



New England Fishery Management Council

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**MEMORANDUM**

**DATE:** November 25, 2015  
**TO:** Groundfish Committee  
**FROM:** Jamie M. Cournane, PhD, Groundfish Plan Development Team (PDT) Chair  
**SUBJECT:** **Draft Framework Adjustment 55 (FW 55) Environmental Impacts Analysis, “Version 1”**

- “Version 1”, this document, includes the draft protected species, economic, and social impacts analysis as attachments. Sections of the analysis that are incomplete at this time are indicated within each attachment.
- Additional analysis will be included in “Version 2” of the impacts analysis to be distributed on November 30, 2015 or provided at the Council meeting on December 2, 2015. The biological resources analysis will also be provided in “Version 2”, and an abbreviated essential fish impacts analysis may be provided in “Version 2”, if time permits.
- In the meantime, the Committee should refer to the November 16, 2015 memo from the PDT to the Committee and the October 9, 2015 memo from the PDT to the SSC. These documents contain information that will be incorporated into the biological impacts analysis.

### **7.3 Impacts on Endangered and Other Protected Species**

The FW 55 alternatives are evaluated for their impacts on species protected under the Endangered Species Act of 1973 (ESA) and/or the Marine Mammal Protection Act of 1972 (MMPA). Section 6.51 of the Affected Environment Section contains a complete list of protected species (i.e., ESA and non-ESA listed species) that inhabit the areas of operation for the Northeast multispecies fishery (Table XXX). This impact analysis considers how the fishery may overlap with protected species in time and space, as well as records of protected species interaction with particular gear types (e.g. gillnet, hook, and mobile gear).

#### 7.3.1 Updates to Status Determination Criteria and Annual Catch Limits

##### 7.3.1.1 Revised Status Determination Criteria

Updating the SDC is an administrative measure, and will not have a direct impact on protected species because it does not, in and of itself, change fishing effort or fishing behavior. Whatever impact indirectly precipitates from changes to SDC or mortality targets will be discussed in the context of other alternatives – including ACLs- that the Council adopts in order to meet mortality targets derived from the new SDC and control rules.

##### 7.3.1.2 Annual Catch Limits

###### 7.3.1.2.1 Option 1: No Action

Under Option 1, the ACLs specified for FY 2016 would be unchanged from those adopted through FW 53. Default specifications, set at 35% of the FY2015 catch limits, would be put in place for all other stocks and expire on July 31<sup>st</sup>, 2016 or when replaced by new specifications. Default specifications were adopted through FW53 with the intent of allowing the fishing year to begin on time in the event of a delay in rulemaking. Under Option 1, the directed groundfish fishery would be expected to operate in all broad stock areas through July.

After July 31<sup>st</sup>, the following allocated stocks would not have ACLs specified: GB cod, GB haddock, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American plaice, witch flounder, SNE/MA winter flounder, and redfish. Pollock, redfish, American plaice, and witch flounder are unit stocks – meaning that their stock area includes the GOM, GB, and SNE/MA. In the absence of stock specific specifications, commercial groundfish vessels would be unable to fish in the respective broad stock areas without an allocation.

Based on the above information, it is anticipated that Option 1 would result in minimal changes in fishing effort during the first three months of the fishing year. After July 31<sup>st</sup>, Option 1 would be expected to reduce commercial groundfish fishing effort in the GOM, GB, and SNE/MA, thereby reducing the amount of trawl or gillnet gear in the water.; however, other fisheries with incidental catch of groundfish would continue to operate past July 31st in the GOM, GB, and SNE/MA. Effort may increase in other fisheries as commercial groundfish vessels would be unable to conduct a directed groundfish fishery; however, any potential increase in effort in would be constrained with incidental catch limits and quota allocations in these other fisheries.

As a result, significant increases and shifts in overall fishing effort is not expected in these broad stock areas.

Based on the above information, Option 1 would be expected to significantly reduce commercial groundfish fishing effort in the GOM, GB, and SNE/MA (i.e., reduced ACL, potential halt of the groundfish fishery after July 31<sup>st</sup>), thereby reducing the amount of trawl or gillnet gear in the water. As interactions risks with protected species are strongly associated with amount and time that gear is in the water, any reduction in gillnet and trawl gear has the potential to reduce interaction risks, and thus incidences of serious injury or mortality, in these broad stock areas.

Although the latter provides some positive impacts to protected species, protected species may still experience low negative impacts from the operation of other non-groundfish fisheries that can continue to fish in these broad stock areas should new groundfish specifications not be in place by July 31<sup>st</sup>. Although other fisheries have the potential to take advantage of the reduction in groundfish fishing effort after July 31<sup>st</sup>, as noted above, effort is not expected to significantly increase to levels above and beyond what has been experienced in these broad stock areas to date and therefore, interaction risks to protected species in these broad stock areas are not expected to change significantly from what has been observed to date in these regions. Specifically, as fishing behavior and effort are not expected to change significantly from status quo conditions, the presence, quantity, or degree of gillnet, bottom trawl or other gear types used in these areas are also not expected to change significantly. Therefore, continuation of these non-groundfish fishing operations are not expected to introduce any new interaction risks to protected species that would result in elevated levels of interactions above and beyond that which has been observed and considered by NMFS to date (Waring *et al.* 2014; Waring *et al.* 2015; NMFS 2002; NMFS 2012; NMFS 2013; NMFS; [http://www.nefsc.noaa.gov/fsb/take\\_reports/nefop.html](http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html); [www.nefsc.noaa.gov/fsb/take\\_reports/asm.html](http://www.nefsc.noaa.gov/fsb/take_reports/asm.html)). Specifically, continuation of such fishing operations are not expected to change non-groundfish fishing operations to extent not previously consider by NMFS in its assessment of fishery interaction risks and impacts to protected species (Waring *et al.* 2014, Waring *et al.* 2015; NMFS 2002; NMFS 2012; NMFS 2013; NMFS 2014). For instance, as provided in Waring *et al.* (2014, 2015), aside from several large whale species (e.g., North Atlantic right, humpback, and fin), harbor porpoise, and several stocks of bottlenose dolphin, there has been no indication that takes of marine mammals in commercial fisheries has exceeded PBR thresholds, and therefore, gone above and beyond levels which would result in the inability of each species population to sustain itself (Waring *et al.* 2014, 2015). Although, as noted above, several species of large whales, harbor porpoise and several stocks of bottlenose dolphin have experienced levels of take that have resulted in the exceedance of each species PBR threshold, take reduction plans have been implemented to reduce bycatch in the fisheries affecting these species (i.e., Atlantic Large Whale Take Reduction Plan, Harbor Porpoise Take Reduction Plan, and the Bottlenose Dolphin Take Reduction Plan see section X for details). These plans are still in place and are continuing to assist in decreasing bycatch levels for these species and in fact, co-occur with the closed areas in the Western GOM. Although the information presented in Waring *et al.* (2014, 2015 ) is a collective representation of commercial fishery interactions with marine mammals, and does not address the effects of any FMP specifically, the information does demonstrate that fishery operations over last 5 or more years have not resulted in a collective level of take that threatens the continued existence of marine mammal populations (aside from those species noted above).

In conjunction with the above, additional analysis on the impacts of the operation of fisheries in the northeast region have also been conducted by NMFS, pursuant to section 7 of the ESA, for ESA-listed species of sea turtles, fish, and whales. In Biological Opinions issued for specific FMPs in 2002, 2012(a), 2013, and 2014, NMFS concluded that the operation of these FMPs in the region, may affect, but will not jeopardize the continued existence of any ESA listed species (i.e., sea turtle species, Atlantic sturgeon, Atlantic salmon, large whale species). Since issuance of these Opinions, there has been no indication that these fisheries have changed in any significant manner such that the level of ESA listed species interactions has gone above and beyond those considered by NMFS in its assessment of fisheries affects to listed species (if they had, NMFS would have re-reinitiated the Opinions). As fishing effort in non-groundfish fisheries are not expected to significantly change from current operating conditions, interactions with ESA listed species that are above and beyond levels previously considered by NMFS are not expected. As a result, we do not expect, impacts to ESA-listed species to be different from those already considered by NMFS (NMFS 2002; NMFS 2012; NMFS 2013; NMFS 2014) and therefore, we do not, as concluded by NMFS, expect continued operation of non-groundfish fisheries to result in interactions levels that would jeopardize the continued existence of any ESA listed species.

Based on the above information, and the fact that all fisheries must comply with existing ALWTRP, HPTRP, and BDTRP regulations, we expect impacts to protected species (MMPA protected and ESA listed species) from Option 1 to be low positive to low negative). Relative to Option 2, Option 1, will afford more positive impacts to protected species as lower Annual Catch Limits and the potential for the groundfish fishery to be halted after July 31 will likely decrease overall effort in the BSAs and therefore, reduce the potential for interactions with protected species. These positive impacts would be removed under Option 2 which would set allocations to all stocks for the entire fishing year, facilitating directed commercial groundfish fishing in all broad stock areas.

#### 7.3.1.2.2 Option 2: Revised Annual Catch Limit Specifications

Option 2 would adopt new specifications for all 20 groundfish stocks (see Table 10, Alternatives under Consideration, November 20, 2015), based on the most recent scientific data. This measure includes the identification of ACLs, ABCs, and OFLs as required by the M-S Act and as implemented by Amendment 16. It also incorporates adoption of the incidental catch TACs for the special management programs that use Category B DAS. Implementation of ACLs is required by the Magnuson-Stevens Act and may have protected species impacts that are difficult to define. The protected species impacts of ACL-setting in general are discussed in detail in Amendment 16.

For the US/Canada stocks, the U.S. TAC for EGB haddock, would decrease in Option 2, while the U.S. TAC for EGB increase and GB yellowtail flounder would increase slightly (see Table 7, Alternatives under Consideration, November 20, 2015). The EGB haddock TAC remains substantially higher than both the EGB cod and GB yellowtail TACs. This could lead to a shift in effort to the eastern area for EGB haddock, though it is likely that the EGB cod TAC would

continue to constrain the full utilization of the EGB haddock quota (e.g. US EGB haddock TAC of 15,170 mt, and US EGB cod TAC of 138 mt). The quantitative consequences of these changes are unknown, although it is unlikely that full EGB haddock quota allocation will be achieved due to the constraints experienced by the EGB cod quota. As a result, fishing effort to its fullest potential will likely not be experienced and therefore, any effort increases are likely minimal in this area.

Option 2 would increase FY 2016 ACLs for GB and GOM haddock, GOM cod, GOM winter flounder, pollock, halibut, wolfish, and southern windowpane flounder. There would be several significant decreases FY 2016 ACLs, specifically witch flounder, SNE/MA yellowtail flounder, GB winter flounder, and GB cod. While there would be a small uptick in the GOM cod ACL, the status of the stock is poor and quotas remain near all-time lows. Under Option 2, the declining ACLs for several stocks are likely to constrain the directed fishery, and may significantly reduce fishing effort in all broad stock areas.

While the ACLs for some stocks are increasing, the new ACLs would be similar to or less than ACLs the fishery has operated under over the past four fishing years. The ACL for GB haddock has not been caught under sectors and thus, the quota is not a true reflection of fishing behaviors for this stock. That is, a higher quota does not necessarily equate to increases in fishing effort. For instance, in FY 2013, when the ACL was roughly 28,000 mt, approximately 5,000 mt higher than what is proposed, the fishery caught roughly 12% of the GB haddock quota and therefore, did not fish at its full potential. Since FY 2010, the groundfish fishery has never caught more than 50% of its sub-ACL of GB haddock. As a result, quota increases to the ACL do not necessarily equate to increases fishing effort and therefore, Option 2 is likely to have a negligible to low negative impact on protected species.

Based on the above information, it is anticipated that Option 2 would result in minimal, if any effort shifts. Further, as ACLs under Option 2 are not significantly greater than those authorized over the last several years, significant changes in effort are not expected under this Option and therefore, fishing behavior is expected to remain similar to current operating conditions. Taking these factors and pieces of information into consideration, below we have considered the impacts of Option 2 on protected species (MMPA protected and ESA listed species).

#### *MMPA Protected Species Impacts*

Impacts of Option 2 on marine mammals (i.e., species of cetaceans and pinnipeds) are somewhat uncertain as quantitative analysis has not been performed. However, we have considered, to the best of our ability, available information on marine mammal interactions with commercial fisheries, including the skate fishery over the last 5 or more years (Waring et al. 2014, Waring et al. 2015, NEFOP/ASM observer site). Aside from several large whale species (e.g., North Atlantic right, humpback, and fin), harbor porpoise, and several stocks of bottlenose dolphin, there has been no indication that takes of any other marine mammal species in commercial fisheries has exceeded potential biological removal (PBR) thresholds, and therefore, gone above and beyond levels which would result in the inability of each species population to sustain itself (Waring et al. 2014, 2015). Although, as noted above, several species of large whales, harbor porpoise and several stocks of bottlenose dolphin have experienced levels of take that have

resulted in the exceedance of each species PBR threshold, take reduction plans have been implemented to reduce bycatch in the fisheries affecting these species (Atlantic Large Whale Take Reduction Plan, Harbor Porpoise Take Reduction Plan, and the Bottlenose Dolphin Take Reduction Plan; see section X for details); these plans are still in place and are continuing to assist in decreasing bycatch levels for these species. Although the information presented in Waring et al. (2014, 2015) is a collective representation of commercial fishery interactions with marine mammals, and does not address the effects of any FMP specifically, the information does demonstrate that fishery operations over last 5 or more years have not resulted in a collective level of take that threatens the continued existence of marine mammal populations (aside from those species noted above).

