Environmental Assessment
For an
Interim Action to Implement Gulf of Maine Atlantic Cod Mortality-Reduction Area Closures
and
Other Conservation Management Measures

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1.0 Executive Summary

This Environmental Assessment evaluates the impacts on the human environment for an action that would:

- Replace the Gulf of Maine Rolling Closures with several seasonal 30-minute grids in the Gulf of Maine (GOM) Broad Stock Area (BSA). These Seasonal Interim Closure Areas would be closed to federally permitted vessels using commercial and recreational gear capable of catching cod (see Figure 4).
- Implement a GOM cod trip limit of 200 lb for sector vessels fishing in the remaining open areas of the broad stock area. The common pool trip limit would be reduced to 200 lb per trip.
- Prohibit possession of recreationally caught GOM cod.
- Restrict commercial limited access groundfish vessels that fish in the GOM BSA to fishing only in that broad stock area for the duration of the declared trip.

The time and area closures are expected to reduce overfishing on GOM cod for the remainder of fishing year 2014 by reducing catch. This will occur by eliminating fishing pressure on areas where cod have recently been found (i.e., standing stock protection), and by where it is known that they aggregate and spawn. This suite of closures is expected to help reduce overfishing and begin the process of rebuilding GOM cod.

Trip limits are intended to discourage sector vessels with unused fishing year 2014 GOM cod annual catch entitlement (ACE) from targeting GOM cod. Observed trips will still occur within the GOM and unobserved trips will be attributed discard rates, consistent with past practices. A trip limit still has value because, given the very poor status of the stock, there must be measures that seek to minimize targeting and/or catch of GOM cod.

Similarly, prohibiting possession of recreationally caught GOM cod for the remainder of fishing year 2014 and beyond (if the action is extended for a full year) is intended to discourage fishing for or catching cod in areas not otherwise closed to gear capable of catching cod in this action.

The prohibition on fishing outside of the GOM BSA when vessels choose to fish in the GOM is expected to help improve catch attribution to stock areas. Because vessels cannot split trips between one or more broad stock areas, all cod caught and discarded will be attributed to the GOM stock area. Furthermore, misreporting area caught, whether intentional or accidental, will not occur under the reduced flexibility of single-stock area designation and reporting requirements.

The measures are anticipated to be positive for GOM cod given the potential reduction in GOM cod mortality as a result of reducing the fishing grounds available to the fleet. Given the depleted status of the stock, a substantial and immediate reduction in mortality for GOM cod will better ensure that the stock can rebuild to sustainable levels. Removing effort from the areas that have high historical catch in combination with trip limits outside these areas would provide a reduction

in mortality and overfishing for the duration of the action. The requirement to fish only in the BSA within the GOM that is declared would further prevent errors in area caught attribution.

The impacts on other target groundfish stocks such as haddock, and non target stocks are anticipated to be minor and negligible. Other stocks have ACLs, and mortality controls in place to limit mortality, and any displacement of effort into areas outside the proposed closure areas is anticipated to be small. It is anticipated that GOM haddock will be available for harvest in sufficient quantities outside the action closure areas. Further, a separate emergency action is being implemented to increase the ACL for GOM haddock. This should allow for additional opportunities to harvest GOM haddock outside the closure areas without undermining the mortality reduction and spawning protection objectives for GOM cod. Available quantities of other groundfish stocks are not anticipated to be substantially affected.

Impacts to protected resources are not anticipated to be substantial, but may be low positive with the anticipated reduction in effort. Gear interactions with protected resources may be higher in the inshore GOM within the areas proposed for closure, and as such, any shift of effort into other open areas may result in a decrease in interactions – even if overall effort remains constant.

Impacts to the physical environment and EFH are not anticipated to be substantial. Fishing effort within areas closed in certain months will continue in other open months. Thus, it is not expected that long term positive habitat benefits will result from the seasonal closures. There may be some shifting of effort into areas less heavily fished, however, this action does not change the permanent habitat closures in place currently, or the new areas proposed in the Council's Omnibus Habitat Amendment 2 (OHA2) Draft Environmental Impact Statement (DEIS). It is not believed that temporary cessation of fishing effort within some of the proposed closure areas would provide an improvement to habitat. In light of these considerations, the Alternative 2 impacts are expected to be negligible in comparison to the Alternative 1 status quo/no action.

The economic impacts are likely moderately negative in the short term, as a result of this action. As described in Section 9.4.

In general, the adoption of all these measures will benefit GOM cod because collectively they make it more likely that overfishing will be reduced. The measures are not likely to impact non-groundfish stocks, protected species, or habitat to any great extent when compared to the No Action alternative. However, impacts to human communities are likely moderately negative in the short term. Long term impacts may be positive if stocks rebuild to levels sustainable for harvest.

2.0 Introduction

The National Marine Fisheries Service (NMFS) has prepared this environmental analysis to evaluate impacts that would result from the proposed action to implement seasonal closures, commercial trip limits, and other management measures in the Gulf of Maine (GOM) to provide protection for the GOM Atlantic cod stock.

In accordance with the National Environmental Policy Act (NEPA), NMFS evaluated the potential impacts of a range of cod conservation management measures designed to reduce the

level of fishing mortality on the stock, by prohibiting fishing on core areas of stock distribution and protecting spawning aggregations of cod and their spawning-related activities. These measures are designed to reduce fishing mortality, protect, and rebuild the critically depressed GOM cod stock while long-term management measures are developed by the New England Fishery Management Council (Council).

3.0 Background

In August 2014, the Northeast Fisheries Science Center (NEFSC or Center), performed an unscheduled update to the most recent GOM cod stock assessment[1]. This update added additional fishery independent (i.e., survey information) and dependent data (i.e., catch information) to the assessment model and methods approved for management use during the December 2012 benchmark assessment peer review.[2]

The assessment update was peer reviewed on August 28-29, 2014, by a subgroup of the Council's Scientific and Statistical Committee (SSC) and others. The peer reviewers met all the terms of reference established for the review and upheld the findings that the GOM cod stock is overfished, subject to overfishing, and in very poor overall condition (Table 1). While the stock status did not change from being both overfished and subject to overfishing, the stock's condition indicates its status has worsened substantially since the 2012 benchmark assessment. The update indicates that the spawning stock biomass has continued to decline and is at a historically low level (Figure 1).

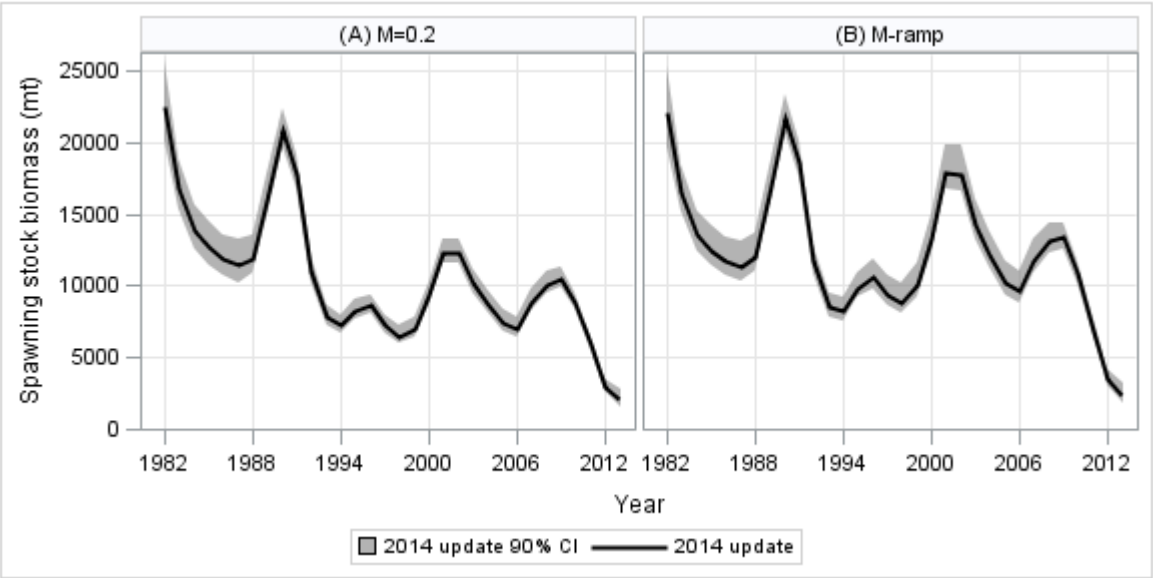
[1] Northeast Fisheries Science Center. 2014. Gulf of Maine Atlantic Cod 2014 Assessment Update Report. Last update: September 3, 2014

[2] Stock Assessment Review Committee (SARC) 55; Northeast Fisheries Science Center. 2013. 55th Northeast Regional Stock Assessment Workshop (55th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-11; 845 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online athttp://www.nefsc.noaa.gov/nefsc/publications/

Table 1. Biological reference points and stock status for Gulf of Maine Atlantic cod based on SARC 55 benchmark assessment (NEFSC 2013) and the revised 2014 updated assessment. Intervals shown are the 5th and 95th percentiles.

Assessment	Proxy reference points	M=0.2	M-ramp
SARC 55	Ffull, 2011	0.86 (0.58 - 1.17)	0.90 (0.62 - 1.23)
	FMSY	0.18	0.18
	Ffull, 2011/FMSY	4.78	5.00
	Overfishing	Yes	Yes
	SSB2011 (mt)	9,903 (7,644 - 13,503)	10,221 (7,943 - 13,676)
	SSBMSY (mt)	54,743 (40,207 - 73,354)	80,200 (64,081 - 99,972)
	SSB2011/SSBMSY	0.18	0.13
	Overfished	Yes	Yes
	MSY(mt)	9,399 (6,806 - 13,153)	13,786 (10,900 - 17,329)
	Median age1 recruitment (000s)	5,254 (2,206 - 14,727)	9,446 (4,480 - 16,321)
2014 update	Ffull, 2013	1.33 (0.89 - 1.92)	1.24 (0.84 - 1.78)
	FMSY	0.18	0.18
	Ffull, 2013/FMSY	7.39	6.89
	Overfishing	Yes	Yes
	SSB2013 (mt)	2,063 (1,561 - 2,774)	2,432 (1,819 - 3,230)
	SSBMSY (mt)	47,184 (32,903 - 67,045)	69,621 (53,349 - 89,302)
	SSB2013/SSBMSY	0.04	0.03
	Overfished	Yes	Yes
	MSY(mt)	7,753 (5,355 - 11,162)	11,388 (8,624 - 14,750)
	Median age1 recruitment (000s)	4,665 (1,414 - 14,649)	9,173 (2,682 - 16,262)

Figure 1. Gulf of Maine Cod Spawning Stock Biomass in Metric Tons from 2014 stock assessment update, under M =0.2 and Mramp model approaches.



Additional information on the condition of the GOM cod stock is available in the materials assembled for the SSC's peer review and are not repeated here. Those materials can be found on the New England Fishery Management Council's web site: http://www.nefmc.org/calendar/september-15-2014-ssc-meeting. Additional materials, including the SSC peer review report and SSC acceptable biological catch recommendation discussion document, can be found in the meeting materials assembled for the September 30-October 2, 2014, Council meeting held in Hyannis, MA. These materials are not repeated here, but may be found on the Council's web site: http://www.nefmc.org/library/groundfish-september-2014. These materials provide detailed discussions of the GOM cod stock's status, including sensitivity runs conducted during the peer review, documents from the Council's Plan Development Team (PDT) summarizing the results of the assessment and peer review, etc.

During the meeting held in Hyannis, MA, the Council spent considerable time deliberating on what measures could be recommended to NMFS for an "emergency" action in fishing year 2014[3]. While the majority of the Council supported some type of emergency action response in light of the updated assessment information, the Council did not agree on specific measures to forward for NMFS consideration. In the end, the Council recommended by a vote of 14 to 3 in favor of NMFS using the authority of Magnuson-Stevens Fishery Conservation and Management Act Section 305(c) to implement measures to reduce GOM cod mortality in fishing year 2014. This is a more generic recommendation than many that were discussed during Council deliberations.

4.0 Purpose and Need

The purpose of this action is to implement interim measures for the remainder of fishing year 2014 that: (1) afford immediate but temporary overfishing reduction on GOM cod by restricting commercial and recreational fishing in areas where the highest concentrations of catch has occurred in recent years as well as those areas identified as spawning aggregation areas in the fall, winter, and spring; and (2) improve catch attribution between broad stock areas.

The recent stock assessment shows the status of cod worsening and this action is needed to quickly lessen fishing effort and impact such that overfishing is reduced on the GOM stock that is severely depleted. These measures are designed to mitigate the magnitude of overfishing that may be occurring on the stock in fishing year 2014 and to provide broadly based emergency protection for spawning activities so that recovery and rebuilding can continue while allowing some fishing on other stocks in the GOM according to and consistent with the current fishery management plan, as the Council develops longer-term measures in Framework Adjustment 53. Changes to broad stock area reporting are needed to ensure that catch is accurately reported and subsequently attributed to the appropriate area. Revising the reporting requirements will better ensure cod from GOM is reported as such.

[3] The Magnusson-Stevens Act provides authority for the Secretary of Commerce to take action to address emergencies, including overfishing, or interim measures to reduce overfishing for a fishery. Emergency regulations typically address unforeseen events (e.g., oil spills, natural disasters) and interim regulations address overfishing. This action addresses overfishing and is therefore an interim action. The action is also consistent with guidance for implementing emergency regulations as well (*Federal Register* Notice 62 FR 44421 (August 21, 1997)

This EA analysis supports interim or emergency measures that are constrained to 180 days with the possibility of extension for an additional 186 days by the Magnuson-Stevens Act authority granted to the Secretary of Commerce (see section 305(c) of the Magnuson-Stevens Act). Therefore, the scope of the action is necessarily constrained and narrowly focused on measures that would likely demonstrate short-term benefits for GOM cod stock recovery for a one-year period.

5.0 Proposed Action and Alternatives

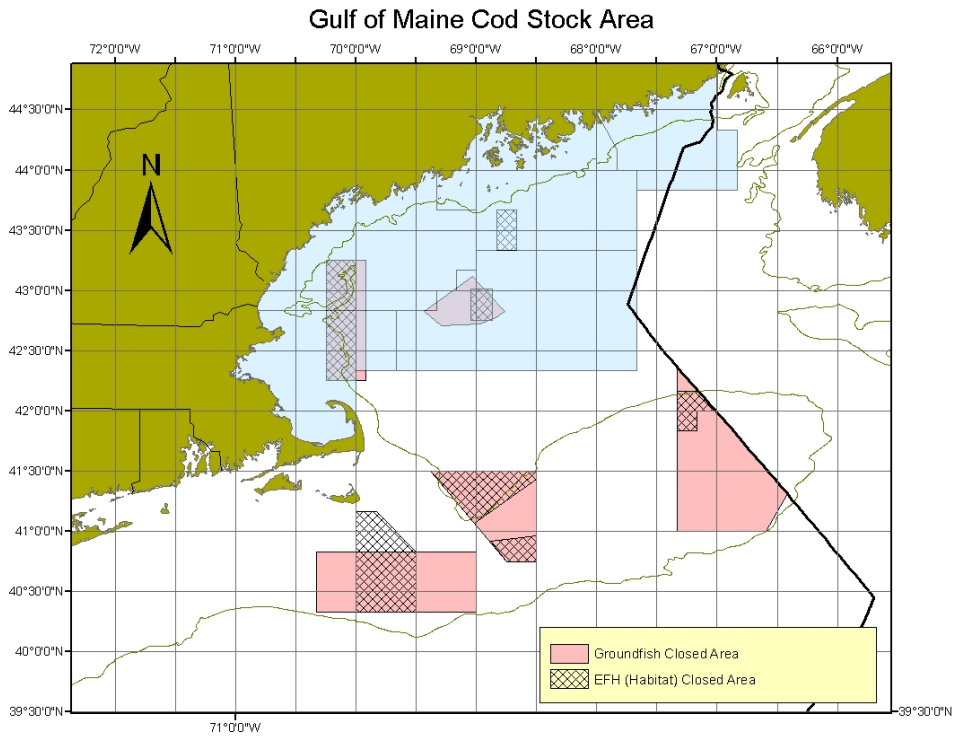
As described above, the purpose of this action is to revise the GOM cod management measures for the remainder of fishing year 2014 in order to reflect the most recent scientific information for this stock and to provide temporary overfishing reduction, while minimizing to the extent possible the economic impacts on the fishing industry while the Council develops Framework Adjustment 53. In addition to the No Action/Status Quo Alternative, only one alternative is fully analyzed because of the narrow objectives, scope, and short duration of this action. Given the short duration that this action will be in effect, and the fact that the proposed alternative is within the context of management measures already in place, it is not feasible, practicable, nor necessary to consider a broader range of alternatives.[4] Furthermore, consideration of a broader suite of alternatives would undermine NMFS's ability to analyze and implement new catch specifications in a timely manner. The Council is considering alternatives for long-term modifications to the FMP as part of Framework Adjustment 53 being developed for May 1, 2015 implementation. Although the GOM cod management measures would be revised under this action, they do not change the catch limit parameters and methods of calculating catch limits implemented by Amendment 16 and Framework Adjustment (FW 51) to the Northeast Multispecies Fishery Management Plan (FMP).

5.1 Status Quo/No Action Alternative 1

The No Action alternative would result in the status quo measures remaining in effect through the remainder of FY2014. That is, no changes would be made to GOM cod management measures or the fishery as a whole for the remainder of fishing year 2014. Specifically, only year-round 'mortality' closures, the Western Gulf of Maine (WGOM) and Cashes Ledge would apply to commercial fisheries, including cod, and only the Gulf of Maine Cod Spawning Protection Area would be in place for recreational fisheries. Existing rolling closures for sector and common pool vessels would remain effective as well. No trip limits would be imposed on sector fishing vessels and the common pool GOM cod trip limit (200 lb/day-at-sea, up to 600 lb/trip) trip when this EA was drafted) would remain unchanged. Possession of recreationally caught GOM cod would be permitted April 15-30, 2015, and possible in-seasons adjustments, yet to be determined through Council process, after May 1, 2015. Commercial fishing in the GOM broad stock area, as show in Figure 2, could continue to fish in multiple broad stock areas on a single trip, irrespective of if an at-sea monitor or observer were onboard (e.g., GOM and Georges Bank stock areas).

[4] Other alternatives were briefly considered and discussed in Section 6.3 Considered but Rejected.

Figure 2. Gulf of Maine Broad Stock Area (light blue area).



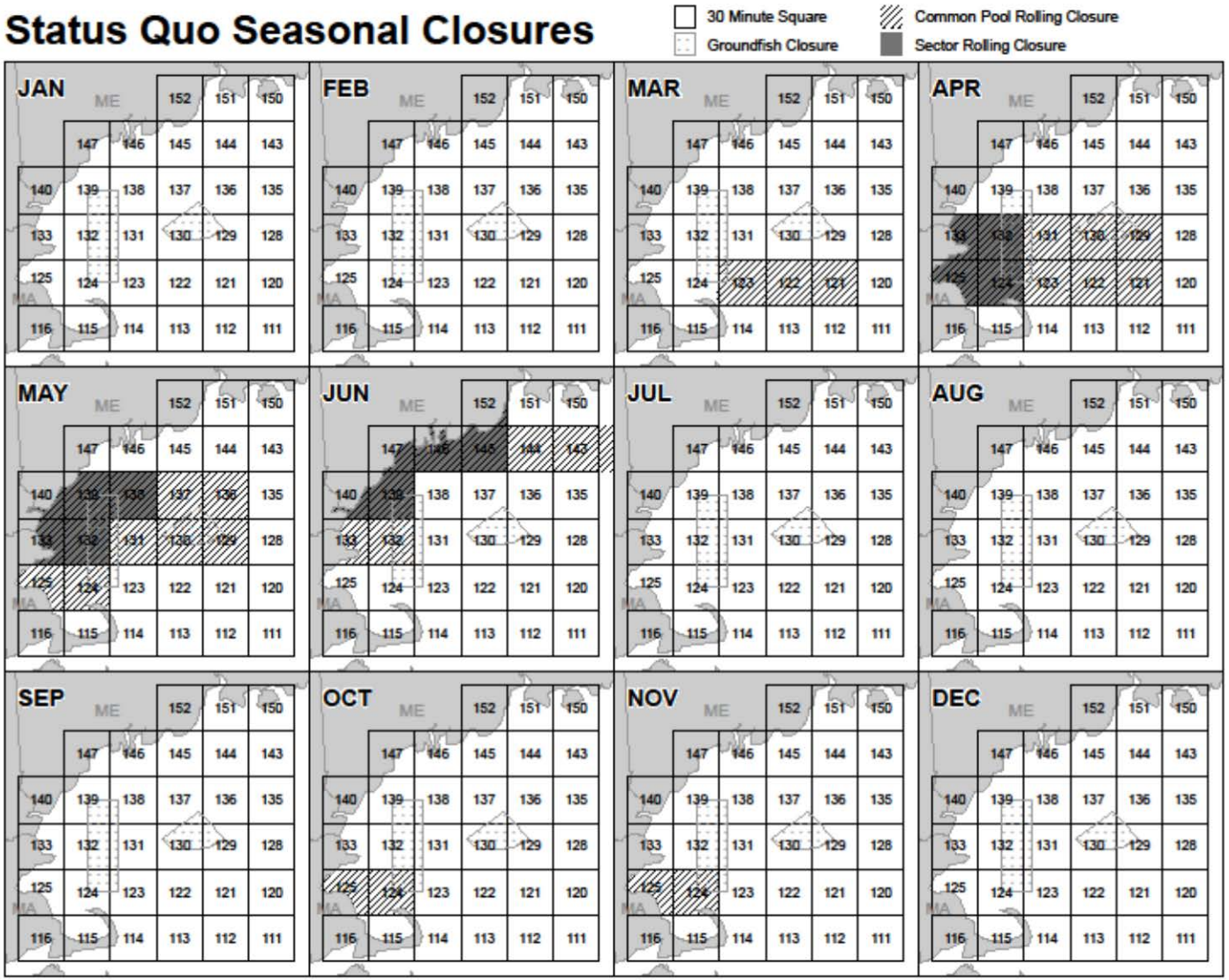
Under the status quo/no action, seasonal rolling closure areas would continue to apply to common pool and sector commercial fishing vessels. More extensive areas apply to common pool vessels under the status quo/no action as sector vessels have been exempt from some rolling closure components for fishing year 2014 and other fishing years, as indicated in Table 2 below. These areas are shown in Table 2 and Figure 3. The regulations outlining the existing rolling closures can be found in section *648.81 NE multispecies closed areas and measures to protect essential fish habitat* of the Northeast multispecies regulations.

Table 2. Status Quo/No Action Gulf of Maine Rolling Closure Areas for Fishing Year 2014 Commercial (Common Pool and Sector) Vessels.

Gulf of Maine Rolling Closure Areas (based on 30' squares)

Rolling Closure	Current Closures	Amendment 16 Universal Exemption from Closures for Sector Vessels
Area I March 1 – 31	Blocks 121, 122, 123	All blocks open to sector participants
Area II April 1 – 30	Blocks 121, 122, 123, 124, 125, 129, 130, 131, 132, 133	Blocks 121, 122, 123, 129, 130, 131 open to sector participants (Specific exemption would still be needed for blocks 124, 125, 132, 133)
Area III May 1 – 31	Blocks 124, 125, 129, 130, 131, 132, 133, 136, 137, 138, 139, 140	Blocks 124, 125, 129, 130, 131, 136, 137 open to sector participants (Specific exemption would still be needed for blocks 132, 133, 138, 139, 140)
Area IV June 1 – 30	Blocks 132, 133, 139, 140, 142, 143, 144, 145, 146, 147, 152	Blocks 132, 133, 142, 143, 144 open to sector participants (Specific exemption would still be needed for blocks 139, 140, 145, 146, 147, 152)
Area V October 1 – November 30	Blocks 124, 125	All blocks open to sector participants

Figure 3. Status Quo Seasonal and Year-Round Gulf of Maine Closures.



In addition, several existing closures and gear-related restrictions are in place for inshore Gulf of Maine waters as part of the Harbor Porpoise Take Reduction Plan. These are more fully described in section 7.1.4.2 of this document. These closures are depicted in Figure 26 in that same section that begins on page 72 of this document. These measures are part of both the status quo/no action and preferred alternative as this action does not contemplate changes to the existing Take Reduction Plan measures.

5.2 Alternative 2 (preferred)

Under the preferred alternative, the following interim measures would be implemented for a maximum of one year:

- Revised rolling closures would be implemented consisting of several 30-minute grids in the GOM broad stock area. These would be closed to federally permitted vessels using commercial and recreational gear capable of catching cod (Figure 4).
- A 200-pound GOM cod trip limit would be put in place for sector vessels fishing in the remaining open areas of the broad stock area. The common pool trip limit would be reduced to 200 pounds.
- Possession of recreationally caught GOM cod would be prohibited. This would be in effect for the duration of the interim measures. This would be a change for the April 15-30, 2015, period where possession of recreationally caught cod was scheduled to occur.
- Commercial vessels declaring to fish in the GOM broad stock area would be required to fish only in that broad stock area for the duration of the declared trip.

These time and area measures are expected to reduce overfishing for the remainder of fishing year 2014 by reducing catch, providing some protection by eliminating fishing pressure on areas where cod have recently been found (i.e., standing stock protection), and provide a mechanism to allow cod to aggregate and spawn without disruption. This suite of closures is expected to help reduce overfishing and begin the process of rebuilding GOM cod in anticipation of longer-term measures to be implemented through Framework Adjustment 53. These measures also allow some fishing of other stocks consistent with the purpose and objectives of the FMP. Vessels will be allowed to continue to transit these closure areas, provided gear is stowed according to the regulations.

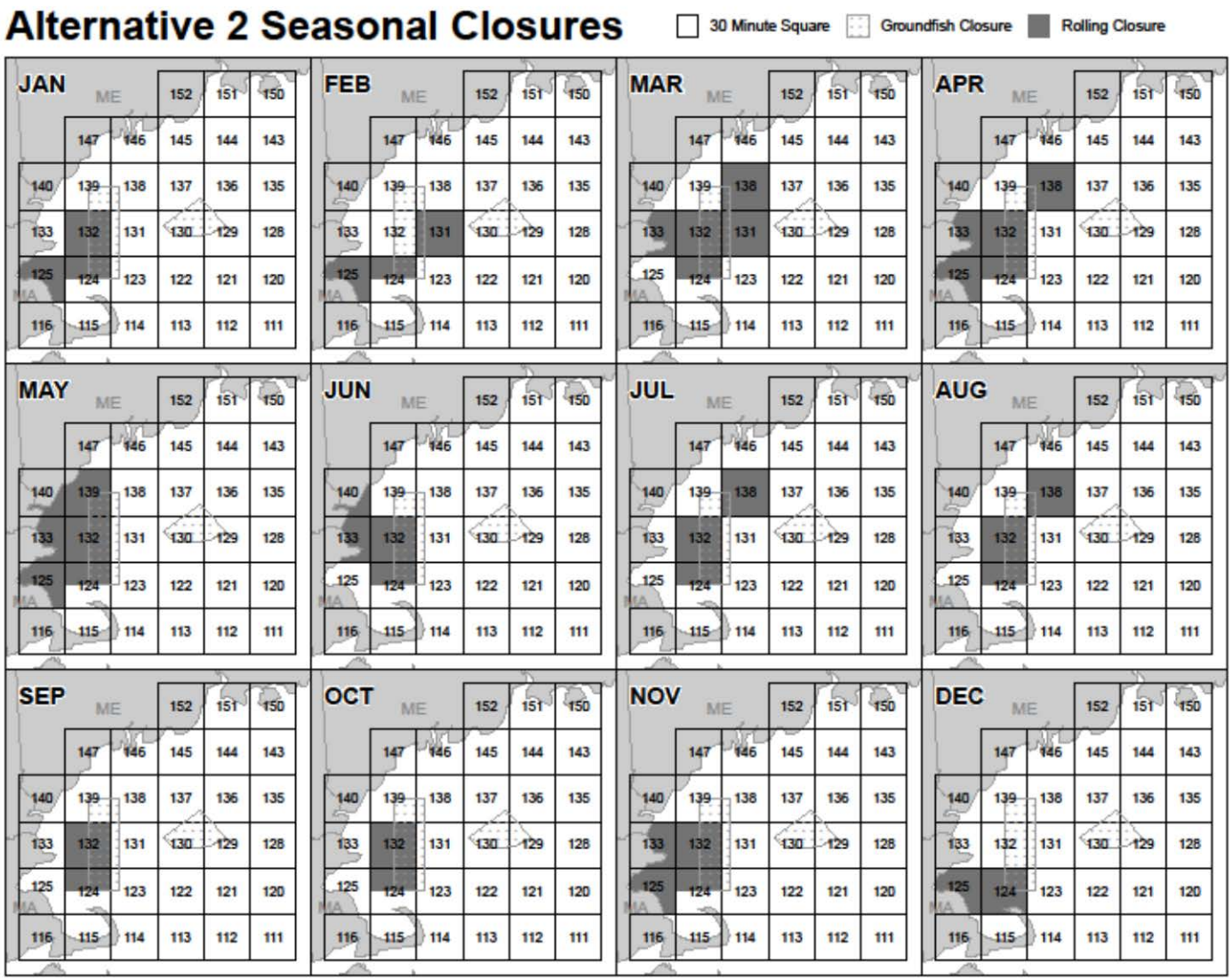
Trip limits are intended to discourage sector vessels with unused GOM cod ACE from targeting GOM cod in areas not closed by this action. Observed trips will still occur within the GOM and unobserved trips will be attributed discard rates, consistent with past practices. These measures are necessary to minimize targeting and/or catch of GOM cod in open areas.

Similarly, prohibiting possession of recreationally caught GOM cod for the remainder of fishing year 2014 and beyond (if the action is extended for a full year) is intended to discourage fishing for or catching cod in areas not otherwise closed to gear capable of catching cod in this action. Additional recreational measures for GOM cod will be considered and evaluated for the 2015 fishing year that begins on May 1, 2015. These measures may include additional time/area closures for the recreational fishery, prohibition on possession of recreationally caught cod, gear requirements, or other measures.

The use of a single stock area declaration is expected to help improve catch and discard reporting of GOM cod. Because vessels cannot split trips between one or more broad stock areas, all cod caught and discarded will be attributed to the GOM stock area. Furthermore, misreporting, whether intentional or accidental, will not occur under the reduced flexibility of single-stock area designation and reporting requirements.

All remaining commercial and recreational fisheries management measures for the groundfish fishery remain unchanged.

Figure 4. Alternative 2 GOM broad stock area seasonal interim measure closures.



5.3 Considered but Rejected

Several variations of time/area closures were evaluated by NMFS in developing this action. These ranged from configurations that had less overall time and area closed to those that were much more extensive. Ultimately, given the narrow objectives and scope of this action, these measures were adjudged to not meet the purpose and need strongly enough or were potentially more restrictive than necessary to reduce overfishing and provide spawning protection in the near term.

NMFS considered wholescale closure of the GOM; however, it was recognized that the negative socio-economic impacts were not justified for the conservation return that could be realized for such an action. As indicated in stock assessment projections, it is not necessary to stop all mortality on this stock for it to be rebuilt over time as long as appropriate measures are implemented in 2015 and onward.

NMFS considered requiring selective trawl gear use in conjunction with closed areas. These types of nets have demonstrated an ability to reduce cod catch when properly outfitted and fished. The agency concerned that the benefits of requiring such gear would be diluted due to delays necessary to allow fishermen to comply with this action. In light of this delay and the difficulty in quantifying the amount of reduction in overall GOM cod mortality that would come from such a measure, It was decided that costs that fishermen would incur for purchasing or rigging new gear did not justify imposing this requirement as a potentially short-term interim measure.

NMFS considered reducing catch limits inseason to ensure fishing mortality is reduced. This would be an administratively complex process and presented some equity issues as to how they would be implemented. Arguably, inshore closures have a degree of inequity as they may disproportionately affect smaller commercial and recreational fishing vessels. However, it was of paramount importance in the interim action is the ability to analyze and implement measures quickly. Making quota changes in season were expected to take a more extensive development and implementation than working with or modifying existing measures. For this reason, inseason changes to existing fishing year 2014 catch limits were considered but rejected.

Changes in recreational fishing terminal tackle (i.e., hooks and lures) was considered in lieu of possession restrictions. Ongoing studies by researchers at the New England Aquarium, Massachusetts Department of Marine Fisheries (MA DMF, University of New England (UNE), and The School for Marine Science and Technology (SMAST) at the University of Massachusetts Dartmouth, have indicated that discard mortality for recreationally caught cod is lower for fish taken on baited hooks in comparison to unbaited jigs. However, this research is ongoing and the results not yet finalized. The current stock assessment estimated mortality for discard recreationally caught cod is 30 percent. As a long-term management measure, changes to recreational terminal tackle may have value; however, for this action more substantive mortality reductions were necessary to meet the purpose and need. As a result, such changes were considered but not adopted for this action.

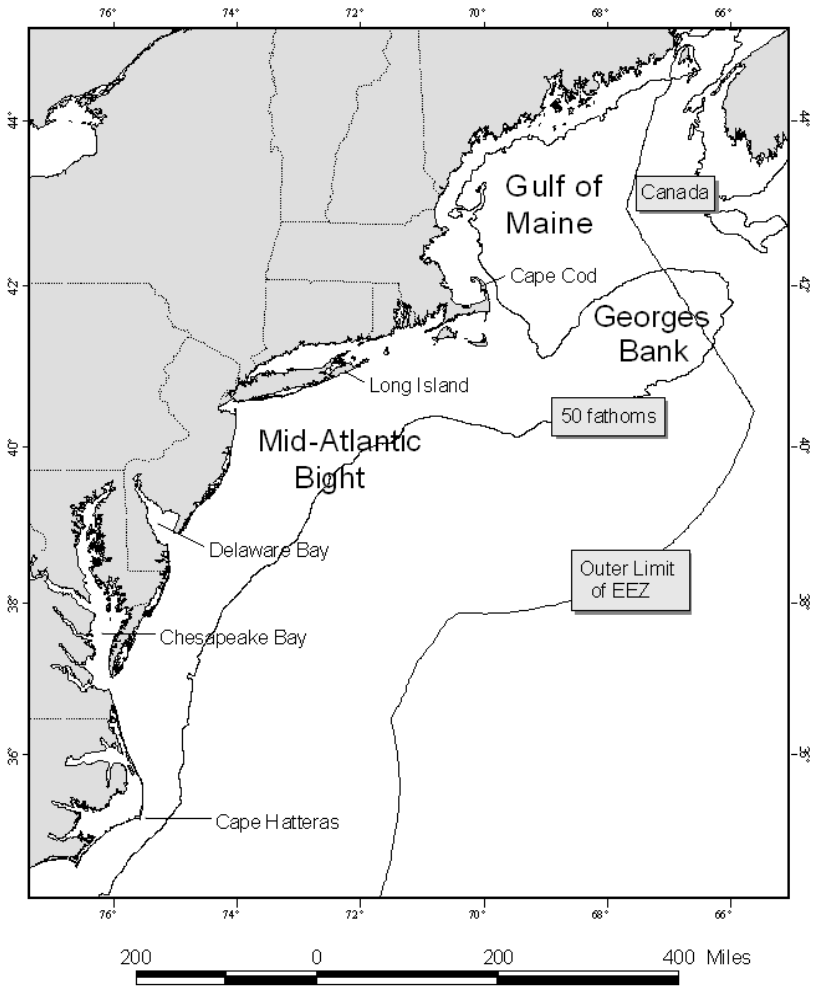
6.0 Affected Environment

The Valued Ecosystem Components (VECs) affected by the Preferred Alternative include the physical environment, Essential Fish Habitat (EFH), target species, non-target species/bycatch, protected resources, and human communities. These VECs are described in more detail for the entire Greater Atlantic region in Section 6.0 of Environmental Assessment completed for Framework Adjustment 51 and 52 to the FMP (NEFMC 2014a and b) and incorporated by reference. A brief summary of these VECs is provided here with additional details relating to the Gulf of Maine cod stock, as follows.

6.1 Physical Environment/Habitat/EFH

The northeast U.S. shelf ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, North Carolina (Figure 5). It extends from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream (Figure 5). It includes four distinct sub-regions: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. The continental slope includes the area seaward of the shelf out to a depth of 2000 m. Information included in this document was extracted from Stevenson et al. (2004).

Figure 5 – Northeast U.S. Shelf Ecosystem



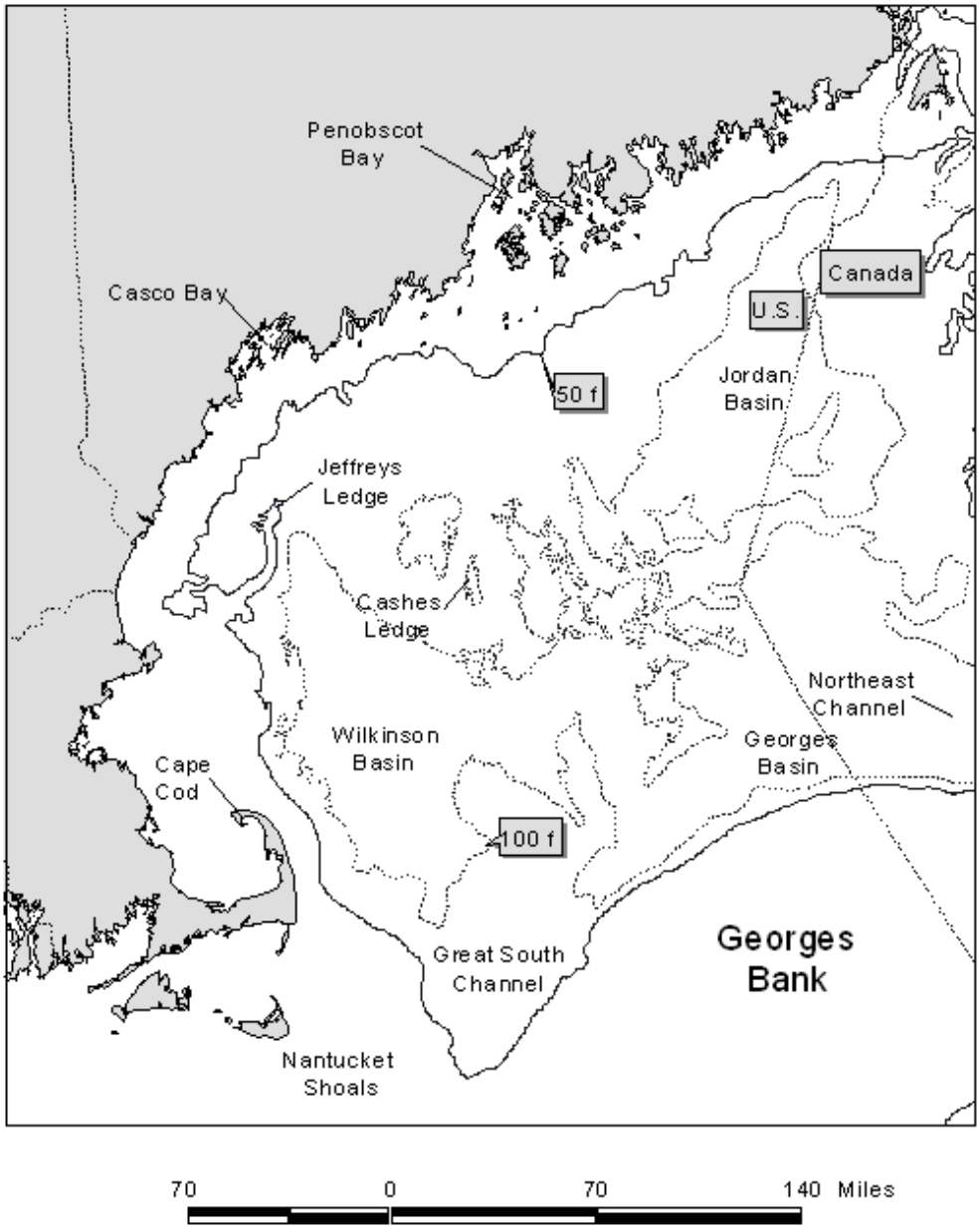
6.1.1 Gulf of Maine

Although not obvious in appearance, the Gulf of Maine (GOM) is actually an enclosed coastal sea, bounded on the east by Browns Bank, on the north by the Nova Scotian (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank (Figure 6). The Gulf of Maine is a boreal environment characterized by relatively cold waters and deep basins, with a patchwork of various sediment types (Figure 6). The GOM was glacially derived, and is characterized by a system of deep basins, moraines and rocky protrusions with limited access to the open ocean. This geomorphology influences complex oceanographic processes that result in a rich biological community.

The GOM is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The GOM's geologic features, when coupled with the vertical variation in water properties, result in a great diversity of habitat types. It contains twenty-one distinct basins separated by ridges, banks, and swells. The three largest basins are Wilkinson, Georges, and

Jordan. Depths in the basins exceed 250 meters (m), with a maximum depth of 350 m in Georges Basin, just north of Georges Bank. The Northeast Channel between Georges Bank and Browns Bank leads into Georges Basin, and is one of the primary avenues for exchange of water between the GOM and the North Atlantic Ocean.

Figure 6 – Gulf of Maine



High points within the Gulf include irregular ridges, such as Cashes Ledge, which peaks at 9 m below the surface, as well as lower flat topped banks and gentle swells. Some of these rises are remnants of the sedimentary shelf that was left after most of it was removed by the glaciers. Others are glacial moraines and a few, like Cashes Ledge, are outcroppings of bedrock. Very

fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the GOM, particularly in its deep basins. These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains. Some shallower basins are covered with mud as well, including some in coastal waters. In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, as on Sewell Ridge to the north of Georges Basin and on Truxton Swell to the south of Jordan Basin. Sand predominates on some high areas and gravel, sometimes with boulders, predominates on others.

Coastal sediments exhibit a high degree of small-scale variability. Bedrock is the predominant substrate along the western edge of the GOM north of Cape Cod in a narrow band out to a depth of about 60 m. Rocky areas become less common with increasing depth, but some rock outcrops poke through the mud covering the deeper sea floor. Mud is the second most common substrate on the inner continental shelf. Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Many of these basins extend without interruption into deeper water. Gravel, often mixed with shell, is common adjacent to bedrock outcrops and in fractures in the rock. Large expanses of gravel are not common, but do occur near reworked glacial moraines and in areas where the seabed has been scoured by bottom currents. Gravel is most abundant at depths of 20 - 40 m, except in eastern Maine where a gravel-covered plain exists to depths of at least 100 m. Bottom currents are stronger in eastern Maine where the mean tidal range exceeds 5 m. Sandy areas are relatively rare along the inner shelf of the western GOM, but are more common south of Casco Bay, especially offshore of sandy beaches.

6.1.2 Habitat requirements of groundfish (focus on demersal life stages)

Figure 7 briefly summarizes the habitat requirements for all the federally-managed species that are occupy benthic habitats in the Gulf of Maine that are potentially vulnerable to the management alternatives being considered in this action. EFH information for these species was compiled from NEFMC 1998 and from various other NEFMC and MAFMC fishery management plans and amendments.

Figure 7 - EFH descriptions for the benthic life stages of federally-managed species in the Greater Atlantic Region that are potentially vulnerable to the adverse effects of fishing in the Gulf of Maine.

Species	Life Stage	Depth (meters)	Bottom Type
American plaice	juvenile	45 - 150	Fine grained sediments, sand, or gravel
American plaice	adult	45 - 175	Fine grained sediments, sand, or gravel
Atlantic cod	juvenile	25 - 75	Cobble or gravel
Atlantic cod	adult	10 - 150	Rocks, pebbles, or gravel
Atlantic halibut	juvenile	20 - 60	Sand, gravel, or clay
Atlantic halibut	adult	100 - 700	Sand, gravel, or clay
Atlantic herring	eggs	20 – 80	Attached to gravel, sand, cobble or shell fragments, and macroalgae
Atlantic sea scallops	juvenile/adult	18 - 110	Cobble, shells, gravelly sand, and sand
Atlantic wolffish	eggs	40 - 240	Rocky substrates in “nests”
Atlantic wolffish	juvenile/adult	40 - 240	Range from rocky to soft substrates

Species	Life Stage	Depth (meters)	Bottom Type
Barndoor skate	juvenile/adult	l0 - 750, mostly < 150	Mud, gravel, and sand
Black sea bass	juvenile	1 - 38	Rough bottom, shellfish and eelgrass beds, manmade structures in sandy-shelly areas, offshore clam beds, and shell patches
Black sea bass	adult	20 - 50	Structured habitats (natural and manmade), sand and shell substrates preferred
Haddock	juvenile	35 - 100	Pebble and gravel
Haddock	adult	40 - 150	Broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches
Little skate	juvenile/adult	0 - 137, mostly 73 - 91	Sandy or gravelly substrate or mud
Longfin squid	eggs	<50	Egg masses attached to rocks, boulders and vegetation on sand or mud bottom
Monkfish	juvenile/adult	25 - 200	Sand, rocks, gravel, and mud
Ocean pout	eggs	<50	Generally sheltered nests in hard bottom in holes or crevices
Ocean pout	juvenile	< 50	Close proximity to hard bottom nesting areas
Ocean pout	adult	< 80	Smooth bottom near rocks or algae
Pollock	juveniles	0 - 250	Aquatic vegetation, sand, mud, or rocks
Pollock	adult	15 – 365	Bottom habitats (not specified)
Red hake	juvenile	< 100	Shell fragments, including areas with an abundance of live scallops
Red hake	adult	10 - 130	In sand and mud, in depressions
Redfish	juvenile	25 - 400	Silt, mud, or hard bottom
Redfish	adult	50 - 350	Silt, mud, or hard bottom
Scup	juvenile	(0 - 38)	Sands, mud, mussel, and eelgrass beds
Scup	adult	(2 -185)	Various substrate types
Silver hake	juvenile	20 – 270	All substrate types
Smooth skate	juvenile/adult	31 – 874, mostly 110 - 457	Soft mud (silt and clay), sand, broken shells, gravel and pebbles
Summer flounder	juvenile	Inshore in shallow water	On mud but prefer mostly sand; found in the lower estuaries in flats, channels, salt marsh creeks, and eelgrass beds
Summer flounder	adult	Shallow to 500 ft	Not specified
Thorny skate	juvenile/adult	18 - 2000, mostly 111 - 366	Sand, gravel, broken shell, pebbles, and soft mud
White hake	juvenile	5 - 225	Seagrass beds, mud, or fine grained sand
White hake	adult	5 - 325	Mud or fine-grained sand
Windowpane flounder	juvenile	1 – 100	Mud or fine-grained sand
Windowpane flounder	adult	1 – 75	Mud or fine-grained sand
Winter flounder	juvenile	0 - 50	Mud or fine-grained sand
Winter flounder	adult	1 - 100	Mud, sand, and gravel
Winter skate	juvenile/adult	0 - 371, mostly < 111	Sand and gravel or mud
Witch flounder	juvenile	50 - 450 to 1500	Fine grained substrate
Witch flounder	adult	25 - 300	Fine grained substrate
Yellowtail flounder	juvenile/adult	20 - 50	Sand or sand and mud

6.1.3 Essential Fish Habitat (EFH) Designations

The proposed action could potentially affect EFH for benthic life stages of species that are managed under the Northeast Multispecies; Atlantic sea scallop; monkfish; northeast skate complex; Atlantic herring; summer flounder, scup, and black sea bass; squid, Atlantic mackerel, and butterfish; Atlantic surf clam and ocean quahog; spiny dogfish; bluefish. EFH for the species managed under these FMPs includes a wide variety of benthic habitats in state and federal waters throughout the Gulf of Maine. Figure 7 summarizes the EFH descriptions of the general substrate or bottom types for all the benthic life stages of the species managed under these FMPs. Full descriptions and maps of EFH for each species and life stage are available on the NMFS Northeast Region website at http://www.nero.noaa.gov/hcd/index2a.htm. In general, EFH for species and life stages that rely on the seafloor for shelter (e.g., from predators), reproduction, or food is vulnerable to disturbance by bottom tending gear. The most vulnerable habitat is more likely to be hard or rough bottom with attached epifauna.

6.1.4 Gear Types and Interaction with Habitat

The EA for FW 51 contains a detailed description of how gear used in the Northeast Multispecies and other fisheries interacts with habitat. This information is found in Section 6.1.6 of the FW 51 EA and is incorporated here by reference. As a general summary, groundfish vessels fish for target species with a number of gear types: trawl, gillnet, fish pots/traps, and hook and line gear (including jigs, handline, and non-automated demersal longlines) as part of the fishing activities in the Gulf of Maine. These gears have different impacts on habitat, as outlined in Section 6.1.6 of the FW 51 EA.

The report from a "Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern U.S." sponsored by the NEFMC and MAFMC (NEFSC 2002) provides additional information for various Northeast region gear types. The most recent Multispecies FMP action to include a comprehensive evaluation of gear effects on habitat was Amendment 13 (NEFMC 2003). Amendment 13 described the general effects of bottom trawls on benthic marine habitats. The Council is also evaluating the impact of fishing gear as well as comprehensively evaluating the habitat protection needs in the Gulf of Maine and greater region where groundifishing occurs in the Omnibus Habitat Amendment 2. The most recent version of the amendment can be found on the Council's website at : http://archive.nefmc.org/habitat/council_mtg_docs/Sept%202013/1.%20OA2%20DEIS%20sections%209-12-13%20version%202.pdf.

6.2 Groundfish Species

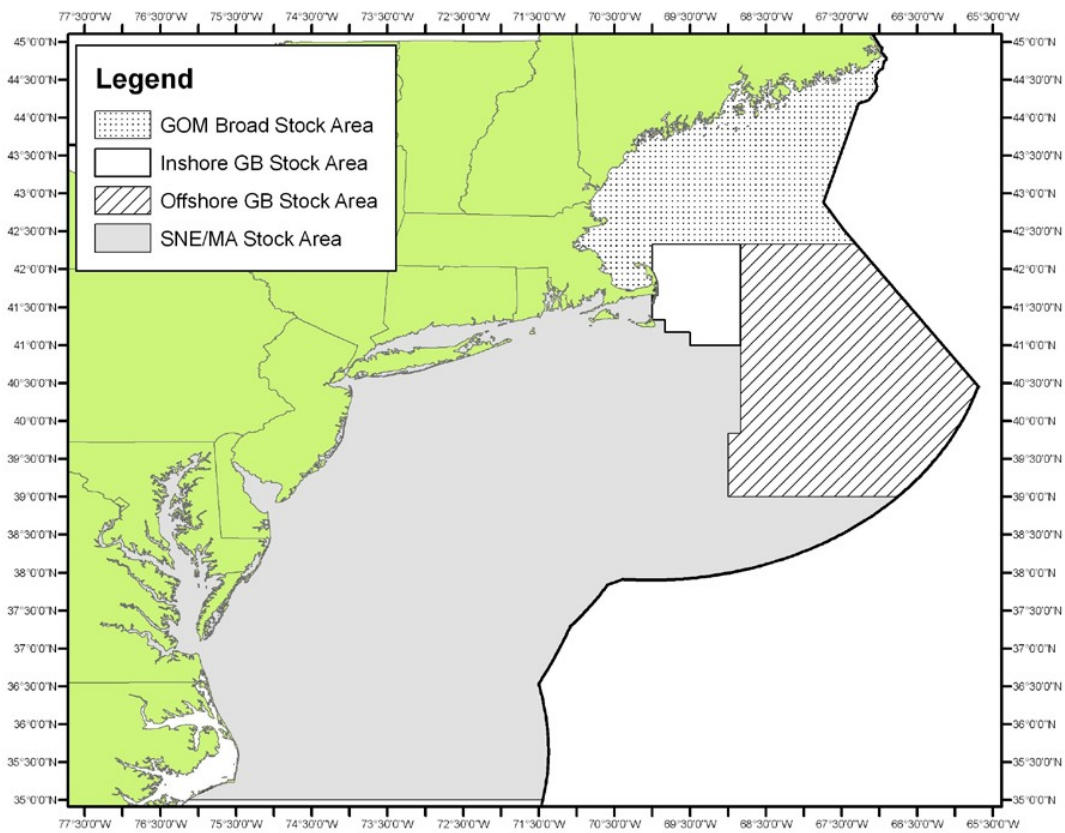
Brief descriptions of the life history and stock population status for each allocated fish stock in the Northeast Multispecies FMP is provided in Section 6.2.1 of the FW 51 EA and are not repeated here. A more detailed summary of GOM cod life history and stock status is provided, with an emphasis on spawning locations and times of year Additional information for all the target stocks can be found in the Groundfish Assessment Review Meeting (GARM) III report

(NEFSC 2008) and the EFH Source Documents, which are accessible at http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

6.3 Gulf of Maine Cod

Life History: The Atlantic cod, *Gadus morhua*, is a demersal gadoid species found on both sides of the North Atlantic. In the western North Atlantic, cod occur from Greenland to North Carolina. In U.S. waters, cod are assessed and managed as two stocks: Gulf of Maine and Georges Bank (Figure 8). Gulf of Maine (GOM) cod attain sexual maturity at a later age than Georges Bank (GB) cod due to differences in growth rates between the two stocks. The greatest concentrations of cod off the Northeast coast of the U.S. are on rough bottoms in waters between 33 and 492 ft. (10 and 150 m) and at temperatures between 32 and 50°F (0 and 10°C). Total biomass of the Gulf of Maine stock during the last ten years has been concentrated in the southwestern portion of the gulf. Juvenile cod are distributed more broadly in coastal waters whereas spawning biomass is almost exclusively limited to the southwest Gulf of Maine (Figure 9). Analysis of NEFSC trawl survey data collected since 1968 shows that Gulf of Maine cod have not experienced significant range contraction, but the stock has moved south in recent years as water temperatures have increased (Nye et al. 2009).

Figure 8 - Broad stock areas as defined in Amendment 16



In the GOM, cod are found in inshore waters as well as on shallow offshore banks and ledges. They are particularly concentrated in the southwestern portion of the gulf. Analysis of trawl

survey data from the northwest Atlantic shows that, as they age, cod inhabit increasingly deeper waters (Tremblay and Sinclair 1985; Wigley and Serchuk 1992; Anderson and Gregory 2000; Dalley and Anderson 2000).

Cod are usually found within two meters or so of the bottom (Klein-MacPhee 2002). Larger fish generally stay closer to the bottom unless feeding in the water column. They are associated with a variety of bottom types, but prefer coarser substrates (Methratta and Link 2006, Auster et al. 2001) and are associated with deep (50-100 m) boulder reef habitats (Lindholm and Auster 2003, Auster and Lindholm 2005, Lindholm et al. 2007). Video surveys and hook-and-line sampling in the GOM has suggested that cod are most abundant in complex habitats such as rocky ledge and cobble habitats (Dr. Jonathan Grabowski, pers. comm.).

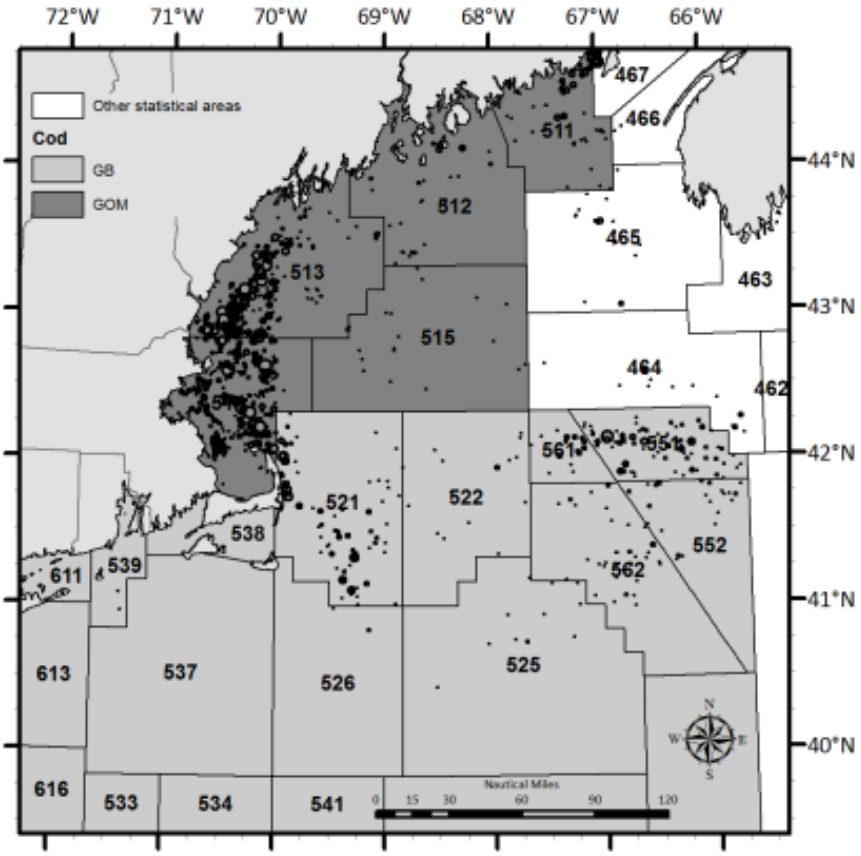
Cod exhibit seasonal migrations. Methratta and Link (2006) analyzed 1968-2002 spring and fall NEFSC trawl survey data in relation to depth and bottom temperatures and described cod as a species that remains in cool water, migrating from deeper water in the fall to shallower water in the spring. A similar pattern has been observed in the Maine/New Hampshire (ME/NH) inshore trawl survey. Specifically, data from 2000-2007 showed that juveniles (<35 cm) were more likely to be caught between 10 and 50 m in the spring and at two different depth intervals (20-30 and 50-90 m) in the fall, while adults were more likely to be caught between 80 and 110 m in the spring and 80-140 m in the fall, with a very abrupt increase in catch rates at 80 m during both seasons.

