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New England Fishery Management Council
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To: Paul J. Howard, Executive Director
From: Scientific and Statistical Committee
Date: 24 September 2012

Subject: Groundfish ABC for FY2013-2015

The Scientific and Statistical Committee (SSC) met on three occasions to address groundfish catch recommendations.

During the first meeting (March 28, 2012), the SSC was asked to:

2. Discuss the performance of projections for groundfish stocks based on the February 2012 groundfish assessment updates.
3. Review assessments and develop FY 2013and FY 2014 ABC recommendations for redfish, Georges Bank haddock, Gulf of Maine /Georges Bank windowpane flounder, Southern New England /Mid-Atlantic windowpane flounder, ocean pout, wolffish and halibut.

During the second and third meetings (August 24 and September 13, 2012), the SSC was asked to:

1. The SSC is asked to develop Overfishing Limit (OFL) and Acceptable Biological Catch (ABC) recommendations for Northeast Multispecies stocks as specified below. Specifications for GOM cod and GB Cod will be determined after SARC 55 is conducted this fall. OFL and ABC recommendations for other stocks were determined by the SSC at earlier meetings.
2. ABC recommendations are to be based on the fishing mortality strategies approved by the Council in Amendments 13 and 16 and related management actions. Status determination criteria should be used that are specified in Amendment 16 or subsequent actions, or that will be implemented through FW 48 consistent with the recommendations of recent SARCs. The general control rule for groundfish stocks that has been adopted is:
   "These ABC control rules will be used in the absence of better information that may allow a more explicit determination of scientific uncertainty for a stock or stocks. If such information is available – that is, if scientific uncertainty can be characterized in a more accurate fashion -- it can be used by the SSC to determine ABCs, These ABC control rules can be modified in a future Council action (an amendment, framework, or specification package):
   a. ABC should be determined as the catch associated with 75% of FMSY.
   b. If fishing at 75% of FMSY does not achieve the mandated rebuilding requirements for overfished stocks, ABC should be determined as the catch associated with the fishing mortality that meets rebuilding requirements (Frebuild).
   c. For stocks that cannot rebuild to BMSY in the specified rebuilding period, even with no fishing, the ABC should be based on incidental bycatch, including a reduction in bycatch rate (i.e., the proportion of the stock caught as bycatch).
   d. Interim ABCs should be determined for stocks with unknown status according to case-bycase recommendations from the SSC."

3. GB yellowtail flounder: Provide a range of ABCs for 2013-2014 that will meet management objectives and that will result in a low to neutral risk of exceeding FMSY (F=0.25).
4. Review the SARC-54 advice on a biomass target for SNE/MA yellowtail flounder. Provide advice on a process to reconcile the two biomass targets identified by the SARC review panel.
5. At its March meeting, the SSC directed the Plan Development Team to consider three approaches for setting ABCs because of concerns that the stock projections were not performing well. Consider the PDT's report on this issue and whether alternative approaches to setting the ABCs should be used for FY 2013- 2015.
6. Provide ABC recommendations for the following Northeast Multispecies stocks for FY 2013 – 2015.
    SNE/MA yellowtail flounder
    GOM haddock
    CC/GOM yellowtail flounder
    Witch flounder
    Plaice
7. Provide an ABC recommendation for white hake for FY 2013. A benchmark assessment is planned for early 2013, but an ABC is needed for the start of the fishing year on May 1 and none has been previously approved. There aren't any ABC carry-over provisions in the Northeast Multispecies FMP. There is no assessment update available.

