New England Fishery Management Council
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**MEMORANDUM**

**DATE:** June 6, 2016

**TO:** Groundfish Committee

**FROM:** Groundfish Plan Development Team

**CC:** Herring Committee, Herring Plan Development Team

**SUBJECT:** **Modifications to the sub-ACL and AM for Georges Bank haddock in the Atlantic herring fishery**

The Groundfish Plan Development Team (PDT) met on May 26, 2016, via webinar to discuss modifications to the sub-annual catch limits (sub-ACLs) and the existing accountability measure (AM) for Georges Bank (GB) haddock in the Atlantic herring fishery. The Groundfish PDT focused its discussion on modification of the sub-ACL and to a lesser extent modifications to the AM. *Version 1 of this memo summarizes background information. The PDT plans to update this memo in time for the June Groundfish Committee meeting in version 2 of this memo.*

## A. Background

### 1. Status of Georges Bank haddock

**Population Status**. The GB haddock stock is a transboundary stock co-managed by the U.S. and Canada. The stock is not overfished and overfishing is not occurring (NEFSC 2015). The fishing mortality rate for this stock has been low in recent years. There has been a steady increase in spawning stock biomass (SSB) from ~15,000 mt in the early 1990s, to about 182,000 mt in 2007 to 163,000 mt in 2013. Two exceptionally large year classes (2003 and 2010) contributed to this growth.

Retrospective adjustments were made to the model results from the 2015 operational assessment, due to a major retrospective pattern in SSB and fishing mortality (F). The retrospective adjustment changed the 2014 SSB from 225,080 to 150,053 and the 2014 $F_{Full}$ from 0.159 to 0.241. SSB in 2014 was estimated to be 150,053 (mt) which is 139% of the biomass target ($SSB_{MSY}$ proxy = 108,300). The 2014 fully selected fishing mortality was estimated to be 0.241 which is 62% of the overfishing threshold proxy ($F_{MSY}$ proxy = 0.39).

In the past, extremely large year classes were considered anomalies (e.g., 1963 and 2003). However, since 2003, two additional extremely large (2010 and 2013) and one very large (2012) year classes occurred. Uncertainty remains as to the size of the 2013 year class, which could be even stronger than the 2003 and 2010 year classes. The current model estimate for the 2013 year class is 3.4 billion fish. Experience suggests that estimates of year class strength are usually

revised downward with additional years of information. For example, the 2003 year class is now estimated to be only 28% of its initial model estimate, while the 2010 year class is now estimated to be 63% of its initial estimate. Given that only 5 years of data are available to estimate the 2010 year class, it is possible that there may be further revisions to the magnitude of this year class estimate with more years of data (NEFSC 2015).

**Spawning**. Haddock are highly fecund broadcast spawners, spawning over various substrates including rocks, gravel, smooth sand, and mud. On Georges Bank, spawning occurs from January to June, usually peaking from February to early-April. This is the principal haddock spawning area in the Northeast U.S. Shelf Ecosystem, concentrating on the northeast peak of Georges Bank. In the Gulf of Maine, spawning occurs from early February to May, usually peaking in February to April.

Figure 1 to Figure 3 are from the Habitat Omnibus Amendment 2, section 4.4.2 of volume 1 of the FEIS (affected environment). Figure 1 maps the spring distribution of large spawner hotspots for haddock in the Georges Bank/Southern New England region identified from examining multiple surveys (i.e., 2002-2012 NEFSC, MADMF, ME-NH, and IBS trawl surveys). The majority of Georges Bank haddock large (> 50 cm) spawner hotspots are identified on Eastern Georges Bank with some additional hotspots on the western portion of the bank within Closed Area I and its vicinity. Figure 2 plots the distribution of haddock by small (35-50 cm) and large (> 50 cm) mature fish size classes during spring and summer surveys of Georges Bank during 2002-2011. Large Georges Bank haddock are predominately on Eastern Georges Bank, the western portion of the bank within Closed Area I, and to a lesser extent the northern and southern flanks of Georges Bank. Small Georges Bank haddock exhibit the greatest concentrations on Eastern Georges Bank. Figure 3 maps the distribution of haddock by maturity stage during 2002-2011 surveys. The majority of Georges Bank haddock in spawning condition (i.e., ripe, eyed, running ripe, and spent) during the spring surveys are located on Eastern Georges Bank and to a lesser extent on the western portion of the bank in Closed Area I.