Spawning locations and seasons: Spawning occurs year-round, near the ocean bottom, with a peak in winter and spring. Peak spawning corresponds to water temperatures between 41 and 45°F (5 and 7°C). It is delayed until spring when winters are severe and peaks in winter when mild. Eggs are pelagic, buoyant, spherical, and transparent. They drift for 2 to 3 weeks before hatching. The larvae are pelagic for about three months until reaching 1.6 to 2.3 in (4 to 6 cm), at which point they descend to the seafloor. Most remain on the bottom after this descent, and there is no evidence of a subsequent diel, vertical migration. Adults tend to move in schools, usually near the bottom, but also occur in the water column.

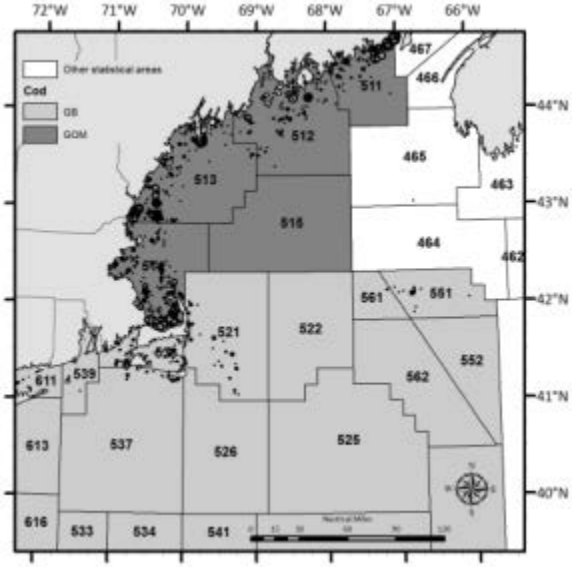
Ames (2004) examined spatial structure of cod populations along the coast of Maine (Figure 9).

Figure 9 – Atlantic cod stock boundaries and catch/tow from spring and fall NEFSC, MADMF, and ME/NH surveys, 2002-2013. Spring survey values shaded grey may obscure fall survey values shaded black.

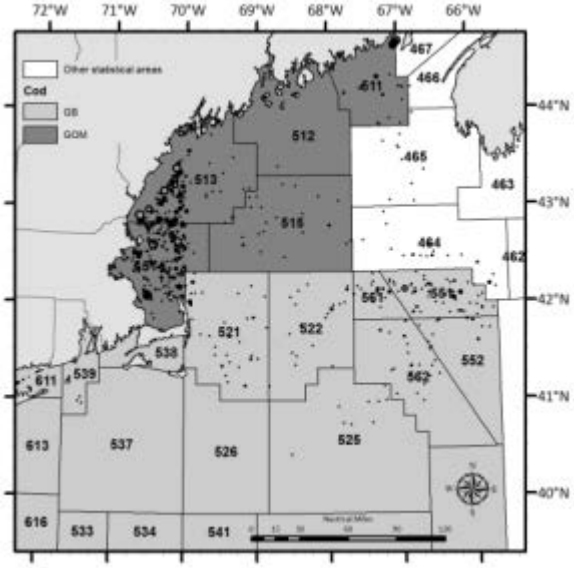
Total biomass (kg/tow)



Juvenile abundance < 35cm (#/tow)

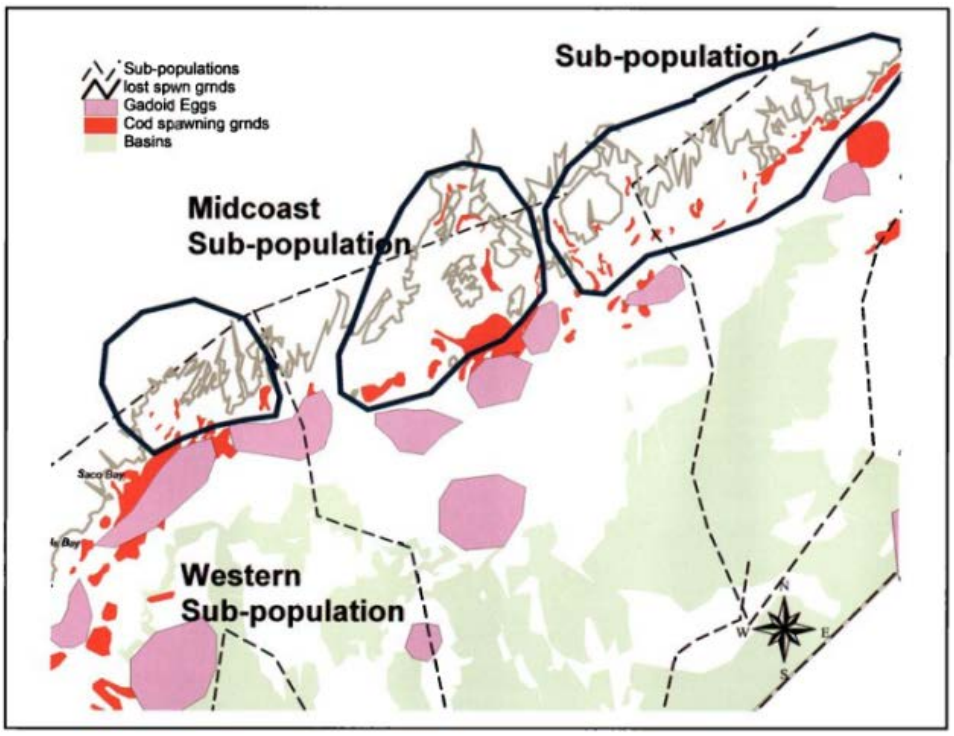


Spawning biomass > 75cm (kg/tow)



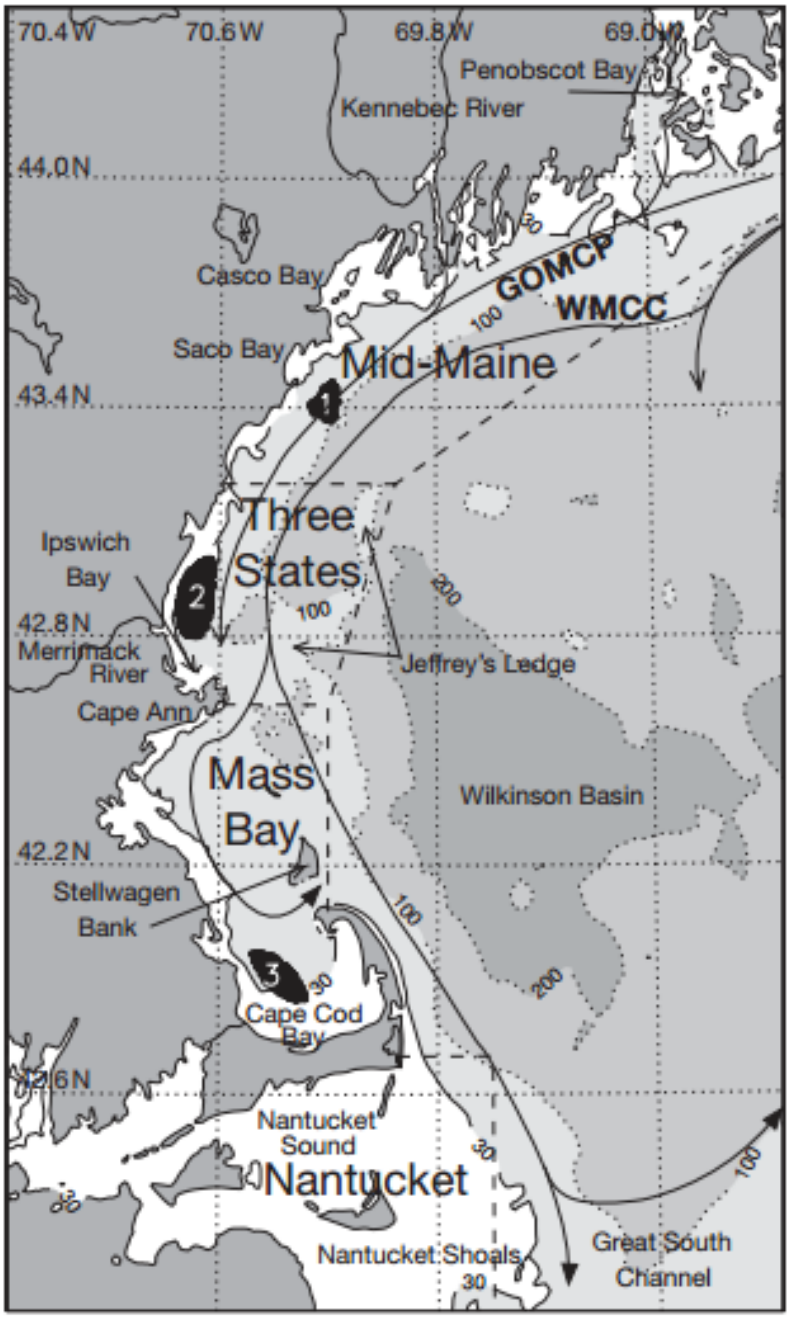
He describes a series of sub-populations (Figure 10), each composed of several finer scale spawning components that each utilize one or more still finer scale spawning grounds. Howell et al. (2008) and similar tagging studies in Massachusetts Bay also suggest fine-scale structure further west within the Gulf of Maine involving fidelity to spawning sites. Sherwood and Grabowski (2010) found local forms of cod within the Gulf of Maine as well. A synthesis of information on larval dispersal, life history, genetics and tagging provides evidence for the presence of fine-scale, sub-stock structure in the Gulf of Maine (Runge et al).

Figure 10 – Cod spawning areas. Circled areas indicate former spawning grounds that are no longer active..



Huret et al. (2007) identified a larger range of cod spawning areas at different times of the year within Ipswich Bay, Cape Cod Bay and Saco Bay. Cod spawning periods were May to July and December to January in Ipswich Bay, December to January in Cape Cod Bay and July and October for Saco Bay (Figure 10 and Figure 11).

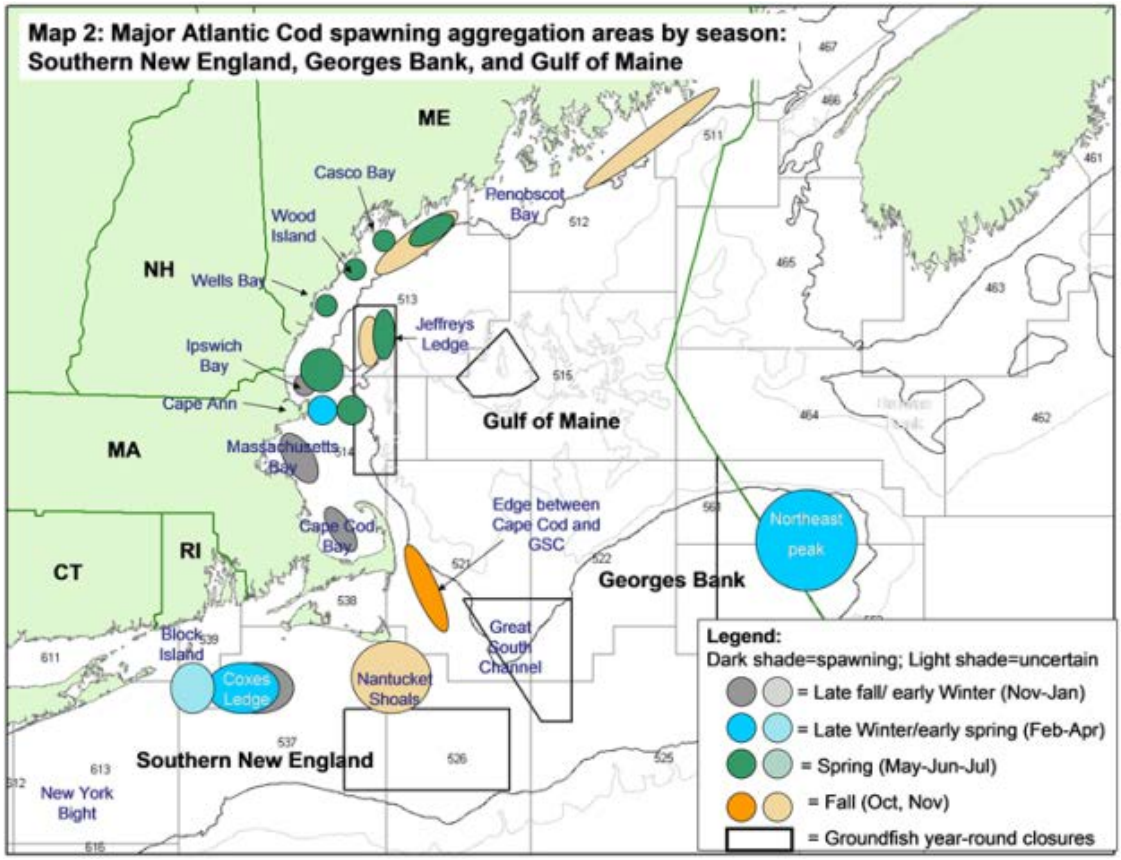
Figure 11 – Locations of three identified cod spawning grounds in the Gulf of Maine. 1 - Saco Bay. 2 - Ipswich Bay. 3 - Cape Cod Bay.



Deese (2005) reviewed observations of Atlantic cod spawning aggregations off the northeastern United States, synthesizing data from sources such as research surveys and fishermen's observations. Cod spawning aggregations were identified in the Gulf of Maine and on Georges Bank (Figure 12). In the inshore Gulf of Maine specifically, she identified fall and winter spawning in Cape Cod Bay, Massachusetts Bay and Ipswich Bay. Aggregations of cod that may be spawning occur along the western Maine coast and on Jeffreys Ledge (Deese 2005). Fall spawning also occurs in the inshore areas of Cape Cod down to Nantucket Shoals and winter

spawning is observed in the Cox Ledge area (Deese 2005). Outside of fall and winter, major aggregations of spawning cod are observed off Cape Ann from March-April and in Ipswich Bay from May-June.

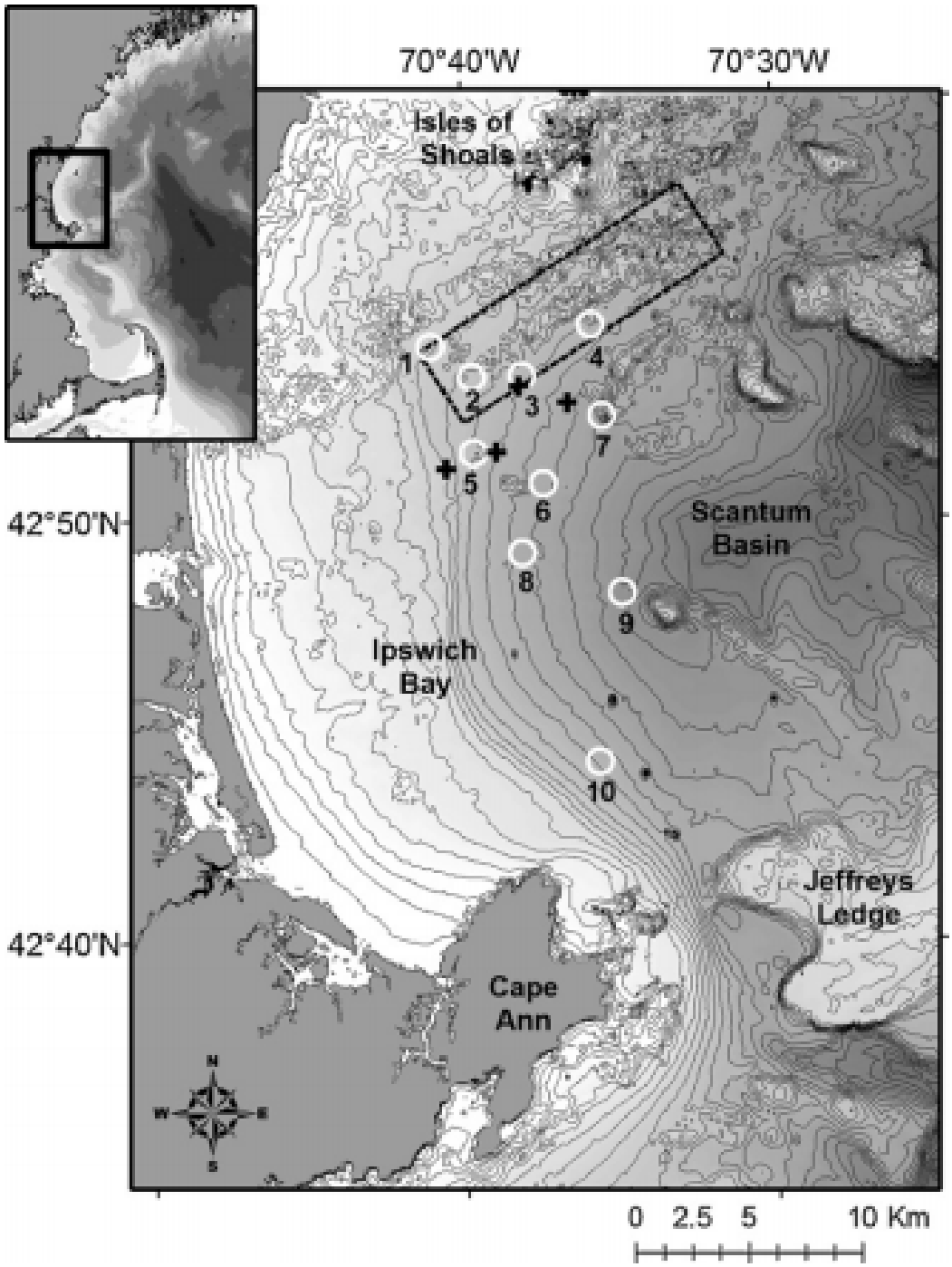
Figure 12 – Cod spawning areas in the Gulf of Maine and on Georges Bank



After analyzing the results of a mark and recapture study of cod in the western Gulf of Maine, Howell et al. (2008) concluded that there were two spawning groups in thirty minute square 133; a winter group that spawns from November to January and a spring group that spawns from April to July. They observed that the general pattern was a concentration of large cod in the area in both the spring and winter, with dispersion from that area in the ensuing months.

Siceloff and Howell (2012) identified the "Whaleback" feature (Figure 13) as a location where spawning cod aggregate, at depths > 40m, based on a tagging study in Ipswich Bay. The tagged spawning cod aggregated in small, concentrated groups around specific humps and ridges. The spawning areas were <60 km² in size with a mean size of 41 km². The analysis was instrumental in establishing the GOM Cod Spawning Protection Area in Northeast Multispecies Framework Adjustment 45.

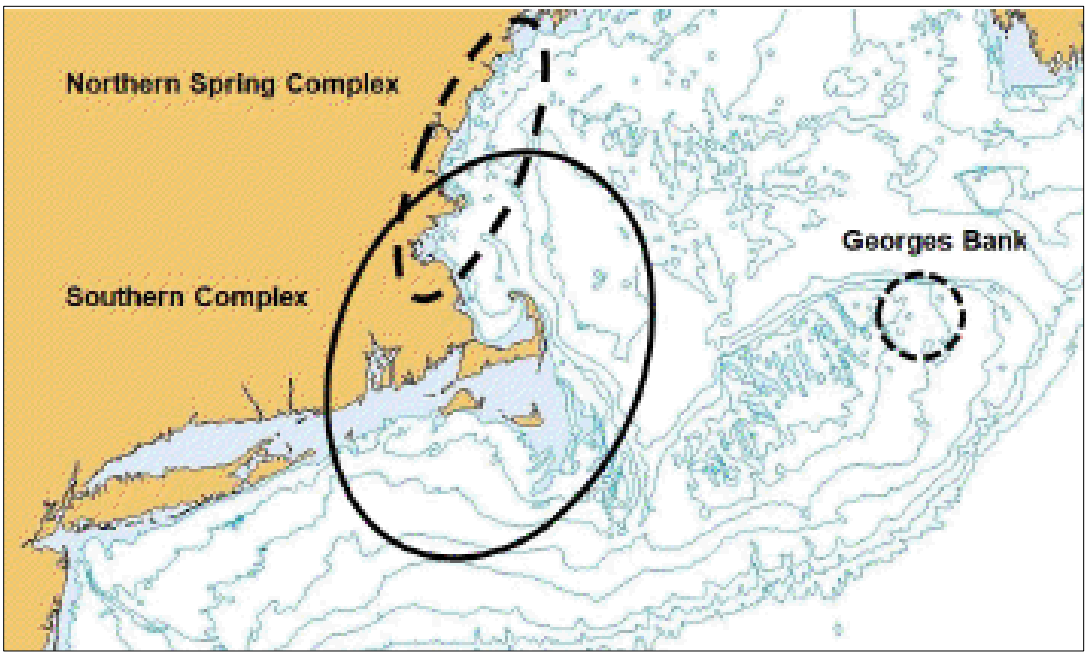
Figure 13 – Bathymetic map of Ipswich Bay. Black dotted rectangle highlights the elevated bathymetric feature "Whaleback".



Berlinsky (2009) and Morin (2000) identified two cod spawning complexes; a spring spawning complex in the northern Gulf of Maine and a spring/winter spawning complex in the western Gulf of Maine (Figure 14). Berlinsky's research was a partnership of commercial fisherman and

scientists from UNH and NYU with the purpose of investigating stock definitions for Atlantic cod using 10 microsatellite and 6 SNP markers, while Morin used a mark and recapture method.

Figure 14 – Proposed cod spawning complexes. Source: Berlinsky 2009.



Population Status: The inshore GOM stock appears to be relatively distinct from the offshore cod stocks on the banks of the Scotian Shelf and Georges Bank based on tagging studies. GOM cod spawning stock biomass has increased in the early 2000s to between 12.3-17.8 kmt; however since 2009, stock biomass has declined sharply and is currently at historic levels and is subject to a formal stock rebuilding plan. The 2014 biomass estimate, the most recent estimate available, was 3-4% percent of the biomass rebuilding target, depending on which of the two peer-review accepted models are used to estimate stock size. Currently, the GOM cod stock is overfished and overfishing is occurring.

6.4 Stock Status Trends

The most recent stock assessments for the 20 groundfish stocks can be found via the NEFSC website at http://www.nefsc.noaa.gov/saw/. The information in this section is adapted from the most recent stock assessment report for the groundfish stocks. The information in this section is adapted from the most recent stock assessment report for the groundfish stocks. Table 3 summarizes the status of the northeast groundfish stocks. Of note are GOM cod (overfished and subject to overfishing) and GOM haddock (not overfished and not subject to overfishing).

Table 3- Status of the Northeast Groundfish Stocks for fishing year 2014

Stock Status	Stock (assessment source)
Overfished and Overfishing Biomass < ½ B_{MSY} and F > F_{MSY}	GB Cod (SARC 55) GOM Cod (2014 assessment update) Cape Cod/GOM Yellowtail Flounder (assessment update 2012) Witch Flounder (assessment update 2012) Northern Windowpane (operational assessment 2012)
Overfished but not Overfishing Biomass < ½ $_{MSY}$ and F ≤ F_{MSY}	Ocean Pout (assessment update 2012) Atlantic Halibut (assessment update 2012) GOM Winter Flounder (assessment update 2014) Atlantic wolffish (assessment update 2012) SNE/MA winter flounder (SARC 52)
Not Overfished but Overfishing Biomass ≥ ½ B_{MSY} and F > F_{MSY}	No groundfish stocks currently meet this criteria
Not Overfished or Subject to Overfishing Biomass ≥ ½ B_{MSY} and F < F_{MSY}	White hake (assessment update 2011) Pollock (SARC 50) Acadian Redfish (assessment update 2012) SNE/MA yellowtail flounder (SARC 54) American Plaice (assessment update 2012) GB Haddock (assessment update 2012) GB Winter Flounder (assessment update 2012) Southern Windowpane (assessment update 2012) GOM Haddock (SARC 59)
Unknown	GB Yellowtail Flounder (2013 TRAC)—Status previously overfished and subject to overfishing GOM Winter Flounder (assessment update 2014); stock is subject to overfishing but status relative to being overfished is unknown

6.6 Areas Closed to Fishing

Select areas are closed to some level of fishing to protect the sustainability of fishery resources. Long- term closures result in the removal or reduction of fishing effort from important fishing grounds. Area closures may serve one or more purposes: As noted, they can be used to remove or reduce fishing effort, they can be used to try and minimize disruption or capture of spawning fish, or may serve to protect essential fish habitat. In some cases, closures provide all 3 functions simultaneously. Additional seasonal closures are applicable to commercial (sector and common pool) and recreational fisheries. Figure 3 shown previously in the description of the status quo/no action alternative in section 5.1 outlines the existing seasonal rolling closures for commercial fisheries. Amendment 13 to the Northeast Multispecies FMP and Amendment 10 of the Atlantic Sea Scallop FMP established year-round habitat closed areas which are off-limits to all mobile, bottom-tending gear like trawls and dredges. These closures were designed to minimize the adverse effects of fishing on EFH for species managed by the NEFMC. In many cases, these closed areas overlap portions of the groundfish mortality closures (see Figure 16). However, in other cases (Jeffreys Bank in the Gulf of Maine and the area southeast of Nantucket Island) they do not. NEFMC Omnibus EFH Amendment 2 is currently evaluating the closed habitat areas. Therefore, these areas may be changed or eliminated in the future. Framework Adjustment 48 allowed sectors to request exemptions to the closed areas. In addition, portions of four submarine canyons on the outer continental shelf are closed to all bottom trawling in order to protect vulnerable habitats for tilefish. Detailed descriptions and maps of these areas are available in Amendment 1 to the MAFMC Tilefish FMP.

Figure 17 illustrates the current GOM cod spawning protection area that is a seasonal recreational fishery closure from April 1 through June 30. This is called the cod spawning protection area and is also known as the “whaleback closure”.

There are some existing closures in state waters as well, primarily in Massachusetts Bay, that are not depicted here.

Figure 15 - Northeast Multispecies Year Round Closed Areas and U.S./Canada

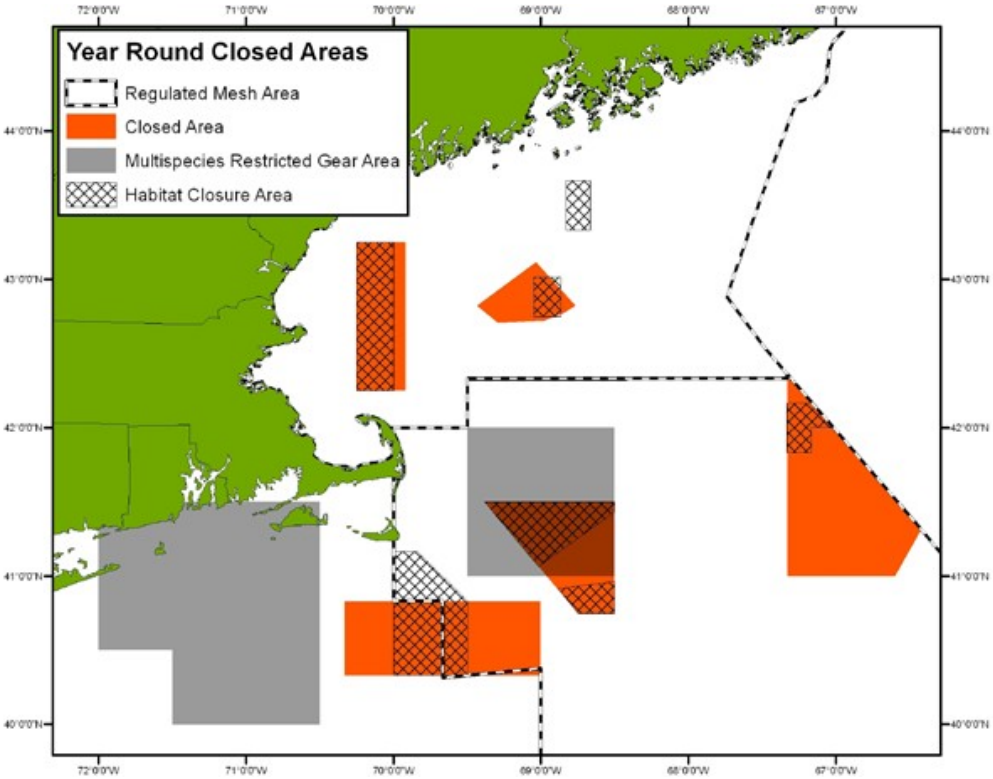


Figure 16. Existing seasonal rolling closure areas for commercial sector and common pool fishing vessels.

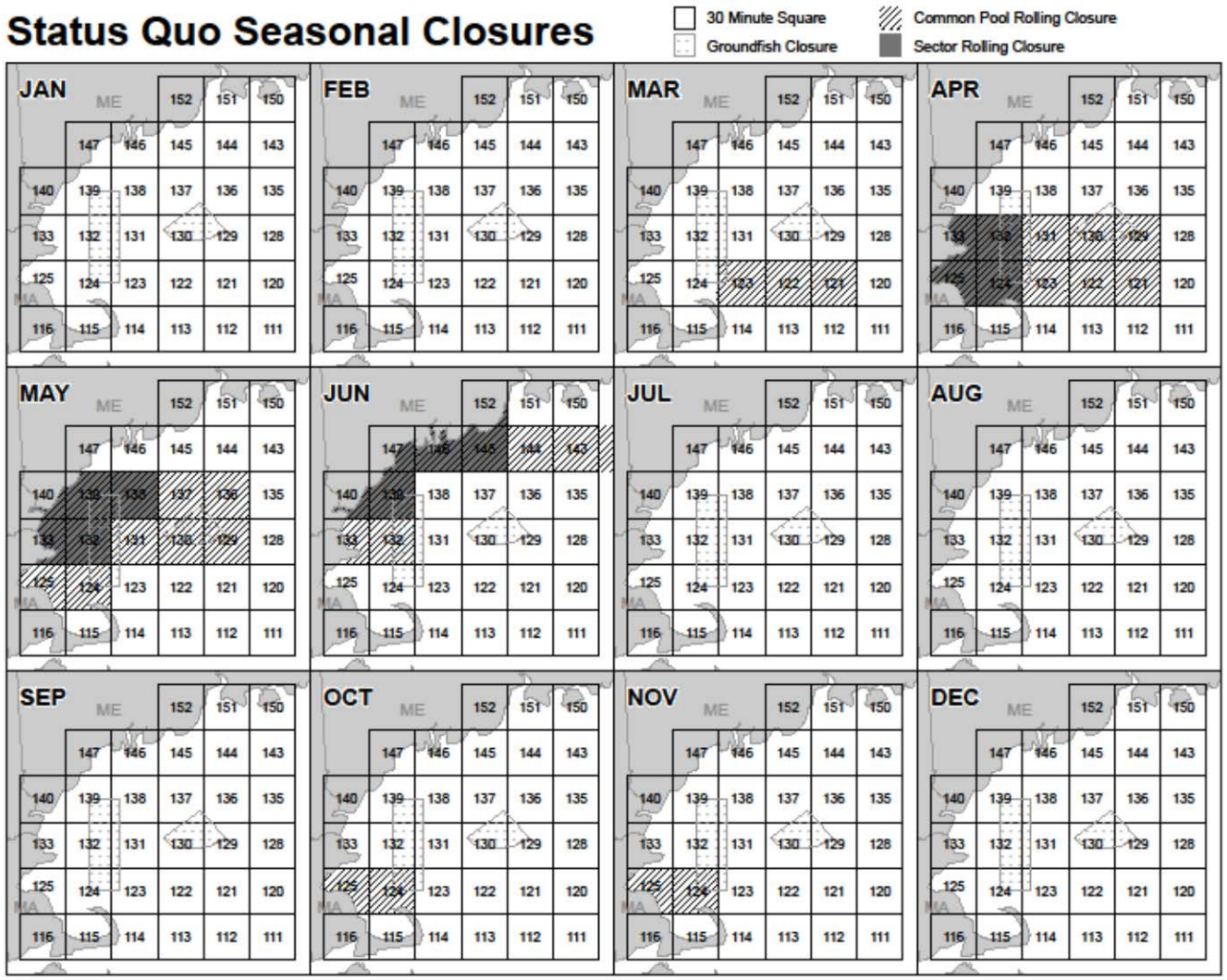
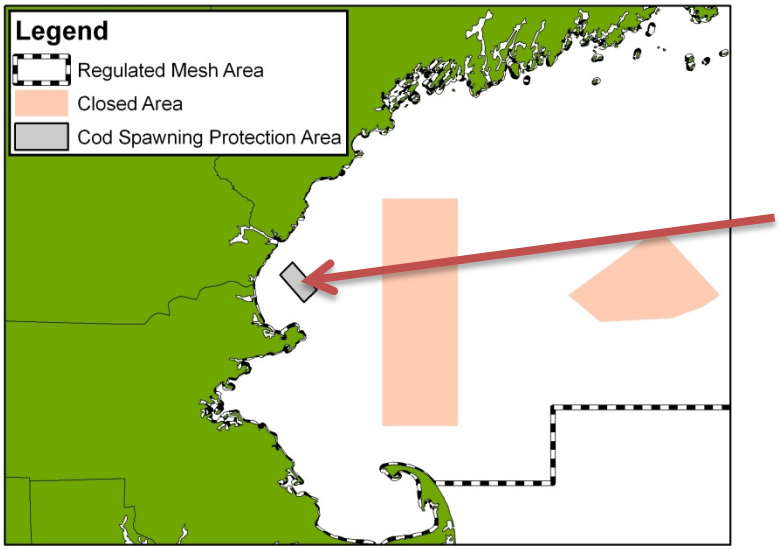


Figure 17. GOM Cod Spawning Protection Area.



Whaleback Closure Area		
Point	**N. Latitude**	**W. Longitude**
1	42° 50.95’	70° 32.22’
2	42° 47.65’	70° 35.64’
3	42° 54.91’	70° 41.88’
4	42° 58.27’	70° 38.64’

6.7 Non-Allocated Target Species and Bycatch

Non-allocated target species are species that are not part of the Northeast Multispecies FMP species complex but can target and land. Bycatch refers to fish which are harvested in a fishery, but are discarded and not sold or kept for personal use. Non-allocated target species and bycatch may include a broad range of species. FW 51 identified the primary non-allocated target species and bycatch most likely to be affected by groundfish operations as spiny dogfish, skates, American lobster, and monkfish. Groundfish fishermen may land skates, lobster, and monkfish; dogfish are largely discarded by GOM groundfish fishermen. These species are discussed in some detail here. Some other stocks such as scallops, summer flounder, and whiting are species that may generally be affected by measures designed to reduce or control catches of groundfish; however, this action is not expected to appreciably impact these stocks. With the exception of whiting, scallops and summer flounder are not widely targeted in the Gulf of Maine area. A more detailed description of these and other non-allocated target species and bycatch is provided in Section 6.3 of the Framework Adjustment 52 EA and are not repeated here.

6.7.1 Spiny Dogfish

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

is around 31 in (80 cm), but can vary from 31 to 33 in (78 cm to 85 cm) depending on the abundance of females.

Population Management and Status: The NEFMC and MAFMC jointly develop the spiny dogfish FMP for federal waters. The Atlantic States Marine Fisheries Commission (ASMFC) concurrently develops a plan for state waters. Spawning stock biomass of spiny dogfish declined rapidly in response to a directed fishery during the 1990's. NFMS initially implemented management measures for spiny dogfish in 2001. These measures have been effective in reducing landings and fishing mortality. Based upon the 2009 updated stock assessment performed by the Northeast Fisheries Science Center, the spiny dogfish stock is not presently overfished and overfishing is not occurring. NMFS declared the spiny dogfish stock rebuilt for the purposes of U.S. management in May 2010.

6.7.2 Skates

Life History: The seven species in the Northeast Region skate complex are: little skate (*Leucoraja erinacea*), winter skate (*L. ocellata*), barndoor skate (*Dipturus laevis*), thorny skate (*Amblyraja radiata*), smooth skate (*Malacoraja senta*), clearnose skate (*Raja eglanteria*), and rosette skate (*L. garmani*). The barndoor skate is the most common skate in the Gulf of Maine, on Georges Bank, and in southern New England. Georges Bank and southern New England is the center of distribution for the little and winter skates in the Northeast Region. . The thorny and smooth skates typically occur in the Gulf of Maine. The clearnose and rosette skates have a more southern distribution, and occur primarily in southern New England and the Chesapeake Bight.

Skates are not known to undertake large-scale migrations. Skates tend to move seasonally in response to changes in water temperature. Therefore, they move offshore in summer and early autumn and then return inshore during winter and spring. Skates lay eggs enclosed in a hard, leathery case commonly called a mermaid's purse. Incubation time is 6 to 12 months, with the young having the adult form at the time of hatching.

Population Management and Status: NMFS implemented the Northeast Skate Complex Fishery Management Plan (Skate FMP) in September 2003. The FMP required by both dealers and vessels to report skate landings by species (http://www.nefmc.org/skates/fmp/fmp.htm). Possession prohibitions of barndoor, thorny, and smooth skates in the Gulf of Maine were also provisions of the FMP. The FMP implemented a trip limit of 10,000 lbs (4,536 kg) for winter skate, and required fishermen to obtain a Letter of Authorization to exceed trip limits for the little skate bait fishery.

In 2010 Amendment 3 to the Skate FMP implemented a rebuilding plan for smooth skate and established an ACL and annual catch target for the skate complex, total allowable landings for the skate wing and bait fisheries, and seasonal quotas for the bait fishery. Amendment 3 also reduced possession limits, in-season possession limit triggers, and other measures to improve management of the skate fisheries. Due to insufficient information about the population dynamics of skates, there remains considerable uncertainty about the status of skate stocks. Based on NEFSC bottom trawl survey data through autumn 2011/spring 2012 one skate species was overfished (thorny) and overfishing was not occurring in any of the seven skate species.

Skate landings have generally increased since 2000. The landings and catch limits proposed by Amendment 3 have an acceptable probability of promoting biomass growth and achieving the rebuilding (biomass) targets for thorny skates. Modest reductions in landings and a stabilization of total catch below the median relative exploitation ratio should cause skate biomass and future yield to increase.

6.7.3 Monkfish

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

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

Population Management and Status: NMFS implemented the Monkfish FMP in 1999 (NEFMC and MAFMC 1998). The FMP included measures to stop overfishing and rebuild the stocks through a number of measures. These measures included:
Limiting the number of vessels with access to the fishery and allocating DAS to those vessels;
Setting trip limits for vessels fishing for monkfish; minimum fish size limits;
Gear restrictions;
Mandatory time out of the fishery during the spawning season; and
A framework adjustment process.

The Monkfish FMP defines two management areas for monkfish (northern and southern), divided roughly by an east-west line bisecting Georges Bank. Monkfish in both management regions are not overfished and overfishing is not occurring.

6.7.4 American Lobster

Life History: The American lobster, *Homarus americanus*, occurs in continental shelf waters from Maine to North Carolina. The American lobster is long-lived and known to reach more than 40 pounds in body weight (Wolff, 1978). Lobsters are encased in a hard external skeleton that is periodically cast off (molted) to allow growth and mating to take place. Eggs are carried under the female's abdomen during the 9 to 12 month incubation period. Larger lobsters produce eggs with greater energy content and thus, may produce larvae with higher survival rates (Attard and Hudon, 1987). Seasonal timing of egg extrusion and larval hatching is somewhat variable among areas and may also vary due to seasonal weather patterns. Overall, hatching tends to occur over a four month period from May – September, occurring earlier and over a longer period in the southern part of the

range. The pelagic larvae molt four times before they resemble adults and settle to the bottom. They will molt more than 20 times over a period of 5 to 8 years before they reach the minimum legal size to be harvested. Cooper and Uzmann, (1971) and Uzmann, et al., (1977) observed that tagged lobster were observed to move to relatively cool deep canyon areas in late fall and winter, and then migrate back to shallower and relatively warm water in spring and summer.

Population Management and Status: The states and NMFS cooperatively manage the American lobster resource and fishery under the framework of the ASMFC. States have jurisdiction for implementing measures in state waters, while NMFS implements complementary regulations in federal waters. Inshore landings have increased steadily since the early 1970s. Fishing effort is intense and increasing throughout much of the range of the species. The majority of the landings are reportedly harvested from state waters (within 3 miles of shore). The most recent peer-reviewed stock assessment for American lobster, published by the ASMFC in 2009, identifies the status of the three biological stock units, delineated primarily on the basis of regional differences in life history parameters, such as lobster distribution and abundance, patterns of migration, location of spawners, and the dispersal and transport of larvae. These stock units are the Gulf of Maine, Georges Bank, and Southern New England. While each area has an inshore and offshore component, Gulf of Maine and Southern New England areas support predominantly inshore fisheries and the Georges Bank supports a predominantly offshore fishery. The most recent 2009 Stock Assessment Report concluded that "(t)he American lobster fishery resource presents a mixed picture, with stable abundance for much of the Gulf of Maine stock, increasing abundance for the Georges Bank stock, and decreased abundance and recruitment yet continued high fishing mortality for the Southern New England stock (ASMFC 2009).

6.7.5 Interaction between Gear and Non-allocated Target Species and Bycatch

The majority of the proposed sectors have minimal operational history; therefore, the analysis of interactions between gear and non-allocated target species and bycatch is based in part on catch information for the Northeast Multispecies FMP common pool fishery from FY 1996 to FY 2006. It is also based on sector data from FY 2009 to FY 2011, as presented in Section 8.0.

The Final Supplemental Environmental Impact Statement to Amendment 2 to the Monkfish FMP (NEFMC and MAFMC 2003) evaluated the potential adverse effects of gears used in the directed monkfish fishery. It evaluated impacts for monkfish and other federally-managed species, as well as the effects of fishing activities regulated under other federal FMPs on monkfish. Bottom trawls and bottom gillnets and the two gears used in the monkfish fishery. Amendment 2 to the Monkfish FMP (NEFMC and MAFMC 2003) describes these gears in detail. Sectors would use these same gears in FY 2012.

Fishermen in the Northeast Region harvest skates in two very different ways. Fishermen harvest whole skates for lobster bait. They also harvest skate wings for food. Vessels tend to catch skates when targeting other species like groundfish, monkfish, and scallops. The vessels will land skate if the price is high enough. The recent NEFMC Amendment to the Skate FMP and accompanying Final Supplemental Environmental Impact Statement (NEFMC 2009b) contain detailed information about skate fisheries.

Dogfish have the potential to interact with all gear types used by the sectors. Table 4 shows that otter trawl gear caught the majority of non-allocated target species and bycatch between FY 1996 to FY 2006.

Table 4– Landings (mt) for non-allocated target species and bycatch by gear type[a]

	Trawl		Gillnet		Dredge		Other Gear		Total[b]	
Species	Landings	Discard	Landings	Discard	Landings	Discard	Landings	Discard	Landings	Discard
Monkfish	NA	16,516	NA	6,526	NA	16,136	NA	4 [c]	228,000	39,182
Skates	117,381	315,308	29,711	26,601	--	146,725	4,413	2,646 [d]	151,505	491,280
Dogfish	24,368	61,914	72,712	39,852	--	--			98,026	101,766

Notes:
NA = landings or discard data not available for individual fishery gear type for this species.
-- = None reported
a Monkfish 1996-2006, skates 1996-2006, dogfish 1996-2006
b Total landings or discards may differ slightly from the sum of the individual fishery entries due to differences in rounding.
c Shrimp Trawl
d Line and Shrimp Trawl
Source: Northeast Data Poor Stocks Working Group 2007a; Northeast Data Poor Stocks Working Group 2007b; Sosebee et al. 2008; NEFSC 2006a.

7.0 Protected Resources

7.1.1 Species Present in the Area

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

Table 5. Species Protected Under the Endangered Species Act and/or Marine Mammal Protection Act that May Occur in the Operation Area for the Northeast Multispecies Fishery

Species	Status	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (*Eubalaena glacialis*)	Endangered	Yes
Humpback whale (*Megaptera novaeangliae*)	Endangered	Yes
Fin whale (*Balaenoptera physalus*)	Endangered	Yes
Sei whale (*Balaenoptera borealis*)	Endangered	Yes
Blue whale (*Balaenoptera musculus*)	Endangered	No
Sperm whale (*Physeter macrocephalus*	Endangered	No
Minke whale (*Balaenoptera acutorostrata*)	Protected	Yes
Pilot whale (*Globicephala spp.*)[1]	Protected	Yes
Risso's dolphin (*Grampus griseus*)	Protected	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected	Yes
Short Beaked Common dolphin (*Delphinus delphis*)[2]	Protected	Yes
Spotted dolphin (*Stenella frontalis*)	Protected	No
Bottlenose dolphin (*Tursiops truncatus*)[3]	Protected	Yes
Harbor porpoise (*Phocoena phocoena*)	Protected	Yes
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle (*Chelonia mydas*)	Endangered[4]	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected	Yes
Gray seal (*Halichoerus grypus*)	Protected	Yes
Harp seal (*Phoca groenlandicus*)	Protected	Yes
Hooded seal (*Cystophora cristata*)	Protected	Yes

Notes:
[1] 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 just referred to as *Globicephala spp*.

[2] Prior to 2008, this species was called "common dolphin."

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

Dolphins.

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

In addition to those species described in Table 5, two candidate species occur in the affected environment of the multispecies fishery: cusk (*Brosme brosme*) and dusky shark (*Carcharhinus obscurus*). Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA, and also include those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. Candidate species receive no substantive or procedural protection under the ESA, and therefore, these species will not be discussed further in this document. However, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed project.

7.1.2 Species and Critical Habitat Not Likely to be Affected by the Proposed Action

Based on available information, it has been determined that this action is not likely to affect shortnose sturgeon, hawksbill sea turtles, blue whales, or sperm whales. Further, this action is not likely to adversely affect Atlantic salmon, the Northwest Atlantic DPS of loggerhead or North Atlantic right whale critical habitats. The following discusses the rationale for these determinations.

7.1.2.1 Shortnose Sturgeon

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They occupy rivers along the western Atlantic coast from St. Johns River in Florida, to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while some northern populations are amphidromous (NMFS 2010a). Given the range of the species (remaining mostly in the river systems, with some coastal migrations between rivers), and the fact that the multispecies fishery will not operate in or near the rivers where concentrations of shortnose sturgeon are most likely found, direct (e.g., interaction with gear) and indirect (e.g., prey removal, habitat modification) impacts to shortnose sturgeon are not expected. In addition, interactions with shortnose sturgeon have never been documented from the multispecies fishery (Northeast Fisheries Observer Program database). Based on this information, it is extremely unlikely that the proposed action will affect shortnose sturgeon.

7.1.2.2 Hawksbill Sea Turtle

The hawksbill turtle is uncommon in the waters of the continental U.S. Although there are accounts of hawksbills in south Florida and individuals have been sighted along the east coast as far north as Massachusetts, east coast sightings north of Florida are rare (NMFS and USFWS 1993). Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America, and prefer nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands. As the multispecies fishery will not occur in waters that are typically used by hawksbill sea turtles, direct (e.g., interaction with gear) and indirect (e.g., prey removal, habitat modification) impacts to hawksbills are not expected. Based on this information, it is extremely unlikely that the proposed action will affect hawksbill sea turtles.

7.1.2.3 Blue Whale

Blue whales do not regularly occur in waters of the U.S. EEZ, and all calving for the species occurs in low latitude waters (Waring *et al*. 2010). During the Cetacean and Turtle Assessment Program surveys of the mid- and North Atlantic areas of the outer continental shelf, no blue whales were observed (Cetacean and Turtle Assessment Program 1982). There has also been no observed fishery-related mortalities or serious injuries to blue whales to date (Waring *et al*. 2010). Based on this information, and the fact that the multispecies fishery will not overlap with blue whale occurrence or habitat, direct (e.g., interaction with gear) or indirect (e.g., prey removal, habitat modification) effects to blue whales from the proposed action are not expected.

7.1.2.4 Sperm Whale

Sperm whales regularly occur in waters of the U.S. EEZ. However, the distribution of the sperm whales in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring *et al*. 2014). The average depth over which sperm whale sightings occurred during the Cetacean and Turtle Assessment Program surveys was 1,792 meters (Cetacean and Turtle Assessment Program 1982). Female sperm whales and young males almost always inhabit open ocean, deep water habitat with bottom depths greater than 1,000 meters and at latitudes less than 40° N (Whitehead 2002). In contrast, the multispecies fishery will operate in shallower continental shelf waters, and thus, sperm whales are unlikely to occur in water depths where the multispecies fishery will operate. Based on this information, and the fact that there have been no observed fishery-related mortalities or serious injuries to sperm whales (Waring *et al*. 2014), we do not expect any direct (e.g., interaction with gear) or indirect (e.g., prey removal, habitat modification) impacts to sperm whales from the proposed action.

7.1.2.5 North Atlantic Right Whale Critical Habitat

Critical habitat for right whales has been designated in the Atlantic Ocean in Cape Cod Bay, Great South Channel, and in nearshore waters off Georgia and Florida (50 CFR 226.13). Cape Cod Bay and Great South Channel, which are located within the affected environment of the multispecies fishery, were designated as critical habitat for right whales due to their importance as spring/summer foraging grounds for the species. What makes these two areas so critical is the presence of dense concentrations of copepods. The multispecies fishery will not affect the availability of copepods for foraging right whales because copepods are very small organisms that will pass through multispecies fishing gear (e.g., bottom trawls, gillnets) rather than being captured in it. The multispecies fishery will also not affect critical habitat designated off of Georgia or Florida as it is located outside of the area where the multispecies fishery operates. Since the multispecies fishery is not likely to affect the availability of copepods, and these are the biological feature that characterized Cape Cod Bay and the Great South Channel as critical (feeding) habitat, the proposed action is not likely to adversely affect designated critical habitat for right whales and, therefore, will not be considered further in this document.

7.1.2.6 Northwest Atlantic Distinct Population Segment (DPS) of Loggerhead Sea Turtle DPS Critical Habitat

NMFS issued a final rule to designate critical habitat for the Northwest Atlantic Ocean DPS of the loggerhead sea turtle within the Atlantic Ocean and the Gulf of Mexico on July 10, 2014 (79 FR 39856). Specific areas for designation include 38 occupied marine areas within the range of

the Northwest Atlantic Ocean DPS. These areas contain one or a combination of habitat types: Nearshore reproductive habitat, winter area, breeding areas, constricted migratory corridors, and/or Sargassum habitat. Constricted migratory corridors and/or winter critical habitat has been designated from 33'30°N to 36°N; the remaining critical habitat has been designated south of 35°N. As the multispecies fisheries southern extent is 35°N, a small portion of the designated constricted migratory corridor and winter critical habitat will occur in the operational area of the fishery.

The constricted migratory corridor off North Carolina serves as a concentrated migratory pathway for loggerheads transiting to neritic foraging areas in the north, and back to winter, foraging, and/ or nesting areas in the south. The majority of loggerheads pass through this migratory corridor in the spring (April to June) and fall (September to November), but loggerheads are also present in this area from April through November and, given variations in water temperatures and individual turtle migration patterns, these time periods are variable. The primary constituent elements of winter critical habitat are: (1) Water temperatures above 10° C from November through April; (2) Continental shelf waters in proximity to the western boundary of the Gulf Stream; and (3) Water depths between 20 and 100 m. As the multispecies fishery will not modify the physical characteristics of either designated critical habitat or interfere with sea turtles continued use of these essential areas, the multispecies fishery is not expected to result in any significant impacts to sea turtle constricted migratory corridor or winter critical habitats. As all other designated critical habitat is outside of the range of the multispecies fishery, no effects to these areas will be experienced by the fishery or the proposed action. For these reasons, the Northwest Atlantic DPS of loggerhead sea turtle critical habitat will not be considered further in this document

7.1.2.7 Atlantic Salmon Critical Habitat

NMFS issued a final rule designating critical habitat for the Atlantic salmon (*Salmo salar*) Gulf of Maine Distinct Population Segment (GOM DPS) on June 19, 2009 (FR 29300). NMFS designated as critical habitat 45 specific areas occupied by Atlantic salmon at the time of listing that comprise approximately 19,571 km of perennial river, stream, and estuary habitat and 799 square km of lake habitat within the range of the GOM DPS and in which are found those physical and biological features essential to the conservation of the species. The entire occupied range of the GOM DPS in which critical habitat is designated is within the State of Maine. Specific areas within the marine environment where Atlantic salmon occur were not designated as critical habitat because the specific physical and biological features that are essential to the conservation of the species could not be identified at the time salmon were listed. Subsequently it is unlikely that the proposed action will have an adverse effect on Atlantic salmon's designated Critical Habitat and therefore, will not be considered further in this document.

7.1.3 Species Potentially Affected by the Proposed Action

The multispecies fishery may affect multiple protected species of cetacean, sea turtles, pinnipeds, and fish (see Table 1). Of primary concern is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species. To understand the potential risk of an interaction, it is necessary to consider:

1. Species occurrence in the affected area and how the fishery will overlap in time and space with this occurrence; and

2. Records of protected species interaction with particular fishing gear types.

In the following sections, the affected area for which the multi-species fishery operates will be defined as the sub-regions that comprise the fishery. The sub-regions are as follows:

- Gulf of Maine (GOM): bounded on the east by Browns Bank, on the north by the Scotian Shelf, on the west by the New England states, and on the south by Cape Cod and the northern edge of Georges Bank

- Georges Bank (GB): shallow (3 to 150 meter (m) depth), elongated (100 miles [mi] wide by 20 mi) extension of the continental shelf. It is bounded on the west by the Great South Channel, and on the north by the Gulf of Maine (defined above)..

- Southern New-England (SNE): includes the area of the continental shelf south of Cape Cod, including the Great South Channel, extending south to Hudson Canyon. The area is bounded on the west by the eastern U.S. shoreline.

- Mid-Atlantic (Mid-Atl): includes the area of the continental shelf from southern limit of the SNE (e.g., Hudson Canyon) south to Cape Hatteras, North Carolina (NC). It is bordered on the west by the U.S. eastern shoreline and to the east by the EEZ.

Please see section 6.0 (Affected Physical Environment) Figure Y, for additional details on the sub-regions comprising the fishery. Information on protected species interactions with fishery gear will be presented in Section 1.1.4.

7.1.3.1 Sea Turtles

<u>Status and Trends</u>

Table 6 includes the four ESA listed species of sea turtles occur in the affected environment of the multi-species fisheries. Three of the four species are considered hard-shelled turtles (i.e., green, loggerhead, and Kemp's ridley). Additional background information on the range-wide status of the other four species, as well as a description and life history of the species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant *et al.* 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS *et al.* 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Table 6. Sea turtle species found in the affected environment of the multispecies fishery

Species	Listed At	Status	Trends
Green	Species Level	Endangered: Breeding populations in Florida and on the Pacific coast of Mexico Threatened: Other populations	Based on nesting data for four nesting sites, green sea turtle abundance is increasing.[1]
Kemp's ridley	Species Level	Endangered	Total annual number of nest at Rancho Nuevo, Tamaulipas, Mexico, the primary stretch of nesting beach, showed gradual increases in 1990s. Since 2009, nesting has not shown a notable increase.[2]
Loggerhead	Distinct Population Segment (DPS)	Northwest Atlantic DPS: Threatened	• Nesting data from 2008-2012 shows a positive nesting trend since 2007.[3] • In-water studies show an increasing trend in abundance from 3 of the 4 in-water sites in the southeast U.S.(the other site showed no discernable trend, and a decreasing trend at 2 sites in the Mid-Atlantic.[4]
Leatherback	Species Level	Endangered	Nesting counts un many areas show an increasing trend, while the largest nesting area (Suriname and French Guiana) show a stable trend.[5]

Sources:
[1] Seminoff 2004; NMFS and USFWS 2007d.
[2] NMFS and USFWSc; NMFS *et al*. 2011;Pena *et al*. 2012.
[3] http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trends/; NMFS and USFWS 2008; Witherington *et al*. 2009; and TEWG 2009.
[4] TEWG 2009; NMFS and USFWS 2008.
[5] NMFS and USFWS 2013

Occurrence and Distribution

As the affected environment of the multispecies fishery occurs in waters north of 35°N, where sea turtles occur seasonally, a general overview of sea turtle occurrence and distribution in the continental shelf waters of the Northwest Atlantic Ocean is provided below to assist in understanding how the multispecies fisheries overlaps in time and space with the occurrence of sea turtles.

