



New England Fishery Management Council

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MEMORANDUM

DATE: November 30, 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 2”**

- This is a follow-up to “Version 1” distributed on November 25, 2015. Information provided in “Version 1” is not repeated in this document, “Version 2”.
- “Version 2” includes the draft biological impacts, essential fish habitat impacts, and additional economic impacts analysis as attachments. Sections of the analysis that are incomplete at this time are indicated within each attachment.
- Remaining biological impacts analysis (i.e., Groundfish Sector Monitoring Program) will be included in “Version 3” to be distributed on December 1, 2015
- Additional economic impacts analysis (i.e., results from the Quota Change Model) will be provided at the Council meeting on December 2, 2015.
- Corrections to previous documents:
 - In “Version 1” of the impacts analysis – protected resources, economic, and social - November 25, 2015 –the status determination sections will be clarified to indicate that status determination criteria would be changed through FW 55 for Georges Bank cod and Atlantic halibut. The following sentence will be added to each of the impacts sections prior to submission : “Option 2 would change the SDC for GB cod and halibut using the criteria developed at the most recent 2015 operational assessments and would be based on the best available science, consistent with the M-S Act.”
 - In addition in the draft Alternative under Consideration document, November 20, 2015, Table 6 (pp. 22, No Action ACLs) will be corrected for Gulf of Maine winter flounder and Georges Bank winter flounder specifications. We made an error copying in the information. This correction does not change any of the impacts analysis as drafted.

7.1 Biological Impacts

Biological impacts discussed below focus on expected changes in fishing mortality for regulated multispecies stocks. Changes in fishing mortality may result in changes in stock size. Impacts on essential fish habitat and endangered or threatened species are discussed in separate sections. Impacts are discussed in relation to impacts on regulated multispecies and other species. The impacts associated with the measures are anticipated to not be significant.

Throughout this section, impacts are often evaluated using an analytic technique that projects future stock size based on a recent age-based assessment. These projections are known to capture only part of the uncertainties that are associated with the assessments projections. There is evidence, that in the case of multispecies stocks, that the projections tend to be optimistic when they extend beyond a short-term period (i.e., 1-3 years). This means that the projections tend to over-estimate future stock sizes and under-estimate future fishing mortality. Attempts to find a way to make the projections more accurate have so far have proven unsuccessful. These factors should be considered when reviewing impacts that use this tool.

7.1.1 Updates to Status Determination Criteria and Annual Catch Limits

7.1.1.1 Revised Status Determination Criteria

7.1.1.1.1 Option 1: No Action

Impacts on regulated groundfish

Under Option 1/No Action there would be no changes to status determination criteria (SDC) for groundfish stocks, or the resulting numerical estimates derived from these criteria. These values would be based on previous assessments. Since 2015 assessments were completed for all stocks, the use of values from the previous assessments would conflict with M-S Act requirements to use the best available science.

It is difficult to directly compare the Amendment 16 SDCs and subsequent revisions with updated biomass target values and the maximum fishing mortality thresholds to determine the impacts if the older values are retained because of differences between assessments. The 2015 peer review concluded that the GB cod and Atlantic halibut models were not acceptable as a scientific basis for catch advice, and that stock status and catch advice should be based on an alternative approach. Because a stock assessment model framework is lacking for GB cod and Atlantic halibut, no historical estimates of biomass, fishing mortality rate, or recruitment can be calculated for these stocks. Status determination relative to reference points is not possible because reference points cannot be defined. Therefore, the biomass target of B_{MSY} , minimum biomass threshold, and maximum fishing mortality threshold for GB cod and halibut would not be defined by either Option 1/No Action or Option 2. Under Option 2, overfishing status is considered unknown for GB cod and halibut and the peer review concluded for both stocks that evidence suggests that these stocks should still be considered overfished.

Impacts on other species

Option 1/No Action would not be expected to have direct impacts on non-groundfish species such as

monkfish, dogfish, skates, and Atlantic sea scallops. This measure is primarily administrative in that it establishes the criteria used to determine if overfishing is occurring or the stock is overfished.

7.1.1.1.2 Option 2: Revised Status Determination Criteria

Impacts on regulated groundfish

Option 2 would change the SDC for GB cod and halibut using the criteria developed at the most recent 2015 operational assessments and would be based on the best available science, consistent with the M-S Act. It is difficult to directly compare the Amendment 16 SDCs and subsequent revisions with updated biomass target values and The maximum fishing mortality threshold to determine the impacts if the older values are retained because of differences between assessments. Table 1 compares the stock status changes between the previous and current assessments.

The 2015 peer review concluded that the GB cod and Atlantic halibut models were not acceptable as a scientific basis for catch advice, and that stock status and catch advice should be based on an alternative approach. Because a stock assessment model framework is lacking for GB cod and Atlantic halibut, no historical estimates of biomass, fishing mortality rate, or recruitment can be calculated for these stocks. Status determination relative to reference points is not possible because reference points cannot be defined. Therefore, the biomass target of B_{MSY} , minimum biomass threshold, and maximum fishing mortality threshold for GB cod and halibut would not be defined by either Option 1/No Action or Option 2. Under Option 2, overfishing status is considered unknown for GB cod and halibut and the peer review concluded for both stocks that evidence suggests that these stocks should still be considered overfished.

Impacts on other species

Option 2 would not be expected to have direct impacts on non-groundfish species such as monkfish, dogfish, skates, and sea scallops. This measure is primarily administrative in that it establishes the criteria used to determine if overfishing is occurring or the stock is overfished.

Table 1- Comparison of stock status changes between the previous and current assessments.

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

7.1.1.2 Annual Catch Limits

7.1.1.2.1 Option 1: No Action

Impacts on regulated groundfish

Under Option 1/No Action, the ACLs specified for FY 2016 would be unchanged from those adopted through FW 53 (Table 6 in Draft Alternatives under Consideration, November 20, 2015). Default specifications, set at 35% of the FY2015 catch limits, would be put in place for all other stocks and expire on July 31st, 2016 or when replaced by new specifications (Table 5 and 6 in Draft Alternatives under Consideration, November 20, 2015). 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. If Option 1 is selected there would be no quotas specified for transboundary stocks (GB yellowtail flounder, cod, and haddock) including no scallop or small-mesh fisheries sub-ACL for GB yellowtail flounder. In addition, no scallop fishery sub-ACL for SNE/MA yellowtail flounder would be specified. The distribution of Annual Catch Limits (ACLs) to other fishery sub-components would be maintained.

Under Option 1/No Action, the directed groundfish fishery would be expected to operate in all broad stock areas through July. After July 31st, 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.

It is anticipated that Option 1/No Action would result in minimal changes in fishing effort during the first three months of the fishing year. After July 31st, Option 1 would be expected to reduce commercial groundfish fishing effort in the GOM, GB, and SNE/MA.