In order to meet these terms of reference, the SSC considered the following:

1. Groundfish Plan Development Team memo to the SSC dated March 20, 2012
2. Groundfish Plan Development Team memo to the SSC dated August 14, 2012
3. Northeast Fisheries Science Center Reference Document 12-06. Assessment of Data Updates of 13 Northeast Groundfish Stocks through 2010
4. 54th Northeast Regional Stock Assessment Workshop Assessment Summary Report
5. 54th Northeast Regional Stock Assessment Workshop Report (draft)
6. Transboundary Resources Assessment Committee Status Report 2012/01. Georges Bank Yellowtail Flounder
7. Transboundary Resources Assessment Committee Reference Document 2012/02 Stock Assessment of Georges Bank Yellowtail Flounder for 2011
8. Pope, J.G. 1983. Analogies to the Status Quo TACs: Their nature and variance. Canadian Special Publication in Aquatic and Fishery Sciences. 66: 99-113
9. Two presentations from the Groundfish Plan Development Team on projection performance
10. Presentation from lead analyst on George Bank yellowtail flounder
11. Presentation from lead analyst on SNE/MA yellowtail flounder
12. Presentations from Groundfish Plan Development Team on stock specific projections

The SSC reviewed material provided by the PDT regarding the performance of historical projections for the Northeast Multispecies FMP stocks. The presentations by Tom Nies and Paul Nitscke as well as the groundfish PDT report were clear and concise, facilitating the catch advice discussion. Overall, the projections were biased high, meaning the projected stock increased more than the realized stock. This resulted in catches at or below recommended ABCs having fishing mortality rates above what was expected from the projections. For some stocks, this resulted in overfishing occurring despite the fishery catching less than the recommended ABC. The SSC reiterates its concern with medium term projections for these stocks and recommends conducting assessments more regularly so that projections are for shorter periods into the future. The SSC agrees with the

PDT concern regarding this historical performance, but felt this single analysis was insufficient to justify changing the default control rule for all the groundfish stocks. Changing the default control rule should involve a longer term and more systematic process than time allowed. Instead, the SSC examined each stock on a case-by-case basis to see if there was any reason to change from the default control rule. Reasons were found for five of the stocks: the three yellowtail flounder stocks, witch flounder, and Atlantic wolffish. Detailed reasons are provided for each of these stocks below. The 75%Fmsy control rule was applied for the remaining stocks with analytical assessments; the two haddock stocks, American plaice, redfish, and Atlantic halibut, and the three stocks with the index based assessments; the two windowpane stocks and ocean pout. The stocks with index based assessments held the 2013 OFL and ABC values constant for the three years following the default control rule for stocks with index based assessments.

Table 1 presents the OFL and ABC values for all 20 stocks in the Northeast Multispecies FMP for completeness. The three winter flounder stocks and pollock had OFL and ABC values set previously by the SSC. The two cod stocks do not have OFL or ABC values because both have benchmark assessments scheduled for SARC 55 (December 2012). The white hake OFL and ABC for 2013 were set to the values in 2012 because an update assessment was not available and there were no indications from fishery or survey data that any major changes had occurred since the 2012 values were set. White hake has a benchmark assessment scheduled for SARC 56 (February 2013), which will provide the basis for setting OFL and ABC for FY2014-2015.

Technical Notes on Specific Stocks:

- **Georges Bank yellowtail flounder** was updated during TRAC 2012. The SSC used the results of the 2012 TRAC assessment to formulate its recommendations. The assessment method used in recent years (the split series VPA) indicates that the stock is overfished, that overfishing is occurring, and that recent recruitment is weak. However, the assessment exhibited a stronger retrospective pattern this year than last year. The ratio of catch over survey biomass decreased substantially in 1995 and has remained low since, while estimates of total mortality from the survey have remained high. There are no positive signs that the stock is rebuilding. Based on the assessment results and associated uncertainties, the SSC recommends no directed fishery and no increase in bycatch. This recommendation reflects the poor performance of catch advice in recent years relative to reducing the fishing mortality rate below the desired target. In response to the Council's request for a range of ABCs (including US and Canadian catch) that will meet management objectives and that will result in a low to neutral risk of exceeding F_{MSY}, the SSC recommends that:

  1. A catch limit of 200 mt in 2013 is expected to have a low probability of overfishing and is expected to allow the stock to increase ("To achieve both a high probability that F in 2013 will be less than F_{ref} and that adult biomass will increase, a 2013 quota of approximately 200 mt would be required." TRAC 2012)
  2. A catch limit of 400-500 mt is expected to have greater probability of overfishing and allow some rebuilding ("A quota of 400-500 mt implies that either F will be below F_{ref} in 2013 in only one of the five sensitivity analyses or the adult biomass will increase from 2013 to 2014 for the other four." TRAC 2012). This is similar to the basis of the SSC advice for 2012.
  3. The catch associated with unintentional bycatch may exceed 500 mt, but total removals should be less than the 2012 ABC (1,150 mt) to account for the recommended removal of a directed fishery. This ABC of 1,150 mt should be considered a backstop measure only. If there is no directed fishery and measures are taken to reduce bycatch as much as possible,

then fishing mortality would be expected to be below Fmsy. If this low F results in a catch above 500 mt, it would be de facto evidence that the uncertainty in this stock assessment is greater than described by the sensitivity analyses conducted in the TRAC. Thus, this ABC is appropriate only when management measures are implemented that have a high probability in resulting in low fishing mortality rates. This advice is based on the difficulty of setting quota levels based on highly uncertain stock assessment results.

- **Southern New England-Mid Atlantic yellowtail flounder** had a benchmark assessment as part of SARC 54 (June 2012). The assessment of this stock was not questioned, but the SSC discussed the biomass biological reference point (BRP) because the SARC recommended two separate values. One BRP was based on using all the recruitment estimates from the stock assessment with two stanzas associated with different stock sizes (denoted two stanza recruitment). The other BRP was based on using only recent (since 1990) recruitment estimates from the assessment to reflect a change in productivity of this stock (denoted recent recruitment). Projections associated with these two BRPs were nearly identical for FY13 but diverged as years were added to the projections. The SSC considers the recent recruitment BRP the more appropriate reference point because the low recruitment has persisted for more than two decades and high recruitment has been observed in the past at spawning stock biomass similar to those observed during the recent period. Using this BRP, the stock is fully rebuilt. The SSC did not want to recommend fishing at a rate that would cause catches to increase suddenly then decrease as the stock is fished down to the new biomass BRP. So instead, the SSC selected the long term 75%Fmsy catch as the ABC for all three projection years (which is lower than the catch associated with fishing at 75%Fmsy in years 2013-2015). This should allow an examination of how recruitment responds to low fishing mortality rates for a number of years. If the recruitment does considerably increase for multiple years, then the biomass BRP should be updated. While if the recruitment remains low, this will confirm the change in productivity of this stock, and the stock ABC can be set in the future based on applying 75%Fmsy to the extant stock abundance.
- **Cape Cod-Gulf of Maine yellowtail flounder** was updated during the groundfish update assessment review in February 2012. This updated assessment exhibited a retrospective pattern, while the previous assessment did not. To account for the retrospective pattern, the stock abundance at age was reduced at the start of the projections, which assumes whatever mechanism caused the retrospective pattern will continue in the future. The standard projections using the 75%Fmsy control rule resulted in relatively large increases in catch in FY2014-2015 relative to FY2013. The SSC thought the new retrospective pattern, even with the adjustment for starting stock size, was an additional source of uncertainty for this stock, so the SSC set the FY2014 and 2015 ABC values equal to the FY2013 ABC. This results in a larger buffer between OFL and ABC in years 2014 and 2015 than would have occurred from the default control rule to account for the additional uncertainty associated with this stock assessment.
- **Witch flounder** was updated during the groundfish update assessment review in February 2012. The most recent recruitment estimate was estimated to be one of the largest in the time series. Sensitivity projections which reduced the size of this year class resulted in much lower ABC because this stock is in a rebuilding plan and the $F_{rebuild}$ was much lower with the lower recruitment. As in all assessments, the most recent recruitment estimate is highly uncertain. The impact of large versus small cohorts in the projections differs though, with large cohorts having disproportionate impact on $F_{rebuild}$ calculations. To account for this source of uncertainty in the assessment, the SSC set the 2014 and 2015 ABC to the 2013 ABC, which was calculated by applying the $F_{rebuild}$ in 2013. This resulted in a larger buffer between the OFL and ABC in years 2014 and 2015 than the application of the default control rule of $F_{rebuild}$ in each year.