Hard-shelled sea turtles

Distribution

In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (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, loggerhead sea turtles are known to occur in the Gulf of Maine, feeding 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 2004; Morreale and Standora 2005; Blumenthal *et al.* 2006; Hawkes *et al.* 2006; McClellan and Read 2007; Mansfield *et al.* 2009; Hawkes *et al.* 2011; Griffin *et al.* 2013).

Seasonality

Hard-shelled sea turtles occur year-round in waters south of Cape Hatteras, North Carolina. 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 2004; 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 North Carolina, particularly south of Cape Hatteras, and further (Shoop and Kenney 1992; Epperly *et al.* 1995b; Hawkes *et al.* 2011; Griffin *et al.* 2013).

Leatherback sea turtles

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

7.1.3.2 Large Cetaceans

Status and Trends

Table 7 provides the species of large whales that occur in the affected environment of the multispecies fisheries. For additional information on the biology, status, and range wide

distribution of each whale species please refer to: Waring *et al*. 2014; NMFS 1991, 2005, 2010b, 2011, 2012.

Table 7. Large whale species in the affected environment of the multispecies fishery

Species	Listed Under the ESA	Protected Under the MMPA	Minimum Population Size	Population Trend	MMPA Strategic Stock[5]
North Atlantic Right Whale	Yes-Endangered	Yes	454	positive and slowly accelerating	Yes
Humpback Whale	Yes-Endangered	Yes	823	positive	Yes
Fin Whale	Yes-Endangered	Yes	2,817	unknown	Yes
Sei Whale	Yes-Endangered	Yes	236	unknown	Yes
Minke Whale	No	Yes	16,199	unknown	No

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

Source: Waring *et al*. 2014

Occurrence and Distribution

Right, humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean. In general, these species follow an annual pattern of migration between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41°N; Waring *et al*. 2014; NMFS 1991, 2005, 2010b, 2011, 2012). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Waring *et al*. 2014; 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

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

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 2001; Payne *et al.* 1990; Schilling *et al.* 1992). It is important to note, these foraging areas are consistently returned annually, and therefore, can be considered important, high use areas for whales.

As the affected area of the multi-species fishery occurs in waters north of 35°N, and whales may be present in these waters throughout the year, the multispecies fisheries and large whales are likely to co-occur in the affected area. To further assist in understanding how the multi-species fisheries overlaps in time and space with the occurrence of large whales, a general overview on species occurrence and distribution in the continental shelf waters of the affected environment of the multispecies fishery is provided in the following table (Table 8). For additional information on the biology, status, and range wide distribution of each whale species please refer to: Waring *et al*. 2014; NMFS 1991, 2005, 2010b, 2011, 2012.

Table 8. Large cetacean occurrence in the GOM, GB, SNE, and Mid-Atlantic sub-regions of the multi-species fisheries1

Species	Prevalence in Affected Area	High Use Areas and Approximate Months of Occurrence (if known)
North Atlantic Right Whale	• Distributed throughout all continental shelf waters of the Mid-Atl, GOM, GB, and SNE sub-regions throughout the year. • Regularly move through the waters off the Mid-Atlantic states, including New Jersey, New York, Rhode Island, and Southern Massachusetts (migratory corridor to/from feeding and calving grounds; primarily November through April; Mid-Atl through SNE sub-regions). • Winter through summer (approximately December/January-July 31): Distributed in greatest densities in GOM and GB sub-regions (foraging grounds); • Increasing evidence of wintering areas (approximately November – January) in GOM sub-region (e.g., Cape Cod Bay, portions of the GOM (e.g., Jeffreys and Cashes Ledges, Jordan Basin), and Massachusetts Bay (e.g., Stellwagen Bank))	• Approximately April-July: Great South Channel and Georges Bank (foraging grounds) • Approximately January through May: Cape Cod and Massachusetts Bays (foraging grounds) • Approximately March through April: waters off the eastern shore of Cape Cod (foraging grounds)
Humpback	• Distributed throughout all continental shelf waters of the Mid-Atl, GOM, GB, and SNE sub-regions throughout the year. • Regularly move through the waters off the Mid-Atlantic states, including New Jersey, New York, Rhode Island, and Southern Massachusetts throughout the year (migratory corridor to/from feeding and calving grounds;	From approximately March through November: • GOM • Massachusetts (esp. Stellwagen Bank) and Cape Cod Bays

	Mid-Atl through SNE sub-regions) • Spring through fall (approximately March through November), distributed in greatest densities in the GOM and GB sub-regions (foraging grounds) • Increasing evidence of wintering areas (for juveniles) in Mid-Atl sub-region (e.g., waters in the vicinity of Chesapeake and Delaware Bays; peak presence approximately January through March)	• Georges Bank
Fin	• Distributed throughout all continental shelf waters of the Mid-Atl, GOM, GB, and SNE sub-regions throughout the year. • Regularly move through the waters off the Mid-Atlantic states, including New Jersey, New York, Rhode Island, and Southern Massachusetts (migratory corridor to/from feeding and calving grounds; Mid-Atl through SNE sub-regions). • Spring through fall (approximately March through August): distributed in greatest densities in the GOM and GB sub-regions; lower densities are found in these sub-regions in the fall (approximately September-November). • Evidence of wintering areas in mid-shelf areas east of New Jersey, Stellwagen Bank; and eastern perimeter of George's Bank (SNE, GB, and GOM sub-regions)	From approximately March through August: • Massachusetts Bay (esp. Stellwagen Bank) • Great South Channel • Waters off Cape Cod (~40-50 meter contour) • western GOM (esp. Jeffrey's Ledge) • Eastern perimeter of Georges Bank • Mid-shelf area off the east end of Long Island.
Sei	• Uncommon in shallow, inshore waters of the Mid-Atl, SNE, GB, and GOM sub-regions; however, occasional incursions during peak prey availability and abundance. • Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks • Spring through summer, found in greatest densities in offshore waters of the GOM and GB sub-regions.	Throughout the spring and summer: • GOM • Georges Bank (esp. eastern and southwestern edge (Hydrographer Canyon) into Northeast Channel
Minke	Spring through fall found in greatest densities in the GOM and GB sub-regions	From approximately March through December (peak=July through October): • Massachusetts Bay (esp. Stellwagen Bank)

		• Cape Cod Bay • GOM

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

Sources: NMFS 1991, 2005, 2010b, 2011, 2012; Hain *et al.* 1992; Payne 1984; Hamilton and Mayo 1990; Schevill *et al*. 1986; Watkins and Schevill 1982; Payne *et al*.1990; Winn et al. 1986; Kenney et al. 1986, 1995; Khan *et al*. 2009, 2010, 2011, 2012; Brown *et al*. 2002; NOAA 2008; 50 CFR 224.105; CETAP 1982; Clapham *et al*. 1993; Swingle *et al*. 1993; Vu *et al*. 2012; Baumgartner *et al*. 2011; Cole *et al*. 2013; Risch *et al*. 2013; Waring *et al*. 2014.

7.1.3.3 Small Cetacean

Status and Trends

Table 9 provides the species of small cetaceans that occur in the affected environment of the multispecies fisheries. For additional information on the biology, status, and range wide distribution of each small cetacean species please refer to Waring *et al*. 2014.

Table 9. Small cetacean species that occur in the affected environment of the multispecies fishery

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

***Coastal Stock*)**					
Bottlenose Dolphin (*Western North Atlantic Southern Migratory Coastal Stock*)	**No**	**Yes**	**6,326**	**unknown**	**Yes[3]**

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

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

Source: Waring *et al*. 2014

Occurrence and Distribution

Small cetaceans are found throughout the waters of the Northwest Atlantic Ocean. In the affected area, they can be found throughout the year from Cape Hatteras, North Carolina (35°N), to the Canadian border (Waring *et al*. 2014). Within this range; however, there are seasonal shifts in species distribution and abundance. As the affected area of the multi-species fishery occurs in waters north of 35°N, and small cetaceans may be present in these waters throughout the year, the multispecies fisheries and small cetaceans are likely to co-occur in the affected area. To further assist in understanding how the multi-species fisheries overlaps in time and space with the occurrence of small cetaceans, a general overview of species occurrence and distribution in the continental shelf waters of the affected environment of the multispecies fishery is provided in the following table (Table 10). For additional information on the biology, status, and range wide distribution of each species please refer to Waring *et al*. 2014,

Table 10. Small cetacean occurrence in the GOM, GB, SNE, and Mid-Atlantic sub-regions of the multi-species fisheries1

Species	Prevalence and Approximate Months of Occurrence (if known)
Atlantic White Sided Dolphin	• Distributed throughout the continental shelf waters (primarily to 100 meter isobath) of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM sub-regions; however, most common in the SNE, GB, and GOM sub-regions (i.e., shelf waters from Hudson Canyon (~ 39°N) and into Georges Bank, Massachusetts Bay, and the Gulf of Maine). • Seasonal shifts in distribution: ***January-May**: low densities found from Georges Bank to Jeffreys Ledge (GB and GOM sub-regions); ***June-September**: Large densities found from Georges Bank, through the GOM (GB and GOM sub-regions); ***October-December**: intermediate densities found from southern Georges Bank to southern Gulf of Maine (GB and GOM sub-

	regions) • South of Georges Bank (SNE and Mid-Atl sub regions), low densities found year round, with waters off Virginia and North Carolina representing southern extent of species range during winter months.
Short Beaked Common Dolphin	• Regularly found throughout the continental shelf-edge-slope waters (primarily between the 100-2,000 meter isobaths) of the Mid-Atl, SNE, and GB sub-regions (esp. in Oceanographer, Hydrographer, Block, and Hudson Canyons). • Occasionally found in the Gulf of Maine (GOM sub-region). • Seasonal shift in distribution: *__January-May__: occur from Cape Hatteras, NC, to Georges Bank (Mid-Atl, SNE, and GB sub-regions) *__Mid-summer-autumn__: moves onto Georges Bank; *Peak abundance* found on Georges Bank in the autumn (GB sub-region).
Risso's Dolphin	• Common in the continental shelf edge waters of the Mid-Atl, SNE, and GB sub-regions; rare in the GOM sub-region. • From approximately March-November: distributed along continental shelf edge from Cape Hatteras, NC, to Georges Bank (Mid-Atl, SNE, and GB sub-regions). • From approximately December-February: distributed in continental shelf edge of the Mid-Atlantic (SNE and Mid-Atl. sub-regions).
Harbor Porpoise	• Distributed throughout the continental shelf waters (primarily in waters less than 150 meters) of the Mid-Atlantic (north of 35°N), SNE, GB, and GOM sub-regions. • Seasonal shifts in distribution: *__July-September__: Concentrated in the northern Gulf of Maine; low numbers can be found on Georges Bank (GOM and GB sub-regions). *__October-December__: widely dispersed in waters from New Jersey to Maine (SNE/Mid-Atl, GB, and GOM sub-regions). *__January-March__: intermediate densities in waters off New Jersey to North Carolina (SNE and Mid-Atl sub-regions); low densities found in waters off New York to Gulf of Maine (SNE, GB, and GOM sub-regions). *__April-June__: widely dispersed from New Jersey to Maine (SNE/Mid-Atl, GB, GOM sub-regions).
Bottlenose Dolphin:	**<u>Western North Atlantic Offshore Stock</u>** • Spring-Summer: Primarily distributed along the outer continental shelf/edge-slope of the Mid-Atl, SNE, and GB sub-regions • Winter: Distributed in waters south of 35°N **<u>Western North Atlantic Northern Migratory Stock</u>** • Summer (July-August): distributed from the coastal waters from the

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

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

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

7.1.3.4 Pinnipeds

Status and Trends

Table 11 provides the species of small cetaceans that occur in the affected environment of the multispecies fisheries. For additional information on the biology, status, and range wide distribution of each pinniped species please refer to Waring *et al*. 2014.

Table 11. Pinniped species that occur in the affected environment of the multispecies fishery

Species	Listed Under the ESA	Protected Under the MMPA	Minimum Population Size	Population Trend	MMPA Strategic Stock
Harbor Seal	No	Yes	55,409 (in U.S. waters)	unknown	No
Gray Seal	No	Yes	Unknown for U.S. waters; total Canadian population=331,000	positive	No
Harp Seal	No	Yes	Unknown for U.S. waters; total western North Atlantic stock=7.1 million	positive	No
Hooded Seal	No	Yes	Unknown for U.S. waters; minimum population size for the North Atlantic stock=512,000	unknown	No
Source: Waring *et al*. 2014					

Occurrence and Distribution

Pinnipeds are found in the nearshore, coastal waters of the Northwest Atlantic Ocean. In the affected area, they are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35°N) (Waring *et al*. 2007, 2014). As the affected area of the multi-species fishery occurs in waters north of 35°N, and pinnipeds may be present in these waters throughout the year, the multispecies fisheries and pinnipeds are likely to co-occur in the affected area. To further assist in understanding how the multi-species fisheries overlaps in time and space with the occurrence of pinnipeds, a general overview of species occurrence and distribution in the affected environment of the multispecies fishery is provided in the following table (Table 12). For additional information on the biology, status, and range wide distribution of each species of pinniped please refer to Waring *et al*. 2007, 2014.

Table 12. Pinniped occurrence in the GOM, GB, SNE, and Mid-Atlantic sub-regions of the multi-species fisheries

Species	Prevalence and Approximate Months of Occurrence (if known)

Harbor Seal	• Primarily distributed in nearshore waters from New Jersey to Maine (SNE/Mid-Atl, GOM sub-regions); however, increasing evidence indicates that their range is extending into waters as far south as Cape Hatteras, North Carolina (35°N) (Mid-Atl sub-region). • Seasonal distribution: *__Year Round__: Nearshore waters of Maine (GOM sub-regions). *__September-May__: Nearshore waters from New England to New Jersey (GOM and SNE/Mid-Atl sub-regions); potential for some animals to extend range into waters as far south as Cape Hatteras, NC (Mid-Atl sub-region).
Gray Seal	• Distributed in nearshore waters from New Jersey to Maine (SNE/Mid-Atl, GOM sub-regions). • Seasonal distribution: *__Year Round__: Nearshore waters from Maine to Massachusetts (SNE and GOM sub-regions). *__September-May__: Nearshore waters from Rhode Island to New Jersey (SNE/Mid-Atl sub-regions).
Harp Seal	• Winter-Spring (approximately January-May): nearshore waters from Maine to New Jersey (GOM and SNE/Mid-Atl sub regions); represents the southern extent of the harp seal's range.
Hooded Seal	• Winter-Spring (approximately January-May): nearshore waters of New England (GOM and SNE sub regions).
Sources: Waring *et al*. 2007 (for hooded seals); Waring *et al*. 2014.	

7.1.3.5 Atlantic Sturgeon

Status

Table 13lists the 5 DPSs of Atlantic sturgeon likely to occur in the affected area. For additional information on the biology, status, and range wide distribution of each distinct population segment please refer to 77 FR 5880 and 77 FR 5914 (finalized February 6, 2012), as well as the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007).

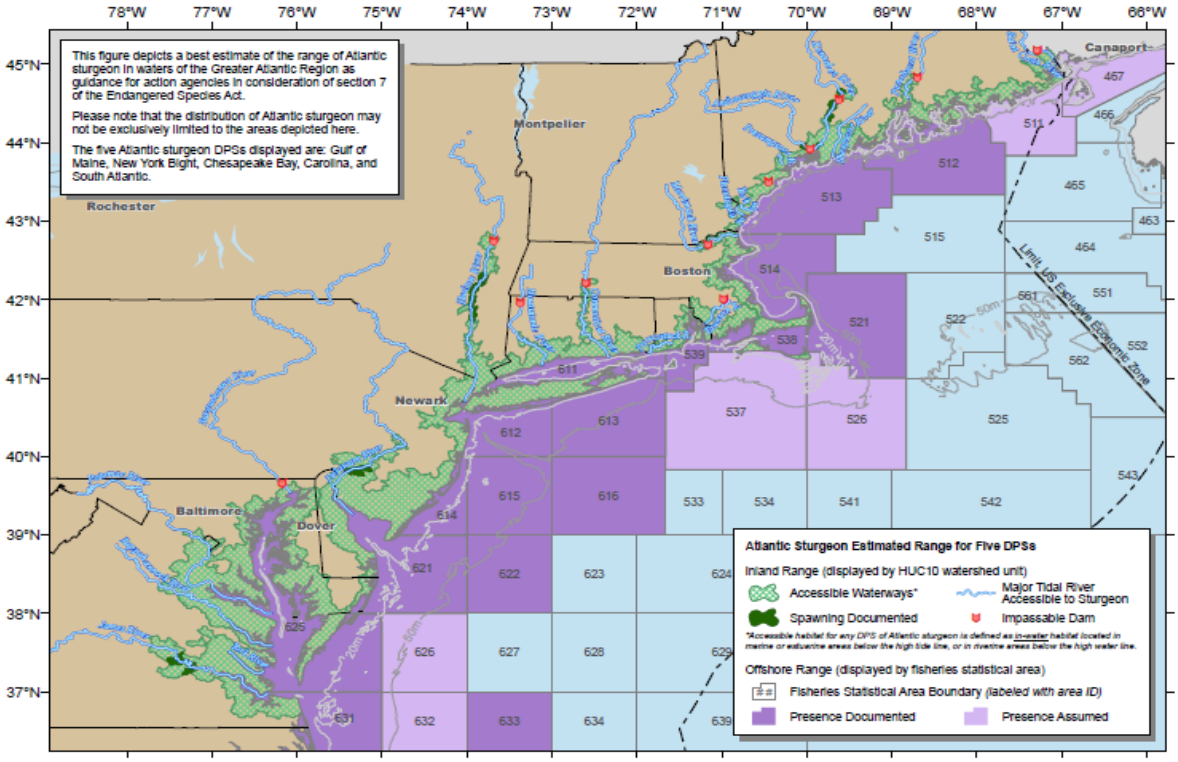
Table 13. Atlantic Sturgeon DPSs occurring in the affected environment of the multispecies fishery

Species	Listed Under the ESA
Gulf of Maine (GOM) DPS	threatened
New York Bight (NYB) DPS	endangered
Chesapeake Bay (CB) DPS	endangered
Carolina DPS	endangered
South Atlantic (SA) DPS	endangered

Occurrence and Distribution

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (See
Figure 18); 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; Erickson *et al*. 2011; Wirgin *et al*. 2012; O'Leary *et al*. 2014; Waldman *et al.* 2013).

Figure 18. Estimated Range of Atlantic Sturgeon Distinct Population Segments (DPSs)



Source: http://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/atlanticsturgeon.pdf.pdf

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 Atlantic sturgeon undertake seasonal movements along the coast. Tagging and tracking studies found that satellite-tagged adult sturgeon from the Hudson River concentrated in the southern part of the Mid-Atlantic Bight, at depths 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). A similar seasonal trend was found by Dunton *et al*. 2010; analysis of fishery-independent survey data indicated a coastwide distribution of Atlantic sturgeon during the spring and fall; a southerly (e.g., North Carolina, Virginia) distribution

during the winters; and a centrally located (e.g., Long Island to Delaware) distribution during the summer. Although studies such as Erickson *et al*. (2011) and Dunton *et al*. (2010) provide some indication that Atlantic sturgeon are undertaking seasonal movements horizontally and vertically along the U.S. eastern coastline, there is no evidence to date that all Atlantic sturgeon make these seasonal movements. For instance, during inshore surveys conducted by the Northeast Fisheries Science Center in the region of the GOM, Atlantic sturgeon have been caught in the fall, winter, and spring between the Saco and Kennebec Rivers (Dunton *et al*. 2010).

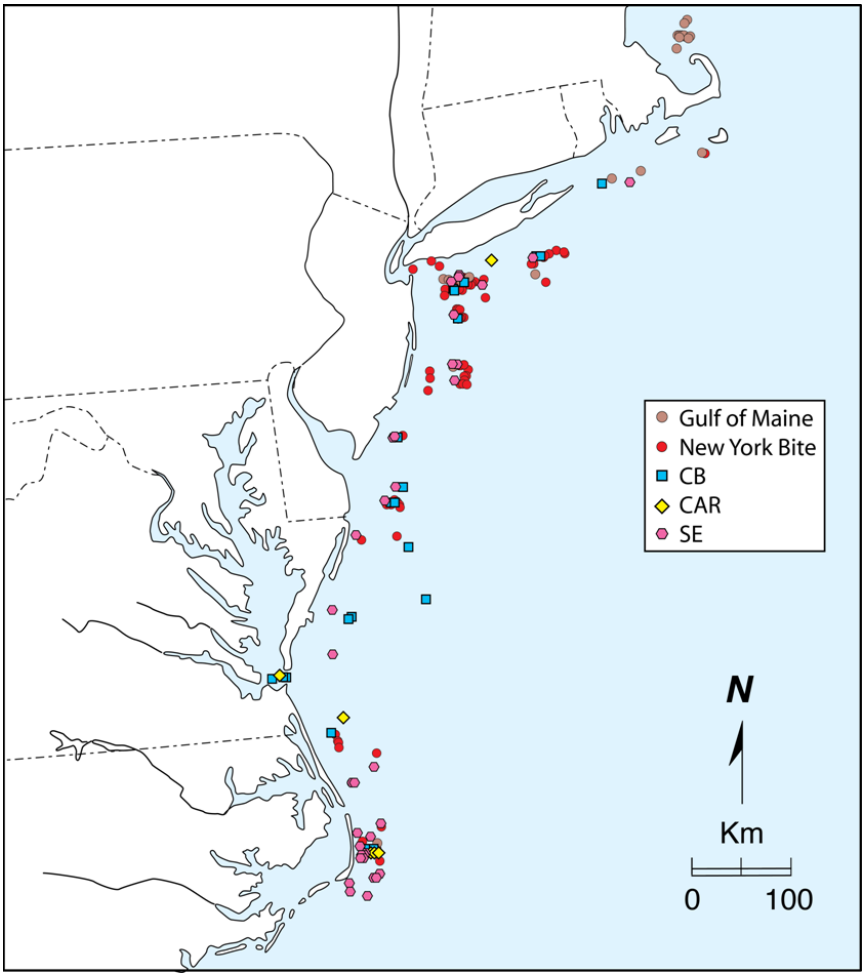
Within the marine range of Atlantic sturgeon, several marine aggregation areas have been identified adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard; depths in these areas are generally no greater than 25 meters (Stein *et al*. 2004a; Laney *et al*. 2007; Dunton *et al*. 2010; Erickson *et al*. 2011). 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). The following are the currently known marine aggregation sites located within the range of the multispecies fishery:

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

In addition, since listing of the five Atlantic sturgeon DPSs, several genetic studies have occurred to address DPS distribution and composition in marine waters. Genetic analysis has been conducted on Atlantic sturgeon captured (fishery-independent) from aggregations in Long Island Sound and the Connecticut River (summer aggregations; Waldman *et al*. 2013), as well as the New York Bight, specifically the coastal waters off the Rockaway Peninsula (spring and fall aggregations; O'Leary *et al*. 2014). Results from these studies showed that these aggregations, regardless of location, were comprised of all 5 DPSs, with the NYB DPS consistently identified as the main contributor of the mixed aggregations, followed by the GOM, CB, SA, and Carolina DPSs. In a similar assessment, genetic analysis was conducted on Atlantic sturgeon captured (fishery-dependent) during the Northeast Fisheries Observer Program and At Sea Monitoring Program, which ranges from Maine to North Carolina. Results from this assessment affirmed that in waters of the Mid-Atlantic, all 5 DPSs co-occur (

Figure 19), with the percentage of each DPS estimated to be as follows: 51% NYB DPS; 22% SA DPS; 13 % CB DPS; 11% GOM DPS; 2 % Carolina DPS; and 1 % Canadian stock (Damon-Randall et al. 2013); however, these results have not been examined relative to the amount of observed fishing effort throughout the area. In a study by Wirgin et al. 2012, genetic analysis revealed that the summer assemblage of Atlantic sturgeon in Minas Basin, Inner Bay of Fundy, Canada, was comprised not only of Canadian origin Atlantic sturgeon, but also Atlantic sturgeon from the GOM DPS (34-64% contribution to the mixed assemblage) and NYB DPS (1-2% contribution to the mixed assemblage). Although additional studies are needed to further clarify the DPS distribution and composition in non-natal estuaries and coastal locations, these studies provide some initial insight on DPS distribution and co-occurrence in particular areas along the U.S. eastern sea board.

Figure 19. Capture locations and DPS of origin assignments for Observer Program specimens (n=173)



Source: Map provided by Dr. Isaac Wirgin; Damon-Randall *et al*. 2013

Based on the above studies and available information, as the affected area of the multi-species fishery occurs in waters north of 35°N, and Atlantic sturgeon from any of the 5 DPSs may be

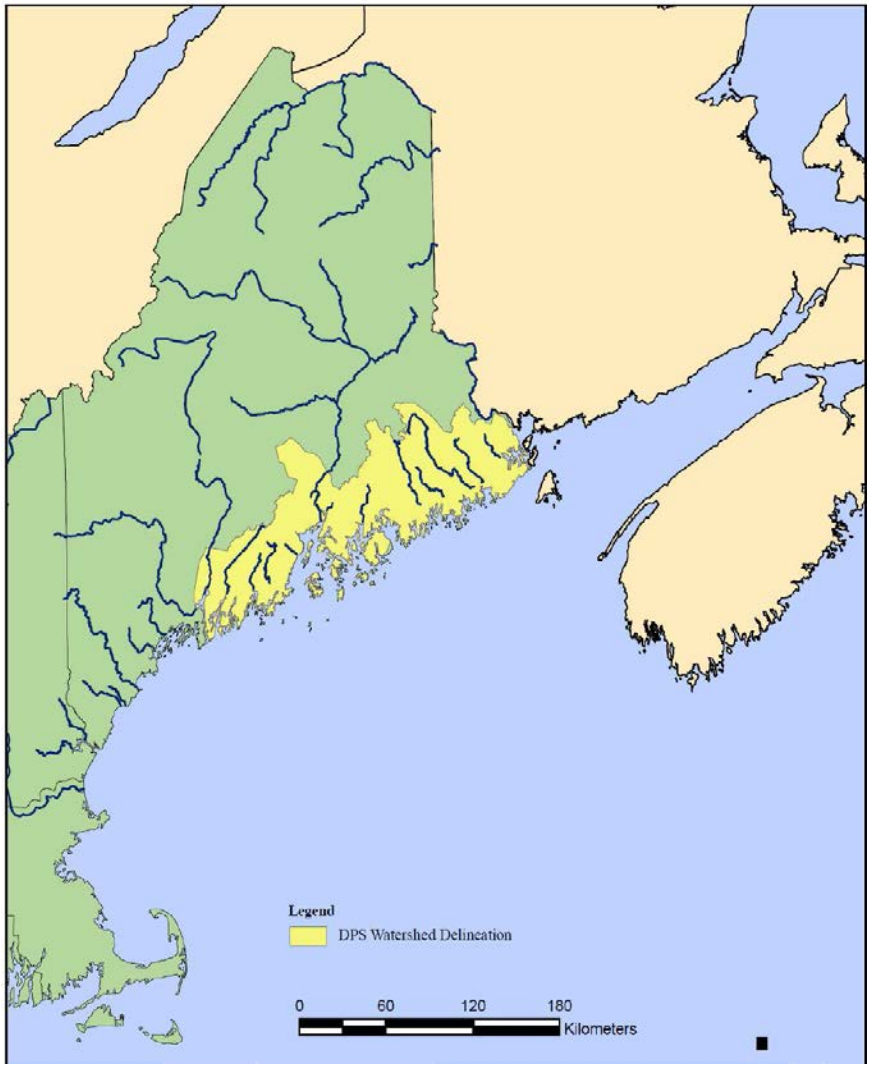
present in these waters throughout the year, the multispecies fisheries and Atlantic sturgeon of the 5 DPSs are likely to co-occur in the affected area.

7.1.3.6 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 (

Figure 20), while the marine range of the GOM DPS extends from the Gulf of Maine (primarily northern portion of the GOM), to the coast of Greenland (NMFS and USFWS 2005; Fay *et al*. 2006). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay *et al*. 2006; 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; Fay *et al*. 2006). For additional information on the on the biology, status, and range wide distribution of the GOM DPS of Atlantic salmon please refer to NMFS and USFWS 2005; Fay *et al*. 2006.

Figure 20. Geographic range of the Gulf of Maine DPS of Atlantic salmon



Source: NMFS and USFWS 2005

Based on the above information, as the multispecies fisheries operates throughout the year, and is known to operate in the GOM, it is possible that the fishery will overlap in time and space with Atlantic salmon migrating northeasterly between U.S. and Canadian waters.

7.1.4 Interactions Between Gear and Protected Resources

Protected species described in Section 1.1.3 are all known to be vulnerable to interactions with various types of fishing gear. In the following sections, available information on gear interactions with a given species (or species group) will be provided. Please note, these sections are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on those gear types that are known to pose the greatest risk to the species under consideration.

7.1.4.1 Marine Mammals

Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery.[6]The categorization in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA such as registration, observer coverage, and take reduction plan requirements. Individuals fishing in Category I or II fisheries must comply with requirements of any applicable take reduction plan.

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

- **Tier 1**- considers the cumulative fishery mortality and serious injury for a particular stock. If the total annual mortality and serious injury rates within a stock resulting from all fisheries are less than or equal to ten percent of the stock's potential biological removal rate (PBR), all fisheries associated with this stock fall into Category III.[7] -If mortality and serious injury rates are greater than ten percent of PBR, the following Tier 2, analysis occurs.

- **Tier 2** -considers fishery-specific mortality and serious injury for a particular stock. Specifically, this analysis compares fishery-specific annual mortality and serious injury rates to a stock's PBR to designate the fishery as a Category I, II, or III fishery (see Table 14).

Table 14. Descriptions of the Tier 2 Fishery Classification Categories (50 CFR 229.2)

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

Please note, in this EA, the following discussion on fishery interactions with marine mammals (large cetaceans, and small cetaceans and pinnipeds) are in reference to the Tier 2 classifications of fisheries in Table 14.

[6] The most recent LOF was issued August 25, 2014; 79 FR 50589.

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

Large Cetaceans

Atlantic large whales are at risk of becoming entangled in fishing gear because the whales feed, travel and breed in many of the same ocean areas utilized for commercial fishing. The greatest entanglement risk to large whales is posed by fixed fishing gear (e.g., sink gillnet and trap/pot gear) comprised of lines (vertical or ground) that rise into the water column. Any line can become entangled in the mouth (baleen), flippers, and/or tail of the whale when the animal is transiting or foraging through the water column (Johnson *et al*. 2005; NMFS 2014; Kenney and Hartley 2001; Hartley *et al*. 2003; Whittingham *et al*. 2005a,b; Waring *et al.* 2014). For instance, in a study of right and humpback whale entanglements, Johnson *et al*. 2005 attributed: (1) 89% of entanglement cases, where gear could be identified, to fixed gear consisting of pot and gillnets and (2) entanglement of one or more body parts of large whales (e.g., mouth and/or tail regions) to four different types of line associated with fixed gear (the buoy line, groundline, floatline, and surface system lines).[8] Although available data, such as Johnson *et al*.2005, provides insight into large whale entanglement risks with fixed fishing gear, to date, due to uncertainties surrounding the nature of the entanglement event, as well as unknown biases associated with reporting effort and the lack of information about the types and amounts of gear being used, determining which part of fixed gear creates the most entanglement risk for large whales is difficult (Johnson *et al.* 2005). As a result, any type or part of fixed gear is considered to create an entanglement risk to large whales and should be considered potentially dangerous to large whale species (Johnson *et al.* 2005).

The effects of entanglement to large whales range from no injury to death (NMFS 2014; Johnson *et al*. 2005; Angliss and Demaster 1998; Moore and Van der Hoop 2012). “When… [whales] become fouled in gear, normal breathing and movement may be impaired or stopped completely. If the animal does manage to struggle free, portions of gear may remain attached to the body. This trailing gear, often made of durable synthetic material, may create excess drag, snag onto objects in the environment and impede normal behavior like breathing, feeding, movement, or breeding. Other effects include infections and deformations" (quote from Center for Coastal Studies, May 14, 2003, in NMFS 2014; Moore and Van der Hoop 2012). Considering these factors, the risk of injury or death in the event of an entanglement may depend on the characteristics of the whale involved (species, size, age, health, etc.), the nature of the gear (e.g., whether the gear incorporates weak links designed to help a whale free itself), human intervention (e.g., the feasibility or success of disentanglement efforts), or other variables (NMFS 2014). Although the interrelationships among these factors are not fully understood, and the data needed to provide a more complete characterization of risk are not available, to date, available data does indicate that the entanglement in fishing gear is a significant source of serious injury or mortality for Atlantic large whales (Table 11; Waring *et al*. 2014).

As described in Section 1.1.3 (Species Potentially Affected), there are four species of large whales likely to occur in the affected area of the multispecies fishery: North Atlantic right whale;

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

humpback whale; fin whale; and minke whale. Table 15 summarizes all known serious injury and fatal entanglements of humpback, fin, sei, minke, and North Atlantic right whales from 1997 to 2011 (NMFS 2014; Waring *et al*. 2014). The entanglement data comes from the 2014 U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment Report and pertains only to entanglements that the National Marine Fisheries Service considers to be the primary cause of serious injury or death to a whale (Waring *et al*. 2014).[9] In addition, only entanglement data from U.S. waters is presented.

Table 15. Summary of confirmed serious injury and mortality of fin, minke, humpback, sei, and North Atlantic right whales from 1997-2011 due to fisheries entanglements

Species	Total Confirmed Serious Injury Cases from 1997-2011	Total Confirmed Mortality Cases from 1997-2011	Annual Fishing Mortality, U.S. Waters Only[1]	Potential Biological Removal (PBR)
North Atlantic Right Whale	15	9	1.6	0.9
Humpback Whale	40	20	4	2.7
Fin Whale	4	8	0.8	5.6
Sei Whale	1	0	0.07	0.5
Minke Whale	6	34	2.7	162

Notes: [1] "Annual Fishing Mortality" refers to mortality and serious injury resulting from large whale interactions with commercial fisheries.

Sources: NMFS 2014; Waring *et al*. 2014.

As many entanglement events go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, it is important to recognize that the information presented in Table 15. likely underestimates the rate of large whale serious injury and mortality due to entanglement. Further, scarring data suggests that entanglements may be occurring more frequently than the observed incidences indicate (NMFS 2014). For instance, a study conducted by Robbins (2009) analyzed entanglement scars observed in photographs taken during 2003-2006. This analysis suggests high rates of entanglements of Gulf of Maine humpback whales in fishing gear. In an analysis of the scarification of right whales, 519 of 626 (82.9%) whales examined during 1980-2009 were scarred at least once by fishing gear (Knowlton *et al*. 2012). Further research using the North Atlantic Right Whale Catalogue has indicated that, annually, between 8.6% and 33.6% of right whales have been involved in entanglements (Knowlton *et al*. 2012). Based on this information, care should be taken when interpreting entanglement data as it is likely more incidences of entanglement are occurring than observation alone indicates.

[9] NMFS defines serious injury as an "injury that is more likely than not to result in mortality" (Waring *et al.* 2014).

As noted above, pursuant to the MMPA, NMFS publishes a LOF annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injurious and mortalities of marine mammals in each fishery. Large whales, in particular, humpback, fin, minke, and North Atlantic right whales, are known to interact with Category I and II fisheries in the (Northwest) Atlantic Ocean. As humpback, fin, and North Atlantic right whales are listed as endangered under the ESA, these species are considered strategic stocks under the MMPA (see Section 7.1.3 Species Potentially Affected). Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan (TRP) for any strategic marine mammal stock that interacts with Category I or II fisheries. In response to its obligations under the MMPA, in 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to develop a plan (Atlantic Large Whale Take Reduction Plan (ALWTRP or Plan)) to reduce serious injury to, or mortality of large whales, specifically, humpback, fin, and North Atlantic right whales, due to incidental entanglement in U.S. commercial fishing gear.[10] In 1997, the ALWTRP was implemented; however, since 1997, the Plan has been modified as NMFS and the ALWTRT learn more about why whales become entangled and how fishing practices might be modified to reduce the risk of entanglement. In fact, two recent adjustments include the "Sinking Groundline Rule," that became effective in April 2009 (September 2, 2008; 73 FR 51228), and the "Vertical Line Rule," that became effective August 26, 2014 (June 27, 2014; 79 FR 36586).[11]

Broadly speaking, the Plan consists of regulatory (e.g., universal gear requirements, modifications, and requirements; area-and season- specific gear modification requirements and restrictions; time/area closures) and non-regulatory measures (e.g., gear research and development, disentanglement, education and outreach) that, in combination, seek to assist in the recovery of North Atlantic right, humpback, and fin whales by addressing and mitigating the risk of entanglement in gear employed by commercial fisheries, specifically trap/pot and gillnet fisheries (http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/; 73 FR 51228; 79 FR 36586). Specifically, the Plan identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in the Northeast, Mid-Atlantic, and Southeast regions of the U.S.; these fisheries must comply with all regulations of the Plan.[12]
The following table (Table 16) provides a brief summary of the specified gear modification requirements and restrictions under the ALWTRP for trap/pot or gillnet fisheries in the Northeast or Mid-Atlantic region of the U.S. As the affected environment of the proposed action will not

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

[11] The most recent rule (Vertical Line Rule) focused on trap/pot vertical line reduction as the ALWTRT determined that gillnets represent less than 1% of the total vertical lines on the east coast and that the impacts from this gear on large whales is minimal (see Appendix 3A, NMFS 2014); however, even with the new Rule, gear will still be subject to existing restrictions under the ALWTRP for gillnet gear.

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

extend into the Southeast region, those provisions of the Plan will not be discussed further. For further details on the gear modification requirements and restrictions under the ALWTRP please see: http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/

Table 16. Summary of gear modification requirements and restrictions for the Northeast and Mid-Atlantic Trap/Pot and Gillnet Fisheries under the Atlantic Large Whale Take Reduction Plan

Fishery	Gear Modification Requirement and Restrictions
Trap/Pot	**Northeast and Mid-Atlantic** • Trap/Pot Universal Requirements • Trap/Pot Weak Link Requirements • Trap/Pot Gear Marking Requirements **Northeast** • Minimum Number of Traps per Trawl Requirement • Minimum Number of Traps per Trawl Requirement Exemption (NH state waters; ¼ mile within Mohegan Island; Matinicus Island; and Ragged Island, Maine).
Gillnet	**Northeast and Mid-Atlantic** • Gillnet Universal Requirements • Gillnet Gear Marking Requirements • Gillnet Weak Link Requirements • Anchored Gillnet Anchoring Requirements • Drift Gillnet Night Fishing & Storage Restrictions

Except for the universal gear requirements, the additional gear modification requirements and restrictions identified in Table 16 will vary by location (i.e., management areas) and dates. The following table (Table 17) and figures (Figure 21 and Figure 22**Error! Reference source not found.**) provide the Management Areas recognized by the ALWTRP in the Northeast and Mid-Atlantic; for details on the specific gear modification requirements and restrictions in each Management Area please see http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/

Table 17. Northeast and Mid-Atlantic Gillnet or Trap/Pot Management Areas under the Atlantic Large Whale Take Reduction Plan

Fishery	Management Areas
Northeast Trap/Pot	• Northern Inshore State Trap/Pot Waters • Massachusetts Restricted Area • Stellwagen Bank/Jeffreys Ledge Restricted Area • Great South Channel Restricted Trap/Pot Area • Northern Nearshore Trap/Pot Waters • Southern Nearshore Trap/Pot Waters (Northeast) • Offshore Trap/Pot Waters (Northeast)

Northeast Gillnet	• Cape Cod Bay Restricted Area • Stellwagen Bank/Jeffreys Ledge Restricted Area • Great South Channel Restricted Gillnet Area • Other Northeast Gillnet Waters (Northeast)
Mid-Atlantic Trap/Pot	• Southern Nearshore Trap/Pot Waters • Offshore Trap/Pot Waters (Mid-Atlantic)
Mid-Atlantic Gillnet	• Other Northeast Gillnet Waters (Mid-Atlantic) • Mid/South Atlantic Gillnet Waters

Figure 21. Summary of Trap/Pot Management Area under the Atlantic Large Whale Take Reduction Plan

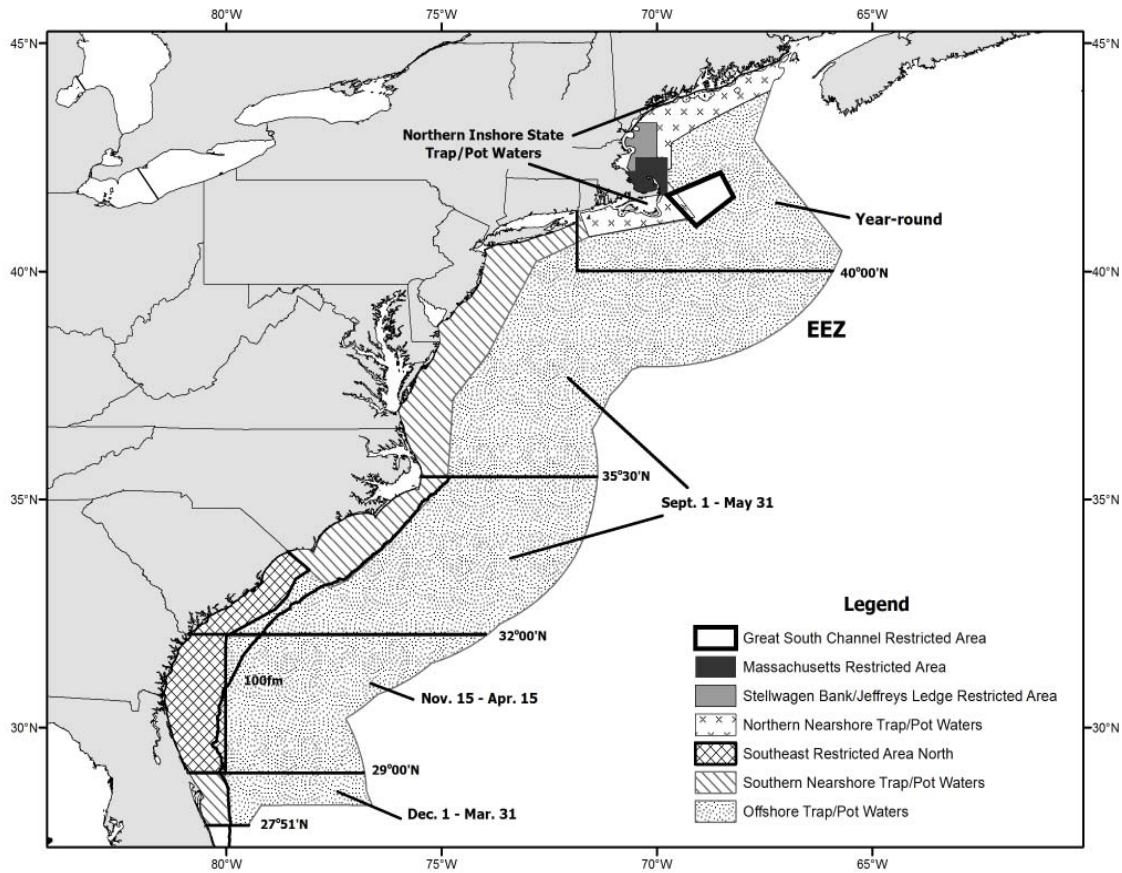
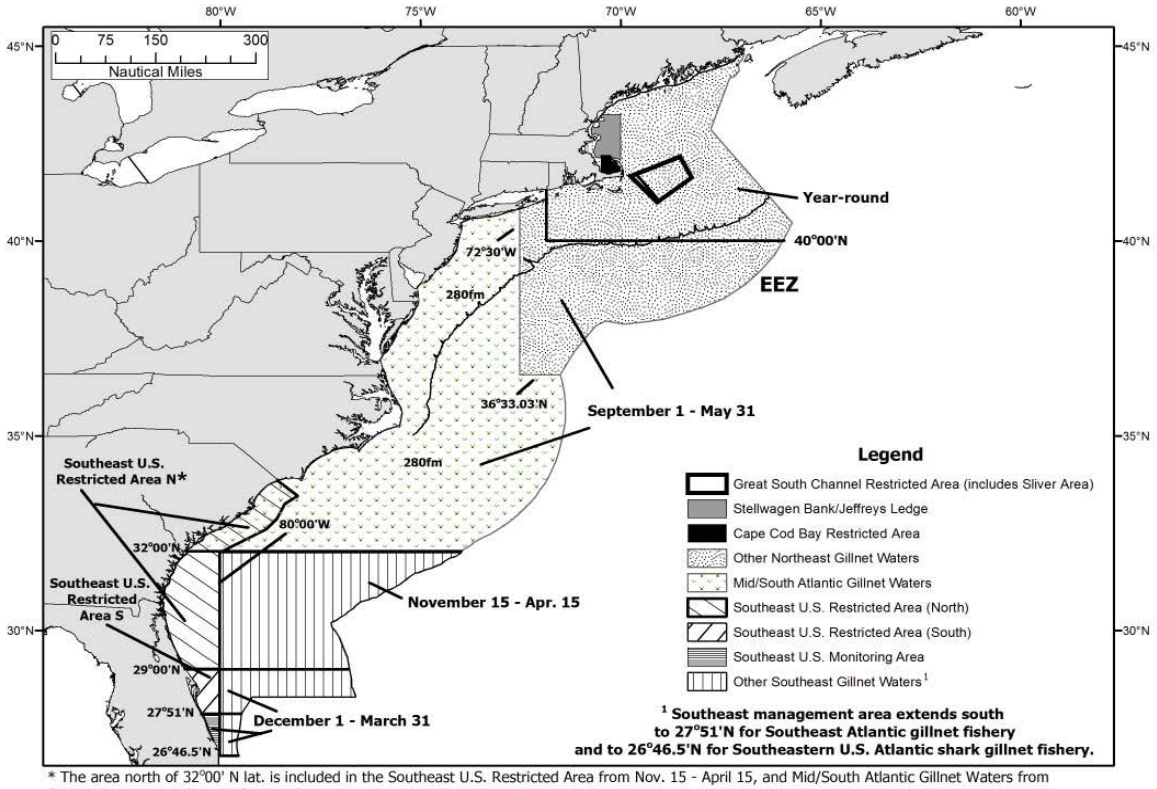


Figure 22 Summary of Gillnet Management Areas under the Atlantic Large Whale Take Reduction Plan



* The area north of 32°00' N lat. is included in the Southeast U.S. Restricted Area from Nov. 15 - April 15, and Mid/South Atlantic Gillnet Waters from Sept. 1 - Nov. 14 and April 16 - May 31.

Small Cetaceans and Pinnipeds

Small cetaceans and pinnipeds are found throughout the waters of the Northwest Atlantic. As they feed, travel and breed in many of the same ocean areas utilized for commercial fishing, they are at risk of becoming entangled or bycaught in various types of fishing gear (see Table 18) provides information on the Category I and II fisheries that occur in the affected environment of the multispecies fishery, and the small cetacean and pinniped species that have been observed incidentally injured and/or killed by these fisheries. Information is also provided on the most recent mean annual mortality estimates for those species observed incidentally injured/killed in the fishery from 2007-2011.[13] Please note, Table 18 does not provide a comprehensive list of all species affected by each fishery, it only addresses those species that occur in the affected environment of the multispecies fishery (see Section 1.1.3). For a comprehensive list of species affected by each category of fishery, please see the recently issued LOF.

[13] For additional information on those species observed incidentally injured or killed in a particular fishery prior to 2007, please refer to Waring *et al*. 2014.

Table 18. Small cetacean and pinniped species observed seriously injured and/or killed by Category I, II, and III fisheries in the affected environment of the multispecies fishery. A (1) indicates those species driving the fisheries classification.

Category I			
Fishery	**Species Observed Injured/Killed**	**Observed in 2007-2011**	**Mean Annual Mortality[1]**
Northeast Sink Gillnet	Bottlenose dolphin (offshore)	N	N/A
	Harbor porpoise (1)	Y	462
	Atlantic white sided dolphin	Y	33
	Short-beaked common dolphin	Y	41
	Pilot whale	Y	1
	Harbor seal	Y	346
	Gray seal	Y	1,043
	Harp seal	Y	208
Mid-Atlantic Gillnet	Bottlenose dolphin (Northern Migratory coastal) (1)	N	N/A
	Bottlenose dolphin (Southern Migratory coastal) (1)	N	N/A
	Bottlenose dolphin (offshore)	N	N/A
	Long-finned pilot whale	N	N/A
	Short-finned pilot whale	N	N/A
	White-sided dolphin	N	N/A
	Harbor porpoise	Y	198
	Short-beaked common dolphin	Y	12
	Risso's dolphin	Y	6.8
	Harbor seal	Y	49
	Harp seal	Y	63
	Gray seal	Y	57
Pelagic Longline	Long-finned pilot whale (1)	N	N/A
	Risso's dolphin	Y	10
	Short-finned pilot whale (1)	Y	119
	Short-beaked common	Y	1.7

	dolphin		
	Bottlenose dolphin (offshore)	Y	1.7
Northeast/Mid-Atlantic American Lobster Trap/Pot	Harbor seal	N	N/A
Category II			
Mid-Atlantic Mid-Water Trawl-Including Pair Trawl	Bottlenose dolphin (offshore)	N	N/A
	Risso's dolphin	Y	0.2
	White-sided dolphin (1)	Y	6
	Short-beaked common dolphin	Y	0.6
	Long and short-finned pilot whales	Y	2.4
	Gray seal	Y	0.2
	Harbor seal	Y	0.2
Northeast Mid-Water Trawl-Including Pair Trawl	White-sided dolphin	N	N/A
	Short-beaked common dolphin	N	N/A
	Long and short-finned pilot whales (1)	Y	4
	Harbor seal	Y	0.7
Northeast Bottom Trawl	Harp seal	Y	0.4
	Harbor seal	Y	0.8
	Gray seal	Y	9.2
	Long and short-finned pilot whales	Y	10
	Short-beaked common dolphin	Y	19
	White-sided dolphin (1)	Y	73
	Harbor porpoise	Y	4.5
	Bottlenose dolphin (offshore)	Y	20
	Risso's dolphin	Y	2.5
Mid-Atlantic Bottom Trawl	White-sided dolphin	Y	4
	Long and short-finned pilot whales (1)	Y	26
	Short-beaked common dolphin (1)	Y	96
	Risso's dolphin (1)	Y	42
	Bottlenose dolphin (offshore)	Y	20
	Harbor seal	Y	0.2

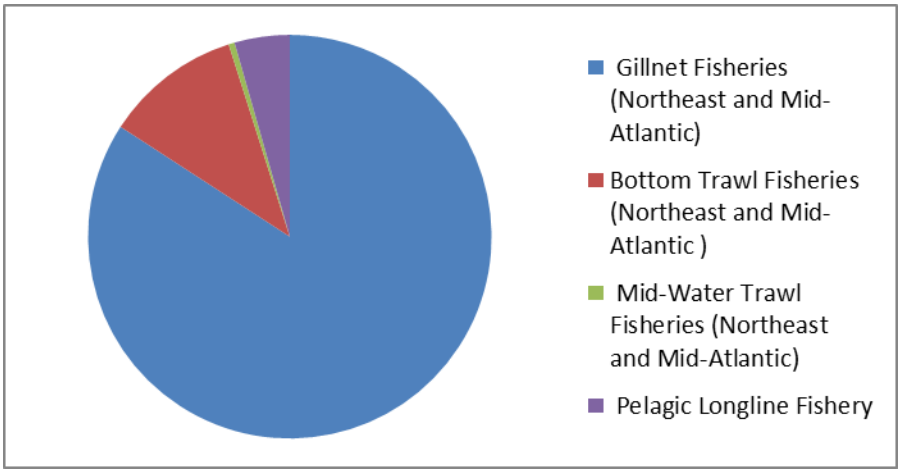
Northeast Anchored Float Gillnet	Harbor seal	N	N/A
	White-sided dolphin	N	N/A
Atlantic Blue Crab Trap/Pot	Bottlenose dolphin (Northern Migratory coastal) (1)	N	N/A
	Bottlenose dolphin (Southern Migratory coastal) (1)	N	N/A
Mid-Atlantic Haul/Beach Seine	Bottlenose dolphin (Northern Migratory coastal) (1)	N	N/A
	Bottlenose dolphin (Southern Migratory coastal) (1)	N	N/A

Notes:
[1] Based on observer data from 2007-2011, estimates of serious injury and estimates of mortality are provided for every year of observation in Waring *et al*. 2014. Estimated "combined mortality" per year of observation is also provided in Waring *et. al* 2014; this is equal to the "estimated serious injury" + "estimated mortality" for every year observed. The "mean annual mortality" is the average of each "estimated combined mortality" value over the 5 year period of observation (Waring *et al.* 2014).

Sources: Waring *et al*. 2014; August 25, 2014, List of Fisheries (79 FR 50589).

Based on the information provided in Table 18 it is apparent that there are multiple Category I and II fisheries in the affected environment of the multispecies fishery that result in the serious injury and morality of small cetaceans and pinnipeds. Of these fisheries; however, the Northeast and Mid-Atlantic gillnet fisheries, followed by the bottom trawl fisheries (Category I and II fisheries, respectively) pose the greatest risks of serious injury and mortality to small cetaceans and pinnipeds. Based on the available observer data from 2007-2011 (see Figure 23), approximately 84% of the total mean annual mortality to marine mammals (small cetaceans + seals, large whales excluded) is attributed to gillnet fisheries, followed by bottom trawl (10.94%), pelagic longline (4.42%) and mid-water trawl (0.48%) fisheries.

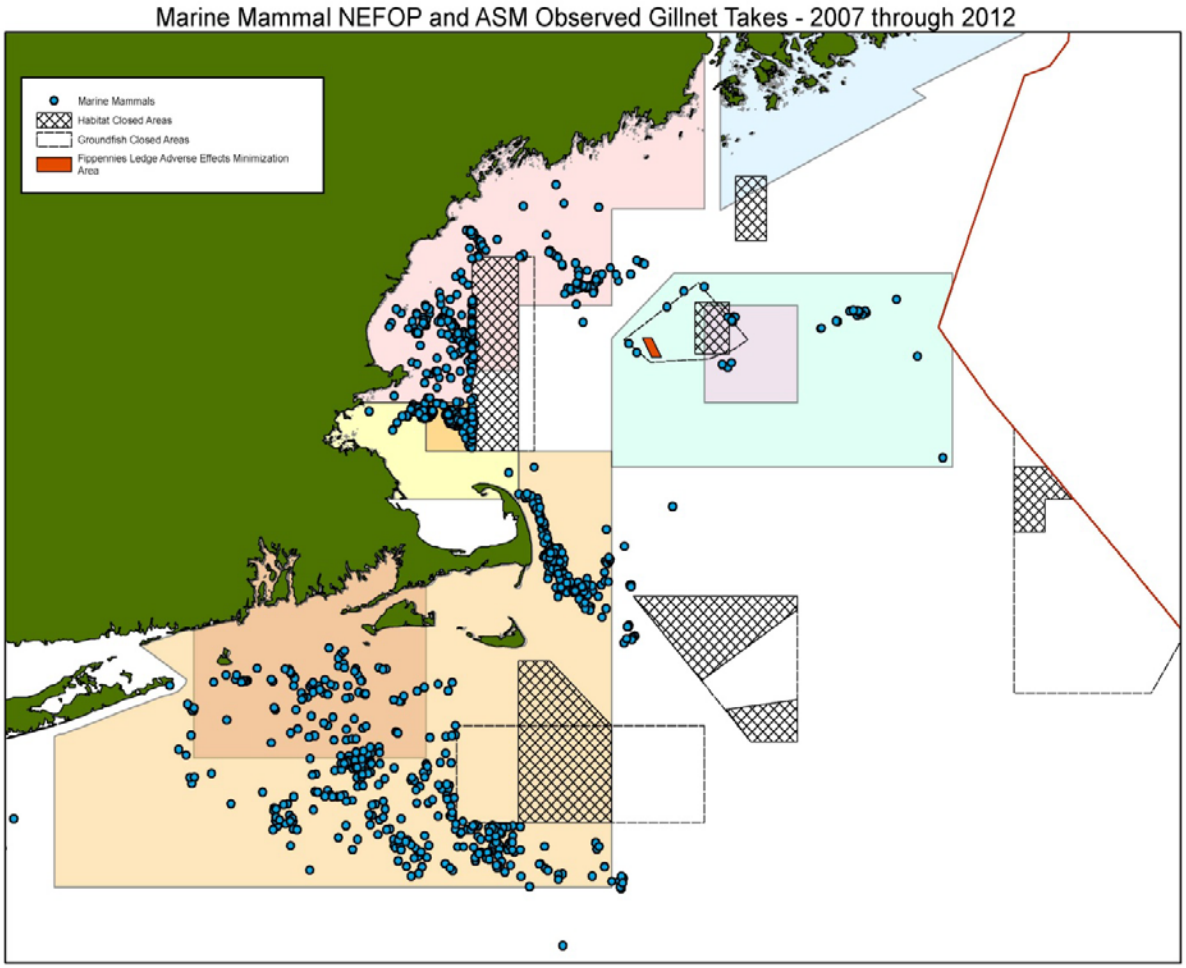
Figure 23. 2007-2011 total mean annual mortality of small cetaceans and pinnipeds by Category I and II Fisheries.