**Figure 1- Seasonal distribution of large spawner hotspots for haddock in the Georges Bank/Southern New England region identified from 2002-2012 NEFSC, MADMF, ME-NH, and IBS trawl surveys.**

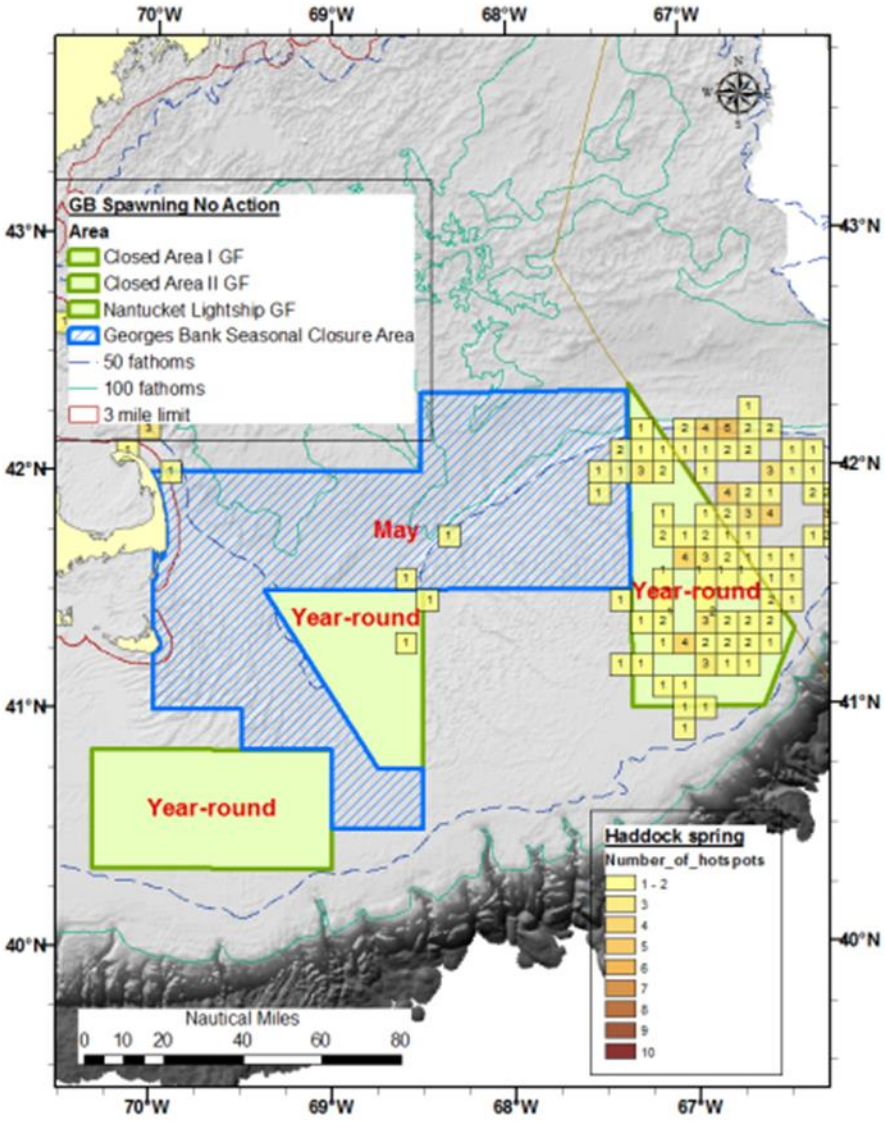


**Figure 2- Distribution of haddock by small and large mature fish size classes during spring and summer surveys of Georges Bank during 2002-2011.**