- **Atlantic wolffish** was updated during the groundfish update assessment review in February 2012. This stock did not have a calibration coefficient available to relate the Bigelow and Albatross survey time series due to insufficient numbers of this fish caught during the calibration experiment. Instead, a calibration from ocean pout was used because it has a similar body shape and habitat as wolffish. The assessment results were sensitive to the choice of the calibration. To account for this additional uncertainty, the SSC set the FY2014 and 2015 ABC equal to the FY2013 ABC, which was calculated by applying 75%Fmsy in 2013. This resulted in a larger buffer between the OFL and ABC in years 2014 and 2015 than the application of the default control rule in each year.

The SSC recommends:

1. **The overfishing limits (OFL) and acceptable biological catches (ABC) for 2013-2015 by stock in Table 1.**
2. **Based on the assessment results and associated uncertainties in the Georges Bank yellowtail fishery assessment, the SSC recommends no directed fishery and no increase in bycatch for this stock.**
3. **Updated assessments for all the groundfish stocks in the Northeast Multispecies Fishery Management Plan should be conducted as soon as possible.**

Table 1. Overfishing limits (OFL) and acceptable biological catches (ABC) in metric tons for years 2013-2015 for the groundfish stocks in the Northeast Multispecies Fishery Management Plan. The four stocks in grey font (three winter flounder stocks and pollock) are included for information purposes only, these OFL and ABC values were set previously by the SSC. For the three US/CA stocks (GB cod, GB haddock, and GB yellowtail flounder), the values shown are total amounts, the US amounts will be lower due to the US/CA sharing agreement.

	2013		2014		2015		Remarks
Stock	OFL	ABC	OFL	ABC	OFL	ABC	
GB cod							TBD after SARC 55
GOM cod							TBD after SARC 55
GB haddock	46,185	35,783	46,268	35,699	56,293	43,606	75%Fmsy
GOM haddock	371	290	440	341	561	435	75%Fmsy
GB yellowtail flounder		200-1,150					range of objectives, 2014-2015 TBD after TRAC 2013-2014
SNE/MA yellowtail flounder	773	700	773	700	773	700	long term 75%Fmsy held constant (ref point uncertainty)
CC/GOM yellowtail flounder	713	548	936	548	1,194	548	2013 75%Fmsy held constant (retrospective uncertainty)
Plaice	2,035	1,557	1,981	1,515	2,021	1,544	75%Fmsy
Witch flounder	1,196	783	1,512	783	1,846	783	2013 Frebuild held constant (recruitment uncertainty)
GB winter flounder	4,819	3,750	4,626	3,598			set previously based on SARC 52 assessment
GOM winter flounder	1,458	1,078	1,458	1,078			set previously based on SARC 52 assessment
SNE/MA winter flounder	2,637	697	3,471	912			set previously based on SARC 52 assessment
Redfish	15,468	10,995	16,130	11,465	16,845	11,974	75%Fmsy
White hake	5,306	3,638					rollover 2012, 2014-2015 TBD after SARC 56
Pollock	20,060	15,600	20,554	16,000			set previously based on SARC 50 assessment
N windowpane	202	151	202	151	202	151	75%Fmsy held constant (index assessment)
S windowpane	730	548	730	548	730	548	75%Fmsy held constant (index assessment)
Ocean pout	313	235	313	235	313	235	75%Fmsy held constant (index assessment)
Atlantic halibut	164	99	180	109	198	119	75%Fmsy
Atlantic wolffish	94	70	94	70	94	70	2013 75%Fmsy held constant (calibration uncertainty)