In conjunction with the above, additional analysis on the impacts of the operation of fisheries in the northeast region have also been conducted by NMFS, pursuant to section 7 of the ESA, for ESA-listed species of marine mammals. Specifically, in a Biological Opinions issued by NMFS in 2013, it was concluded that the operation of the groundfish, in addition to seven other FMPs, may affect, but will not jeopardize the continued existence of any ESA listed species of marine mammals. Since issuance of these Opinions, there has been no indication that these fisheries have changed in any significant manner such that the level of marine mammal interactions has gone above and beyond those considered by NMFS in its assessment of fisheries affects to listed species (if they had, NMFS would have re-reinitiated the Opinions). As a result, we do not expect impacts to ESA-listed species of marine mammals under Option 2 (i.e., status quo conditions) to be different from those already considered by NMFS (NMFS 2013). Specifically, fishing behavior under Option 2 is not expected to introduce any new risks to ESA listed species that have not already been considered by NMFS to date. As a result, Option 2 is not expected to result in interactions with marine mammals that are above and beyond levels previously considered by NMFS. Based on this, Option 2, and the resultant fishing behavior under this Alternative, is not, as concluded by NMFS, expected to result in interaction levels that would jeopardize the continued existence of ESA listed species of marine mammals.

Based on the above information, and the fact that the groundfish fishery must comply with specific take reduction plans (i.e., HPTRP, the BDTRP, ALWTRP); and that voluntary measures exist that reduce serious injury and mortality to marine mammal species incidentally caught in trawl fisheries (see the Atlantic Trawl Gear Take Reduction Team), Option 2 is expected to have low negative to neutral impacts on marine mammal species. Relative to Option 1, Option 2, which has higher Annual Catch Limits than Option 1, may result in more negative impacts to marine mammals as higher allocations may result in increases in fishing effort, which may equate to increased interactions with marine mammals.

### *ESA Listed Species*

Ascertaining the potential impacts of Option 2 on ESA-listed species (i.e., certain species of whales, sea turtles, and fish) are difficult and somewhat uncertain, as quantitative analysis has not been performed. However, we have considered, to the best of our ability, how the fishery has operated in regards to listed species since 2013, when NMFS issued a Biological Opinion (Opinion) on the operation of seven commercial fisheries, including the groundfish FMP, and its impact on ESA listed species (NMFS 2013). The 2013 Opinion concluded that the seven

fisheries may affect, but would not jeopardize the continued existence of any ESA listed species. The Opinion included an incidental take statement authorizing the take of specific numbers of ESA listed species of sea turtles, Atlantic salmon, and Atlantic sturgeon. The groundfish FMP is currently covered by the incidental take statement authorized in NMFS 2013 Opinion.

While specifications have fluctuated since 2013, fishing behavior over this time period has never resulted in the exceedance of NMFS authorized take of any ESA listed species (NMFS 2013). As specifications under Option 2 are no greater those authorized since 2013, , and the resultant fishing behavior under these conditions are not expected to change significantly from current operating conditions, Option 2 is not expected to introduce any new risks or additional takes to ESA listed species that have not already been considered and authorized by NMFS to date. As a result, impacts of the Option 2 on ESA listed species are not expected to be different from those already considered by NMFS (NMFS 2013) and therefore, are not, as concluded by NMFS, expected to result in levels of take that would jeopardize the continued existence of ESA listed species. For these reasons, Option 2 would likely have low negative impacts on ESA listed species.

#### *Overall Impacts to Protected Species*

Relative to Option 1, Option 2 would afford more negative impacts to protected species. As Option 1 would result in overall reduced effort and therefore, reduced quantity and time that gear is in the water, interaction risks under Option 1 are lower relative to Option 2. Option 2; however, with higher ACLs and the potential for a year-round directed commercial groundfish fishery, removes the reduced interaction risks afforded under Option 1 fishing conditions and therefore, the potential for interactions are higher under Option 2 relative to Option 1.

### 7.3.2 Fishery Program Administration

#### 7.3.2.1 Implementation of an Additional Sector

The implementation of an additional sector is an administrative measure, and will not have a direct impact on protected species because it does not, in and of itself, change fishing effort or fishing behavior. The fishery would continue to operate under catch limits with accountability measures.

#### 7.3.2.2 Sector Approval Process

Modifying the sector is an administrative measure, and will not have a direct impact on protected species because it does not, in and of itself, change fishing effort or fishing behavior. The fishery would continue to operate under catch limits with accountability measures.

#### 7.3.2.3 Modification to the Definition of the Haddock Separator Trawl

Modifying the definition of the haddock separator trawl is an administrative measure, and will not have a direct impact on protected species because it does not, in and of itself, change fishing effort or fishing behavior. The fishery would continue to operate under catch limits with accountability measures.

### 7.3.3 Commercial and Recreational Fishery Measures

#### 7.3.3.1 Groundfish Sector Monitoring Program

##### 7.3.3.1.1 Option 1: No Action

This measure, if adopted, would maintain the monitoring requirements adopted by Amendment 16 and subsequent actions. The monitoring provisions in those actions were specifically adopted for monitoring groundfish catches, albeit additional information on encounters between fishing activity and protected and endangered species is provided via ASM. In fact, since its inception in 2010, ASM and the associated coverage levels, have provided a wealth of information about protected species interactions in commercial fishing gear, thereby improving the precision of protected species bycatch analyses and resultant bycatch estimates (see Table 1 and Figure 1, NEFSC PSB, pers. comm). Indirectly, this affords positive impacts to protected species, as reducing uncertainty of the bycatch estimates improves assessments of anthropogenic removals from the population, as well as mitigation efforts in forums such as take reduction teams (NEFSC PSB, pers. comm). Based on this information, the No Action, which will maintain ASM requirements as adopted by Amendment 16, is expected to have low positive impacts to protected species.

Relative to Option 2, which is administrative in nature relative to protected species impacts, the No Action is likely to have neutral impacts to protected species. When compared to Sub-Options 3A, 3B, or Option 5, which are likely to have lower coverage rates than the No Action, the No Action, is likely to have low positive impacts on protected species. Similarly, relative to Sub-Options 4A and 4B, which will remove ASM coverage for a particular sub-set of sector gillnet trips, the No Action will have low positive impacts on protected species. For the rationale behind these conclusions, please see the following sections.

##### 7.3.3.1.2 Option 2: Clarification on Groundfish Monitoring Goals

This is an administrative measure that revises the goals and objectives of the at-sea monitoring program. The option is not considered to directly impact protected species but does prioritize existing ASM goals and objectives. Relative to other options, Option 2 would have neutral impacts to protected species.

##### 7.3.3.1.3 Option 3: Clarification of methods used to set sector ASM coverage rates

###### 7.3.3.1.3.1 Sub-Option 3A or 3B

Sub-Option 3A: This option would clarify that the Council's preferred method for determining ASM coverage levels for sectors is to use only the CVs achieved at the overall stock level, and that overall ASM coverage levels should not be set using an administrative standard of monitoring 80% of discarded pounds at a CV30. ASM coverage levels will be lower relative to the No Action.

Sub-Option 3B: This option would specify a multi-year average of realized stock-level CVs and corresponding coverage rates that would be used when setting ASM coverage levels on an



annual basis. ASM coverage levels are expected to be lower than those under Option 3A and therefore, even lower than those experienced under the No Action.

Over the long term, either sub-option has the potential to result in ASM coverage levels that are lower than levels currently experienced under the No Action. As a result, the informational benefits provided by current ASM coverage levels in assessing protecting species bycatch (see Option 1) may be reduced, thereby affecting the precision of protected species bycatch estimates and reducing available information for protected species management decisions. As a result, either sub-option may result in low negative impacts to protected species.

Relative to Option 2, which is administrative in nature relative to protected species impacts, Sub-Options 3A and 3B is likely to have neutral impacts to protected species. When compared to Option 1, Sub-Options 3A and 3B, with lower coverage levels than the No Action, are likely to result in more negative impacts to protected species. Relative to Sub-Options 4A and 4B, which will remove ASM coverage for a particular sub-set of sector gillnet trips, Sub-Options 3A and 3B will have low positive impacts on protected species. Relative to Option 5, Sub-Options 3A, which is likely to have higher coverage levels than those under Option 5, is likely to have more of a positive impact on protected species, while Sub-Option 3B, which is likely to have lower coverage levels than Option 5, is likely to have more of a negative impact on protected species.

#### 7.3.3.1.4 Option 4: Remove ASM coverage requirements for a sub-set of sector gillnet trips

##### 7.3.3.1.4.1 Sub-Option 4A or Sub-Option 4B.

Sub-Option 4A: This Option would remove ASM requirements for sector gillnet trips fishing only ELM 10'+. The Council may select which broad stock areas to exempt coverage in. Figure XXX in Section 6.5.4, and Figure 6 in Section 7.3.3.1.4.2 indicate sector ELM trips overlap in time and space with observed takes marine mammals throughout the northeast, particularly in the GOM (BSA 1), Inshore GB (BSA 2), and SNE (BSA 4).

Sub-Option 4B: Sub-Option 4B would remove ASM requirements from sector trips that fish exclusively within the footprint and season of three existing spiny dogfish exemption areas. Sector vessels would be allowed to fish gillnets of 6.5' and greater, and would be required to retain all legal sized groundfish would count against their sector's ACE. The three dogfish exempted fisheries would be: Nantucket Shoals Dogfish Exemption Area, the Eastern Areas of the Cape Cod Spiny Dogfish Exemption Area, and the SNE Dogfish Exemption Area. Figure XXX in Section 6.5.4, and Figure 1 in Section 7.3.3.1.4.2 indicated that these exempted fisheries overlap in time and space with observed takes marine mammals to the east of Cape Cod and in southern New England.

As FY 2016 if the first full year in which sectors are expected to cover the cost of ASM, removing this requirement may create an economic incentive to target non-groundfish stocks like skates and monkfish using 10'+ mesh. Although this has the potential to increase fishing effort, effort would still be constrained by quota allocations for these on-groundfish stocks. As a result,

there is the potential that although effort will increase, the increase in effort will result in quota's being attained faster.

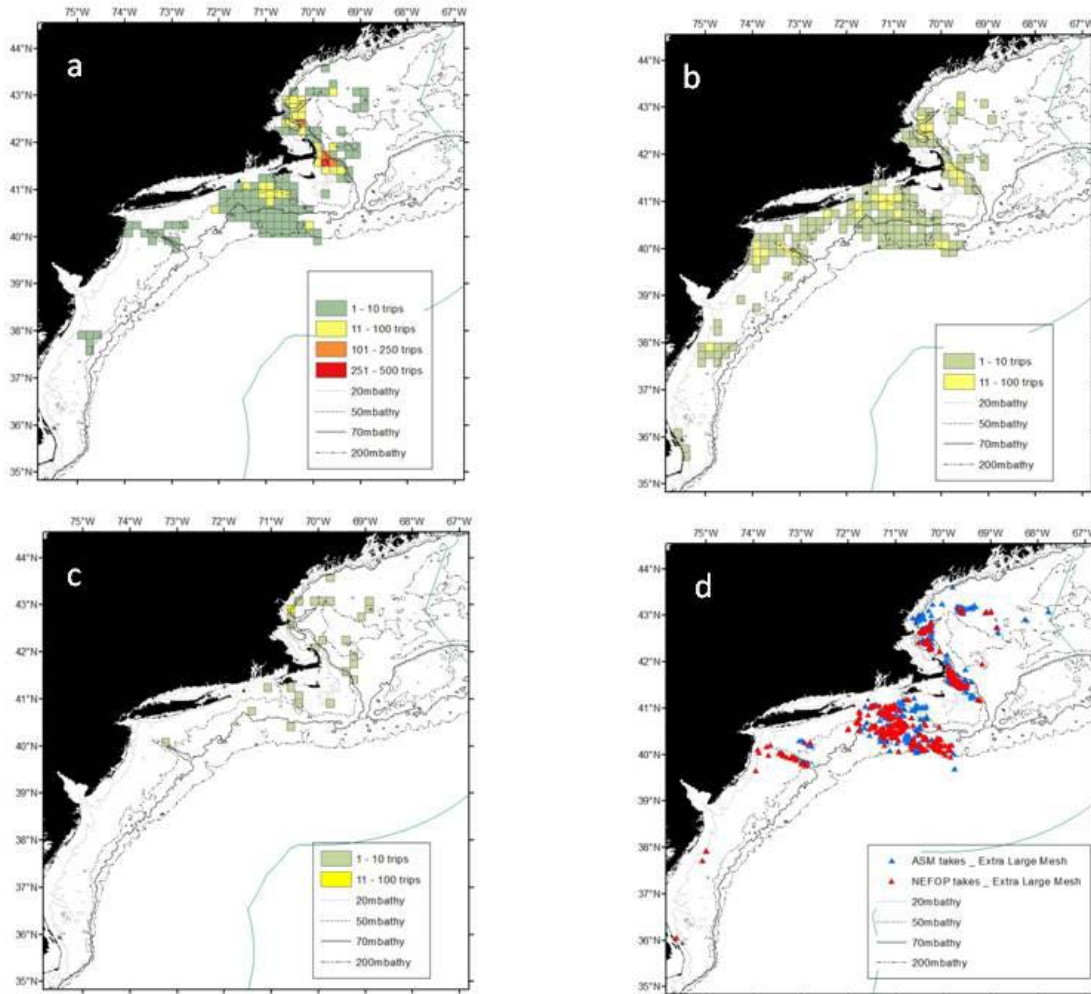
Based on the above information, either sub-option has the potential to result in direct and indirect impacts to protected species. Direct impacts to protected species are likely to be seen via changes in fishing behavior resulting from the economic incentive created from either sub-option. As noted above, this could equate to increased effort and therefore, the potential for increased interactions with protected species; however, as also noted above, under this same scenario, quota constraints are likely to tame any significant increase in effort and in fact, vessels may attain their quota faster under the incentives created under either sub-option. If quota is attained faster, this equates to gear being present for less time in the water. As interactions with protected species is strongly associated with amount and time gear is present in the water, any reduction in either of these will reduce the potential for interactions in these waters. As a result, direct impacts to protected species may range from low positive to low negative.