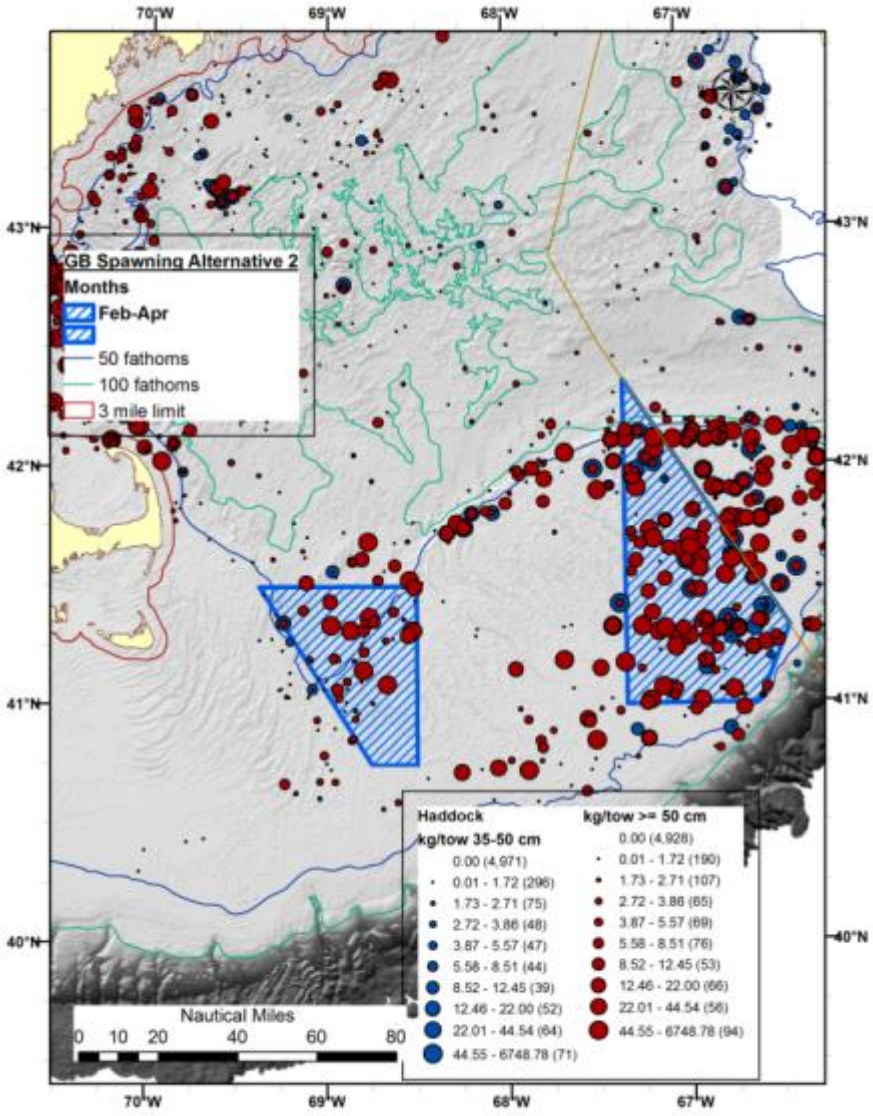