Although there are multiple Category I and II fisheries that result in the serious injury and morality of small cetaceans and pinnipeds, the risk of an interaction with a specific fishery is affected by multiple factors, including where and when fishing effort is focused, the type of gear being used, and how effort overlaps in time and space with specific species in the affected area. For instance, the following figures (Figure 7 and 8) depict observed marine mammal takes (large whales excluded) in gillnet and trawl gear in the GOM, GB, and SNE sub-regions of the multispecies fisheries from 2007-2011.[14] As depicted in Figure 24 and Figure 25, over the last 5 years, there appears to be particular areas of the GOM, GB, and SNE sub-regions where fishing effort is overlapping in time and space with small cetacean or pinniped occurrence. Although uncertainties, such as shifting fishing effort patterns and data on true density (or even presence/absence) for some species, remain, the available observer data, as depicted in Figure 24 and Figure 25 does provide some insight into areas in the ocean where the likelihood of interacting with a particular species is high and therefore, provides a means to consider potential impacts of future shifts or changes in fishing effort on small cetaceans and pinnipeds.

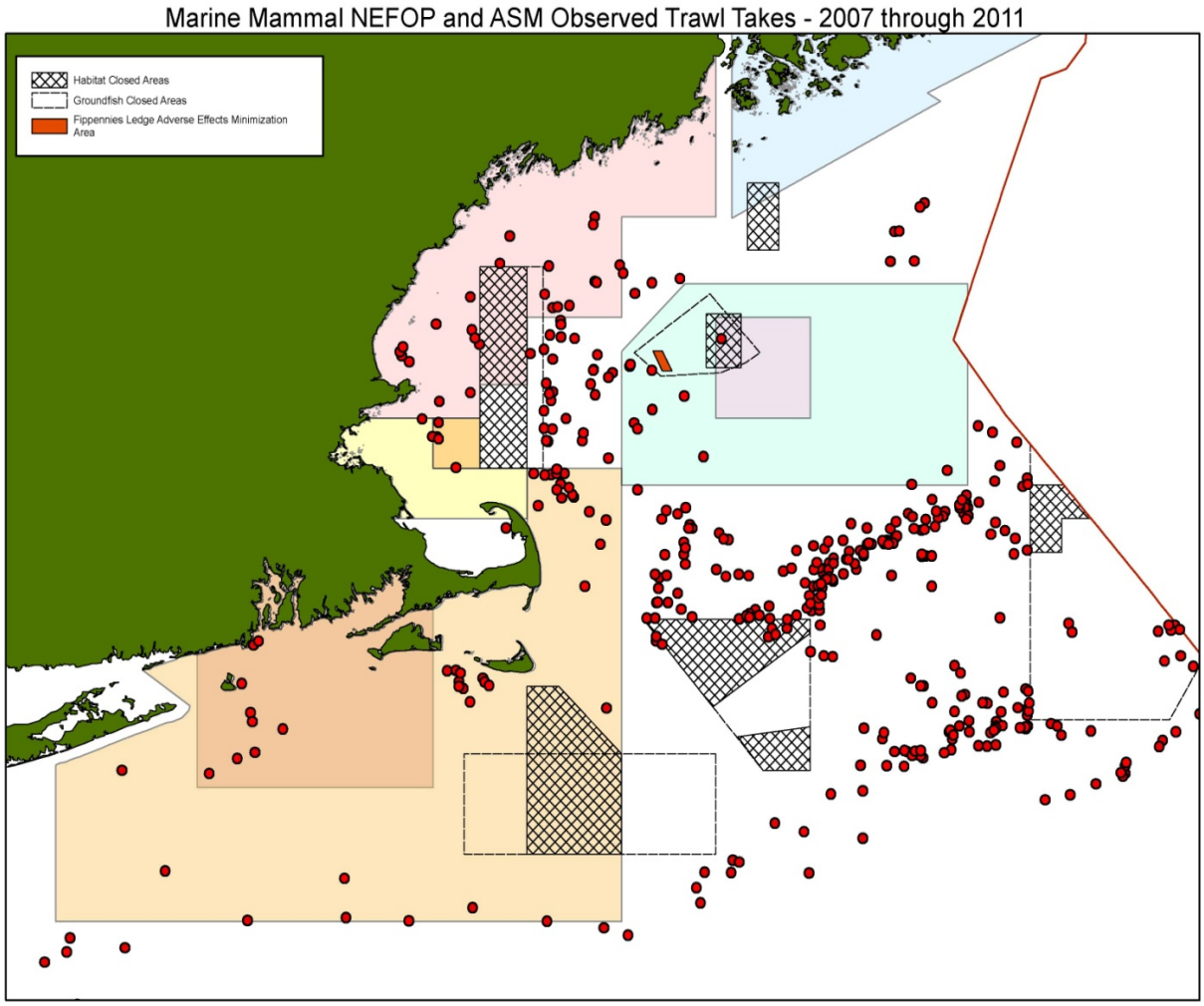
[14] Additional maps of marine mammal takes in various fishing gear can be found in Waring *et al*. 2014.

Figure 24. Map of marine mammal bycatch in gillnet gear in the New England region (excluding large whales) observed by traditional fishery observers and at sea monitors between 2007 and 2011.



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

Figure 25. Map of marine mammal bycatch in trawl gear in the New England region (excluding large whales) observed by traditional fishery observers and at sea monitors between 2007 and 2011.



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

As noted above, numerous species of small cetaceans and pinnipeds interact with Category I and II fisheries in the Atlantic Ocean; however, several species have experienced such great losses to their populations as a result of interactions with Category I and II fisheries that they are now considered strategic stocks under the MMPA.[15] These species are the harbor porpoise, the Western North Atlantic Northern Migratory Coastal Stock of bottlenose dolphin and the Western

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

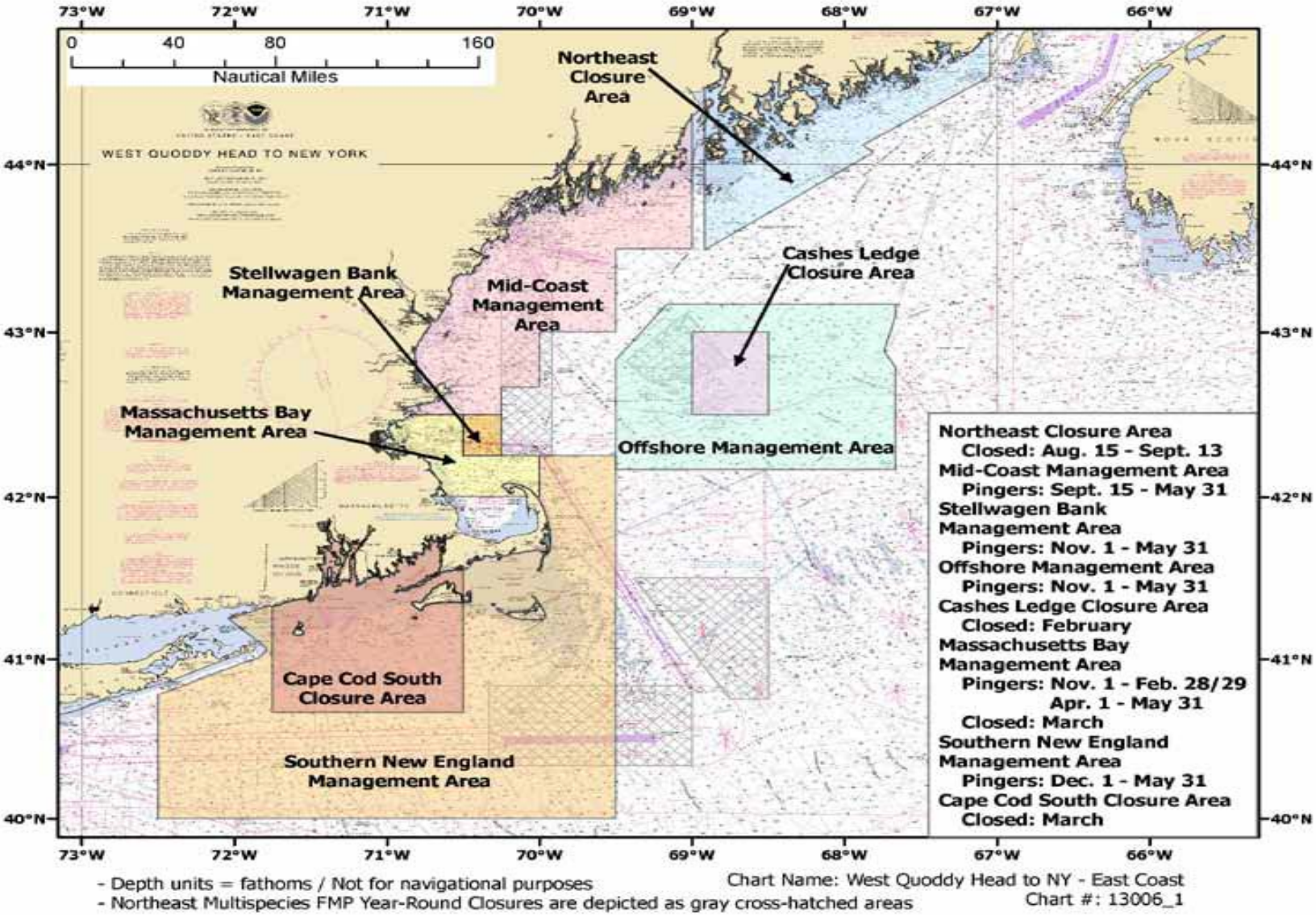
North Atlantic Southern Migratory Coastal Stock of bottlenose dolphin. Section 118(f)(1) of the MMPA requires the preparation and implementation of a TRP for any strategic marine mammal stock that interacts with Category I or II fisheries. As a result, the Harbor Porpoise TRP (HPTRP or Plan) and the Bottlenose Dolphin TRP (BDTRP or Plan) were developed and implemented for these species. The following provides a brief overview and summary for each TRP; however, additional information on each TRP can be found at: http://www.greateratlantic.fisheries.noaa.gov/protected/porptrp/ or http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm

7.1.4.2 Harbor Porpoise Take Reduction Plan (HPTRP)

To address the high levels of incidental take of harbor porpoise in the groundfish sink gillnet fishery, a Take Reduction Team was formed in 1996. A rule (63 FR 66464) to implement the Harbor Porpoise Take Reduction Plan, and therefore, to reduce harbor porpoise bycatch in U.S. Atlantic gillnets was published on December 2, 1998, and became effective on January 1, 1999; the Plan was amended on February 19, 2010 (75 FR 7383), and October 4, 2013 (78 FR 61821). Since gillnet operations differ between the New England and Mid-Atlantic regions, the follow sets of measures were devised for each region:

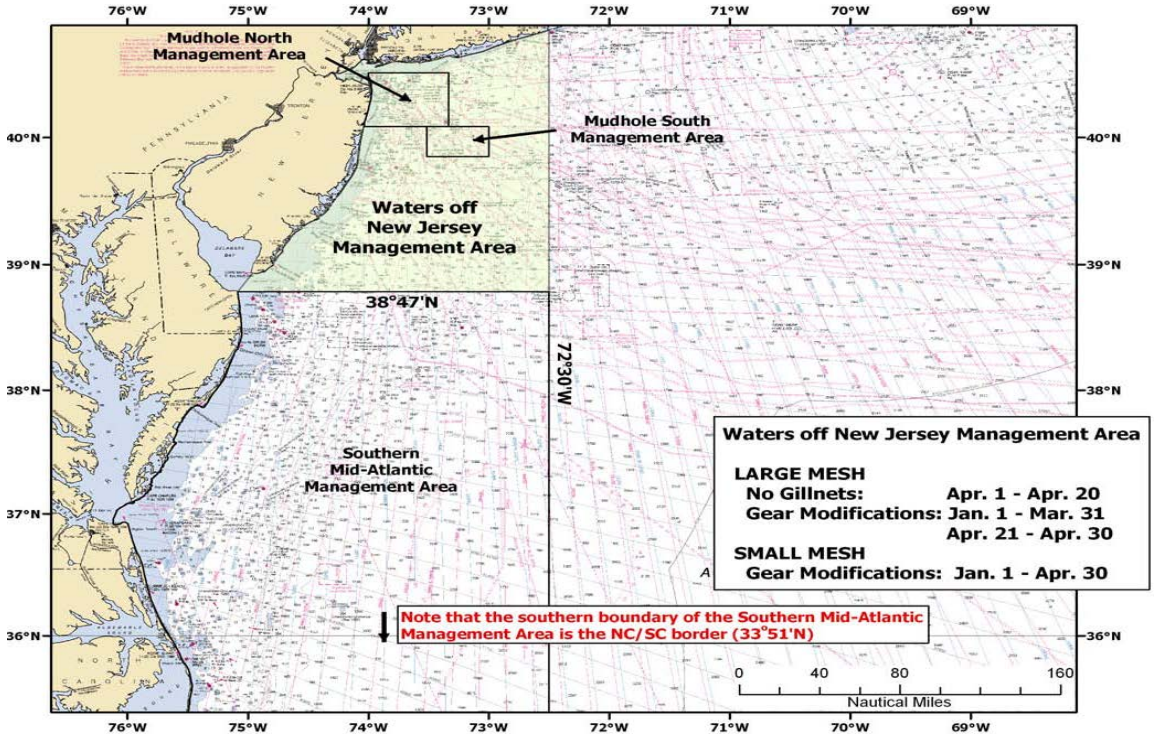
- **New England Region**: The New England component of the HPTRP pertains to all fishing with sink gillnets and other gillnets capable of catching multispecies in New England waters from Maine through Rhode Island. This portion of the Plan includes time and area closures, as well as closures to multispecies gillnet fishing unless pingers are used in the manner prescribed in the TRP regulations (Figure 26). For additional details see 50 CFR 229.33 and the outreach guide at http://www.greateratlantic.fisheries.noaa.gov/prot_res/porptrp/doc/HPTRPNewEnglandGuide.pdf).

Figure 26. HPTRP Management Areas for New England



Mid-Atlantic Region: The Mid-Atlantic portion of the HPTRP pertains to the Mid-Atlantic shoreline from the southern shoreline of Long Island, New York to the North Carolina/South Carolina border. It includes four management areas (Waters off New Jersey, Mudhole North (located in Waters off New Jersey Management Area), Mudhole South (located in Waters off New Jersey Management Area), and Southern Mid-Atlantic), each with time and area closures to gillnet fishing unless the gear meets certain specifications. Additionally, during regulated periods, gillnet fishing in each management area of the Mid-Atlantic is regulated differently for small mesh (> 5 inches to < 7 inches) and large (7-18 inches) mesh gear. The Plan also includes some time and area closures in which gillnet fishing is prohibited regardless of the gear specifications. Figure 27 and 28 provide a depiction of the Mid-Atlantic Management Areas. For additional details see 50 CFR 229.34 and the outreach guide at http://www.greateratlantic.fisheries.noaa.gov/prot_res/porptrp/doc/HPTRPMidAtlanticGuide_Feb%202010.pdf

Figure 27. HPTRP-Waters off New Jersey Management Area



Notes:

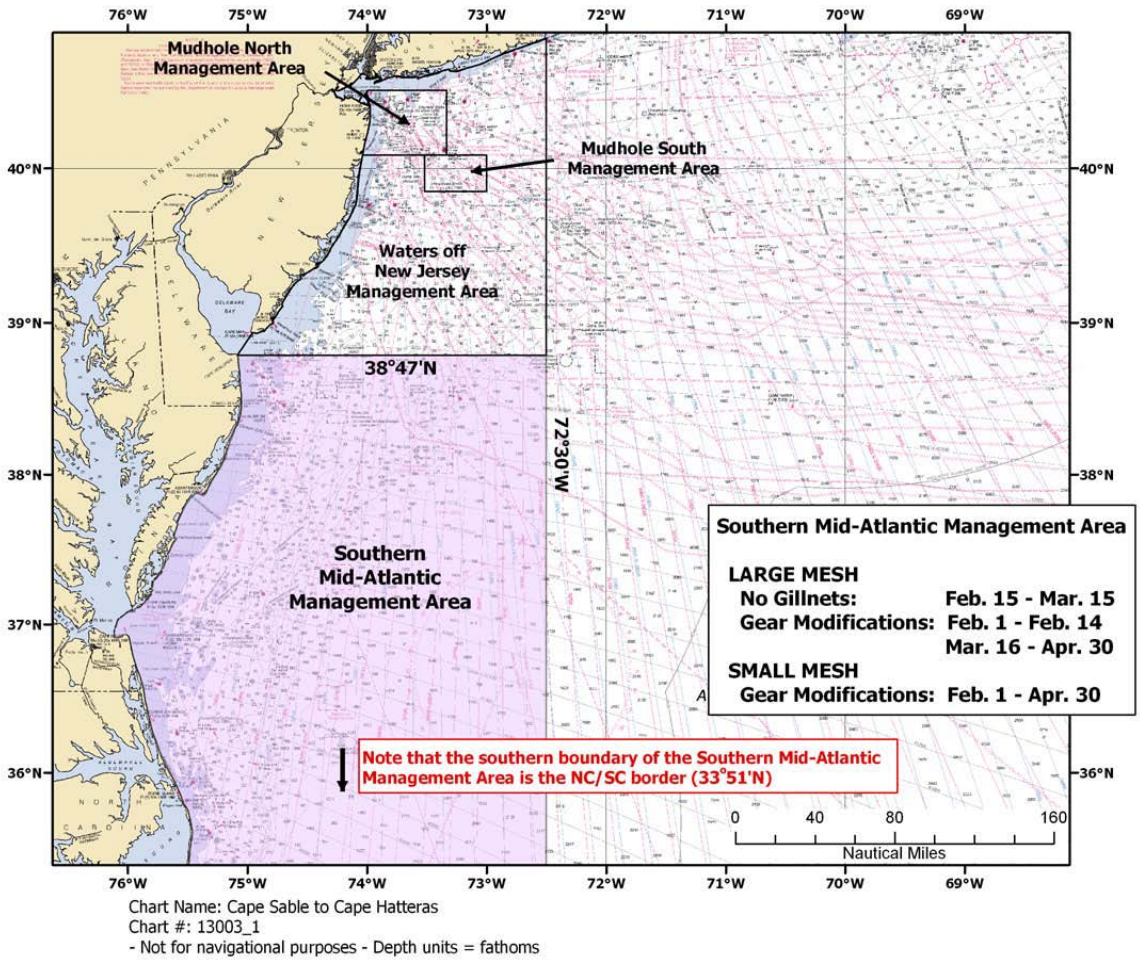
Mudhole North Management Area Small Mesh
Gear Modification: Jan. 1- Apr. 30
No Gillnet: Feb. 15-Mar. 15

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

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

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

Figure 28. HPTRP-Southern Mid-Atlantic Management Area



7.1.4.3 Bottlenose Take Reduction Plan

In April 2006, NMFS published a final rule to implement the TRP for the WNA coastal stock of bottlenose dolphin (April 26, 2006, 71 FR 24776) to reduce the incidental mortality and serious injury in the Mid-Atlantic gillnet fishery and eight other coastal fisheries operating within the dolphin's distributional range. The other Atlantic coastal fisheries include the North Carolina inshore gillnet fishery, Southeast Atlantic gillnet fishery, Atlantic blue crab trap/pot fishery, Mid-Atlantic haul/beach seine fishery, North Carolina long haul seine fishery, North Carolina roe mullet stop net fishery, Southeastern U.S. Atlantic shark gillnet fishery, and the Virginia pound net fishery (NMFS 2002). The final rule also revised the large mesh size restriction under the Mid-Atlantic large mesh gillnet rule for conservation of endangered and threatened sea turtles to provide consistency among Federal and state management measures. The BDTRP was amended on July 31, 2012 (77 FR 45268) to permanently continue nighttime fishing restrictions of medium mesh gillnets operating in North Carolina coastal state waters. The measures contained in the Plan include gillnet effort reduction, gear proximity requirements, gear or gear deployment modifications, and outreach and educational measures to reduce dolphin bycatch below the marine mammals stock's PBR. For additional details on the BDTRP please visit: **http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm.**

7.1.4.4 Sea Turtles

Sea turtles are widely distributed in the waters of the Northwest Atlantic. As a result, sea turtles often occupy many of the same ocean areas utilized for commercial fishing and therefore, interactions with fishing gear are possible. Sea turtles have been incidentally injured or killed in various gear types (e.g., gillnets, trawls, hook and line gear, dredge); however, of the gear types that could be possibly used in the multispecies fishery, trawl and gillnet pose the greatest risk to sea turtles and therefore, will be the focus of the following discussion. In addition, although sea turtle interactions with trawl and gillnet gear have been observed in waters from the Gulf of Maine to the Mid-Atlantic, most of the observed interactions have occurred in the Mid-Atlantic. As few sea turtle interactions have been observed in the Gulf Maine and Georges Bank regions of the Northwest Atlantic, there is insufficient data available to conduct a robust model-based analysis on sea turtle interactions with trawl or gillnet gear in these regions and therefore, produce a bycatch estimate for these regions. As a result, the following bycatch estimates are based on observed sea turtle interactions in trawl and gillnet gear in the Mid-Atlantic.

In a study done by Warden (2011a), it was estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic (i.e., i.e., south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border) was 292 (CV=0.13, 95% CI=221-369), with an additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but being released through a Turtle Excluder Device.[16] Of the 292 average annual observable loggerhead interactions, approximately 44 of those were adult equivalents (Warden 2011a).[17] This estimate is a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated to be 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). Warden (2011b), using species landed, also estimated total loggerhead interactions attributable to managed species. Five loggerhead interactions (estimated observable and unobservable but quantifiable) were attributed to Northeast multispecies. In addition, green, Kemp's ridley, and leatherback sea turtles have been documented in bottom trawl gear in areas that overlap with the Northeast groundfish fishery (NEFSC FSB database). One of these, a leatherback sea turtle, was captured on trip where the top landed species was whiting, while another sea turtle (unknown species) was captured on trip where the top landed species was pollock.

Murray (2013) conducted an assessment of loggerhead and unidentified hard-shell turtle interactions in Mid-Atlantic gillnet gear from 2007-2011. Based on Northeast Fisheries Observer Program data from 2007-2011, interactions between loggerhead and hard-shelled turtles (loggerheads plus unidentified hard-shelled) and commercial gillnet gear in the Mid-Atlantic

[16] Warden (2011) and Murray (2013) define the mid-Atlantic slightly differently, but both include waters north to Massachusetts. See the respective papers for a more complete description of these areas.

[17] Adult equivalence considers the reproductive value of the animal (Warden 2011, Murray 2013), providing a "common currency" of expected reproductive output from the affected animals (Wallace et al. 2008), and is an important metric for understanding population level impacts (Haas 2010).

averaged 95 hard-shelled turtles and 89 loggerheads (equivalent to 9 adults) annually (Murray 2013). However, average estimated interactions in large mesh gear in warm, southern Mid-Atlantic waters have declined relative to those from 1996-2006 (Murray 2009), as did the total commercial effort (Murray 2013). Murray (2013) also estimated interactions by managed species landed in gillnet gear from 2007-2011. An estimate was not provided for the Northeast multispecies fisheries; however, takes have been observed in sink gillnet fisheries targeting other species. One of these was documented by an at sea monitor north of 42° N latitude. Leatherback, Kemp's ridley, and green sea turtles have also been documented in Mid-Atlantic gillnet gear by fishery observers (NEFSC FSB database), with observed takes of Kemp's ridley and leatherback sea turtles having occurred in areas that overlap with the Northeast multispecies fishery.

Although sea turtles have the potential to interact with multiple gear types, such as trawl or gillnet gear, the risk of an interaction is affected by multiple factors, including where and when fishing effort is focused, the type of gear being used, environmental conditions, and sea turtle occurrence and distribution. Murray and Orphanides (2013) recently evaluated fishery-independent and dependent data to identify environmental conditions associated with turtle presence and the subsequent risk of a bycatch encounter if fishing effort is present; It was concluded that fishery independent encounter rates were a function of latitude, sea surface temperature (SST), depth, and salinity. When the model was fit to fishery dependent data (gillnet, bottom trawl, and scallop dredge), Murray and Orphanides (2013) found a decreasing trend in encounter rates as latitude increases; an increasing trend as SST increases; a bimodal relationship between encounter rates and salinity; and higher encounter rates in depths between 25 and 50 m. Similarly, Murray (2013) concluded, based on 2007-2011 data obtained on loggerhead interactions in gillnet gear, that bycatch rates were associated with latitude, SST, and mesh size, with highest interaction rates in the southern mid-Atlantic in warm surface waters and in large (>7 inch mesh). Based on the above 2005-2008 data obtained on loggerhead interactions in bottom trawl gear, Warden (2011a) also found that latitude, depth and SST were associated with the interaction rate, with the rates being highest south of 37° N in waters < 50 meters deep and SST > 15°C (Figure 29).

Figure 29: Mid-Atlantic trawl bycatch rates (Warden 2011a)

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

7.1.4.5 Atlantic Sturgeon

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range, although genetic analyses suggests that the distribution of each varies within that range (King *et al*. 2001; Laney *et al*. 2007; Dunton *et al*. 2012; Wirgin *et al*. 2012; Waldman *et al*. 2013; O'Leary *et al*. 2014). Three separate publications using different information sources reached the same conclusion; Atlantic sturgeon occur primarily in waters less than 50 meters (although deeper waters are also used), aggregate in certain areas, and exhibit seasonal movement patterns (see Stein *et al*. 2004b; Dunton *et al*. 2010; Erickson *et al*. 2011; see Section 1.1.3 for additional details). These characteristics of Atlantic sturgeon occurrence and distribution result in Atlantic sturgeon occupying many of the same ocean areas utilized for commercial fishing and therefore, occupying areas in which interactions with fishing gear are possible.

There are three documents, covering three time periods, that use data collected by the Northeast Fisheries Observer Program to describe bycatch of Atlantic sturgeon: Stein *et al*. (2004b) for 1989-2000; ASMFC (2007) for 2001-2006; and Miller and Shepard (2011) for 2006-2010; None of these provide estimates of Atlantic sturgeon bycatch by DPS. Information provided in all three documents indicate that sturgeon bycatch occurs in gillnet and trawl gear, with the most recent document estimating, based on fishery observer data and VTR data from 2006-2010, that annual bycatch of Atlantic sturgeon was 1,342 and 1,239, respectively (Miller and Shepard 2011). Specifically, Miller and Shepard (2011) observed Atlantic sturgeon interactions in trawl gear with small (< 5.5 inches) and large (≥ 5.5 inches) mesh sizes, as well as gillnet gear with small (< 5.5 inches), large (5.5 to 8 inches), and extra-large mesh (>8 inches) sizes. Although Atlantic sturgeon were observed to interact with trawl and gillnet gear with various mesh sizes, based on observer data, Miller and Shepard (2011) concluded that gillnet gear, in general, posed a greater risk of mortality to Atlantic sturgeon than did trawl gear. Estimated mortality rates in gillnet gear were 20.0%, while those in otter trawl gear were 5.0% (Miller and Shepard 2011). Similar conclusions were reached in Stein *et al*. 2004b and ASMFC 2007 reports, in which both studies also concluded, after review of observer data from 1989-2000 and 2001-2006, that observed mortality is much higher in gillnet gear than in trawl gear. Based on the information presented in these three documents, factors thought to increase the risk of Atlantic sturgeon bycatch, and therefore death, in gillnet gear include:

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

Although Atlantic sturgeon deaths have rarely been reported in otter trawl gear (ASMFC 2007), it is important to recognize that effects of an interaction may occur long after the interaction. Based on physiological data obtained from Atlantic sturgeon captured in otter trawls, Beardsall *et al*. (2013) suggests that factors such as longer tow times (i.e., > 60 minutes), prolonged

handling of sturgeon (> 10 minutes on deck), and the type of trawl gear/equipment used, may increase the risk of physiological disruption or impairment (e.g., elevated cortisol levels, immune suppression, impaired osmoregulation, exhaustion) to Atlantic sturgeon captured in otter trawls and therefore, may result in an increased risk of post-release mortality. The authors also note that post-release exhaustion, even after a 60 minute trawl capture, results in behavioral disruption to Atlantic sturgeon and caution that repeated bycatch events may compound post-release behavioral effects to Atlantic sturgeon which in turn, may affect essential life functions of Atlantic sturgeon (e.g., predator avoidance, foraging, migration to foraging or spawning sites) and therefore, Atlantic sturgeon survival (Beardsall *et al*. 2013). Although the study conducted by Beardsall *et al*. (2013) provides some initial insight into the post-release effects to Atlantic sturgeon captured in trawl gear, additional studies are needed to clearly identify the "after" effects of a trawl interaction. As it is remains uncertain what the overall impacts to Atlantic sturgeon survival are from trawl interactions, trawls should not be completely discounted as a form of gear that poses a mortality risk to Atlantic sturgeon.

7.1.4.6 Atlantic Salmon

The marine range of the Gulf of Maine Distinct Population Segment extends from the Gulf of Maine (primarily northern portion), to the coast of Greenland (NMFS and USFWS 2005; Fay *et al*. 2006). Although the distribution of Atlantic salmon in the marine environment likely overlaps with commercial fisheries, there have been a low number of observed interactions with fisheries and various gear types. 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 of15 individual salmon incidentally caught on over 60,000 observed commercial fishing trips from 1989 through August 2013 (NMFS 2013;Kocik *et al*. 2014). Specifically, Atlantic salmon were observed bycaught in gillnet (11/15) and bottom otter trawl gear (4/15), with 10 of the incidentally caught salmon listed as "discarded" and five reported as mortalities (Kocik (NEFSC), pers. comm (February 11, 2013) in NMFS 2013). The genetic identity of these captured salmon is unknown; however, the NMFS 2013 Biological Opinion considers all 15 fish to be part of the 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).

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

8.0 Human Communities/Social-Economic Environment

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

This section reviews the Northeast multispecies fishery and describes the human communities potentially impacted by the Proposed Action[18]. This includes a description of the sector and common pool participants' groundfish fishing and their homeports. Table 19 contains a summary of major trends in the groundfish fishery. Additional information may be found in the FY2010, FY2011, and FY2012 performance reports for this fishery by the NEFSC (Kitts et al. 2011; Murphy et al. 2014; Murphy et al. 2012).

[18] Information presented in this section includes data from Framework Adjustment 51 (NEFMC 2013), Framework Adjustment 52 (NEFMC 2014), and various NMFS reports on catch and fishery performance. The most up-do-date information is provided; however, because of differences in report timing, some data are from 2013 while others are from 2012.

Table 19- Summary of major trends in the Northeast multispecies fishery

	FY2009	FY2010			FY2011			FY2012		
	Total	Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool	Total	Sector Vessels	Common Pool
Groundfish Gross Nominal Revenue	$82,510,132	$83,177,330	$81,123,145	$2,054,184	$90,453,455	$89,603,929	$849,526	$69,778,174	$69,135,759	$642,414
Non-groundfish Gross Nominal Revenue	$180,396,477	$210,631,484	$115,682,739	$94,948,745	$240,364,488	$144,718,459	$95,646,029	$235,730,686	$140,108,099	$95,622,587
Total Gross Nominal Revenue	$262,906,608	$293,808,814	$196,805,885	$97,002,930	$330,817,943	$234,322,388	$96,495,555	$305,508,860	$209,243,859	$96,265,001
Groundfish average price	$1.21/lb	$1.43/lb	$1.43/lb	$1.58/lb	$1.47/lb	$1.47/lb	$1.64/lb	$1.51/lb	$1.51/lb	$1.79/lb
Non-groundfish average price	$0.97/lb	$1.21/lb	$1.19/lb	$1.24/lb	$1.14/lb	$1.13/lb	$1.16/lb	$1.11/lb	$1.07/lb	$1.17/lb
Number of active vessels	916	854	435	419	776	442	337	764	446	320
Number of active vessels that took a groundfish trip	566	445	303	142	419	302	117	401	304	97
Number of groundfish trips	25,897	13,474	11,190	2,284	15,958	13,679	2,279	14,496	12,943	1,553
Number of non-groundfish trips	37,173	38,489	16,527	21,962	33,675	16,795	16,880	32,523	17,090	15,433
Number of days absent on groundfish trips	24,605	18,401	16,796	1,605	21,465	19,963	1,502	19,935	18,964	971
Number of days absent on non-groundfish trip	31,606	31,352	16,022	15,330	27,997	15,484	12,513	28,632	16,189	12,442
Total Crew Positions	2,416	2,255			2,161			2,136		
Total Crew-trips	148,153	123,885			122,003			116,334		
Total Crew-days	187,219	169,939			169,417			167,620		

Notes: Data includes all vessels with a valid limited access multispecies permit. Sector plus common pool vessel counts may exceed the total vessel count because vessels may switch between sector and common pool eligibilities during the fishing year. "Trips" refer to commercial trips in the northeast Exclusive Economic Zone (EEZ). Past reports included party/charter trips. From Murphy et al. (2014).

8.1 The New England Groundfish Fishery

New England's fishery has been identified with groundfish fishing both economically and culturally for over 400 years. Broadly described, the Northeast multispecies fishery includes the landing, processing, and distribution of commercially important fish that live on the sea bottom. In the early years, the Northeast multispecies fishery caught primarily cod and haddock. Today, the Northeast Multispecies FMP (large-mesh and small-mesh) includes 13 species of groundfish (Atlantic cod, haddock, pollock, yellowtail flounder, witch flounder, winter flounder, windowpane flounder, American plaice, Atlantic halibut, redfish, ocean pout, white hake, and wolffish) harvested from three geographic areas (Gulf of Maine, Georges Bank, and southern New England/Mid-Atlantic Bight), representing 19 distinct stocks.

Prior to the Industrial Revolution, the groundfish fishery focused primarily on cod. The salt cod industry, which preserved fish by salting while still at sea, supported a hook and line fishery that included hundreds of sailing vessels and shoreside industries including salt mining, ice harvesting, and boat building. Late in the 19th century, the fleet also began to focus on Atlantic halibut, with landings peaking in 1896 at around 4,900 tons (4,445 mt) (NOAA 2007).

From 1900 to 1930, the fleet transitioned to steam powered trawlers and increasingly targeted haddock for delivery to the fresh and frozen fillet markets. With the transition to steam powered trawling, it became possible to exploit the groundfish stocks with increasing efficiency. This increased exploitation resulted in a series of boom and bust fisheries from 1930 to 1960 as the North American fleet targeted previously unexploited stocks, depleted the resource, and then transitioned to new stocks (NOAA 2007).

In the early 1960's, fishing pressure increased with the discovery of haddock, hake, and herring off of Georges Bank and the introduction of foreign factory trawlers. Early in this time period, landings of the principal groundfish (cod, haddock, pollock, hake, and redfish) peaked at about 650,000 tons (589,670 mt). However, by the 1970's, landings decreased sharply to between 200,000 and 300,000 tons (181,437 and 272,155 mt) as the previously virgin GB stocks were exploited (NOAA 2007).

The exclusion of the foreign fishermen by the Fisheries Conservation and Management Act in 1976, coupled with technological advances, government loan programs, and some strong classes of cod and haddock, caused a rapid increase in the number and efficiency of U.S. vessels participating in the Northeast groundfish fishery in the late 1970's. This shift resulted in a temporary increase in domestic groundfish landings; however, overall landings (domestic plus foreign) continued to trend downward from about 200,000 tons (181,437 mt) to about 100,000 tons (90,718 mt) through the mid 1980's (NOAA 2007).

In 1986, the NEFMC implemented the Northeast Multispecies FMP with the goal of rebuilding stocks. Since Amendment 5 in 1994, the multispecies fishery has been administered as a limited access fishery managed through a variety of effort control measures including DAS, area closures, trip limits, minimum size limits, and gear restrictions. Partially in response to those regulations, landings decreased throughout the latter part of the 1980's until reaching a more or less constant level of around 40,000 tons (36,287 mt) annually since the mid 1990's.

In 2004, the final rule implementing Amendment 13 to the Northeast Multispecies FMP allowed for self-selecting groups of limited access groundfish permit holders to form sectors. These sectors developed a legally binding operations plan and operated under an allocation of GB cod. While approved sectors were subject to general requirements specified in Amendment 13, sector members were exempt from DAS and some of the other effort control measures that tended to limit the flexibility of fishermen. The rule authorized implementation of the first sector, the GB Cod Hook Sector. A second sector, the GB Cod Fixed Gear Sector, was authorized in 2006.

Through Amendment 16, the NEFMC sought to rewrite groundfish sector policies with a scheduled implementation date of May 1, 2009. When that implementation date was delayed until FY2010, the NMFS Regional Administrator announced that, in addition to a previously stated 18% reduction in DAS, interim rules would be implemented to reduce fishing mortality during FY2009. These interim measures generally reduced opportunity among groundfish vessels through:

- Differential DAS counting;
- Elimination of the SNE/MA winter flounder SAP;
- Elimination of the state waters winter flounder exemption;
- Revisions to incidental catch allocations; and
- Reduction in some groundfish allocations (NOAA 2009).

In 2007, the Northeast multispecies fishery included 2,515 permits. Of these, about 1,400 were limited access. There were about 660 vessels that actively fished. Those vessels include a range of gear types: hook, bottom longline, gillnet, and trawl (NEFMC 2009a). In FY2009, between 40 and 50 of these vessels were members of the GB Cod Sectors. The passage of Amendment 16, implemented in FY2010, ushered in a new era of sector management in the New England groundfish fishery. Since FY2010, over 50% of eligible northeast groundfish multispecies permits and over 90% of landings history has been associated. The remaining vessels were common pool groundfish fishing vessels.

Amendment 16 to the Northeast Multispecies FMP was implemented for the New England groundfish fishery starting on May 1, 2010, the start of the 2010 fishing year. There were two substantial changes meant to adhere to the catch limit requirements and stock rebuilding deadlines of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSA). The first change developed "hard quota" annual catch limits (ACLs) for all 20 stocks in the groundfish complex. The second change expanded the use of Sectors, which are allocated subdivisions of ACLs called Annual Catch Entitlements (ACE) based on each sector's collective catch history.[19] Sectors received ACE for nine of 13 groundfish species (14 stocks + quotas for Eastern US/Canada cod and haddock; 16 ACEs) in the FMP and became exempt from many of the effort controls previously used to manage the fishery.

[19] To determine the ACE, the sum of all of the sector members' potential sector contributions (PSCs) (a percentage of the ACL) are multiplied by the ACL.

During the first year of sector management, 17 sectors operated, each establishing its own rules for using its allocations. Vessels with limited access permits that joined sectors were allocated 98% of the total commercial groundfish sub-ACL, based on their collective level of historical activity in the groundfish fishery. Approximately half (46%) of the limited access groundfish permits opted to remain in the common pool. Common pool vessels act independently of one another, with each vessel constrained by the number of DAS it can fish, by trip limits, and by all of the time and area closures. These restrictions help ensure that the groundfish catch of common pool vessels does not exceed the common pool's portion of the commercial groundfish sub- ACL for all stocks (about 2% for 2010) before the end of the fishing year.

In the second year of sector management, 58% of limited access permits enrolled in one of 16 sectors or one of two lease-only sectors. From 2010 to 2011, the number of groundfish limited access eligibilities belonging to a sector increased by 66, while the number of these permits in the common pool decreased by 85. At the start of FY2011, vessels operating within a sector were allocated about 98% of the total groundfish sub-ACL, based on historical catch levels. Those vessels that opted to remain in the common pool were given access to about 2% of the groundfish sub-ACL based on the historic catch. The same effort controls employed in 2010 were again used in 2011, to ensure the groundfish catch made by common pool vessels did not exceed the common pool's portion of the commercial groundfish sub-ACL.

In FY12, 60% of limited access permits enrolled in sectors. From FY2011 to FY2012, the number of groundfish limited access eligibilities belonging to a sector increased by 22, while the number of these permits in the common pool decreased by 36. Although some trends in the fishery are a result of management changes made to the fishery in the years prior to Amendment 16, many of these trends reflect the current system of catch share management.

8.2 Fleet Characteristics

The overall trend since the start of sector management has been a decline in the number of vessels with a limited access groundfish permit, at a low of 1,177 in FY2012 (

Table 20). Of those vessels, those with revenue from at least one groundfish trip have also declined, with 401 in FY2012. The proportion of vessels affiliated with a sector has increased each year since FY2010. A key aspect of Amendment 16 is the ability of a sector to jointly decide how its ACE will be harvested, through redistribution within a sector and/or transferring ACE between sectors. Because inactive sector vessels may benefit if other sector vessels harvest their allocation, changes in the number of inactive vessels may result from a transfer of allocation and not necessarily vessels exiting the fishery. Since FY2010, 35-37% of the vessels were inactive (no landings). Of these inactive vessels, 64-69% were affiliated with sectors.

Table 20- Number of vessels by fishing year

	FY2009	FY2010	FY2011	FY2012
	As of May 1 each Fishing Year:			
Total groundfish limited access eligibilities	1,464	1,441	1,422	1,408
Eligibilities held as Confirmation of Permit History	81	94	168	228

	During any part of the fishing year*:			
Total eligible vessels	1,459	1,409	1,321	1,223
Eligible vessels that did not renew a limited access groundfish permit	28	26	42	46
Vessels with a limited access groundfish permit	1,431	1,383	1,279	1,177
	While under a limited access groundfish permit:			
... those with revenue from any species**	916	854	776	764
... those with revenue from at least one groundfish trip	566	445	419	401
... those with no landings	515	529	503	413
Percent of inactive (no landings) vessels	(36%)	(38%)	(39%)	(35%)

Source: Murphy et al.
* On May 1st of the fishing year the number of vessels will equal to the number of eligibilities not in Confirmation of Permit History (CPH). Over time the number of vessels will differ from the number of eligibilities because these eligibilities can be transferred from vessel to vessel during the fishing year. These numbers exclude groundfish limited access eligibilities held as CPH. Starting in 2010, Amendment 16 authorized CPH owners to join Sectors and to lease DAS. For purposes of comparison, CPH vessels are not included in the data for either Sector or Common Pool.
**Active vessels in this report received revenue from any species while fishing under a limited access groundfish permit.

8.3 Effort

The groundfish fishery has traditionally been made up of a diverse fleet, comprised of a range of vessels sizes and gear types. Over the years, as vessels entered and exited the fishery, the typical characteristics defining the fleet changed as well. The number of active vessels has declined each year since at least FY2009. This decline has occurred across all vessel size categories (Table 21). Since FY2009, the 30' to < 50' vessel size category, which has the largest number of active groundfish vessels, experienced a 32% decline (305 to 206 active vessels). The <30' vessel size category, containing the least number of active groundfish vessels, experienced the largest (53%) reduction since FY2009 (34 to 16 vessels). The vessels in the largest (≥75') vessel size category experienced the least reduction (9%) since FY2009.

Table 22. Vessel activity by size class

	FY2009	FY2010	FY2011	FY2012
Vessels with landings from any species				
Less than 30	73	65	51	48
30 to < 50	478	455	398	396
50 to < 75	236	217	211	205
75 and above	129	117	116	115
Total	916	854	776	764
Vessels with at least one groundfish trip				
Less than 30	34	24	20	16

30 to < 50	305	240	216	206
50 to < 75	157	118	117	115
75 and above	70	63	66	64
Total	566	445	419	401

Source: Murphy et al. (2014).

Some of the proposed benefits of a catch share system of management are the potential efficiency gains associated with increasing operational flexibility (NOAA 2010). Being released from the former effort controls, but being held to ACLs, sector vessels were expected to increase their catch per unit effort by decreasing effort. Between 2009 and FY2010, the number of groundfish fishing trips[20] and total days absent on groundfish trips declined by 48% and 27%, respectively (Table 23).[21] During the second year of sector management, 2011, the number of groundfish fishing trips and total days absent on groundfish trips increased. Effort on groundfish trips generally decreased in FY2012. Vessels took fewer groundfish trips, with fewer total days absent of groundfish trips, though average trip length increased slightly over FY2011.

The groundfish fleet overall took fewer non-groundfish trips in FY2012 than they did in FY2009-FY2011, but those trips are longer than they were in FY2010 and FY2011. The total number of non-groundfish trips taken by the fleet in FY2012 was 32,523 trips, a four year low and 3.4% lower than in FY2011. However, for the fleet overall, the total number of days absent on non-groundfish trips in FY2012 was higher than it was in 2011, with 635 (2.3%) more days absent. Furthermore, although the total number of days absent was 9.4% fewer than 2009, the average trip length in 2012 was the same as 2009 (0.92 days per trip) and higher than in 2010 and 2011 (0.86 days per trip).

Table 23- Effort by active vessels

	FY2009	FY2010	FY2011	FY2012
Number of trips				
groundfish	25,897	13,474	15,958	14,496
non-groundfish	37,173	38,489	33,675	32,523
Number of days absent on trips				
groundfish	24,605	18,401	21,465	19,935
non-groundfish	31,606	31,352	27,997	28,632
Average trip length*				
groundfish	0.96	1.37	1.35	1.38
(std. dev.)	(1.74)	(2.14)	(2.20)	(2.19)
non-groundfish	0.92	0.86	0.86	0.92
(std. dev.)	(1.66)	(1.56)	(1.52)	(1.62)

Source: Murphy et al. (2014).

[20] "Groundfish trip" is defined as a trip where the vessel owner or operator declared, either through the vessel monitoring system or through the interactive voice response system, that the vessel was making a groundfish trip.
[21] The data is taken from different source materials (VMS, etc.) than other data in this document, and thus, may be slightly different than.

*This is the average trip length of all individual trips that have non-missing values for days absent. Since some trip records have missing values for days absent, average trip length reported here may be higher than what is obtained by dividing the overall number of days absent by the overall number of trips.

8.3.1 Landings and Revenue

Total groundfish landings on trips made by vessels possessing a limited access groundfish permit in FY2012 were 46.3M pounds, which is the lowest landings since at least FY2009 (Table 24 and Table 25). Because only 16 groundfish stocks are limited by sector allocations, it is important to consider the landings of non-groundfish species and groundfish species separately as a means of describing any possible shift in effort to other fisheries. Non-groundfish landings made by limited access vessels increased from 178.1M pounds in FY2010 to 213.8M pounds in FY2011, and remained fairly steady at 212.0M pounds in FY2012. Total landings of all species made by limited access vessels in the Northeast multispecies fishery was 258.3M pounds in FY2012. This compares to landings ranging from 236.4M – 272.9M pounds in the 2009–2011 fishing years. In FY2012, sector vessels accounted for 68% of all landings, 99% of groundfish landings, and 62% of non-groundfish landings.

Table 24. Total landings and revenue from all trips by fishing year

	FY2009	FY2010	FY2011	FY2012
Landed Pounds				
Groundfish	68,416,222	58,178,065	61,661,450	46,295,753
Non-Groundfish	185,631,323	174,269,060	211,226,012	211,983,492
Total Pounds	254,047,546	232,447,125	272,887,462	258,279,245
Gross Revenue				
Groundfish	$82,510,132	$83,177,330	$90,453,455	$69,778,174
(in 2010 dollars*)	($83,386,467)	($83,177,330)	($88,658,472)	($67,252,170)
Non-Groundfish	$180,396,477	$210,631,484	$240,364,488	$235,730,686
(in 2010 dollars*)	($182,312,457)	($210,631,484)	($235,594,629)	($227,197,123)
Total Revenue	$262,906,608	$293,808,814	$330,817,943	$305,508,860
(in 2010 dollars*)	($265,698,924)	($293,808,814)	($324,253,101)	($294,449,293)

Source: Murphy et al. (2014).
* Deflated by the calendar year 2010 Q2 GDP Implicit Price Deflator.

Table 25- Total landings and nominal revenue from groundfish trips by fishing year

	FY2009	FY2010	FY2011	FY2012
Landed Pounds				
Groundfish	68,362,567	58,067,026	61,520,629	46,238,230
Non-Groundfish	30,965,367	23,147,600	28,781,804	27,527,755
Total Pounds	99,327,934	81,214,627	90,302,433	73,765,985
Gross Revenue				
Groundfish	$82,456,833	$82,964,771	$90,237,532	$69,669,582
Non-Groundfish	$25,862,188	$22,339,660	$31,826,744	$25,768,848

Total Revenue	$108,319,021	$105,304,431	$122,064,276	$95,438,430

Source: Murphy et al. (2014, Table 3).
* Deflated by the calendar year 2010 Q2 GDP Implicit Price Deflator.

During the first year of sector management, groundfish revenues from vessels with limited access groundfish permits in FY2010, were $83.2M (Table 25). This was slightly lower than FY2009 revenues. In FY2011, the groundfish revenues from vessels with limited access groundfish permits were $90.4M. Groundfish revenue in FY2012 decreased to a four-year low of $69.8 million (22.9% lower than in 2011). Non-groundfish revenue decreased to $235.7 million (2% lower than in FY2011), but was still higher than in FY2009 and FY2010. In FY2012, sector vessels accounted for about 69% of all revenue earned by limited access permitted vessels. Sector vessels also earned 99% of revenue from groundfish landings and 59% of non-groundfish revenue.

8.3.2 ACE Leasing

Starting with allocations in FY2010, each sector was given an initial ACE determined by the pooled potential sector contribution (PSC) from each entity joining that sector. Every limited access groundfish permit also has a tracking identification number called a Moratorium Right Identifier (MRI). PSC is technically allocated to MRIs, which are subsequently linked to vessels through Northeast Multispecies limited access fishing permits. A vessel's PSC is a percentage share of the total allocation for each allocated groundfish stock based on that vessel's fishing history. Once a sector roster and associated PSC is set at the beginning of a fishing year, each sector is then able to distribute its ACE among its members. By regulation, ACE is pooled within sectors, however most sectors seem to follow the practice of assigning catch allowances to member vessels based on PSC allocations. This is an important assumption because vessels catching more than their allocation of PSC must have leased additional quota, either as PSC from within the sector or as ACE from another sector.

During FY2010, 282 sector-affiliated MRIs had catch that exceeded their individual PSC allocations for at least one stock. These vessels are then assumed to have leased in an additional 22M pounds of ACE and/or PSC with an approximate value of $13.5M. In FY2011, 256 sector-affiliated vessels had catch that exceeded their individual PSC allocations. These vessels are then assumed to have leased in 31M pounds of quota. Although the number of vessels leasing ACE fell by 9% the estimated number of pounds leased was almost 41% greater in FY2011 than in FY2010 (Murphy, et al. 2012). There were 241 sector-affiliated MRIs had catch that exceeded individual PSC allocations for at least one stock. These MRIs leased in >23M pounds of ACE and/or PSC in FY2012 (Murphy, et al. 2014)

8.4 Fishing Communities

There are over 400 communities that have been the homeport or landing port to one or more Northeast groundfish fishing vessels since 2008. These ports occur throughout the New England and Mid-Atlantic. Consideration of the economic and social impacts on these 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). Before any agency of the federal government may take "actions significantly affecting the quality of the human environment," that agency must prepare an Environmental Assessment (EA) that includes the integrated use of the social sciences (NEPA Section 102(2)(C)). National Standard 8 of the MSA stipulates that "conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities" (16 U.S.C. § 1851(a)(8)).

A "fishing community" is defined in the Magnuson-Stevens Act, as amended in 1996, as "a community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community" (16 U.S.C. § 1802(17)). Determining which fishing communities are "substantially dependent" on and "substantially engaged" in the groundfish fishery can be difficult.

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.

Primary and Secondary Fishing Ports

In recent amendments to the FMP (e.g., NEFMC 2009), communities dependent on the groundfish resource have been categorized into primary and secondary port groups, so that community data can be cross-referenced with other demographic information .

Primary ports are those communities that are substantially engaged in the groundfish fishery, and which are likely to be the most impacted by groundfish management measures. Primary ports were selected based on groundfish landings greater than 1,000,000 lbs annually since FY1994 and/or the presence of significant groundfish infrastructure (e.g., auctions and co-ops). They have demonstrated a continued substantial engagement in the groundfish fishery.

Secondary ports are those communities that may not be substantially dependent or engaged in the groundfish fishery, but have demonstrated some participation in the groundfish fishery since FY1994. Because of the size and diversity of the groundfish fishery, it is not practical to examine each secondary port individually, which is why most secondary ports are grouped with others in the same county or in geographically adjacent counties.

Using the above definitions provides a way to consider the impacts of management measures on every port in which some amount of groundfish has been landed since 1994, and identifies place-based fishing communities based on level of engagement. Because significant geographical shifts in the distribution of groundfish fishing activity have occurred, the characterization of some ports as "primary" or "secondary" may not reflect their historical participation in and dependence on the groundfish fishery.

Descriptions of communities involved in the multispecies fishery, and further descriptions of Northeast fishing communities in general, can be found on Northeast Fisheries Science Center's website. There are snapshots of the human communities and fisheries of the Northeast with the most recent data available for key indicators of dependence on fisheries and other economic and demographic characteristics at http://www.nefsc.noaa.gov/read/socialsci/communitySnapshots.php. Detailed profiles regarding the historic, demographic, cultural, and economic context for understanding a community's involvement in fishing are at http://www.nefsc.noaa.gov/read/socialsci/communityProfiles.html

Table 26- FY2012 landings (lbs.) of selected groundfish stocks by homeports

State	Port	GB Yellowtail Flounder	SNE/MA Yellowtail Flounder	CC/GOM Yellowtail Flounder	Witch flounder	GB Winter flounder	GOM Winter flounder	Total
ME	Portland	254	0	2,401	250,774	6,126	172,610	432,165
	Other	0	0	41,067	222,727	0	441,965	705,759
NH	Portsmouth	0	0	23,716	3,413	c	170,360	197,489
	Other	0	0	75,288	32,165	0	451,550	559,003
MA	Boston	30,126	12,819	356,281	490,721	15,471	692,359	1,597,777
	Chatham/Harwichport	c	0	13,450	55,702	0	c	*69,152
	Gloucester	3,073	104	453,490	339,481	5,357	1,646,086	2,447,591
	New Bedford/Fairhaven	284,578	94,107	366,042	370,627	45,504	105,227	1,266,085
	Other	c	1,391	500,517	145,529	c	744,294	*1,391,731
RI	Point Judith	25,915	539,433	c	30,140	306	c	*595,794
	Other	35,139	118,645	c	12,483	c	c	*166,267
NY	Eastern Long Island	c	119,561	0	6,922	c	0	*126,483
	Other	0	13,069	0	912	0	c	*13,981
**Other		11,194	24,649	20,022	60,625	391	105,023	221,904
Total		*390,279	923,778	1,852,274	2,022,221	*73,155	*4,529,474	4,798,273

Notes:
** = Includes states not listed and landings from CPH permits not attributed to a state.
c = Confidential, because less than three ownership groups are included.
* = Total does not include confidential data.
Data from NEFSC, November 2013.

8.5 Vessel Activity in Primary Ports

All states have shown a decline in the number of active vessels with revenue from any species since at least FY2009 (Table 27). In FY2012, Massachusetts had the highest number of active vessels with a limited access groundfish permit and also the highest number of active vessels with revenue from at least one groundfish trip (52%, 207 vessels) (Table 28Table 28). From FY2009 to FY2012, the total number of active vessels with revenue from at least one groundfish trip declined 29% (566 to 401). While all states showed a decline in the number of vessels making groundfish trips, the largest percentage decline occurred in New Jersey (-57%).