Indirectly; however, either sub-option may result in low negative impacts to protected species. As noted previously, since its inception in 2010, at-sea monitoring (ASM) data have provided a wealth of information about protected species interactions in commercial fishing gear, particularly in the large mesh ( $\geq 8''$ ) sink gillnet fisheries (NEFSC PSB pers. comm). From 2010-2014, the number of hauls observed by ASM in the extra-large-mesh (ELM) fishery exceeded the number of hauls observed by traditional Northeast Fisheries Observer Program (NEFOP) observers, constituting 60% of all observed ELM hauls; moreover, ASM documented 63% of all protected species interactions in the ELM fisheries (NEFSC PSB pers. comm). Larger mesh sizes are correlated with higher bycatch rates of both loggerhead sea turtles (Murray 2013) and harbor porpoises (Hatch and Orphanides, 2015; Orphanides 2009), and possibly other species as well (e.g., Atlantic sturgeon; Stein *et al.* 2004; ASMFC 2007; Miller and Shepard 2011). While ASM data have supplemented NEFOP data in the Gulf of Maine and southern New England regions (Figure 1a,b), they have also provided information about ELM fishing practices and bycatch where NEFOP coverage did not (Figure 1c,d). The amount of information ASM data provide to protected species bycatch analyses improves the precision of bycatch estimates. For example, the addition of ASM information to an analysis of gray seal bycatch rates from May 2010-April 2011 reduced the coefficient of variation (CV) around the bycatch rates in almost all strata (Table 19, Graham *et al.* in review). Reducing uncertainty of bycatch estimates improves assessments of anthropogenic removals from the population, as well as mitigation efforts in forums such as take reduction teams. As sub-options 4A and AB will remove ASM coverage requirements for particular sector trips (see description of 4A and 4B above), the full informational benefits provided by current ASM coverage levels in assessing protecting species bycatch will be reduced (see Option 1), thereby affecting the precision of protected species bycatch estimates and reducing available information for protected species management decisions. As a result, indirectly, sub-option 4A or 4B would result in low negative impacts to protected species.

Based on the above information, impacts to protected species from Sub-Option 4A or 4B may range from low negative to low positive. Relative to Option 2, which is administrative in nature relative to protected species impacts, Sub-Options 4A and 4B is likely to have neutral impacts to protected species. Cumulatively, relative to Option 1 and 5, and Sub-Options 3A and 3B, Sub-

Options 4A and 4B, with the removal of ASM and potential increase in effort in the affected areas, has more of a negative impact on protected species.

**Figure 1- a) Number of ASM trips in extra-large ( $\geq 8''$ ) mesh gillnet gear, 2010-2014; b) Number of NEFOP trips in extra-large ( $\geq 8''$ ) mesh gillnet gear, 2010-2014; c) ASM extra-large mesh trips in 10' squares where there was no NEFOP coverage; d) Observed interactions between extra-large mesh gillnet gear and protected species (birds, cetaceans, seals, turtles). Provided by NEFSC, Protected Species Branch.**



**Table 1 - Comparison of estimated bycatch rates, coefficient of variation (CV) and 95% confidence intervals (CI) from a log-normal distribution after pooling NEFOP observer data with ASM data for gray seals in gillnet gear. Provided by NEFSC, Protected Species Branch.**

NEFOP					GILLNET	ASM+NEFOP				
Number of Hauls	Gray Seal Takes	Bycatch Rate	CV	95% CI	Strata	Num of Hauls	Gray Seal Takes	Bycatch Rate	CV	95% CI
1,796	33	0.0184	0.18	0.013-0.026	All	7,850	161	0.0205	0.08	0.017-0.024
1,060	2	0.0019	0.50	0.001-0.005	Inshore GOM	4,621	15	0.0032	0.21	0.002-0.005
357	3	0.0084	0.46	0.004-0.020	Offshore GOM	1,393	5	0.0036	0.37	0.002-0.007
379	28	0.0739	0.20	0.050-0.109	SNE	1,836	141	0.0768	0.09	0.065-0.091
90	1	0.0111	0.72	0.003-0.039	Dogfish	714	1	0.0014	0.72	0.000-0.005
199	11	0.0553	0.29	0.031-0.097	Monkfish	919	71	0.0773	0.12	0.061-0.097
1,287	3	0.0023	0.48	0.001-0.006	Multispecies	5,028	11	0.0022	0.24	0.001-0.003
220	18	0.0818	0.23	0.052-0.128	Skate	1,189	78	0.0656	0.10	0.054-0.080
657	18	0.0274	0.22	0.018-0.042	Jan-Apr 2011	1,728	86	0.0498	0.11	0.040-0.061
630	13	0.0206	0.33	0.011-0.039	May-Aug 2010	3,484	59	0.0169	0.13	0.013-0.022
509	2	0.0039	0.60	0.001-0.012	Sept-Dec 2010	2,638	16	0.0061	0.19	0.004-0.009

#### 7.3.3.1.5 Option 5: Fishery Performance Criteria for Meeting the CV Standard

The application on a prioritization criteria would allow some stocks to be exempt from meeting the CV30 requirement, which in some years may decrease the ASM coverage level when compared to No Action. Based on this information, we expect impacts to protected species to be similar to those provided in Option 3 (i.e., low negative; see section 1.1.3.1.3).

7.3.3.2 Relative to Option 2, which is administrative in nature relative to protected species impacts, option 5 is likely to have neutral impacts to protected species. When compared to Option 1, with higher coverage levels, Option 5 is likely to result in more negative impacts to protected species. Relative to Sub-Options 3A, Option 5, which is likely to have lower coverage levels than those under Sub-Option 3A, is likely to have more of a negative impact on protected species, while relative to Sub-Option 3B, Option 5, which is likely to have higher coverage levels than those under Sub-Option 3B, is likely to have more of a positive impact on protected species. Relative to Sub-Options 4A and 4B, which will remove ASM coverage for a particular sub-set of sector gillnet trips, Option 5 will have more of a positive impact on protected species. Management Measures for U.S./Canada TACs

#### 7.3.3.2.1 Option 1: No Action

This option would not allow sectors to transfer eastern GB cod to the western fishery. The EGB cod quotas in FY 2016 are similar to those in FY 2015, while the quota available to the western fishery is would decline sharply. The no action is not expected to impact overall effort in the eastern area, and may lead to a decline of effort in the western portion of the stock area.

Based on above information, impacts to protected species are not expected to be any greater than those under current operating conditions (see Section 1.1.1.2 for further details to support this rationale), and in fact, may be less than status quo conditions. Specifically, fishing effort is likely to remain similar to status quo conditions or potentially decrease; the latter potentially equates to less fishing time, and therefore, gear being present in the water for a shorter duration. As protected species (ESA listed and MMPA protected species) interactions with gear, regardless of listing status, is greatly influenced by the amount of gear, and the duration of time gear is in the water, any decrease in either of these factors will reduce the potential for protected species interactions with gear and therefore, reduce the potential for serious injury or mortality to these species. As a result, Option 1 may have some positive impacts on protected species; however, as interactions may still occur under Option 1, overall, Option 2 is likely to have low positive to low negative impacts on protected species.

#### 7.3.3.2.2 Option 2: Distribution of U.S. TACs for Eastern/Western Georges Bank Cod

This option allows sectors or state-operated permit banks, to transfer and harvest their EGB cod quota in the western GB stock area at any time during the fishing year. While it is unknown how much EGB quota would be transferred and harvested in the WGB area, the overall GB cod quota that is available to then entire fishery declined sharply from FY 2015 to FY 2016. Therefore, this alternative is not expected to increase fishing effort in the western area where observed interactions with protected species have generally been higher (refer to AE and map of interactions). Based on this information, impacts to protected species are expected to similar to those provided in Option 1; low positive to low negative. When compared to the No Action alternative, Option 2 is expected to have neutral impacts on protected resources.

#### 7.3.3.3 Modification to the Gulf of Maine Cod Protection Measures

##### 7.3.3.3.1 Option 1: No Action

7.3.3.3.2 There would be no changes to the GOM Cod Protection measures implemented on May 1, 2015 through FW 53. As a result, as provided in FW 53, impacts to protected species are expected to be low positive to neutral. For further details please see FW 53, section 7.3.2.1.3.2. Option 2: Change in Authority to Modify GOM Cod Recreational Possession Limits

This option would allow the Regional Administrator (RA) to once again change the possession limit of GOM cod for the recreational fishery.. As the status of GOM cod is poor and ABCs are near all-time lows, any change in the GOM cod bag limit is expected to be small and therefore, changes in impacts to protected species from those provided in Option 1 (section 1.1.3.3.1) are not expected. As a result, relative to Option 1, Option 2 is likely to have a neutral impacts on protected species.

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**7.0 Environmental Consequences – Analysis of Impacts**  
**7.1 Biological Impacts**  
**7.2 Essential Fish Habitat Impacts**  
**7.3 Impacts on Endangered and Other Protected Species**  
**7.4 Economic Impacts**

**Introduction**

Consideration of the economic impacts of the changes made in this framework is required pursuant to the National Environmental Policy Act (NEPA) of 1969 and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976. NEPA requires that before any federal agency may take “actions significantly affecting the quality of the human environment,” that agency must prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS) that includes the integrated use of the social sciences (NEPA Section 102(2) (C)). The MSA stipulates that the social and economic impacts to all fishery stakeholders should be analyzed for each proposed fishery management measure to provide advice to the Council when making regulatory decisions (Magnuson-Stevens Section 1010627, 109-47).

The National Marine Fisheries Service (NMFS) provides guidelines to use when performing economic reviews of regulatory actions. The key dimensions for this analysis are expected changes in net benefits to fishery stakeholders, the distribution of benefits and costs within the industry, and changes in income and employment (NMFS 2007). Where possible, cumulative effects of regulations are identified and discussed. Non-economic social concerns are discussed in Section 7.5. The economic impacts presented here consist of both qualitative and quantitative analyses dependent on available data, resources, and the measurability of predicted outcomes. It is assumed throughout this analysis that changes in revenues would have downstream impacts on income levels and employment; however, these are only mentioned if directly quantifiable.

***Impacts to the sector component of the groundfish fishery***

***Methods (this section will be updated based on forthcoming quota-change model results.)***

The Quota Change Model (QCM) is used to analyze the impacts of each combination of measures on the sector portion of the groundfish fishery, which comprises over 98% of commercial groundfish landings and revenues. 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, a large pool of actual trips is created from a reference data set. The composition of this pool is conditioned on each trip’s utilization of allocated ACE, under the assumption that the most likely trips to take place in the FY being analyzed are those fishing efficiently under the new regulatory requirements. The more efficiently a trip uses 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 17 allocated stocks. Net revenues are calculated as gross revenues minus trip costs minus quota opportunity costs, where trip costs are based on observer data and quota opportunity costs are estimated from an inter-sector lease value model, based here on FY 2014 (details on the methods can be found in Murphy et al. 2015).

After the sample pool has been constructed, trips are pulled from the pool at random, summing the ACE expended for the 17 allocated stocks as each trip is drawn. When one stock’s ACE reaches the sector sub-ACL limit, no further trips from that broad stock area are selected. The model continues selecting trips until sector sub-ACLs are achieved in all three broad stock areas or, alternatively, if sub-ACLs are reached for one of the unit stocks, the trip selection process ends for all broad stock areas at once. This selection process forms a “synthetic fishing year” and a number of years are drawn to form a model. Median values and confidence intervals for all draws in a model are reported.



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

- Stock conditions, fishing practices and harvest technologies existing during the data period are representative;
- Trips are repeatable;
- Demand for groundfish is constant, noting that fish prices do vary between the reference population and the sample population, but this variability is consistent with the underlying price/quantity relationship observed during the reference period;
- Quota opportunity costs and operating costs are both constant; and,
- ACE flows seamlessly from lesser to lessee such that fishery-wide caps can be met without leaving ACE for constraining stocks stranded.

These assumptions will surely not hold—fishermen will continue to develop their technology and fishing practices to increase their efficiency, market conditions will induce additional behavioral changes, and fishery stock conditions are highly dynamic. Fuel and other operating costs may change due to larger economic shifts or shore-side industry consolidation.

The net effect of the constraints placed by these assumptions is unclear. The selection algorithm draws only efficient trips—fishermen making relatively inefficient trips will bias the model results high. Fishermen, however, are generally good at their job, and through a combination of technological improvement (gear rigging, equipment upgrades, etc.) or behavioral modifications, are likely to improve on their ability to avoid constraining stocks. This will bias the model results low.

Additionally, the model will, in general, under-predict true landings and/or revenues if stock conditions for non-constraining stocks improve, if demand for groundfish rises, or if fishing practices change and fishermen become still more efficient at maximizing the value of their ACE. Conversely, the model will over-predict true landings and/or revenues if stock conditions of non-constraining stocks decline, markets deteriorate or fishing costs increase. Importantly, the model will over-predict landings if stock conditions for constraining stocks improve substantially and/or fishermen are unable to avoid the stock—in this circumstance, better than expected stock conditions will lead to worse than anticipated fishery performance. The opposite is also true—if a stock predicted to be constraining to the fishery becomes easier to avoid due to technological or behavioral improvements in targeting, or due to declining stock conditions, the model will under-predict revenues.

The model is intended to capture fishery wide behavioral changes with respect to groundfish sub-ACL changes, and groundfish catch is maximized by the constrained optimization algorithm. Catch of non-groundfish stocks on groundfish trips are captured in the model, but not explicitly modeled, such that constraints on other fisheries are not incorporated.

Groundfish vessels on groundfish trips form the unit of measurement for this analysis and gross revenues from groundfish trips and from groundfish species alone are reported metrics. Many groundfish fishermen are involved in other fisheries 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 QCM is a prediction model and it is important to understand its ability to predict groundfish fishing in the past. The model was developed during FY2011 to make predictions for FW47 (FY 2012) and has

been used in analyzing the impacts of all subsequent groundfish management actions that included ACL changes for the groundfish fishery.

#### Data

Data Management and Imputation System (DMIS) data are used throughout. DMIS derives sub-trip/stock level landings and discards from Vessel, Dealer and Observer reports as well as the Sector and Permit databases maintained by NMFS GARFO and NEFSC.

*To be provided based on forthcoming quota-change model results.*

### **7.4.1 Updates to Status Determination Criteria and Annual Catch Limits**

#### **7.4.1.1 Revised Status Determination Criteria**

##### 7.4.1.1.1 Option 1: No Action

Under Option 1, there would be no revisions to the Status Determination Criteria (SDC) of groundfish stocks (see Table 1 in Alternatives under Consideration, pp.14) and the numerical estimates based of the SDC would not change (see Table 2 in Alternatives under Consideration, pp. 15).