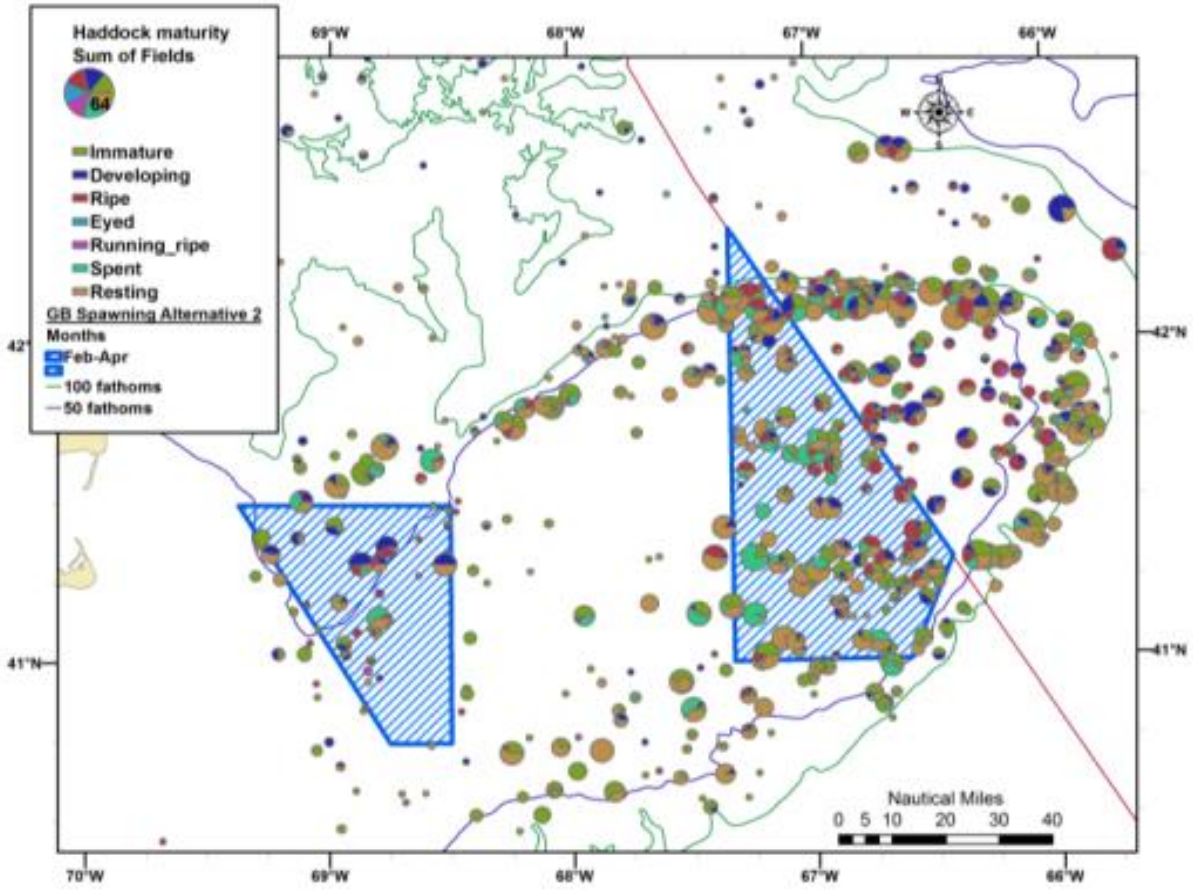