Table 27- Number of vessels with revenue from any species (all trips) by homeport and state

CT		12	11	11	10
MA		459	423	378	375
	Boston	62	52	49	47
	Chatham	42	43	39	38
	Gloucester	110	105	91	92
	New Bedford	86	69	70	69
ME		112	102	88	95
	Portland	17	17	16	18
NH		53	50	46	41
NJ		61	56	49	47
NY		95	93	91	88
RI		93	86	83	77
	Point Judith	48	45	44	44
Other Northeast		34	36	34	37
Grand Total*		916	854	776	764
*** Note: State vessel counts may exceed the grand total vessel count because vessels may change home port during the fishing year.**					

Table 28- Number of vessels with revenue from at least one groundfish trip by homeport and state

CT		8	7	5	5
MA		310	238	224	207
	Boston	46	35	34	28
	Chatham	28	26	26	23
	Gloucester	97	74	70	61
	New Bedford	51	33	37	36
ME		64	43	47	51
	Portland	15	15	15	16
NH		40	32	29	25
NJ		26	21	17	11
NY		47	40	42	43
RI		61	55	49	54
	Point Judith	33	31	28	33

Other Northeast	12	10	8	6
Grand Total*	566	445	419	401
*** Note state vessel counts may exceed the grand total vessel count because vessels may change home port during the fishing year.**				

8.6 Employment

Along with the restrictions associated with presenting confidential information, there is also limited quantitative socio-economic data upon which to evaluate the community-specific importance of the multispecies fishery. In addition to the direct employment of captains and crew, the industry is known to support ancillary businesses such as gear, tackle, and bait suppliers; fish processing and transportation; marine construction and repair; and restaurants. Regional economic models do exist that describe some of these inter-connections at that level (Clay et al. 2007; NMFS 2010; Olson & Clay 2001a; b; Thunberg 2007).

Throughout the Northeast, many communities benefit indirectly from the multispecies fishery, but these benefits are often difficult to attribute. The direct benefit from employment in the fishery can be estimated by the number of crew positions.[22] However, crew positions do not equate to the number of jobs in the fishery and do not make the distinction between full and part-time positions. In FY2012, vessels with limited access groundfish permits provided 2,146 crew positions, with 49% coming from vessels with homeports in Massachusetts (Table 29). Since at least FY2009, the total number of crew positions provided by limited access groundfish vessels has declined by. Changes in crew positions vary across homeport states, with Maine adding a few positions in FY2012.

Table 29- Number of crew positions and crew days on active vessels by homeport and state

Home Port State		FY2009	FY2010	FY2011	FY2012
CT	Total crew	40	36	42	39
	Total crew days	3,700	3,996	3,001	4,312
MA	Total crew	1,231	1,132	1,067	1,053
	Total crew days	95,685	82,066	84,119	81,430
ME	Total crew	266	247	221	242
	Total crew days	15,539	15,541	14,783	16,252
NH	Total crew	110	107	105	96
	Total crew days	5,407	3,909	4,974	5,085
NJ	Total crew	162	149	145	148
	Total crew days	10,865	10,086	9,898	10,292
NY	Total crew	219	209	217	209

[22] Crew positions are measured by summing the average crew size of all active vessels on all trips.

	Total crew days	16,997	15,772	16,031	14,908
RI	Total crew	267	253	248	232
	Total crew days	26,411	26,786	25,130	24,017
Other Northeast	Total crew positions	129	130	128	128
	Total crew days	12,615	11,784	11,480	11,322
Total	Total crew positions	2,424	2,262	2,173	2,146
	Total crew days	187,219	169,939	169,417	167,620

A crew day[23] is another measure of employment opportunity that incorporates information about the time spent at sea earning a share of the revenue. Conversely, crew days can be viewed as an indicator of time invested in the pursuit of "crew share" (the share of trip revenues received at the end of a trip). The time spent at sea has an opportunity cost. For example, if crew earnings remain constant, a decline in crew days would reveal a benefit to crew in that less time was forgone for the same amount of earnings. In FY2012, vessels with limited access groundfish permits used 167,620 crew days, with 48% coming from vessels with homeports in Massachusetts (Table 29). Since at least FY2009, the total number of crew days used by limited access groundfish vessels across the Northeast has declined, though some states had an increase in crew days in FY2012.

The number of crew positions and crew days give some indication of the direct benefit to communities from the multispecies fishery through employment. But these measures, by themselves, do not show the benefit or lack thereof at the individual level. Many groundfish captains and crew are second- or third-generation fishermen who hope to pass the tradition on to their children. This occupational transfer is an important component of community continuity as fishing represents an important occupation in many of the smaller port areas.

8.7 Consolidation and Redirection

The multiple regulatory constraints placed on common pool groundfish fishermen are intended to control their effort and catch per unit effort (CPUE) as a means to limit mortality. Exemptions to many of these controls, which have been granted to sectors, may increase the CPUE of sector participants. As a result, sector fishermen may have additional time that they could direct towards non-groundfish stocks that they otherwise would not have pursued, resulting in redirection of effort into other fisheries. Additionally, to maximize efficiency, fishermen within a single sector may be more likely to allocate fishing efforts such that some vessels do not fish at all. This is referred to as fleet consolidation.

Both redirection and consolidation have been observed when management regimes for fisheries outside the Northeast US shifted toward a catch share management regime such as sectors. For

[23] Similar to a "man-hour," a "crew day" is calculated by multiplying a vessel's crew size by the days absent from port. Since the number of trips affects the crew-days indicator, the indicator is also a measure of work opportunity.

example, research following the rationalization of the halibut and sablefish fisheries by the North Pacific Fishery Management Council found individuals who received enough quota shares were able to continue fishing with less competition, greater economic certainty, and over a longer fishing season (Matulich & Clark 2001). However, individuals who did not receive enough of a catch share either bought or leased catch shares from other fishermen or sold their quota. Similarly, one year after implementation of the Bering Sea-Aleutian Island crab fishery Individual Transferable Quota (ITQ), a study found that about half of the vessels that fished the 2004/2005 Bering Sea Snow Crab fishery did not fish the following year. However, research on the ITQ plan for the British Columbia halibut fishery found efficiency gains were greatest during the first round of consolidation, and little incentive to increase efficiency (or continue consolidation) existed afterward (Pinkerton & Edwards 2009). The scope of consolidation and redirection of effort that may be expected to result from sector operations in FY2014 is difficult to predict.

8.8 Regulated Groundfish Stock Catch

The Northeast Multispecies FMP specifies Annual Catch Limits (ACLs) for 20 stocks. Exceeding an ACL for a stock results in the implementation of Accountability Measures (AMs) to prevent overfishing. The ACL is sub-divided into different components. Those components that are subject to AMs are referred to as sub-ACLs. There are also components of the fishery that are not subject to AMs. These include state waters catches that are outside of federal jurisdiction, and a category referred to as “other sub-components” that combines small catches from various fisheries.

Table 30to Table 32compare FY2013 catches to ACLs. As shown in Table 30catches exceed ACLs for three stocks: Northern and Southern windowpane flounder and GOM haddock. Table 32 summarizes catches by non-groundfish components of the ACLs. Assignment of catches to a specific FMP is difficult unless the FMP uses a specific gear (e.g. the scallop fishery) or has a trip activity declaration (e.g. groundfish and monkfish trips). For this reason, the assignment of catch to FMP should be viewed with caution.

Table 30- FY2013 Catches of Regulated Groundfish Stocks (Metric Tons, Live Weight)

Stock	Total Catch	Groundfish Fishery	Sector	Common Pool	Recreational	Midwater Trawl Herring Fishery	Scallop Fishery[1]	Small Mesh Fisheries	State Water	Other
	A to H	A+B+C	A	B	C	D	E	F	G	H
GB Cod	1,616.3	1,572.9	1,540.6	32.3					9.2	34.2
GOM cod	1,418.8	1,380.1	732.0	8.8	639.3				35.8	2.9
GB Haddock	3,330.1	2,977.5	2,977.1	0.4		290.0			6.1	56.5
GOM Haddock	405.7	402.9	169.2	2.2	231.5	0.0			1.3	1.6
GB Yellowtail Flounder	93.3	55.8	55.8	0.0			37.5	2.5	0.0	0.0
SNE/MA Yellowtail Flounder	466.1	373.3	281.9	91.4			48.6		14.5	29.8
CC/GOM Yellowtail Flounder	453.1	380.5	376.5	4.1					42.8	29.7
Plaice	1,444.6	1,395.2	1,391.6	3.6					19.6	29.8
Witch Flounder	745.2	642.3	638.9	3.4					27.1	75.8
GB Winter Flounder	1,763.1	1,722.0	1,722.0	0.0					0.0	41.0
GOM Winter Flounder	245.6	169.3	167.6	1.7					67.4	8.9
SNE/MA Winter Flounder	1,025.9	788.6	670.4	118.3					55.7	181.6
Redfish	4,023.5	4,000.6	3,996.2	4.4					19.0	3.9
White Hake	2,056.3	2,045.6	2,039.8	5.8					2.3	8.3
Pollock	7,029.1	4,915.0	4,878.4	36.5					981.7	1,132.4
Northern Windowpane	280.1	237.5	237.3	0.2					0.9	41.6
Southern Windowpane	554.7	115.9	86.0	30.0			129.1		37.3	272.4
Ocean Pout	59.3	33.2	27.3	5.9					1.5	24.6
Halibut	79.0	54.7	53.8	0.9					22.8	1.5
Wolffish	19.1	17.1	17.1	0.0					1.3	0.7

[1]Based on scallop fishing year March, 2013 through February, 2014

Values in metric tons of live weight

Sector and common pool include estimate of missing dealer reports

Source: NMFS Northeast Regional Office

Source: NMFS Greater Atlantic Regional Office

October 20, 2014, run date of July 15, 2014

Any value for a non-allocated species may include landings of that stock or misreporting of species and/or stock area. These are northern windowpane, southern windowpane, ocean pout, halibut, and wolffish.

These data are the best available to NOAA's National Marine Fisheries Service (NMFS). Data sources for this report include: (1) Vessels via VMS; (2) Vessels via vessel logbook reports; (3) Dealers via Dealer Electronic reporting; (4) Observers and at-sea monitors via the Northeast Fisheries Observer Program. Differences with previous reports are due to corrections made to the database.

Table 31 – FY2013 Catches as Percent of ACL

Stock	Components with ACLs and sub-ACLs; (with AMs)								sub-components: No AMs	
	Total Groundfish	Groundfish Fishery	Sector	Common Pool	Recreational	Midwater Trawl Herring Fishery	Scallop Fishery	Small Mesh Fisheries	State Water	Other
	A to H	A+B+C	A	B	C	D	E	F	G	H
GB Cod	84.8	87.0	86.8	101.0					46.0	42.8
GOM cod	96.5	104.9	90.2	48.9	131.5				34.7	5.7
GB Haddock	11.9	11.4	11.4	0.5		106.2			2.1	4.8
GOM Haddock	147.9	154.4	91.2	108.9	312.2	-			30.4	25.3
GB Yellowtail Flounder	44.7	36.1	36.5	0.4			90.3	63.7	NA	0.6
SNE Yellowtail Flounder	70.1	63.7	57.8	93.1			111.4		206.5	106.3
CC/GOM Yellowtail Flounder	86.7	79.4	80.9	31.5					130.2	271.3
Plaice	97.5	98.3	99.8	14.3					63.0	95.7
Witch Flounder	99.2	105.3	106.6	30.6					115.5	64.5
GB Winter Flounder	48.4	48.8	49.1	0.0					NA	36.5
GOM Winter Flounder	23.6	23.7	24.4	6.6					24.8	16.5
SNE/MA Winter Flounder	63.6	65.2	62.4	87.0					23.7	108.1
Redfish	38.5	39.5	39.6	10.9					17.3	1.8
White Hake	51.7	53.1	53.4	21.6					5.5	9.9
Pollock	47.1	38.1	38.1	40.2					104.9	103.7
Northern Windowpane	195.0	242.4	NA	NA					62.2	95.0
Southern Windowpane	105.3	113.7	NA	NA			70.5		67.9	146.4
Ocean Pout	26.9	16.9	NA	NA					62.6	116.4
Halibut	82.1	105.2	NA	NA					57.5	31.0
Wolffish	29.3	27.6	NA	NA					185.0	26.3

Values in percent of live weight (%), "-" for values exactly equal to zero

Source: NMFS Greater Atlantic Regional Office
October 20, 2014, run date of July 15, 2014

These data are the best available to NOAA's National Marine Fisheries Service (NMFS). Data sources for this report include: (1) Vessels via VMS; (2) Vessels via vessel logbook reports; (3) Dealers via Dealer Electronic reporting; (4) Observers and at-sea monitors via the Northeast Fisheries Observer Program. Differences with previous reports are due to corrections made to the database.

Table 32- FY2013 Catches by Non-Groundfish FMPs (Metric Tons, Live Weight)

Stock	Total Catch	SCALLOP[1]	FLUKE	HAGFISH	HERRING	LOBSTER/ CRAB	MENHADEN	MONKFISH	RESEARCH	SCUP	SHRIMP
GB cod	34.2	4.9	0.3	0.0	1.4	0.8	0.3	0.2	14.5	0.1	0.0
GOM cod	2.9	0.2	-	0.0	1.3	0.3	-	-	0.1	-	-
GB Haddock	56.5	3.5	0.1	0.0	5.2*	0.0	0.0	0.0	0.5	0.1	0.0
GOM Haddock	1.6	0.0	-	-	0.3*	-	-	-	0.0	-	-
GB Yellowtail Flounder	0.0	-*	-	-	-*	-	-	-	-	0.0	-
SNE Yellowtail Flounder	29.8	-*	5.7	-	1.3	0.0	0.0	0.0	1.3	5.6	0.0
CC/GOM Yellowtail Flounder	29.7	23.2	-	-	1.3	-	-	-	2.1	-	-
Plaice	29.8	13.5	0.7	-	1.3	0.0	0.0	0.0	0.8	0.8	0.0
Witch Flounder	75.8	26.7	5.7	0.0	3.3	0.1	0.1	0.0	0.6	4.7	0.0
GB Winter Flounder	41.0	25.0	-	-	1.5	-	-	-	-	0.1	-
GOM Winter Flounder	8.9	6.0	-	0.0	0.2	0.0	-	-	0.1	-	-
SNE Winter Flounder	181.6	78.2	10.8	-	4.7	0.0	0.1	0.0	19.9	9.7	0.0
Redfish	3.9	0.0	0.0	0.0	1.0	0.4	0.1	0.0	0.0	0.0	0.0
White Hake	8.3	1.0	0.1	0.0	2.0	1.0	0.3	0.1	0.1	0.2	0.0
Pollock	1,132.4	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.1	0.0	0.0
Northern Windowpane	41.6	40.7	-	0.0	0.2	0.0	-	-	0.0	0.0	-
Southern Windowpane	272.4	-*	66.9	-	3.0	0.1	0.5	0.0	0.0	69.6	0.0
Ocean Pout	24.6	2.9	0.5	0.0	2.0	0.0	0.0	0.0	0.0	0.5	0.0
Halibut[2]	1.5	0.2	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0
Wolffish	0.7	0.5	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Values in metric tons of live weight

[1]Based on scallop fishing year March, 2013 through February, 2014

[2] Note some Canadian landings of this stock are included in the most recent assessment for Atlantic halibut (2012 Assessment Update). However, Canadian landings for 2013 have not yet been reported to the Northwest Atlantic Fisheries Organization (NAFO), and, as a result, are not included here.

*Some or all catch attributed to separate sub-ACL as shown in Tables 1 through 5, and so is not included above.

Source: NMFS Greater Atlantic Regional Office
October 20, 2014, run date of July 15, 2014

These criteria are used by the Northeast Regional Office (NERO) to categorize trips to attribute groundfish catch for groundfish ACL accounting. By necessity these rules cannot capture the full complexity of categorizing every trip taken by vessels fishing in the Northeast. Further analysis should be completed to definitively attribute groundfish catch to an FMP for management purposes.

These data are the best available to NOAA's National Marine Fisheries Service (NMFS). Data sources for this report include: (1) Vessels via VMS; (2) Vessels via vessel logbook reports; (3) Dealers via Dealer Electronic reporting. Differences with previous reports are due to corrections made to the database.

Table 32Continued.

SQUID	SQUID/ WHITING	SURFCLAM	TILEFISH	WHELK/ CONCH	WHITING	UNKNOWN	RECREATIONAL
0.6	0.6	0.0	0.0	0.1	0.0	2.5	8.0
-	0.2	-	-	0.0	0.4	0.5	-*
14.8	15.5	0.0	0.0	0.0	0.0	16.7	-
-	0.3	-	-	-	0.5	0.5	-*
-*	0.0*	-	-	-	-	0.0*	
2.0	2.2	-	-	-	0.0	11.7	
-	0.6	-	-	-	1.3	1.3	
3.6	3.9	-	-	-	0.1	5.1	
8.7	9.9	0.0	0.0	0.0	0.2	15.8	
0.5	12.7	-	-	-	-	1.3	
-	0.1	-	-	0.0	0.2	2.3	0.1
14.5	11.2	-	-	-	0.0	32.4	0.0
0.6	0.7	0.0	0.0	0.0	0.0	0.9	
0.6	1.3	0.0	0.0	0.1	0.0	1.5	
1.0	1.0	0.0	0.0	0.0	0.0	1.3	1,128.0
0.0	0.6	0.0	-	0.0	0.0	0.1	
12.3	19.0	0.0	0.0	0.0	0.0	100.9	
5.6	5.9	0.0	0.0	0.0	0.1	6.9	
0.1	0.2	0.0	0.0	0.0	0.0	0.3	
0.0	0.0	-	-	-	0.0	0.1	

[1]Based on scallop fishing year March, 2013 through February, 2014

[2] Note some Canadian landings of this stock are included in the most recent assessment for Atlantic halibut (2012 Assessment Update). However, Canadian landings for 2013 have not yet been reported to the Northwest Atlantic Fisheries Organization (NAFO), and, as a result, are not included here.

*Some or all catch attributed to separate sub-ACL as shown in Tables 1 through 5, and so is not included above.

These criteria are used by the Northeast Regional Office (NERO) to categorize trips to attribute groundfish catch for groundfish ACL accounting. By necessity these rules cannot capture the full complexity of categorizing every trip taken by vessels fishing in the Northeast. Further analysis should be completed to definitively attribute groundfish catch to an FMP for management purposes.

These data are the best available to NOAA's National Marine Fisheries Service (NMFS). Data sources for this report include: (1) Vessels via VMS; (2) Vessels via vessel logbook reports; (3) Dealers via Dealer Electronic reporting. Differences with previous reports are due to corrections made to the database.

8.9 Fishery Sub-Components

8.9.1 Sector Harvesting Component

In FY2010, the sector vessels landed the overwhelming majority of the groundfish ACL. Each sector receives a total amount of fish it can harvest for each stock, its Annual Catch Entitlement (ACE). Since the ACE is dependent on the amount of the ACL in a given fishing year, the ACE may be higher or lower from year to year even if the sector's membership remains the same. There are substantial shifts in ACE for various stocks between FY2009 and FY2012 (Table 33). There has been a general decrease in trips, and catch for sector vessels, and there has been a shift in effort out of the groundfish fishery into other fisheries. However, these changes may correlate to a certain extent with the decrease in ACL.

Combined, 161M (live) pounds of ACE was allotted to the sectors in FY2011, but only 70M (live) pounds were landed. Of the 16 stocks allocated to sectors, the catch of 7 stocks approached (>80% conversion) the catch limit set by the ACE (Table 34). By comparison, the catch of only five stocks approached the catch limit set by the total allocated ACE in FY2010. The catch of white hake in FY2011 was particularly close to reaching the limit, with 98% of the white hake ACE being realized. As was the case in FY2010, the majority of the unrealized landings in 2011 were caused by a failure to land Georges Bank haddock. Collectively, East and West GB haddock, accounted for 63M pounds (62%) of the uncaught ACE in FY2011.

Table 33. Commercial groundfish sub-ACL, FY 2009 to FY 2012

Groundfish Stock	FY2009 TAC (lbs)	FY2010 ACL (lbs)	% Change 2009 to 2010	FY2011 ACL (lbs)	% Change 2010 to 2011	FY2012 ACL (lbs)	% Change 2011 to 2012
GB cod W	10,965,793	6,816,693	-37.84%	9,041,157	32.63%	9,795,138	8.34%
GB cod E	1,161,836	745,162	-35.86%	440,925	-40.83%	357,149	-19.00%
GOM Cod	23,642,373	10,068,512	-57.41%	10,637,304	5.65%	4,310,037	-59.48%
GB haddock W	171,861,356	62,725,923	-63.50%	46,164,798	-26.40%	45,322,632	-1.82%
GB haddock E	24,471,311	26,429,016	8.00%	21,252,562	-19.59%	15,167,804	-28.63%
GOM Haddock	3,448,030	1,818,814	-47.25%	1,715,196	-5.70%	1,439,619	-16.07
GB Yellowtail Flounder	3,564,875	1,814,404	-49.10%	2,517,679	38.76%	479,946	80.94%
SNE/MA Yellowtail Fl.	857,598	683,433	-20.31%	1,155,222	69.03%	1,675,513	45.04%
CC/GOM Yellowtail Fl.	1,895,975	1,717,401	-9.42%	2,072,345	20.67%	2,306,035	11.28%
Plaice	7,085,657	6,278,765	-11.39%	6,851,967	9.13%	7,226,753	5.47%

Witch Flounder	2,489,019	1,878,338	-24.53%	2,724,914	45.07%	3,192,294	8.34%
GB Winter Flounder	4,418,064	4,082,961	-7.58%	4,424,678	8.37%	7,467,057	68.76%
GOM Winter Flounder	835,552	348,330	-58.31%	348,330	0.00%	1,576,305	352.53 %
Redfish	18,990,619	15,092,846	-20.52%	16,625,059	10.15%	18,653,483	10.40
White Hake	5,238,183	5,635,015	7.58%	6,556,548	16.35%	7,237,776	10.39%
Pollock	13,990,535	36,493,118	160.84%	30,758,895	-15.71%	27,804,700	-9.60%
Totals	294,916,777	182,628,733	-38.07%	163,287,579	-10.59%	153,712,242	-5.86%

Table 34- Annual Catch Entitlement (ACE) and catch (Live lbs.)

	2010			2011			2012		
	Allocated ACE	Catch	% caught	Allocated ACE*	Catch	% caught	Allocated ACE*	Catch	% caught
Cod, GB East	717,441	562,610	78%	431,334	357,578	83%	350,835	148,576	42%
Cod, GB West	6,563,099	5,492,557	84%	9,604,207	6,727,837	70%	10,542,407	3,363,415	32%
Cod, GOM	9,540,389	7,991,172	84%	11,242,220	9,561,153	85%	9,008,557	4,808,408	53%
Haddock, GB East	26,262,695	4,122,910	16%	21,122,565	2,336,964	11%	15,126,216	806,562	5%
Haddock, GB West	62,331,182	13,982,173	22%	50,507,974	6,101,400	12%	51,898,296	1,832,577	4%
Haddock, GOM	1,761,206	819,069	47%	1,796,740	1,061,841	59%	1,599,136	540,299	34%
Plaice	6,058,149	3,305,950	55%	7,084,289	3,587,356	51%	7,771,254	3,530,494	45%
Pollock	35,666,741	11,842,969	33%	32,350,451	16,297,273	50%	30,670,586	14,097,873	46%
Redfish	14,894,618	4,647,978	31%	17,369,940	5,951,045	34%	19,933,122	9,751,824	49%
White hake	5,522,677	4,687,905	85%	6,708,641	6,598,273	98%	7,527,513	5,394,273	72%
Winter flounder, GB	4,018,496	3,036,352	76%	4,679,039	4,241,177	91%	7,752,484	4,256,996	55%
Winter flounder, GOM	293,736	178,183	61%	750,606	343,152	46%	1,590,301	568,828	36%
Witch flounder	1,824,125	1,528,215	84%	2,839,697	2,178,941	77%	3,409,459	2,162,678	63%
Yellowtail flounder, CC/GOM	1,608,084	1,268,961	79%	2,185,802	1,743,168	80%	2,448,240	2,103,947	86%
Yellowtail flounder, GB	1,770,451	1,625,963	92%	2,474,662	2,176,921	88%	802,654	474,540	59%
Yellowtail flounder, SNE	517,372	340,662	66%	963,033	795,267	83%	1,422,815	938,303	66%
Total	179,350,461	65,433,630	36%	172,111,201	70,059,346	41%	171,853,874	54,779,592	32%

Notes:
*includes carryover from the prior fishing year.
Stocks with > 80% ACE conversion highlighted in bold.
2010 and 2011 data from Murphy et al (Table 37, 2012). FY12 data from NERO.

8.9.2 Common Pool Harvesting Component

With the adoption of Amendment 16, most commercial groundfish fishing activity occurs under sector management regulations. There are, however, a few vessels that are not members of sectors and continue to fish under the effort control system. Collectively, this part of the fishery is referred to as the "common pool." These vessels fish under both limited access and open access groundfish fishing permits. Common pool vessels accounted for only a small amount of groundfish catch in FY2012 (Table 35). The largest common pool catch (pollock, 67.8 mt) was only 0.8% of the total groundfish fishery catch of this stock. Common pool vessels caught 0.8% of the GOM cod and 0.2% of the GOM haddock groundfish fishery catch.

Common pool vessels with limited access permits landed 1.3M lbs. (landed lbs.) of regulated groundfish in FY2010, worth over $2M in ex-vessel revenues (Table 35). Landings declined to 518K lbs., worth about $850,000 in FY2011and declined again in FY2012 to 358K lbs., worth $642,000. Most common pool vessel groundfish fishing activity takes place in the state of Massachusetts. From FY2010 to FY2011, the activity from Maine ports declined dramatically and from FY2011 to FY2012 the decline can be seen in Massachusetts (Table 36). The primary ports for this activity over the last 4 years (FY2009-2012) are Gloucester, Portland, and New Bedford (Table 37).

Table 35- Summary of common pool fishing activity

		A	C	D	E	HA	Total
FY2010	Permits landing groundfish	78	4	6	5	33	126
	Groundfish lbs. landed	1,256,311	1,843	2,012	596	35,367	1,296,129
	Groundfish revenues	$1,981,076	$4,727	$3,643	$682	$64,056	$2,054,184
FY2011	Permits landing groundfish	61	6	3	12	32	115
	Groundfish lbs. landed	401,715	31,844	2,836	1,990	80,441	518,831
	Groundfish revenues	$601,506	$62,408	$7,042	$2,634	$175,929	$849,526
FY2012	Permits landing groundfish	56	6		8	25	98
	Groundfish lbs. landed	281,212	52,955		1,954	22,251	358,414
	Groundfish revenues	$479,051	$109,630		$2,522	$51,132	$642,414

Notes: Confidential data excluded.

Table 36- Common pool groundfish landings by state of trip (landed lbs.)

	FY2010	FY2011	FY2012
CT	1,574	2,561	1,579
MA	809,231	372,282	169,662
MD		88	375
ME	344,783	49,559	49,260
NC	315		
NH	6,547	25,912	26,634
NJ	13,128	19,060	20,628
NY	94,900	37,115	58,331
RI	24,712	12,248	31,944
VA	916		
Total	1,296,106	518,825	358,414
Note: Confidential data removed			

Table 37- Common pool groundfish landings by port (landed lbs.)

Port	FY2010	FY2011	FY2012
Gloucester, MA	372,481	260,347	150,405
Portland, ME	333,852	40,520	34,054
New Bedford,	278,221	39,884	8,248
Provincetown,	100,952	51,561	2,116
Montauk, NY	75,460	17,894	54,212
Sandwich, MA	40,385	2,666	0
Point Judith, RI	3,478	4,708	13,161
Little Compton,	20,787	7,478	15,952
Hampton Bays,	13,512	6,807	3,770
Plymouth, MA	4,527	4,444	0
Rye, NH	1,491	20,304	21,845
Point Pleasant,	9,043	16,932	15,195

The primary groundfish stocks landed by common pool vessels include GOM cod, GB cod, and pollock (Table 35). GB haddock was an important component in FY2010 but not in FY2011 or FY2012. Vessels using HA and HB permits on groundfish trips primarily target GB and COM cod, GOM haddock, and pollock.

For the common pool permits that landed at least one pound of regulated groundfish in either FY2010 or FY2011, groundfish revenues were a major portion of revenues on groundfish fishing trips. Groundfish revenues were 80% or more of the trip revenues for 49% of these vessels; they were 60% of the revenues for 61.5% of these vessels. Dependence on groundfish was greatest for HA permitted vessels, with 70% of these vessels earning all revenues on these trips from regulated groundfish.

Table 38- Common pool landings (landed lbs.) by permit category and stock

FY2010 Landings	A	C	D	E	HA	Total
GB Cod W	109,582	1,120	1,269		6,179	118,150
GOM Cod	350,947	651			17,048	368,646
GB Haddock W	177,033				202	177,235
GOM Haddock	12,257				995	13,252
GB Yellowtail Flounder	17,260					17,260
SNE Yellowtail Flounder	32,901			596		33,497
CC/GOM Yellowtail Flounder	35,969				245	36,214
Plaice	48,020				112	48,133
Witch Flounder	57,158					57,158
GB Winter Flounder	13,011					13,011
GOM Winter Flounder	45,172				250	45,423
SNE Winter Flounder	4,646					4,646
Redfish	14,007				763	14,769
White Hake	68,756				139	68,894
Pollock	265,840		730		9,156	275,726
Southern Windowpane	3,566					3,566
Halibut	162				255	417
Wolffish	3					3
Total	1,256,290	1,771	1,999	596	35,344	1,296,000
FY2011 Landings	A	C	D	E	HA	Total
GB Cod W	102,450	3,186	168		15,577	121,382
GB Cod E	3,340					3,340
GOM Cod	53,984	18,816	2,666		54,982	130,448
GB Haddock W	33,053				85	33,138
GOM Haddock	1,945	161			763	2,869
GB Yellowtail Flounder	3,944			1,521		5,465
SNE Yellowtail Flounder	25,272					25,272
CC/GOM Yellowtail Flounder	23,408	66		19		23,493
Plaice	10,213	686				10,899
Witch Flounder	9,448	972				10,420
GB Winter Flounder	2,411					2,411
GOM Winter Flounder	5,257	374				5,631
SNE/MA Winter Flounder	816					816
Redfish	7,208	38			147	7,393
White Hake	19,901	2,890			177	22,968
Pollock	89,533	4,653			7,644	101,830
Northern Windowpane	850					850
Southern Windowpane	8,607					8,607
Halibut					1,065	1,065

Total	401,640	31,842	2,834	1,540	80,441	518,297
FY2012 Landings	A	C	D	E	HA	Total
GB Cod W	38,725	266			9,428	48,419
GOM Cod	13,209	22,379	16		8,983	44,587
GB Haddock W	13,373					13,373
GOM Haddock	1,117	420			470	2,007
GB Yellowtail Flounder	758			1,550		2,308
SNE Yellowtail Flounder	77,293			285		77,578
CC/GOM Yellowtail Flounder	876	799				1,675
Plaice	4,028	1,443				5,471
Witch Flounder	3,671	795				4,466
GB Winter Flounder	1,626					1,626
GOM Winter Flounder	669	1,775				2,444
SNE Winter Flounder	278					278
Redfish	11,678	253			25	11,956
White Hake	19,936	10,586			160	30,682
Pollock	92,614	14,221			3,122	109,957
Southern Windowpane	940					940
Ocean Pout		18				18
Halibut	218					218
Total	281,010	52,955	16	1,835	22,188	358,004

8.9.3 Recreational Harvesting Component

The recreational fishery includes private anglers, party boat operators, and charter vessel operators. Several groundfish stocks are targeted by the recreational fishery, including GOM cod, GOM haddock, pollock, and GOM winter flounder. GB cod and haddock are targeted as well, but to a lesser extent. SNE/MA winter flounder is also a target species. Amendment 16 (Section 6.2.5, NEFMC 2009) included a detailed overview of recreational fishing activity.

Recreational removals of GOM cod declined by 72% from FY2011 to FY2012, but then increased slightly in FY2013 (Table 39). Removals of GOM haddock were more equivalent through the time series. The number of angler trips also declined by about 30% (Table 40). There were 122 active party or charter vessels catching cod or haddock in the Gulf of Maine in 2013, down from of 188-195 vessels between 2004-2010.

Table 39- Recent recreational fishing activity for GOM cod and GOM haddock

	FY2011	FY2012	FY2013
Angler Trips	235,343	182,999	225,624
Cod Total Catch (numbers, a+b1+b2)	1,389,408	846,655	879,366
Cod Removals (numbers, a+b1+(0.3*b2)))	773,085	410,231	491,568
Cod Removals (weight, mt)	2,116	596	706
Haddock Total Catch (numbers, a+b1+b2)	184,709	369,427	654,227
Haddock Total removals (numbers, a+b1)	146,042	166,610	146,976
Haddock Total Removal (weight, mt)	231	211	256
Note: FY2013 catches are an estimate since not all data are			

Table 40- Recreational vessels catching cod or haddock from the Gulf of Maine

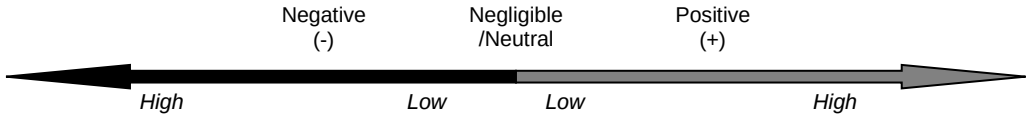
Calendar Year	Party	Charter	Total
1999	53	100	153
2000	48	103	151
2001	59	116	175
2002	43	130	173
2003	53	128	181
2004	64	124	188
2005	60	135	195
2006	62	126	188
2007	52	133	185
2008	54	128	182
2009	48	131	179
2010	60	135	195
2011	47	128	175
2012	44	108	152
2013	31	89	120
Notes: Includes catch (kept and discarded)			

from any of the Gulf of Maine statistical areas. Source: NERO, January 2014.

9.0 Direct and Indirect Impacts of the Alternatives

Impacts from all alternatives are judged relative to the baseline conditions, as described in Section 6.0 and compared to each other.

Impact Definition			
	Direction		
VEC	**Positive (+)**	**Negative (-)**	**Negligible (Negl)**
Allocated target species, other landed species, and protected resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
Impact Qualifiers:			
Low (L, as in low positive or low negative)	To a lesser degree, but not significant		
High (H; as in high positive or high negative)	To a substantial degree, but not significant		
Likely	Some degree of uncertainty associated with the impact		



9.1 Biological Impacts

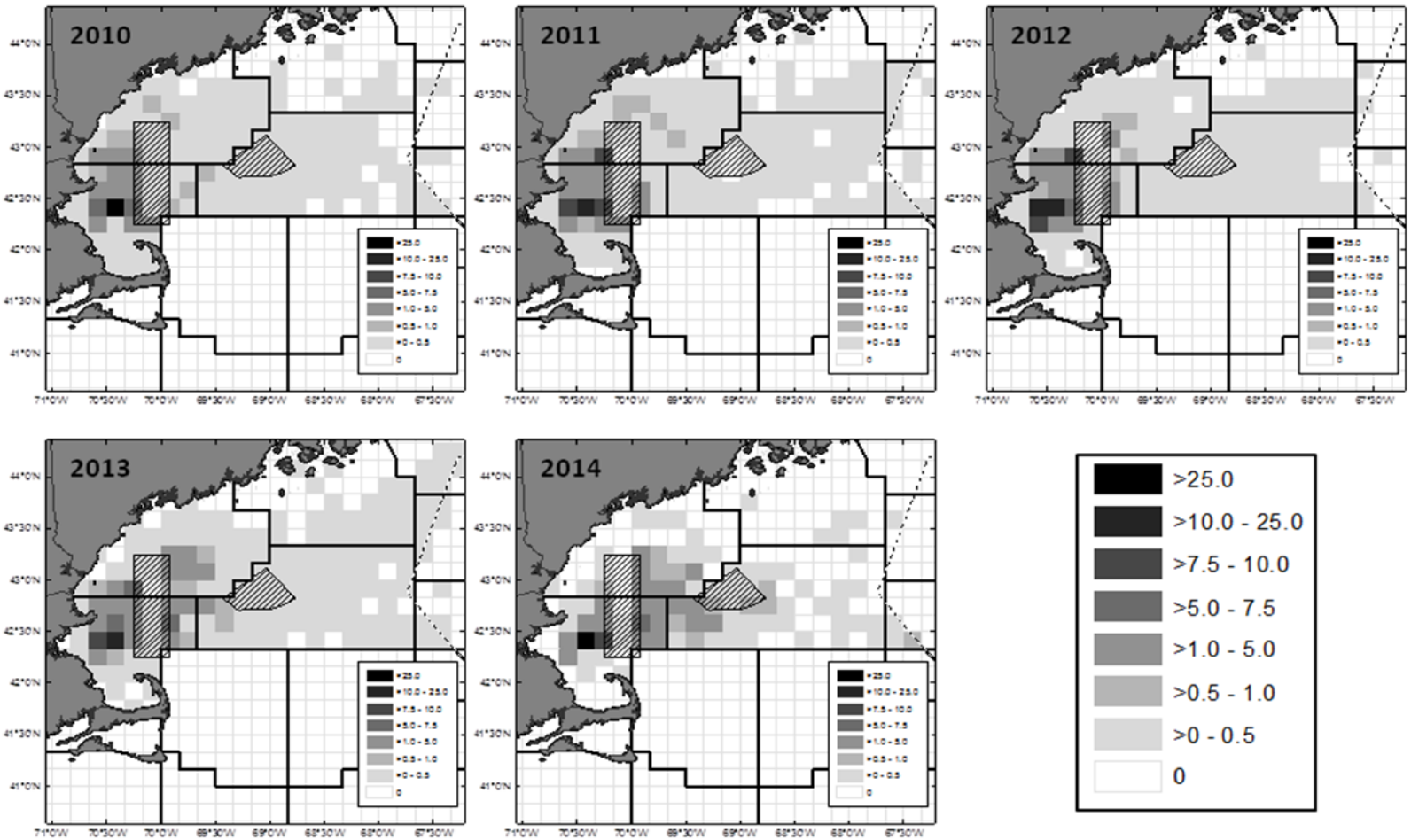
9.1.1 Status Quo/No Action

Under the status quo/no action there would be no changes made during fishing year 2014 to modify the existing FMP closure areas or enact other measures that would reduce GOM cod fishing mortality or provide additional protection to GOM cod spawning activities. Under such a scenario, overfishing is expected to continue at a very high level for the fishing year. Aggregated cod and/or areas of high recent catch and bycatch may be susceptible to continued high rates of removal. Spawning activities such as pre-spawn courting rituals, aggregation, actual spawning, and post-spawning foraging may be disrupted by fishing activities or fish removal through capture.

Plan development team evaluation indicated that if the total fishing year 2014 GOM cod ACL of 1,470 mt is fully harvested, the fishing mortality rate (F) would be 0.76 to 0.85 (dependent on model approach and natural mortality assumptions). The overfishing limit is 0.18 under all model approaches; thus, if fishing is not constrained in some manner the potential fishing mortality rate could be 4-5 time higher than desired.

Cod continue to be taken at disproportionately higher rates from several key inshore areas. While analysis indicates that the distribution of GOM cod catch has shifted some to the east in 2013 and through summer 2014, the inshore areas have historically been important areas of catch and spawning. Figure 30 shows the changes of catch distribution of GOM cod for 2010 through July 2014. The importance of the inshore area, west of the WGOM Closure Area, can be seen from these distribution maps.

Figure 30. Annual percentage of commercial Gulf of Maine cod landings by ten minutes square from calendar years 2010-2014 (2014 plot only includes data reported through July)



In addition, some areas identified by OHA2 analysis[24] (incorporated here by reference) and the Industry Based Survey (IBS)[25] as important potential areas of seasonal cod spawning would not be protected (as shown under section 9.1.2). The existing rolling closures apply to several inshore GOM areas in May-July. OHA2/ Closed Area Technical Team (CATT), IBS, and Massachusetts Division of Marine Fisheries analysis indicate that many of these same areas are important aggregation areas beginning in November and running through May.

Under the status quo, sector vessels would continue to target cod up to their available ACE, because trip limits would not be in place. This would be expected to cause continued high levels of catch-related mortality. Due to all these concerns, the status quo/no action alternative would likely have high negative impacts on the GOM cod stock.

9.1.2 Alternative 2 (Preferred Alternative)

Under the preferred alternative, fishing mortality is expected to be reduced (i.e., overfishing reduction) by a combination of measures. In particular, the combination of commercial and recreational fishery closure areas, the prohibition on recreational possession, and commercial trip limits are expected to have positive impacts on GOM cod stock when compared to Alternative 1. Analysis indicates that the seasonal closures have the potential to reduce catch by substantial amounts, as outlined in Table 41.

Table 41. Potential GOM cod catch reduction comparison of alternatives, by fleet, for 2010-partial 2014 (2014 analysis includes data through September, 2014).

Fleet	Year	Landings in open areas		Fractional reduction
		No action	Alternative 2	
Commercial (mt)	2010	4,170	877	0.79
	2011	3,587	840	0.77
	2012	2,207	399	0.82
	2013	754	203	0.73
	2014	371	117	0.68
Recreational (000s fish)	2010	205	45	0.78
	2011	152	42	0.73
	2012	100	19	0.81
	2013	136	29	0.78
	2014	38	7	0.81

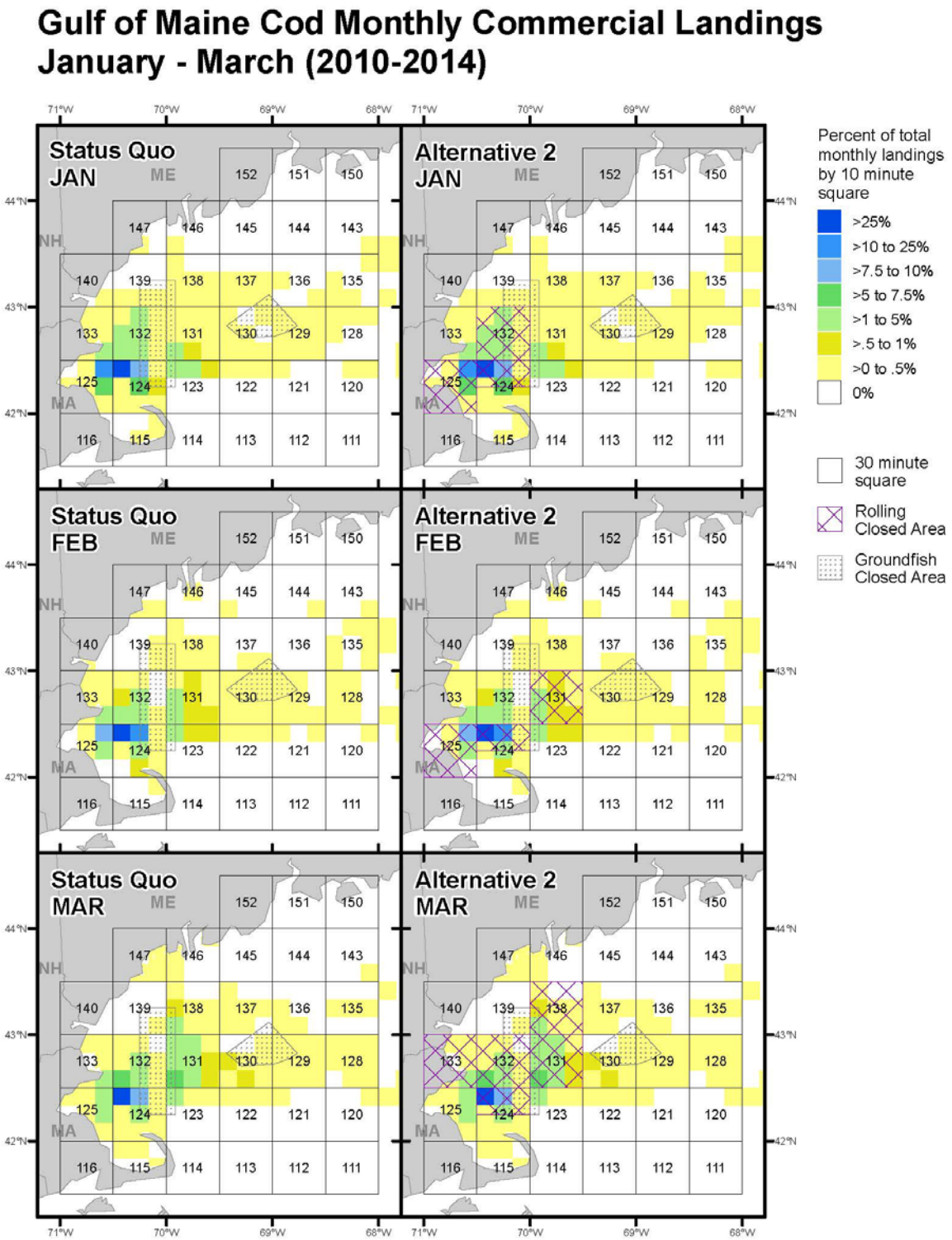
[24] Omnibus Essential Fish Habitat Amendment 2 Draft Environmental Impact Statement; Appendix E – Synopsis of Closed Area Technical Team analysis of juvenile groundfish habitats and groundfish spawning areas

[25] An industry based cooperative research project conducted 2003-2007 in the months of November-May

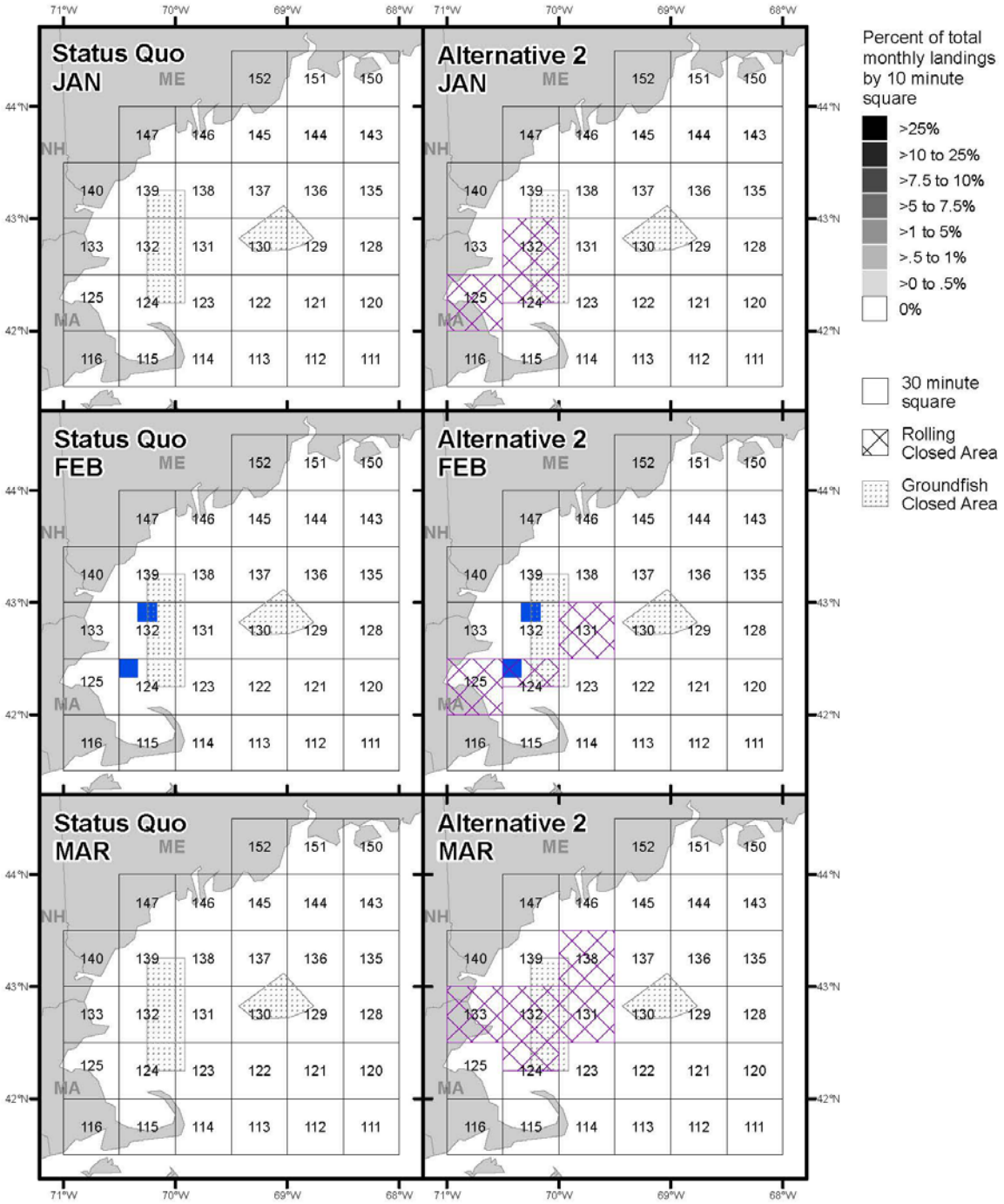
These potential reductions must be viewed with some caution: It is not possible to completely predict how fishing behaviors will change in response to the seasonal closures, prohibition on recreational possession, commercial trip limits, and single broad stock area requirement. Substantial catch, sufficient to cause overfishing, has already occurred in fishing year 2014. The only reduction in overfishing available; therefore, is within the context of what remains available for the fishing year. In addition, effort may shift and even increase to the available open areas. This should not cause a large increase in GOM cod mortality based on the catch data from 2010-2014. As outlined in Table 41, the amount of catch that has come from open areas ranges from 32 to 18 percent for the commercial fishery and 27 to 19 percent from the recreational fishery.

Figure 31 shows that the interim action closures being implemented are expected to prohibit commercial and recreational fishing in many of the areas where catch has been highest in recent years.

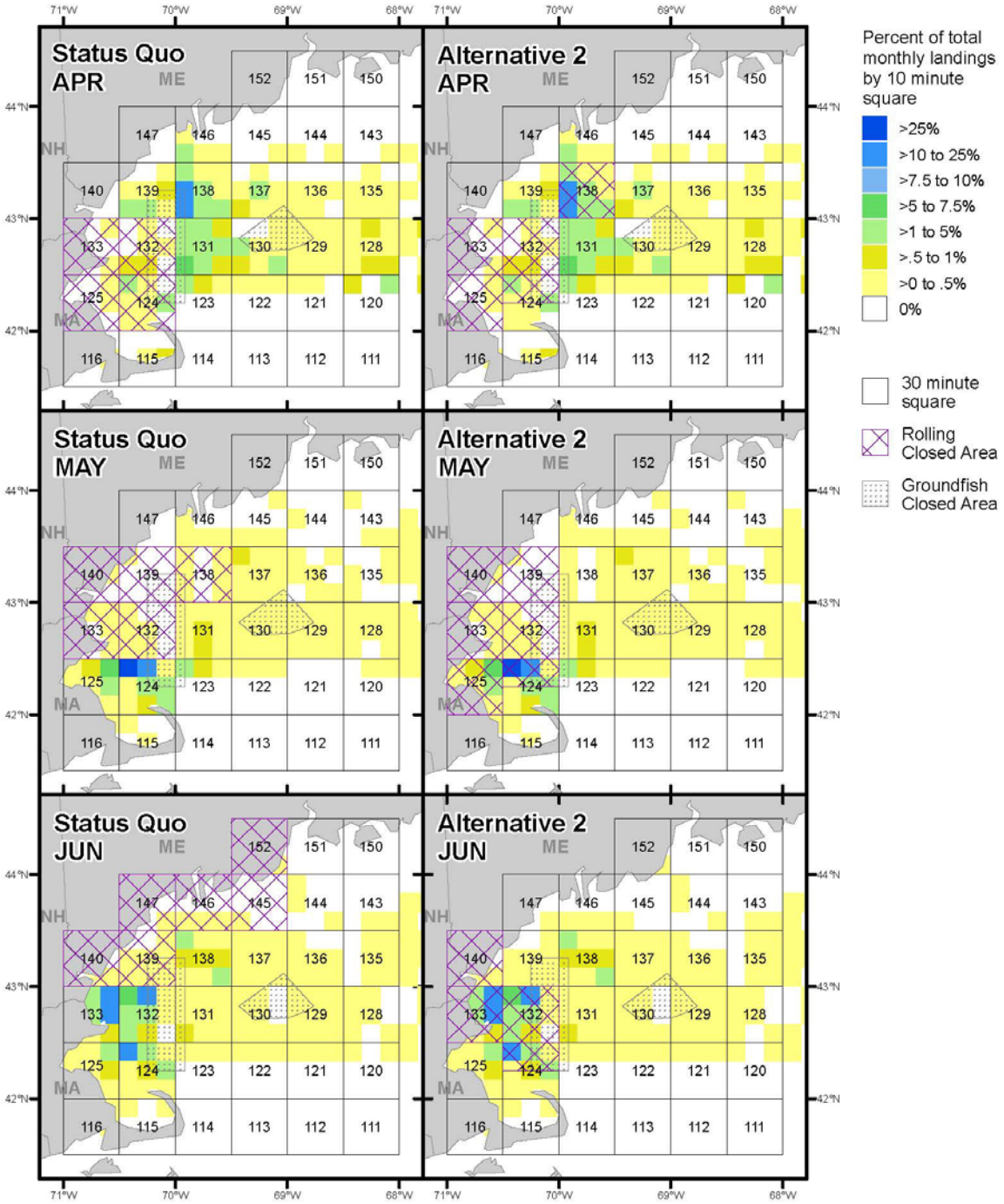
Figure 31. Comparison of the Proportion of Commercial and Recreational GOM cod landings, by month, for 2010-partial Calendar Year 2014 for Alternative 1 (status quo/no action) and Alternative 2.