After July 31, an Overfishing Level (OFL), Acceptable Biological Catch (ABC) or ACLs would not be defined for certain stocks in the multispecies fishery. Without specification of an ACL, a catch would not be allocated to the groundfish fishery (sectors or common pool vessels) and targeted groundfish fishing activity would not occur for these stocks. Catches would not be eliminated because there would probably be incidental catches or bycatch from other fisheries. The lack of an OFL makes it difficult to determine whether overfishing is likely to occur, however, with limited fishing activity the probability of overfishing would be low. Accountability Measures (AMs) in the multispecies fishery would be maintained but are expected to have a low probability of being triggered without allocations.

In addition to the lack of targeted groundfish fishing activity on stocks without an ACL, certain provisions of the sector management system make it likely that fishing activity could be constrained even for stocks with an ACL. Current management measures require that a sector stop fishing in a stock area if it does not have ACE for a stock. Fishing can continue on stocks for which the sector continues to have ACE only if the sector can demonstrate it would not catch the ACE-limited stock. What these provisions mean is that in most cases there would be little opportunity for sector vessels to fish on stocks that have an ACL under no action, most groundfish fishing activity would not occur. As a result, in general Option 1 option would be expected to result in dramatically lower fishing mortality and dramatically lower impacts to regulated groundfish species as compared to the alternative specifications (Option 2). The default specifications would continue to allow fishing for the first three months of the fishing year, but after that effort and biological impacts on regulated groundfish species would decline. As a result, in general Option 1 would be expected to result in dramatically lower fishing mortality and more rapid stock rebuilding than would be the case for Option 2.

For stocks that have an age-based assessment, an age-based projection model was used to estimate the short-term impacts on stock size of setting the ABCs (stocks listed in Table 2). These models project the estimated median stock sizes expected to result by limiting catches to the ABC. Recent experience suggests that the projections tend to be biased high, predicting stocks sizes that are larger than realized and fishing mortality rates that are higher than expected (Groundfish Plan Development Team, pers. comm.).

There may be catches of these stocks by the groundfish fishery under default specifications through July 31, 2016 and by other fisheries throughout the year under No Action/Option. An estimate of these catches to approximate the catches that might occur was compared to ABCs under Option 2 (Table 2). Using this information, a qualitative comparison of impacts on SSB by stock under No Action/Option 1 and Option 2 is provided. Generally, lower fishing mortality under Option 1 /No Action leads to increases in SSB, relative to Option 2.

Table 2- Estimated catches that might occur in FY 2016 under Option 1/No Action. “No Action Assumed Catch” used to compare to 2016 ABC used in Option 2 stock projections.

Stock	2016			ABC
	Groundfish Assumed Catch	Non-Groundfish Assumed Catch	Total Assumed Catch	
GOM cod	328	39	367	500
GB haddock	7,616	23,473	31,089	77,898
GOM haddock	1,620	55	1,675	3,630
SNE/MA yellowtail flounder	195	72	267	267
CC/GOM yellowtail flounder	161	69	230	427
American plaice	492	52	544	1,297
Witch flounder	213	71	284	394
GB winter flounder	1,982	63	2,045	755
SNE/MA winter flounder	457	164	621	780
Redfish	3,862	310	4,172	10,338
White hake	4,280	139	4,419	3,816
Pollock	13,720	2,158	15,878	21,312

Notes:

Groundfish Assumed Catch:

- Stocks with specifications under the No Action/Option 1 for FY 2016 – GOM cod, GOM haddock, GB winter flounder, white hake, and pollock- groundfish assumed catch was the groundfish sub-ACL in Table 6 (Option 1 in Alternatives under Consideration, November 20, 2015).
- For stocks with default specifications for FY 2016 – GB haddock, SNE/MA yellowtail flounder, CC/GOM yellowtail flounder, American plaice, witch flounder, and redfish – groundfish assumed catch was the groundfish sub-ACL in Table 5 (Option 1 in Alternatives under Consideration, November 20, 2015)

Non-Groundfish Assumed Catch

- For FY 2016, "Non-Groundfish" includes the other sub-component, state waters sub-component, scallops, small-mesh sub-ACL, and mid-water trawl sub-ACL as in Table 10 (Option 2 in Alternatives under Consideration, November 20, 2015).
- However for stocks with specifications under the No Action/Option 1 for FY 2016, these values were used to approximate non-groundfish catches based on Table 6 (Option 1 in Alternatives under Consideration, November 20, 2015).
- Canadian quota for FY 2016 (21, 830) was added to GB haddock for Table 7 (Option 2 in Alternatives under Consideration, November 20, 2015).

Gulf of Maine Cod- Under Option 1/No Action the assumed catch in FY 2016 is 367 mt versus 500 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Georges Bank Haddock- Under Option 1/No Action the assumed catch in FY 2016 is 31,089 mt versus 77,898 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Gulf of Maine Haddock- Under Option 1/No Action the assumed catch in FY 2016 is 1,675 mt versus 3,630 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Southern New England/Mid-Atlantic Yellowtail Flounder- Under Option 1/No Action the assumed catch in FY 2016 is 267 mt and 267 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be similar under Option 1 and Option 2.

Cape Cod/Gulf of Maine Yellowtail Flounder- Under Option 1/No Action the assumed catch in FY 2016 is 230 mt versus 427 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

American Plaice- Under Option 1/No Action the assumed catch in FY 2016 is 544 mt versus 1,297 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Witch Flounder- Under Option 1/No Action the assumed catch in FY 2016 is 284 mt versus 394 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Georges Bank Winter Flounder- Under Option 1/No Action the assumed catch in FY 2016 is 2,045 mt versus 755 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 2 than Option 1.

Southern New England/Mid-Atlantic Winter Flounder- Under Option 1/No Action the assumed catch in FY 2016 is 621 mt versus 780 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Redfish - Under Option 1/No Action the assumed catch in FY 2016 is 4,172 mt versus 10,338 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

White Hake- Under Option 1/No Action the assumed catch in FY 2016 is 4,419 mt versus 3,816 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 2 than Option 1.

Pollock- Under Option 1/No Action the assumed catch in FY 2016 is 15,878 mt versus 21,312 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Is not possible to project stock sizes for the following stocks:

- GB Cod
- GB Yellowtail Flounder
- GOM Winter Flounder
- Northern Windowpane Flounder
- Southern Windowpane Flounder
- Ocean Pout
- Atlantic halibut
- Atlantic Wolffish

For index-assessed stocks an estimate of the probability of overfishing cannot be determined but the proposed ABC is based on an exploitation rate (i.e., GB yellowtail flounder) or the SSC's default control rule of 75% F_{MSY} (i.e., GOM winter flounder) or 75% of F_{MSY} (remaining stocks on the above list) applied to the most recent estimate of stock size. As a result, if stock size does not decline then the proposed ABC would not be expected to result in overfishing. This is an unrealistic assumption – stock size could increase or decrease but is unlikely to remain constant.

