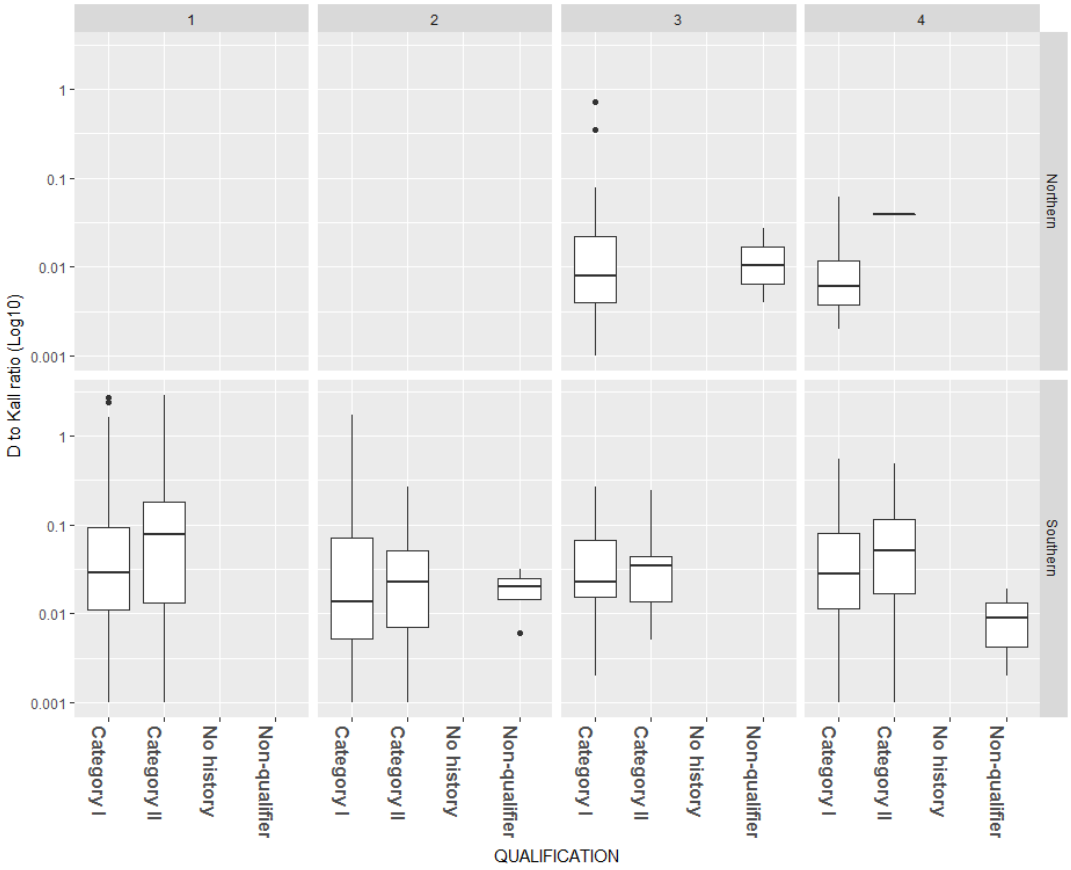


Figure 81. 2014-2016 bycatch rates (D/Kall) for summer flounder by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.9 Barndoor skate

Although they are an infrequent bycatch in number of animals observed, barndoor skate bycatch rates by weight rank in the middle of all observed species. Barndoor skate bycatch rates were the next highest of the observed discards in the small-mesh multispecies fishery, ranking 8th (0.005 lbs/lbs. kept) in the northern and 9th (0.030 lbs/lbs. kept) in the southern management areas. Barndoor skate bycatch rates appear to have declined since 2010 in the northern management area, but have held steady since 2008 in the southern management area (Figure 82).

Like summer flounder bycatch, the barndoor skate bycatch rate in the northern area for the raised footrope trawl is lower than for a standard groundfish trawl, but similar to a 2/4 seam trawl (Figure 83). Bycatch rates among Alternative 2 qualification categories is very similar to each other in both areas and most quarters (Figure 84).

Figure 82. Barndoor skate bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

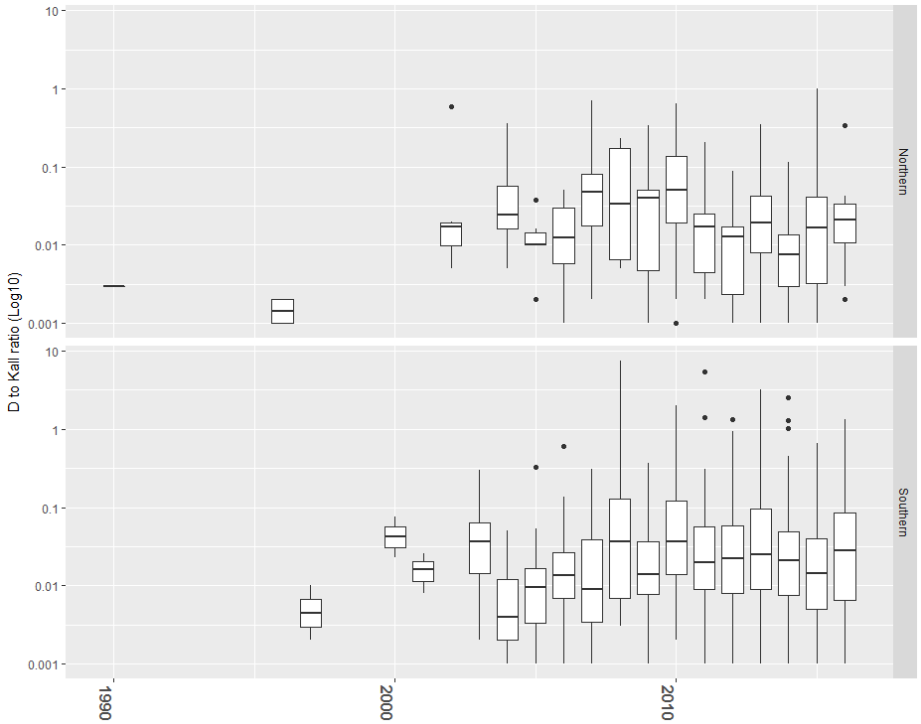


Figure 83. Barndoor skate bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

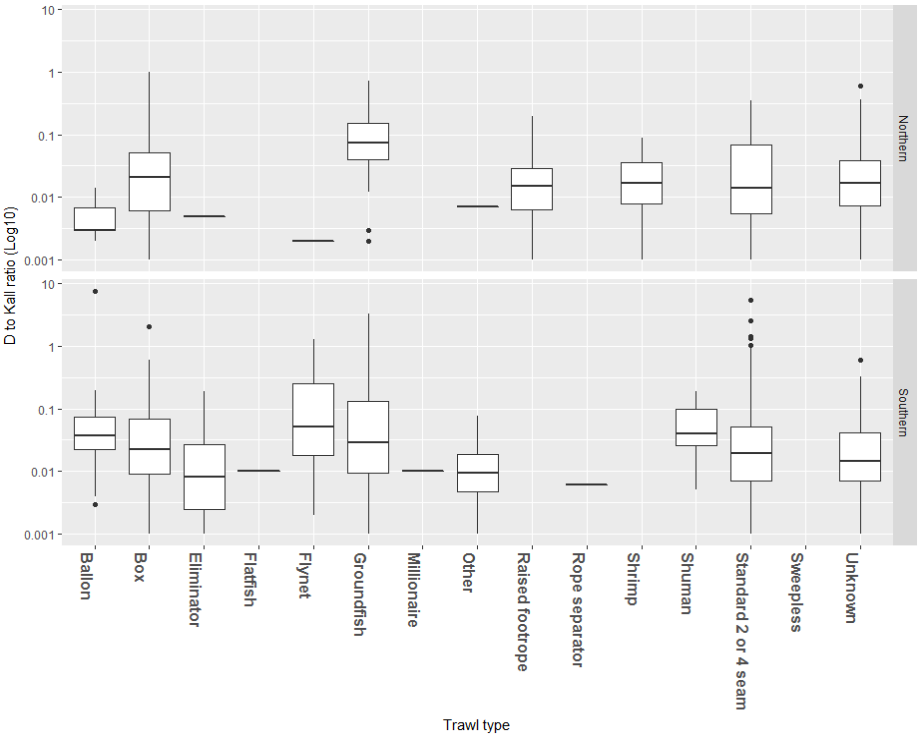
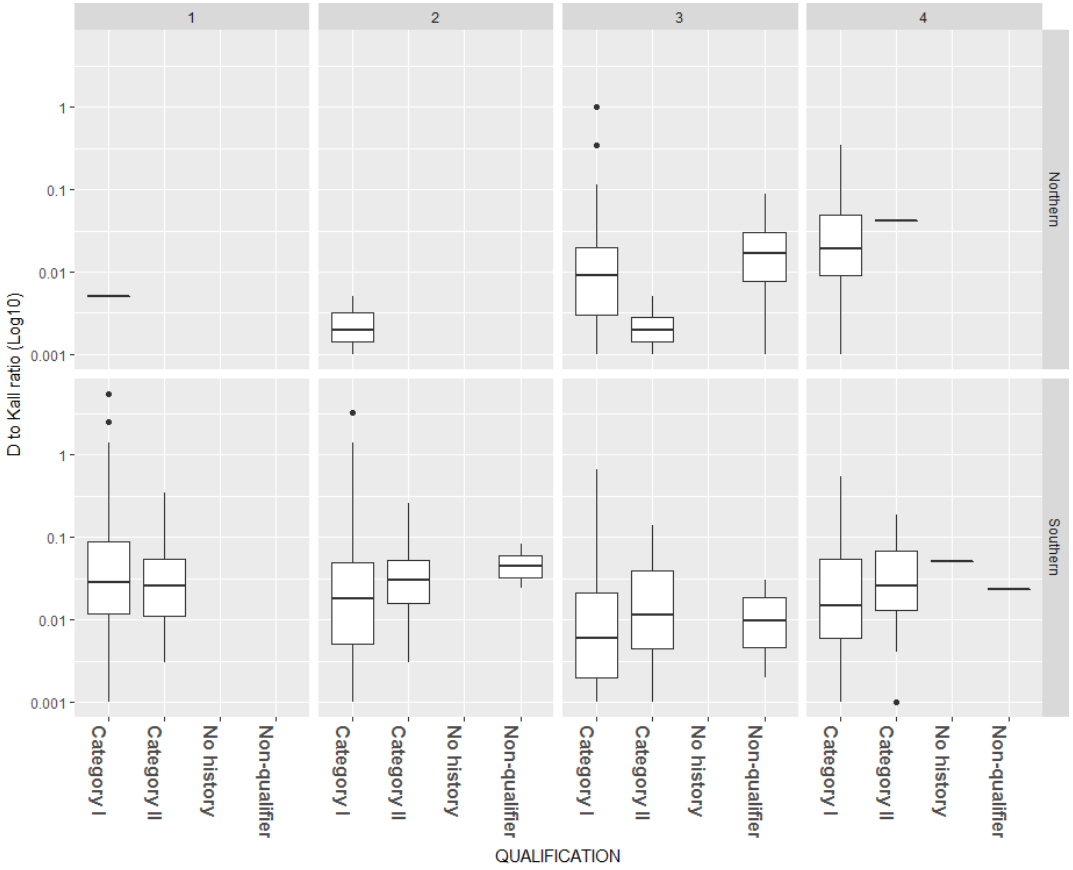


Figure 84. 2014-2016 bycatch rates (D/Kall) for barndoor skate by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.10 Atlantic herring

Atlantic herring appear in the observed small-mesh multispecies fishery bycatch more frequently in the northern area than they do in the southern area. In particular, there is a significant overlap between the fishery in the Cultivator Shoals Area and herring on the northern edge of Georges Bank, which may have seasonal characteristics. Atlantic herring bycatch rates ranked 6th (0.051 lbs/lbs. kept) in the northern and 13th (0.005 lbs/lbs. kept) in the southern management area.

In the northern management area, the bycatch rate has substantially declined since a peak in 2005 (Figure 85). Atlantic herring bycatch in the southern management area is sporatic and varies between years without trend.

As with other species, the Atlantic herring bycatch in the northern management area using a raised footrope trawl is similar to the rate for a 2/4 seam net, but less than that for a standard groundfish net (Figure 86). There does not appear to be much difference in Atlantic bycatch among qualification categories and catches in the southern management area are too sporatic to say whether there was a meaningful difference (Figure 87).