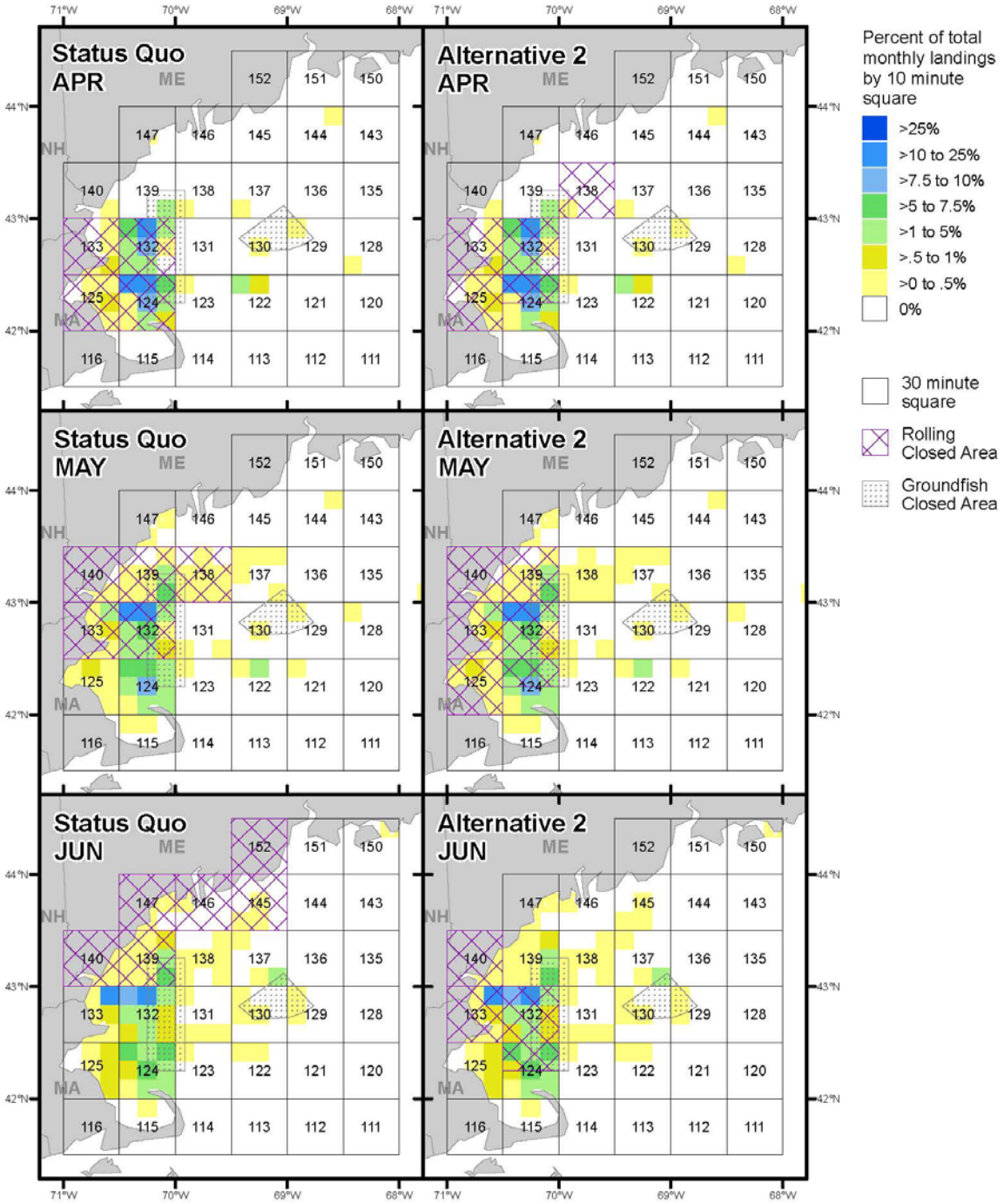
Gulf of Maine Cod Monthly Recreational Landings January - March (2010-2014)



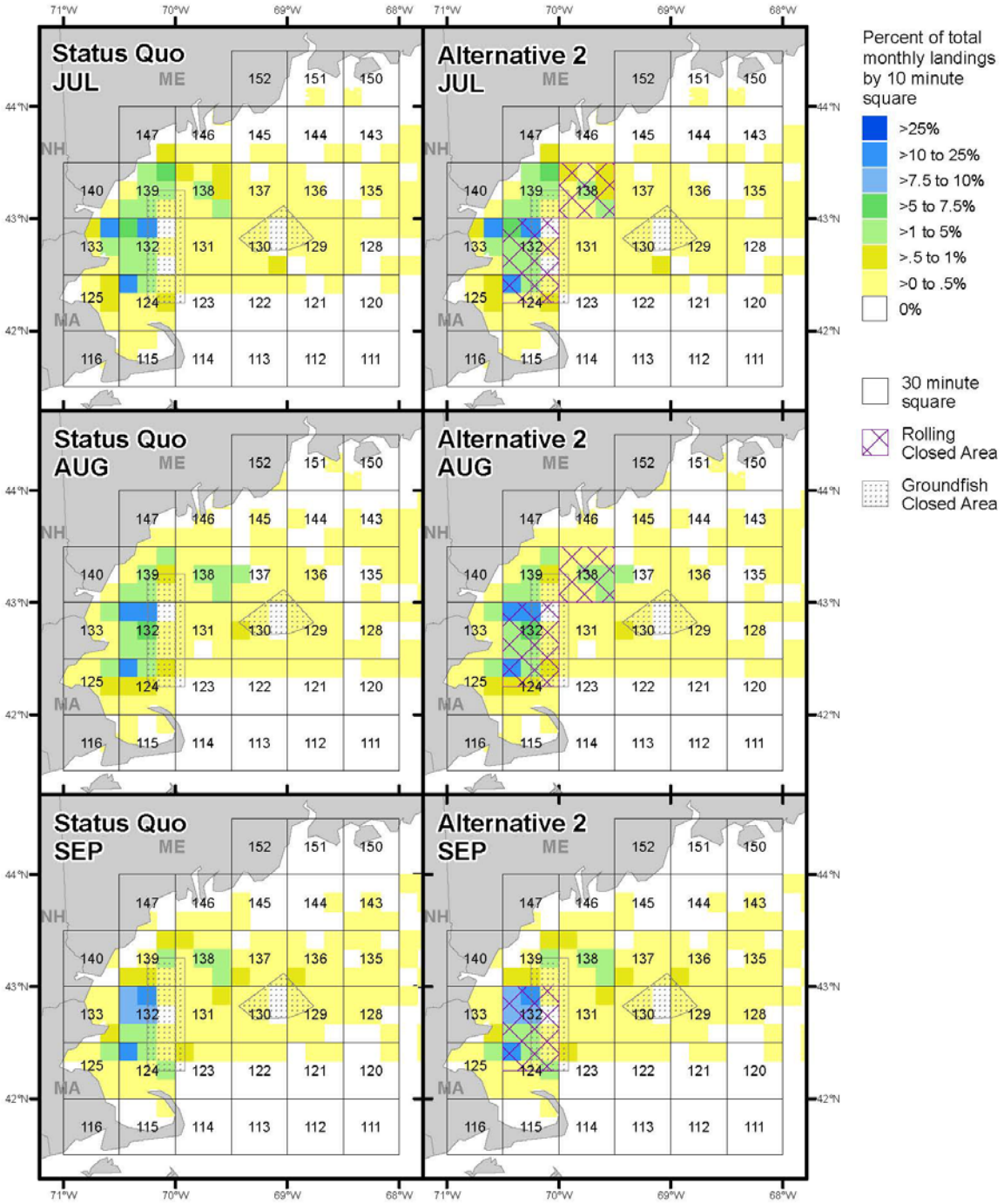
Gulf of Maine Cod Monthly Commercial Landings April - June (2010-2014)

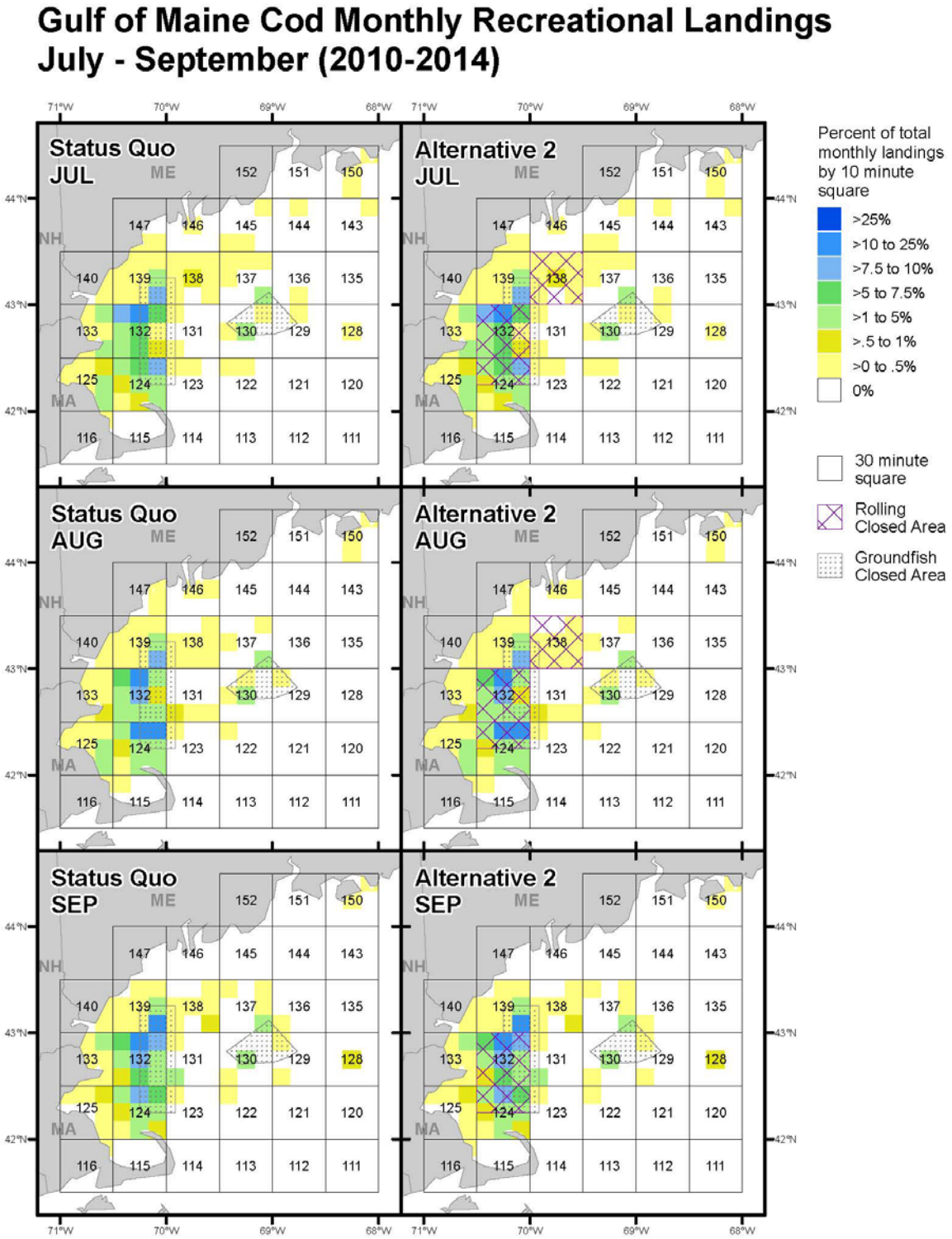


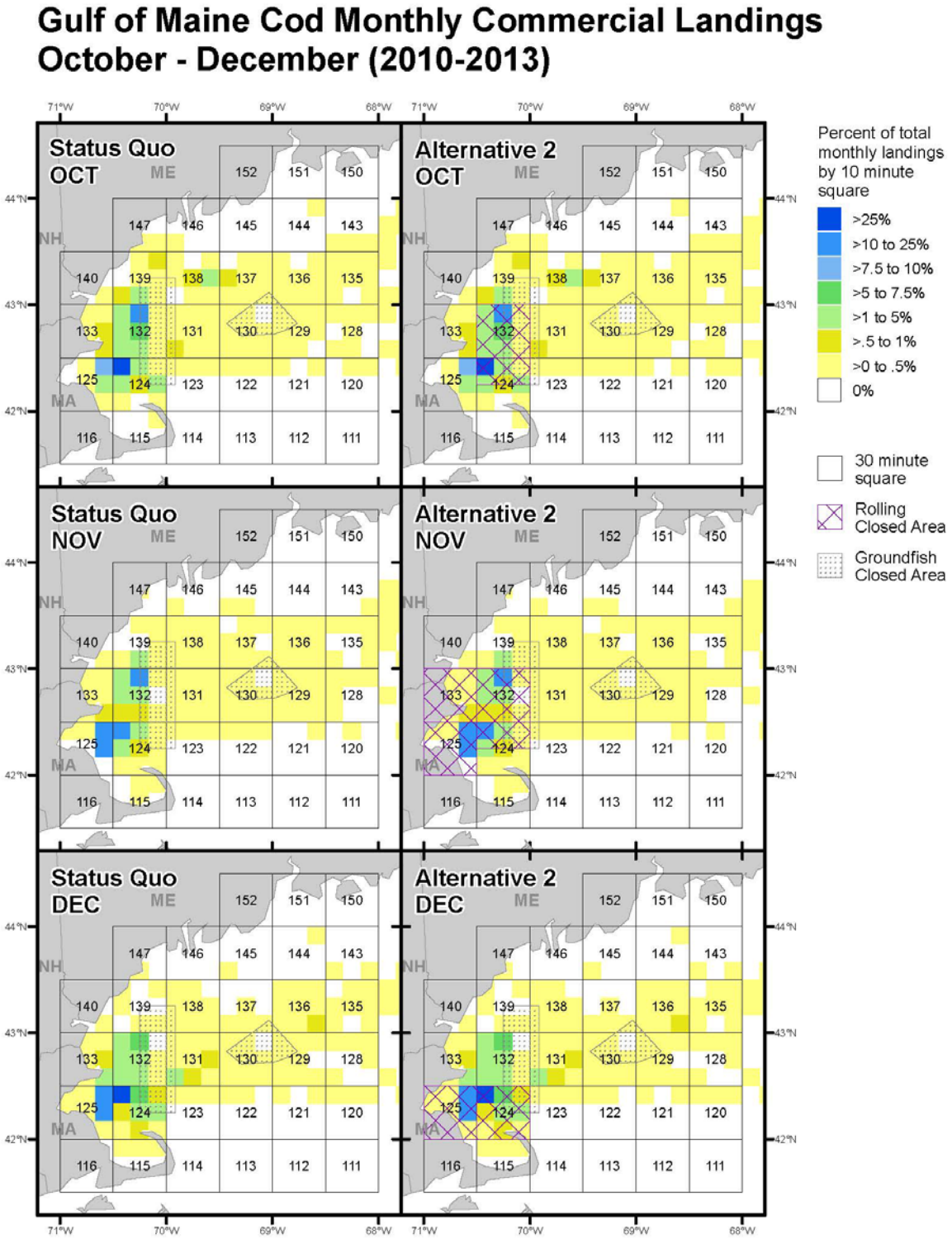
Gulf of Maine Cod Monthly Recreational Landings April - June (2010-2014)



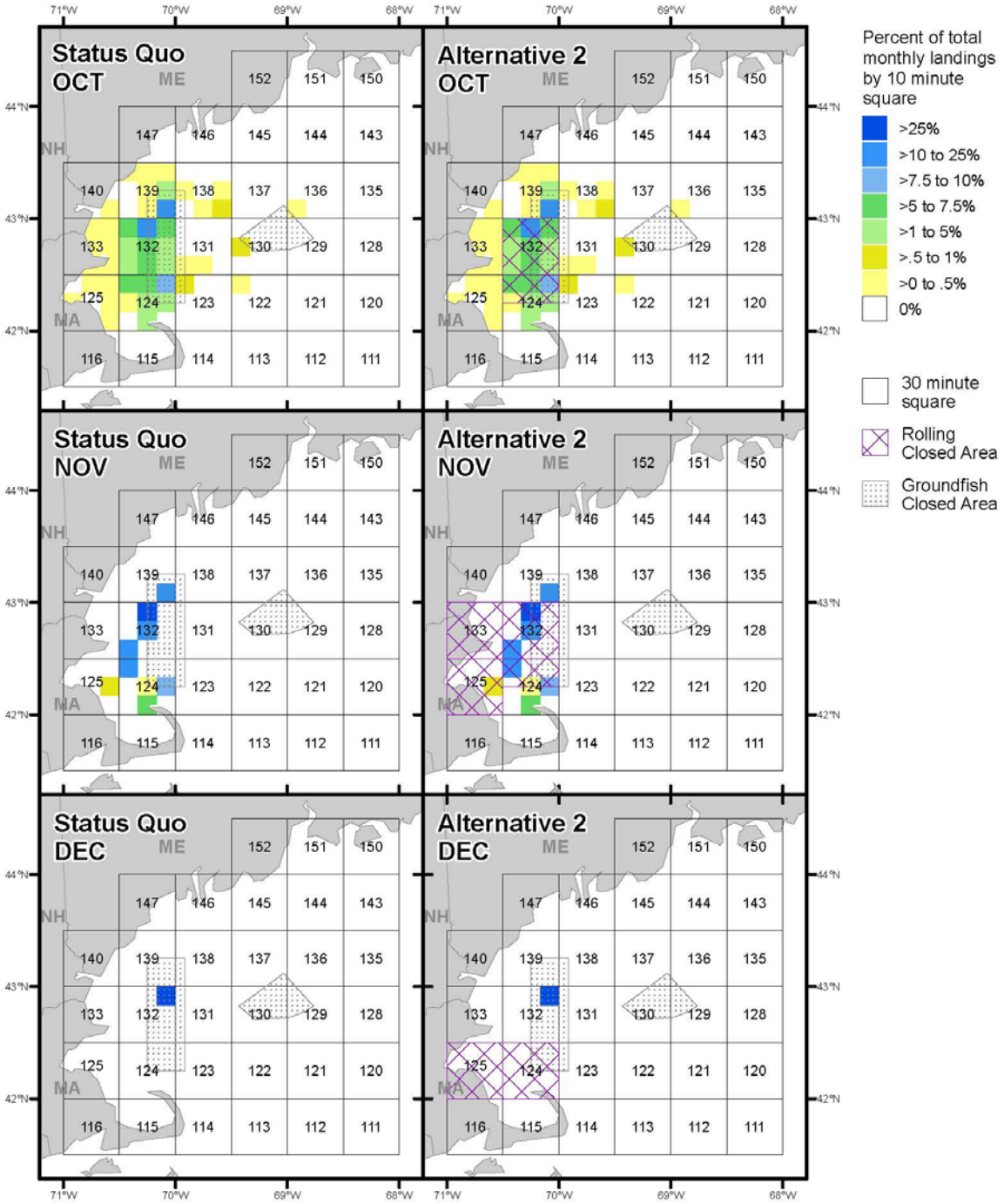
Gulf of Maine Cod Monthly Commercial Landings July - September (2010-2014)




Gulf of Maine Cod Monthly Recreational Landings
July - September (2010-2014)
Status Quo
JUL
Alternative 2
JUL
Status Quo
AUG
Alternative 2
AUG
Status Quo
SEP
Alternative 2
SEP
ME
NH
MA
71°W
70°W
69°W
68°W
44°N
43°N
42°N
Percent of total monthly landings by 10 minute square
>25%
>10 to 25%
>7.5 to 10%
>5 to 7.5%
>1 to 5%
>.5 to 1%
>0 to .5%
0%
30 minute square
Rolling Closed Area
Groundfish Closed Area


Gulf of Maine Cod Monthly Commercial Landings
October - December (2010-2013)
Status Quo
OCT
Alternative 2
OCT
Status Quo
NOV
Alternative 2
NOV
Status Quo
DEC
Alternative 2
DEC
ME
NH
MA
71°W
70°W
69°W
68°W
44°N
43°N
42°N
Percent of total monthly landings by 10 minute square
>25%
>10 to 25%
>7.5 to 10%
>5 to 7.5%
>1 to 5%
>.5 to 1%
>0 to .5%
0%
30 minute square
Rolling Closed Area
Groundfish Closed Area

Gulf of Maine Cod Monthly Recreational Landings October - December (2010-2013)



This qualitative evaluation also suggests that the amount of catch reduction will reduce overfishing on the GOM cod stock for duration of the action.

Catch has already occurred during the fishing year, so it is not possible that catch can be reduced to the levels shown in Table 41. However, by evaluating what catch has occurred, it can infer the potential catch reduction available for the remainder of the year. Through October 21, 2014, commercial fisheries (common pool and sectors) have caught (landings + discards) 346 mt of GOM cod. This is roughly 42 percent of the fishing year 2014 commercial fishery sub-ACL. Recreational fisheries catch for May-August 2014, the period for which GOM cod could be legally retained during fishing year 2014 to date, is estimated at 551 mt from the Marine Recreational Information Program (MRIP). The fishing year 2014 recreational sub-ACL is 486 mt. Thus, the combined known catch to date is approximately 897 mt. Approximately 573 mt remains available under the 2014 fishing year ACL. The challenge in predicting where and how effort may shift is one complication in projecting how effective the interim measures may be. Also, catch from state waters and other sub-components (other fisheries that may catch and discard cod) are not easily forecasted inseason. While these later components are a relatively small aspect of the overall fishery, they do contribute to total mortality on the stock. That said, if the remaining available ACL catch is reduced by half (i.e, 287 mt), then the total catch may be approximately 1,200 mt for the year. This would be close to a 20-percent reduction in catch and fishing mortality from what would be available under the total 1,470 mt ACL. It is possible that the amount of reduction could be greater than this conservative example. Table 42 provides further evaluation of a range of potential reductions, considering various levels of effective catch reduction of remaining available catch from 10 to 75 percent.

Table 42. Potential catch reduction for fishing year 2014 Gulf of Maine cod, based on catch to date and remaining ACL to be harvested before April 30, 2015.

Catch to date (mt) [1]			
Commercial	Recreational	Total Catch	Remaining ACL unharvested
346	551	897	573
ACLs and sub-ACLs (mt)			
Commercial	Recreational	Total	
1,316	486	1,470	
[1] Based on commercial catch through October 21 and recreational catch through October 31, 2014.			
Potential catch based on possible reduction of catch in remaining ACL (573 mt)			
Reduction		Total Catch (mt)	Percent of Total ACL
10%		1,413	96%
15%		1,384	94%
25%		1,327	90%
35%		1,269	86%
50%		1,184	81%
75%		1,040	71%

To better demonstrate the magnitude of potential overfishing reduction, Table 43 shows the expected fishing mortality (F) reduction based on the three primary GOM cod model

configurations (M = natural mortality). Note the catch reductions in Table 44 differ from those in 43; Table 43 considers the potential reduction from the amount of GOM cod remaining to be caught. Table 44 evaluates the potential reduction if applied to the starting total ACL. As such, the evaluations are slightly different (e.g., Table 43 reduction of 25 percent has projected catch of 1,327 mt; Table 44 shows a 25-percent reduction from the total ACL as 1,103—a difference of 224 mt). A 10-percent reduction in catch in comparison to the ACL (i.e., 1,323 mt) or a 15 percent reduction in remaining available catch (i.e., total catch of 1,384 mt) results in an approximate reduction of fishing mortality of 12 percent.

Table 43. Potential realized fishing mortality reductions (F) for fully selected GOM cod based on a range of potential total ACL changes. Overfishing limit under all model approaches is F =

Percent ACL reduction (%) [1]	FY catch (mt)	Model		
		M=0.2	M-ramp	
		No retro. adj.	M=0.2	M=0.4
		F_{full}	F_{full}	F_{full}
0%	1,470	0.80	0.76	0.85
10%	1,323	0.71	0.67	0.74
25%	1,103	0.57	0.54	0.60
50%	735	0.36	0.34	0.38
75%	368	0.17	0.16	0.18

[1] *Note: The percent reductions are an evaluation of reduction from the total, not a reduction in remaining available catch. As such, values of catch differ from those in Table 42.*

Irrespective of the magnitude of overfishing reduction, reducing overfishing by lowering catch is expected to have a positive impact on the GOM cod stock relative to the status quo. With the stock level of abundance very low, it is important to preserve as much standing stock as possible.

The closure areas in Alternative 2 are also expected to provide substantial protection to spawning GOM cod, which will have additional positive impacts on GOM cod. This is because spawning will not be disrupted, nor will spawning individuals in the population be removed at a key time when aggregated for spawning. Information from the Council's OHA2 and CATT analyses, data from the IBS and MA DMF, as well as literature indicate that the timing and location of likely GOM cod spawning events are well understood and can be protected temporarily and spatially (see also section 6.3). Furthermore, literature, particularly that which examines the Atlantic Canada Northwest Atlantic cod stock collapse, and work by GOM cod researchers, including NMFS and MA DMF, indicate that gadid fishes such as GOM cod have complex courtship and spawning behaviors that are susceptible to disruption by fishing activities. (Dean et al. 2012). Targeting spawning aggregations may negatively impact long term stock productivity and mask declines in overall biomass as catch rates can remain high as fish densities are high during spawning (Armstrong et al. 2013). Disruption of spawning activity through fishing activity will likely further reduce recruitment success from record low spawning stock biomass. Figure 32 shows the distribution of ripe and running fish taken in the industry based survey conducted 2003-2007 in November through May.

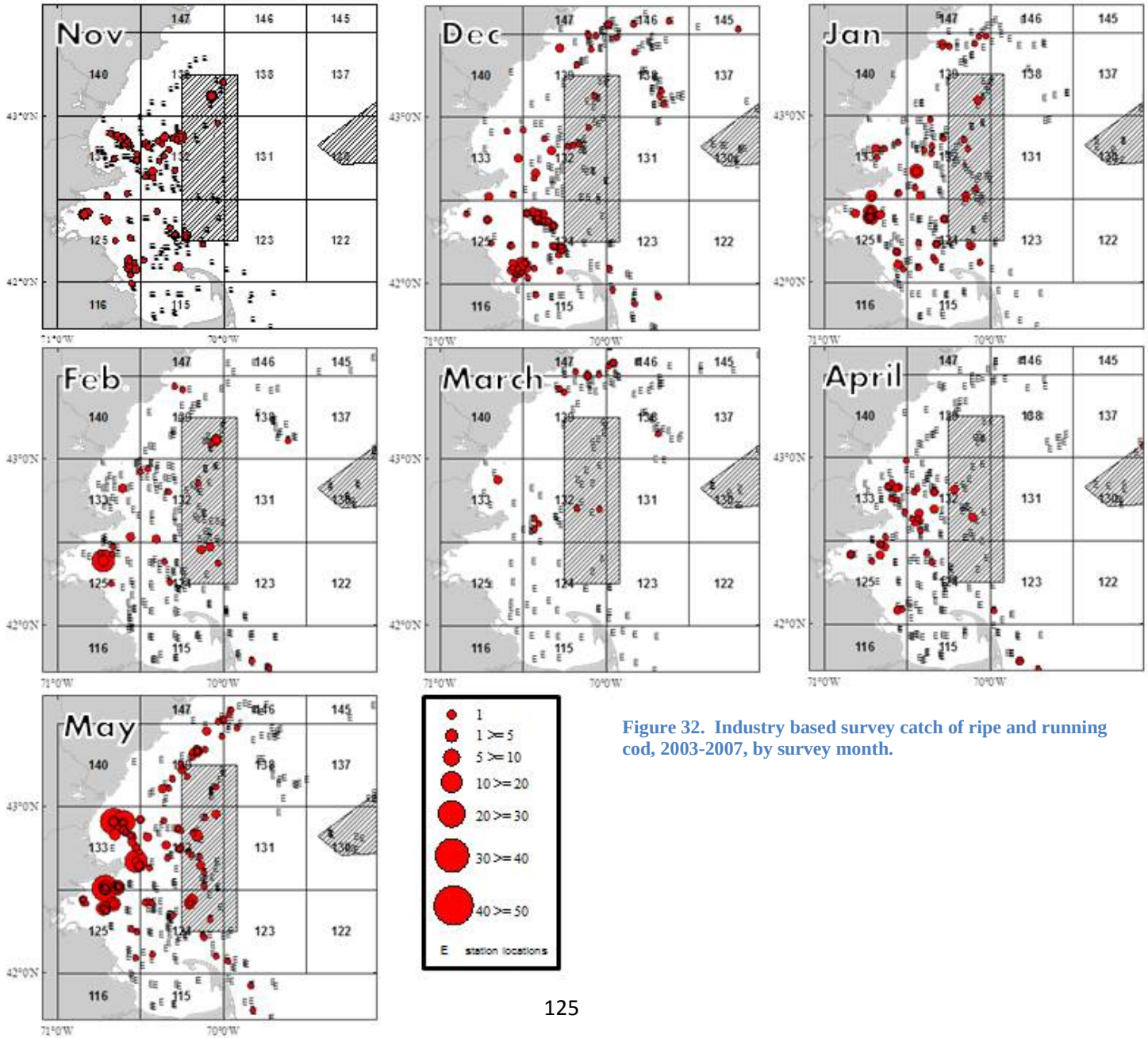


Figure 32. Industry based survey catch of ripe and running cod, 2003-2007, by survey month.

The use of commercial (sector and common pool) trip limits in the areas are designed to give fishermen an incentive to avoid targeting GOM cod. Analyses in section 9.5.2 suggest that a trip limit may not be a strong economic incentive to avoid cod and that the tradeoff in potential mortality reduction versus loss of revenue from discard fish is potentially disproportionate. However, any reduction in cod mortality in this interim action is beneficial. More importantly, in the short-term context of this action, trip limits could serve a greater purposes as a safeguard against unpredictable targeting of cod in the remaining open areas, particularly if there are unforeseen shifts in concentrations of cod or fishing effort. In such a case, the measures of this action would be substantially compromised if fishing were allowed to continue unfettered in open areas. Trip limits are the most likely short-term measure, short of changing ACLs, that can dissuade unexpected utilization of available catch limits in the remaining open areas. When used in conjunction with the other measures of the preferred alternative, trip limits are projected to effect fishing mortality reduction for the remainder of the fishing year and into next year, should measures be extended. Should the trip limits discourage cod targeting or available catch limit utilization behavior in this manner, they will increase the positive impact on GOM cod in comparison to Alternative 1 as the limits will assist in at least some additional catch reduction.

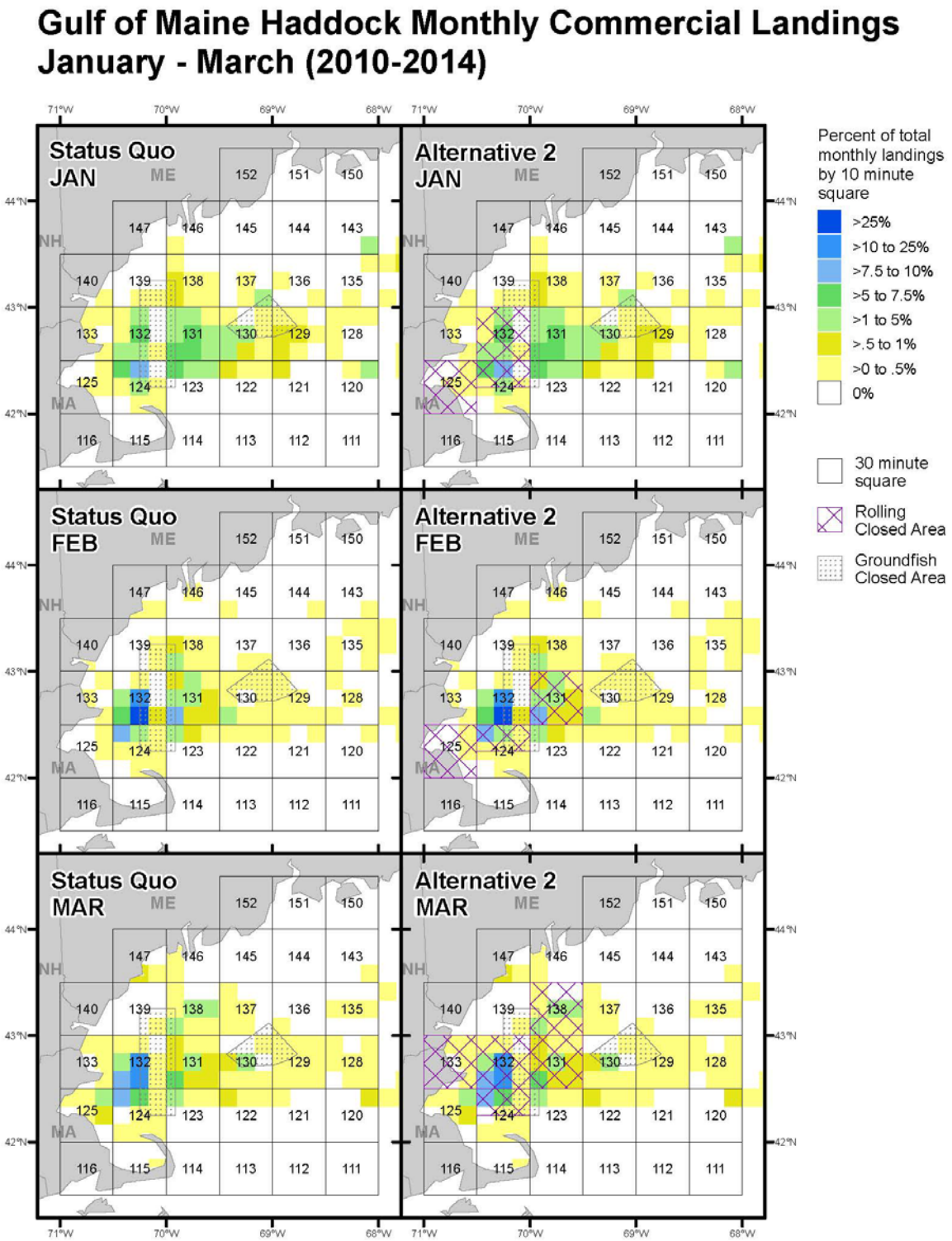
Figure 34 shows the catch trip-level catch distribution of cod from the 30 minute squares in 2013. This figure only includes trips from when the areas were open to commercial fishing under Alternative 2 measures. The red line indicates 200 pounds. There are clearly some trips that consisted of much higher amounts of cod landings, approaching or exceeding 2,000 pounds. However, most trips, on average, landed 200 pounds or less. This may mean that even if the trip limits do not influence targeting behavior that commercial fishermen may not encounter large amounts of cod. This would lessen the potential for large scale regulatory discard. Catch and subsequent discard of cod caught above and beyond the 200 pound trip limit will have a neutral impact on GOM cod in comparison to Alternative 1. In most cases, the fish will not survive capture; however, under Alternative 2 measures cod in excess of 200 pounds total catch must be discarded. For comparison, under Alternative 1 sector vessels must retain all legal sized cod caught and, depending on common pool permit type, up to 800 pounds per trip or 200 pounds a day, for common pool. The options vessels have under Alternative 1 are to the amount of comply with existing regulations and retain legal cod to be debited against their ACE or illegally discard. In addition, given observer rates for GOM groundfish, it is likely that some unobserved discard would occur under either trip limits (Alternative 2) or status quo (Alternative 1) that would not be well estimated or reported. Thus, discard estimates under both alternative approaches may be biased low.

The impact on GOM cod as a result of a concurrent action to increase haddock catch limits is expected to be similar to the impacts that would occur if the haddock catch limit had not been increased. In evaluating areas for closure, Alternative 2 closes areas of recent substantial cod catch and spawning. In so doing, several high abundance areas for haddock are also being made inaccessible. Several areas where haddock remain available have demonstrated lower proportional cod catches, such that it is expected the amount of cod mortality from these areas will not increase even if effort for haddock does. Figure 33 shows the distribution of GOM haddock landings by 10 minute square for the aggregate period of 2010-August 2014. These

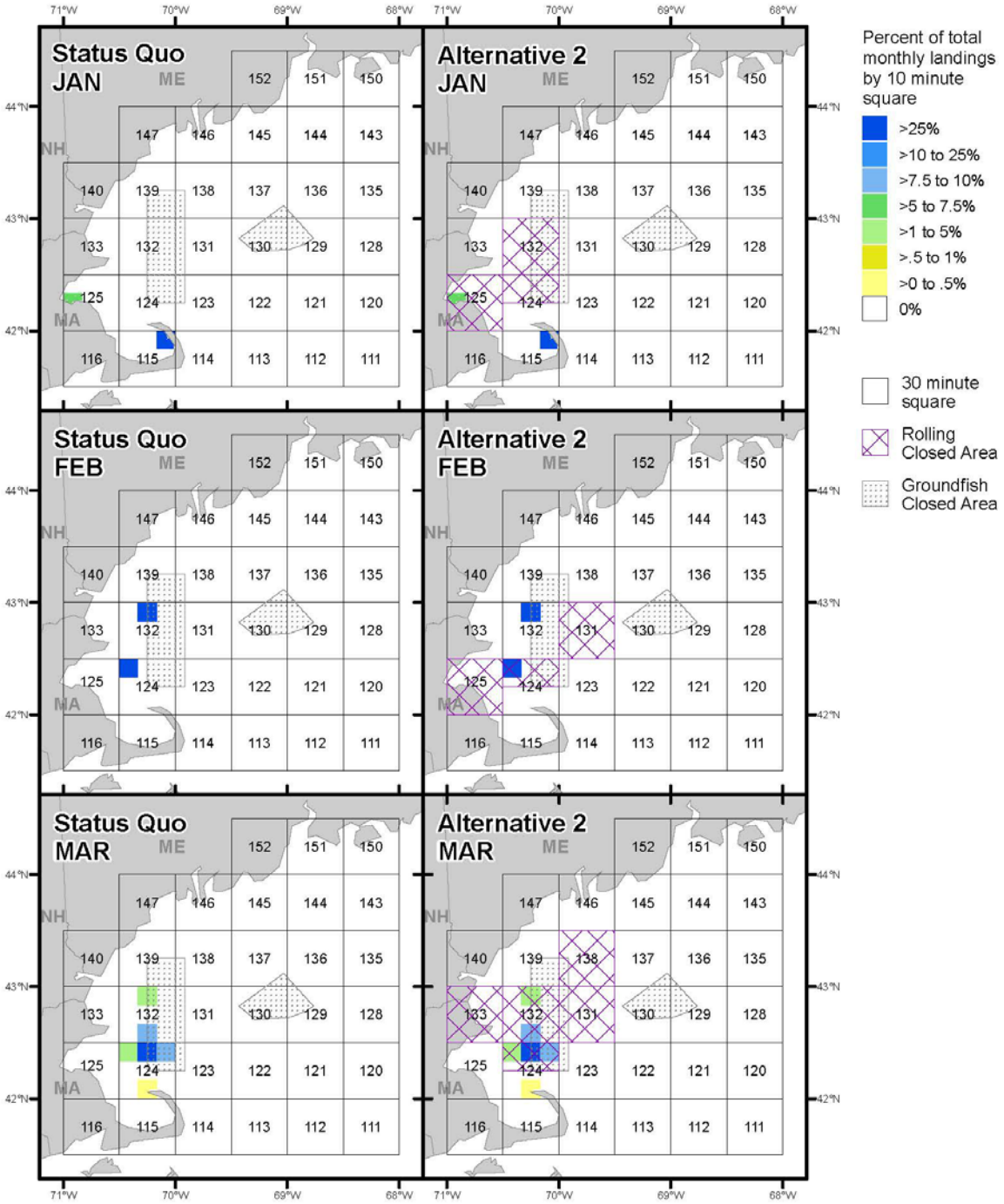
maps are valuable to compare to those for the same time period showing cod catch distribution from the same time period (Figure 33). This methodology, based on the data used to build the maps, was used in evaluating potential closure areas. For example, block 131 in January has strong indication of haddock catch with low occurrence of cod catch. The block had no indication of spawning activity in the industry based survey. For this reason, block 132 remains open under Alternative 2 in February. By contrast, block 132 in December provided approximately 20 percent of the haddock landed in that month for the time series evaluated. This area was not opened because it also demonstrated a high proportion of cod catch and a presence of spawning activity in the industry based survey.

In addition, the GOM cod trip limit should function to dissuade cod targeting. It may also have this effect should trips primarily targeting haddock encounter cod in excess of the trip limit: Vessels will be forced to either discard cod, an undesirable outcome, or move to other areas in hopes of maintaining haddock catch with lower cod bycatch.

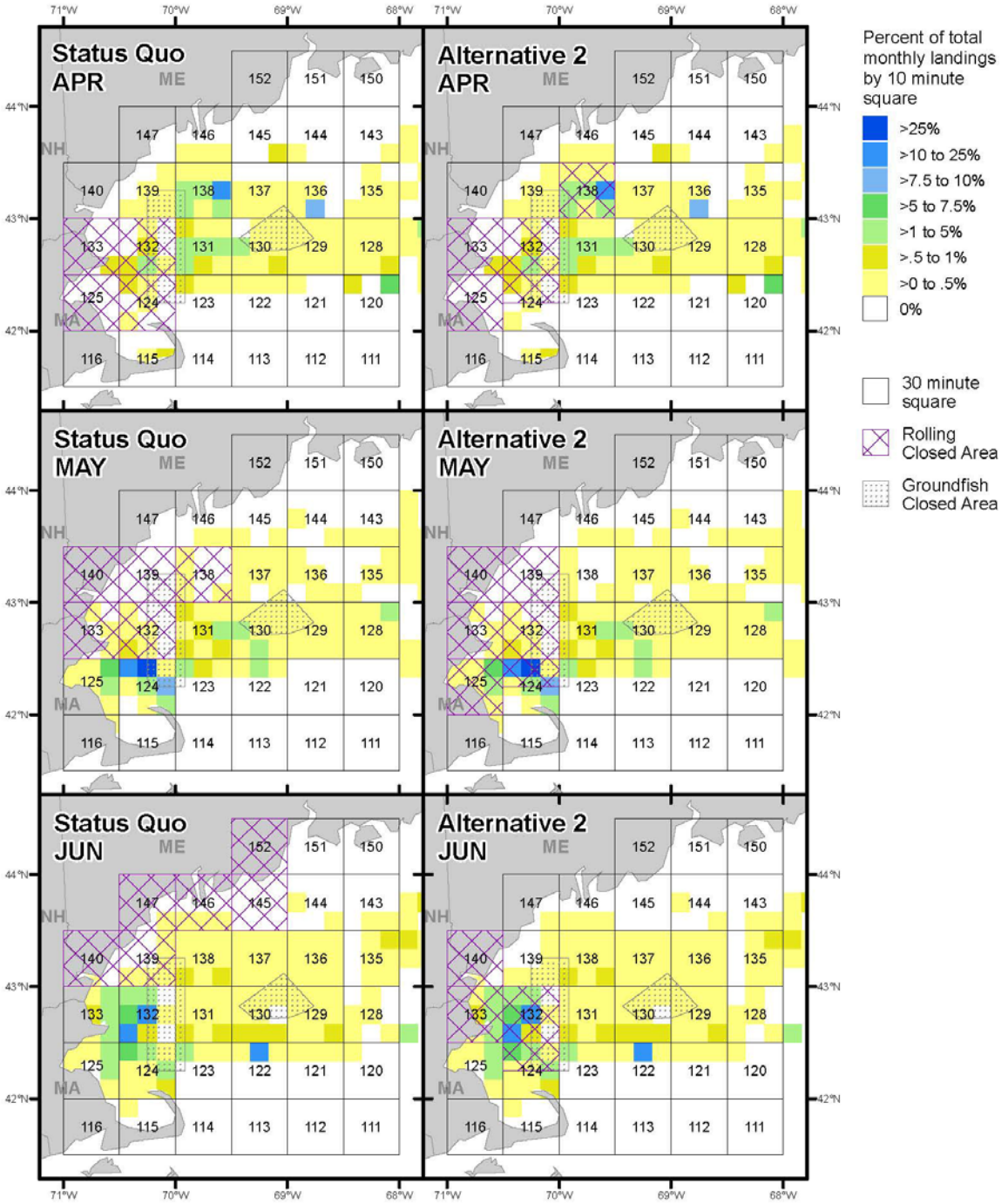
Figure 33. GOM haddock commercial and recreational catch distribution comparison for commercial and recreational fisheries, by month, for 2010 through August 2014.



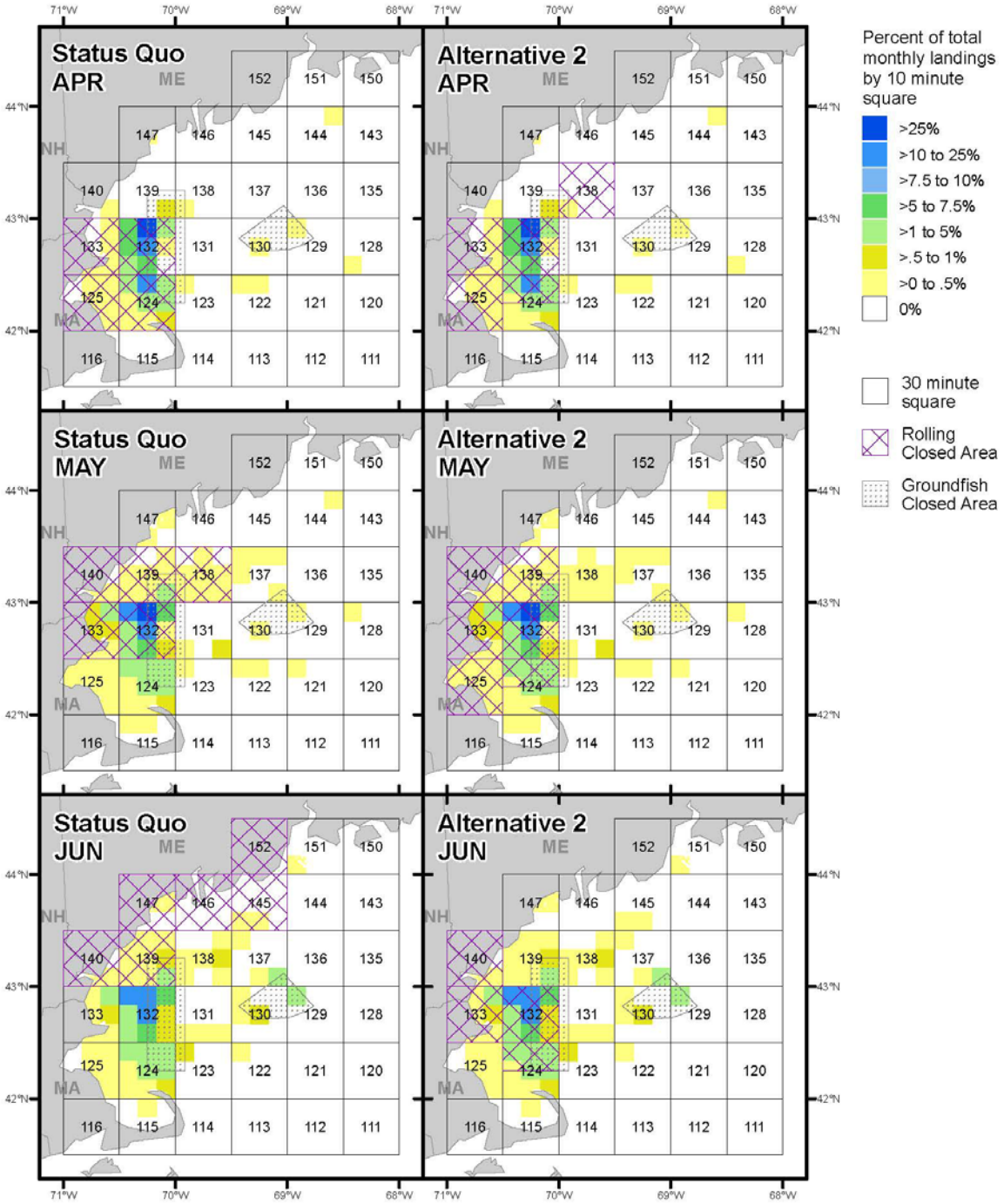
Gulf of Maine Haddock Monthly Recreational Landings January - March (2010-2014)



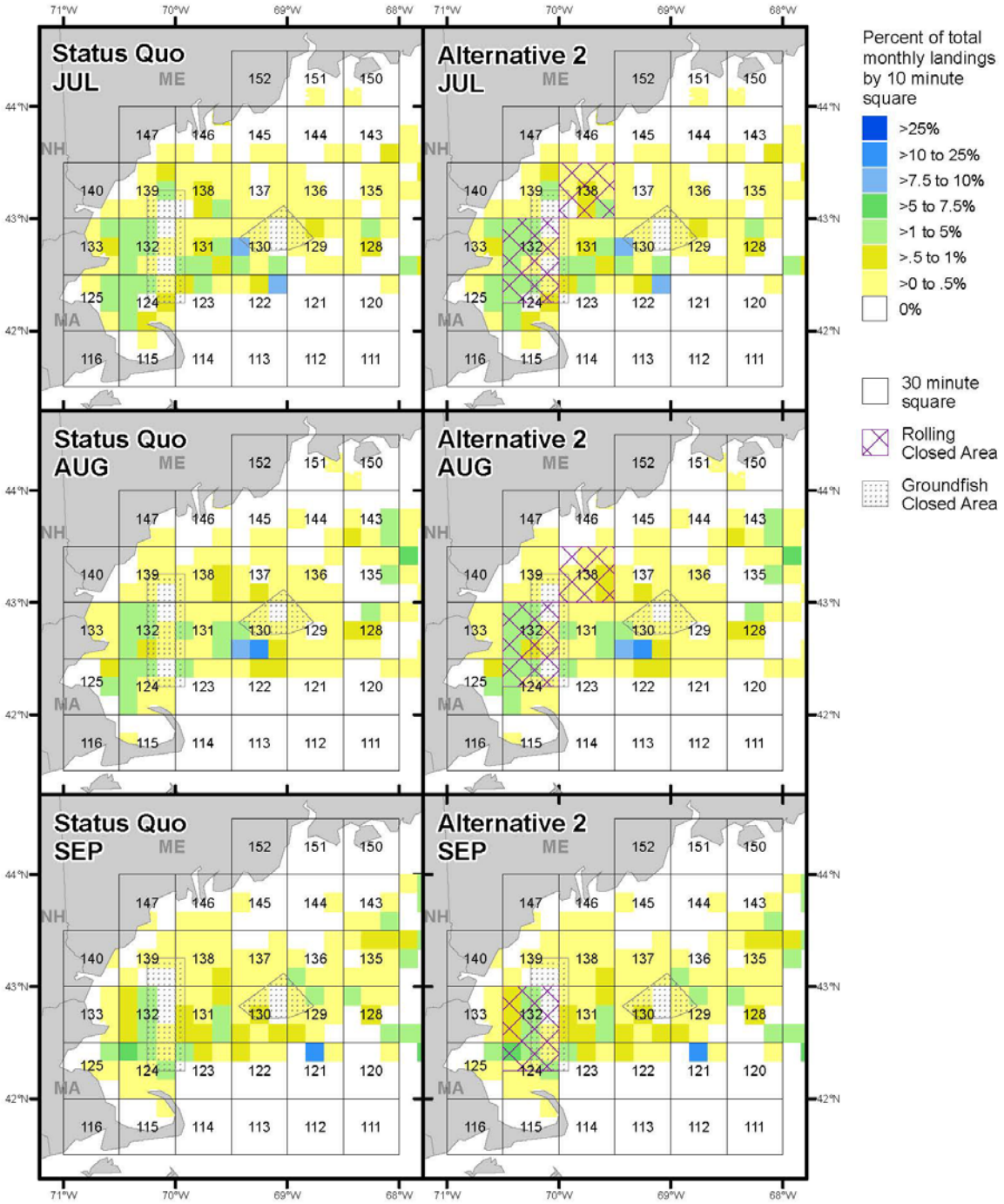
Gulf of Maine Haddock Monthly Commercial Landings April - June (2010-2014)



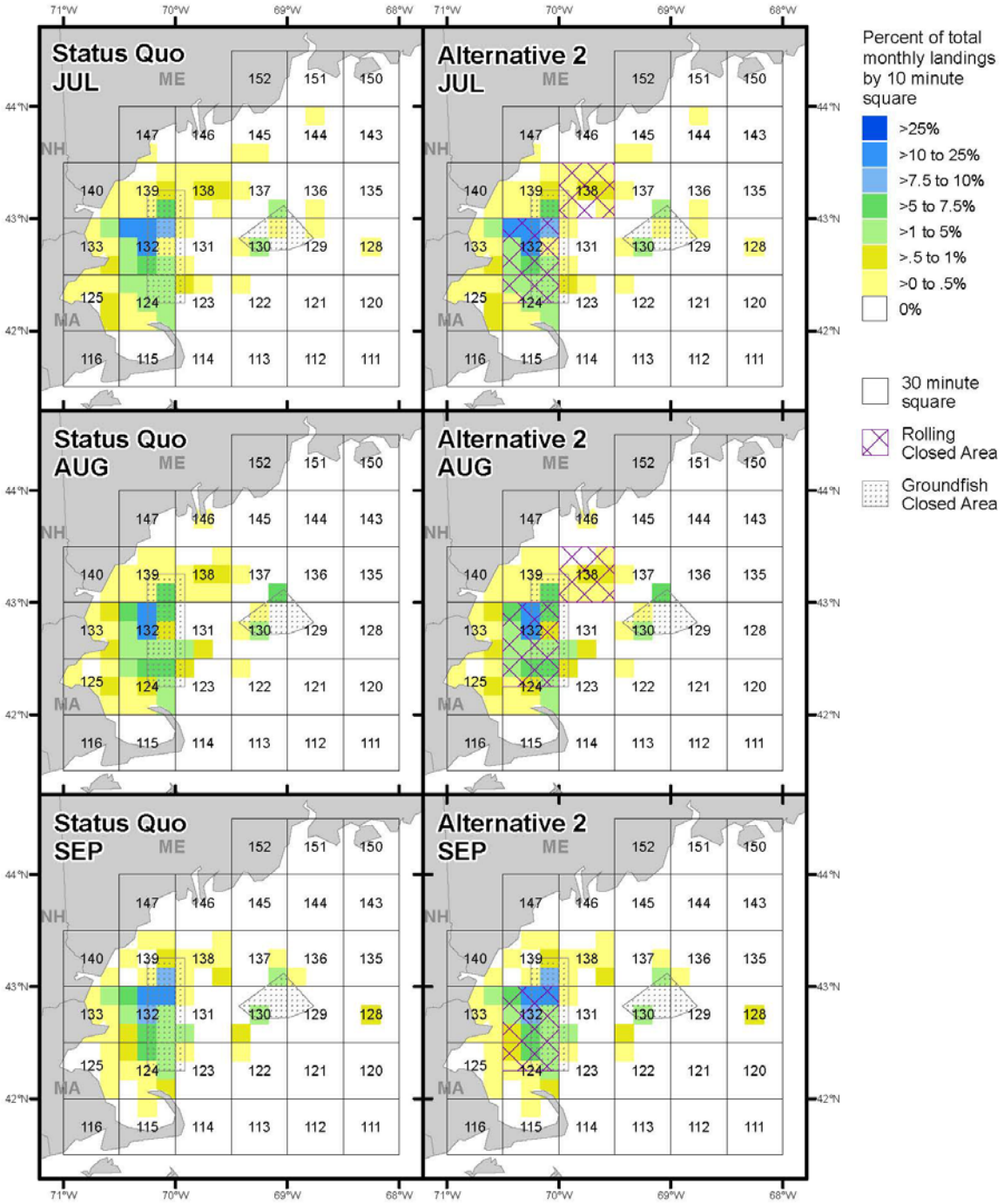
Gulf of Maine Haddock Monthly Recreational Landings April - June (2010-2014)



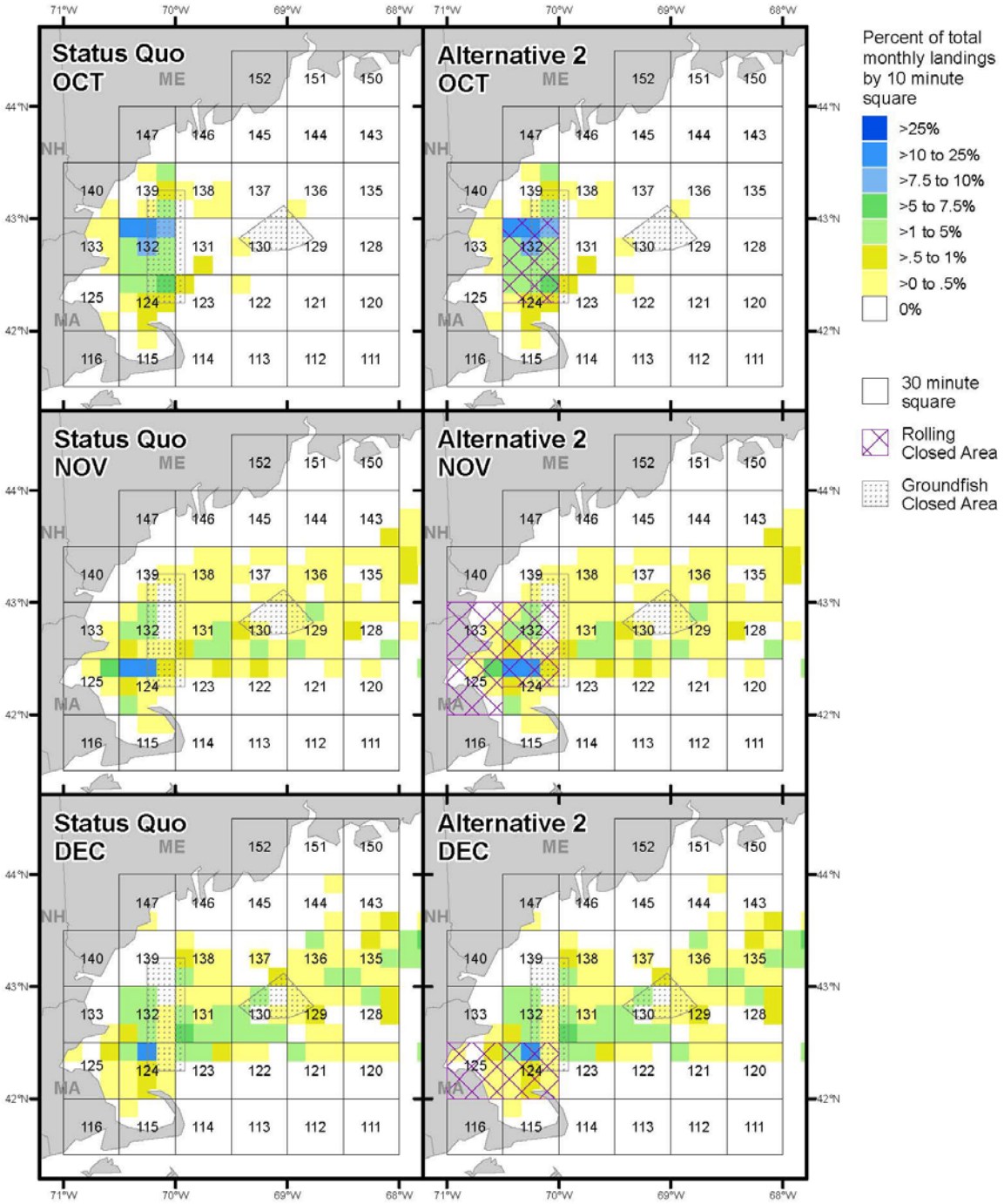
Gulf of Maine Haddock Monthly Commercial Landings July - September (2010-2014)



Gulf of Maine Haddock Monthly Recreational Landings July - September (2010-2014)



Gulf of Maine Haddock Monthly Commercial Landings October - December (2010-2013)



Gulf of Maine Haddock Monthly Recreational Landings October - December (2010-2013)

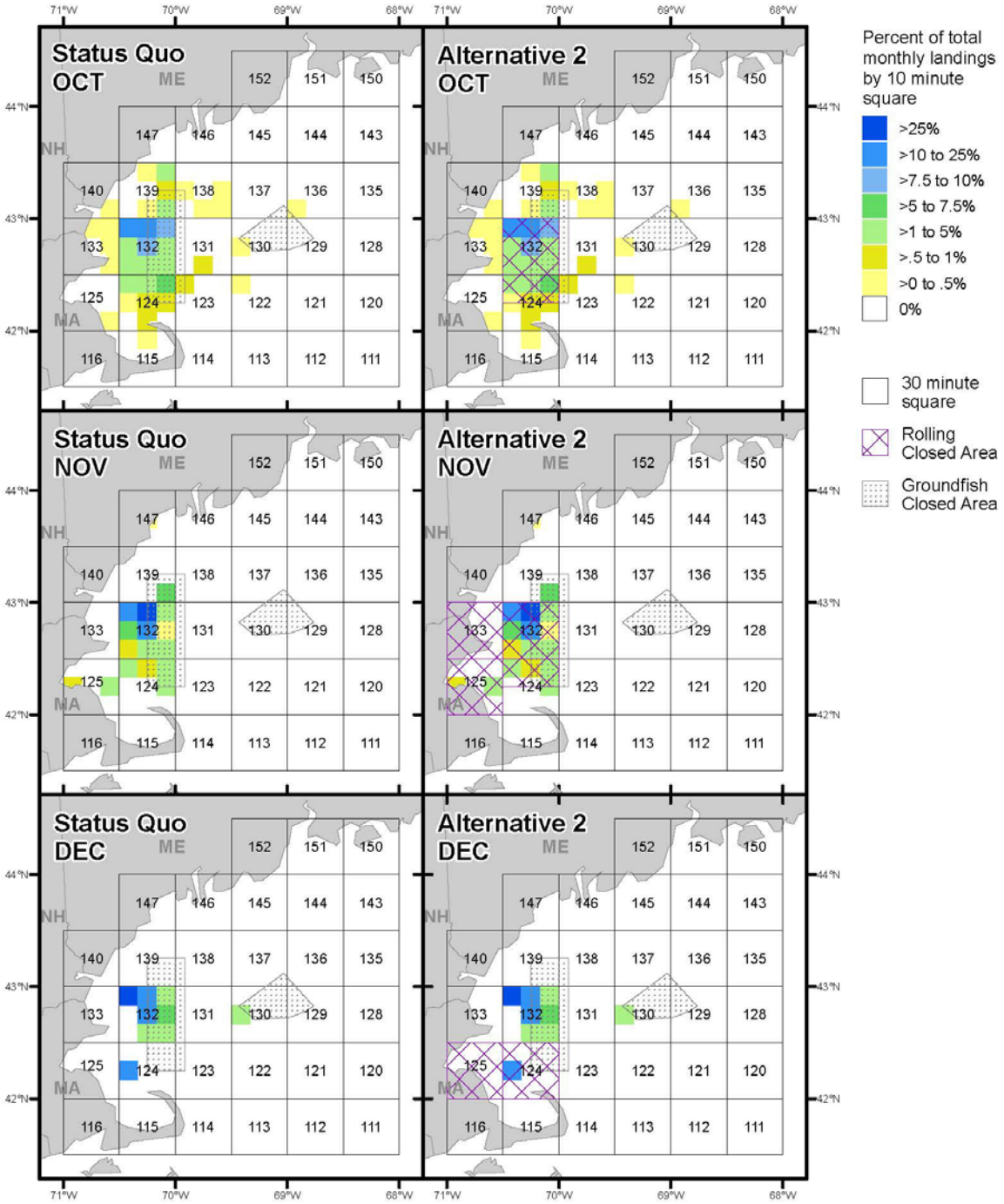
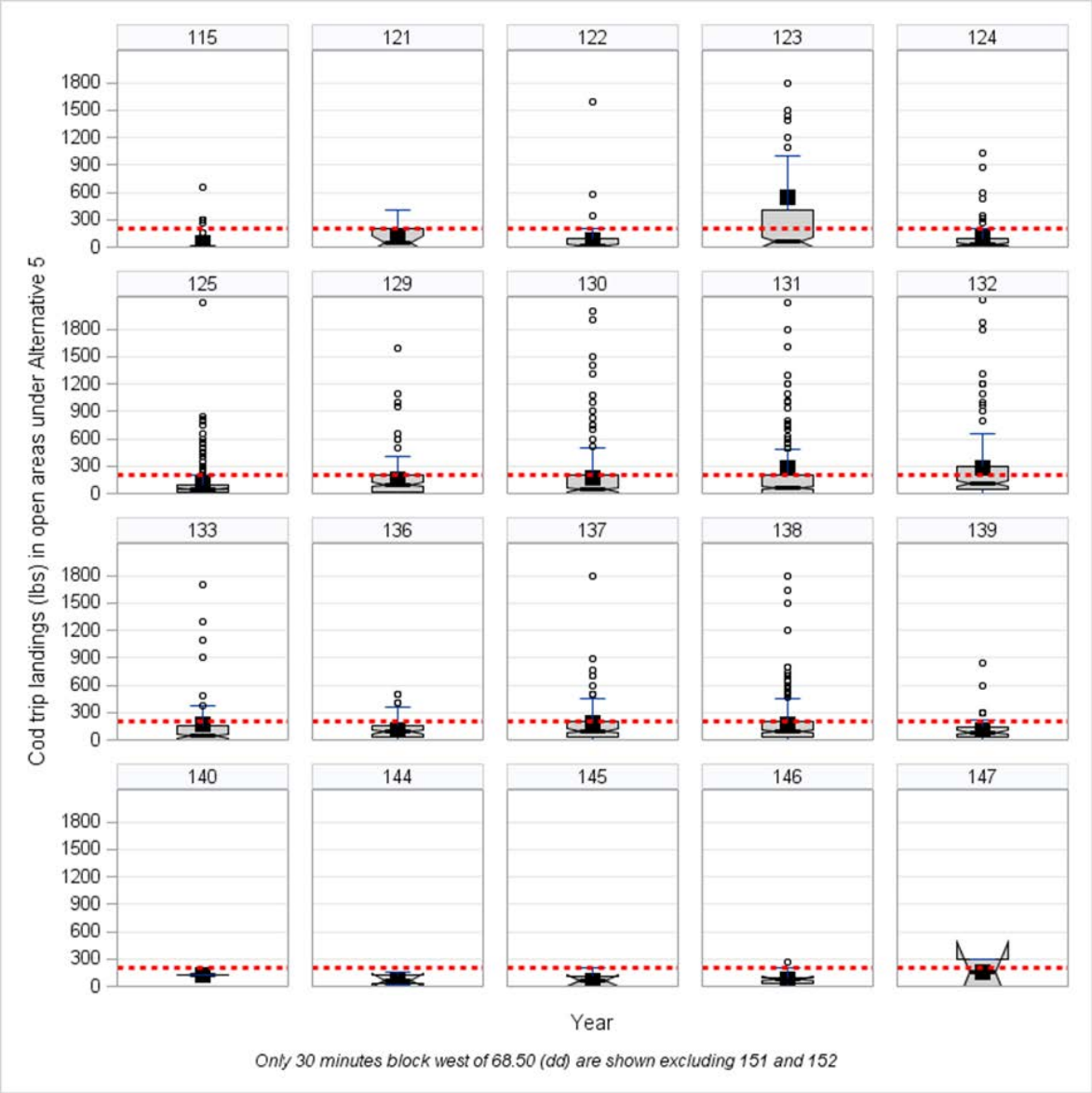


Figure 34. Distribution of commercial trip-level cod catches by open 30 minute block in 2013.