Impacts on other species

Option 1/No Action is not expected to have direct impacts on non-groundfish species such as monkfish, dogfish, skates, and Atlantic sea scallops. Indirect effects are generally likely to be beneficial given the expected reduced groundfish fishing activity. Catches of other species that occur on groundfish trips would decline as a result. There are only limited opportunities for groundfish vessels to target other stocks in other fisheries, so the shifting of effort into other fisheries is not likely to occur on a large scale. These other fisheries will also have ACLs and AMs so while such effort shifts may have economic effects the biological impacts should not be negative. Considering the differences between the ACLs of Option 1/No Action and Option 2, the fishing mortality on other stocks would probably be lower under Option 1/No Action.

7.1.1.2.2 Option 2: Revised Annual Catch Limit Specifications

Impacts on regulated groundfish

Option 2 would adopt new ABCs consistent with the best available science for all stocks. Generally, increases in SSB are lower under Option 2 than those under Option 1/No Action.

Because this option would adopt FY 2016 – FY 2018 ABCs for the stocks listed above, and all the stocks have recent assessment updates, short-term projections can be used to estimate the probability of overfishing and short-term changes in stock size (stocks listed in Table 2). These projections use catches equal to the ABCs that would be adopted if this option is selected. Since the management goal is to keep catches at or below ACLs, and ACLs are always less than the ABC, the projection results would be expected to slightly over-estimate the risk of overfishing and under-estimate future stock size. However, experience demonstrates that projections tend to be overly optimistic, and therefore, concerns about over-estimating the risk of overfishing and under-estimating future stock size are expected to be minimal.

Projected stock sizes are provided in Table 3 to Table 16 for these stocks and the probability of overfishing is listed in Table 17. This table compares projected future stock size to both 2017 and 2018. A comparison of probability of overfishing between the two options is difficult as Option 1/No Action has no OFLs defined for some stocks.

Relative to FY 2015, Option 2 would increase FY 2016 ACLs for GB and GOM haddock, GOM cod, GOM winter flounder, pollock, halibut, wolffish, and southern windowpane flounder. There would be several decreases in FY 2016 ACLs, specifically witch flounder, SNE/MA yellowtail flounder, GB winter flounder, and GB cod. Under Option 2, the declining ACLs for several stocks are likely to constrain the directed fishery, and may reduce fishing effort in all broad stock areas relative to fishing effort in FY 2015.

Gulf of Maine Cod- The recent assessment for GOM cod indicates that the stock is well below SSB_{MSY} (4%-6% of target SSB_{MSY} in 2014). Under Option 2, the projections indicate an increase in SSB after 2016. For Option 2, three scenarios were run dependent on the natural mortality assumption, base ($m=0.2$) and ramp ($m=0.2$ and $m=0.4$); each show an increase in SSB after 2016 but it remains well below SSB_{MSY} (Table 3, Table 4, and Table 5). Under Option 1/No Action the assumed catch in FY 2016 is 367 mt versus 500 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 3- Projection results from the M=0.2 model for Gulf of Maine cod, $SSB_{MSY} = 40,187$ mt.

year	OFL	ABC	F	SSB
2016	667	500	0.130	4,445
2017	667	500	0.092	6,153
2018	667	500	0.067	8,418

Table 4- Projection results from the M-ramp model, M=0.2 for Gulf of Maine cod, $SSB_{MSY} = 59,045$ mt.

year	OFL	ABC	F	SSB
2016	667	500	0.122	5,002
2017	667	500	0.080	7,413
2018	667	500	0.054	10,688

Table 5- Projection results from the M-ramp model, M=0.4 for Gulf of Maine cod, $SSB_{MSY} = 59,045$ mt.

year	OFL	ABC	F	SSB
2016	667	500	0.167	3,853
2017	667	500	0.137	4,615
2018	667	500	0.115	5,447

Georges Bank Haddock- The recent assessment for GB haddock indicates that the stock is well above SSB_{MSY} (139% of target SSB_{MSY} in 2014). The stock is expected to increase from 2016 to 2017 and then decrease from 2017 to 2018 under Option 2 (Table 6). Under Option 1/No Action the assumed catch in FY 2016 is 31,089 mt versus 77,898 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 6- Projection results from the Georges Bank haddock, $SSB_{MSY} = 108,300$ mt.

year	OFL	ABC	F	SSB
2016	160,385	77,898	0.181	1,190,563
2017	258,691	77,898	0.109	1,350,021
2018	358,077	77,898	0.075	1,253,343

Gulf of Maine Haddock- The recent assessment for GOM haddock indicates that the stock is well above SSB_{MSY} (223% of target SSB_{MSY} in 2014). The stock is expected to increase slightly from 2016 to 2017 and then decrease from 2017 to 2018 under Option 2. Under Option 1/No Action the assumed catch in FY 2016 is 1,675 mt versus 3,630 mt under Option 2 (Table 7). Therefore, SSB increases are expected to be greater under Option 1 than Option 2 (Table 2).

Table 7- Projection results for Gulf of Maine haddock, $SSB_{MSY} = 4,623$ mt.

year	OFL	ABC	F	SSB
2016	4,717	3,630	0.351	25,635
2017	5,873	4,534	0.351	25,915
2018	6,218	4,815	0.351	22,532

Southern New England/Mid-Atlantic Yellowtail Flounder- The recent assessment for SNE/MA yellowtail flounder indicates that the stock is below SSB_{MSY} (26% of target SSB_{MSY} in 2014). The stock is expected to increase during the projected years under Option 2 (Table 8). Under Option 1/No Action the assumed catch in FY 2016 is 267 mt and 267 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be similar under Option 1 and Option 2.