If Option 1 is selected, there would not be any immediate economic impacts to the groundfish fishery or any other fishery, as the current methodology used for setting ABCs for groundfish stocks would not be altered. The long term consequences of Option 1 would be that biomass targets would be based on outdated information, and this would not constitute the use of best scientific information as stipulated by the Magnuson-Stevens Act (101-627, 104-297). By not incorporating the new numerical estimates of the SDC from the 2015 Operational Stock Assessments, overfishing of some groundfish stocks under rebuilding plans would be more likely to occur during FY 2016. While a greater harvest of these stocks would yield positive short term economic impacts, overfishing of these stocks would compromise their rebuilding potential and the long term revenue that could be generated from these stocks.

##### 7.4.1.1.2 Option 2: Revised Status Determination Criteria

Under Option 2, the numerical estimates of the SDC for all groundfish stocks would be updated (Table 4 in Alternatives under Consideration, pp.18). Given that this updated information should provide more accurate estimates of the Maximum Sustainable Yield (MSY) and the fishing mortality (F) at MSY for groundfish stocks, the long term economic impacts of Option 2 would expected to be positive. However, as there is always some degree of uncertainty surrounding Biological Reference Point estimates, a definitive statement on long term impacts cannot be made.

#### **7.4.1.2 Annual Catch Limits**

##### 7.4.1.2.1 Option 1: No Action

If Option 1 is selected, the FY2016 Annual Catch Limits (ACLs) for GOM cod, GOM haddock, GB winter flounder, GOM winter flounder, and pollock would be unchanged from the FW53 specifications. For all other groundfish stocks, ACLs were not specified in FY2016 through the FW53 specifications and the default ACLs for these stocks would be set at 35% of the FY2015 value. These default ACLs would expire on July 31<sup>st</sup>, 2016.

### ***Economic impacts on the commercial groundfish fishery***

Option 1 would have negative impacts to the commercial groundfish fishery relative to FY2015 and Option 2. Groundfish vessels would only have three months (May, June, and July) to operate in FY2016 before the default ACLs expire. Once the default specifications expire, there would be no ACL for a number of unit groundfish stocks, and the groundfish fishery would be closed for the remainder of the fishing year.

### ***Economic impacts on the recreational groundfish fishery***

Option 1 would have neutral impacts to the recreational fishery relative to FY 2015. The recreational groundfish sub-ACLs for GOM cod and GOM haddock would be unchanged from those specified in FW53.

Option 1 would likely have negative impacts to the recreational fishery relative to Option 2, as the recreational sub-ACLs for both GOM cod and GOM haddock in FY 2016 would be unchanged from those in FY 2015. Option 2 would increase the recreational sub-ACLs for both stocks. The higher sub-ACLs under Option 2 should allow for more relaxed regulations while still keeping GOM cod and GOM haddock mortality in the recreational fishery below the sub-ACL.

### ***Economic impacts on other fisheries***

#### ***Sea scallop fishery***

Under No Action, there would be no scallop fishery sub-ACL for SNE/MA yellowtail flounder. While this would not prevent the scallop fishery from fishing in FY 2016, it is not clear if the absence of a sub-ACL would be treated as if the sub-ACL was zero. If this were to be the case, then any catches of SNE/MA yellowtail flounder would lead to scallop fishery AMs being implemented in FY 2017 and/or later years. Such a scenario would result in large reductions in scallop fishery revenues relative to Option 2. If however the scallop fishery catches of SNE/MA yellowtail flounder would not trigger AMs, Option 1 might allow for greater scallop fishery revenues than would be the case if AMs are triggered using the ACLs of Option 2. As it is not clear how the absence of a sub-ACL for SNE/MA yellowtail flounder would be treated, the direction and magnitude of the Option 1 impacts to the scallop fishery are unknown.

GB yellowtail flounder AMs were developed for the sea scallop fishery in Amendment 15 to the Atlantic Sea Scallop FMP, and later modified in FW23. The scallop fishery is subject to an AM in the following fishing year if scallop vessels participating in either open-area or access-area trips exceed their sub-allocation of GB yellowtail flounder, and either the total GB yellowtail flounder ACL is exceeded or the scallop fishery exceeds its ACL by 50 percent or more. The length of the AM area closures is determined by the overage percent. If the total ACL is exceeded, the fishery that caused the overage would also be subject to a pound for pound payback under the US/Canada resource sharing agreement.

Under Option 1, the sea scallop fishery sub-ACL for GB yellowtail flounder is expected to increase from 38 mt in FY2015 to 55 mt in FY 2016, an increase of 44.7%. Actual catches were 37.5 mt in FY 2013, 59 mt in FY2014, and are projected to be as high as 49.6 mt in FY2015. Accountability measures were not triggered in FYs 2013 or 2014. Recent utilization rates of GB yellowtail flounder in the groundfish fishery (24.5% in FY14; 36.1% in FY13; 58.5% in FY12) suggests that the total ACL is unlikely to be exceeded in FY 2016, even if the sub-ACL in the scallop fishery is. This means that the likely threshold of GB yellowtail catch to trigger scallop fishery AMs would be 82.5 mt (150% of 55 mt) under Option 1. Therefore, the scallop fishery would not be functionally limited by a sub-ACL of 55 mt in FY2016.

Atlantic herring fishery

Option 1 would have negative impacts to the Atlantic herring fishery relative to FY 2015 and Option 2. The sub-ACL for GB haddock in the Atlantic herring fishery would be decreased to 79mt, 35% of the FY 2015 value of 227mt. The FY 2015 sub-ACL for GB haddock was reached by the Atlantic herring fishery, triggering accountability measures (AMs) on October 22, 2015. Under Option 1, AMs will be triggered even earlier during FY 2016 if incidental catch rates of GB haddock in the herring fishery are similar to those of FY 2015.

Small mesh fishery

Option 1 would have neutral impacts to the small mesh fishery. The sub-ACL for GB yellowtail flounder in the small mesh fishery would remain unchanged (7mt) from the FW53 specifications.

Option 1 would have positive impacts to the small mesh fishery relative to Option 2. Option 2 would decrease the sub-ACL for GB yellowtail flounder from 7mt to 5mt in FY 2016.

7.4.1.2.2 Option 2: Revised Annual Catch Limit Specifications

***Economic impacts relative to No Action***

*To be provided based on forthcoming quota-change model results.*

***Economic impacts on the Sector-based commercial fishery relative to FY 2015***

*To be provided based on forthcoming quota-change model results.*

***Economic impacts on the Common Pool fishery relative to FY 2015***

*To be provided based on forthcoming quota-change model results.*

In the absence of QCM results, Table 1 provides quota changes from FY 2015 to FY 2016 for commercial groundfish fishery sub-ACLs for allocated stocks, followed by a brief discussion.

**Table 1- Commercial groundfish sub-ACLs for FY 2015 and FY 2016 under Option 2**

Stock	FY 2015 commercial groundfish sub-ACL	FY 2016 commercial groundfish sub-ACL	% Change
GB Cod	1,787	608	-66.0%
GOM Cod	328	280	-14.6%
GB Haddock	21,759	51,667	137.5%
GOM Haddock	1,329	2,416	81.8%
GB Yellowtail Flounder	195	211	8.2%
SNE/MA Yellowtail Flounder	557	182	-67.3%
CC/GOM Yellowtail Flounder	458	341	-25.5%
Plaice	1,408	1,183	-16.0%
Witch Flounder	610	307	-49.7%
GB Winter Flounder	1,891	590	-68.8%
GOM Winter Flounder	392	639	63.0%
SNE/MA Winter Flounder	1,306	585	-55.2%
Redfish	11,034	9,526	-13.7%
White Hake	4,343	3,459	-20.4%
Pollock	13,720	17,817	29.9%

In FW53, the QCM predicted sector groundfish revenue of \$59 million in FY 2015 from the implementation of new ACLs and GOM cod protection measures. Based off of the number of stocks that would have large ACL reductions under Option 2 (Table 1), predicted revenue in FY 2016 for the sector-based fishery is likely to be less than \$59 million. For reference, the most recent fishing year for which revenue data is finalized is FY 2013, in which nominal sector groundfish revenue was \$58 million and nominal common pool groundfish revenue was \$1 million (Murphy et al. 2015). The ACL reductions under Option 2 for the stocks listed below may particularly cause negative impacts to the groundfish fishery in FY 2016 given recent utilization rates and relatively high ex-vessel prices for these stocks:

**GB Cod**

- Utilization rates of 59.8% in FY 2012, 87% in FY 2013, and 78.4% in FY 2014.
- As of November 17, 2015, catch of GB cod during FY 2015 is 644 mt, already in excess of the proposed commercial groundfish sub-ACL of 608mt for FY 2016.
- Ex-vessel price for cod in FY 2015, from dealer data (accessed on 11/24/2015): **\$2.24**

**SNE/MA Yellowtail Flounder**

- Utilization rates of 60.9% in FY 2012, 63.7% in FY 2013, 71.0% in FY 2014.
- As of November 17, 2015, catch of SNE winter flounder during FY 2015 is 126 mt, just 63 mt short of the proposed commercial groundfish sub-ACL of 189 mt for FY 2016.

- Ex-vessel price for yellowtail flounder in FY 2015, from dealer data (accessed on 11/24/2015):  
**\$1.20**

### **Witch Flounder**

- Utilization rates of 67.9% in FY 2012, 105.3% in FY 2013, and 84.5% in FY 2014
- As of November 17, 2015, catch of witch flounder during FY 2015 is 256 mt, just 51 mt short of the proposed commercial groundfish sub-ACL of 307 mt for FY 2016
- Ex-vessel price for witch flounder in FY 2015, from dealer data (accessed on 11/24/2015): **\$2.51**

### **GB Winter Flounder**

- Utilization rates of 57.0% in FY 2012, 48.8% in FY 2013, 34.0% in FY 2014
- As of November 17, 2015, catch of GB winter flounder during FY 2015 is 824 mt, already in excess of the proposed commercial groundfish sub-ACL of 608mt for FY 2016.
- Ex-vessel price for winter flounder in FY 2015, from dealer data (accessed on 11/24/2015): **\$2.07**

### **SNE Winter Flounder**

- Utilization rates of 35.0% in FY 2012, 65.2% in FY 2013, 45.1% in FY 2014
- As of November 17, 2015, catch of SNE winter flounder during FY 2015 is 518 mt, just 67 mt short of the proposed commercial groundfish sub-ACL of 585 mt for FY 2016
- Ex-vessel price for winter flounder in FY 2015, from dealer data (accessed on 11/24/2015): **\$2.07**

### ***Economic impacts on the Recreational fishery relative to FY 2015***

Option 2 would likely result in positive impacts to the recreational fishery. Option 2 would increase the recreational sub-ACLs for GOM haddock and GOM cod in FY 2016. A higher sub-ACL for GOM haddock should result in relaxed regulations from the bag limit of 3 in FY 2015 and increase recreational fishing effort. A higher sub-ACL for GOM cod could only result in a bag limit >0 if Option 2 is selected in Section 4.4.3.3. Further economic impacts will be discussed in that section.

### ***Economic impacts on other fisheries***

#### **Sea scallop fishery**

Under Option 2, the sea scallop fishery sub-ACL for SNE/MA yellowtail flounder is expected to decrease from 66 mt in FY2015 to 31 mt in FY2016, a decrease of 53.0%. Actual catches were 48.6 mt in FY2013, 63 mt in FY 2014, and are projected to be 54 mt in FY2015. Accountability measures were not triggered in FYs 2013 and 2014 and are not projected to be triggered in FY 2015 (see Scallop PDT Memo to Groundfish PDT, November 9, 2015). With a sub-ACL of 31 mt and catch projections in FY 2015 and actual catches in FY 2014 that exceed 46.5 mt (150% of 31 mt), there is certainly a strong possibility that

accountability measures will be triggered. Should accountability measures be triggered for SNE/MA yellowtail flounder in the scallop fishery then the activity of scallop vessels would be curtailed and revenues from scalloping would be reduced. The extent of revenue reduction from the presence of AMs, which would be implemented in FY 2017, is uncertain at this time.

Under Option 2, the sea scallop fishery sub-ACL for SNE/MA windowpane flounder is expected to increase from 183 mt in FY2015 to 209 mt in FY2016, an increase of 14.2%. Actual catches were 129.1 mt in FY 2013, 136 mt in FY 2014, and were projected to be 134 mt in FY2015. As of November 2015, catch was 139 mt, though it is not expected that catch will exceed 183 mt (see Scallop PDT Memo to Groundfish PDT, November 9, 2015). Given these recent conditions, it is not likely that the scallop fishery would be functionally limited by a SNE/MA windowpane flounder sub-ACL of 209 mt in FY2016.

GB yellowtail flounder AMs were developed for the sea scallop fishery in Amendment 15 to the Atlantic Sea Scallop FMP, and later modified in FW23. The scallop fishery is subject to an AM in the following fishing year if scallop vessels participating in either open- area or access-area trips exceed their sub-allocation of GB yellowtail flounder, and either the total GB yellowtail flounder ACL is exceeded or the scallop fishery exceeds its ACL by 50 percent or more. The length of the AM area closures is determined by the overage percent. If the total ACL is exceeded, the fishery that caused the overage would also be subject to a pound for pound payback under the US/Canada resource sharing agreement.

Under Option 2, the sea scallop fishery sub-ACL for GB yellowtail flounder is expected to increase from 38 mt in FY2015 to 42 mt in FY2016, an increase of 10.5%. Actual catches were 37.5 mt in FY 2013, 59 mt in FY2014, and are projected to be as high as 49.6 mt in FY2015. Accountability measures were not triggered in FYs 2013 and 2014 and are not projected to be triggered in FY 2015. Recent utilization rates of GB yellowtail flounder in the groundfish fishery (24.5% in FY14; 36.1% in FY13; 58.5% in FY12) suggests that the total ACL is unlikely to be exceeded in FY 2016, even if the sub-ACL in the scallop fishery is. This means that the likely threshold of GB yellowtail flounder catch to trigger scallop fishery AMs would be 63 mt (150% of 55 mt) under Option 2. The projected bycatch of GB yellowtail flounder bycatch by the scallop in FY 2016 is between 27.9 and 49.6mt (see Scallop PDT Memo to Groundfish PDT, November 9, 2015). Therefore, while the sub-ACL of 42mt may be exceeded, the likely threshold of 63mt to trigger AMs is not expected to be reached. If GB yellowtail flounder bycatch does exceed the projections, the scallop fishery could be negatively impacted by AMs.