Prohibiting retention of recreationally caught GOM cod is expected to provide positive benefits for the stock. This measure will help reduce overfishing because a high proportion of GOM cod, estimated at 70 percent in the most recent benchmark (SARC 55), are expected to survive capture with recreational fishing gear. The prohibition may also dissuade targeting cod in recreational fisheries, which, in turn may help minimize catch and discard. The survivability of recreationally captured cod that are discarded may be further improved by handling techniques and the use of baited hooks instead of jigs as preliminary field work by several New England institutions indicates a lower instance of traumatic body hooking occurs when baited hooks are used.

The measures restricting commercial vessels to the GOM Broad Stock Area are expected to have positive benefits with regards to catch accounting precision. Trips into multiple Broad Stock Areas require the catch and discard information to be apportioned into the respective areas. This may be done based on observed trips, self-reported logbook data, amount of effort in each area, or trawl tow retrieval location. Each of these methods carries with them some uncertainty. Under the Alternative 2 measures, there will be no uncertainty so long as vessels abide by the rules, which is more likely as NMFS can monitor fishing activity through VMS. Improved catch accounting is expected to have positive benefits on tracking landing-related mortality.

9.2 Impacts on Non-Allocated Target Species

9.2.1 Alternative 1 (Status Quo/No Action)

The No Action/Status Quo Alternative is not expected to have an appreciable change of the impact determinations from Framework Adjustment 51 which established Acceptable Biological Catches (ABCs) and ACLs for many groundfish stocks. In general, the specification of groundfish ABCs and ACLs were not expected have direct impacts on non-groundfish target species. Other species are caught on groundfish fishing trips and Framework Adjustment 51 determined that the ABCs/ACLs could indirectly affect species if they result in changes in groundfish fishing activity.

The implementing FMPs for federally regulated non-allocated target species such as monkfish, skates, and dogfish contain similar measures designed to control catch and maintain accountability. Effort control measures exist in the American lobster fishery in the form of limited-entry permits and, in some areas, trap limits. Because these non-allocated fisheries are heavily regulated themselves, along with the regulations for groundfish, it is not expected that maintain the status quo would have anything but a positive impact on these species.

9.2.2 Alternative 2 (Preferred Alternative)

The preferred alternative measures are not expected to have an appreciable change of the impact determinations from Framework Adjustment 51 which established Acceptable Biological Catches (ABCs) and ACLs for many groundfish stocks. The measures are designed to have an impact on Gulf of Main cod by reducing catch of that stock through closures and other measures. Alternative 2 would not make changes to either ACL or ABC for the remainder of

fishing year 2014. The seasonal area closures may modify fishing behavior by either shifting groundfish effort to other areas or reducing effort overall. In most cases, the gears used for non-allocated target species is considered gear capable of catching groundfish and, as such, would be excluded from operating in seasonal closure areas under Alterative 2. These closures may provide temporary refuge from non-target stocks with respect to being caught; however, the areas are not expected to reduce overall catch or effort for non-target stocks. Trip limits may also influence fishing behaviors, but are not expected to change fishing practices for non-target species. Thus, it is expected that the Alternative 2 measures will be neutral to slightly positive in comparison to status quo/no action Alternative 1 measures.

9.3 Impacts on Endangered and Other Protected Species

9.3.1 Alternative 1 (Status Quo/No Action)

The impacts of the status quo/no alternative are not expected to differ from those described and analyzed for FY 2014 in the EA analysis for Framework Adjustment 51's preferred alternatives. Framework Adjustment 51 implemented rebuilding programs for GOM cod and American plaice, set specifications, and modified accountability measures. These measures were expected to ensure stocks were not overfished, rebuilt as applicable, and maintain accountability if catch limits are exceeded. The primary mechanism for ensuring overfishing does not occur and to rebuild stocks are reductions in available commercial and recreational catch. Generally, reductions in catch may result in reductions in fishing effort and thus, minimize the potential for interaction with endangered and other protected resources. Framework Adjustment 51 concluded that the status/quo measures would have a positive impact on endangered and other protected species because of continued grounfish management measures designed to manage the fisheries that minimize interaction and impacts on endangered and other protected species. Management measures include such as catch limits, restrictions on number of gillnets that may be used, etc.

9.3.2 Alternative 2 (Preferred Alternative)

The impacts of Alternative 2 are expected to have a low positive impact on ESA listed and non-listed species (i.e., protected species). Alternative 2 builds on the measures in Framework Adjustment 51 and the catch limit process established by Amendment 16 to the FMP. The catch limits put in place by Framework Adjustment 51 are not being changed. These limits are one of the primary management controls for the NE multispecies fishery as previously outlined in section 6.2.1. As described above, this measure, in addition to other measures put in place by FW 51 designed to manage the fisheries that also minimize interactions with protected resources, will be maintained in Alternative 2. In addition, Alternative 2 will also not provide any new, additional, access to year-round closed areas and would still require compliance with protected species take reduction plans (e.g., Large Whale Take Reduction Plan, Harbor Porpoise Take Reduction Plan) and sea turtle resuscitation guidelines.

The seasonal closure areas in Alternative 2 would be expected to have the potential for low positive to neutral impacts on endangered and other protected species in comparison to the

status/quo no action Alternative 1. . It is expected that effort shifts may occur as result of Alternative 2's seasonal closures. The shifts; however, will be confined to areas that are already subject to fishing by bottom trawls and gillnets in the Gulf of Maine and therefore, in areas which have been considered by NMFS in its assessment of fishery effects to protected species and that are thus, currently regulated to minimize interactions with protected species (i.e., Harbor Porpoise, HPTRP; large whales, ALWTRP) or have been determined to be areas where takes are not expected to so great that the continued existence of the species is jeopardized (NMFS 2013; Waring *et al*. 2014). In addition, the seasonal closures will eliminate protected species interactions in those areas that are closed in the GOM at particular times of year. Shifts in fishing effort from the GOM to other areas of the multispecies fishery (e.g., GOM to GB), as well as well as changes in fishing behavior in other components of the multispecies fishery are also not expected as a result of Alternative 2 and therefore, increases interactions with protected species in these areas is also not expected.

The commercial fisheries in the GOM are primarily prosecuted with various trawl gear types and gillnets. Of these, gillnets have a higher impact potential on specific protected species in the GOM area, as outlined in section 7.1.3. It is possible that the shift of gillnet effort could increase potential interactions; however, the majority of the closures are inshore of the WGOM area. Based NEFOP and ASM observed marine mammal (non-listed) gillnet takes from 2007-2012, a substantial amount of gillnet interactions with marine mammal species west of the Western Gulf of Maine (WGOM) Closure Area have been observed, suggesting that the area along the WGOM Closure area is heavily concentrated with gillnet gear and therefore, poses an interaction risk to not only non-listed marine mammal species, but also listed species. Because Alternative 2 would close many inshore areas seasonally, it is expected that the number of takes in gillnets may be reduced resulting in positive impacts for protected species in comparison to Alternative 1 measures. In addition, as Alternative 2 is expected to disperse gillnets from this area in many months of the year (See seasonal closure areas; Figure 3), as well as moderately reduce the amount of groundfish specific gillnet gear used in the GOM, the risk of listed species interacting with gillnet gear may decrease in the affected area as gillnet gear will not only be more diffuse, but also reduced in number. Interaction with trawl gear is more variable as seen in the observed takes distribution of trawl gear (see section 7.1.4). Interactions in trawl gear have not been observed in the GOM for any ESA listed species. Non-ESA listed marine mammal species have been observed incidentally taken in this area by trawl gear; however, there has been no indication that takes of non-ESA listed species of marine mammals in commercial trawl fisheries has gone above and beyond levels which would result in the inability of each species population to sustain itself (Waring et al. 2014).(Figure 25.). However, Because the overall effort will be constrained by the Framework Adjustment 51 catch limits and likely reduced by the combination of trip limits and area closures, Alternative 2 is not expected to result in elevated levels of take that are beyond those previously assessed by NMFS (Waring et al. 2014; NMFS 2013). As a result, Alternative 2 is expected to have low positive to negligible impact on endangered and protected species with respect to overall trawl gear interactions and in comparison to Alternative 1.

The changes to recreational fisheries in Alternative 2 are expected to result in impacts that are similar or slightly more positive than Alternative 1. This is because the combination of time/area closures and prohibition on possession may reduce overall recreational fishing effort. It is also possible that anglers will simply move to other available fisheries, thereby having no net

reduction in overall effort. However, recreational impact on protected species is expected to be negligible. Recreational fisheries gear interaction has been documented with some turtle and Atlantic sturgeon. However, the majority of the GOM cod and groundfish recreational fisheries occur further offshore, in water depths much greater than those preferred by Atlantic sturgeon (i.e., outside 50 meters) and; therefore, the likelihood of sturgeon interaction is believed to be lower. As a result, Alternative 2 impacts are expected to be positive for endangered and protected species.

9.4 Physical Environment/Habitat/EFH Impacts

9.4.1 Alternative 1 (Status Quo/No Action)

Under the status quo/no action alternative, impacts are expected to be consistent with those analyzed for Framework Adjustment 51. Specifically, the measures for the fishery will have a mixed impact on habitat. Effort reductions and better control of non-fishing activities have positive impacts on habitat (positive impact) but fishing activities and non-fishing activities continue to reduce habitat quality (negative impact).

9.4.2 Alternative 2 (Preferred Alternative)

Under Alternative 2 measures, there will be temporary cession of fishing activities for commercial and recreational gear capable of catching cod. The time and area involved in the closures does change throughout the year (Figure 4). Thus, it is not expected that long term positive habitat benefits will result from the seasonal closures in Alternative 2. Some effort may shift as a result of the seasonal closures. Information in the OHA2 DEIS indicates that the Gulf of Maine has been subject to intense fishing activities for many consecutive years, with the exception of some of the year round mortality and EFH closure areas. This action does not change those permanent closures already in place and it is not expected that the areas were effort may shift to have not already been extensively fished. It is perhaps less likely that commercial fishermen will explore new or unfished areas, if the trip limit influences fishing behavior. That is, if fishermen actively seek to avoid cod because of the trip limit, they will fish in areas where cod encounters are known in advance to be infrequent if there are other stocks in the area for harvest. In light of these considerations, the Alternative 2 impacts are expected to be neutral in comparison to the Alternative 1 status quo/no action.

9.5 Human Communities/Economic/Social Environment Impacts

Introduction

The National Marine Fisheries Service (NMFS) provides a series of guidelines to be used when analyzing the impacts of regulatory actions on human communities. The key dimensions for such analyses are anticipated changes in net benefits to fishery stakeholders, the distribution of both benefits and costs within the industry, and changes in income and employment (NMFS 2007). Where possible, cumulative effects of regulation will be identified and discussed. The human community impacts presented here consist of both qualitative descriptions and, when appropriate data are available, quantitative analyses designed to predict outcomes.

In general, the regulations proposed in this action will impact revenue due to the imposition of time/area closures, the prohibition on recreational possession of Gulf of Maine cod, commercial cod trip limits in the Gulf of Maine, and, lastly, a requirement to fish in only one broad stock area in the Gulf of Maine. These measures, scheduled to take effect during the second half of the 2014 fishing year, will likely reduce revenues for smaller vessels in the inshore Gulf of Maine and may increase operating costs as some trips will be forced to steam farther to fish in open areas, or similarly shift the timing of trips to avoid closures.

It is assumed throughout this analysis that changes in revenues will have downstream impacts on income levels and employment, however, these impacts are not directly quantified here.

Methods

Wherever possible, quantitative methods are employed to inform the range of possible impacts of the Alternatives. The Quota Change Model (QCM) is used here to predict the potential impact of the alternatives on the Sector-based commercial fishery. The QCM is a monte carlo simulation model that selects from existing records the most likely trips to take place under new regulatory conditions. To do this, first a large pool of actual trips is created from a reference data set. The composition of the pool is based on each trip's utilization of allocated ACE, under the assumption that the most likely trips to take place in the period being predicted are those fishing efficiently under the new regulatory requirements. The more efficiently a trip used its ACE, the more likely that trip is to be drawn into the sample pool. ACE efficiency is determined by the ratio of ACE expended to net revenues on a trip, iterated over each of the 16 allocated stocks. Net revenues are calculated as gross revenues minus trip costs minus quota leasing costs, where trip costs are based on observer data and quota leasing costs are estimated from an inter-sector lease value model, based here on FY 2013 (details on the methods can be found in Murphy et al. 2013). After the sample pool has been constructed, trips are pulled from the pool at random, summing the ACE expended for the 16 allocated stocks as each subsequent trip is drawn. When one stock's ACE reaches the Sector sub-ACL, no trips from that broad stock area are selected and the model continues selecting trips until Sector sub-ACLs are achieved in all three broad stock areas or, alternatively, for one of the unit stocks, which ends the trip selection process for all broad stock areas at once. These "synthetic fishing years" are drawn a number of times, and median values and confidence intervals can be reported.

By running simulations based on actual trips, the model implicitly assumes that:

- stock conditions existing during the data period are representative;
- trips are repeatable;
- price/quantity relationships realized during the data period are applicable to the forecast period, noting that fish prices do vary between the reference population and the sample population but this variability is consistent with the underlying supply/demand relationship during the reference time period; and,
- reference year quota costs are constant.

These assumptions will surely not hold—fisherman will continue to develop their technology and fishing practices to increase their efficiency, market conditions will induce additional behavior changes, and fishery stock conditions are highly dynamic. Fuel and other costs may change due to larger economic shifts or shoreside industry consolidation. Demand for quota lease will likely drop as a result of time/area closures, but the countervailing impact of assumed discards under a trip limit provision is difficult to predict.

In general, the model will under-predict true landings and/or revenues if stock conditions improve, if prices rise in response to lower quantities landed, or if fisherman become more efficient at maximizing the value of their ACE. Conversely, the model will over-predict true landings and/or revenues if stock conditions decline, markets deteriorate or fishing costs increase. The model will over-predict landings if stock conditions for a highly constraining stocks are such that catchability increases substantially and/or fisherman are unable to avoid the stock--in this circumstance, better than expected stock conditions will lead to worse than anticipated fishery performance.

To model the impacts of the Alternatives, several changes to standard QCM methods were made. First, to accommodate half-year simulations, catch and revenues were projected linearly from the most recent date of data availability, October 23, 2014, to the anticipated date of effect for these regulations, November 15, 2015. QCM simulations were then created under baseline (FW51 Sector sub-ACLs) conditions, drawing only trips from a November 15, 2013 thru April 30, 2014 reference population. A new GOM haddock Sector sub-ACL was incorporated based on an anticipated Emergency Action and in the spirit of Reasonably Foreseeable Future Actions. Quota limits for unit stocks and/or broad stock areas are triggered when the Sector sub-ACL remaining as of November 15, 2014 is caught. Second, to model the impacts of time/area closures all trips that occurred inside closure areas during closed months are eliminated from the sample pool of available trips. To model the effect of trip limits, all cod caught in excess of the limit are converted to discards and the revenues associated with that catch is deducted from the trip's revenue. This changes the relative efficiency of trips, and the consequent probability that a trip will be selected into a synthetic fishing year during model runs. In this respect the behavioral changes associated with both time/area closures (i.e. the need to fish in other areas or other times) and trip limits (i.e. the reduced incentive to fish in areas of the Gulf of Maine where cod are likely to be present in significant abundance) are directly incorporated in the model results.

The impact of exclusive Gulf of Maine broad stock area declaration requirement is not modeled. While the requirement to not cross into the Georges Bank stock area on a trip in the Gulf of Maine will increase operational costs due to a lack of flexibility to respond efficiently to changing on-the-water fishery conditions, the primary impact of the measure will be on the accuracy of catch accounting and not on fishery revenues—that is, this requirement is unlikely to meaningfully affect landings.

Gross revenues from groundfish species alone are reported here, noting that these revenues typically make up about two thirds of total revenues on groundfish trips (Murphy et al. 2013). Furthermore, many groundfish fisherman are involved in other fisheries in addition to groundfish fishing and groundfish trip revenues may represent anywhere from 100% to a small fraction of the total revenues of individual fishing business impacted by these regulations. The abbreviated

time available to analyze the impacts of these Alternatives prevents a more thorough treatment of likely impacts.

Table 44 – Total sector sub-ACL (mt), catch (mt) and revenue ($ millions) to date projected thru November 15, 2014

	Sub-ACL*	Catch to date	Revenue to date
Pollock	13,224	2,210	5.7
GB Haddock West	17,172	2,290	5.8
White Hake	4,277	990	4
GB Cod West	1,769	690	3.2
Redfish	10,565	3,010	3.3
GB Winter Flounder	3,385	1,070	4.6
Plaice	1,399	750	2.6
GOM Cod	830	390	2.5
Witch Flounder	610	280	1.5
GB Haddock East	10,003	560	1.5
SNE Winter Flounder	1,210	420	1.9
SNE/MA Yellowtail Flounder	564	190	0.6
CC/GOM Yellowtail Flounder	479	170	0.4
GOM Haddock	432	140	0.6
GOM Winter Flounder	714	80	0.3
Halibut	57	30	0.2
GB Yellowtail Flounder	255	40	0.1
GB Cod East	148	20	0.1
Northern Windowpane	98	100	0
Ocean Pout	197	30	0
Southern Windowpane	102	50	0
Wolffish	62	10	0
TOTAL	**67,552**	**13,520**	**38.9**

*GOM haddock Emergency Action sub-ACL incorporated

9.5.1 Alternative 1 (Status Quo/No Action)

Impacts on the Sector-based commercial fishery

Under this Alternative, gross revenues from groundfish are predicted to be $65.9 million for FY2014 (Table 44). Projected gross revenues from groundfish are $38.9 million and, for the prediction period of the remainder of FY14, additional revenues are predicted to be $27.0 million. 60% of these revenues are predicted to come from landings of five groundfish stocks: pollock, Georges Bank (GB) haddock, white hake, GB cod and redfish (Table 45). Massachusetts and Maine ports comprise 92% of the groundfish revenues predicted to be landed during the second half of the 2014 fishing year (Table 46). Vessels greater than 75ft comprise almost 60% of these revenues (Table 47). Variable costs are predicted to be at 59% of gross groundfish revenues (Table 48).

This option would not change regulations for commercial fisherman and will have no additional impacts beyond those detailed in Frameworks 51 and 52 to the Northeast Multispecies FMP.

Table 45 – Median catch (mt) and gross revenues from groundfish ($ millions) with 5th/95th percentile confidence intervals from 500 simulations

	Catch	Revenue	*5th percentile*	*95th percentile*
Pollock	2,510	5.1	4.6	5.7
GB Haddock West	1,370	3.4	3	4
White Hake	900	2.8	2.5	3
GB Cod West	870	3.1	2.8	3.2
Redfish	2,120	2.4	2.1	2.9
GB Winter Flounder	120	0.6	0.5	0.7
Plaice	600	2.6	2.4	2.7
GOM Cod	340	1.6	1.4	2
Witch Flounder	300	1.4	1.4	1.5
GB Haddock East	410	1	0.8	1.2
SNE Winter Flounder	110	0.5	0.4	0.6
SNE/MA Yellowtail Flounder	260	0.8	0.8	0.9
CC/GOM Yellowtail Flounder	180	0.5	0.4	0.6
GOM Haddock	90	0.3	0.3	0.4
GOM Winter Flounder	50	0.2	0.2	0.3
Halibut	20	0.1	0.1	0.1
GB Yellowtail Flounder	30	0.1	0.1	0.3
GB Cod East	10	0	0	0.1
Northern Windowpane	80	0	0	0
Ocean Pout	10	0	0	0
Southern Windowpane	60	0	0	0
Wolffish	10	0	0	0
	10,450	**27.0**	**25.7**	**28.4**

Table 46 - Gross revenues from groundfish by State and for selected Ports predicted for Nov 15, 2014 – April 30, 2015 under the No Action Alternative ($ millions; median values and 5th/95th percentile confidence intervals from 500 simulations)

		Revenue	*5th percentile*	*95th percentile*
Connecticut		0	0	0
Massachusetts		18.4	15.9	21
	Boston	6	5.3	6.8
	Chatham	0	0	0
	Gloucester	5.4	4.6	6.2
	New Bedford	5.8	5.1	6.5
Maine		6	5.1	6.9
	Portland	5.5	4.7	6.4
New Hampshire		0.8	0.6	1
New Jersey		0	0	0.1
New York		0.5	0.3	0.7
Rhode Island		1.1	1	1.3
	Point Judith	1	0.9	1.1
Other Northeast		0.1	0	0.1
TOTAL		27.0	25.7	28.4

Table 47 – Gross revenues from groundfish by length class predicted for Nov 15, 2014 – April 30, 2015 under the No Action Alternative ($ millions; median values and 5th/95th percentile confidence intervals from 500 simulations)

Length class	Revenue	*5th percentile*	*95th percentile*
<30'	0.1	0.0	0.1
30'to<50'	2.6	1.1	2.1
50'to<75'	8.6	7.2	9.0
75'+	15.6	14.8	17.0
TOTAL	27.0	25.7	28.4

Table 48 – Variable costs for predicted for Nov 15, 2014 – April 30, 2015 under the No Action Alternative ($ millions; median, max, min and standard deviations from 500 simulations)

	Revenue	*max*	*min*	*std dev (+/-)*	Variable costs as a percent of groundfish gross revenues
Operational	10.8	11.6	9.6	0.3	
Quota	4.3	4.8	3.8	0.2	
Sector	0.8	0.9	0.7	0.0	
TOTAL	15.9	17.1	14.1	0.5	59%

Impacts on the Common Pool fishery

The Common Pool fishery comprises less than 3% of all groundfish fishery landings, discards and revenues. Groundfish catch is constrained by trimester Total Allowable Catch restrictions and other regulations designed to prevent the fishery from exceeding it's available quota.

This option would not change regulations for commercial fisherman and will have no additional impacts beyond those analyzed in Framework Adjustment 51.

Impacts on the recreational groundfish fishery
Recreational fishermen target GOM haddock, GOM cod, pollock, and GOM winter flounder, with GOM cod and GOM haddock a particularly important part of the catch (see Amendment 16 for a description of the recreational fishery in the GOM).

This option would not change regulations for recreational fisherman in the Gulf of Maine, and would have no additional impacts beyond those analyzed in Framework Adjustment 51.

9.5.2 Alternative 2 (Preferred Alternative)

Impacts on the Sector-based commercial fishery
Under this Alternative, gross revenues from groundfish are predicted to be $64.3 million for FY2014, a reduction of $1.6 million relative to the No Action Alternative and all occurring in the period November 15, 2014 to April 30, 2015. Projected gross revenues from groundfish for this period are predicted to be $25.4 million (Table 49). This is alternative is expected to have a moderately negative short-term impact when compared to the no action alternative, but is not expected to be significant.

Smaller vessels homeported in the inshore Gulf of Maine bear the brunt of these reductions. Gloucester, MA and New Hampshire ports in particular are hardest hit, seeing reductions in gross revenues of between 13-26% (Table 50, Table 53). Vessels in the 30-50 ft size class are predicted to see gross revenue declines on the order of 40% (Table 51, Table 54). Costs as a proportion of gross groundfish revenues rise slightly under the Preferred Alternative, due primarily to increased operational costs as vessels fish farther from port due to closures.

This option includes a 200-lbs trip limit on cod caught on trips in the Gulf of Maine. This provision would reduce cod catch by 20 mt. The current GOM cod discard rate is a little over 2% as of October 23, 2014. The end-of-year GOM cod discard rate is predicted to rise to over 22% by the end of the fishing year under the Preferred Action, even while incorporating the reduced profitability of trips catching cod in the QCM. The implications of this non-marginal change in discard rates may have unpredictable impacts on sector-level imputed discard rates for unobserved trips, and may create an incentive for captains to behave differently on observed and unobserved trips (noting that there is no regulation that mandates or implies that captains should fish in similar manners whether or not an observer is onboard). The analysis here predicts that this measure may result in discarding over 100 metric tons of marketable fish with a value of a half a million dollars ex-vessel. Additional discussion of trip limits can be found in the biological impacts section 9.1.2.

Revenue from ACE leasing will not likely compensate lost revenues from fishing opportunities, as the demand for GOM cod ACE will likely decrease due to disincentives to catch allocated quota created by the time/area closures and trip limit regulations. Table 45 and Table 49 show that aggregate GOM cod catch is predicted to decline under the Preferred Alternative. Demand for other species such as plaice and witch flounder may increase if those stocks prove, as

predicted, to be constraining on fishing in the Gulf of Maine broad stock area, but the distribution of ACE and PSC may mean that vessels most adversely affected by these measures do not benefit from the demand increase either because they do not have sufficient allocation or, alternatively, they continue fishing and need to acquire more of these stocks to compensate for the loss of GOM cod catch and/or lease revenues.

Table 49 - Median catch (mt) and gross revenues from groundfish ($ millions) with 5th/95th percentile confidence intervals from 500 simulations

	Catch	Revenue	*5th percentile*	*95th percentile*
Pollock	2,490	5.2	4.5	6
GB Haddock West	1,400	3.5	3.1	4.1
White Hake	900	2.8	2.5	3.1
GB Cod West	890	3.1	3	3.2
Redfish	2,280	2.6	2.2	3.1
GB Winter Flounder	130	0.6	0.5	0.7
Plaice	600	2.6	2.5	2.7
GOM Cod	140	0.2	0.2	0.3
Witch Flounder	290	1.4	1.4	1.5
GB Haddock East	430	1	0.8	1.2
SNE Winter Flounder	110	0.5	0.4	0.6
SNE/MA Yellowtail Flounder	260	0.8	0.8	0.9
CC/GOM Yellowtail Flounder	30	0.1	0	0.1
GOM Haddock	80	0.3	0.2	0.3
GOM Winter Flounder	10	0	0	0.1
Halibut	20	0.1	0.1	0.1
GB Yellowtail Flounder	30	0.1	0.1	0.3
GB Cod East	10	0	0	0.1
Northern Windowpane	80	0	0	0
Ocean Pout	10	0	0	0
Southern Windowpane	60	0	0	0
Wolffish	10	0	0	0
TOTAL	10,260	25.4	24.0	26.9

Table 50 - Gross revenues from groundfish by State and for selected Ports predicted for Nov 15, 2014 – April 30, 2015 under the Preferred Alternative ($ millions; median values and 5th/95th percentile confidence intervals from 500 simulations)

		Revenue	*5th percentile*	*95th percentile*
Connecticut		0	0	0
Massachusetts		16.9	14.4	19.5
	Boston	5.7	5	6.5
	Chatham	0	0	0
	Gloucester	4	3.3	4.7
	New Bedford	6.1	5.4	6.9
Maine		6	5	7
	Portland	5.7	4.8	6.6
New Hampshire		0.7	0.5	1.1
New Jersey		0.1	0	0.1
New York		0.4	0.3	0.6
Rhode Island		1.1	0.9	1.3
	Point Judith	1	0.9	1.1
Other Northeast		0	0	0
TOTAL		25.4	24.0	26.9

Table 51 - Gross revenues from groundfish by length class predicted for Nov 15, 2014 – April 30, 2015 under the Preferred Alternative ($ millions; median values and 5th/95th percentile confidence intervals from 500 simulations)

Length class	Revenue	*5th percentile*	*95th percentile*
<30'	0.1	0.0	0.2
30'to<50'	1.5	1.1	2.0
50'to<75'	7.8	7.0	8.7
75'+	15.7	14.5	16.9
TOTAL	25.4	24.0	26.9

Table 52 - Variable costs for predicted for Nov 15, 2014 – April 30, 2015 under the Preferred Alternative ($ millions; median, max, min and standard deviations from 500 simulations)

	Revenue	*max*	*min*	*std dev (+/-)*	Variable costs as a percent of groundfish gross revenues
Operational	10.7	11.7	9.9	0.3	
Quota	3.7	4.1	3.3	0.1	
Sector	0.8	0.9	0.7	0.0	
TOTAL	15.2	16.5	14.1	0.4	60%

Table 53 – Relative change in gross revenues from groundfish during the period November 15, 2014 to April 30, 2015 between the No Action Alternative and the Preferred Alternative

		Relative Change
Connecticut		n/a
Massachusetts		-8%
	Boston	-5%
	Chatham	n/a
	Gloucester	-26%
	New Bedford	5%
Maine		0%
	Portland	4%
New Hampshire		-13%
New Jersey		n/a
New York		0%
Rhode Island		0%
	Point Judith	0%
Other Northeast		n/a
TOTAL		-6%

Table 54 – Relative change in gross revenues from groundfish during the period November 15, 2014 to April 30, 2015 between the No Action Alternative and the Preferred Alternative

Length class	Preferred Alternative
<30'	n/a
30'to<50'	-41%
50'to<75'	-9%
75'+	1%
TOTAL	-6%

Table 55 – Impact of imposition of 200lbs trip limit compared to the No Action and Preferred Alternative if implemented without a trip limit

	Discards (mt)	GOM cod catch (mt)	Groundfish revenue ($ millions)	Relative cost of cod uncaught ($ / lbs)^	Cost of cod uncaught due to trip limits alone ($ / lbs)
No Action	25.7	340	27	-	-
Preferred Alternative	116.5	140	25.4	3.63	11.34
Preferred Alternative w/out trip limits	24.2	160	25.9	2.77	-
difference between No Action and Preferred Alternative	*90.8*	*-200*	*-1.6*		
difference between No Action and Preferred Alternative without trip limits	*-1.6*	*-180*	*-1.1*		

^ difference in aggregate gross revenues from groundfish divided by the difference in GOM cod catch in pounds for the No Action and Preferred Alternative (with and without trip limits)

Impacts on the Common Pool fishery

This option prevents vessels in the Common Pool from fishing in the certain areas at certain times (see SECTION 9.1.2) and would impose a 200 lbs trip limit on Gulf of Maine cod. Time/area closures may increase costs for these vessels, and revenue foregone from cod catch in excess of the trip limit may reduce gross revenues. Compared to the no action alternative, this measure is expected to have moderately, negative non-significant short-term impacts on vessels fishing in the Common Pool.

Impacts on the recreational groundfish fishery

The proposed time/area closures encompass the principal recreational bottom fishing locations in the GOM and the majority of the recreational fishing access points in the GOM (see SECTION 9.1.2). Approximately 85-90% of GOM cod and haddock mortality generally occurs in Federal waters. However, the recreational fishery is only open for two weeks in the end of April during the Action period (November 15, 2014, through April 30, 2015). The impact of the closures on revenues during these two weeks may be significant when compared to the no action, but will ultimately be a function of anticipated regulations in FY15.

The level of noncompliance associated with the closed areas is impossible to predict, but if it is high the conservation benefit of the closures will be further eroded and adverse impacts to angler welfare will be someone mitigated, albeit with long term costs.

Businesses that support the recreational fishing industry will also be impacted if recreational fishing effort declines because of the prohibition of bottom fishing in the time/area closures. Bait and tackle shops, marinas, boat repair shops, convenience stores, restaurants, hotels, and

many other indirectly affected businesses would face revenue declines due to lower angler spending.

10.0 Cumulative Effects Analysis

10.1 Introduction

A cumulative effects assessment (CEA) is a required part of an EIS or EA according to the Council on Environmental Quality (CEQ) (40 CFR part 1508.7) and NOAA's agency policy and procedures for NEPA, found in NOAA Administrative Order 216-6. The purpose of the CEA is to integrate into the impact analyses, the combined effects of many actions 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. This section serves to examine the potential direct and indirect effects of the alternative analyzed in this EA together with past, present, and reasonably foreseeable future actions that affect the groundfish environment. It should also be noted that the predictions of potential synergistic effects from multiple actions, past, present and/or future will generally be qualitative in nature.

Valued Ecosystem Components (VEC)
As noted in Section 6.0 (Description of the Affected Environment), the VECs that exist within the groundfish fishery are identified and the basis for their selection is established. Those VECs were identified as follows:

1. Regulated groundfish stocks (target and non-target);
2. Non-groundfish species (incidental catch and bycatch);
3. Endangered and other protected species;
4. Habitat, including non-fishing effects; and
5. Human Communities (includes economic and social effects on the fishery and fishing communities).

Temporal Scope of the VECs
While the effects of historical fisheries are considered, the temporal scope of past and present actions for regulated groundfish stocks, non-groundfish species, habitat and the human environment is primarily focused on actions that have taken place since implementation of the initial NE Multispecies FMP in 1977. An assessment using this timeframe demonstrates the changes to resources and the human environment that have resulted through management under the Council process and through U.S. prosecution of the fishery, rather than foreign fleets. For endangered and other protected species, the context is largely focused on the 1980s and 1990s, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ. In terms of future actions, this analysis examines the period between the expected implementation and maximum duration of this emergency action (November 15, 2015).

Geographic Scope of the VECs

The geographic scope of the analysis of impacts to regulated groundfish stocks, non-groundfish species and habitat for this action is the total range of these VECs in the Western Atlantic Ocean, as described in the Affected Environment section of the document (Section 6.0). However, the analyses of impacts presented in this framework focuses primarily on actions related to the harvest of the managed resources. The result is a more limited geographic area used to define the core geographic scope within which the majority of harvest effort for the managed resources occurs. For endangered and protected species, the geographic range is the total range of each species (Section 7.0).

Because the potential exists for far-reaching sociological or economic impacts on U.S. citizens who may not be directly involved in fishing for the managed resources, the overall geographic scope for human communities is defined as all U.S. human communities. Limitations on the availability of information needed to measure sociological and economic impacts at such a broad level necessitate the delineation of core boundaries for the human communities. Therefore, the geographic range for the human environment is defined as those primary and secondary ports bordering the range of the groundfish fishery (Section 8.0) from the U.S.-Canada border to, and including, North Carolina.

Analysis of Total Cumulative Effects

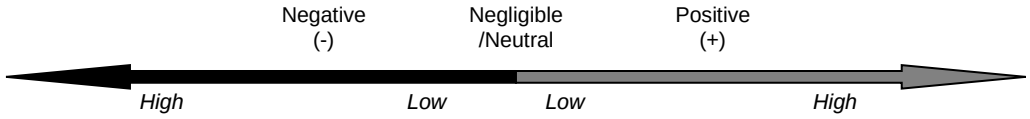
A cumulative effects assessment ideally makes effect determinations based on the culmination of the following: (1) impacts from past, present and reasonably foreseeable future actions; PLUS (2) the baseline condition for resources and human communities (note – the baseline condition consists of the present condition of the VECs plus the combined effects of past, present and reasonably foreseeable future actions); plus (3) impacts from the Preferred Alternative and other alternatives.

A description of past, present and reasonably foreseeable future actions is presented in Table 71. The baseline conditions of the resources and human community are subsequently summarized although it is important to note that beyond the stocks managed under this FMP and protected species, quantitative metrics for the baseline conditions are not available. Finally, a brief summary of the impacts from the alternatives contained in this framework is included. The culmination of all these factors is considered when making the cumulative effects assessment.

Impact definitions for the tables in this section are as summarized in Figure 35.

Figure 35- Impact definitions for cumulative effects analyses.

VEC	Direction		
	Positive (+)	**Negative (-)**	**Negligible/Neutral**
Allocated target species, other landed species, and protected resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
	Impact Qualifiers:		
All VECs: Mixed	**both positive and negative**		
Low (L, as in low positive or low negative)	To a lesser degree		
High (H; as in high positive or high negative)	To a substantial degree		
Likely	Some degree of uncertainty associated with the impact		



Past, Present and Reasonably Foreseeable Future Actions

The following is a synopsis of the most applicable past, present, and reasonably foreseeable future actions (PPRFFA) that have the potential to interact with the current action. For a complete historical list of PPRFFAs, please see Amendment 16 – the last EIS developed for the NE Multispecies FMP.

Table 56- Summary of Effects on VECs from Past, Present, and Reasonably Foreseeable Future FMP and Other Fishery Related Actions.

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Past and Present Fishing Actions					
Amendment 13 (2004) – Implemented requirements for stock rebuilding plans and dramatically cut fishing effort on groundfish stocks. Implemented the process for creating sectors and established the GB Cod Hook Gear Sector	L+	H+	+ .	L+ .	Mixed
FW 40A (2004) – allowed additional fishing on GB haddock for sector and non-sector hook gear vessels, created the GB haddock Special Access Pilot Program, and created flexibility by allowing vessels to fish inside and outside the U.S./Canada Area on the same trip	Negl	L-	L-	Negl	+
FW40B (2005) – Allowed Hook Sector members to use GB cod landings caught while using a different gear during the landings history qualification period to count toward the share of GB cod that will be allocated to the sector, revised DAS leasing and transfer programs, modified provisions for the Closed Area II yellowtail flounder SAP, established a DAS credit for vessels standing by an entangled whale, implemented new notification requirements for Category I herring vessels, and removed the net limit for trip gillnet vessels.	Negl to L+	L-	L-	Negl	L+
FW41 (2005) – Allowed for participation in the Hook Gear Haddock SAP by non-sector vessels	Negl	Negl	Negl to L -	Negl	+

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
FW42 (2006) – Implemented further reductions in fishing effort based upon stock assessment data and stock rebuilding needs, implemented GB Cod Fixed Gear Sector	L+	+	+	L+	Mixed
Atlantic Large Whale Take Reduction Plan	Negl to L-	Negl	Negl	+	L-
Monkfish Fishery Management Plan and Amendment 5 (2011) Implemented ACLs and AMs; set the specifications of DAS and trip limits; and make other adjustments to measures in the Monkfish FMP.	L+	+	+	+	Mixed
Spiny Dogfish Fishery Management Plan	Negl	Negl	+	Negl	L+
Amendment 16 to the Northeast Multispecies FMP (2009) Implemented DAS reductions and gear restrictions for the common pool, approved formation of additional 17 sectors	+	+	+	+	Mixed
Skate Fishery Management Plan and Amendment 3 (2010) Amendment 3 implemented final specifications for the 2010 and 2011 FYs, implemented ACLs and AMs, implemented a rebuilding plan for smooth skate and established an ACL and annual catch target for the skate complex, total allowable landings for the skate wing and bait fisheries, seasonal quotas for the bait fishery, new possession limits, in season possession limit triggers.	+	+	+	+	-

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
FW 44 to the Northeast Multispecies FMP (2010) **Set ACLs, established TACs for transboundary U.S./CA stocks, and made adjustments to trip limits/DAS measures**	**+**	**+**	**+**	**+**	**Mixed**
FW 45 to the Northeast Multispecies FMP (2011) **Revised the biological reference points and stock status for pollock, updated ACLs for several stocks for FYs 2011–2012, adjusted the rebuilding program for GB yellowtail flounder, increased scallop vessel access to the Great South Channel Exemption Area, modified the existing dockside and at-sea monitoring requirements, established a GOM Cod Spawning Protection Area, authorized new sectors and adjusted TACs for stocks harvested in the US/ CA area for FY 2011.**	**L+**	**L+**	**L+**	**L+**	**Mixed**
FW 46 to the Northeast Multispecies FMP (2011) **Increased the haddock catch cap for the herring fishery to 1% of the haddock ABC for each stock of haddock.**	**Negl**	**Negl**	**Negl**	**Negl**	**L-**

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Harbor Porpoise Take Reduction Plan (2010) **Plan was amended to expand seasonal and temporal requirements within the HPTRP management areas; incorporate additional management areas; and create areas that would be closed to gillnet fisheries if certain levels of harbor porpoise bycatch occurs.**	**Likely +**	**Likely +**	**Likely +**	**Likely +**	**Likely -**
Scallop Amendment 15 (2011) **Implemented ACLs and AMs to prevent overfishing of scallops and yellowtail flounder; addressed excess capacity in the LA scallop fishery; and adjusted several aspects of the overall program to make the Scallop FMP more effective, including making the EFH closed areas consistent under both the scallop and groundfish FMPs for scallop vessels.**	**Negl**	**L+**	**Negl**	**Negl**	**L+**
Amendment 17 to the Northeast Multispecies FMP **This amendment streamlined the administration process whereby NOAA-sponsored, state-operated permit banks can operate in the sector allocation management program**	**Negl**	**Negl**	**Negl**	**Negl**	**Negl**

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
FW 47 to the Northeast Multispecies FMP (2012) **FW 47 measures include revisions to the status determination for winter flounder, revising the rebuilding strategy for GB yellowtail flounder, Measures to adopt ACLs, including relevant sub-ACLs and incidental catch TACs; adopting TACs for U.S/Canada area, as well as modifying management measures for SNE/MA winter flounder, restrictions on catch of yellowtail flounder in GB access areas and accountability measures for certain stocks**	**Negl**	**+**	**+**	**Negl**	**-**
Secretarial Amendment to Establish Annual Catch Limits and Accountability Measures for the Small-Mesh Multispecies Fishery **This amendment established the mechanism for implementing ACLs and AMs.**	**Negl to L+**	**Negl**	**Negl**	**Negl**	**Negl to +**
Amendment 3 to the Spiny Dogfish FMP **This amendment established a research set aside program, updates to EFH definitions, year-end rollover of management measures and revisions to the quota allocation scheme.**	**Likely Negl**	**Likely Negl**	**Likely L+**	**Likely Negl**	**Likely L+**

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Framework 24 to the Atlantic Sea Scallop FMP (Framework 49 to the Northeast Multispecies FMP) **This framework set specifications for scallop FY 2013 and 2014. It is also considered measures to refine the management of yellowtail flounder bycatch in the scallop fishery**	**Likely Negl**	**Likely Negl to L+**	**Likely Negl to L+**	**Likely Negl**	**Likely - to +**
FW 48 to the Northeast Multispecies FMP **This FW modified the ACL components for several stocks, adjust AMs for commercial and recreational vessels, modify catch monitoring provisions, and allow sectors to request access to parts of groundfish closed areas.**	**Mixed**	**+**	**+**	**+**	**Mixed**
FW50 to the Multispecies FMP **This FW adopted FY2013-2015 ACLs and specifications for the U.S./Canada Total Allowable Catches (TACs)**	**+**	**+**	**+**	**Negl**	**-**
FW 51 to the Multispecies FMP **This FW adopted FY 2014-2016 specifications and 2014 ACLs for groundfish stocks. It also modified management measures for yellowtail flounder and U.S./CA management Area**	**Mixed**	**+**	**+**	**Negl**	**Mixed**
Reasonably Foreseeable Future Fishing Actions					

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Omnibus Essential Fish Habitat Amendment **Omnibus EFH Amendment would consider the effects of fishing gear on EFH and move to minimize, mitigate or avoid those impacts that are more than minimal and temporary in nature. Further, the omnibus would reconsider closures put in place to protect EFH and groundfish mortality in the Northeast Region, including designated habitat research areas that may be closed to recreational and party/charter groundfish fishing..**	**Likely +**	**Likely +**	**Likely +**	**ND**	**ND**
Harbor Porpoise Take Reduction Plan (Potential Future Actions) **Future changes to the plan in response to additional information and data about abundance and bycatch rates.**	**Likely L+**	**Likely +**	**Likely +**	**Likely +**	**Likely -**
Framework 25 to the Atlantic Sea Scallop FMP **This framework sets specifications for scallop FY 2014 and 2015. It is also considering accountability measures for windowpane flounder stocks.**	**Likely Negl**	**Likely Negl to L+**	**Likely Negl to L+**	**Likely Negl**	**Likely - to +**
Framework 52 to the Northeast Multispecies FMP **This Framework would establish criteria that, if met, would allow for adjustments of northern and southern windowpane flounder accountability measures**	**Likely Negl**	**Likely Negl**	**Likely Negl**	**Likely Negl**	**Likely +**

Actions	Habitat	Regulated Groundfish Stocks	Non-Groundfish Species	Endangered and other Protected Resources	Human Communities
Emergency Action to Increase FY 2014 Haddock ACL **This emergency action would provide additional ACL for GOM Haddock due to the new stock assessment information**	**Likely Negl**	**Likely Negl**	**Likely Negl**	**Likely Negl**	**Likely Negl to L+**
Framework 53 to the Northeast Multispecies FMP **This framework would establish specifications for FY 2015-2017 and set annual catch limits for FY 2015. It may also include additional management measures to protect GOM cod**	**Likely +**	**Likely +**	**Likely Negl**	**Likely Negl**	**Likely Mixed to -**

Noted: ND= Not determined

Table 57 summarizes the combined effects of past, present and reasonably foreseeable future actions that affect the VECs, i.e., actions other than those alternatives under development in this document.

Note that most of the actions affecting this framework and considered in Table 57 come from fishery-related activities (e.g., federal fishery management actions – many of which are identified above in Table 56). As expected, these activities have fairly straightforward effects on environmental conditions, and were, are, or will be taken, in large part, to improve those conditions. The reason for this is the statutory basis for federal fisheries management: the reauthorized Magnuson-Stevens Act. That legislation was enacted to promote long-term positive impacts on the environment in the context of fisheries activities. More specifically, the act stipulates that management comply with a set of National Standards that collectively serve to optimize the conditions of the human environment. Under this regulatory regime, the cumulative impacts of past, present, and future Federal fishery management actions on the VECs should be expected to result in positive long-term outcomes. Nevertheless, these actions are often associated with offsetting impacts. For example, constraining fishing effort frequently results in negative short-term socio-economic impacts for fishery participants. However, 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 managed resource. In addition to the above actions, as a direct result of the new assessment on GOM Cod, several of the exemptions currently allowed pursuant to the rule implementing the operation of Sectors for the FY 2014 fishing year are being re-evaluated for applicability and continuation for the remainder of the FY 2014 fishing year. NMFS will revoke the FY 2014 sector exemption that allows for additional gillnet use by day gillnet vessels. This is expected to have a positive impact for GOM cod by reducing potential catch, particularly adjacent to closed areas. It is a frequently documented occurrence that effort often shifts to boundary lines when closures or marine protected areas are implemented when there is a high occurrence of targeted stocks within the closure area. Because these closures are designed expressly to contain cod and or spawning activity, it is important to minimize the potential impacts that static fishing gear along the boundary may have. NMFS will undertake a more extensive evaluation of potential sector

exemptions for fishing year 2015 in the spring of 2015 through the normal sector exemption rulemaking process.

Non-fishing activities were also considered when determining the combined effects from past, present and reasonably foreseeable future actions. Activities that have meaningful effects on the VECs include the introduction of chemical pollutants, sewage, and impacts from climate change such as changes in water temperature, ocean acidity, salinity, dissolved oxygen, and suspended sediment into the marine environment. These activities pose a risk to the all of the identified VECs in the long term. Human induced non-fishing activities that affect the VECs under consideration in this document are those that tend to be concentrated in near shore areas. 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.

Table 57- Summary effects of past, present and reasonably foreseeable future actions on the VECs identified for Framework 51.

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Regulated Groundfish Stocks	**Mixed** Combined effects of past actions have decreased effort, improved habitat protection, and implemented rebuilding plans when necessary. However, some stocks remain overfished	**Positive** Current regulations continue to manage for sustainable stocks	**Positive** Future actions are anticipated to continue rebuilding and strive to maintain sustainable stocks	**Short-term Negative** Several stocks are currently overfished, have overfishing occurring, or both **Long-Term Positive** Stocks are being managed to attain rebuilt status
Non-Groundfish Species	**Positive** Combined effects of past actions have decreased effort and improved habitat protection	**Positive** Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species	**Positive** Future actions are anticipated to continue rebuilding and target healthy stocks, thus limiting the take of discards/bycatch	**Positive** Continued management of directed stocks will also control incidental catch/bycatch
Endangered and Other Protected Species	**Positive** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources	**Positive** Current regulations continue to control effort, thus reducing opportunities for interactions	**Mixed** Future regulations will likely control effort and thus protected species interactions, but as stocks improve, effort will likely increase, possibly increasing interactions	**Positive** Continued effort controls along with past regulations will likely help stabilize protected species interactions
Habitat	**Mixed** Combined effects of effort reductions and better control of non-fishing activities have been positive but fishing activities and non-fishing activities	**Mixed** Effort reductions and better control of non-fishing activities have been positive but fishing activities and non-fishing activities continue to reduce habitat quality	**Mixed** Future regulations will likely control effort and thus habitat impacts but as stocks improve, effort will likely increase along with additional non-fishing	**Mixed** Continued fisheries management will likely control effort and thus fishery related habitat impacts but fishery and non-fishery related activities will continue to reduce habitat quality

	continue to reduce habitat quality		activities	
Human Communities	**Mixed** Fishery resources have supported profitable industries and communities but increasing effort and catch limit controls have curtailed fishing opportunities	**Mixed** Fishery resources continue to support communities but increasing effort and catch limit controls combined with non-fishing impacts such as high fuel costs have had a negative economic impact	**Short-term Negative** As effort controls are maintained or strengthened, economic impacts will be negative **Long-term Positive** As stocks improve, effort will likely increase which would have a positive impact	**Short-term Negative** Revenues would likely decline dramatically in the short term and may remain low until stocks are fully rebuilt **Long-term Positive** Sustainable resources should support viable communities and economies

Impact Definitions:
-Regulated Groundfish Stocks, Non-groundfish species, Endangered and Other Protected Species: positive=actions that increase stock size and negative=actions that decrease stock size
-Habitat: positive=actions that improve or reduce disturbance of habitat and negative=actions that degrade or increase disturbance of habitat
-Human Communities: positive=actions that increase revenue and well-being of fishermen and/or associated businesses and negative=actions that decrease revenue and well-being of fishermen and/or associated businesses

10.1.1 Baseline Conditions for Resources and Human Communities

For the purposes of a cumulative effects assessment, the baseline conditions for resources and human communities is considered the present condition of the VECs plus the combined effects of the past, present, and reasonably foreseeable future actions. The following table (Table 58) summarizes the added effects of the condition of the VECs (i.e., status/trends from Section 6.4) and the sum effect of the past, present and reasonably foreseeable future actions (from Table 44 above). The resulting CEA baseline for each VEC is exhibited in the last column (shaded). In general, straightforward quantitative metrics of the baseline conditions are only available for the managed resources, non-target species, and protected resources. The conditions of the habitat and human communities VECs are complex and varied. As such, the reader should refer to the characterizations given in Sections 6.1 through 8.0. As mentioned above, this cumulative effects baseline is then used to assess cumulative effects of the proposed management actions described in section 9.0.

