



New England Fishery Management Council

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Eric Reid, *Chair* | Thomas A. Nies, *Executive Director*

DATE: November 29, 2021

TO: Tom Nies, Executive Director

FROM: Scientific and Statistical Committee (SSC)

SUBJECT: Terms of Reference – Specify overfishing levels and develop acceptable biological catch recommendations for Georges Bank cod and Gulf of Maine cod for fishing years 2022 to 2024 and Georges Bank haddock, Gulf of Maine haddock, and white hake for fishing year 2022.

The SSC met on October 25, 2021, via webinar to address the following terms of reference (TORs):

Considering the Council’s Risk Policy Statement, provide an OFL and an ABC recommendation that will prevent overfishing and meet the management objective to rebuild the stock(s), and that are consistent with the Council’s ABC control rule for groundfish stocks for:

- *Fishing years 2022 to 2024 for Georges Bank (GB) cod and Gulf of Maine (GOM) cod, and fishing year 2022 for white hake, and*
- *Consider adjusting the OFL and ABC recommendations for fishing year 2022 for GB haddock and GOM haddock.*

To address these TORs, the SSC considered the following information:

1. The Council’s Risk Policy Road Map (2016), that includes the Risk Policy Statement and Implementation Plan, see pp. 4-5 and 10-12
2. 2021 Management Track Assessment Reports and Background, available at: https://apps-nefsc.fisheries.noaa.gov/saw/sasi/sasi_report_options.php
3. 2021 GB cod and GOM cod Management Track Peer Review Report, September 2021
4. 2019 Groundfish Operational Assessments Report, Pre-Publication, January 2020 version (NEFSC)
5. SSC to Nies re Groundfish OFLs and ABCs FY2020-FY2022, as amended January 22, 2020
6. SSC to Nies re Groundfish OFLs and ABCs FY2020-FY2022 for four stocks, January 22, 2020
7. Presentation: Overview of the 2021 Management Track Assessment of GB cod (NEFSC staff)
8. Presentation: Overview of the 2021 Management Track Assessment of GOM cod (NEFSC staff)
9. Presentation: Groundfish Plan Development Team Report (NEFMC staff)
10. Memo from Groundfish PDT to SSC re GB cod and GOM cod specifications for FY2022-FY2024
11. Memo from Groundfish PDT to SSC re GB haddock and GOM haddock specifications for FY2022-Corrected
12. Memo from Groundfish PDT to SSC re white hake specifications for FY2022

13. State of the Ecosystem and Current Conditions. NOAA/NEFSC. Available at :
<https://www.fisheries.noaa.gov/new-england-mid-atlantic/ecosystems/state-ecosystem-reports-northeast-us-shelf>

SSC members in attendance

Lisa Kerr, Cate O’Keefe, Richard Merrick, Yong Chen, Jeremy Collie, Fred Serchuk, John Wiedenmann, J.J. Maguire, Terry Stockwell, Anna Birkenbach,, Kevin Friedland, Conor McManus, Hiro Uchida, Adrian Jordan, Jason McNamee

Gulf of Maine Cod

TERMS OF REFERENCE

Considering the Council’s Risk Policy Statement, provide an OFL and an ABC recommendation that will prevent overfishing and meet the management objective to rebuild the stock(s), and that are consistent with the Council’s ABC control rule for groundfish stocks for: fishing years 2022 to 2024 for Gulf of Maine (GOM) cod.

Gulf of Maine cod is considered to be overfished with the overfishing status differing between models (overfishing is occurring based on the M=0.2 model, overfishing is not occurring based on the M-ramp model). The SSC endorses the use of the ASAP model for recommending catch advice as well as continuing to use a model averaging approach. Specifically, the SSC chose to average the projections from the rho-adjusted M = 0.2 model and the M-ramp (M = 0.4) model with a single bridge year (CY2020) to generate the ABC recommendation. The SSC recommends a constant ABC for 2022-2024, with the constant catch level being the average of the two 2022 ABC values (i.e., the lowest value of the three-year 75%F_{MSY} projection). The OFL was based on the projections of fishing at F_{MSY}, averaged for the two models, and set dynamically (i.e., not held constant) for the three-year period.

RATIONALE INCLUDING SIGNIFICANT SOURCES OF UNCERTAINTY

The SSC deliberated whether to use Option A or C under the ABC control rule, and ultimately decided to follow the former. Option B was not considered as in this case the F_{rebuild} value is greater than 75%F_{MSY}. The SSC was concerned that catch projections using two bridge years could be overly optimistic, given the model’s tendency to overestimate terminal year SSB and projection biomasses under declining biomass and low recruitment conditions, suggesting that the ABC should be set conservatively. Projecting biomass with only one bridge year (as opposed to two in the assessment analysis) addressed some of the additional source of uncertainty associated with an additional bridge year and resulted in projections that were similar to 2019 ABC estimates.