Table 8- Projection results for Southern New England/Mid-Atlantic yellowtail flounder, $SSB_{MSY} = 1,959$ mt.

year	OFL	ABC	F	SSB
2016	Unknown	267	0.747	460
2017	Unknown	267	0.750	531
2018	Unknown	267	0.750	888

Cape Cod/Gulf of Maine Yellowtail Flounder- The recent assessment for CC/GOM yellowtail flounder indicates that the stock is well below SSB_{MSY} (16% of target SSB_{MSY} in 2014). The stock is expected to increase during the projected years under Option 2 (Table 9). Under Option 1/No Action the assumed catch in FY 2016 is 230 mt versus 427 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 9- Projection results for Cape Cod/Gulf of Maine yellowtail flounder, $SSB_{MSY} = 5,259$ mt.

year	OFL	ABC	F	SSB
2016	555	427	0.210	2,485
2017	707	427	0.161	3,074
2018	900	427	0.125	4,053

American Plaice- The recent assessment for American plaice indicates that the stock is below but approaching SSB_{MSY} (84% of target SSB_{MSY} in 2014). The stock is expected to decrease slightly from 2016 to 2017 and then increase from 2017 to 2018 under Option 2 (Table 10). Under Option 1/No Action the assumed catch in FY 2016 is 544 mt versus 1,297 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 10- Projection results for American plaice, $SSB_{MSY} = 13,107$ mt.

year	OFL	ABC	F	SSB
2016	1,695	1,297	0.147	8,743
2017	1,748	1,336	0.147	8,740
2018	1,840	1,404	0.147	9,417

Witch Flounder- The recent assessment for witch flounder indicates that the stock is below SSB_{MSY} (22% of target SSB_{MSY} in 2014). The stock is expected to increase during the projected years under Option 2 (Table 11). Under Option 1/No Action the assumed catch in FY 2016 is 284 mt versus 394 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 11- Projection results for witch flounder, $SSB_{MSY} = 9,473$ mt.

year	OFL	ABC	F	SSB
2016	513	394	0.209	3,220
2017	925	394	0.142	4,310
2018	974	394	0.106	5,662

Georges Bank Winter Flounder- The recent assessment for GB winter flounder indicates that the stock is below SSB_{MSY} (43% of target SSB_{MSY} in 2014). The stock is expected to increase during the projected years under Option 2 (Table 12). Under Option 1/No Action the assumed catch in FY 2016 is 2,045 mt versus 755 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 2 than Option 1.

Table 12- Projection results for Georges Bank winter flounder, $SSB_{MSY} = 6,700$ mt.

year	OFL	ABC	F	SSB
2016	957	755	0.402	2,293
2017	1,056	755	0.36	2,617
2018	1,459	755	0.252	3,786

Southern New England/Mid-Atlantic Winter Flounder- The recent assessment for SNE/MA winter flounder indicates that the stock is below SSB_{MSY} (23% of target SSB_{MSY} in 2014). The stock is expected to decrease from 2016 to 2017 and then increase from 2017 to 2018 under Option 2 (Table 13). Under Option 1/No Action the assumed catch in FY 2016 is 62 mt versus 780 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 13- Projection results for Southern New England/Mid-Atlantic winter flounder, $SSB_{MSY} = 26,928$ mt.

year	OFL	ABC	F	SSB
2016	1,041	780	0.237	4,786
2017	1,021	780	0.243	4,041
2018	1,587	780	0.152	5,065

Acadian Redfish- The recent assessment for Acadian redfish indicates that the stock is well above SSB_{MSY} (117% of target SSB_{MSY} in 2014). The stock is expected to increase during the projected years under Option 2 (Table 14). Under Option 1/No Action the assumed catch in FY 2016 is 4,172 mt versus 10,338 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 14- Projection results for Acadian redfish, $SSB_{MSY} = 281,112$ mt.

year	OFL	ABC	F	SSB
2016	13,723	10,338	0.028	368,571
2017	14,665	11,050	0.028	387,014
2018	15,260	11,501	0.028	401,143

White Hake- The recent assessment for white hake indicates that the stock is below but approaching SSB_{MSY} (88% of target SSB_{MSY} in 2014). The stock is expected to decrease during the projected years under Option 2 (Table 15). Under Option 1/No Action the assumed catch in FY 2016 is 4,419 mt versus 3,816 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 15- Projection results for white hake, $SSB_{MSY} = 32,550$.

year	OFL	ABC	F	SSB
2016	4,985	3,816	0.141	29,619
2017	4,816	3,686	0.141	28,711
2018	4,733	3,622	0.141	28,355

Pollock- The recent assessment for pollock indicates that the stock is well above SSB_{MSY} (147% of target SSB_{MSY} in 2014). The stock is expected to increase during the projected years under Option 2 (Table 16). Under Option 1/No Action the assumed catch in FY 2016 is 15,878 mt versus 21,312 mt under Option 2 (Table 2). Therefore, SSB increases are expected to be greater under Option 1 than Option 2.

Table 16- Projection results for pollock, $SSB_{MSY} = 105, 226$ mt.

year	OFL	ABC	F	SSB
2016	27,668	21,312	0.307	178,534
2017	32,004	21,312	0.261	181,807
2018	34,745	21,312	0.238	184,116

Table 17- Estimated probability of overfishing if catch is equal to ABC (to be provided).

Species	Stock	Probability of Overfishing		
		2016	2017	2018
Cod	GB			
Cod (m=0.2 model)	GOM			
Cod (mramp m=0.2)	GOM			
Cod (mramp m=0.4)	GOM			
Haddock	GB			
Haddock	GOM			
Yellowtail Flounder	GB			
Yellowtail Flounder	SNE/MA			
Yellowtail Flounder	CC/GOM			
Plaice				
Witch Flounder				
Winter Flounder	GB			
Winter Flounder	GOM			
Winter Flounder	SNE/MA			
Redfish				
White Hake				
Pollock				
Windowpane Flounder	GOM/GB			
Windowpane Flounder	SNE/MA			
Ocean Pout				
Atlantic Halibut				
Atlantic Wolffish				

NE = Not Estimated

Impacts on other species

In general, the specification of groundfish ABCs and ACLs by this option would not be expected to have direct impacts on most other species. Other species are caught on groundfish fishing trips and the ABCs/ACLs could indirectly affect species if they result in changes in groundfish fishing activity. When compared to Option 1/No Action, this option would be expected to result in more groundfish fishing effort and as a result catches of other species would be expected to be higher. This would be expected to result in higher fishing mortality rates for those species when compared to the No Action alternative. Species such as monkfish, skates, and spiny dogfish are among those most likely to be affected. All of these species are subject to management controls, and it is not likely that fishing mortality will exceed targets. Indeed, when compared to recent years, the reduction in some groundfish ABCs/ACLs as proposed in this action would be expected to result in reduced catches of other species.

The ABCs and

ACLs under Option 2 include specification of sub-ACLs for other fisheries with catches of groundfish species including GB yellowtail flounder, SNE/MA yellowtail flounder, southern windowpane flounder, GOM haddock, and GB haddock.

A species that could be affected by this option would be Atlantic sea scallops. Sub-ACLs are designed to limit the incidental catch of yellowtail flounder and windowpane flounder by the scallop fishery, and exceeding the allocations results in triggering AMs in subsequent years. The sub-ACLs can affect fishing mortality and stock size of sea scallops through this mechanism.