**Figure 3- Distribution of haddock by maturity stage during 2002-2011 spring surveys.**




## 2. Recent catch information

Haddock comprises the largest component of groundfish bycatch by midwater trawl vessels, and the catch of haddock by these vessels is managed by the Council through a catch cap (implemented under Framework 46 to the Multispecies FMP). Vessels issued a Category A/B Atlantic herring permit and on a declared herring trip, regardless of gear or area fished, and or a vessel issued a Category C permit and/or an Category D permit (open access) that fishes with midwater trawl gear in Areas 1A, 1B, and 3 are prohibited from discarding haddock at-sea (those haddock brought on the deck or pumped into the hold). These vessels are limited to possessing/landing up to 100 lb. of other NE multispecies (e.g., cod, pollock). Atlantic herring processors and dealers are required to separate out, and retain such haddock for at least 12 hours for inspection by authorized NMFS officers. However, haddock or other NE multispecies separated from the herring catch may not be sold, purchased, received, traded, bartered, or transferred, or attempted to be sold, purchased, received, traded, bartered, or transferred for, or intended for, human consumption.

Table 1 summarizes Georges Bank haddock catch by the herring midwater trawl fleet from groundfish fishing years 2010-2014. Starting in 2011, data used to estimate/monitor the cap included observer data, vessel trip reports (VTR), and dealer reports. During the 2012 groundfish

fishing year, the haddock catch cap was fully utilized in the GB area. The 2013 Georges Bank haddock cap was slightly exceeded. As a result, the 2014 catch cap was adjusted downward from 179 mt to 162 mt to account for the overage. There remains very little catch of Gulf of Maine haddock by midwater trawl vessels in the Atlantic herring fishery.

For the purpose of comparison, Table 2 summarizes recent catches of Georges Bank haddock by the US commercial groundfish fishery.

**Table 1- Summary of recent catches (mt) of Georges Bank haddock by the midwater trawl Atlantic herring fishery, groundfish FY 2010- FY 2016. Sources: Groundfish FY2010 – FY2014 final year-end catch reports, FY2015 preliminary in-season report, and FY 2016 preliminary in-season report, GARFO, and CV and observer coverages rates for FY 2011- FY 2015 from GARFO personal communication May 23, 2016.**

| | *Midwater Trawl- Georges Bank Haddock* | | | | | | |
|---|---|---|---|---|---|---|---|
| **Groundfish FY** | **Sub-ACL** | **Landings** | **Discards** | **Catch** | **Percentage of sub-ACL** | **CV on Catch** | **Observer Coverage % Trips** |
| 2010 | 84 | 69.2 | 0 | 69.2 | 82.3% | | |
| 2011 | 318 | 101.8 | 0 | 101.8 | 32.0% | 17.6% | 41.7% |
| 2012 | 286 | 271.9 | 16.7 | 288.6 | 100.9% | 12.3% | 62.9% |
| 2013 | 273 | 272.7 | 17.2 | 290 | 106.2% | 21.3% | 35.6% |
| 2014 | 162 | 113.5 | 0 | 113.5 | 70.1% | 20.5% | 27.2% |
| 2015 | 227 | | | 235.54 | 103.76% | 61.4% | 4.9% |
| 2016 | 521 | | | 12.08 | 2.3% | | |

*2016 - FW 55 value does not include deduction for FY 2015 overage; catch from 5/1/16-5/15/16*

**Table 2- Summary of recent catches (mt) of Georges Bank haddock by the US commercial groundfish fishery, groundfish FY 2010- FY 2016. Sources: Groundfish FY2010 – FY2014 final year-end catch reports, FY2015 preliminary in-season report, and FY 2016 preliminary in-season report.**

| | ***Commercial Fishery- Georges Bank Haddock*** | | | | |
|---|---|---|---|---|---|
| **Groundfish FY** | **Sub-ACL** | **Landings** | **Discards** | **Catch** | **Percentage of sub-ACL** |
| 2010 | 40,440 | 8,299.2 | 41 | 8,340.2 | 20.6% |
| 2011 | 30,580 | 3,758.5 | 82 | 3,840.5 | 12.6% |
| 2012 | 27,438 | 926.8 | 270.7 | 1,197.6 | 4.4% |
| 2013 | 26,196 | 2,696.4 | 281.1 | 2,977.5 | 11.4% |
| 2014 | 17,171 | 4,975.3 | 473.7 | 5,449.1 | 31.7% |
| 2015 | 21,759 | 4,240.0 | 861.3 | 5,101.2 | 23.4% |
| 2016 | 51,667 | 398.4 | 73.5 | 471.9 | 0.9% |

## 3. Specifications

FW 55 established specifications for FY 2016 to FY 2018 for all groundfish stocks. FY 2017 and FY 2018 specifications could be modified in future actions based on TACs in Eastern Georges Bank (i.e., haddock, cod, and yellowtail flounder). In addition, FY 2019 default specifications were published by NMFS in the FW 55 final rule (note the final rule incorrectly reports the FY 2019 default specifications for GB haddock, Table 3 below displays the correction.) Table 3 summarizes specifications for GB haddock for FY 2016 –FY 2018 and partial FY 2019 (default specifications span May 1- July 31).