#### Atlantic herring fishery

Option 2 would have positive impacts on the Atlantic herring fishery relative to No Action and FY 2015. The sub-ACLs for GB haddock and GOM haddock would be increased from FY 2015 under Option 2. The GB haddock sub-ACL would be increased from 227mt to 521mt and the GOM haddock sub-ACL would be increased from 14mt to 34mt. These increased sub-ACLs should provide a better opportunity for the Atlantic herring fishery to avoid triggering AMs, which the herring fishery is operating under for exceeding the sub-ACL for GB haddock in-season from October 22, 2015 until the end of the 2015 groundfish fishing year. These AMs implemented a 2,000 lb. possession limit for most of the GB stock area, resulting in revenue decreases for the Atlantic herring fishery.

To estimate the loss in revenue from the FY 2015 AMs, average annual Atlantic herring revenue from herring trips to statistical areas currently under AMs (521, 522, 525, 561, and 562) for the months of November-April during FYs 2011-2014 was calculated. Table 2 shows that average herring revenue from these stat areas during this six month duration is nearly \$2,000,000. The average volume of herring landings on the considered trips was slightly over 360,000 pounds (16,664,386/46), 180 times the 2,000 lb. legal possession limit under the AMs.

**Table 2- Atlantic Herring trips, landings, and revenue from statistical areas 521, 522, 525, 561, or 562 for the months of Nov, Dec, Jan, Feb, Mar, and Apr during groundfish fishing years 2011-2014**

Groundfish Fishing Year	# of Herring Trips (In stat areas 521, 522, 525, 561, or 562 during Nov-Apr)	Herring Landed	Herring Revenue
2011	29	10,320,385	\$1,155,744
2012	47	12,854,138	\$1,696,119
2013	70	27,199,795	\$3,057,235
2014	38	16,283,224	\$1,879,268
Avg. 2011-2014	46	16,664,386	\$1,947,092

The AMs, in place to limit incidental catch of GB haddock in FY 2015, likely offer no long term economic benefit to the groundfish fishery at this point. The GB haddock stock is well above  $B_{MSY}$  and utilization rates have been low in recent fishing years. During May-October 2015, incidental catch of GB haddock by the Atlantic herring fishery totaled 291 mt. This number is more or less insignificant when considering the commercial groundfish sub-ACL for GB haddock is nearly 22,000 and utilization rates in recent fishing years have been well below 50%.

Small mesh fishery

Option 2 would have negative impacts on the small mesh fishery relative to No Action. The sub-ACL for GB yellowtail flounder in the small mesh fishery would be decreased from the FW53 specifications from 7mt to 5mt. Under Option 2, the sub-ACL in FY 2016 would be the same as the 2015 value (5 mt). While this sub-ACL is not monitored in-season, AMs can be triggered at the end of the FY from an overage.

**7.4.2 Fishery Program Administration**

**7.4.2.1 Implementation of an Additional Sector**

7.4.2.1.1 Option 1: No Action

The economic impacts of Option 1 would be neutral in that status quo would be retained, and there would not be any additional sectors added to the roster at the start of FY 2016. However, relative to Option 2, Option 1 would likely have negative economic impacts. Option 1 would not offer the same flexibility as Option 2 for sector management to adapt to new conditions in the groundfish fishery.

7.4.2.1.2 Option 2: Implement a New Sector for FY 2016

The economic impacts of Option 2 would likely be positive relative to No Action. Since the widespread implementation of sector management through Amendment 16 to the Groundfish FMP, the limited access groundfish fleet and fishery managers have gained experience of how the fishery operates under the current management regime. It is reasonable to believe that these experiences are leading to an informed decision and the implementation of a new sector at the start of FY2016 will increase the efficiency of Sustainable Harvest Sector operations.



### **7.4.2.2 Sector Approval Process**

#### **7.4.2.2.1 Option 1: No Action**

The economic impacts of Option 1 would be neutral. The process of creating a new sector, and the associated costs of doing so, would be unchanged.

#### **7.4.2.2.2 Option 2: Revised Process for Approving New Northeast Groundfish Sectors**

The economic impacts of Option 2 would be low positive relative to No Action. Option 2 would lessen the administrative costs of approving a new sector by not requiring the proposed sector to undergo review within a Council action (framework or amendment). Additionally, by streamlining the sector approval process, fishery managers would be offered more time to make an informed decision on whether or not to apply for the implementation of a new sector in the following fishing year. Any proposed sector would still be required to submit its preliminary operations plan to the Council and NMFS prior to the submission of a final operations plan to NMFS. Accordingly, Option 2 would not result in the implementation of any sector that is expected to have adverse economic impacts to the remainder of the groundfish fishery.

### **7.4.2.3 Modification to the Definition of the Haddock Separator Trawl**

#### **7.4.2.3.1 Option 1: No Action**

The economic impacts of Option 1 would be neutral. All vessels currently operating with a Haddock Separator Trawl would not be required to replace the separator panel portion of the trawl.

#### **7.4.2.3.2 Option 2: Revised Definition of the Haddock Separator Trawl**

The economic impacts of Option 2 would be mixed relative to No Action. Option 2 would require all vessels operating with a Haddock Separator Trawl (HST) to use a separator panel of contrasting color to those sections of the net that it separates. This action would require all vessels operating under the current definition of the HST to incur the upfront cost of replacing the panel portion of the trawl.

During fishing years 2013-2015, there were 46 unique vessels that had at least one trip in which they operated with a HST, according to their Vessel Trip Report (VTR). This figure represents the estimated number of vessels for which the owner would have to pay for the cost of materials and labor associated with replacing the HST panel. The cost of panel twine is estimated to be \$360 - \$800 and the cost of installing the new panel is estimated to be \$200 - \$600, for a total estimate of \$560 - \$1,400 per panel. Multiplying the estimated number of vessels operating with a HST by the cost of replacing the panel results in a one-time total cost estimate to the groundfish fleet between \$25,760 (46\*\$560) and \$64,400 (46\*\$1,400). This estimate assumes that each vessel identified as using a HST during fishing years 2013-2015 has only one HST for which the panel must be replaced under Option 2.

The economic benefit associated with Option 2 would be in time savings to members of the Coast Guard conducting inspections and to vessels which have to delay fishing operations while inspections occur. If the value of time saved to both parties during FY 2016 and beyond exceeds the cost of replacing the HST panels, then the economic impacts of Option 2 would be positive. However, the amount of time that would be saved per inspection under Option 2 and the number of Coast Guard inspections that occur each fishing year is unknown.

### **7.4.3 Commercial and Recreational Fishery Measures**

#### **7.4.3.1 Groundfish Sector Monitoring Program**

*Cost estimations for sector monitoring are based off of FY 2014 effort. Additional estimates to be provided based on forthcoming quota-change model results for FY 2016.*

##### **7.4.3.1.1 Option 1: No Action**

The economic impacts of Option 1 would be neutral. The groundfish sector monitoring program would be unchanged from the performance criteria established in Amendment 16 and FW48.

##### ***Economic impacts relative to FY 2015***

Option 1 would result in a higher level of ASM coverage in FY 2016 than in FY 2015. As sectors in the groundfish fishery will be responsible for funding ASM coverage throughout FY 2016, this will represent a significant cost that up to this point was not borne by the fishery. If monitoring 80% of discarded pounds at CV30 were to be required in FY 2016, the target coverage rate would be 41% (see Groundfish PDT memo to Committee - Appendix III, November 16, 2015). If this were not to be a requirement, the target coverage would be set at 37% and be driven by redfish, the stock with the highest CV during FY 2014.

The overall impacts of Option 1 cannot be determined as the benefits of ASM are not quantifiable at this time. While increased coverage leads to a better estimate of discards and improved stock estimates, the marginal value of each % increase in coverage is unknown. Option 1 would result in higher coverage levels than in recent fishing years.

##### **The Council may select Options 2, 3, 4, and 5 in this section.**

##### **7.4.3.1.2 Option 2: Clarification of Groundfish Monitoring Goals and Objectives**

The economic impacts of Option 2 are expected to be neutral in relation to No Action. Option 2 alone would not change the current methods for setting target coverage levels.

##### **7.4.3.1.3 Option 3: Clarification of methods used to set sector ASM coverage rates**

##### **The Council may select both Sub-Option 3A and 3B.**

##### **7.4.3.1.3.1 Sub-Option 3A: Monitoring 80% of discarded pounds at CV30**

Option 3A would result in a lower level of ASM coverage relative to No Action and thereby a reduction in cost to sectors. If monitoring 80% of discarded pounds at CV30 were to be required in FY 2016, the target coverage rate would be 41% (see Groundfish PDT memo to Committee - Appendix III, November 16, 2015). Under Sub-Option 3A, in which this would not be a requirement, target coverage would be set at 37% and be driven by redfish. Assuming NEFOP coverage were to be set at 4% for FY 2016, ASM target coverage rates would be 37% for monitoring 80% of discarded pounds at CV30 and 33% for redfish driving the CV30 requirement.

The number of days absent by sector vessels on groundfish trips during FY 2014 was 15,937. Assuming, the same level of effort during FY 2016, at a 37% ASM coverage rate and a cost of \$710 per observed seaday, the cost of ASM to sectors would be \$4.2 million ( $15,937 \times .37 \times \$710$ ) under No Action. Under Sub-Option 3A, and the same effort assumption, an ASM coverage rate of 33% would result in ASM costs of \$3.7 million ( $15,937 \times .33 \times \$710$ ). Sub-Option 3A would yield in an estimated \$0.5 million decrease in ASM costs to groundfish sectors during FY 2016 relative to No Action.

#### 7.4.3.1.3.2 Sub-Option 3B: Multi-year approach to setting sector ASM coverage

Option 3B would result in a lower level of ASM coverage relative to Sub-Option 3A and thereby a reduction in cost to sectors. Under Sub-Option 3A, in which only one year of data (FY 2014) would be used to set a coverage target, the ASM coverage rate would be set at 33%. Appendix IV in PDT memo to GF committee shows that as more years of data are used, the average required coverage to achieve CV30 across all stocks declines. With two years of data, the average falls to 23% (based on redfish); with five years of data, the average falls to 12% (based on GB winter flounder). Option 3B would result in a lower coverage rate and a greater reduction in costs to sectors during FY 2016 than Option 5, which would establish performance criteria for meeting the CV30 standard. At a coverage rate of 12%, and assuming the same level of effort during FY 2016 as FY 2014 (15,937 days absent), and a cost of \$710 per observed seaday, the cost of ASM to sectors would be \$1.4 million ( $15,937 \times .12 \times \$710$ ) under Sub-Option 3B. This would represent cost savings of \$2.3 million relative to using the one year approach.

The overall impacts of Option 3 relative to No Action cannot be determined, as the benefits of ASM are not quantifiable at this time. While increased coverage leads to a better estimate of discards and improved stock estimates, the marginal value of each % increase in coverage is unknown.

#### 7.4.3.1.4 Option 4: Remove ASM Coverage Requirements for a sub-set of sector gillnet trips

##### **The Council may select both Sub-Options 4A and 4B**

##### 7.4.3.1.4.1 Sub-Option 4A: Remove ASM coverage req

During FYs 2012-2014, there were 376 sector trips carrying an ASM observer and fishing strictly with gillnets of mesh size 10" or greater (Table 3). At an annual rate, the number of trips is 125. This is the estimated number of sector trips fishing exclusively with gillnets of mesh size 10" or greater that will occur during FY 2016 and will be exempt from ASM coverage under Option 2. Based on the average trip length for gillnet vessels during FY 2014 (0.8 days), the number of seadays from these 125 trips is estimated to be 100. The monitoring cost of each observed seaday is \$710, meaning Option 4A would result in cost savings of \$71,000 ( $710 \times 100$ ) compared to Option 1 for the portion of the groundfish fleet fishing with ELM gillnets during FY 2016. However, if this observer coverage were to get shifted onto other components of the groundfish fleet, then Sub-Option 4A would result in no overall cost savings.

**Table 3-Number of observer sector trips fishing strictly with ELM (10'+) gillnets, FYs 2012-2014**

Source: NEFSC Observer Database

Observer Program	Fishing Year			Grand Total (2012-2014)
	2012	2013	2014	
ASM	176	59	141	376
All others (NEFOP, SNE Monkfish Exemption, or Unidentified)	49	60	128	237
Total	225	119	269	613

7.4.3.1.4.2 Sub-Option 4B: Remove ASM coverage requirements for sector gillnet trips fishing exclusively within the footprint of existing dogfish exempted fisheries

*To be provided based on forthcoming quota-change model results.*

7.4.3.1.5 Option 5: Fishery Performance Criteria for Meeting CV Standard

***Economic impacts relative to No Action***

Option 5 would result in a lower level of ASM coverage relative to No Action and Sub-Option 3A and thereby a reduction in cost to sectors. Under Sub-Option 3A, redfish would drive the target observer coverage rate at 37%. Under No Action, the standard to monitor 80% of discarded pounds at CV30 would drive the rate up to 41%. Assuming the NEFOP target coverage rate remained at 4% in FY 2016, the ASM target coverage rate would be 33% under Sub-Option 3A. Under the Fishery Performance Criteria, redfish would be exempt from the CV 30 standard, and GOM winter flounder would drive the target observer coverage rate, which would be set at 26%. The ASM target coverage rate would therefore be 22%.