In addition, sub-ACLs are designed to limit the incidental catch of GB yellowtail flounder by small-mesh fisheries, and exceeding the allocations results in triggering AMs in subsequent years. The sub-ACLs may affect fishing mortality and stock size of small-mesh species (e.g., whiting and squid) through this mechanism.

Lastly, sub-ACLs are designed to limit the incidental catch of GOM and GB haddock by mid-water trawl herring fisheries, and exceeding the allocations results in triggering AMs in-season. The sub-ACLs may affect fishing mortality and stock size of Atlantic herring (e.g., whiting and squid) through this mechanism.

7.1.2 Fishery Program Administration

7.1.2.1 Implementation of an Additional Sector

7.1.2.1.1 Option 1: No Action

Impacts on regulated groundfish

Under Option 1/No Action the existing list of 24 sectors would be maintained as-is. Maintaining the current fleet organization in terms of the number of authorized sectors is not expected to have direct impacts, positive or negative, on regulated groundfish species.

Impacts on other species

Option 1/No Action would maintain the current groundfish fleet organization in terms of the number of authorized sectors and would not be expected to have direct impacts, positive or negative, on non-groundfish species such as monkfish, dogfish, skates, and sea scallops.

7.1.2.1.2 Option 1: Implement a New Sector for FY 2016

Impacts on regulated groundfish

Under Option 2, the Sustainable Harvest Sector II would be allowed to operate beginning May 1, 2016. Changes to the fleet's organization in terms of the number of authorized sectors is not expected to have direct impacts, positive or negative, on regulated groundfish species.

Impacts on other species

Under Option 2, changes to the groundfish fishery organization in terms of the number of authorized sectors is not expected to have direct impacts, positive or negative, would not be expected to have direct impacts, positive or negative, on non-groundfish species such as monkfish, dogfish, skates, and sea scallops.

7.1.2.2 Sector Approval Process

7.1.2.2.1 Option 1: No Action

Impacts on regulated groundfish

Under Option 1/No Action the Amendment 16 procedures for approving a sector would be maintained. The sector approval process is administrative and is not related to the fishery's impact on regulated groundfish species, so there are no biological impacts positive or negative on regulated groundfish species associated with this alternative.

Impacts on other species

Under Option 1/No Action the Amendment 16 procedures for approving a sector would be maintained. The sector approval process is administrative and is not related to the fishery's impact on other species, so there are no biological impacts positive or negative on non-groundfish species such as monkfish, dogfish, skates, and sea scallops associated with this alternative.

7.1.2.2.2 Option 2: Revised Process for Approving New Northeast Groundfish Sectors

Impacts on regulated groundfish

Under Option 2, the process would be revised to still allow for Council input to the process, but sector approvals would no longer be considered as part of a Council management action. This change adds flexibility to the sector approval process. As above, there are no biological impacts, positive or negative, on regulated groundfish species associated with changes to the procedure for sector approvals.

Impacts on other species

Under Option 2, the process would be revised to still allow for Council input to the process, but sector approvals would no longer be considered as part of a Council management action. This change adds flexibility to the sector approval process. As above, there are no biological impacts positive or negative on non-groundfish species such as monkfish, dogfish, skates, and sea scallops associated with this alternative.

7.1.2.3 Modification to the Definition of the Haddock Separator Trawl

7.1.2.3.1 Option 1: No Action

Impacts on regulated groundfish

Under Option 1/No Action the current regulatory definition of this gear would be maintained (see 50 CFR 648.85(a)(3)(iii)(A)). Use of the gear as defined would continue to provide positive benefits for regulated groundfish species, specifically reducing catches of cod and flatfish species, such as windowpane flounder and GB yellowtail flounder.

Impacts on other species

Under Option 1/No Action, use of the gear as defined would continue to provide positive benefits for other species, if they are excluded by the gear during operation.

7.1.2.3.2 Option 2: Revised Definition of the Haddock Separator Trawl

Impacts on regulated groundfish

Under Option 2, the middle, separator panel would be required to be woven of a contrasting color material, so that it can be more readily identified by enforcement officers. This alternative has neutral biological impacts on regulated groundfish relative to Option 1/No Action, because the change does not have any effect on the way the gear fishes that would influence the degree of bottom contact, swept area, or efficiency.

Impacts on other species

Option 2 has neutral biological impacts on other species relative to Option 1/No Action, because the change does not have any effect on the way the gear fishes that would influence the degree of bottom contact, swept area, or efficiency.

7.1.3 Commercial and Recreational Fishery Measures

7.1.3.1 Groundfish Sector Monitoring Program

To be provided.

7.1.3.2 Management Measures for U.S./Canada TACs

7.1.3.2.1 Option 1: No Action

Impacts on regulated groundfish

Option 1/No Action maintains current separations between eastern and western Georges Bank cod allocations. Option 1/No Action option is not expected to impact regulated groundfish species, since the distribution of U.S. TACs for Eastern/Western Georges Bank cod would remain unchanged.

Impacts on other species

This option would not be expected to have any direct impacts on other species. This option would not be expected to lead to any changes in catches of other species, since the distribution of U.S. TACs for Eastern/Western Georges Bank cod would remain unchanged.

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

Impacts on regulated groundfish

Option 2 would allow some eastern GB allocations to be converted irreversibly to western GB allocation and harvested within the western GB area within a fishing year. Western GB cod could not be converted to eastern GB cod. The purpose is to create flexibility while preventing overharvest of eastern GB cod which is a transboundary resource. An identical provision is currently in place for GB haddock. This

measure could allow more of the GB cod stock to be harvested by creating opportunities for vessels that do not typically fish on eastern GB to convert their allocations of eastern GB cod to western GB cod, and then harvest it in the western GB stock area. This could increase fishing effort on Georges Bank slightly. If there is a shift in the fishery to the western GB area, then fishery size selectivity of GB cod may change. However, given that the ACL for GB cod is fairly small compared to recent years, large increases in effort and major changes in fishery size selectivity are not expected under this alternative. Other groundfish species, caught on the same trips (e.g., Georges Bank haddock) could have increased fishing effort. Thus, biological impacts on regulated groundfish species are expected to be neutral to slightly negative relative to Option 1.

Impacts on other species

This option would not be expected to have any direct impacts on other species. This option would not be expected to lead to any changes in catches of other species, and would not affect the management of those species.