Figure 85. Atlantic herring bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

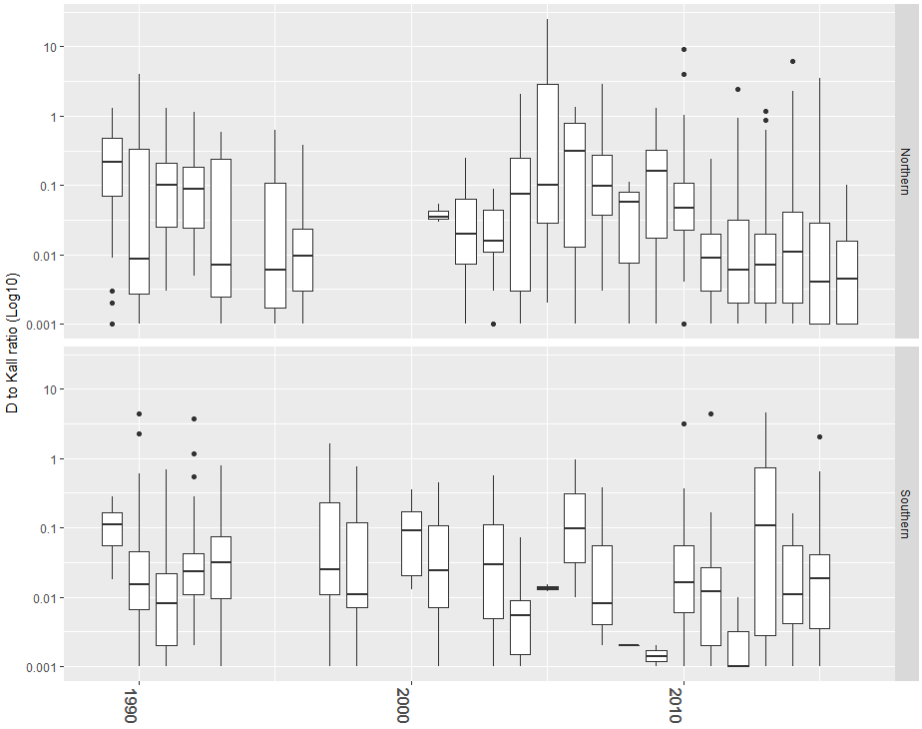


Figure 86. Atlantic herring bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

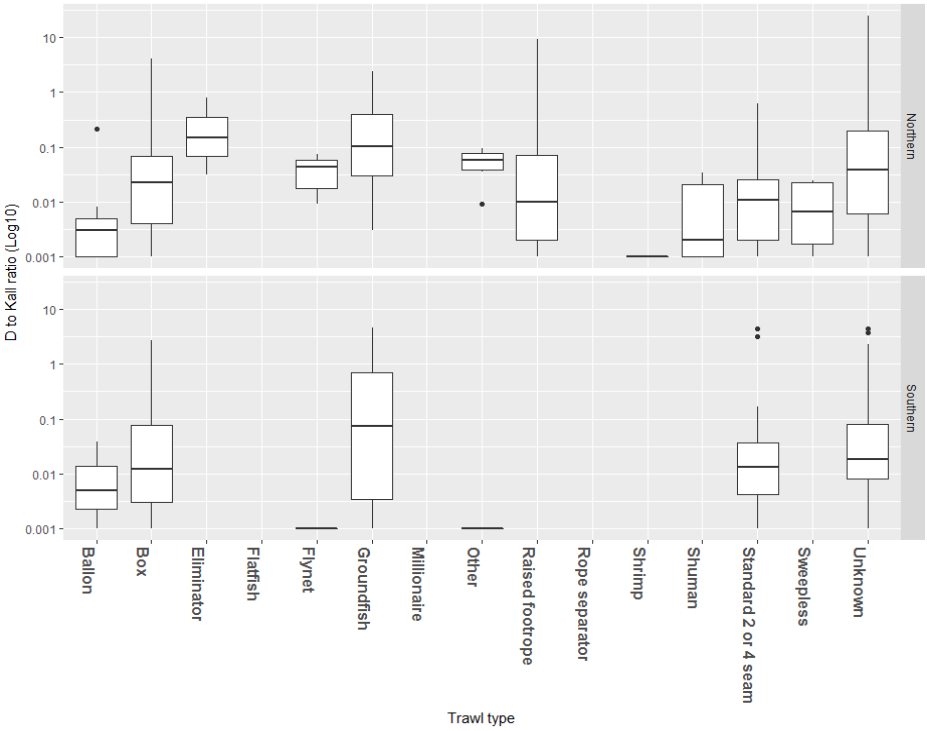
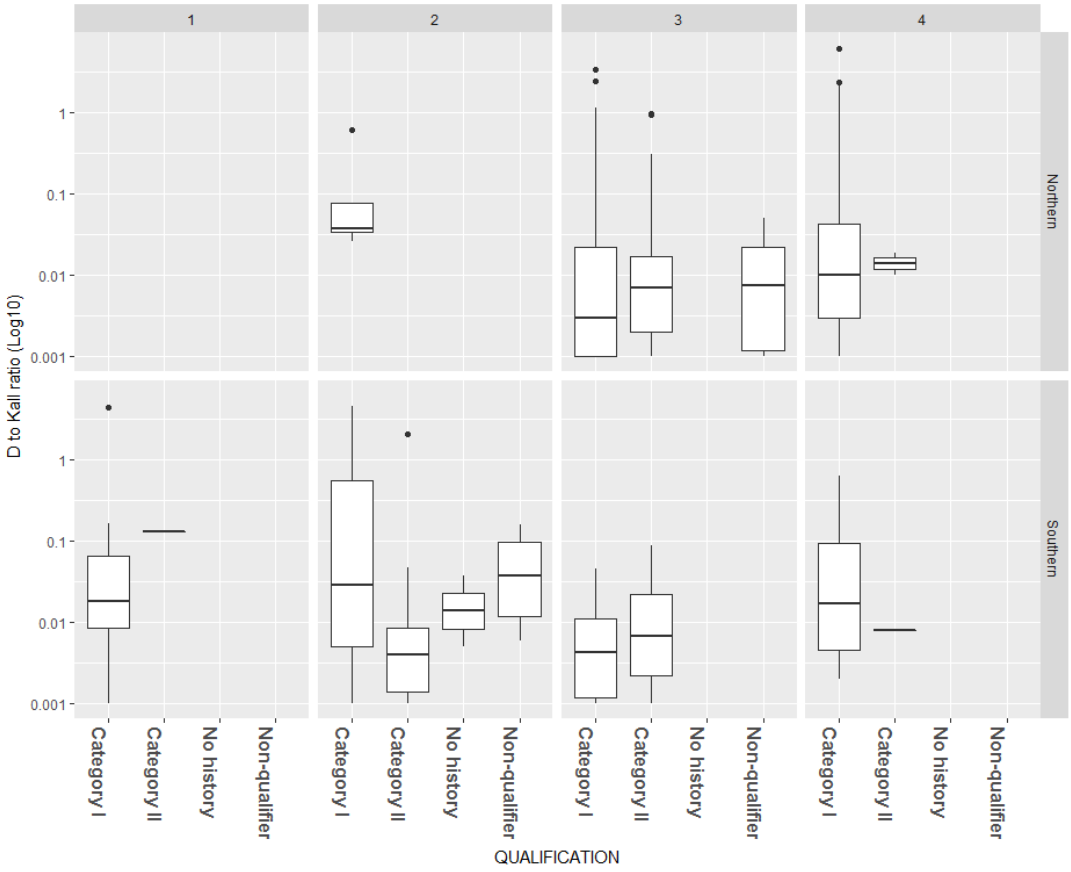


Figure 87. 2014-2016 bycatch rates (D/Kall) for Atlantic herring by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.11 Witch flounder

Witch flounder bycatch rates were the next highest of the observed discards in the small-mesh multispecies fishery, ranking 10th (0.004 lbs/lbs. kept) in the northern and 12th (0.005 lbs/lbs. kept) in the southern management area.

Witch flounder observed bycatch was sporadic in the northern management area and the bycatch rate had a high degree of variation among years (Figure 88). In the southern management area, the bycatch rate appeared to increase through the time series through 2013, but then has declined.

It is difficult to say whether the bycatch rate was different amongst trawl configurations in the northern management area because witch flounder was not frequently observed. In the southern management area, the bycatch rate appears to be lower for the 'eliminator' and 'millionaire' trawls than for other trawl types (Figure 89).

In the southern management area, the bycatch of witch flounder appears to be substantially higher for vessels that would qualify for a Category I permit under Alternative 1 than for other vessels (Figure 90). This result may be due to the larger Category I vessels tending to fish further offshore and on Georges Bank, in the southern management area.

Figure 88. Witch flounder bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

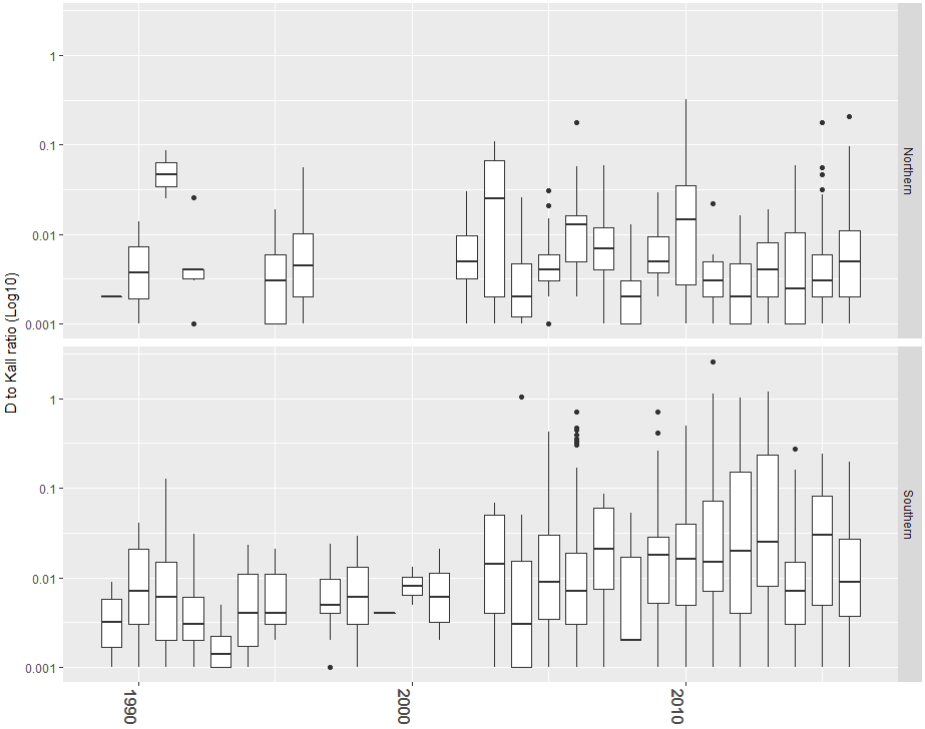


Figure 89. Witch flounder bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

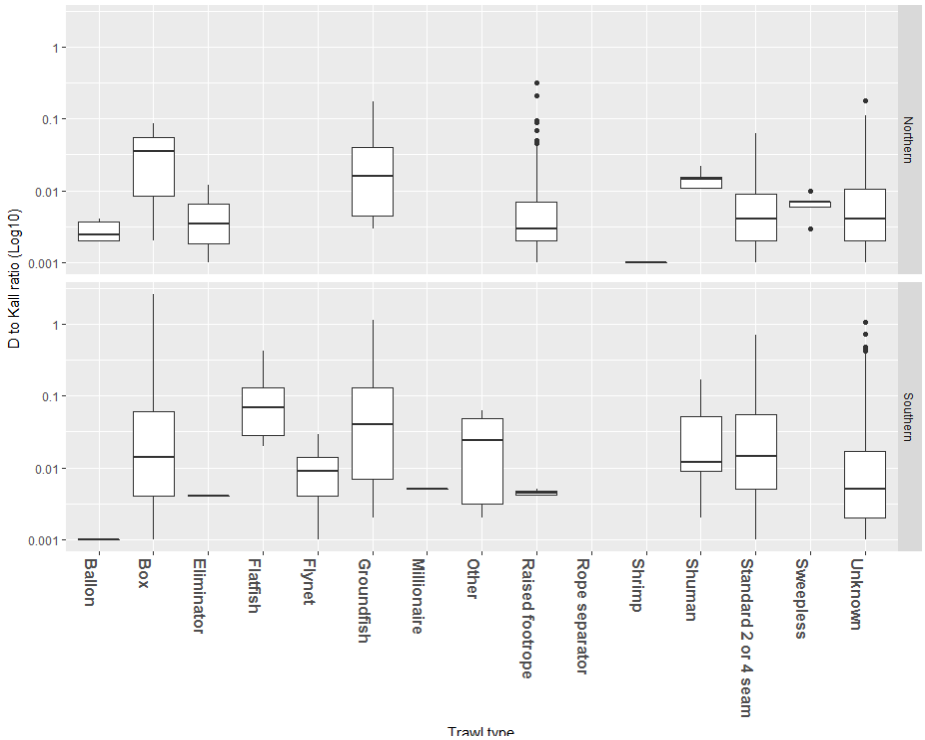
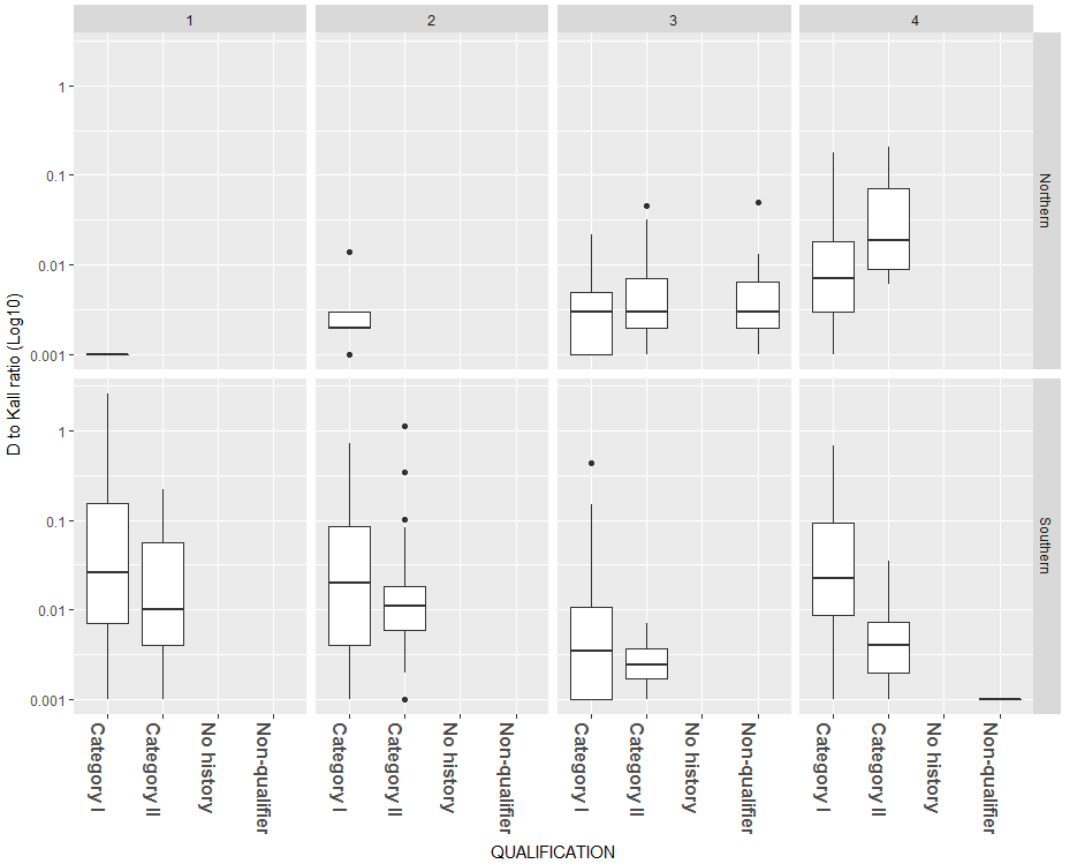