The number of days absent by sector vessels on groundfish trips during FY 2014 was 15,937. Assuming, the same level of effort during FY 2016, at a 33% ASM coverage rate and a cost of \$710 per observed seaday, the cost of ASM to sectors would be \$3.7 million (15,937\*.37\*\$710) under Option 1. Under Option 5 and the same effort assumption, an ASM coverage rate of 22% would result in ASM costs of \$2.5 million (15,937\*.22\*\$710). Option 5 would yield in an estimated \$1.2 million decrease in ASM costs to groundfish sectors during FY 2016 relative to the coverage rate driven by redfish.

***Economic impacts relative to FY 2015***

Option 5 would result in a target observer coverage rate of 26% during FY 2016, a 2% increase relative to the FY 2015 target of 24%. Assuming a 4% NEFOP target coverage level in FY 2016, the ASM target coverage level would be 22%. As sectors will be responsible for funding ASM coverage throughout FY 2016, this will represent a significant cost that up to this point was not borne by the fishery. As stated above, the estimated cost of ASM during FY 2016 under Option 5 would be \$2.5 million.

The overall impacts of Option 5 relative to No Action cannot be determined as the benefits of ASM are not quantifiable at this time. While increased coverage leads to a better estimate of discards and improved stock estimates, the marginal value of each % increase in coverage is unknown.

**7.4.3.2 Management Measures for U.S./Canada TACs**

7.4.3.2.1 Option 1: No Action

The economic impacts of Option 1 would be neutral in that status quo would be retained. However, given the sizable decrease in the revised ACL for (Western) Georges Bank cod in FY2016, groundfish fishing effort on Western Georges Bank may be further constrained under Option 1 relative to Option 2. Option 1 would have negative economic impacts relative to Option 2.

7.4.3.2.2 Option 2: Distribution of U.S. TACs for Eastern/Western Georges Bank Cod

The economic impacts of Option 2 would be positive relative to No Action. Option 2 would provide added operational flexibility to sectors that have excess Eastern Georges Bank (EGB) cod ACE and are in need of Western Georges Bank (hereafter GB cod) ACE in order for its members to continue fishing on the Western portion of Georges Bank. Given the sizable decreases in the revised ACL for GB cod in FY2016, the ability of sectors to convert their EGB cod ACE may be of critical importance for allowing their members to maintain fishing operations on Georges Bank throughout FY2016. In the absence of available ACE for GB cod, sector members are not permitted to fish on Inshore Georges Bank (BSA 2) or Offshore Georges Bank (BSA 3). Table 4 gives a breakdown of the highest revenue-grossing species per fishing year from sector groundfish trips within these statistical areas during FYs 2010-2014.

**Table 4- Highest average revenue-grossing species on sector groundfish trips to Georges Bank\* (BSA 2 & 3) during FYs 2010-2014**

\*Trip location from DMIS

Species	Avg. Nominal \$ generated per fishing year, FYs 2010-2014
Haddock	\$10,849,762
Cod	\$7,621,202
Winter Flounder	\$7,208,260
Monkfish	\$3,348,327
Pollock	\$2,751,193

**7.4.3.3 Modification to the Gulf of Maine Cod Protection Measures**

7.4.3.3.1 Option 1: No Action

The economic impacts of Option 1 would be neutral. The Gulf of Maine Cod Protection Measures established under FW 53 to the Groundfish FMP would be unchanged. In the absence of a cod bag limit >0, the recreational fishery is still likely to experience positive impacts relative to FY 2015 if the haddock bag limit is set higher than 3. Options 2-5 in Table 5 show an increase in angler effort relative to the status quo despite a zero possession limit on cod.

7.4.3.3.2 Option 2: Modify GOM Cod Recreational Possession Limits

The economic impacts of Option 2 would vary based on future management actions taken. If the Regional Administrator (RA) were to set a possession limit on GOM cod of zero for FY 2016, then Option 2 would have neutral impacts relative to No Action. If however the RA were to set a possession limit on GOM cod

greater than zero, then Option 2 would yield positive impacts to the recreational fishery relative to No Action in FY 2016. The magnitude of these impacts is difficult to predict. It is unclear how many more recreational trips would be taken if there was some allowance on the possession of GOM cod in FY 2016, but simulation results under various suites of regulations indicate a non-negligible increase in the number of trips in FY 2016 with a cod bag limit of 1 (Table 5).

If the possession limit on GOM cod were to be set above zero and GOM cod mortality in FY 2016 remains below the recreational sub-ACL, then the long term impacts of Option 2 would be positive as well. Table 5 shows that a cod possession limit of one would be likely to keep GOM cod mortality below the recreational sub-ACL in the RAP recommendation Option, Committee recommendation Option, as well as in Options 6, 7, 9, and 11. For all Options presented, haddock mortality is predicted to remain under the recreational sub-ACL 100% of the time. The likelihood of cod mortality remaining below the recreational sub-ACL decreases when the open season occurs during Wave 3 compared to Wave 4, all else held equal. A change in the cod size limit from 24” to 23” also causes a sizable decrease in the probability of remaining below the sub-ACL.

Option 12 shows that a 23” cod size limit combined with a long haddock open season and no possession limit on haddock would keep cod mortality under the ACL less than 50% of the time, making it not a viable choice. Option 14, with a two wave season for cod, also would not be a viable choice. If GOM cod mortality in the recreational fishery were to exceed the sub-ACL, then the long term impacts of Option 2 may be negative. Overfishing would not only jeopardize the likelihood of higher possession limits for the recreational fishery in fishing years beyond 2016, but could also negatively affect the long term harvest of the commercial fishery.

**Works Cited:**

Source: Murphy, T., Kitts, A., Demarest, C., and Walden, J. 2015. 2013 Final Report on the Performance of the Northeast Multispecies (Groundfish) Fishery (May 2013 -April 2014). Woods Hole: NEFSC. NOAA Fisheries Northeast Fisheries Science Center. 15-01. 121 pp

**Table 5- Recreational fishery projections for FY 2016 under 16 different management scenarios, including the RAP recommendation and Groundfish Committee recommendation; results from the bioeconomic model for GOM fisheries, NEFSC, November 25, 2015**

FY 2016 Gulf of Maine Cod and Haddock Simulation Projections																
Option	Haddock						Cod						Angler Trips (Median)	% Under Had ACL (out of 100 Simulations)	% Under Cod ACL (out of 100 Simulations)	
	Had Limit	Had Size	Had Open Season	Had Kept mt (Median)	Had Release Mortality mt (Median)	Had Total Mortality mt (Median)	Cod Limit	Cod Size	Cod Open Season	Cod Kept mt (Median)	Cod Release Mortality mt (Median)	Cod Total Mortality mt (Median)				
<b>1 (Status Quo)</b>	3	17"	Waves 3, 4, 6, 1	268	137	405	0		Closed	4	62	66	117,139	100	100	
<b>2</b>	8	17"	Waves 3, 4, 6, 1	351	100	451	0		Closed	4	64	68	118,912	100	100	
<b>3</b>	No limit	17"	Waves 3, 4, 6, 1	393	80	473	0		Closed	4	64	68	119,345	100	100	
<b>4</b>	No limit	17"	Waves 3, 4, 5, 6, 1	494	83	577	0		Closed	5	74	79	142,410	100	100	
<b>5</b>	No limit	17"	Waves 3, 4, 5, 6, 1, 2*	626	89	715	0		Closed	5	92	97	167,103	100	100	
<b>6</b>	No limit	17"	Waves 3, 4, 5, 6, 1	499	84	583	1	24"	Wave 3	67	66	133	143,756	100	95	
<b>7</b>	No limit	17"	Waves 3, 4, 5, 6, 1	496	85	581	1	24"	Wave 4	45	69	114	143,503	100	100	
<b>8</b>	No limit	17"	Waves 3, 4, 5, 6, 1	501	85	586	1	23"	Wave 3	79	65	144	144,171	100	73	
<b>9</b>	No limit	17"	Waves 3, 4, 5, 6, 1	497	85	582	1	23"	Wave 4	50	69	119	143,720	100	100	
<b>10</b>	No limit	17"	Waves 3, 4, 5, 6, 1, 2*	631	90	721	1	24"	Wave 3	68	83	151	168,505	100	63	
<b>11</b>	No limit	17"	Waves 3, 4, 5, 6, 1, 2*	629	90	719	1	24"	Wave 4	47	87	134	168,264	100	92	
<b>12</b>	No limit	17"	Waves 3, 4, 5, 6, 1, 2*	633	90	723	1	23"	Wave 3	80	82	162	168,898	100	39	
<b>13</b>	3	17"	Waves 3, 4, 6, 1	275	140	415	1	24"	Waves 3, 4	105	49	154	119,740	100	57	
<b>14</b>	8	17"	Waves 3, 4, 6, 1	359	102	461	1	24"	Waves 3, 4	107	50	157	121,437	100	46	
<b>RAP Recommended</b>	15	17"	Waves 3, 4, 5, 6, 1, 2*	610	99	709	1	24"	Wave 4	46	86	132	168,125	100	93	
<b>Committee Recommended</b>	15	17"	Waves 3, 4, 5, 6, 1, 2*	609	98	707	1	24"	Wave 5	25	89	114	167,549	100	100	

\* Wave 2 open Apr 15 - 30  
FY 2016 GOM haddock recreational sub-ACL = 928 mt  
FY 2016 GOM cod recreational sub-ACL = 157 mt

## **7.0 Environmental Consequences – Analysis of Impacts**

### **7.1 Biological Impacts**

### **7.2 Essential Fish Habitat Impacts**

### **7.3 Impacts on Endangered and Other Protected Species**

### **7.4 Economic Impacts**

### **7.5 Social Impacts**

National Standard 8 (NS8) requires the Council to consider the importance of fishery resources to affected communities and provide those communities with continuing access to fishery resources, but it does not allow the Council to compromise the conservation objectives of the management measures. Thus, continued overall access to fishery resources is a consideration, but not a guarantee that fishermen will be able to use a particular gear type, harvest a particular species of fish, fish in a particular area, or fish during a certain time of the year.

A fundamental difficulty exists in forecasting social change relative to management alternatives, since communities or other societal groups are constantly evolving in response to external factors (e.g., market conditions, technology, alternate uses of waterfront, and tourism). Certainly, management regulations influence the direction and magnitude of economic and social change, but attribution is difficult with the tools and data available. While the focus here is on the economic and social impacts of the proposed fishing regulations, external factors may also influence change, both positive and negative, in the affected communities. External factors may also lead to unanticipated consequences of a regulation, due to cumulative impacts. These factors contribute to a community's ability to adapt to new regulations.

When examining potential social impacts of management measures, it is important to consider impacts on the following: the fishing fleet (vessels grouped by fishery, primary gear type, and/or size); vessel owners and employees (captains and crew); groundfish dealers and processors; final users of groundfish; community cooperatives; fishing industry associations; cultural components of the community; and fishing families. While some management measures may have a short-term negative impact on some communities, these should be weighed against potential long-term benefits to all communities which can be derived from a sustainable groundfish fishery.

The social impact factors outlined below are used to describe the Northeast multispecies fishery, its sociocultural and community context and its participants. These factors are considered relative to the management alternatives and used as a basis for comparison between alternatives. Use of these kinds of factors in social impact assessment is based on NMFS guidance (NMFS 2007) and other texts (e.g., Burdge 1998). Longitudinal data describing these social factors region-wide and in comparable terms is limited. While this analysis does not quantify the impacts of the management alternatives relative to the social impact factors, qualitative discussion of the potential changes to the factors characterizes the likely direction and magnitude of the impacts.

*The social impact factors fit into five categories:*

1. *Size and Demographic Characteristics* of the fishery-related workforce residing in the area; these determine demographic, income, and employment effects in relation to the workforce as a whole, by community and region.
2. *The Attitudes, Beliefs, and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding the behavior of fishermen on the fishing grounds and in their communities.



3. The effects of the proposed action on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities, as well as effects on the community's social structure, politics, etc.

4. The *Non-Economic Social Aspects* of the proposed action; these include lifestyle, health, and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.

5. The *Historical Dependence on and Participation in* the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights (NMFS 2007).

#### Surveys of the Socio-Economic Aspects of Commercial Fishing Vessel Owners and Crew in New England

In addition to insights and information from prior research on groundfish fisheries, the economic impact analysis provided for this framework, and qualitative assessments of public comment sections at Council meetings, this social impact analysis will also provide analysis of data from the Surveys on the Socio-Economic Aspects of Commercial Fishing Vessel Owners and Crew in New England and the mid-Atlantic (SEAS) conducted by the Social Science Branch at the Northeast Fisheries Science Center.

The crew survey began in October, 2012 and concluded in September, 2013. The survey was administered via face to face interviews to a randomly selected sample of 1,300 crew members. The interviews were conducted at several selected fishing ports from the region. By the closing of the survey, 400 interviews were completed.

The Survey on the Socio-Economic Aspects of Commercial Fishing Vessel Owners in New England and the Mid-Atlantic is currently underway. Surveys were mailed to 1,400 vessel owners on September 13, 2013. One-hundred and fifty-seven surveys (one-hundred and thirty-eight were submitted via mail and nineteen online) have been completed as of January 13, 2014 (i.e., an 11% survey response rate). More information about the surveys, including survey instruments, can be found at <http://www.nefsc.noaa.gov/read/socialsci/>.

### **7.5.1 Updates to Status Determination Criteria and Annual Catch Limits**

#### **7.5.1.1 Revised Status Determination Criteria**

##### **7.5.1.1.1 Option 1: No Action**

Under Option 1, there would be no revisions to the Status Determination Criteria (SDC) and numerical estimates of groundfish stocks would not change.

If Option 1 is selected, the primary result would be numerical estimates of SDCs based on outdated groundfish stock assessments. While this is not expected to have substantial immediate social impacts, the *Attitudes, Beliefs, and Values* of stakeholders could be negatively impacted if they perceive management to not be utilizing the best available science to make status determinations of groundfish stocks. It is worth noting, however, that some stakeholders remain skeptical of the science used to make SDC decisions even when SDC are updated. According to the SEAS survey, sixty percent of crew on vessels targeting groundfish (n=48) reported that they did not believe information that was presented to them by management. This pattern is not unique to groundfish fishermen, however, as about fifty-seven percent of crew on all other fishing trips (n=136) reported that they did not believe such information.