7.1.3.3 Modification to the Gulf of Maine Cod Protection Measures

7.1.3.3.1 Option 1: No Action

Impacts on regulated groundfish

Option 1/No Action would continue the zero possession limit for this stock, which was implemented via Framework 53 as a Gulf of Maine Cod Protection Measure. Option 1/No Action would continue to provide positive impacts for GOM cod. Results from the bioeconomic model for GOM recreational fisheries indicate that recreational mortality for GOM cod is predicted to be less than the recreational sub-ACL for FY 2016 under no possession of GOM cod (see Table 5, pp. 16 in Draft Economic Impacts Analysis, Version 1, November 25, 2015). The mortality of GOM cod depends on NMFS adjustments to the GOM haddock measures (bag limit, size limit, and season) in FY 2016, with increasing access to GOM haddock (405 mt – 715 mt) and predicted increase in effort aligned with increasing mortality on GOM cod (66 mt to 97 mt). The GOM cod sub-ACL is 157 mt and GOM haddock sub-ACL is 928 mt and under Option 1/No Action, the recreational fishery is not predicted to exceed either of the sub-ACLs.

Impacts on other species

Option 1/No Action would not be expected to have any direct impacts on other species. This option would not be expected to lead to any changes in catches of other species co-caught with groundfish species, and would not affect the management of those species. In general, this option would not be expected to have direct impacts on other species caught on recreational fishing such as monkfish, skates, and spiny dogfish are not likely to be affected.

7.1.3.3.2 Option 2: Modify GOM Cod Recreational Possession Limits

Option 2 would return to prior policy which allowed the Regional Administrator to modify the possession limit for GOM cod. This change is considered to be largely administrative, as the provisions of the GOM cod protection measures would still be considered when the Regional Administrator sets the bag limit, size limit, and seasons for GOM cod, which may include keeping the GOM cod possession limit at zero. Therefore, Option 2 would provide neutral to low negative impacts on GOM cod, when compared to Option 1/No Action.

Results from the bioeconomic model indicate that for all options, GOM haddock mortality is predicted to remain under the recreational sub-ACL 100% of the time (see Table 5, pp. 16 in Draft Economic Impacts Analysis, Version 1, November 25, 2015). The likelihood of GOM cod mortality remaining below the recreational sub-ACL decreases with bag limit increases when the open season occurs during Wave 3 (March-April) compared to Wave 4 (July and August) or Wave 5 (September-October), all else held equal. Wave 5 open is predicted to have lower GOM cod mortality than Wave 4 open. 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. For viable options, GOM cod mortality ranges from 66 mt to 134 mt.

Closures for the commercial fishery under the GOM cod protection measures for sectors occurs in specific 30-minute blocks in May, June, and November – January and for the common pool additional closures in March and October. The commercial closures were designed to protect spawning cod and reduce mortality on cod in certain times and areas. GOM cod protection measures – as time-area closures – are not in place in February, April, July, August, and September. These months correspond to the second half of wave 2 (February), the second half of wave 3 (April), wave 4 (July and August) and first part of wave 5 (September).

Impacts on other species

Option 1/No Action would not be expected to have any direct impacts on other species. This option would not be expected to lead to any changes in catches of other species co-caught with groundfish species, and would not affect the management of those species. In general, this option would not be expected to have direct impacts on other species caught on recreational fishing such as monkfish, skates, and spiny dogfish are not likely to be affected.

7.2 Essential Fish Habitat Impacts

The Essential Fish Habitat (EFH) impacts discussions below focus on changes in the amount or location of fishing that might occur as a result of the implementation of the various alternatives. This approach to evaluating adverse effects to EFH is based on two principles: (1) seabed habitat vulnerability to fishing effects varies spatially, due to variations in seabed substrates, energy regimes, living and non-living seabed structural features, etc., between areas and (2) the magnitude of habitat impacts is based on the amount of time that fishing gear spends in contact with the seabed. This seabed area swept (seabed contact time) is grossly related to the amount of time spent fishing, although it will of course vary depending on catch efficiency, gear type used, and other factors.

The area that is potentially affected by the proposed alternatives includes EFH for species managed under the following Fishery Management Plans: NE Multispecies; Atlantic Sea Scallop; Monkfish; Atlantic Herring; Summer Flounder, Scup and Black Sea Bass; Atlantic Mackerel, Squid, and Butterfish; Spiny Dogfish; Tilefish; Deep-Sea Red Crab; Atlantic Surfclam and Ocean Quahog; Atlantic Bluefish; Northeast Skates; and Atlantic Highly Migratory Species.

7.2.1 Updates to Status Determination Criteria and Annual Catch Limits

7.2.1.1 Revised Status Determination Criteria

7.2.1.1.1 Option 1: No Action

Under Option 1/No Action there would be no changes to status determination criteria for groundfish stocks, or the resulting numerical estimates derived from these criteria. From a habitat perspective, the SDC themselves are less important than the catch limits that result from implementing those criteria to generate annual catch limits (ACL). Qualitatively, it is assumed that criteria that are not based on the most recent scientific advice may not result in increases in stock size over the long term. This could lead to reduced CPUE and a resulting increase in seabed area swept, particularly when compared to Option 2. However, many factors interact to produce the amount and location of seabed area swept in a particular fishery, such that the effect of SDC on the amount of habitat impacts is uncertain at best.

7.2.1.1.2 Option 2: Revised Status Determination Criteria

Under Option 2, status determination criteria (SDC) for most stocks would remain unchanged, and the numerical estimates would be updated for informational purposes to reflect assessment updates completed during 2015. For Georges Bank cod and halibut, the SDC would be changed to unknown. From a habitat perspective, the SDC themselves are less important than the catch limits that result from implementing those criteria to generate annual catch limits (ACL). Qualitatively, it is assumed that revised criteria based on the most recent scientific advice will result in increases in stock size over the long term, which hopefully should lead to increased catch per unit effort (CPUE), and therefore reduce seabed area swept. However, many factors interact to produce the amount and location of seabed area swept in a particular fishery, such that the effect of changing SDC on the amount of habitat impacts is uncertain at best. In this specific case, the unknown overfishing status of GB cod and halibut may or may not lead to increased precaution in setting catch limits for these stocks, so long-term conservation benefits are difficult to determine.

7.2.1.2 Annual Catch Limits

7.2.1.2.1 Option 1: No Action

Under Option 1/No Action, the ACLs specified for FY 2016 would be unchanged from those adopted through FW 53 (Table 6 in Draft Alternatives under Consideration, November 20, 2015). Default specifications, set at 35% of the FY2015 catch limits, would be put in place for all other stocks and expire on July 31st, 2016 or when replaced by new specifications (Table 5 and 6 in Draft Alternatives under Consideration, November 20, 2015). 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. If Option 1 is selected there would be no quotas specified for transboundary stocks (GB YTF, cod, and haddock) including no scallop or small-mesh fishery sub-ACLs for GB YTF. In addition, no scallop fishery sub-ACL for SNE/MA yellowtail flounder would be specified.

After July 31st, 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.