Figure 90. 2014-2016 bycatch rates (D/Kall) for witch flounder by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



11.4.12 Other species in observed bycatch

Other species that were observed in 2014-2016 sea sampling and at-sea monitoring data include monkfish (northern rank=15; southern rank=10), yellowtail flounder (11,15), winter flounder (13,14), American plaice (9,19), windowpane flounder (14,16), ocean pout (20,11), white hake (16,17), cod (18,18), thorny skate (19,-), and smooth skate (21,-).

Yellowtail flounder is a species with a sub-ACL that applies to the small-mesh multispecies fishery that operates in the Georges Bank yellowtail flounder stock area. The yellowtail flounder bycatch rate was high in the northern management area (which includes the Cape Cod yellowtail flounder stock) during 2003-2010, then drops to a lower level (Figure 91). Observed yellowtail flounder bycatch in the southern management area peaked in 2010 and 2012, but had no trend for other years.

Interestingly (because the raised footrope trawl is expected to reduce catches of flatfish), the bycatch rate for observed hauls using a raised footrope trawl in the northern management area does not appear to be different than that for hauls using a standard 2/4 seam net (Figure 92), but less than that observed for a standard groundfish net.

In the northern management area, there does not appear to be much difference in yellowtail flounder bycatch among Alternative 2 qualification categories (Figure 93). In the southern management area, the

yellowtail flounder bycatch for Category II vessels appears to be lower than for other qualification categories, particularly during quarters 2 and 3. This may be related to differences in the target species and areas fished by vessels that would qualify for Category I or Category II.

Figure 91. Yellowtail flounder bycatch rates (D/Kall) by year on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

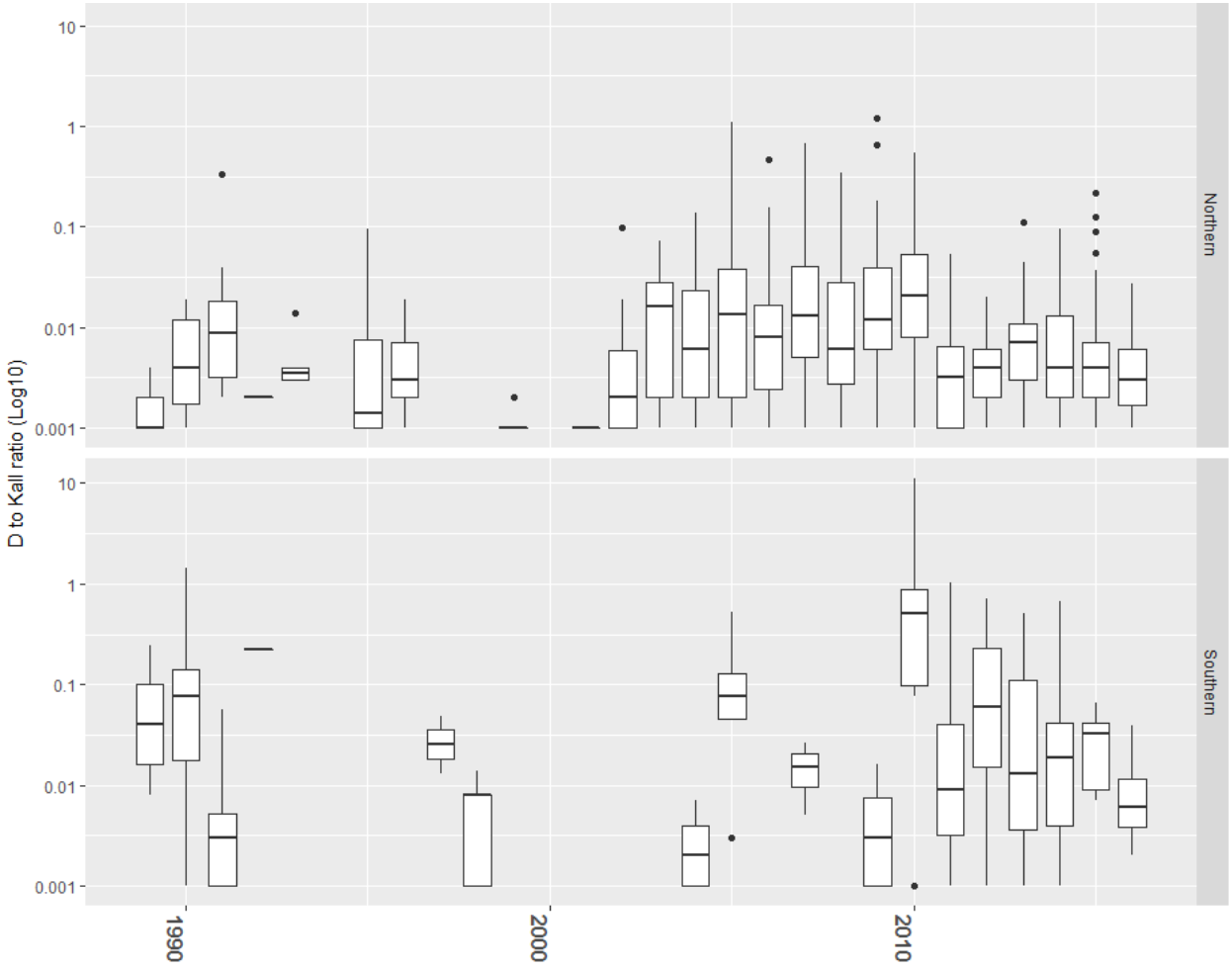


Figure 92. Yellowtail flounder bycatch rates (D/Kall) by trawl type on observed small-mesh multispecies trips in Northern (Top) and Southern (Bottom) management areas.

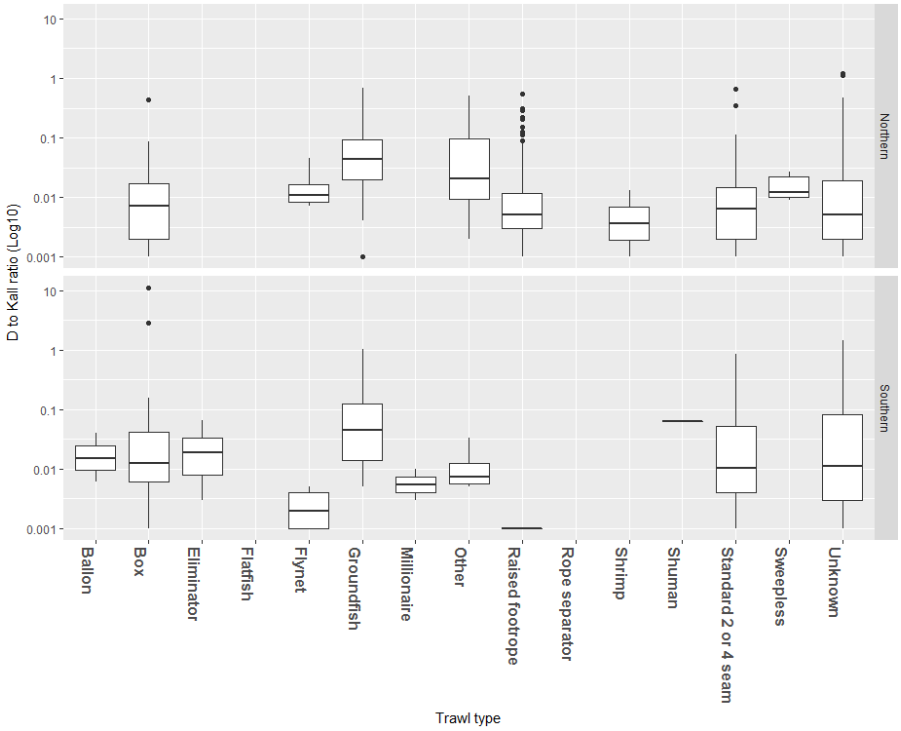
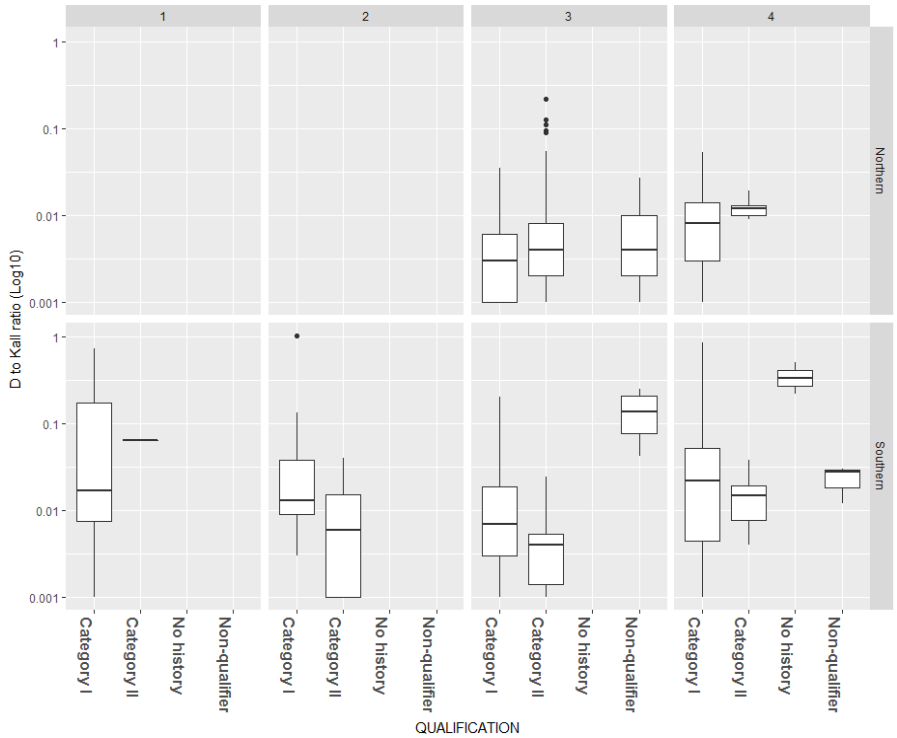


Figure 93. 2014-2016 bycatch rates (D/Kall) for yellowtail flounder by Alternative 2 qualification status on observed small-mesh multispecies trips by management area and quarter.



12.0 Appendix II: Scoping Hearing Summaries

12.1 Portland, ME

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

SCOPING MEETING SUMMARY

Northeast Multispecies Fishery Management Plan
Amendment 22
December 1, 2015

Holiday Inn by the Bay
88 Spring Street
Portland, ME 04101

The Council held a scoping hearing to accept public comments on the intended scope of Amendment 22. The purpose of Amendment 22 is "to implement measures that would prevent unrestrained increases in fishing effort by new entrants to the fishery." Copies of the scoping document were available at: http://s3.amazonaws.com/nefmc.org/a-22-whiting-Scoping-document-4.pdf. The meeting started promptly at 7:30 pm.

MEETING ATTENDANCE: Mark Gibson, Vincent Balzano, and Ellen Goethel (Committee members), Andrew Applegate and Chris Kellogg (Council staff), plus 2 members of the public including: Bonnie Brady and Katie Almeida.

Hearing Chair Mark Gibson, the chair of the Small-Mesh Multispecies Committee began the meeting with an introduction, explaining the purpose and need and highlighting some relevant questions from the public hearing document. There were no immediate questions, so Mr. Gibson opened the floor to comments.

Comments: No comments were offered and Mr. Gibson closed the hearing at approximately 7:40 p.m.

12.2 Gloucester, MA

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

SCOPING MEETING SUMMARY

Northeast Multispecies Fishery Management Plan
Amendment 22
December 8, 2015

MA Division of Marine Fisheries
Annisquam River Marine Fisheries Station
30 Emerson Ave; Gloucester, MA

The Council held a scoping hearing to accept public comments on the intended scope of Amendment 22. The purpose of Amendment 22 is "to implement measures that would prevent unrestrained increases in fishing effort by new entrants to the fishery." Copies of the scoping document were available at: http://s3.amazonaws.com/nefmc.org/a-22-whiting-Scoping-document-4.pdf. The meeting started promptly at 7:30 pm.