Table 58- Cumulative effects assessment baseline conditions of the VECs.

VEC		Status/Trends, Overfishing	Status/Trends, Overfished	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 72)	Combined CEA Baseline Conditions
Regulated Groundfish Stocks	GB Cod	***Yes***	***Yes***	**Negative** – short term: Several stocks are currently overfished, have overfishing occurring, or both; **Positive** – long term: Stocks are being managed to attain rebuilt status	**Negative** – short term: Overharvesting in the past contributed to several stocks being overfished or where overfishing is occurring; **Positive –** long term:
	GOM Cod	***Yes***	***Yes***		
	GB Haddock	No	No		
	GOM Haddock	No	No		
	GB Yellowtail Flounder	***Yes***	***Yes***		
	SNE/MA Yellowtail Flounder	No	No		
	CC/GOM Yellowtail Flounder	***Yes***	***Yes***		
	American Plaice	No	No		

	Witch Flounder	***Yes***	***Yes***		Regulatory actions taken over time have reduced fishing effort and with the addition of Amendment 16, stocks are expected to rebuild in the future
	GB Winter Flounder	No	No		
	GOM Winter Flounder	No	***Unknown***		
	SNE/MA Winter Flounder	No	***Yes***		
	Acadian Redfish	No	No		
	White Hake	No	No		
	Pollock	No	No		
	Northern (GOM-GB) Windowpane Flounder	***Yes***	***Yes***		
	Southern (SNE-MA) Windowpane Flounder	No	No		
	Ocean Pout	No	***Yes***		
	Atlantic Halibut	No	***Yes***		
	Atlantic Wolffish	n/a	***Yes***		

cont'd.

VEC		Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 72)	Combined CEA Baseline Conditions
Non-groundfish Species (principal species listed in section 6.3)	**Monkfish**	Not overfished and overfishing is not occurring.	**Positive** – Continued management of directed stocks will also control incidental catch/bycatch.	**Positive** – Although prior groundfish management measures likely contributed to redirecting effort onto non-groundfish species, as groundfish rebuild this pressure should lessen and all of these species are also managed through their own FMP.
	Dogfish	Not overfished and overfishing is not occurring.		
	Skates	Thorny skate is overfished but overfishing is not occurring. All other skate species are not overfished and overfishing is not occurring.		
Habitat		Fishing impacts are complex and variable and typically adverse (see section 6.1); Non-fishing activities had historically negative but site-specific effects on habitat quality.	**Mixed** – Future regulations will likely control effort and thus habitat impacts but as stocks improve, effort will likely increase along with additional non-fishing activities. An omnibus amendment to the FMP with mitigating habitat measures is under development.	**Mixed** - reduced habitat disturbance by fishing gear but impacts from non-fishing actions, such as global warming, could increase and have a negative impact.
Protected Resources	**Sea Turtles**	Leatherback, Kemp's ridley and green sea turtles are classified as endangered under the ESA and loggerhead sea turtles are classified as threatened.	**Positive** – reduced gear encounters through effort reductions and management actions taken under the ESA and MMPA have had a positive impact	**Positive** – reduced gear encounters through effort reductions and additional management actions taken under the ESA and MMPA.
	Fish	Atlantic salmon, Shortnose sturgeon, and Atlantic sturgeon are classified as endangered under the ESA; Atlantic sturgeon Gulf of Maine DPS is listed as threatened; cusk and dusky shark are candidate species		
	Large Cetaceans	Of the baleen whales (right, humpback, fin, blue, sei and minke whales) and sperm whales, all are protected under the MSA and with the exception of minke whales, all are listed as endangered under the ESA.		
	Small Cetaceans	Pilot whales, dolphins and harbor porpoise are all protected under the MSA, the HPTRP and the Large Whale Take Reduction Plan Amendment		
	Pinnipeds	ESA classification: Endangered, number of nesting females below sustainable level; taken by longfin trawl		

cont'd.

VEC	Status/Trends	Combined Effects of Past, Present Reasonably Foreseeable Future Actions (Table 72)	Combined CEA Baseline Conditions
Human Communities	Complex and variable (see Section 6.5). Although there are exceptions, generally groundfish landings have decreased for most New England states since 2001. Declines in groundfish revenues since 2001 have also generally occurred.	**Negative** – Although future sustainable resources should support viable communities and economies, continued effort reductions over the past several years have had negative impacts on communities	**Negative –** short term: lower revenues would continue until stocks are sustainable **Positive** – long term: sustainable resources should support viable communities and economies

10.1.2 Summary Effects of the FY 2014 GOM Cod Emergency Action

In general the following measures, as described in more detail in section 5.2, would be implemented for the extent of emergency authority:

- Replace the Gulf of Maine Rolling Closures with several seasonal 30-minute grids in the Gulf of Maine (GOM) Broad Stock Area (BSA). These Seasonal Interim Closure Areas would be closed to federally permitted vessels using commercial and recreational gear capable of catching cod (see Figure 4).
- Implement a GOM cod trip limit of 200 lb for sector vessels fishing in the remaining open areas of the broad stock area. The common pool trip limit would be reduced to 200 lb per trip.
- Prohibit possession of recreationally caught GOM cod.
- Restrict commercial limited access groundfish vessels that fish in the GOM BSA to fishing only in that broad stock area for the duration of the declared trip.

The time and area measures are expected to reduce overfishing for the remainder of fishing year 2014 by reducing catch, providing some protection by eliminating fishing pressure on areas where cod have recently been found (i.e., standing stock protection), and provide a mechanism to allow cod to aggregate and spawn without disruption. This suite of closures is expected to help reduce overfishing and begin the process of rebuilding GOM cod.

Trip limits are intended to discourage sector vessels with unused GOM cod ACE from targeting GOM cod. Observed trips will still occur within the GOM and unobserved trips will be attributed discard rates, consistent with past practices. A trip limit still has value because, given the very poor status of the stock, there must be measures that seek to minimize targeting and/or catch of GOM cod.

Similarly, prohibiting possession of recreationally caught GOM cod for the remainder of fishing year 2014 and beyond (if the action is extended for a full year) is intended to discourage fishing for or catching cod in areas not otherwise closed to gear capable of catching cod in this action.

The use of a single stock area declaration is expected to help improve catch and discard reporting of GOM cod. Because vessels cannot split trips between one or more broad stock areas, all cod caught and discarded will be attributed to the GOM stock area. Furthermore, misreporting, whether intentional or accidental, will not occur under the reduced flexibility of single-stock area designation and reporting requirements.

The measures are anticipated to be positive for GOM Cod given the potential reduction in GOM Cod mortality as a result of reducing the fishing grounds available to the fleet. Given the depleted status of the stock (see description of recent stock assessment, section 3), a substantial and immediate reduction in mortality for GOM Cod will better ensure that the stock can rebuild to sustainable levels. Removing effort from the areas that have high historical catch in combination with trip limits outside these areas would provide a reduction in mortality and overfishing for the duration of the action (see section 9). The requirement to fish only in the BSA within the GOM that is declared would further prevent errors in catch accounting.

The impacts on other target groundfish stocks such as haddock, and non-target stocks are anticipated to be minor and negligible. Other stocks have ACLs, and mortality controls in place to limit mortality, and any small displacement of effort into areas outside the proposed closure areas is anticipated to be small. It is anticipated that GOM haddock will be available for harvest in sufficient quantities outside the proposed closure areas as shown in Figure 4 and within the discussion in section 9.0. Further, a separate emergency action is being implemented to increase the ACL for GOM haddock. This should allow for additional opportunities to harvest GOM haddock outside the closure areas. Available quantities of other groundfish stocks are not anticipated to be substantially affected.

As described in section 9.3, impacts to protected resources are not anticipated to be substantial, but may be low positive with the anticipated reduction in effort. Gear interactions with protected resources may be higher in the inshore GOM within the areas proposed for closure, and as such, any shift of effort into other open areas may result in a decrease in interactions – even if overall effort remains constant.

As described in section 9.4, impacts to the physical environment and EFH are not anticipated to be substantial. Fishing effort within areas closed in certain months will continue in other open months. Thus, it is not expected that long term positive habitat benefits will result from the seasonal closures in Alternative 2. There may be some shifting of effort into areas less heavily fished, however, this action does not change the permanent habitat closures in place currently, or the new areas proposed in the OHA2 DEIS. It is not believed that temporary cessation of fishing effort within some of the proposed closure areas would provide an improvement to habitat. In light of these considerations, the Alternative 2 impacts are expected to negligible in comparison to the Alternative 1 status quo/no action.

In general, the adoption of all these measures will benefit GOM Cod because collectively they make it more likely that overfishing will be reduced. The measures are not likely to impact non-groundfish stocks, protected species, or habitat to any great extent when compared to the No

Action alternative. However, impacts to human communities are moderately negative in the short term. Long term impacts may be positive if stocks rebuild to levels sustainable for harvest.

10.1.3 Cumulative Effects Summary

The regulatory atmosphere within which Federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of resources, habitat, and human communities. Consistent with NEPA, the M-S Act requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, impacts on all VECs (except short-term impacts to human communities) from past, present and reasonably foreseeable future actions, when combined with baseline conditions, have generally been positive and are expected to continue in that manner for the foreseeable future. This is not to say that some aspects of the various VECs are not experiencing negative impacts, but rather that when taken as a whole and compared to the level of unsustainable effort that existed prior to and just after the fishery came under management control, the overall long-term trend is positive.

Section 10.1.4 provides as a summary of likely effects from the management alternatives contained in this EA. The CEA baseline that, as described above in Table 58 represents the sum of the past, present, and reasonably foreseeable future (identified hereafter as "other") actions and conditions of each VEC. When an alternative has a positive effect on a VEC, for example, reduced fishing mortality on a managed species, it has a positive cumulative effect on the stock size of the species when combined with the "other" actions that were also designed to increase stock size. In contrast, when an alternative has a negative effect on a VEC, such as increased mortality, the cumulative effect on the VEC would be negative and tend to reduce the positive effects of the "other" actions. The resultant positive and negative cumulative effects are described below for each VEC.

<u>Managed Resources</u>

As noted in Table 58, the combined impacts of past federal fishery management actions have led to short-term impacts that result in overfishing and/or overfished status for several stocks. However, management measures, in particular modifications implemented through Amendment 16 to the FMP, are expected to yield rebuilt sustainable groundfish stocks in the future. The actions proposed by this emergency action are expected to continue this trend. The adoption of the proposed closure areas and trip limits for Gulf of Maine cod would have the largest biological and economic impacts. The measures are designed to reduce overfishing in order to promote stock rebuilding. This objective is not expected to be compromised by a concurrent increase in GOM haddock catch limits. The past and present impacts, combined with the Preferred Alternative and future actions are expected to continue rebuilding and strive to maintain sustainable stocks, and should yield positive non-significant impacts to managed resources in the long term.

<u>Non-Target Species</u>

As noted in Table 58, the combined impacts of past federal fishery management actions have decreased fishing effort and improved habitat protection for non-target species. Current management measures, including those implemented through Amendment 16 to the FMP, are expected to continue to control effort, and decrease bycatch and discards. The actions proposed by this emergency action are expected to continue this trend. The primary mechanism is through the proposed closure areas, and GOM Cod trip limits imposed outside the proposed closure areas. The modifications in management measures are not expected to affect non-target species substantially. The past and present impacts, combined with the Preferred Alternative and future actions which are expected to continue rebuilding and strive to maintain sustainable stocks, should yield positive non-significant impacts to non-target species.

Protected Resources

As noted in Table 58, the combined impacts of past federal fishery management actions have reduced fishing effort, and therefore reduced interactions with protected resources. Current management measures, including those implemented through Amendment 16 to the FMP, are expected to continue to control effort and catch, and therefore continue to lessen interactions with protected resources. The actions proposed by this EA are expected to continue this trend; however, as stocks rebuild to sustainable levels, future actions may lead to increased effort, which may increase potential interactions with protected species. The reductions in available fishing grounds for cod and the trip limits may provide short-term benefits to protected resources as groundfish fishing effort will decline, but as stocks rebuild effort may increase. Changes to management measures are not expected to affect protected species. Overall, the combination of past, present, and future actions is expected to stabilize protected species interactions and lead to positive impacts to protected species.

Habitat, Including EFH

As noted in Table 58, the combined impacts of past federal fishery management actions have reduced fishing effort, and therefore have been positive for habitat protection. In addition, better control of non-fishing activities has also been positive for habitat protection. However, both fishing and non-fishing activities continue to decrease habitat quality. None of the measures are expected to have substantial impacts on habitat or EFH. The proposed closure areas for cod and the trip limits are of short duration and will not likely provide benefits to habitat. Overall, the combination of past, present, and future actions is expected to reduce fishing effort and hence reduce damage to habitat; however, it is likely that fishing and non-fishing activities will continue to degrade habitat quality.

Human Communities

As noted in Table 58, the combined impacts of past federal fishery management actions have reduced effort, and therefore have curtailed fishing opportunities. Past and current management measures, including those implemented through Amendment 16 to the FMP and subsequent framework actions will maintain effort and catch limit controls, which together with non-fishing impacts such as rising fuel costs have had significant negative short term economic impacts on human communities. The closure areas for GOM cod and the trip limits are expected to have long-term positive impacts on human communities, particularly when considered with future

Council management actions, as they promote stock rebuilding. However, in the short-term, the cumulative effect of past groundfish actions when combined with the proposed action will likely result in impacts that are negative and significant. This is especially true for impacts to the recreational fishery when considered with future actions such as proposed closure areas under the Omnibus Habitat Amendment. However, this action alone is not expected to have significant socioeconomic impacts beyond what was anticipated in Amendment 16.

11.0 List of Preparers and Persons/Agencies Consulted

Questions concerning this document may be addressed to:
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This document was reviewed by staff of the NMFS GARFO, NEFSC, NOAA Office for Program Planning and Integration, and NOAA General Counsel. Staff members of Council, GARFO, NEFSC, and MA DMF were also consulted in preparing this EA. No other persons or agencies were consulted.

12.0 Compliance with Applicable Laws and Executive Orders

12.1 Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens act)

12.1.1 National Standards

Section 301 of the Magnuson-Stevens Act requires that FMPs contain conservation and management measures that are consistent with the ten National Standards. The following section outlines how the emergency action is consistent with these standards.

National Standard 1

The most recent FMP changes implemented by Amendment 16 address how the proposed management actions comply with the National Standards. This action is intended to work in concert with those overarching measures and programs through balancing the reductions in GOM cod mortality through the rest of the fishing year with allowing some fishing on other stocks consistent with their management objectives, including optimum yield. Under Amendment 16, the Council adopted conservation and management measures that would end overfishing and rebuild NE multispecies stocks to achieve, on a continuing basis, the optimum yield for NE multispecies stocks and the U.S. fishing industry using the best scientific information available consistent with National Standards 1 and 2. Amendment 16 implemented a comprehensive system of ACLs and accountability measures designed to function consistent with revised National Standard 1 guidelines issued subsequent to the 2006 reauthorization of the Magnuson-Stevens Act (74 FR 3178; January 16, 2009). The Amendment 16 measures have been updated through subsequent framework actions. In particular, a revised rebuilding program for GOM cod was adopted in Framework Adjustment 51 (April 22, 2014; 79 FR 22421). This revised program established a new rebuilding program with a 2024 end date because the previous program had made inadequate progress toward rebuilding the GOM cod stock.

National Standard 2

The updated assessment conducted by the NEFSC, used previously peer-reviewed models and assessment methods, only updating additional years of fishery catch and survey information. The updated assessment information for GOM cod underwent external peer review in August 2014. While there are those that disagree with the process that generated the assessment update, the peer review met all the terms of reference for the assessment update review and recommended using the information for fisheries management. These practices are consistent with guidance for applying National Standard 2. Criticism has been leveled on the amount of transparency that occurred with the assessment update. To be clear, this was an update to an existing assessment not a benchmark assessment wherein all components of the data, methods, assumptions, and modeling approaches are reviewed and potentially revised based on working group and peer review advice. The peer review was announced and conducted in an open and transparent process.

National Standard 3

The NE Multispecies FMP and implementing regulations manage all 20 groundfish stocks (13 species) throughout their entire range, as required by National Standard 3.

National Standard 4

Section 9.1.1 of Amendment 16 describes how the measures implemented under that action do not discriminate among residents of different states consistent with National Standard 4. This emergency action similarly does not discriminate among residents of different states. The measures apply equally to all NE groundfish fishery participants irrespective of their home state.

National Standard 5

This emergency action does not have economic allocation as its sole purpose. Similarly, the measures implemented in Amendment 16 were also demonstrated as not having economic allocation as their sole purpose, consistent with National Standard 5.

National Standard 6

The emergency action takes into account variation in the groundfish fishery, specifically changes in the understanding of GOM cod stock status and the heightened need to provide mortality reductions and spawning protections.

National Standard 7

The emergency action avoids unnecessary duplication by working in concert with existing FMP measures and providing an approach that may be adopted in whole or part by future Council action. The measures do not overlap with other regulatory requirements imposed by other agencies.

National Standard 8

The emergency measures taken into account the needs of fishing communities to the extent practicable. The change in GOM stock status and the overall low spawning stock biomass necessitates management responses to effectively reduce overfishing and to provide stock protections to foster rebuilding. These measures have been analyzed and will have an effect on fishing communities, particularly those heavily reliant on GOM cod or that have fishing fleets (commercial and recreational) that have made use of the emergency area closures. Section X.X contains more information on these impacts. NMFS has, to the extent possible, sought to minimize the impact of the emergency measures by balancing time/area closures in a manner that will continue to permit some inshore fishing activity and allow the perpetuation of fishing in areas that either demonstrate low abundance of cod or low likelihood of cod aggregation/spawning activities.

National Standard 9

The use of time/area closures for both commercial and recreational fisheries are deliberately designed to keep fisheries from harvesting cod and thereby minimize bycatch of the stock. Other measures, previously implemented in Amendment 16 further address bycatch and, with the exception of trip limits, remain unchanged in this action from when implemented in Amendment 16. The use of trip limits may cause regulatory discard on individual trips but it is expected that overall fishing mortality on GOM cod will be lower with trip limits than without. Analyses

indicate that from 2010 through October 2014, approximately 25 percent of commercial trips in the areas that will be left open under this action would be required to discard some GOM cod. Because of the need to discourage targeting GOM cod, these potential regulatory discards are acceptable in the short term (i.e., 6 months) as a means to reduce overall fishing mortality on this stock before more permanent measures, including lower catch limits, are put in place. Recreational discards may result because of the prohibition on possession; however, 70 percent of recreational discards are expected to survive. Thus, the measures in this action minimize, to the extent practicable, bycatch as directed by National Standard 9.

National Standard 10

The emergency measures promote safety at sea. The distinct area closures leave available some inshore waters in certain seasons so fishery participants, particularly those in small vessels, are not forced to fish exclusively offshore.

12.1.2 Magnuson-Stevens Act Section 305(c) Interim Action

The Magnuson-Stevens Act authorizes the Secretary to act if (1) the Secretary finds that an emergency involving a fishery exists; or (2) the Secretary finds that interim measures are needed to reduce overfishing in any fishery; or (3) if the Council finds one of those factors exists and requests that the Secretary act. Although this action is billed as an interim rule to reduce overfishing and reduce fishing mortality while the Council develops longer-term measures in Framework Adjustment 53, it is consistent with NMFS guidelines on implementing emergency actions under Section 305 (c) of the Magnuson-Stevens Act. This guidance defines when an emergency involving a fishery exists (62 FR 44421; August 21, 1997) and can be addressed through Secretarial action. Where such circumstances exist, the Secretary may promulgate emergency rules or interim measures "to address the emergency or overfishing." 16 USC 1855(c)(1) and (2). The Secretary has delegated this authority to NMFS. Further, NMFS has issued guidance defining when "an emergency" involving a fishery exists (62 FR 44421; August 21, 1997). This guidance defines an emergency as a situation that (1) arose from recent, unforeseen events, (2) presents a serious conservation problem in the fishery, and (3) can be addressed through interim emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and the deliberative consideration of the impacts on participants to the same extent as would be expected under the formal rulemaking process.

Under the statute and guidance, the rationale for issuing these emergency and interim regulations is as follows: The August 2014 GOM cod assessment update indicates that the stock is overfished, is subject to overfishing, and is at a historically low level of abundance. The measures currently in place for fishing year 2014 may result in substantial overfishing of the stock and compromise the stock's ability to rebuild over the long term if not implemented as soon as possible. This action is necessary to reduce overfishing, consistent with the stated authority in section 305(c) of the Magnuson-Stevens Act.

Both NMFS and the Council agree with the stock assessment update's findings and that the stock is in need of immediate emergency measures to reduce overfishing and provide protection to stock aggregations and spawning activities as a stop-gap while the Council develops longer-term measures necessitated by the updated assessment. Stated more simply, catch must be reduced

and when and where cod are caught matters. The Council process would not be able to develop and recommend a framework adjustment, or other management measures, until November 2014 at earliest and most likely later. NMFS would not be able to consider and implement any such Council recommendations, even if issued directly as a final rule without prior public comment, until late winter or early spring. Based on this, the Council voted 14 for, 3 against to recommend that NMFS take emergency action as expeditiously as possible on behalf of the Secretary. NMFS stated its support for this request during Council deliberations, as the agency believes GOM cod is in need of immediate and rigorous protection. The Council's request is to use measures to reduce fishing mortality in fishing year 2014 while the Council works on long-term measures for May 1, 2015, implementation through Framework Adjustment 53. Accordingly, under the Magnuson-Stevens Act, NMFS, issues these emergency interim measures to address the need to reduce overfishing and protect the stock of GOM cod more expeditiously than the Council process or standard Administrative Procedure Act (APA) agency rulemaking could achieve.

12.2 Essential Fish Habitat (EFH)

There are no adverse impacts associated with this action, so no EFH assessment or EFH consultation is required, as determined by a Habitat Conservation Division Review (November, 3 2014).

12.3 Endangered Species Act (ESA)

As outlined in the impacts analysis this EA, the fishing activities anticipated to occur under this action are not expected to affect endangered and threatened species or critical habitat in any manner not considered in prior consultations on this fishery

12.4 Marine Mammal Protection Act (MMPA)

As outlined in the impacts analysis of this EA, the interim measures have been determined to be consistent with the provisions of the MMPA and would not alter existing measures to protect the species likely to inhabit the management unit of the NE multispecies FMP.

12.5 National Environmental Policy Act (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), as has NOAA in its agency policy and procedures for NEPA in NAO 216-6 §5.04b.1. All of those requirements are addressed in this document, as referenced below.

12.5.1 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b) and NAO 216-6 §5.04b.1. They are included in this document as follows:

- The need for this action are described in Section 4.0;
- The alternatives that were considered are described in Section 5.0;
- The environmental impacts of alternatives are described in Section 9.0;
- The agencies and persons consulted on this action are listed in Section 11.0.

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 Sections 3.0 and 4.0.
- A summary of the document can be found in Sections 1.0 and 3.0.
- A brief description of the affected environment is in Section 6.0.
- Cumulative impacts of the Preferred Alternatives are described in Section 10.0.
- A determination of significance is in Sections 12.5.2 and 12.5.3.
- A list of preparers is in Section 11.0.

12.5.2 Finding of No Significant Impact (FONSI)

National Oceanic and Atmospheric Administration Order (NAO) 216-6 (revised May 20, 1999) provides sixteen criteria for determining the significance of the impacts of a final fishery management action. These criteria are discussed below:

(1) *Can the Preferred Alternatives reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?*

Response: The Preferred Alternatives cannot reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action. With respect to the target species in the Northeast Multispecies fishery the Preferred Alternatives adopt catch limits or management measures that are consistent with target fishing mortality rates that promote rebuilding and/or sustaining stock sizes.

(2) *Can the Preferred Alternatives reasonably be expected to jeopardize the sustainability of any non- target species?*

Response: For fishery resources that are caught incidental to groundfish fishing activity, there is no indication in the analyses that the alternatives will threaten sustainability. The Preferred

Alternatives will probably result in declines in overall groundfish fishing effort because of reductions in available fishing grounds and trip limits. Since the fishery does not currently jeopardize non-target species it is not likely that these alternatives will change that status.

(3) *Can the Preferred Alternatives reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?*

Response: The Preferred Alternatives cannot reasonably be expected to cause substantial damage to the oceans and coastal habitats and/or essential fish habitat. Analyses described in Section 9.4.2 indicate that negligible impacts are expected.

(4) *Can the Preferred Alternatives be reasonably expected to have a substantial adverse impact on public health or safety?*

Response: Nothing in the Proposed Action can be reasonably expected to have a substantial adverse impact on public health or safety. Measures adopted in Amendment 16 were designed to improve safety in spite of low ACLs anticipated by subsequent actions in the near term future. The flexibility inherent in sector management and the ability to use common pool DAS at any time are key elements of the measures that promoted safety. The Preferred Alternative is not likely to impact vessel safety.

(5) *Can the Preferred Alternatives reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?*

Response: The Preferred Alternative cannot be reasonably expected to adversely affect endangered or threatened species. As discussed in Section 9.3.2, this action is expect to have low positive impacts on protected resources as effort will be reduced in areas where interactions with marine mammals is a concern.

(6) *Can the Preferred Alternatives be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?*

Response: The Preferred Alternative is not expected to have a substantial impact on biodiversity and/or ecosystem function with the affected area. The use of ACLs tightly controls catch of target and incidental regulated groundfish stocks. Catches of target and incidental catch species under this program will be consistent with the mortality targets of Amendment 16, and thus will not have a substantial impact on predator-prey relationships or biodiversity. Particular measures within this action will have no more than minimal adverse impacts to EFH. It is therefore reasonable to expect that there will not be substantial impact on biodiversity or ecosystem function.

(7) *Are significant social or economic impacts interrelated with natural or physical environmental effects*?

Response: The Preferred Alternative is designed to continue the groundfish rebuilding programs that were first adopted in Amendment 13 to the Northeast Multispecies Fishery Management Plan and modified in subsequent actions, including Amendment 16. The environmental assessment

documents that no significant natural or physical effects will result from the implementation of the Preferred Alternative. As described in Section 4.0, the proposed area closures, and cod trip limits are designed to reduce overfishing and continue rebuilding. The action cannot be reasonably expected to have significant impacts on habitat or protected species, as the impacts are expected to fall within the range of those resulting from Amendments 13 and 16 and will generally result in a reduction in fishing area, and/or interactions. The action's potential economic and social impacts are also addressed in the environmental assessment (Section 9.5), as well as in the Executive Order 12866 review (Section 12.10). The proposed area closures and trip limits are expected to result in gross groundfish revenues for $64.3 million for FY2014, a reduction of $1.6 million relative to the No Action Alternative. Smaller vessels homeported in the inshore Gulf of Maine bear the brunt of these reductions. Gloucester, MA and New Hampshire ports in particular are hardest hit, seeing reductions in gross revenues of between 13-26% (Table 50, Table 53). Vessels in the 30-50 ft size class are predicted to see gross revenue declines on the order of 40% (Table 51, Table 54). While these declines in revenues are substantial, because they are less than $100 million they are not considered significant under the criteria used for E.O. 12866. The Preferred Alternatives, however, may place small entities (defined as those generating less than $500K in annual sales) at a competitive disadvantage relative to large entities, particularly for vessels participating in the commercial groundfish fishery.

NMFS has determined that despite the potential socio-economic impacts resulting from this action, there is no need to prepare an EIS. The purpose of NEPA is to protect the environment by requiring Federal agencies to consider the impacts of their proposed actions on the human environment, defined as " the natural and physical environment and the relationship of the people with that environment." The EA describes and analyzes the preferred alternatives and concludes that there will be no significant impacts to the natural and physical environment. While some fishermen, shore-side businesses, and others may experience impacts to their livelihood, these impacts, in and of themselves, do not require the preparation of an EIS, as supported by NEPA's implementing regulations at 40 C.F.R. 1508.14. Consequently, because the EA demonstrates that the action's potential natural and physical impacts are not significant, the execution of a FONSI remains appropriate under these criteria.

(8) *Are the effects on the quality of the human environment likely to be highly controversial*?

Response: The effects of the proposed actions for the EA on the quality of human environment are not expected to be highly controversial. The public is aware of the revised stock assessment for GOM Cod and the Councils request for emergency action in order to reduce mortality on the stock. The latest stock assessment for GOM cod constitutes the best available peer reviewed science. The Council voted at the September 2014 Council meeting to request that NMFS take emergency action to reduce mortality on GOM Cod. NMFS and the Council are obligated under the FMP and National Standard 1 provisions of the Magnuson-Stevens Act to implement measures to prevent overfishing. The measures of the proposed action are intended to reduce the likelihood of overfishing, and mortality on the stock. As such, they are consistent with both the FMP and the Magnuson-Stevens Act requirements. They provide a reasonable probability of being effective at their designed objective of constraining GOM cod catch. The proposed action is not expected to negatively impact habitat, target and non-target species, or protected resources. In summary, because the proposed action is based on the best available science that

has been peer reviewed, and is not considered controversial, the effects of the actions should not be controversial.

(9) *Can the Preferred Alternatives reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?*

Response: No, the Preferred Alternatives cannot be reasonably expected to result in substantial impacts to unique areas or ecological critical areas. The only designated HAPC in the areas affected by this action is protected by an existing closed area that would not be affected by this action. In addition, vessel operations around the unique historical and cultural resources encompassed by the Stellwagen Bank National Marine Sanctuary would not likely be altered by this action. As a result, no substantial impacts are expected from this action.

(10) *Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?*

Response: The Preferred Alternative is not expected to result in highly uncertain effects on the human environment or involve unique or unknown risks. The measures used in this action are similar to those adopted in past management actions, and these prior actions have reduced fishing mortality on many stocks and initiated stock rebuilding. While there is a degree of uncertainty over how fishermen will react to the proposed measures, the analytic tools used to evaluate the measures attempt to take that uncertainty into account and reflect the likely results as a range of possible outcomes. For example, the economic analysis in Section 9.5 illustrates the distribution of results that are expected rather than provide only a point estimate. Overall, the impacts of the Preferred Alternatives can be, and are, described with a relative amount of certainty.

(11) *Is the Preferred Alternative related to other actions with individually insignificant, but cumulatively significant impacts?*

Response: The Proposed Action is not related to other actions with individually insignificant but cumulatively significant impacts. Recent management actions in this fishery include FW 42, FW 43, Amendment 16, FW 44, FW 45, FW 46, FW 47, FW 48, FW 49, FW 50, and FW 51. FW 42 developed specific measures implementing programs adopted by Amendment 13; each was determined to be insignificant. FW 43 adopted limits on groundfish bycatch by mid-water trawl herring vessels and was not determined to have a significant effect on either the groundfish or herring fisheries. Amendment 16 had significant impacts and thus required the preparation of an EIS, while Frameworks 44 and 46 set specifications as required under Amendment 16 and made relatively minor adjustments to the sector administration program. Framework 46 modified the amount of haddock that may be caught by the midwater herring fishery. Framework 47 adjusted several ABCs/ACLs for FY 2012, FW 48 modified many of the ABC/ACL provisions, AMS, and monitoring provisions, and FW 49 adjusted the timing of scallop vessel access to access areas on GB. Framework 50 and 51 adjusted ABCs/ACLs for FY 2013/2014. The measures in this action are needed to respond to the best available science in order to meet the rebuilding objectives for cod specific in Amendment 16 and thus cannot be said to have different cumulative impacts that were not foreseen and addressed in the amendment. Therefore, the Preferred Alternatives, when assessed in conjunction with the actions noted above, would not have significant impacts on the natural or physical environment.

(12) *Are the Preferred Alternatives likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural or historical resources?*

Response: The Preferred Alternative is not likely to affect objects listed in the National Register of Historic Places or cause significant impact to scientific, cultural, or historical resources. The only objects in the fishery area that are listed in the National Register of Historic Places are ship wrecks, including several in the Stellwagen Bank National Marine Sanctuary. The current regulations allow fishing within the Stellwagen Bank National Marine Sanctuary. The Preferred Alternatives would not regulate current fishing practices within the sanctuary. However, vessels typically avoid fishing near wrecks to avoid tangling gear. Therefore, this action would not result in any adverse effects to wrecks.

(13) *Can the Preferred Alternatives reasonably be expected to result in the introduction or spread of a non-indigenous species?*

Response: This action would not result in the introduction or spread of any non-indigenous species, as it would not result in any vessel activity outside of the Northeast region.

(14) *Are the Preferred Alternatives likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?*

Response: No, the Preferred Alternative is not likely to establish precedent for future actions with significant effects. The Preferred Alternative adopts measures that are designed to react to the necessity to reduce fishing mortality for GOM cod in order to reduce the likelihood of overfishing. As such, these measures are designed to address a specific problem and are not intended to represent a decision about future management actions that may adopt different measures.

(15) *Can the Preferred Alternatives reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?*

Response: The Preferred Alternative is intended to implement measures that would offer further protection of marine resources and would not threaten a violation of Federal, state, or local law or requirements to protect the environment.

(16) *Can the Preferred Alternatives reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?*

Response: As specified in the responses to the first two criteria of this section, the Preferred Alternative is not expected to result in cumulative adverse effects that would have a substantial effect on target or non-target species. This action would likely reduce fishing mortality within M-S Act requirements for GOM cod, with no expected increase in mortality for non-target and non-groundfish stocks.

12.5.3 FONSI Statement

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for Framework Adjustment 51 to the Northeast Multispecies Fishery Management Plan, it is hereby determined that this interim action will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the Proposed Action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not required.

for JOHN BULLARD — 11/4/14

Regional Administrator, Greater Atlantic Regional Fisheries Office, NOAA — Date

12.6 Administrative Procedure Act (APA)

Section 553 of the APA establishes procedural requirements applicable to 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. Pursuant to 5 U.S.C. 553(b)(B) and 5 U.S.C. 553(d)(3), the Assistant Administrator for Fisheries finds good cause to waive the otherwise applicable requirements for both notice and comment rulemaking and a 30-day delay in effectiveness for this emergency interim action implementing GOM cod management measures.

The availability of information and need for expedient action made it impracticable to provide prior notice-and-comment opportunity and a 30-day cooling off period. The updated GOM cod assessment was initially made available in August and peer-review was conducted late in that same month. The assessment updated indicates the stock continues to be overfished, subject to substantial overfishing, and is estimated to be the smallest total size in recorded history. Over the course of September, the Council's PDT and SSC received the results of the assessment and peer-review before providing advice to the Council's Groundfish Oversight Committee (Committee) on September 24, 2014. In turn, the Committee recommended to the Council that a recommendation for emergency action be forwarded to NMFS. The Council deliberated on the Committee recommendation on October 1, 2014. The Council overwhelmingly agreed that the fishing mortality for GOM cod needed to be reduced as quickly as possible for the remainder of fishing year 2014. The existing catch limits if left in place with no additional management changes, have the potential to result in 4 times the desired fishing mortality for the year. The emergency is designed to implement measures that will reduce fishing mortality, shift fishing effort to areas of lower cod abundance (i.e., standing stock protection), and provide protection to

cod spawning activities. Reducing catch limits or otherwise recalling previously issued percent sector contributions during the fishing year would be administratively complex and time consuming. By taking the approach outlined in the emergency interim rule, NMFS can put in place measures that have the potential to reduce fishing mortality, as requested by the Council. In the interim between this action and the start of the 2015 fishing year that begins May 1, 2015, the Council will develop and recommend long-term solutions, including potentially lower catch limits, designed to protect and rebuild GOM cod.

These timing-related issues paired with the need to complete analyses and the rulemaking processes as quickly as possible to reduce cod catches make it impracticable to propose GOM cod measures through notice-and-comment rulemaking. During the delay in which measures were developed and implemented, additional and potentially excessive GOM cod mortality was expected to occur. In addition, some empirical data indicate that spawning, as indicated by ripe and running fish, begins in November. To provide protection for the 2014 spawning activities that begin in fall and continue through winter into spring, expediting these emergency measures were necessary.

For the reasons outlined, NMFS finds it impracticable and contrary to the public interest to provide prior opportunity to comment on these GOM cod emergency measures and provide a 30-day delay in implementation. Therefore there exists good cause to waive both of those requirements.

12.7 Paperwork Reduction Act (PRA)

The purpose of the PRA is to control and, to the extent possible, minimize the paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by, or for, the Federal Government. This action contains no new information collection requirements and, as such, no review under the PRA is necessary.

12.8 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the CZMA requires that all Federal activities which affect any coastal use or resource be consistent with approved state coastal zone management programs (CZMP) to the maximum extent practicable. NMFS has reviewed the relevant enforceable policies of each coastal state in the NE region for this action and has determined that this action is incremental and repetitive, without any cumulative effects, and is consistent to the maximum extent practicable with the enforceable policies of the CZMP of the following states: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, and North Carolina. NMFS finds this action to be consistent with the enforceable policies to manage, preserve, and protect the coastal natural resources, including fish and wildlife, and to provide recreational opportunities through public access to waters off the coastal areas. Pursuant to the general consistency determination provision codified at 15 CFR 930.36(c), NMFS sent a general consistency determination applying to the current NE Multispecies FMP, and Federal actions carried out in accordance with the FMP, to the following states: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, and North Carolina on October

21, 2009. North Carolina, Rhode Island, Virginia, Connecticut, New Hampshire, New Jersey, Delaware, and Pennsylvania have concurred with the general consistency determination. Consistency was inferred for those states that did not respond.

12.9 Information Quality Act (IQA)

A. Is the information helpful, beneficial or serviceable to the intended user?

The interim rule outlines measures being implemented to reduce catch of and provide stock and spawning protection for Gulf of Maine cod for the remainder of the 2014 fishing year that ends April 30, 2015. An environmental assessment (EA) compiled to satisfy National Environmental Policy Act requirements and outline compliance with other applicable laws and a Federal Register rule for this action describe the actions being taken (seasonal closures, trip limits, changes to reporting, prohibition on recreational retention, and change to the number of gillnets that may be fished), the reasons for why the interim measures are necessary, and the biological, economic, and social impacts of those measures. The information contained in the EA and rule are useful to understand the rationale for the action as well as the potential impacts of the measures. The Federal Register rule provides a summary of the information in the EA to inform interested public of the scope and purpose of the action. The interim action is consistent with the FMP and the conservation and management goals of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

B. Is the data or information product an improvement over previously available information? Is it more current or detailed? Is it more useful or accessible to the public? Has it been improved based on comments from or interactions with customers?

The interim measures are based on a recently completed and peer reviewed stock assessment for GOM cod. This stock assessment is the best scientific information available, and incorporates more up-to-date fishery and survey catch information and uses this information to model the overall cod population using previously peer reviewed methods. The development of the EA, interim rule, and the decisions of NMFS in implementing this action were in response to a request by the New England Fishery Management Council. During the Council proceedings that generated the request, substantial public comment on the types of measures desired were expressed. These have been used to improve the interim rule, where possible.

The intended users of the information product are participants of the NE multispecies fishery, industry members and other interested members of the public, members of the New England Fishery Management Council (Council), and the National Marine Fisheries Service (NMFS). The information provided in this EA and rule are based on the most recent available information from the relevant data sources.

What media are used in the dissemination of the information? Printed publications? CD-ROM? Internet? Is the product made available in a standard data format? Does it use consistent attribute naming and unit conventions to ensure that the information is accessible to a broad range of users with a variety of operating systems and data needs?

The *Federal Register* document that announces the emergency measures, as well as the EA that analyzes the potential impacts of such measures, will be made available in printed publication and on the Internet websites for the NMFS Greater Atlantic Regional Fisheries Office and the Council. Electronic files will use a standard format accessible to all operating systems. This temporary rule provides catch limits in metric tons, consistent with previous groundfish actions.

Integrity of Information Product:

This action (a Natural Resource Plan) ensures that electronic information adheres to the standards set out in Appendix III, Security of Automated Information Resources, OMB Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

What published standard(s) govern the creation of the Natural Resource Plan? Does the Plan adhere to the published standards?

Any management action under this FMP must comply with the requirements of the MSA, including section 305(c) regarding interim and emergency rules; the National Environmental Policy Act; the Regulatory Flexibility Act; the Administrative Procedures Act; the Paperwork Reduction Act; the Coastal Zone Management Act; the Endangered Species Act; the Marine Mammal Protection Act; and Executive Orders 12612 (Federalism), 12630 (Property Rights), 12866 (Regulatory Planning), and 13158 (Marine Protected Areas). National Marine Fisheries Service (NMFS) has determined that the interim rule to implement cod protection measures is consistent with the National Standards of the MSA and all other applicable laws.

Was the Plan developed using the best information available?

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Stock status (including estimates of biomass and fishing mortality) reported in this product are based on the most recent GOM cod stock assessment update prepared by scientists of the Northeast Fisheries Science Center (NEFSC). The assessment update was peer-reviewed by an independent panel of subject matter experts. Information in the EA, including landings and revenue information, is based upon information collected through the Vessel Trip Report and Commercial Dealer databases. NMFS, in conjunction with the commercial fishery, operates multiple data collection programs (e.g., vessel trip reports, commercial dealer databases, NMFS Observer Program, At-Sea Monitoring). These programs incorporate peer-reviewed, scientifically valid sampling protocols. Additional information is presented in the EA that has been accepted and published in peer-reviewed journals or by scientific organizations. Original analyses in the EA were prepared using data from accepted sources. Summary information in the interim rule is based upon information in the EA.

The conservation and management measures proposed for this action were selected based upon the best scientific information available. The information is consistent with the principles for evaluating best scientific information available, as proposed in National Standard 2 Guidelines (74 FR 65724; December 11, 2009): Relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review. Specialists who worked with these data are

familiar with the most current analytical techniques and with the available data and information relevant to the groundfish fishery.

Have clear distinctions been drawn between policy choices and the supporting science upon which they are based? Have all supporting materials, information, data and analyses used within the Plan been properly referenced to ensure transparency?

The policy decisions (i.e., catch limit specifications) specified in the interim action are supported by the best scientific information available. The supporting materials and analyses used to develop these measures are contained in the EA. The policy choices are clearly articulated in the EA document as are the management alternatives considered in this action. The supporting science and analyses, upon which the policy choices are based, are summarized and described in the EA. All supporting materials, information, data, and analyses within the EA have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency.

Describe the review process of the Plan by technically qualified individuals to ensure that the Plan is valid, complete, unbiased, objective and relevant. For example, internal review by staff who were not involved in the development of the Plan to formal, independent, external peer review. The level of review should be commensurate with the importance of the Plan and the constraints imposed by legally enforceable deadlines.

The development of the Secretarial Interim Action involves the NMFS Northeast Fisheries Science Center (Center) and the Greater Atlantic Regional Fisheries Office. The Center's technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment models, demersal resources, population biology, and social sciences. 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. Final review and approval of the emergency action and clearance of the rule is conducted by staff at NMFS Headquarters, General Counsel, and the Department of Commerce.

Through the rulemaking process, the public and the New England Fishery Management Council will have an opportunity to comment on any aspect of the EA. The review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, law enforcement, protected species, and compliance with the applicable laws. Final approval of the action will be by the Regional Administrator, Greater Atlantic Region.

12.10 Regulatory Impact Review

12.10.1 Executive Order 12866

The purpose of E.O 12866 is to enhance planning and coordination with respect to new and existing regulations. This E.O. requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be "significant." Section 12.10 of this document represents the RIR, which includes an assessment of the costs and benefits of the Proposed Action in accordance with the guidelines established by E.O. 12866. The analysis included in

the RIR shows that this action is not a "significant regulatory action" because it will not affect in a material way the economy or a sector of the economy.

E.O. 12866 requires a review of proposed regulations to determine whether or not the expected effects would be significant, where a significant action is any regulatory action that may:

- Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

12.10.2 Objectives

The goals and objectives of Framework Adjustment 51 derive from those detailed in Amendment 16 to the Northeast Multispecies Fishery FMP and are as follows:

Goal 1: Consistent with the National Standards and other required provisions of the Magnuson-Stevens Fishery Conservation and Management Act and other applicable law, manage the northeast multispecies complex at sustainable levels.

Goal 2: Create a management system so that fleet capacity will be commensurate with resource status so as to achieve goals of economic efficiency and biological conservation and that encourages diversity within the fishery.

Goal 3: Maintain a directed commercial and recreational fishery for northeast multispecies.

Goal 4: Minimize, to the extent practicable, adverse impacts on fishing communities and shoreside infrastructure.

Goal 5: Provide reasonable and regulated access to the groundfish species covered in this plan to all members of the public of the United States for seafood consumption and recreational purposes during the stock rebuilding period without compromising the Amendment 13 objectives or timetable. If necessary, management measures could be modified in the future to insure that the overall plan objectives are met.

Goal 6: To promote stewardship within the fishery.

Objective 1: Achieve, on a continuing basis, optimum yield (OY) for the U.S. fishing industry.

Objective 2: Clarify the status determination criteria (biological reference points and control rules) for groundfish stocks so they are consistent with the National Standard guidelines and applicable law.

Objective 3: Adopt fishery management measures that constrain fishing mortality to levels that are compliant with the Sustainable Fisheries Act.

Objective 4: Implement rebuilding schedules for overfished stocks, and prevent overfishing.

Objective 5: Adopt measures as appropriate to support international trans-boundary management of resources.

Objective 6: Promote research and improve the collection of information to better understand groundfish population dynamics, biology and ecology, and to improve assessment procedures in cooperation with the industry.

Objective 7: To the extent possible, maintain a diverse groundfish fishery, including different gear types, vessel sizes, geographic locations, and levels of participation.

Objective 8: Develop biological, economic and social measures of success for the groundfish fishery and resource that insure accountability in achieving fishery management objectives.

Objective 9: Adopt measures consistent with the habitat provisions of the M-S Act, including identification of EFH and minimizing impacts on habitat to the extent practicable.

Objective 10: Identify and minimize bycatch, which include regulatory discards, to the extent practicable, and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

12.10.3 Description

A description of the entities affected by this action, specifically the stakeholders of the New England Groundfish Fishery, is provided in Section 8.0 of this document.

12.10.4 Problem Statement

The need and purpose of the actions proposed in this action are set forth in Section 4.0 of this document and are incorporated herein by reference.

12.10.5 Analysis of Alternatives

This section provides an analysis of the two proposed Alternatives of this action as mandated by EO 12866. The focus will be on the expected changes (1) in net benefits and costs to stakeholders of the New England Groundfish Fishery, (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. Much of this information is captured already in the detailed human communities impacts analysis found in Section 8.0 of this

document. This RIR will summarize and highlight the major findings of the economic impacts analysis provided in section 7.4 of this document, as mandated by EO 12866.

When assessing benefits and costs of the regulations, it is important to note that the analysis will focus on producer surplus only, namely the impacted fishing businesses. Given the large supply of domestic and foreign seafood imports consumer surplus is not expected to be affected by any of the regulatory changes proposed here.

Alternative 1 – No Action

Under this Alternative, gross revenues from groundfish are predicted to be $65.9 million for FY2014 (Table 44). Projected gross revenues from groundfish are $38.9 million and, for the prediction period of the remainder of FY14, additional revenues are predicted to be $27.0 million. 60% of these revenues are predicted to come from landings of five groundfish stocks: pollock, Georges Bank (GB) haddock, white hake, GB cod and redfish (Table 45). Massachusetts and Maine ports comprise 92% of the groundfish revenues predicted to be landed during the second half of the 2014 fishing year (Table 46). Vessels greater than 75ft comprise almost 60% of these revenues (Table 47). Variable costs are predicted to be at 59% of gross groundfish revenues (Table 48).

This option would not change regulations for commercial or recreational fisherman and will have no additional impacts beyond those detailed in Frameworks 51 and 52 to the Northeast Multispecies FMP.

Alternative 2 – Preferred Action

Under this Alternative, gross revenues from groundfish for Sector-enrolled vessels are predicted to be $64.3 million for FY2014, a reduction of $1.6 million relative to the No Action Alternative. Projected gross revenues from groundfish for the period November 15, 2014 to April 30, 2015 are predicted to be $25.4 million.

This option includes a 200-lbs trip limit on cod caught on trips in the Gulf of Maine. This provision would reduce cod catch by 20 mt. The current GOM cod discard rate is a little over 2% as of October 23, 2014. The end-of-year GOM cod discard rate is predicted to rise to over 22% by the end of the fishing year under the Preferred Action, even while incorporating the reduced profitability of trips catching cod in the QCM. The implications of this non-marginal change in discard rates may have unpredictable impacts on sector-level imputed discard rates for unobserved trips, and may create an incentive for captains to behave differently on observed and unobserved trips (noting that there is no regulation that mandates or implies that captains should fish in similar manners whether or not an observer is onboard). The analysis here predicts that this measure may result in discarding over 100 metric tons of marketable fish with a value of a half a million dollars ex-vessel.

Smaller vessels homeported in the inshore Gulf of Maine bear the brunt of these reductions. Gloucester, MA and New Hampshire ports in particular are hardest hit, seeing reductions in gross revenues of between 13-26% (Table 50, Table 53). Vessels in the 30-50 ft size class are

predicted to see gross revenue declines on the order of 40% (Table 51, Table 54). Costs as a proportion of gross groundfish revenues rise slightly under the Preferred Alternative, due primarily to increased operational costs as vessels fish farther from port due to closures.

This option prevents vessels in the Common Pool from fishing in the certain areas at certain times and would impose a 200 lbs trip limit on Gulf of Maine cod. Time/area closures may increase costs for these vessels, and revenue foregone from cod catch in excess of the trip limit may reduce gross revenues.

The proposed time/area closures encompass the principal recreational bottom fishing locations in the GOM and the majority of the recreational fishing access points in the GOM (see SECTION 9.1.2). Approximately 85-90% of GOM cod and haddock mortality generally occurs in Federal waters. However, the recreational fishery is only open for two weeks in the end of April during the Action period (November 15, 2014 thru April 30, 2015). The impact of the closures on revenues during these two weeks may be significant, but will ultimately be a function of anticipated regulations in FY15.

12.10.6 Determination of Significance

The Proposed Action is not predicted to have an adverse impact on fishing vessels, purchasers of seafood products, ports, recreational anglers, and operators of party/charter businesses in excess of $100 million. Adverse economic impacts will likely result from this proposed action, particularly in the Gulf of Maine, including reduced income and employment opportunities. These impacts are estimated to be most significant for smaller vessels fishing in the inshore GOM, though other larger vessels also see increases in operating costs due to increased steaming times to avoid closures. ACE trading and leasing will not likely mitigate the adverse effects. The potential decrease in gross revenues from fishing on sector trips under this action is estimated to be $1.5 million relative to the No Action Alternative, falling far short of the $100 million standard for significance. Since total predicted gross revenues on groundfish trips for 2014 are below $100 million, and since some of the industry capitalization could be recovered through the sale or repurposing of assets, it is unlikely that the total pecuniary impact would surpass the threshold of significance as defined by E.O. 12866, even under unforeseen circumstances as dire as a complete fishery shutdown.

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15.0 Acronyms and Definitions

These are commonly used acronyms used in this document and in fisheries-related discussions.

ABC	Acceptable Biological Catch
ACE	Annual Catch Entitlement
ACL	Annual Catch Limit
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
APA	Administrative Procedures Act
ASAP	Age-structured assessment program; assessment model
ASM	At-sea monitoring
ASMFC	Atlantic States Marine Fisheries Commission
B	Biomass
CAA	Catch at Age
CAI	Closed Area I
CAII	Closed Area II
CC	Cape Cod
CEQ	Council on Environmental Quality
CHOIR	Coalition for the Atlantic Herring Fishery's Orderly, Informed, and Responsible Long-Term Development
CPUE	Catch per unit of effort
CZMA	Coastal Zone Management Act
DAH	Domestic Annual Harvest
DAM	Dynamic Area Management
DAP	Domestic Annual Processing
DAS	Days-at-sea
DEA	Data Envelopment Analysis
DFO	Department of Fisheries and Oceans (Canada)
DMF	Division of Marine Fisheries (Massachusetts)
DMR	Department of Marine Resources (Maine)
DSEIS	Draft Supplemental Environmental Impact Statement
DSM	Dockside monitoring
DWF	Distant-Water Fleets
E.O.	Executive Order
EA	Environmental Assessment
ECPA	East Coast Pelagic Association
ECTA	East Coast Tuna Association
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ETA	Elephant Trunk Area
F	Fishing mortality rate
FAAS	Flexible Area Action System
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
FSCS	Fisheries Scientific Computer System
FSEIS	Final Supplemental Environmental Impact Statement
FW	Framework
FY	Fishing year
GAMS	General Algebraic Modeling System
GB	Georges Bank
GEA	Gear Effects Evaluation
GIFA	Governing International Fisheries Agreement
GIS	Geographic Information System
GMRI	Gulf of Maine Research Institute
GOM	Gulf of Maine
GRT	Gross registered tons/tonnage
HAPC	Habitat area of particular concern
HCA	Habitat Closed Area
HPTRP	Harbor Porpoise Take Reduction Plan
I/O	Input/output
ICNAF	International Commission for the Northwest Atlantic Fisheries
IFQ	Individual fishing quota

IOY	Initial Optimal Yield
IRFA	Initial Regulatory Flexibility Analysis
ITQ	Individual transferable quota
IVR	Interactive voice response reporting system
IWC	International Whaling Commission
IWP	Internal Waters Processing
JVP	Joint Venture Processing
LISA	Local Indicator of Spatial Association
LOA	Letter of authorization
LPUE	Landings per unit of effort
LWTRP	Large Whale Take Reduction Plan
M	Natural Mortality Rate
MA	Mid-Atlantic
MA DMF	Massachusetts Division of Marine Fisheries
MAFAC	Marine Fisheries Advisory Committee
MAFMC	Mid-Atlantic Fishery Management Council
MARFIN	Marine Fisheries Initiative
ME DMR	Maine Department of Marine Resources
MEY	Maximum economic yield
MMC	Multispecies Monitoring Committee
MMPA	Marine Mammal Protection Act
MPA	Marine protected area
MRFSS	Marine Recreational Fishery Statistics Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum sustainable yield
MWT	Midwater trawl; includes paired mid-water trawl when referring to fishing activity or vessels in this document
mt	Metric Tons
NAO	North Atlantic Oscillation
NAPA	National Academy of Public Administration
NAS	National Academy of Sciences
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fishery Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NLCA	Nantucket Lightship closed area
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS	National Standard
NSGs	National Standard Guidelines
NSTC	Northern Shrimp Technical Committee
NT	Net tonnage
NWA	Northwest Atlantic
OBDBS	Observer database system
OA2	Omnibus Essential Fish Habitat Amendment 2
OCS	Outer Continental Shelf
OFL	Overfishing Limit
OLE	Office for Law Enforcement (NMFS)
OY	Optimum yield
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act
PREE	Preliminary Regulatory Economic Evaluation
PS/FG	Purse Seine/Fixed Gear
PSC	Potential Sector Contribution
QCM	Quota change model
RFA	Regulatory Flexibility Act
RFFA	Reasonably Foreseeable Future Action
RIR	Regulatory Impact Review
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

SASI	Swept Area Seabed Impact
SAV	Submerged Aquatic Vegetation
SAW	Stock Assessment Workshop
SBNMS	Stellwagen Bank National Marine Sanctuary
SCAA	Statistical catch-at-age assessment model
SEIS	Supplemental Environmental Impact Statement
SFA	Sustainable Fisheries Act
SFMA	Southern Fishery Management Area (monkfish)
SIA	Social Impact Assessment
SNE	Southern New England
SNE/MA	Southern New England-Mid-Atlantic
SSB	Spawning stock biomass
SSC	Scientific and Statistical Committee
TAC	Total allowable catch
TALFF	Total Allowable Level of Foreign Fishing
TC	Technical Committee
TED	Turtle excluder device
TEWG	Turtle Expert Working Group
TMGC	Trans-boundary Management Guidance Committee
TMS	Ten minute square
TRAC	Trans-boundary Resources Assessment Committee
TRT	Take Reduction Team
TSB	Total stock biomass
USAP	U.S. At-Sea Processing
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VEC	Valued Ecosystem Component
VMS	Vessel monitoring system
VPA	Virtual population analysis
VTR	Vessel trip report
WGOM	Western Gulf of Maine
WO	Weighout
YPR	Yield per recruit