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 31st, Option 1 would be expected to reduce commercial groundfish fishing effort in the GOM, GB, and SNE/MA. In addition, certain provisions of the sector management system make it likely that fishing activity could be constrained even for stocks with an ACL. Current management measures require that a sector stop fishing in a stock area if it does not have ACE for a stock. Fishing can continue on stocks for which the sector continues to have ACE only if the sector can demonstrate it would not catch the ACE-limited stock. What these provisions mean is that in most cases there would be little opportunity for sector vessels to fish on stocks that have an ACL under no action, most groundfish fishing activity would not occur. As a result, in general this option would be expected to result in dramatically lower fishing mortality and dramatically lower impacts to EFH and benthic habitats as compared to the alternative specifications (Option 2). The default specifications would continue to allow fishing for the first three months of the fishing year, but after that effort and habitat impacts would decline.

7.2.1.2.2 Option 2: Revised Annual Catch Limit Specifications

Under Option 2, updated specifications for all stocks would be adopted for fishing years 2016, 2017, and 2018. Values for transboundary stocks would be subject to adjustment in 2017 and 2018 (as written, Table 10 shows the total ABC and ACL values for these years, without a deduction for the Canadian fishery). A scallop fishery sub-ACL for SNE/MA yellowtail flounder would be specified. Most stocks show an increase in their ACLs under Option 2 when compared to No Action. In particular, the GB haddock ACL is substantially higher under this option (new ACL, 53,309 mt is over six times higher than the default ACL, 8,121 mt), and the GOM haddock ACL is approximately double under Option 2 (3,430 mt vs. 1,675 mt). The Option 2 redfish and pollock specifications are also much larger; 9,837 mt vs. 3,988 mt for redfish and 20,374 mt vs. 15,878 mt for pollock. However, the GB winter flounder specification is lower under Option 2 compared to No Action (new ACL, 650 mt is 32% of current ACL, 2,046 mt). Thus, relative to No Action/Option 1 specifications, fishing effort and therefore associated fishery impact to EFH may increase slightly due to the higher ACLs. Net habitat impacts are difficult to estimate, but may be slightly negative relative to No Action.

Relative to FY 2015 specifications (which are not shown in the tables, and are different from Option 1/No Action), Option 2 would increase FY 2016 ACLs for GB and GOM haddock, GOM cod, GOM winter

flounder, pollock, halibut, wolffish, and southern windowpane flounder. There would be several important decreases in 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 relative to fishing effort in FY 2015. Thus, Option 2 is likely to have positive impacts to EFH relative to the status quo.

7.2.2 Fishery Program Administration

7.2.2.1 Implementation of an Additional Sector

7.2.2.1.1 Option 1: No Action

Under Option 1/No Action the existing list of 24 sectors would be maintained as-is. Maintaining the current fleet organization in terms of the number of authorized sectors is not expected to have direct impacts, positive or negative, on EFH.

7.2.2.1.2 Option 1: Implement a New Sector for FY 2016

Under Option 2, the Sustainable Harvest Sector II would be allowed to operate beginning May 1, 2016. Changes to the fleet's organization in terms of the number of authorized sectors is not expected to have direct impacts, positive or negative, on EFH.

7.2.2.2 Sector Approval Process

7.2.2.2.1 Option 1: No Action

Under Option 1/No Action the Amendment 16 procedures for approving a sector would be maintained. The sector approval process is administrative and is not related to the fishery's impact on EFH, so there are no habitat impacts positive or negative associated with this alternative.

7.2.2.2.2 Option 2: Revised Process for Approving New Northeast Groundfish Sectors

Under Option 2, the process would be revised to still allow for Council input to the process, but sector approvals would no longer be considered as part of a Council management action. This change adds flexibility to the sector approval process. As above, there are no habitat impacts, positive or negative, associated with changes to the procedure for sector approvals.

7.2.2.3 Modification to the Definition of the Haddock Separator Trawl

7.2.2.3.1 Option 1: No Action

Under Option 1/No Action the current regulatory definition of this gear would be maintained (see 50 CFR 648.85(a)(3)(iii)(A)). Because there are no particular habitat conservation implications associated with the haddock separator trawl, there are no habitat impacts, positive or negative, associated with the gear definition.

7.2.2.3.2 Option 2: Revised Definition of the Haddock Separator Trawl

Under Option 2, the middle, separator panel would be required to be woven of a contrasting color material, so that it can be more readily identified by enforcement officers. This alternative has neutral impacts on EFH relative to No Action, because the change does not have any effect on the way the gear fishes that would influence the degree of bottom contact, swept area, or efficiency.

7.2.3 Commercial and Recreational Fishery Measures

7.2.3.1 Groundfish Sector Monitoring Program

In this section, the Council may combine the various action alternatives (Options 2, 3A/B, 4A/B, and 5). The action alternatives in general are intended to maintain monitoring coverage levels needed to estimate catches of groundfish stocks, and reduce or eliminate monitoring in areas where it is not needed to manage costs. Thus, the action alternatives in combination may lead to increases in fishing effort where it otherwise would have been constrained due to costs associated with ASM. Increased ASM cost sharing is forthcoming under any of these alternatives, which could lead to reduced fishing effort. However, it is difficult to predict how the industry will operate under Option 1, in terms of whether it will constrain effort, let alone under the other options in this section.

7.2.3.1.1 Option 1: No Action

Option 1/No Action would maintain the existing monitoring program as defined in Amendment 16 and Framework 48. The cost sharing envisioned under Amendment 16, which is just now being implemented, combined with no other changes to the goals or requirements of the program, could lead to reduced fishing effort under No Action as compared to current conditions, and therefore to reductions in gear impacts on EFH. It is difficult to predict the magnitude of these changes, and the gear types and locations that would see more or less fishing activity during the coming fishing years.

7.2.3.1.2 Option 2: Clarify Groundfish Monitoring Goals and Objectives

Option 2 would clarify that the primary goal of ASM is to verify area fished, catch, and discards by species and gear type, and that this goal should be met via the most cost effective means practicable. This clarification may help to limit ASM coverage to instances where it is necessary to achieve these objectives, therefore reducing cost burdens associated with ASM. As this option represents a change to the goals of the program only, it will have an indirect impact on coverage levels and distribution of covered trips. While adherence to this goal may mitigate any negative impacts of ASM requirements on the amount of trips a vessel takes and therefore increase fishing effort somewhat relative to maintaining the ASM program as-is via the No Action alternative, no direct impacts to EFH are expected.

7.2.3.1.3 Option 3: Clarify methods used to set sector ASM coverage rates

- *Sub-Option 3A: Monitoring 80% of discarded pounds at CV30*
- *Sub-Option 3B: Multi-year approach to setting sector ASM coverage*

These sub-options would refine the approaches used to set ASM coverage rates and should help to make these rates more stable over time and across sectors. Again, while either or both of these options may mitigate some of the negative impacts of ASM requirements on the amount of trips a vessel takes and therefore increase fishing effort somewhat relative to maintaining the ASM program as-is via the No Action alternative, no direct impacts to EFH are expected.