MEETING ATTENDANCE: Mark Alexander (Committee member), Andrew Applegate (Council staff), plus 12 members of the public including: Susan Altenberger, Joseph Orlando, Tory Bramante, Joe Rudolph, Sam Novello, Thomas Testeverde, Al Cotture, David Goethel, David Wesville, Ipanzio "Naz" Sanfilippo, and Vito Giacalone.

Hearing Chair Mark Alexander, a member of the Small-Mesh Multispecies Committee began the meeting with an introduction, explaining the purpose and need and highlighting some relevant questions from the public hearing document. There were no immediate questions, so Mr. Alexander opened the floor to comments.

Comments: The following comments were made by various individuals, summarized in the following text. In general, the commenters favored:

- A simple limited access program with different criteria for the northern and southern management areas
- Qualification criteria that use 5 to 10 years of landings history derived from any valid source, including vessel trip reports
- Some fishermen supported a continuation of open access for small vessels, which typically fish close to shore and have limited hold capacity.
- A tiered limited access permit program, similar to the one the Council established for herring.
- An incidental possession limit of 1,000 to 2,000 lbs./day.
- An earlier open season for the Gulf of Maine exemption areas in response to the existing effects of warming water temperatures.

- A modification of the 40,000 silver hake possession limit to make it seasonal, reverting to the original 30,000 lbs. possession limit during the summer and fall when the Gulf of Maine small-mesh multispecies exemption areas are open. This action would increase prices that the northern boats receive.

Mr. Sam Novello, a whiting fisherman since 1964, began first. He said that fishermen have observed changes in environmental conditions and the distribution of whiting. The traditional fishing dates are now too late and now occur when fish have left the area. The fixed exemption area dates hurt small boat fishermen, since they cannot travel long distances to other areas and seek fish. Mr. Novello thought that an earlier season opening would not cause groundfish bycatch problems, because bycatch is effectively reduced by the raised footrope trawl, if used properly. He thought that Amendment 22 should consider changing regulations to respond to new environmental conditions, migration and distribution. He also recommended that fishermen in all exemption areas should use raised footrope configured to Gulf of Maine standards.

Mr. Novello spoke in support of experimental whiting fishery for Stellwagen Bank, to evaluate whether a new exemption area could be opened there. It could be justified because the new raised footrope nets do not catch large mesh multispecies, so an expansion of the areas and seasons open for small-mesh multispecies fishing is justified.

Speaking about the limited access issue, Mr. Novello thought that the small boats the fishery should stay open (i.e. no limited access criteria or requirements), to allow access to local waters.

Mr. Tom Testeverde, owner of the FV Midnight Sun, was fully in favor of limited access using a 5 to 10-year catch history ending at the November 2012 control date to determine qualification. Mr. Testeverde was in favor of limited access, because newcomers are not proficient using the gear. He explained that improper use of the gear or fishing in areas where they shouldn't, fishing by new vessels could increase the bycatch rate and the results would affect established whiting fishermen.

Mr. Testaverde added that in Southern New England, a lot of southern boats fish the northern management area in the Cultivator Shoals Area. He recommended that a southern management area limited access permit should allow access to Cultivator Shoals Area but not to the other exemption areas further north (unless the vessel qualifies for both northern and southern areas.

Mr. Testeverde favored opening the bay early (i.e. the small mesh areas in Ipswich Bay) two weeks before July 15. He said that the 40,000 lbs. silver hake possession limit should be modified so that it lowers to the original 30,000 lbs. possession limit in to June. This change would improve prices in the summer and early fall when the northern area vessels are able to fish in the exemption areas. Agreeing with Mr. Novello, Mr. Testeverde said that the raised footrope trawl should be used everywhere, i.e. in all exemption areas and other areas where groundfish occur. The raised footrope trawl has not been proven to work in all areas, but can be made to work. It is more difficult to use it in deep water, where the chain digs in more.

Mr. David Goethel, owner of the FV Ellen Diane, spoke next. He was in favor limited access and thought the qualification criteria should apply to all fisheries. He recommended basing the qualification criteria on the November 2012 control date and go back 5 to 10 years of fishing history, based on the level of landings only of red and silver hake (not including other small mesh species like herring, shrimp, or squid). He recommended that the qualifying history should not extend further back in time because those fishermen (ones that fished for whiting more than 10 years ago) are no longer active in the fishery. He recommended that qualification should require whiting landings for at least three (consecutive or non-consecutive) years during the qualification period to weed out vessels that only targeted whiting for a

short period. He thought that the Council should consider differing qualification criteria for the two management areas, because vessels in the northern area had been limited to whiting fishing in seasonal exemption areas.

Qualifying data should include whatever is available, not just dealer reports because a considerable amount of catch is not sold to a licensed dealer, Mr. Goethel explained. Some of the whiting catch is sold over the side at sea and reported only on vessel trip reports.

Mr. Goethel was in favor of a tiered limited access program (i.e. two or more limited access permit categories), similar to what was established for the herring fishery. With differing qualification criteria by area, he thought that limited access permit holders should be able to fish for whiting only in the area for which they qualified for limited access, recognizing that some vessels will qualify for a limited access permit in both areas. In response to Mr. Applegate's question, Mr. Goethel said that it would be acceptable for the fishing area for qualifying trips would be determined from vessel trip reports, since that information is not available from dealer reports. He recommended that the Council could use VMS data as a diagnostic about where vessels fished to determine area-specific qualification, especially for vessels fishing in the exemption areas. He added that the amendment should require vessels to use VMS, but requiring daily catch reports was probably unnecessary.

Mr. Goethel said that allowing new vessels into the limited access fishery would be acceptable if it was done in through a slow, orderly process, possibly with applicants chosen by lottery. He recommended that the amendment consider accumulation limits now, rather than later. He was adamantly opposed to sector management for the whiting fishery.

Mr. Goethel thought that there should be an incidental permit, with a possession limit consistent with the landings data for incidental landings. He recommended that a fair incidental limit should be 1,000 or 2,000 pounds per day. Possession limit for limited access vessels based on the size of the mesh they used should continue.

Mr. Joe Orlando, a fisherman from Gloucester and historic whiting fishermen spoke next. He explained that he has not fished for whiting in the last 10-12 years. He had focused on fishing for large mesh groundfish after the exemption area restrictions went into place. Mr. Orlando favored a limited access system, with permit tiers that limit the number of whiting trips that a vessel could make. This way, regular fishermen would be rewarded more than others that fished less frequently for whiting.

Mr. Orlando added that other traditional fishing areas should be re-evaluated and reconsidered. Money is available to do the experimental fishery with observers. ??? fishing should occur two weeks earlier than currently allowed.

Mr Tory Bramante, a Gloucester fisherman, explained that he fished for a variety of species 20 years ago. He has been serving as a crew member on another whiting fishing vessel. He explained that before 2010, the day-at-sea cuts caused fishermen to fish solo, prevented whiting fishing which requires more than one person onboard to handle the catch. This prevented some fishermen the ability to participate in the whiting fishery and build history. He thought that in the future, fishermen may want to team up to target whiting, but limited access would prevent them from doing so. He felt that the groundfish limited access program was a management disaster.

For these reasons, Mr. Bramate was opposed to limited access for the whiting fishery. He thought that everyone should have a shot to make a living on the water and fish prices will dictate participation in the fishery. He added that the limited access initiative for the squid fishery fizzled out and asked whether in the whiting fishery there was really a problem that required limited access restrictions. Mr. Alexander

explained that the industry feared new fishing pressure that has not been previously observed and that the new fishing pressure could limit fishing for existing participates due to limits on northern red hake and other bycatch, such as Georges Bank yellowtail flounder.

Mr. Vito Giacalone pointed out that whiting fishing used to be a year round activity in the Gulf of Maine, but the restricted exemption areas caused it to become a seasonal fishery. He was in favor of limited access because the fishery needs control so that it remains a profitable venture. He added that the entry of a few large vessels in the fishery could have a big effect on the biology and markets.

Mr. Giacalone said that a tiered permit system should be developed, instead of an all-in or all-out system. It should be modeled after the herring limited access program, which has 3-4 permit levels above incidental. There should be an allowance for some non-qualifying small vessels to enter the fishery in a controlled manner. He thought the Council should avoid creating a limited access system with a lot of moratorium permits that could suddenly re-enter the fishery.

An unknown fishermen agreed with Mr. Giacalone that there should be two different fisheries and small boat vessels should not be cut out via limited access. He asked how would the Council apply the control date to determine qualification. Mr. Applegate explained that the Council could use, but is not obligated to use, the control date as an end point in the period to determine qualification. He added that newer fishing history could be used, but the control date notified fishermen that it might not be used and was intended to prevent speculative entry into the fishery to build history for qualification.

The scoping hearing adjourned at approximately 8:00 p.m.

12.3 New Bedford, MA

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

SCOPING MEETING SUMMARY

Northeast Multispecies Fishery Management Plan
Amendment 22
December 14, 2015

Fairfield Inn & Suites
185 MacArthur Drive
New Bedford, MA 02740

The Council held a scoping hearing to accept public comments on the intended scope of Amendment 22. The purpose of Amendment 22 is "to implement measures that would prevent unrestrained increases in fishing effort by new entrants to the fishery." Copies of the scoping document were available at: http://s3.amazonaws.com/nefmc.org/a-22-whiting-Scoping-document-4.pdf. The meeting started promptly at 7:30 pm.

MEETING ATTENDANCE: Mark Gibson (Chairman), Andrew Applegate (Council staff), plus 12 members of the public including: Dan Farnham Sr., Dan Farnham Jr., Mario Gonsalves, Bob Conrad, Katie Almeida, Steve Athanosios, Susan Sonesson, David Chosid (MA DMF), Walter Anoushian (NMFS), Doug McLaughlin, Jerry Raposa, and Peter Raposa.

Mark Gibson, Chair of the Small-Mesh Multispecies Committee began the meeting with an introduction, explaining the purpose and need and highlighting some relevant questions from the public hearing document. There were no immediate questions, so Mr. Gibson opened the floor to comments.

Comments: The following comments were made by various individuals, summarized in the following text. In general, the commenters favored:

- A simple limited access program with different criteria for the northern and southern management areas
- Qualification criteria that use 5 to 10 years of landings history derived from any valid source, including vessel trip reports
- A tiered limited access permit program
- An earlier open season for the Gulf of Maine exemption areas in response to the existing effects of warming water temperatures.

Mr. Farnham Sr., an owner of two whiting vessels ported in Montauk NY and offloading fish in New Bedford, supported the Council developing limited access with a 5 to 10-year period ending on the control date. He recommended that there should be two management area permits with different qualifying conditions, due to distinct management and fishery differences between the two areas. He

explained that Southern New England vessels have more opportunity to fish for whiting and they would have higher landings during a qualification period. He thought a two-tiered limited access category to accommodate true whiting fleet would admit into the fishery vessels that land about 75-80% of landings, with a third incidental category to accommodate the remaining landings. He explained that New Bedford is the largest port for whiting landings, employing 40 people.

Mr. Farnham mentioned that the Council will find discrepancies between dealer reports and vessel trip reports. He recommended that the Council should allow qualification through either source of information. He explained that although the dealer reports often had problems, people didn't keep their historic fish returns, or some had more recently purchased boats with history but do not have the documentation. He thought that in some cases, the dealer reports were off as much as 50%. In his case, one of the dealers buying his fish had not reported the landings because the species code was not known by the dealer and he therefore did not know that he had to report the landings.

Mr. Conrad, a co-owner of full time whiting boats in New Bedford agreed with Mr. Farnham's comments. He favored creating limited access for the whiting fishery, but said he was sensitive to the needs of smaller boats fishing in the northern area. Thus he though different qualification criteria for the northern area would be justified. He pointed out that in addition to the four boats employing 40 people, there are also shore-side services that add economic activity and employment to New Bedford.

Mr Farnham, Jr., an employee on whiting boats, spoke next. He favored limited access using the existing 2012 control date and different permits and qualifying criteria for each management area. He agreed that a two or multi-tiered system would be appropriate, with an incidental category for vessels not targeting whiting. He explained that new entrants into the fishery could cause the catch of choke species to rise and close the fishery. Quite a bit of skill and experience is needed to avoid bycatch.

Mr. Athanosios, a boat owner from Portland ME, supported limited access for the Gulf of Maine whiting fishery. He also thought that it is tricky to fish for whiting and avoid bycatch He said that there is a potential for new entrants in the whiting fishery from Gulf of Maine vessels looking for new opportunities in lieu of traditional groundfish, which could increase bycatch in the whiting fishery.

Mr. Gonzales, a boat captain, spoke in favor of limited access.

Mr. Chosid, MADMF, said that he was working with fishermen who are investigating whether the exemption areas could open earlier due to shifts in whiting distribution and migration. He asked if it is possible that the Council could consider this action in the amendment or what trailing action could address changes in season. Mr. Applegate responded that data from an experimental fishery would be needed in late summer or early fall to analyze potential alternatives. The amendment would probably take effect at the beginning of the 2018 fishing season, after the Council had taken the amendment to public hearings and submitted it to NMFS for formal review, followed by a period for qualification appeals. Alternatively, Mr. Applegate said that the Council might be able to make a seasonal adjustment through a specifications package, which would be developed in 2017 for the 2018 fishing year.