#### 7.5.1.1.2 Option 2: Revised Status Determination Criteria

Under Option 2, the numerical estimates of the SDC for all groundfish stocks would be updated (Table 3). As a result of updated numerical estimates, MSY will be lower for GOM Cod, GB Haddock, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American Plaice, Witch Flounder, GB Winter Flounder, and White Hake. While lower MSY does not necessarily lead to lower ACL, some of the aforementioned stocks will have substantial decreases in their ACL as a result of these updated estimates and related status determinations. If Option 2 leads to lower ACLs, the short-term social impact would be negative relative to the *Size and Demographic Characteristics* of the groundfish fishery. Lower ACLs will likely reduce fishing opportunity, thus contributing to potential declines in income and employment in the fishery.

The social impacts of Option 2 relative to the *Attitudes, Beliefs, and Values* of the groundfish fishery are likely to be neutral and potentially negative given the scientific uncertainty associated with the status determinations of GB cod, halibut, and SNE/MA yellowtail flounder. Although using the best available science to make status determinations and provide catch advice can lead to increases in positive attitudes among fishermen towards the management process, this effect could be mitigated by uncertainties about multiple stocks and the models used to assess them. This is especially likely when lower ACLs result from the revised SDC because it can directly impact the *Size and Demographics* of the fishery vis-à-vis income and employment reductions. These negative “felt” impacts, or negative changes to the socioeconomic well-being of fishing communities, increase the likelihood of negative “perceived” impacts, or negative changes to the *Attitudes, Beliefs, and Values* fishermen hold in regard to the management process. According to SEAS data, about seventy percent of groundfish fishing crew and vessel owners (n=56) reported that rules and regulations in their fishery have been too restrictive. Fishermen in all other fisheries were less likely to express such views; about sixty percent (n=182) reported rules and regulations were too restrictive in their respective fisheries.

With these precautions in mind, Option 2 would constitute the use of the best available science to determine stock status and this could alternatively lead to positive social impacts relative to the *Attitudes, Beliefs, and Values* of the groundfish fishery. If the prevailing perception among fishermen is that the best available science is being used to make stock status determinations, then the *Attitudes, Beliefs, and Values* of the associated fishing communities may reflect this positive impact.

#### 7.5.1.2 Annual Catch Limits

##### 7.5.1.2.1 Option 1: No Action

If Option 1 is selected, there would be no changes to the specifications for FY 2016 – FY 2017 that were adopted by FW 53 (Table 7) and default catch limits for stocks would remain until July 31, 2016 (Table 6). Additionally, quotas would not be specified for the Georges Bank stocks, namely GB Cod, GB haddock, and GB yellowtail flounder. These stocks are managed through the US/CA Resource Sharing Understanding and the quotas are specific annually.

No Action would likely lead to high negative social impacts in terms of the *Size and Demographic Characteristics* of the groundfish fishery due to probable reductions in fishing opportunity and resultant losses in employment and income. Without annual catch limits specified, the fishery would revert to the default specifications and eventually shut down if no further action is taken. This would likely precipitate a reduction in income for vessels and loss of employment opportunities for crew members typically employed on vessels which target groundfish.

Additionally, electing to proceed with Option 1 would not constitute use of the best available science for catch advice and thus could have a negative impact on the *Attitudes, Beliefs, and Values* of stakeholders in the groundfish fishery. Perceptions of effective management are based in part on the use of good scientific information, so it follows that No Action would not be conducive to fostering positive attitudes among those in the groundfish fishing communities.

#### 7.5.1.2.2 Option 2: Revised Annual Catch Limit Specifications

Option 2 would set the annual specifications for FY 2016 – FY 2018 for all groundfish stocks and FY 2016 – FY 2017 for GB yellowtail flounder would follow the specifications listed in Table 12. This option also includes specifications of TACs for the US/Canada Management Area for FY 2016, as noted in Table 8, as well a specification for the scallop fishery sub-ACL for SNE/MA yellowtail flounder based on 90 percent of the estimated catch of SNE/MA yellowtail flounder by the scallop fishery.

##### *Social impacts relative to No Action*

Relative to the No Action alternative, Option 2 may have low positive to neutral impacts on the *Attitudes, Beliefs, and Values* and *Size and Demographic Characteristics* of the groundfish fishery. While many stakeholders in the groundfish fishery have voiced frustration with management and have questioned the science underlying stock assessments at recent public comment sections of Council meetings, no action would likely be perceived as a continued failure of management to adequately address both ecological and socioeconomic concerns of the groundfish fishery.

Option 2 also provides for positive impacts in *the Size and Demographic Characteristics* relative to the No Action alternative. If no action is taken, there would be significant disruption in the fishing industry because transboundary specifications would not be set, the default catch limit would be set at 35% of the prior year's catch limit, and the default catch limit would expire on July 31st 2016. The results of these outcomes could precipitate major reductions in income and employment among vessels in the groundfish fishery. As the only alternative to Option 1, Option 2 at least avoids the potentially high negative impacts of taking no action.

##### *Social impacts relative to FY 2015 specifications*

*To be provided based on forthcoming quota-change model results.*

##### *Scallop Fishery Sub-ACL for SNE/MA Yellowtail Flounder*

This option would also continue to specify scallop fishery sub-ACLs for SNE/MA yellowtail flounder, which has been based on 90 percent of the estimated scallop fishery catch since FY2011. Under this option, the sea scallop fishery sub-ACL for SNE/MA yellowtail flounder is expected to decrease substantially. If accountability measures would be implemented in FY2017, this would curtail scallop vessel activity and subsequently reduce revenues. The extent of revenue reduction from the presence of AMs, which would be implemented in FY 2017, is uncertain at this time.

Option 2 could have negative impacts in terms of the *Size and Demographics* of the scallop fishery by reducing revenues, thereby decreasing incomes and potentially affecting employment in that fishery. That said, the extent of the revenue reductions is not certain at this time.

## 7.5.2 Fishery Program Administration

### 7.5.2.1 Implementation of an Additional Sector

#### 7.5.2.1.1 Option 1: No Action

Under Option 1, the Council would not approve the application of a new sector, Sustainable Harvest Sector II. This alternative would have neutral-to-negative impacts on at least three of the social impact factors relative to the approval of this new sector through Option 2, namely the *Size and Demographic Characteristics, Attitudes, Beliefs, and Values*, and *Social Structure and Organization* of groundfish fishing communities.

Without the new sector requested by recent applicants, there may not be increased potential for income and employment in the fishery over and above what is already present with the current 24 approved sectors. On the other hand, some fishermen and other stakeholders have expressed concern that sectors contribute to the consolidation of the fishery. This would result in neutral-to-low negative impacts on the *Size and Demographics* relative to implementing Option 2.

In terms of the *Attitudes, Beliefs, and Values* of groundfish fishermen, Option 1 would have neutral-to-negative impacts due to disappointment likely to arise from perceived inaction and unfairness on the part of management. The sector approval process is already perceived as burdensome and the denial of a new sector would likely only contribute to negative attitudes towards the sector management system. Frustrations with the sector system overall, however, could overshadow the potential benefits of an additional sector if fears of consolidation spread with the implementation of additional sectors.

Option 1 may also have neutral-to-negative impacts on the *Social Structure and Organization* of the groundfish fishery relative to Option 2. Not approving an additional sector would not promote the potential for enhanced support from the fishery to the broader fishing communities which rely on the fishery for a variety of social and economic supports, such as a more robust and vibrant fishery with the flexibility to foster new relationships between community members and stakeholders. That said, any perceived consolidation of the fishery could precipitate fracturing of the fishing communities along pro-sector/anti-sector lines. Additional sectors may fuel such divisions among fishermen in the groundfish fishery and the associated fishing communities.

An additional limitation of Option 1 relative to Option 2 might be the long-term negative impact to the *Historical Dependence on and Participation* in the fishery. If an additional sector is not approved and all of the aforementioned negative impacts result, some groundfish fishermen may leave the fishery due to frustrations with management, the sector system, and the lack of new opportunities for social networking, employment, and income in the fishery and associated fishing communities.

#### 7.5.2.1.2 Option 2: Implement a New Sector for FY 2016

Under Option 2, Sustainable Harvest Sector II would be implemented and allowed to operate on May 1, 2016. A sector that wishes to begin operating in a given fishing year is required to submit a proposal and preliminary operations plan one year prior to the beginning of that fishing year. The anticipated impacts of Option 2 are neutral-to-positive relative to the *Size and Demographic Characteristics, Social Structure and Organization, and Attitudes, Values, and Beliefs* of the groundfish fishery and fishing communities.

The impact to particular individuals and communities will depend on whether they choose to join a sector and whether a community has a large proportion of individuals in sectors in comparison with the common

pool. The approval of Sustainable Harvest Sector II could provide new fishing opportunities, thus contributing to increased employment and income for fishing communities. If individuals in the groundfish fishery choose not to join this sector, however, the potential for these positive impacts on the *Size and Demographic Characteristics* would be reduced and may have no discernible difference over selecting Option 1.

Sectors have the potential to be relationship-building or to breed disputes and strife, depending on the success of the individual organization. Participants in a sector become responsible for sharing resources and dividing shares of catch and profits amongst themselves. If relationships are good between members, a sense of community and partnership could flourish. However, the opposite could happen if sector members have bad interactions or do not cooperate. The approval of Sustainable Harvest Sector II could provide for positive social impacts as it relates to the *Social Structure and Organization* of the groundfish fishery should the relationship-building potential of this additional sector be realized. A recent study of social capital and economic performance among New England fisheries found positive correlations between measures of social capital and net revenue per active vessel among sampled sectors (Holland et al 2015).

While sectors are a form of catch shares that has extensive support among government agencies (including NOAA) and some environmental organizations, their application in the multispecies fishery has received a neutral/mixed reception from fishermen. There are those who welcome this opportunity to move away from the effort control system, but others are concerned that sectors will lead to further industry consolidation and make it more difficult for independent small vessel owners to remain viable. The impacts of approving Sustainable Harvest Sector II relative to the *Attitudes, Beliefs, and Values* of the groundfish fishery are likely to be neutral to low-positive. Groundfish fishermen and stakeholders have voiced frustration with the sector management system in public comment sections at Council meetings. On the other hand, this additional sector is supported by at least some groundfish fishermen and if it provides the aforementioned positive impacts relative to the *Size and Demographics* and *Social Structure and Organization* it could increase the potential for positive impacts relative to the *Attitudes, Beliefs, and Values* of groundfish fishermen.

### **7.5.2.2 Sector Approval Process**

#### **7.5.2.2.1 Option 1: No Action**

The process for creating a new sector, as described in Amendment 16, would not change under Option 1. Under the current regulations, a sector must submit its preliminary operations plan to the Council no less than one year prior to the date that it plans to begin operations. The Council must decide whether or not to approve the implementation of an additional sector through an action (Amendment or Framework). Any sector that is authorized by the Council must also submit an operations plan to NMFS. NMFS may consult with the Council and will solicit public comment on the operations plan consistent with the Administrative Procedures Act (APA). Upon review of the public comments, the RA may approve or disapprove sector operations through a final determinate consistent with the APA.

No action would likely produce neutral-to-negative impacts on the *Attitudes, Beliefs, Values* of groundfish fishermen relative to Option 2. Sector approval process has been cited in public comments at Council meetings as overly burdensome and not conducive to the kind of flexibility needed to keep up with changing regulations and legal circumstances. These frustrations with the pace of change in rules and regulations have been echoed by SEAS survey results. Seventy-two percent of groundfish fishing vessel crew reported that rules change so quickly it can be hard to keep up.

#### 7.5.2.2.2 Option 2: Revised Process for Approving New Northeast Groundfish Sectors

Under Option 2, the process for approving new groundfish sectors would be changed, such that new sectors would not need to be approved through a Council action. A sector would be required to notify the Council and NMFS in writing of its intent to form a new sector no later than 30 days prior to the deadline to submit an operations plan for the following FY. NMFS would make a determination about formation of the proposed sector consistent with the APA, and would approve or disapprove the operations plan through the existing process.

This option would add flexibility to the sector approval process, particularly with regard to the requirement for the Council to approve new sectors through a Council Action, and the requirement to submit a new sector formation proposal 1 year prior to when the sector wishes to begin operations. As a result, Option 2 would likely have neutral-to-positive impacts on the *Attitudes, Beliefs, and Values* of groundfish fishermen and communities. Recent research on groundfish fisheries management has highlighted flexibility as an important goal to strive towards in order to improve fishery management and community relations (Olson and Pinto da Silva 2014).

Also, recent survey data shows a relatively high proportion of groundfish fishermen are frustrated with management. According to SEAS data, about seventy-three percent of vessel owners fishing in the groundfish fishery reported that they were frustrated with management and regulations (n=26), compared with only fifty-four percent of vessel owners in all other fisheries (n=153). Greater flexibility may improve attitudes among some fishermen who hold negative views towards management, especially those who view rules and regulations as overly burdensome. Some evidence exists to suggest that groundfish fishermen are more likely to hold these views than fishermen in other fisheries. According to the SEAS survey of both vessel owners and crew, about forty-four percent of groundfish fishermen either agreed or strongly agreed that the rules have been easy to comply with (n=56), compared to about fifty-four percent of fishermen in all other fisheries (n=184).

#### 7.5.2.3 Modification to the Definition of the Haddock Separator Trawl

##### 7.5.2.3.1 Option 1: No Action

If Option 1 is adopted, no changes would be made to the definition of the haddock separator trawl. Relative to Option 2, which would change the definition to require contrasting mesh colors, this No Action alternative will likely have neutral-to-negative impacts on the *Size and Demographic Characteristics* of the fisheries and fishing communities. As it is currently constituted, the definition does not account for color schema on large mesh separator trawls and enforcement officials have cited difficulty in recognizing separator panels, thus slowing the speed of inspections and taking away from the time vessels could be spending on normal fishing operations. This reduces the potential for increasing income by fostering inefficient enforcement and could contribute to stagnating or declining incomes from sub-optimal fishing trip productivity.