**Table 3 - Summary of FY 2016 – FY 2018 specifications and FY 2019 default specifications for GB haddock. Source: FW 55.**

| | | | | | | | ***ACLs*** | | |
|---|---|---|---|---|---|---|---|---|---|
| **GF FY** | **OFL** | **ABC** | **Canadian TAC** | **US ABC** | **State waters Sub-Component** | **Other Sub-Component** | **Commercial Groundfish sub-ACL** | **MWT Sub-ACL** | **Total ACL** |
| 2016 | 160,385 | 77,898 | 21,830 | 56,068 | 561 | 561 | 51,667 | ***521*** | 53,309 |
| 2017 | 258,691 | 77,898 | 29,500 | 48,398 | 484 | 484 | 44,599 | ***450*** | 46,017 |
| 2018 | 358,077 | 77,898 | 0 | 77,898 | 779 | 779 | 71,783 | ***724*** | 74,065 |
| 2019 | | 27,264 | | 27,264 | | | 25,124 | ***253*** | 25,923 |

The default specifications process was established in FW 53. The process allows the directed groundfish fishery to begin fishing on-time in the event that specifications are not in place in time for the start of the fishing year. Default specifications are set as 35% of the previous year's specifications for three months (May 1- July 31) or when replaced by the new specifications. Delays in final rulemaking for specifications actions are anticipated to be minor, and the limited duration of the "rollover period" (August 1st end date) retains a timeline for rulemaking while allowing fishing to begin on time. In the event that there was a continued delay in rulemaking (beyond August 1st), there would be no fishing for stocks without specifications in place, nor any fishing for other groundfish stocks that share the same broad stock area (BSA) as stocks with no specifications.

The Final Rule for FW 53 further clarified that since the midwater trawl Atlantic herring fleet has sub-ACLs and in-season AMs for the two haddock stocks, the fishery is subject to the default specifications with similar consequences as the groundfish fishery. If, for example, specifications were not in place by August 1 of the groundfish fishing year for Georges Bank haddock, the midwater trawl Atlantic herring fishery would not be allowed to operate in the Georges Bank haddock stock area until specifications were in place.

*Calculation of the sub-ACL*

Several steps are needed to determine the midwater trawl herring fishery sub-ACL. First, the Canadian TAC in Eastern Georges Bank is deducted from the total ABC (for the Georges Bank stock), leaving a U.S. ABC. After the state and other sub-components are deducted, the

remaining portion of the U.S. ABC is the amount available to the fishery components that receive an allocation (i.e., subject to accountability measures). Allocation are made first to non-groundfish fisheries, and the portion of the U.S. ABC remaining is the commercial groundfish allocation. The MWT sub-ABC (1% of the U.S. ABC) is further reduced by a management uncertainty buffer (7% - the default level for no possession stocks in the groundfish plan) to determine the MWT sub-ACL.

*Other Sub-Component and State Waters Catches of Georges Bank Haddock*

Amendment 16 provides that the distribution to various sub-components can be modified in a framework or specification action. These adjustments are often made as more experience is gained with the ACL system adopted by Amendment 16. Changes can also be required if there are large changes in ABCs, particularly because the sub-components of the fishery are not subject to specific catch controls by the FMP and a specific percentage allocation has not been defined. This is the case for state waters and other sub- component catches. Unlike the case when a specific allocation has been specified, the PDT estimates the expected catch from these two components and then compares that amount to the ABC to determine the percentage that should be set aside to account for these catches. These sub-components are not subject to specific catch controls by the Groundfish FMP. As a result, the state waters and other sub-components are not allocations, and these components of the fishery are not subject to accountability measures if the catch limits are exceeded. Because the state waters and other sub-component values are based on expected catch, there is no downward adjustment for management uncertainty that applies to fisheries with specific allocations and accountability measures.

Table 4 summarizes the other sub-component percentages relative to the U.S. ABC for Georges Bank haddock, FY 2010 – FY 2018. Table 5 summarizes catches of Georges Bank haddock by fisheries included within the other sub-component.