Mr. Raposa, an owner of two whiting vessels, spoke in favor of limited access with a tiered system based on how much vessels land. He recommended that the Council choose a fair amount of time to determine history, but don't change the control date.

The scoping hearing adjourned at approximately 8:30 p.m.

12.4 Online Webinar

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

SCOPING MEETING SUMMARY

Northeast Multispecies Fishery Management Plan
Amendment 22
December 17, 2015

Webinar

The Council held a scoping hearing to accept public comments on the intended scope of Amendment 22. The purpose of Amendment 22 is "to implement measures that would prevent unrestrained increases in fishing effort by new entrants to the fishery." Copies of the scoping document were available at: http://s3.amazonaws.com/nefmc.org/a-22-whiting-Scoping-document-4.pdf. The hearing started promptly at 3:00 pm.

MEETING ATTENDANCE: Mark Gibson (Chairman) and Eric Reid (NEFMC member), Nicole Lengyel (RIDEM Fish and Wildlife), Andrew Applegate (Council staff), plus 4 members of the public including: Jim Lovgren, Greg DiDomenico, and Megan Lapp.

Mark Gibson, Chair of the Small-Mesh Multispecies Committee, chaired the hearing, but Mr. Gibson was feeling ill and a member of his RI DFW staff, Ms. Lengyel, read an introduction and conducted the hearing. The introduction explained the purpose and need as well as highlighted some relevant questions from the public hearing document.

There were no immediate questions, so Ms. Lengyel opened the floor to comments.

Comments: The following comments were made by various individuals, summarized in the following text. In general, the commenters favored:

- A single tier limited access program with low qualification criteria
- Recognition of and allowance for entry by historic participants, such as fishermen from NJ who have not fished recently but have contributed significant whiting landings in previous decades as well as ME fishermen who have been prevented from whiting fishing by the large-mesh groundfish regulations.
- A need for public hearings in NJ and participation by NJ fishermen on the Council's Advisory Panel.

Mr. Lovgren, a NJ fisherman Fisherman's Coop, said that he was not happy about NJ not having a scoping hearing. In the past, such hearings have been well attended. Historically NJ landed 1/3rd of the East Coast whiting landings. Mr. Lovgren said that NJ has had little representation on the advisory panel (AP). Joe Branin from NJ resigned 2-3 years ago at Mr. Lovgren's request because he was not attending

meetings. Although Joe Brannin is still listed as an advisory he doesn't go to the meetings, so NJ is left on the dark. Mr. Lovgren was previously chair of panel and kicked off six or seven years ago, but never received an explanation. He said that NJ would like to have someone on the AP, but Mr. Lovgren said that he would refuse to serve at this point. He thought that Roy Deal from Belford has been interested in being an advisor. Mr. Applegate encouraged Mr. Lovgren to have Roy Deal contact him about being an advisor.

Mr Lovgren said that the support limited access had been driven by boats or industry segments requesting protect the fishery with limited access, but limited access was turned down by Regional Administrator in Amendment 12 because the industry wanted the qualification period to go back to the 1980s. NMFS didn't want to go back far enough in landings to include ME, NC (both having an active whiting fishery in the 1970s and 1980s, and the industry wanted inclusive to anyone that had a history in the fishery if they could demonstrate participation. Consequently all issues related to limited access have since been turned down.

Mr. Lovgren supported the development of limited access for the whiting fishery without tiers to prevent a potential goldrush, but one with liberal qualification criteria that included historic fishermen. The NJ fishermen are seriously concerned with being left out by qualification limited to the last five years and current participants. In NJ, there has been no hearing, and no AP member

Mr. Lovgren explained that the whiting fishery is not easy, since price is variable and market driven. Fishermen never know what price they will get for their landings, but it is a very labor intensive fishery. The domestic market is very limited and over the years it has gotten worse, with less market demand. This is why the fishery has not expanded. Point. Pleasant and Belford were bringing in 10-12 million lbs. per year, and Point Judith was matching those landings. Currently, the market cannot handle additional landings, due to competition. There is no export market and the fish is delicate and hard to process. The idea that the fishery will expand is counter-intuitive to what will happen to the fishery, Mr. Lovgren predicted. There is a certain sector in the fishery that wants to protect and enrich themselves by kicking the competition out.

Similar to Amendment 12, the limited access should address prior participation and it is not a major issue, liberal threshold. ME fishery restricted by mesh, but there are sections of the East Coast where there has been a fishery and those fishermen should not be shut out of the fishery. They are in favor of limited access but the criteria should be liberal and allow for historic participants in the fishery. He is not in favor of tiers, but an incidental category is needed, to deal with bycatch in the squid fishery, although most vessels should qualify for limited access anyway. He explained that that was the purpose of the 3,500 lbs. possession limit for vessels using 2-inch mesh, to accommodate the whiting bycatch in the squid fishery. He did not want to have 80-90% of the access to be given to only a handful of vessels. If catch share followed, these few vessels would get all of the quota and everyone else would be left without or forced to discard whiting.

Mr. Lovgren went on to explain that NJ landings are now low compared to the past when whiting was a bread and butter fishery. The fish have been less available to NJ fishermen whether it had been due to global warming or overfishing on juvenile fishery, NJ has but few fish available now. In contrast to the past, NJ now lands about 300 to 500 thousand pounds per year. The whiting fishery has evolved from being 7-8 months long to being only a month long in May and June now.

There have been lots of effects on fishery as water temp warmed. NJ has lost access to yellowtail flounder, blackback flounder, and lobsters as well as whiting. Fishermen don't know if the fish will come back. He said that sometimes the water is a little colder and NJ has more whiting landings when that

occurs. NJ fishermen don't want to lose the ability to catch whiting when they are available due to limited access restrictions.

Mr. DiDomenico, Garden State Seafood Association, asked if the Council has done any analysis justifying further limiting entry and in response to possible latent effort due to other effects. He asked if the potential for latent effort entering the fishery being a threat to choke species. Mr. Applegate answered that the Council is starting the amendment and that other than analyses that had been done the last time the Council attempted to develop a limited access amendment, no new analyses had been performed. Such analysis including the potential effect on choke species would be part of the analysis, he said. These analyses will be in the draft amendment when it is taken out to public hearing. Mr. DiDomenico requested that when the hearings on the draft amendment are conducted, that a hearing be held in Point Pleasant or Belford, NJ. Mr. Applegate said that he would forward that recommendation to his superiors when it came time to schedule hearings on a draft amendment. The other alternatives in the draft amendment will include alternatives discussed in the scoping hearings, or have other limits been development for the amendment. Mr. Applegate replied that other than the qualification criteria that were evaluated in 2006-2007, no additional alternatives have been developed or analyzed.

Mr. Reid, a Council member, explained that Point Pleasant was an important landings port, the whiting capital of the universe. The whiting fishery important to a tremendous range of fishermen, including large boats fishing offshore to target whiting and smaller vessels fishing inshore, hundreds of vessels catch and land whiting on a regular basis. He would be upset if it led to a tiered system, similar to mackerel. He recommended that the Council consider simple qualification criteria with a reasonable threshold. He said that the fishery is nowhere close to achieving optimum yield, and 2006 landing 16,000 mt had declined to 5,000 mt. Fishery is not therefore overexploiting the resource. Mr Reid felt it makes no sense to overly constrain entry into the fishery. The landings data show a shift in landing ports around 2009 and 2010 where offshore fishermen go into New Bedford to offload because it is closer to the grounds. Previously, other states from NJ to ME but not MA accounted for nearly 100% of the landings. For this reason, he said it would be a shame to prevent qualification for historical participants, since optimum yield is not even close to being used. He recommended that the qualification criteria should not be restrictive in any way and no tiered system is needed.

As of 3:37 pm, no further comments were made, but the webinar remained open until 5 pm for potential late-coming participants.

12.5 Montauk, NY

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SCOPING MEETING SUMMARY

Northeast Multispecies Fishery Management Plan
Amendment 22
December 21, 2015

Montauk Playhouse Community Center Foundation, Inc.
240 Edgemere St.
Montauk, New York 11954

The Council held a scoping hearing to accept public comments on the intended scope of Amendment 22. The purpose of Amendment 22 is "to implement measures that would prevent unrestrained increases in fishing effort by new entrants to the fishery." Copies of the scoping document were available at: http://s3.amazonaws.com/nefmc.org/a-22-whiting-Scoping-document-4.pdf. The meeting started promptly at 7:30 pm.

MEETING ATTENDANCE: Laurie Nolan (Committee member, Mid-Atlantic Fishery Management Council), Andrew Applegate (NEFMC Council staff), plus 9 members of the public including: Charles Morici Jr., Glenn Bickelman, Bruce Beckwith, Vincent Carillo Jr., Dan Farnham, Paul Farnham, Hank Lackner, Daniel J. Farnham, Katie Almeida.

Hearing Chair Laurie Nolan, a member of the Small-Mesh Multispecies Committee began the meeting with an introduction, explaining the purpose and need and highlighting some relevant questions from the public hearing document.

With respect to NMFS fishery data to be used to analyze and potentially determine qualification, Mr. Farnham asked about data quality and verification. He was interested whether data quality had improved and what sources of information could be used to determine qualification. Mr. Applegate answered that although data quality had improved over what it was 10 or so years ago, there still appeared to be some differences between the dealer reports and vessel trip report data, comparing what had been reported on individual trips. He said that it was particularly problematic where the landings from a single trip was split between more than one dealer. For some trips that landed with three different dealers, often the landings for only two dealers reported, he explained. Mr. Applegate added that the opposite was also true in some cases, where a dealer reported and there was no matching VTR, so totals could be close yet the landings for particular vessels could be off.

Comments: The following comments were made by various individuals, summarized in the following text. In general, the commenters favored:

- Most commenters favored a tiered limited access program with two levels for vessels targeting whiting and one incidental level.
- Fishermen with smaller vessels that occasionally targeted whiting inshore feared being left out by excessively high qualification criteria.

Mr. Mauricy FV Axe One, said that his family had fished out of Montauk since 1920 and he urged the Council to apply common sense when choosing qualification criteria. He was concerned about qualification of day boats under 60 feet; that they would be cut out by a high qualification threshold. He explained that these boats sometimes targeting whiting or landed quantities of whiting while targeting another species, but had small fish holds and short trips. He explained that his highest whiting landings from a trip was 20,000 lbs. Although it is an important component of his catch, whiting is generally not a target species, but caught while targeting squid, flounder, and groundfish.

Mr. Lackner, a boat owner from Montauk, NY, was in favor of limited access because whiting fishery is constrained by choke species such as red hake, yellowtail flounder windowpane, and potentially haddock. He said that limited access will protect the fishing communities that depend on whiting landings, rather than hurting them by disallowing new entrants. He felt that there is no potential room for vessels with latent effort to enter the whiting fishery. He urged the Council to apply consistent limited access decisionmaking across all fisheries. In other fisheries, limited access was based on dealer landings and it wasn't an issue. He thought that the groundfish "use it or lose it" policy should remain intact.

Mr. Lackner spoke in favor of a three-tier system highest trip limit. He suggested that the highest tier should require 1.5 million pounds of whiting landings over a 10-year period and have a 30,000 to 40,000 lbs. possession limit as currently applies when using 3-inch or greater mesh. A second tier should require 750,000 lbs. of whiting landings over 10 years and should have a 20,000 lbs. whiting possession limit. A third incidental category should have a 2,500 lbs. whiting possession limit, he suggested. Mr. Lackner explained that these qualification criteria would be reasonable because the highest tier qualification would average five 30,000 lbs. trips per year or 5,000 lbs per day per month over a 10 year period. He was not in favor of requiring vessels to use VMS, unless 85% of the TACs were being caught.

Mr. Lackner thought that the 2012 control date was stale and suggested that the qualification criteria should include more recent landings data, showing present participation. He recommended that the Council consider qualification criteria that relied on both past and present history (i.e. since the control date) from dealer reports. He recommended that all areas use the same qualification criteria and current possession limits.

Concerning groundfish boats now landing whiting that won't qualify for limited access, Mr. Lackner felt that they could be accommodated with a reasonable incidental landings limit of 2,500 lbs. This limit would also allow for most of the catch to be landed and counted. He said that the Council should not allow new entrants into the whiting fishery unless there are adequate choke species to cover new entrants. Dan Farnham also spoke in favor of a tiered limited access approach that would protect all fishery participants that had landings during whatever timeline the Council chooses. A tiered system should accommodate both smaller and larger participants. Without limited access, Mr. Farmham feared that the choke species like red hake, yellowtail flounder, windowpane flounder, and possibly haddock will shut down the whiting fishery for everyone.

Mr. Beckwith, a Montauk fisherman, was concerned about a limited access program causing non-qualifying vessels to discard whiting. He thought that those vessels need a decent size incidental catch of about 10,000 lbs. per day. Mr. Beckwith explained that whiting was important to inshore boats years ago. If the whiting come back, he doesn't want to be forced to discard them. Lately, there have been more whiting offshore in recent years than there have been inshore, however, but that may change.

Mr. Paul Farnham, a Montauk fisherman, also spoke in favor of limited access qualification. He agreed with using the Nov 2012 control date as the basis for qualification. Mr. Farnham thought that a fair tiered system would limit landings to 40,000 lbs., then 20,000 lbs., then 6,000 lbs. for an incidental category. He recommended that the qualification time period should go back to 1998, using both dealer and VTR data (the latter used especially in Southern New England ports). Mr. Farnham said that historical participation should be included, all time periods to be counted equally. He recommended that the northern and southern areas should have the same qualification criteria and possession limits. He suggested that the Council use qualification criteria for higher tier of 1 million pounds over a 15 year period. A vessel should be given an incidental permit if it landed 100,000 lbs. over the 15 year period.