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

- *Sub-Option 4A: Eliminate ASM Coverage Requirements for Sector Trips Fishing Extra-Large Mesh (ELM) Gillnet Gear*
- *Sub-Option 4B: Remove ASM coverage requirements for sector gillnet trips fishing exclusively within the footprint of existing dogfish exempted fisheries*

Under Sub-Option 4A, ASM coverage would not be required for sector vessels that declare an ELM gillnet trips in specific BSAs. Sub-Option 4B is similar, except that it applies to sector vessels fishing with gillnets in the Cape Cod Spiny Dogfish Exemption Area and SNE Dogfish Gillnet Fishery Exemption Area. On both types of trips, groundfish catches are low. These options, singly or in combination, could help to maintain the amount of fishing on these types of trips at status quo levels, limiting any dampening effect ASM requirements have on these fisheries. However, gillnet gear generally has minimal and temporary impacts on EFH, such that implementing either or both of these options is expected to have neutral impacts on habitat relative to No Action.

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

Option 5 would set specific criteria under which the CV standard would not need to be met. The criteria are related to stock condition (exceeding reference points), low discards (5-10% of catch), and moderate percentage of the ACL harvested (50-75%). In practice, other stocks not meeting these criteria might be the primary determinants of ASM coverage levels. Option 5 may mitigate some of the negative impacts of ASM requirements on the amount of trips a vessel takes and therefore increase fishing effort somewhat relative to maintaining the ASM program as-is via the No Action alternative, no direct impacts to EFH are expected.

7.2.3.2 Management Measures for U.S./Canada TACs

7.2.3.2.1 Option 1: No Action

Option 1/No Action maintains current separations between eastern and western Georges Bank cod allocations. Under this option neutral impacts to EFH area expected as current spatial patterns of groundfishing would be generally maintained.

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

Option 2 would allow some eastern GB allocations to be converted irreversibly to western GB allocation and harvested within the western GB area. Both the conversion and the harvest would need to occur within a single fishing year. Western GB cod could not be converted to eastern GB cod. The purpose is to create flexibility while preventing overharvest of eastern GB cod which is a transboundary resource. An identical provision is currently in place for GB haddock. This measure could allow more of the GB cod stock to be harvested by creating opportunities for vessels that do not typically fish on eastern GB to convert their allocations of eastern GB cod to western GB cod, and then harvest it in the western GB stock area. This could increase fishing effort on Georges Bank slightly. However, given that the ACL for GB cod is fairly small, large increases in effort are not expected under this alternative. Thus, habitat impacts are expected to be neutral to slightly negative relative to Option 1.

7.2.3.3 Modification to the Gulf of Maine Cod Protection Measures

7.2.3.3.1 Option 1: No Action

Option 1/No Action would continue the zero possession limit for this stock, which was implemented via Framework 53 as a Cod Protection Measure. As recreational hook and line gears do not have adverse impacts on fish habitat, maintaining the current zero possession limits for the recreational fishery has no effect positive or negative on habitat impacts in the groundfish fishery.

7.2.3.3.2 Option 2: Change in Authority to Modify GOM Cod Recreational Possession Limits

Option 2 would return to prior policy which allowed the Regional Administrator to modify the possession limit for GOM cod. Impacts are the same as for Option 1, as recreational hook and line gears do not have adverse impacts on fish habitat and changing the possession limits for the recreational fishery has no effect positive or negative on habitat impacts in the groundfish fishery.

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7.4 Economic Impacts

7.4.3 Commercial and Recreational Fishery Measures

7.4.3.1 Groundfish Sector Monitoring Program

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

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

Dogfish Exemption Area Trips

The number of sector trips to the three dogfish exemptions specified in Alternative 4.3.1.4.2 is given in Table 1. While only gillnet trips to these exemption area would not be required to adhere to ASM coverage requirements, trawl gear is allowed in the Nantucket Shoals Dogfish Exemption Area and longline and handgear is allowed in the Cape Cod Spiny Dogfish Exemption Area. Table 1 includes all gear types, and so the number of sector trips that would have been impacted under Sub-Option 4B during FYs 2012-2015 should be considered an overestimate.

Table 2, which sums up sector trips across the three exemption areas, therefore would also be an overestimate of the number of sector trips that would have been impacted under Sub-Option 4B. Nevertheless, the 469 average ASM trips to these exemption areas per fishing year are used as a proxy for FY 2016 effort. Based on the average trip length for gillnet vessels during FY 2014 (0.8 days), the number of seadays from these 469 trips is estimated to be 375 in FY 2016. The monitoring cost of each observed seaday is \$710, meaning Sub-Option 4B would result in cost savings of \$266,250 (710×375) compared to Option 1 for the portion of the groundfish fleet fishing with ELM gillnets in the dogfish exemption areas during FY 2016. Again, this figure is likely an overestimate. If observer coverage were to get shifted onto other components of the groundfish fleet, then Sub-Option 4B would result in no overall cost savings to sectors.

Direct comparison to other options to be completed prior to submission.

Table 1- Total trips and sector trips to the three dogfish exemption areas specified in Alternative 4.3.1.4.2, fishing years 2012-2015

Nantucket Shoals Dogfish Exemption Area				
EXEMPTION	FISHING_YEAR	TRIPS	SECTOR_TRIPS	
Nantucket Shoals	2015	1110	1063	
Nantucket Shoals	2014	1069	1034	
Nantucket Shoals	2013	965	919	
Nantucket Shoals	2012	1231	1215	

Cape Cod Spiny Dogfish Exemption Eastern Area				
EXEMPTION	FISHING_YEAR	TRIPS	SECTOR_TRIPS	
Cape Cod Eastern Area	2015	1023	647	
Cape Cod Eastern Area	2014	1598	573	
Cape Cod Eastern Area	2013	1239	517	
Cape Cod Eastern Area	2012	1846	1227	

SNE Dogfish Gillnet Exempted Fishery				
EXEMPTION	FISHING_YEAR	TRIPS	SECTOR_TRIP	
SNE Gillnet	2015	790	265	
SNE Gillnet	2014	1766	418	
SNE Gillnet	2013	1550	262	
SNE Gillnet	2012	1987	381	

Table 2- Total sector trips to the three dogfish exemption areas specified in Alternative 4.3.1.4.2, fishing years 2012-2015

Fishing Year	Sector Trips	Number of ASM Trips, assuming 22% coverage
2015	1,975	435
2014	2,025	446
2013	1,698	374
2012	2,823	621
Avg. 2012-2015	2,130	469