There was discussion of and support for the use of Option C, restricting catch to incidental bycatch only. However, the available bycatch data were considered insufficient to inform setting an ABC. The PDT concluded that quantification of incidental non-target catch of GOM cod is difficult, because it is conditional on multiple factors, including the: 1) groundfish ACLs in a given fishing year; 2) availability of cod and exploitable stock biomass; 3) variation in

definitions of a targeted cod trip, 4) willingness/ability of the fishery to change fishing practices to avoid cod; 5) multispecies nature of the fishery; and 6) ability to define which components of the fishery are actively targeting cod. While the PDT presented recent discard information for the SSC to consider, they indicated that the values do not represent all incidental, non-target catch under the current prevailing operating conditions of the fishery.

ADDITIONAL COMMENTS AND RESEARCH RECOMMENDATIONS

The SSC remains concerned about the impact of retrospective patterns on the determination of Gulf of Maine cod catch advice. The SSC recommends additional consideration of whether both the $M = 0.2$ and M-ramp models are useful, as the retrospective pattern is increasing for both models. In addition, selection of an appropriate recruitment stanza to inform projections deserves additional research. The impact of changing ocean conditions on aspects of stock productivity (e.g., natural mortality and recruitment) and on the projections underlie the SSC’s rejection of the ABC projections using two bridge years and will need to be considered in future assessments. In addition, the SSC recommends that the findings of the Atlantic Cod Stock Structure Working Group be integrated into the stock assessment process. The SSC recommends that all of these comments should be considered in the Atlantic cod research track stock assessment process.

The SSC requests that the Groundfish PDT continue to explore development of a more robust estimate of incidental bycatch to support application of Option C of the ABC control rule. The PDT presented estimates of discards, but these values do not represent all bycatch, which would be required to apply Option C.

SUMMARY OF RECOMMENDATIONS

The SSC accepts the ASAP model results and chooses to apply Option A under the ABC control rule to derive ABCs for GOM cod. Option B was not considered as the advice would have exceeded Option A (i.e., the $F_{rebuild}$ value is greater than $75\%F_{MSY}$) and the SSC did not feel they had sufficient information to apply Option C. Based on the best available scientific information and uncertainty (e.g., different overfishing status resulting from the $M=0.2$ and M-ramp models), the SSC recommends calculating ABC using only one bridge year and holding this value constant for three years. This recommendation results in a lower ABC value (as compared to projections using two bridge years) and holding the value constant is aimed at reducing the likelihood of overfishing and promoting rebuilding for this stock. The SSC recommends the following OFLs and ABCs:

Fishing Year	OFL (mt)	ABC (mt)
2022	724	551
2023	853	551
2024	980	551

TERMS OF REFERENCE

Considering the Council's Risk Policy Statement, provide an OFL and an ABC recommendation that will prevent overfishing and meet the management objective to rebuild the stock(s), and that are consistent with the Council's ABC control rule for groundfish stocks for: fishing years 2022 to 2024 for Georges Bank (GB) cod.

The SSC accepts the continued use of the Plan B smooth approach for setting the ABC for fishing years 2022 to 2024. There are no accepted reference points for this stock, so the OFL remains unknown.

RATIONALE INCLUDING SIGNIFICANT SOURCES OF UNCERTAINTY

The PlanBsmooth approach has been used to set the ABC for GB cod since the 2015 age-based update assessment was rejected. This approach was put forward in the most recent management track assessment and was approved by the peer review committee. In addition, the PlanBsmooth approach was extensively tested and performed well in the simulation work of the Index-Based Methods Working Group.

One of the important uncertainties associated with the PlanBsmooth approach is the impact that the missing 2020 spring and fall survey values have on the results. Two applications of the PlanBsmooth approach were presented to the SSC. In the first approach, Plan B was applied with missing values for the 2020 spring and fall survey, which resulted in a catch multiplier of 0.611 and an ABC of 729 mt. In the second approach, values for 2020 survey data were imputed (i.e., the spring 2020 survey was set equal to the average of 2019 and 2021 values and the fall 2020 value was set equal to the 2019 value), resulting in a catch multiplier of 0.632 and an ABC of 754 mt. The majority of the SSC (see the **Minority Report** section for an alternative proposal) endorsed the application of the PlanBsmooth approach for setting catch advice and ultimately adopted the approach that filled in the missing 2020 survey values.

ADDITIONAL COMMENTS AND RESEARCH RECOMMENDATIONS

The recommended ABC represents an approximate 57% decrease from the ABC value for GB cod in the previous three years and would represent a 37% decrease from the most recent three-year average catch for GB cod. Concerns were expressed by the SSC about the economic impact this reduction would have on the fishery. There was extensive discussion of how the Council's Risk Policy might be used to inform a more gradual decrease in ABC. However, the economic analysis and information presented by the PDT did not evaluate the quantitative impacts of possible levels of ABC. In the case of such large, anticipated decreases in ABC, the SSC recommends that additional socioeconomic information be presented in the future to better understand how such decreases in the ABC may impact the groundfish fishery.