##### 7.5.2.3.2 Option 2: Revised Definition of the Haddock Separator Trawl

Contrasting colors on the horizontal large mesh separator panel are expected to make inspections by enforcement more efficient and this could lead to more time available for vessels to conduct their normal fishing operations. This may result in more income from increased productivity of vessels. Therefore, it is expected that Option 2 could have at least neutral to low-positive impacts on fisheries and fishing communities in terms of the *Size and Demographics* and *Attitudes, Beliefs, and Values* relative to taking No Action.

That said, given the frustrations with management voiced through recent surveys and public comments, some may view this action as increasing the burdens and costs associated with complying with new rules and regulations. Fifty-nine percent of vessel owners (n=76) who responded to the SEAS survey item, “The rules and regulations in my primary fishery in 2012 caused my fishing costs to increase,” reported that they either agreed or strongly agreed with this statement. Perhaps more importantly, seventy-nine percent (n=77) of the vessel owners who responded to the SEAS item, “Over the next five years (2014-2018), I expect the rules and regulations in my primary fishery to cause my fishing costs to increase,” reported that they either agreed or strongly agreed with this statement. The total cost of the haddock separator panel per vessel, including materials and installation, is expected to be between \$560 and \$1,200 (Table 11). This additional cost may be negatively impactful for smaller, owner-operated vessels, but the benefit of more efficient inspections could offset this initial cost and lead to improved attitudes among fishermen.

### **7.5.3 Commercial and Recreational Fishery Measures**

#### **7.5.3.1 Groundfish Sector Monitoring Program**

##### **7.5.3.1.1 Option 1: No Action**

Under Option 1, the groundfish monitoring program would remain as defined in Amendment 16 and FW 48. The at-sea monitoring program would continue to be industry funded. The No Action alternative will likely have negative impacts on the *Size and Demographic Characteristics* of the fishery and *Attitudes, Beliefs, and Values* of fishermen relative to Options 2, 3, 4 and 5. Some groundfish fishermen have expressed their frustration with the monitoring programs in recent surveys of groundfish vessel owners. For example in response to a series of items on the SEAS survey asking vessel owners about their top three frustrations as commercial fishing vessel owners, one vessel owner commented, “observers – not necessary.” After the shift to an industry-funded observer program, frustrations may increase among groundfish fishermen.

***The Council may select Options 2, 3, 4, and 5 in this section.***

##### **7.5.3.1.2 Option 2: Clarification of Groundfish Monitoring Goals and Objectives**

Option 2 would clarify that the primary goal of the groundfish sector ASM program is to verify area fished, catch, and discards by species, by gear type; and meeting these primary goals should be done in the most cost effective means practicable.

Greater clarification about the ASM program would have neutral-to-low-positive impacts in terms of the *Attitudes, Beliefs, and Values* of groundfish fishermen. Fishermen are not as frustrated by the ease with which they are able to access the information they need regarding management and regulations. According to SEAS data, only about one-third of crew fishing on groundfish trips (n=43) disagreed/strongly disagreed with the statement, “Information about the rules and regulations that govern my primary fishery is easy to find.” Most groundfish fishermen seem to at least agree or are neutral to the notion that information is easy to obtain, so greater clarity about the ASM program will likely only provide minimal positive impacts, if any at all.

##### **7.5.3.1.3 Option 3: Clarification of methods used to set sector ASM coverage rates**

***The Council may select both Sub-Option 3A and 3B.***

#### 7.5.3.1.3.1 Sub-Option 3A: Monitoring 80% of discarded pounds at CV30

Option 3A would clarify the Council's intent that ASM coverage levels for sectors should be set using only realized stock level CVs, and that overall ASM coverage levels should not be set using an administrative standard of monitoring 80% of discards pounds at a CV30.

This alternative will likely have neutral-to-low-positive impacts on the *Attitudes, Beliefs, and Values* of groundfish fishermen. If fishermen perceive the scientific rationale for ASM coverage rates as valid, then there may be less frustration with the program overall. That said, this is unlikely to offset the frustrations associated with the move to an industry-funded ASM program.

#### 7.5.3.1.3.2 Sub-Option 3B: Multi-year approach to setting sector ASM coverage

Option 3B would specify that a multi-year average of realized stock-level CVs and corresponding coverage rates would be used when setting ASM coverage levels on an annual basis, consistent with the requirement that minimum coverage levels must meet the coefficient of variation in the Standardized Bycatch Reporting Methodology at the overall stock level. Option 3B may have low-positive impacts relative to the *Attitudes, Beliefs, and Values* of groundfish fishermen, as a multi-year approach could appease some concerns fishermen have about the validity of methods used to determine ASM coverage levels. Additionally, making coverage requirements more predictable for industry members and stakeholders could improve attitudes towards management. According to SEAS survey results, about eighty-one percent of crew fishing in the groundfish fishery reported that they either agree or strongly agree that the rules change too quickly and that it can be hard to keep up (n=48). On the other hand, this appears to be less of an issue, relatively speaking, in all other fisheries, as about sixty-one percent of crew in all other fisheries agree/strongly agree that rules change too quickly and it can be hard to keep up (n=114). Applying a multi-year approach to the ASM program coverage rates could bring some consistency to the management of fisheries which is at least perceived to be changing too often.

#### 7.5.3.1.4 Option 4: Remove ASM Coverage Requirements for a sub-set of sector gillnet trips

***The Council may select both Sub-Options 4A and 4B.***

##### 7.5.3.1.4.1 Sub-Option 4A: Remove ASM coverage requirements for sector trips fishing extra-large mesh (ELM) gillnet gear

Under Option 4A, ASM coverage would be removed for sector vessels fishing exclusively with extra-large mesh (ELM) gillnets of 10" or greater on a sector trip in specific BSAs (Figure 1). Vessels declaring an ELM trip would still be prohibited from changing this declaration during their trip and would be required to retain and land all groundfish of legal size for that trip. According to analyses presented in Figure 2, groundfish catch represented less than 5% of total catch on the majority of trips fishing multiple mesh sizes (large and ELM) in Broad Stock Areas 2 and 4. Option 4A is expected to reduce the cost of monitoring for sectors by removing the ASM requirement for trips fishing exclusively with ELM gear.

Relative to the No Action alternative, Option 4A would be likely to have positive impacts in terms of the *Size and Demographic Characteristics* and the *Attitudes, Beliefs, and Values* on fishermen in the groundfish fishery. As mentioned above in section 7.5.2.3.2, vessel owners in the groundfish fishery responding to the SEAS survey mostly reported that regulations caused costs to increase and that they expect costs to increase as a result of regulations in the next five years (2014-2018). Since this measure is expected to reduce at least some of the costs associated with the monitoring program, the *Attitudes,*



*Beliefs, and Values* about management among some fishermen could improve. As it relates to the *Size and Demographic Characteristics* of fishing communities, Option 4A could relieve some financial pressure on sectors and as a result could increase employment and incomes, at least among those vessels affected. Improvements to the *Size and Demographics* could in turn improve the *Attitudes, Beliefs, and Values* of fishermen. However, if this observer coverage were to get shifted onto other components of the groundfish fleet, then Sub-Option 4A would result in no overall cost savings.

7.5.3.1.4.2 Sub-Option 4B: Remove ASM coverage requirements for sector gillnet trips fishing exclusively within the footprint of existing dogfish exempted fisheries.

ASM coverage would be removed for sector vessels fishing exclusively within the footprint and season of either the Nantucket Shoals Dogfish Exemption Area, the Eastern Area of the Cape Cod Spiny Dogfish Exemption Area, and SNE Dogfish Gillnet Fishery Exemption Area (Figure 1). Vessels making a declaration to fish in these areas would not be subject to ASM coverage. A vessel declaring to fish as a sector trip within a dogfish exemption area would still be prohibited from changing its declaration for that trip, and would be required to retain and land all groundfish of legal size on the trip. This means that only gillnet gear of 6.5” and greater can only be fished on this type of trip. NMFS would need to revise the PTNS to allow a vessel to indicate a trip would be fishing exclusively inside the footprint and season of dogfish exempted fisheries on either a groundfish DAS, a monkfish DAS, or both.

Option 4B would reduce the cost of monitoring while maintaining coverage levels because the majority of catch on sector trips using 6.5” diamond mesh gillnets or greater in BSA 2 and 4 is not composed of groundfish stocks, but rather mostly skates, monkfish, and dogfish. This Option is expected to have positive social impacts by decreasing costs associated with management and regulations, thereby increasing incomes, revenues, and possible employment opportunities for sector vessels. This is directly related to the *Size and Demographic Characteristics* of the groundfish fishery, but may also indirectly improve the *Attitudes, Beliefs, and Values* of fishermen and other stakeholders involved in the groundfish fishery. If the socioeconomic conditions of the fishery improve even by a minor increment, attitudes towards management among crew and vessel owners, especially owner-operators, may improve somewhat given the trends in the survey data and public comment sections at Council meetings cited numerous times in the above sections. Aside from the reverberations from socioeconomic improvements, the attitudes towards management among fishermen may improve as a result of changes to an ASM program. The coverage levels as currently constituted may seem arbitrarily high to fishermen who have to bring an observer aboard on a trip which does not primarily target the species the observers are interested in assessing. In this case, it means relief for vessels fishing within the footprint season and season of either the Nantucket Shoals Dogfish Exemption Area, the Eastern Area of the Cape Cod Spiny Dogfish Exemption Area, and the SNE Dogfish Gillnet Fishery Exemption Area (Figure 1). However, if this observer coverage were to get shifted onto other components of the groundfish fleet, then Sub-Option 4B would result in no overall cost savings.

7.5.3.1.5 Option 5: Fishery Performance Criteria for Meeting the CV Standard

Option 5 would set forth certain fishery performance criteria to be used in order to determine groundfish sector ASM coverage levels. Stocks which meet all three of the proposed performance criteria would not need to meet the CV standard. The three fishery performance criteria would be as follows:

1. Stock condition – Not overfished and overfishing is not occurring.
2. The percentage of stock specific catch comprised of discards (5% - 10%).

3. The percentage of the sector sub-ACL harvested (50% - 75%).

Figure 1 demonstrates visually how the performance criteria would be applied in practice in order to determine ASM coverage rates. Option 3 is expected to reduce the cost of monitoring associated with the ASM program. The performance criteria would balance the goals of minimizing possible monitoring bias while helping to promote flexibility in the fishery and enhance socioeconomic viability.

Option 3 would likely result in low positive-to-positive impacts in terms of the *Size and Demographic Characteristics* and *Attitudes, Beliefs, and Values* of groundfish fishermen and stakeholders. Given the frustrations expressed with overly burdensome regulations, management, and observers as mentioned throughout this impact statement, any measure of reduction in the cost associated with coverage of the ASM program would likely produce more favorable *Attitudes, Beliefs, and Values* among fishermen towards management. If utilizing the performance criteria leads to a reduction in costs associated with ASM coverage, Option 3 would also likely have positive impacts on the *Size and Demographics* of the fishery by relieving some of the financial burden placed on vessels and sectors by this industry-funded management measure.

### 7.5.3.2 Management Measures for U.S./Canada TACs

#### 7.5.3.2.1 Option 1: No Action

Option 1 would make no adjustments to the amount of the U.S. TAC for Eastern GB cod that is allocated to the Eastern U.S./Canada Management Area. Eastern GB cod is a sub-unit of the total GB cod stock. Under the current regulations, the U.S. share of the eastern GB cod can only be caught in the eastern U.S./Canada Management Area, and the remaining portion of the total ABC is only available outside of the eastern U.S./Canada Management Area. Option 1 could have negative social impacts by reducing the flexibility of fishing vessels. This would particularly affect communities that are more reliant on the EGB stocks. There may also be a negative social impact to the *Attitudes, Beliefs, and Values* of fishermen regarding the flexibility of management.

#### 7.5.3.2.2 Option 2: Distribution of U.S. TACs for Eastern/Western Georges Bank Cod

Option 2 would allow a sector, or state-operated permit bank, to convert its Eastern GB cod and ACE to Western GB cod ACE at any time during the fishing year, and up to two weeks into the following fishing year. Option 2 would provide additional flexibility for sectors to harvest GB cod and mirrors a provision adopted in FW 51 which allows sectors and state-operated permit banks to move Eastern GB haddock ACE to the Western GB fishery. As is currently the case, sectors and state run permit banks receive eastern GB allocations as a share of their overall GB cod allocation, thus creating situations where vessels which have never fished in the Eastern U.S./Canada area have allocations of Eastern GB cod. This limits the amount of cod that could be caught in the Western area, may unnecessarily reduce flexibility, and potentially limit fishing in the Western U.S./Canada.

Option 2 could have positive impacts on the *Historical Dependence on and Participation in* the fishery by increasing the flexibility of fishing operations, thus helping to sustain communities which rely upon Eastern GB cod. This may also have positive impacts on the *Attitudes, Beliefs, and Values* of fishermen regarding the flexibility and responsiveness of management to the needs of the fishery.

### 7.5.3.3 Modification to the Gulf of Maine Cod Protection Measures

#### 7.5.3.3.1 Option 1: No Action

Under Option 1, there would be no changes to the Gulf of Maine Cod Protection Measures implemented on May 1, 2015 date through FW 53. The recreational possession limit for GOM cod would remain at zero, and could only be adjusted through a future Council action. Relative to Option 2, this No Action alternative could have neutral to low-negative impacts on the *Attitudes, Beliefs, and Values* of fishermen because it keeps the status quo of Council action to make changes based on new scientific information.

#### 7.5.3.3.2 Option 2: Modify GOM cod recreational possession limits

Option 2 would remove the prohibition on the possession of GOM cod by the recreational fishery and the RA would be allowed to set the GOM cod possession limit for recreational fishery as an AM after consultation with the Council. This would increase flexibility in management for the recreational fishery. Increased flexibility in this respect is expected to have at least neutral to low-positive impacts on the *Attitudes, Beliefs, and Values* of fishermen due to the frustrations with management they have vocalized in the past. It is most likely that increased flexibility would be preferred over further Council actions to restrict or allow greater access to the fishery.

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