Katie Almeida explained that the boats she represented concentrate on squid fishing and asked if the written comment deadline had been extended. Mr. Applegate replied that the written comment period was being extended to 5 pm on January 20, 2016 to accommodate an additional public hearing on January 20, 2016 in Warwick RI. Ms. Almeida said that she will be submitting written comments and would come to that additional hearing.

The scoping hearing adjourned at approximately 8:20 p.m.

12.6 Warwick, RI

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SCOPING MEETING SUMMARY

Northeast Multispecies Fishery Management Plan
Amendment 22
January 20, 2016

Hampton Inn & Suites
2100 Post Road
Warwick, RI 02886

The Council held a scoping hearing to accept public comments on the intended scope of Amendment 22. The purpose of Amendment 22 is "to implement measures that would prevent unrestrained increases in fishing effort by new entrants to the fishery." Copies of the scoping document were available at: http://s3.amazonaws.com/nefmc.org/a-22-whiting-Scoping-document-4.pdf. The meeting started promptly at 7:30 pm.

MEETING ATTENDANCE: Mark Gibson (Chairman), Eric Reid and Frank Blount (Small-Mesh Multispecies Committee members), Andrew Applegate (Council staff), Nicole Lengyel (RI DEM), plus 19 members of the public including: Katie Almeida, Michael Hall, Phil Mearis, Troy Sawyer, Donald Fox, Chris Brown, Brian Loftes, Jeremy Reposa, Tom Williams, Aaron Williams, Chuck Maney, Joel Hovanesian, Howard Follett, Edward Everich, Rich Fulva, Aaron Williams, Glenn Goodwin, and Jerry Caravallo.

Mark Gibson, Chair of the Small-Mesh Multispecies Committee began the meeting with an introduction, explaining the purpose and need and highlighting some relevant questions from the public hearing document. There were no immediate questions, so Mr. Gibson opened the floor to comments.

Comments: The following comments were made by various individuals, summarized in the following text. In general, the commenters favored:

- About half of the commenters spoke in support of a limited access program with liberal (low) qualification criteria to allow vessels in the fishery with lower amounts of whiting landings to qualify and retain their flexibility to target whiting when conditions were favorable.
- Many spoke against the need to be too restrictive (i.e. admit too few vessels using high qualification criteria) because the fishery was not close to achieving optimum yield.
- Some commented that the assessment was flawed and that the stocks were not as healthy as the survey-based assessment indicated it was.
- About half of the commenters spoke against a limited access program, since the fishery was not achieving optimum yield and they feared that limited access would take away flexibility and opportunity to fish from smaller fishing boats that targeted a variety of species. They felt that using limited access restrictions to address problems caused by choke species was the wrong approach, using the wrong measures to address the problem.

Mrs. Katie Almeida, Town Dock Seafood, spoke in favor of a limited access program which would be as inclusive as possible, using the last 15 years of landings history, or go back to the beginning when the whiting permit was originally issued. She felt that the qualification criteria should be set low enough to qualify most vessels that had history. She did not, however, support a tiered limited access permit system, preferring one permit that would treat all qualifiers equally, with an adequate incidental landings limit for non-qualifying vessels.

Mr. Donald Fox, FV Lightning Bay and works for Town Dock Seafood, said that the RI fishery has survived due to its diversity, catching and landing a wide range of species. He felt that a tiered limited access system could eliminate that important diversity. Thus he does not support a whiting limited access program. If one is considered, he thought that anyone with landings history before the control date should be treated the same. He said that an incidental permit would be needed for non-qualifiers, vessels that had no landings before the control date. For the seven boats at the Town Dock, there is a huge discrepancy between dealer landings and landings reported on VTRs he explained, so both sources of data should be considered. He doubted that there was a real need for limited access because despite recent changes in the fishery there was no new effort entering the whiting fishery. New effort was being limited by market conditions, because low whiting prices will keep effort in check. He said that he didn't want to loose the ability and flexibility to target whiting because of a tiered limited access system.

Mr. Chris Brown, a Point Judith fisherman, said that the whiting fishery was very important to the port of Point Judith, which has been one of the top ports for whiting landings. He was not in favor of a management plan (sic a limited access program) at this time. He thought it would be more productive to improve the fishery science as the agency moves toward another management regime. A two year old assessment is a lethal mix and the assessment is wrong, Mr. Brown contended. He reported that there are hundreds of whiting south of Cape Cod. The stock isn't as strong as the assessment indicates and enforceability is an issue. Also confusing is that we are concerned about fleet diversity for the large-mesh groundfish fleet and no consideration is given about that for the whiting fisher. With limited access, higher levels of profitability would be generated for a few vessels, but smaller flexible boats could be left out of the fishery because they had insufficient history. Increasing numbers of fishermen recognize climate change effects cause entire permit system to be flawed, because it locks them into a fishery which could become less available and prevents them from targeting other species that become more abundant. This increases vulnerability to climate change, Mr. Brown said. By forcing boats to not fish on what is available instead of groundfish is hurting us – the fishery is less resilient with fewer opportunities. Instead of limited access, he felt that the Council was not doing enough in the whiting fishery to limit impacts on other fisheries. If the fishery is not clean, it doesn't matter how many vessels are in the fishery if the bycatch isn't low enough. He said that a lot of gear research is being done in Southern New England and that the whiting fishery bycatch problems should be solved that way, rather than limiting the number of vessels in the fishery.

Mr. Brown explained further that a little boat with 3-6,000 lbs. of landings is not respected compared to landings of bigger boat. Longer history will show greater dependence of the smaller boats. Using a longer history, the more it will reveal smaller boat level of dependence, which should be considered more important than total landings.

Mr. Brian Loftes felt that there doesn't seem to be a fishery problem as of yet. He thought that government should not be creating a problem where none exists. Point Judith will land a lot of whiting again, he explained, so create a management plan (e.g. limited access) for something not overfished is not the way to go. Some fishermen will succeed and others will fail, balancing things out. Everything that the Council does put the fishery in the hands of a few – large businesses and processors rather than helping small independent fishermen.

Mr. Michael Hall, a retired fisherman, thought that the management plan should stay with status quo. Because the fishery is not catching TAC, it would be wrong to take diversity away from boats in the favor of a few. He explained that market effects will keep whting fishing effort in check. Fishermen that no longer have the option to fish for whiting would cause overfishing for other species.

Mr. Joel Hovanesian said that the Council hasn't learned much in five years – Amendment 22 is just another attempt to do the same thing and is ill-advised. Because the fishery is nowhere near the TAC, he doesn't understand why limited access is being promoted, creating new problems where problems don't exist. Mr. Hovanesian said the he doesn't want to see whiting fishery end up like the scallop fishery, with too much consolidation and was therefore opposed to limited access for the whiting fishery.

Mr. Troy Sawyer, FV Debie Sue, also favored previous comments. There is no fishery problem, and we don't need limited access since we are not near the TAC. He said that there is no need for action at this time.

Mr. Brent Loftus, FV Ashen Ariana, also agreed with the comments that there should be no action at this time. When groundfish turned to sector management, the stock assessment said something completely different. He thought the whiting fishery would get in the same situation if we then have a bum stock assessment and he feared that the experience could be repeated in the whiting fishery if limited access locked vessels into (and out of) the fishery. He thought that the Council should not take any whiting management action. Mr Loftus explained that the fishery needs the diversity to fish for whiting when it is available.

Jim Jordan commented that any landings history before the control date should qualify a vessel for limited access.

Mr. Peter Reposa commented that the Council should use full history as qualification criteria. It should pick a full poundage, i.e. any landings to qualify vessels.

Mr. Howard Fowlett, FV Atlantic Queen, commented that the Council should choose status quo, go back to history to determine qualification.

Ed Everich, FV Osprey, explained that he fished with Joel Hovanesian. They started off in 1967 when a lot of whiting were available to the port. Now the climate change have caused fish to moved off. The stock assessments on groundfish are poor to say the least. Mr. Everich commented that the Council should focus on improving science and assessments, rather than limited access. Groundfish management is a mess, he thought, and many boats are going out of business. If whiting isn't broken don't try to fix it, he said.

Tom Williams, FV Heritage Tradition from Point Judith also favored status quo. He said that the Council should not create a problem where none exists.

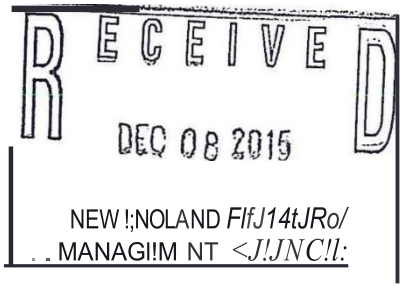
Mr. Phil Marris, FV Excaliber, said that the stock is healthy and underutilized, so no one should be closed out of the fishery by limited access.

No more comments were offered and the scoping hearing adjourned at approximately 6:35 p.m.

12.7 Written Comments During Scoping

ASSOCIATED FISHERIES OF MAINE
PO Box 287, South Berwick, ME 03908

December 8, 2015



Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill #2
Newburyport, MA 01950

VIA ELECTRONIC MAIL

Small-Mesh Multispecies Amendment 22 Scoping Comments

Dear Tom:

Thank you for the opportunity to comment on the proposed Amendment 22 to implement limited entry in the whiting fishery:

The scoping document describes the need for this amendment as "to reduce the potential for a rapid escalation of the small-mesh multispecies fishery, possibly causing overfishing and having a negative effect on red hake and whiting markets, both outcomes having negative effects on fishery participants."

It is hard to imagine how a "rapid escalation of the fishery" could occur under current conditions:

- small mesh fishing in the groundfish regulated mesh area has been severely constrained for nearly two decades, and
- the scoping document shows that the fishery is harvesting less than 25% of the acceptable biological catch (ABC) for whiting in both the northern and southern stock areas

While the harvest of red hake in the northern stock area has recently exceeded the ABC, this catch can be controlled or discouraged by low red hake possession limits and/or limitations to known areas of high red hake bycatch.

While Southern New England/Mid Atlantic yellowtail flounder catch has been above the small-mesh fishery sub-ACL, the appropriate solution to reducing yellowtail catch in small mesh fisheries is gear modifications.

Sincerely,

H.

Maggie Raymond

91 FAIRVIEW AVE
PORSTMOUTH NH 03801

NORTHEAST HOOK FISHERMAN'S ASSOCIATION

December 21, 2015

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 9784650492 | FAX 9784653116
Thomas A Nies, *Executive Director*

Subject: Small-Mesh Multispecies Amendment 22 Scoping Comments.

Dear Executive Director Tom Nies:

We represent a small group of Commercial Fishermen with the Limited Access Handgear HA Permits, employing the use rod and reel, handlines or tub trawls to catch some species of groundfish. Historically and currently our fishermen account for a small percentage of the groundfish landed in New England.
However, the monetary gains obtained by the participants in this fishery are very important to us.

Regarding Amendment 22, our comments are:

• Should non-qualifiers be allowed to land red hake and whiting?

Yes. There should be a % of the fishery allocated to the non-qualifiers who may incidentally catch red hake and whiting. Sometimes these fish are caught for bait by hand.gear fishermen to use for Bluefin Tuna fishing. These fish would be recorded on a VTR since the holder of a HA permit is required to report all ground.fish caught even if the fish are used as bait. Without this allowance we would not be able to use these important fish for bait.

• What would vessels with an incidental permit be able to land (using any gear type) and what other restrictions might apply?

Some incidental trip limit should apply.

Respectfully,

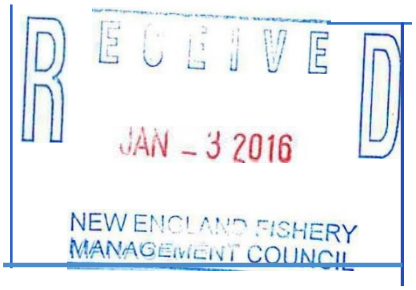
t--a-v-C-

Marc Stettner /s/

NEHFA MEMBERS: Marc Stettner, Timothy Rider, AJ Orlando, Hilary Dombrowski, Paul Hoffman, Christopher DiPilato, Ed Snell, Scott Rice, Roger Bryson, Brian McDevitt, Anthony Gross, Doug Amorello

If you are a holder of a groundfish HA permit and wish to join the NEHFA, please contact the NEHFA at the address above.

Blue Water Fisheries, Inc.
PO Box 2242
Montauk, NY 119S4



01/03/2016

Thomas A. Nies, Executive Director
NEFMC
SO Water Street, Mill #2
Newburyport, MA 019SO

Dear Mr. Nies,

I am writing this letter in response to a request for comments on the Scoping Document for the Small Mesh Multispecies Limited Access amendment that the NEFMC is considering. Blue Water Fisheries owns two vessels that fish for small mesh multispecies in both the northern and southern management areas.

First and foremost I would like to say that I am in favor of developing a limited access plan for the small-mesh multispecies [whiting] fishery. The justification for such a plan is spelled out thoroughly in the Scoping Document. The Council initiated the development of this amendment to address three issues. The following are my thoughts on each one.