In FW 55, the PDT acknowledged that the other sub-component catch increased in FY 2014 relative to the previous years. It is unclear why catch increased, but one explanation may be the increased GB haddock abundance. The PDT further articulated that given the recommended ABC increases for FY 2016- FY 2018, maintaining the other sub-component at its current level, or even reducing to 1%, will more than cover catch. Reducing to 1% is more than the annual other sub-component catch for most years from FY 2010- FY 2014, and more than the 5 year average (Table 5). Therefore, the PDT recommended decreasing the FY 2016- FY2018 other sub-component to 1% of the ABC (from 4%).

In addition, the PDT noted in FW 55 that state waters catch has been less than 15 mt each year since FY 2010. With no adjustment in FY 2016- FY 2018, state sub-component would be larger than average FY 2010-FY 2014 catch (6.8 mt), and larger than the greatest catch (14.2 mt in FY 2012). The PDT recommended no change (1% of the ABC) for the 2016-2018 state sub-component.

**Table 4- Summary of other sub-component percentages relative to ABC and values for Georges Bank haddock. Source: FW 50, FW 51, FW 53, and FW 55.**

| *Fishing Year* | *U.S. ABC (mt)* | *Other sub-Component* | | | |
|---|---|---|---|---|---|
| | | % of ABC | Value (mt) | Catch (mt) | % of sub-Component Caught |
| 2010 | 44,903 | 4% | 1,796 | 131.0 | 7% |
| 2011 | 34,244 | 4% | 1,370 | 305.8 | 22% |
| 2012 | 30,726 | 4% | 1,229 | 25.1 | 2% |
| 2013 | 29,335 | 4% | 1,173 | 56.5 | 5% |
| 2014 | 19,229 | 4% | 769 | 793.4 | 103% |
| 2015 | 24,366 | 4% | 975 | | |
| 2016 | 56,068 | 1% | 561 | | |
| 2017 | 48,398 | 1% | 484 | | |
| 2018 | 77,989 | 1% | 779 | | |

**Table 5- Summary of other sub-component catches of Georges Bank haddock by fishery. Source: Groundfish FY2010 – FY2014 final year-end catch reports. "Unknown" refers to catches not binned into the specific categories (e.g., squid, scallop, herring (non-MWT)). Category designations are based on GARFOS's binning rules which classify catches by using trip, landings, and revenue information.**

| | ***Fishing Year*** | | | | | |
|---|---|---|---|---|---|---|
| **Fishery** | **2010** | **2011** | **2012** | **2013** | **2014** | **Average Catch** |
| Scallop | 2.6 | 2.4 | 3.4 | 3.5 | 5.5 | **3.5** |
| Fluke | 0.6 | 8.2 | 0.0 | 0.1 | 31.1 | **8.0** |
| Herring (non-MWT) | 45.1 | 14.4 | 1.8 | 5.2 | 40.1 | **21.3** |
| Lobster/Crab | 0.2 | 2.3 | 0.6 | 0.0 | 0.8 | **0.8** |
| Menhaden | 1.5 | 0.0 | 0.5 | 0.0 | 0.5 | **0.5** |
| Monkfish | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | **0.0** |
| Research | 0.0 | 18.1 | 3.4 | 0.5 | 5.6 | **5.5** |
| Scup | 0.2 | 5.5 | 0.0 | 0.1 | 38.3 | **8.8** |
| Shrimp | 0.1 | 0.1 | 0.0 | 0.0 | 6.3 | **1.3** |
| Squid | 23.4 | 98.8 | 6.7 | 14.8 | 194.8 | **67.7** |
| Squid/Whiting | 17.1 | 52.0 | 3.9 | 15.5 | 149.5 | **47.6** |
| Surf Clam | 0.0 | 0.0 | 0.0 | 0.0 | 23.6 | **4.7** |
| Whelk/Conk | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | **0.0** |
| Whiting | 0.1 | 0.9 | 0.0 | 0.0 | 0.1 | **0.2** |
| Unknown | 40.0 | 102.9 | 4.7 | 16.7 | 297.2 | **92.3** |
| **Total** | **131.0** | **305.8** | **25.1** | **56.5** | **793.4** | **262.4** |

## 4. Impacts of the In-Season AM in FY 2015: excerpt from Framework Adjustment 55 – Biological and Economic Impact Analysis

Biological Impacts Analysis

*Impacts on 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.