1] Limited access qualification criteria:

As already stated, I believe that the Council should use limited access to control capacity in this fishery and the control date of November 28, 2012 should be used. I think that the Council should also consider developing a limited access permit with multiple tiers, including an incidental permit, based on the qualifying vessels history with different possession limits for each tier. The tiers should be based on landings over a 10-year period going back from the control date. Here are some options that the Council could analyze and consider.

Tier 1: Consider using a landings qualifier of between 1,000,000 - 1,500,000 lbs of silver hake/red hake combined over the 10-year period. Analyze this option in increments of 100,000 lbs to look at the number of vessels that would qualify over this range of options.

Tier 2: Consider using a landings qualifier of between 300,000 - 1,000,000 lbs of silver hake/red hake combined over the same period and do an analysis in increments of 100,000 lbs.

Tier 3: Consider using a landings qualifier of between S0,000 - 300,000 lbs of silver hake/red hake combined over the same period and do an analysis in increments of S0,000 lbs.

Although some people would consider these qualifiers to be on the high side keep in mind that this has traditionally been a high volume/low price fishery. Consider that a vessel that has landed just 2 trips of 7,5OO lbs per year would have l5,000 lbs of history per year or a potential of l50,000 lbs for the 10-year period. On the higher end a vessel that has landed 20 trips of 30,000 lbs per year could have a 10- year history of 6,000,000 lbs. Also keep in mind that some of the directed whiting vessels land between SO and 70 directed trips of 30-40,000 lb of whiting each per year. These vessels have upwards of l5 million pounds of landings each over the 10- year period.

I think that the qualification criteria should be developed so that the participants who were active in the 10 year period are not adversely affected by this amendment. As far as the data quality problems, I believe that the Council should use a combination of VTR and dealer data to determine limited access qualification with an emphasis on the VTR data. I also believe that the qualification criteria should be the same for both the northern and southern areas with each

limited access permit being able to fish in either area. Both management areas could have different possession limits based on the status of each stock and on the areas fished.

2] Limited access permit characteristics and conditions:

I do not believe that new entrants should be allowed to enter the fishery if it is not achieving OY due to insufficient effort. There are too many existing and potential choke species that could shut this fishery down now without the additional effort of new entrants. An accumulation limit would be one permit per vessel with one possession limit per trip. An incidental trip limit of 3,500 lbs of combined silver hake/red hake would keep the limited access qualification from having an affect on participation in other small-mesh fisheries. I believe that the proposed limited access permit should be attached to each vessels existing Northeast permit package and transferable by sale only.

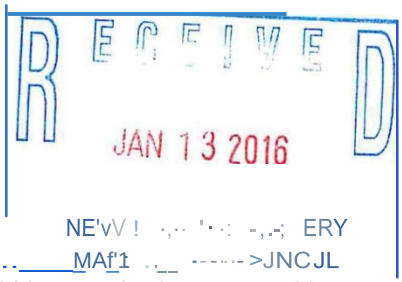
3] Permit categories and associated measures.

If the Council develops a multi-tiered limited access system for this fishery then the amount of small-mesh fishing activity allowed under each permit could be determined by the vessels qualification history. In my opinion the Council should consider a different trip limit of silver hake for each tier. For example, a tier 3 permit could be allowed a maximum trip limit of 7,500 lbs of silver hake, a tier 2 permit could be allowed a maximum trip limit of 15,000 lbs of silver hake and a tier 1permit would be allowed the maximum limit of silver hake which is now 30,000 lbs in the northern area and 40,000 lbs in the southern area. The trip limit for red hake could remain the same as it is now based on which area the vessel fishes in.

Also, keep in mind that the existing mesh-size based trip limits for silver hake would remain the same as they are now. Smaller than 2.5 inches is a possession limit of 3,500 lbs, greater than 2.5 inches but less than 3 inches is a maximum of 7,500 lbs and 3 inches or greater is the maximum trip limit allowed by the area fished. The incidental permit could allow a maximum possession limit of 3,500 lbs for other fisheries. This trip limit could be based on a percentage of the weight of the targeted species so as not to allow the incidental permit to become a directed fishery itself.

Thank you,

Dan Farnham, VP
Blue Water Fisheries ,Inc.



Received via email - January 13, 2016

To Mr. Tom Nies as well as whomever it may concern,

My name is Hank Lackner the owner and operator off an offshore whiting trawler homeported in Mon auk NY.

I believe it is imperative that the council vote in favor of limited entry in the whiting fishery. The reasons are simple :

There are numerous choke species(red hake, Georges yt flounder, windowpane flounder and quite possibly haddock) that effect or could effect the fishery . Until there is adequate amounts of these species, the fishery cannot handle any new entrants. It should not matter if OY is being reached or not.

In the past the council has used a "use it or loose it" policy and they should remain CONSISTENT in their decision making policies!!!

I am in favor of a 4 tiered system:

tier 1-full participation 40,000lb trip limit.
tier 2- 20,000 lb trip limit
tier 3- 7,500 trip limit / mandatory 2.5 in twine
tier 4- incidental trip limit 2,500

The qualifying pounds for these categories would be

tier1 - 1,500,000 lbs.. a combination of both past and CURRENT landings
tier 2- 750,000lbs again both past and CURRENT landing needed
tier 3- 250,000lbs past and current
tier 4- incidental open access

The rational for these numbers is quite simple : 1,500,000 lbs equates to less than 4 directed trips for whiting a year, at the current trip limit, spread over a 10 year time period.. even these numbers do not seem like something that would be considered full time. So it is extremely fair. Of course similar logic applies to the other tiers as well..

The current control date is on the verge of being stale.so with that being said a mix of both PAST and CURRENT landings should be used» this will show who the true whiting fisherman are..

Handling groundfish boats that catch whiting is very simple.. Due to the choke species involved (red hake,georges yt flounder ,window pane flounder and possibly haddock) only incidental landings limits should apply. This will make enforcement issues quite easy.

The northern and southern areas should remain as one permit but the boats must operate under each areas regs..-keep things the same..

VMS should only be used if 85% of a tac is caught. That is either silver or red hake

Communities that will be most effected are those that don't get protection from a limited access plan. Choke species can possibly close down the fishery for those that have been in it for years.

Lastly,I am asking the council again, to be consistent in their decision making policies. Long past history was never considered in the groundfish plan and should not be here. Decisions were based on recent history. Policy should remain the same throughout New Englands jurisdiction.

Management decisions should not be based on what ifs and what was!!

Limited entry was established in a lot of other fisheries and should be done here as well

Thank You ,

Hank Lackner

Received VIA email: Monday, Janua ry 18, 2016

I am writing this comment to oppose the proposed changes to the whiting fishery.

First, there is no biological reason to travel down this road. The whiting resource is not being over exploited and at first appearance this seems to be an attempt to take the control of this fishery from the hands of the many who depend on the flexibility to pursue this fishery and put it into the hands of the few in order to gain control of this fishery. Here in Pt. Judith whiting has been a staple of this fleet since Ihave been around and well before. I can remember lumping small day boats with whiting back in the

late 60's.

What this seems to be is yet another case of the council pitting fisherman against fisherman. It sickens me to watch what has happened to the fishing industry in New England using this tactic. Diversity and flexibility has always been the cornerstone into the success and viability of the fleet here in RI. The precedent that this resource grab would set would be yet another step in the downward spiral of the fishing industry and food supply of this nation. We don't need to have Pt. Judith turn into Gloucester with yet another misguided management plan that does nothi ng but eliminate another fishery from those who depend on it.

Thank you for your consideration
Joel Hova nesia n
F/V Defia nt, Pt. Judith RI

COMMENTS ON AMENDMENT 22 SCOPING HEARING

Submitted by Fishermans Dock Co-op point pleasant NJ 1/15/16

Following are the comments/ opinions of the members of the Fishermans dock Co-op in regard to the possible proposed regulations regarding the Whiting fishery. Point Pleasant NJ has at times been the leading port in the country in the volume of Whiting landed annually, as has the state of New Jersey itself. In the 1970's and 1980's we averaged over 10 million pounds of Whiting a year, with point pleasant accounting for % of that. In the late 1980's our landings started to decline as states to the east of us entered the fishery. The Point Judith Co-op [RI,traded places with NJ as the leading state for Whiting landings in this time period], secured 7 million dollars of Government money to expand their operations to enter the international Headed and gutted market at which they failed miserably leaving a huge pool of publicly secured debt, and a decimated stock as they kept fishing and brought in a lot of inferior product that ended up being sold as animal feed. When the Co-op dissolved many of those boats left RI and relocated to long Island and Connecticut, where they then invented another stock killer the juvenile whiting fishery targeting small immature Whiting with a desired length of 5 to 7 inches.
Really responsible fishing. Kill the babies.

With the decline of groundfish stocks the NEFMC created the Cultivator Shoal whiting fishery which as I wrote in a letter to the council from the mid 90's created a giant sucking sound of the Whiting that we targeted in the winter months being captured during the summer months in their summer grounds before they migrated south to New Jersey for the winter. Consequently these circumstances have contributed to New Jersey no longer having much of a Whiting fishery. We have watched as through the last few decades species after species have been leaving our waters due to global warming, leaving us with very few of our traditional groundfish species such as Blackback Flounder, Yellowtail Flounder, Cod, Whiting, and Ling. Every new regulation passed by the NEFMC punishes us for not have landings of those species usually by using a shortened time frame so they can weed out as many fishermen as possible. Our Whiting landings during the last decade are lucky if they average 300,000 pounds a year. This is not for lack of trying. The only fish we get now show up in the late spring in drips and drabs from late April to June. We used to self-limit our vessels to a 10,000 pound trip limit daily, in which Point Pleasant, Belford, and western Long Island vessels all abided.Now I can count on one hand the amount of 10,000 pound trips landed in New Jersey in the last 15 years. But does that mean it will not happen again? Whiting may very well retake their geographical habitat off of New Jersey in the future, it would be especially ironic if the New Jersey vessels that actually cared about the stocks health by creating their own trip limits back in the 70's

were not allowed to participate inthe fishery any longer. As the Whiting AP chairman during the creation of amendment 12 I fought for and got consensus from the rest of the panel and industry to have limited assess included in that original small mesh plan. It was denied by the RA, and we have had problems ever since with a segment of the industry that has continually feared new entrants into the fishery. The panel and Whiting committee desired that the amendment go back as far as possible so that everybody who had a hi tory inthe fishery would be included, we wanted the early 1980's as the date, so that fisheries in North Carolina, and Maine that had disappeared in the late 1980's and 1990's would not be kicked out of the fishery if the stocks reappeared in their waters.

The whiting fishery has always been labor intensive and the prices fluctuate widely which has been the historical detriment that discourages new entrants. This has been true for decades, and I know of nothing that has changed on either the marketing end, or the fishing aspect, it's a tough labor-intensive fishery that's pretty specialized. The fishery itself is said by NMFS to be in a very healthy condition, although they ignore the fact that the main biomass has moved over 80 miles to the east. So it appears that the driving force behind this amendment is not one of fishery rebuilding, but of fishery reallocation, or the protection of a few over the interests of the many. So following are our concerns about what is proposed.

1. *New Jersey does not have representation on the AP and has not since I was removed for unexplained reasons in 2007 while I was still the chairman of the panel. Despite my history as the only chairman ever for the panel, and my years as a MAFMC member, I was given a dear John letter, for both Whiting and Groundfish AP's. Joe Branin was left on as an advisor despite a spotty attendance record. Joe sent a letter of resignation into the council 3 years ago, but he is still listed as an advisor and has not made a meeting in close to 10 years. We support Roy Dehl of Belford to take his position as soon as possible.*
2. *We support limited access for the fishery using the last control date for new entrants and support going back as far as possible for inclusion of as many historical participants as possible, to the first control date in 1994.*
3. *We support a 20,000 pound qualifier in any one year within that time frame,[1994 to 2012] so as to include as many historical participants as possible recognizing that many historical participants would not be able to show landings in a shortened time period due to climatical conditions beyond their control.*
4. *We felt left out of the scoping process as there was no hearing held in New Jersey, when previously Whiting hearings here have seen 50 to 100 people attend them back in the*

   1990's. We request that a public hearing be held in New Jersey when the amendment goes out for public hearings in the future. Webinars may work for policy wonks and advocates but they do not work for Fishermen, who have trouble figuring it out, and would rather speak and listen in person.

5. *We oppose any type of tiered management system which is advocated by a very select few fishermen who wish to turn the fishery into their own private property, at everybody else's expense. We understand that a small group of fishermen now account for the majority of Whiting landings, and feel that they are still protected by the fishing and market conditions that have limited the expansion of the fishery in the past. By approving a limited access provision into the management plan these fishermen will be protected, by creating a tiered system they will be rewarded at many other fishermen's expense, The creation of a tiered system could present a legal challenge as it would appear the only purpose of the amendment was an economic consideration [reallocation] for few industry participants.*

If a tiered system was put into place using recent landings data about 80 % of the resource could be allocated to the top tier consisting of about a dozen vessels. If in the future the fishery needed to be rebuilt, all the other historic participants would be left fighting over a few crumbs and would be screwed over once again losing access to another historic fishery.

We support the retention of the present mesh sizes and their trip limit triggers for the various mesh sizes which were put into place to address the difference in catching rates between large high horsepower vessel, and smaller vessels with less horsepower. If it's not broke don't fix it, until it is.

In regards to research needs, we need more information on what has driven the migration of whiting to the east out of their historical grounds, and what has happened to the ling population which should be in excellent health as they spend their most vulnerable life stage inside of live scallops for protection from predators. With the scallop population so healthy the ling population should be also. So there is something else eating the ling, and my bet is its Dogfish, so we need a REAL examination of the effects of dogfish predation on every stock in the Atlantic waters and what are the cascading effects down the foodchain from it. This should include the economic impacts of NMFS protecting these voracious sharks and why they have done so, including the cozy relationship of the Dogfish plan's instigator, Sonia Ford ham and the Council staff and former RA. How could one person persuade the NMFS and NEFSC that this stock was in such dire trouble that they were in danger of becoming extinct, with virtually no chance of the stock recovering for a minimum of at least 30 years, unless N MFS themselves wanted to use Dogfish for another ulterior motive. As you know within 5 years of the rebuilding plan the fishery was declared completely recovered.

We also need a complete review of what the general category scallop plan did to all fisheries as it has created a have/ have not industry on the east coast with those who were gifted quota are millionaires while those who got the shaft are struggling to stay in business. Many of those have nots participate in the Whiting fishery, so Its understandable they seek some

kind of protection. Meanwhile the larger scallop quota owners are busy buying up every fluke permit they can find that they want to speculate on and push their scallop vessels into, causing even more harm to the have nots. Since the plan's implementation two scallop boat owners in Point went from owning 1boat to 4 and 5, while one also bought his own dock. Other have's are just sitting back collecting ill gotten rent from the share croppers that the council created.

Thanks for your consideration,
Jim Lovgren Board of Directors FD Co-op

Rianda S. Fisheries

Chuck Weinar
P.O. Box 2017
Montauk, NY 11954

I am a commercial fisherman from Montauk, New York. I am the owner and operator of the fishing vessel Rianda S. and part owner of Inlet Seafood which is a commercial shore side fish packing facility in Montauk. As a full time commercial fisherman since 1973, I have seen the coming and going of the foreign fishing fleets from around the world fishing right off our shores, putting tremendous pressure on the natural resources.

I would like to submit my comments to the Small-Mesh Multispecies Amendment 22 Scoping document.

Small-Mesh Multispecies Amendment 22 Scoping Comments

1. *Limited Access Qualification Criteria*
   - *If the intent of this amendment is to keep the displaced groundfish fleet out of the whiting fishery then it only makes sense to use the same 10 qualifying years as were used for the groundfish quota allocation that we all received.*
   - *If the boats that were groundfishing got the groundfish allocation for the 10 qualifying years, the same years should be used for the whiting qualifying criteria.*
   - *The majority of the boats were built in the 1980s and have been fishing since. Now after the groundfish crisis, the reallocation to the whiting fishery should not be given to the displaced groundfishermen who have been whiting fishing for the past 10 years unless they meet the qualifying criteria for the same years as the groundfish.*
   - *We are not in favor of the tiered fishery allocation for whiting.*
   - *VTRs matched to Dealer reports should be used. VTRs have been around since 1996-2006 that are the same qualifying years as the groundfish quota. If VTRs cannot be matched to dealer reports, that should act as a disqualifier.*
   - *Other small mesh fish landings should NOT be considered in the red hake and whiting fishery.*

2. *Limited Access Permit Characteristics and Conditions*
   - *We have always been in the mixed trawl fishery so our groundfish allocation is not what is would be if we were a groundfish boat. Our scallop permit was taken away because of*

qualifying criteria. The precedent has been set. I agree that there should be a limited access permit.

- *I do not support a mechanism to allow new entries in the fishery if not achieving OY. It is not allowed in other fisheries (i.e. scallops, tilefish).*

3. *Permit Categories and Associated Measures*
   a. *I do not support multi-tiered limited access. It monopolizes the fishery with a few big boats, displacing hundreds of traditional smaller boats that land whiting.*

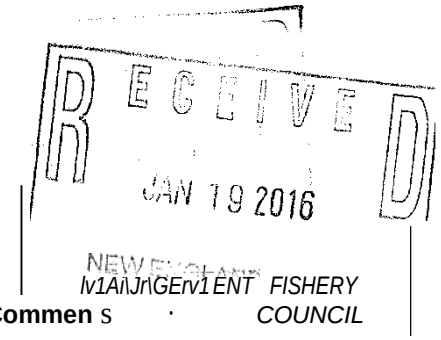
I have been a commercial fisherman for over 40 years fishing out of Montauk NY. Thank you for consideration of my comments. Sincerely,

Chuck Weimar
FNRianda S
Email: star2017@aol.com
Phone: 516-971-1706

Seafreeze *Ltd*. 411JI11

100 Davisville Pier
North Kingstown, R.I. **02852 U.S.A.**
Tel: (401)295-2585

January 19, 2016



Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill #2
Newburyport, MA 01950

Re: Small mesh Multispecies Amendment 22 Scoping Commen s

Dear Executive Director Nies,

The Amendment 22 Scoping Document clearly states that the "purpose of this action is to implement measures that would prevent unrestrained increases in fishing effort by new entrants to the fishery" and that the "need for the amendment is to reduce the potential for a rapid escalation of the small mesh species fishery". The Council has attempted, since the initial 1996 control date used to develop Amendment 12, to establish a limited access program. However, there is no evidence in the scoping document that over the past 20 years that "unrestrained increases in fishing effort" or a "rapid escalation" of the fishery has occurred or been a real threat.

On the contrary, particularly for whiting, southern stock whiting catches have been below 20% of the ACLs since 2013, and northern stock whiting catches shown similar trends. Since limited entry was first proposed in 1996, landings data demonstrates an overall decrease in landings, as well as number of vessels participating in the fishery. Without solid evidence to justify undertaking such an action, it would seem that the Council may best direct its resources towards more pressing issues.

Rhode Island vessels have been historic participants in the whiting fishery, and have relied on access to multiple fisheries to remain viable. This flexibility is essential to the success of the Point Judith fleet and shoreside infrastructure. To potentially deny historic participants access to a fishery that does not even achieve 20% of its ACL is nonsensical and could have extremely negative consequences to Rhode Island vessels in particular.

If the Council chooses to move forward with this Amendment, we support using a qualifying period that spans the time series of Council efforts to create a limited access fishery, from 1996- 2015, since VTRs have been mandatory during this time. At a minimum, the qualifying years should cover a 15 year span. We also support minimal qualifying poundage to ensure that historic participants do not lose access to the whiting fishery. However, rather than move forward, we would instead suggest that measures be introduced to lower trip limits if/when 80% of the whiting ACL is harvested.

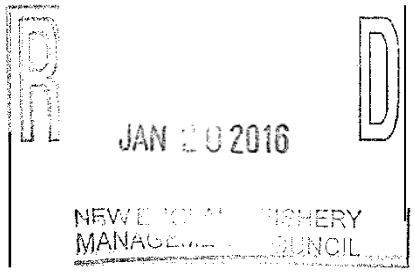
Sincerely,

Meghan Lapp
Fisheries Liaison, Seafreeze Ltd.

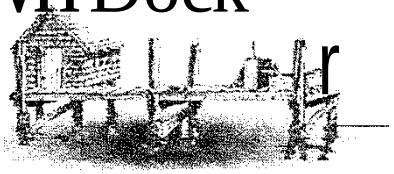
Amendment 22 Comment Received - January 19, 2016

I would like to put in writing that I am opposed to any changes in the management of this fishery. And as far as privitization is concerned I am strongly opposed. There is currently zero overfishing occuring according to your own statistics therefore other than putting the resource into the hands a few boats there is zero need for this action.

Sincerely, Brent Loftes
F/V Asher & Ariana
Point Judith, Rhode Island



Town Dock



January 20[1]2016 h,

Thomas A. Nies,
Executive Director New England Fishery Management Council 50 Water Street, Mill #2
Newburyport, MA 01950

Dear Director Nies,

I'm writing to provide our Small Mesh Multispecies Amendment 22 Scoping comment.

The Town Dock is one of Rhode Island's largest seafood dealers. With over 100 employees, two processing plants, and seven owned fishing vessels we purchase millions of pounds of seafood each year from both local and out of state vessels (around 62 vessels) and dealers.

Because we rely on a diverse fleet, we at the Town Dock will only support a Limited Access whiting fishery as long the program is as inclusive as possible with a reasonable qualifier.
We suggest a qualifying landings measure low enough so that it would cover those fisherman that have any landings history over the past 15 years.

We think that it's vital that people who have fished for whiting in the past be allowed to continue to participate in this fishery and not be pushed out of it for diversifying their catch over the years.

At this point we are not in support of a tiered system. We believe that anyone who qualifies for a whiting permit should be treated equally within the fishery. Since the TAC hasn't been met and a Limited Access fishery will prevent new entry into the fishery, we feel that equal access within the fishery is appropriate.

We support setting an incidental landing limit for whiting for those who would not qualify for a Limited Access permit.

Thank you for the opportunity to comment on this issue and for adding a scoping hearing in Rhode Island.

Sincerely, Katie Almeida
Fishery Policy Analyst

The Town Dock: P.O. Box 608; 45 State St Narragansett, RI 02882 PH: 401-789-2200 FAX: 401-782-4421
Website: www.towndock.com

Penobscot EAST RESOURCE CENTER

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Securing a future for fishing communities

Thomas A. Nies
Executive Director
New England

GRANT SPECIALIST
DEBORAH SMITH

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

RE: Small-Mesh Multispecies Amendment 22 Scoping Comments

Dear Director Nies,

I write to comment, on behalf of Penobscot East Resource Center in Stonington, Maine, regarding the scoping period for Amendment 22 to the Northeast Multispecies Fisheries Management Plan regarding access to the small mesh multispecies fishery. Penobscot East works with community fishermen throughout eastern Maine to foster diversity in fishing opportunities, sustainable fishing, and to build vibrant fishing communities. Most fishermen we work with are owner operators and many participate in a variety of state and federal fisheries. We also manage the Northeast Coastal Communities Sector, representing 23 fishermen from Maine and Massachusetts and 26 federal groundfish permits. Thank you for the opportunity to submit our comments.

We do not believe it is necessary for the Council to limit access to the small mesh multispecies fishery and that other actions would improve sustainable utilization of this resource with a lower risk of social and economic impacts on coastal communities and small scale fishermen. Moving toward limited access in this fishery is a solution in search of a problem and an unnecessary step that will only serve to further consolidate access to federal fishery resources that are managed in the public trust.

The scoping rationale states that the purpose and need for this action are to *"prevent unrestrained increases in fishing effort by new entrants to the fishery"* citing the potential for a *"rapid escalation"* of the fishery due to transition from other fisheries, including large mesh multispecies and northern shrimp: However, NMFS data shows that the number of permitted vessels actually fell from over 700 in 1996 to fewer than 400 in 2013, a year after a disaster was declared in the New England large mesh multispecies fishery and significant declines in the northern shrimp fishery. In fact, the number of permitted vessels has been stable around

400 vessels since 2004, despite failures in other fisheries, which raises further questions about the fundamental rationale for limiting access. Why would there be a drive toward limiting participants from other struggling fisheries ability to transition into an otherwise healthy fishery? It would appear that fishermen shifting effort into a healthier fishery from one that needs to rebuild is a more logical goal to support healthy resources as well as positive social and economic outcomes.

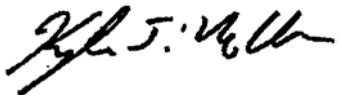
We do acknowledge that this fishery has very high discard rates for managed species and interactions with other fisheries. Red hake discard rates in the northern area have been as high as 40 to 80 percent since 2004 according to NEFMC, but it is unclear how moving to limited access would address this problem. Although getting a handle on discards and interactions with other fisheries are laudable and important priorities for the management of this fishery, encouraging fishermen and dealers to pursue new markets for catch; encouraging better fishing practices, and/or restricting at sea operations through trip limits seem like approaches that could better address these concerns.

Lastly, we are concerned that moving toward limited access is a step that will limit the ability of fishermen and communities to respond to climate change. In the 2015-2017 specification document for this fishery it is stated that *"climate change is already impacting fishery resources by shifting distributions, abundances, and phenology of species and the communities that depend on them. For example, cold water species are shifting northward."* It also cited Nye et al. 2009 and 2011, which document shifts in red and silver hake distribution, but despite this work showing climate impacts on these exact species nowhere in the scoping document is climate changed mentioned. Moving toward limited access is simply the wrong response to climate change. In other fisheries with limited access, work is already beginning to emerge on how difficult limited entry systems make climate adaptation for communities and individual fishermen. Locking in participants based on historical fishing practices and historical resource patterns fails to acknowledge what we do know for certain, that resources will change thus communities and fishermen will need to adapt.

To summarize, we do not support Council actions that would limit access to the small mesh multispecies fishery to historical participants. The transition to limited access in other federal fisheries, including large mesh multispecies, and particularly allocation of quota based on fishing history has proved disastrous for small fishing communities in Eastern Maine and beyond. However, should the Council move forward with limited access in this fishery, it must include steps to retain open access opportunities for community fishermen, perhaps by creating a lower tier open access permit that is not limited by any allocation scheme and allowing the landing of hake and whiting as bycatch in other groundfish fisheries. Steps to preserve meaningful open access will provide flexibility for communities and fishermen to respond to changing resource distributions, changing markets, and changes in other fisheries that necessitate diversifying fishing portfolios.

Thank you for the opportunity to provide our comments. We look forward to working with the Council and NOAA toward a sustainable fishery for small mesh multispecies and other groundfish resources, while maintaining meaningful access for community fishermen across the region.

Sincerely,



Kyle J. Molton Policy Director
Penobscot East Resource Center