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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 by restricting herring fishing in areas before quotas are reached.

Economic Impacts Analysis

*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 increase from 227 mt to 521 mt and the GOM haddock sub-ACL would increase from 14 mt to 34 mt. These increases should provide a better opportunity for the Atlantic herring fishery to avoid triggering AMs, which effectively closed the herring fishery on Georges Bank for exceeding the sub-ACL for GB haddock in-season from October 22, 2015, through April 30, 2016. 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 was calculated from herring trips in statistical areas closed by the AM (521, 522, 525, 561, and 562) for the months of November-April during FYs 2011-2014. Table 6 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 (16,434,386/44), 180 times the 2,000 lb. legal possession limit under the AMs.

**Table 6- Atlantic herring trips, landings, and revenue from statistical reporting areas 521, 522, 525, or 652 from November through April during groundfish FY 2011-2014. Trip locations from VTRs. (Table 116 in FW 55)**

| Groundfish Fishing Year | # of Herring Trips (In stat areas 521, 522, 525, 561, or 562 during Nov-Apr) | Herring Landed | Herring Revenue (2010$) |
|---|---|---|---|
| 2011 | 27 | 10,320,385 | $1,112,396 |
| 2012 | 43 | 11,934,138 | $1,498,469 |
| 2013 | 69 | 27,199,795 | $2,859,290 |
| 2014 | 38 | 16,283,224 | $1,731,738 |
| Avg. 2011-2014 | 44 | 16,434,386 | $1,800,473 |

The AM triggered to limit incidental catch of GB haddock in FY 2015 was unlikely to have provided either long-term economic benefit to the groundfish fishery or long-term biological benefit to the GB haddock stock. 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 mt and utilization rates in recent fishing years have been well below 50% of the commercial groundfish sub-ACL.

## B. PDT Analysis

After reviewing the draft decision document that includes a preliminary range of alternatives for consideration by the Groundfish and Herring Committees, the PDT discussed the types of analyses it could complete during the development of the action, depending on the range of alternatives selected by the Council. Some of these analyses may be completed in consultation with the Herring PDT.

- Sub-ACLs
    - Analyze a range of fixed percentage sub-ACLs for the midwater trawl fishery (e.g., 1%, 2%, 3%, and 5%) with respect to the groundfish fishery and the Georges Bank (GB) haddock stock
    - Develop an approach to adjust the GB haddock sub-ACL for the midwater trawl fishery as a varying percentage based on
        - Status of GB haddock
        - Catch performance in the groundfish fishery
    - Evaluate the performance of sub-components of GB haddock (i.e., commercial groundfish, midwater trawl, and non-groundfish catch currently included in other sub-component)
    - Examine the commercial catch length frequency data by sub-components
- AMs
    - Explore biological and economic considerations of modifying the existing GB haddock AM consequence area – in time/space
        - Update FW 55 economic impact analysis to quantify the impact of the AM in place for FY 2015.
        - Examine spawning information for GB haddock
        - Summarize spatial and temporal patterns of midwater trawl Atlantic herring fishery catches of GB haddock – Groundfish FY 2010 – FY 2014/15
        - Summarize spatial and temporal patterns of commercial groundfish fishery catches of GB haddock – Groundfish FY 2010 – FY 2014/15
- Calculation of the GB haddock catch estimate in the midwater trawl fishery
    - Describe how the GB haddock catch estimate varies year-to-year due to variable observer coverage rates
    - Compare the GB haddock catch estimates with an alternative estimate that stratifies by observer coverage requirements (i.e., access to groundfish closed areas)

## C. PDT Discussion

Given the scope of groundfish priorities this year, the Groundfish PDT suggests that the Committee reduce the preliminary range of alternatives to a more reasonable number if the intent is to take final action this year for implementation by May 1, 2017.