Another concern raised by the SSC was the potential for the PlanBsmooth approach to be chasing noise in the survey index, particularly for a stock at low abundance. It was noted that the average across the spring and fall surveys has fluctuated without trend over the last decade or so. No specific research recommendations were made in response to this issue, however.

SUMMARY OF RECOMMENDATIONS

A majority of the SSC (see the **Minority Report** section for an alternative approach) accepts the continued use of the PlanBsmooth approach for setting the ABC for GB cod. The SSC based its advice on the PlanBsmooth application with imputed data values for missing 2020 surveys. This approach falls under option D of the ABC control rule (*Interim ABCs should be determined for stocks with unknown status according to case-by-case recommendations from the SSC*). The application of this approach results in a large reduction in the ABC for GB cod from the previous three years (i.e., approximately 57%) which we anticipate will increase the probability of stock rebuilding. However, the OFL remains unknown for this stock, therefore the SSC cannot explicitly determine whether the proposed ABC will end overfishing. The SSC recommends the following ABCs:

Fishing Year	OFL (mt)	ABC (mt)
2022	unknown	754
2023	unknown	754
2024	unknown	754

Georges Bank Haddock

TERMS OF REFERENCE

Considering the Council’s Risk Policy Statement, provide an OFL and an ABC recommendation that will prevent overfishing and meet the management objective to rebuild the stock(s), and that are consistent with the Council’s ABC control rule for groundfish stocks: Consider adjusting the OFL and ABC recommendations for fishing year 2022 for Georges Bank haddock.

Georges Bank haddock is considered rebuilt, it is not overfished, and overfishing is not occurring. The SSC was provided with updated survey and economic information to review and consider whether adjustments to the OFL and ABC recommendations were needed. The SSC supports the PDT recommendation to maintain the current FY 2022 OFLs and ABCs for Georges Bank haddock.

RATIONALE INCLUDING SIGNIFICANT SOURCES OF UNCERTAINTY

Updated survey estimates for Georges Bank haddock track the projections made in the 2019 stock assessment and reflect a continued decline in the survey indices. Length frequencies from the surveys track growth in the size of fish and decline in abundance of the strong year-classes of the early 2010s. There is no indication of strong year-classes in recent surveys. The SSC notes that stock utilization for Georges Bank haddock is low, generally less than 20% during 2011-2020. Based on the review of updated survey and economic information, the SSC did not see a need for adjustment to the existing fishing year 2022 OFL and ABC recommendations for Georges Bank haddock.

ADDITIONAL COMMENTS AND RESEARCH RECOMMENDATIONS

The Haddock Research Track Assessment is ongoing, it will be reviewed in 2022 and a Management Track Assessment is scheduled for the autumn of 2022, during which the magnitude of the decline in abundance will be evaluated.

SUMMARY OF RECOMMENDATIONS

The SSC supports the PDT recommendation to maintain the current FY 2022 OFLs and ABCs for Georges Bank haddock as indicated in the table below (note: the 2022 ABC value reflects a correction in the Memo from the Groundfish PDT to SSC made after the SSC meeting):

Fishing Year	OFL (mt)	ABC (mt)
2022	114,925	88,856

Gulf of Maine Haddock

TERMS OF REFERENCE

Considering the Council's Risk Policy Statement, provide an OFL and an ABC recommendation that will prevent overfishing and meet the management objective to rebuild the stock(s), and that are consistent with the Council's ABC control rule for groundfish stocks: Consider adjusting the OFL and ABC recommendations for fishing year 2022 for Gulf of Maine haddock.

Gulf of Maine haddock is considered rebuilt, it is not overfished, and overfishing is not occurring. The SSC was provided with updated survey and economic information to review and consider whether adjustments to the OFL and ABC recommendations were needed. The SSC supports the PDT recommendation to maintain the current FY 2022 OFLs and ABCs for Gulf of Maine haddock.

RATIONALE INCLUDING SIGNIFICANT SOURCES OF UNCERTAINTY

Updated survey estimates for Gulf of Maine haddock track the projections made in the 2019 stock assessment and reflect a continued decline in the survey indices. Length frequencies from the surveys also track declines in the previous strong year-classes, with no indication from the surveys of strong year-classes following. The SSC notes that stock utilization for Gulf of Maine haddock is low to moderate in recent years (2018-2020), ranging between 32-42%. Based on the review of updated survey and economic information, the SSC did not see a need for adjustment to the existing fishing year 2022 OFL and ABC recommendations for Gulf of Maine haddock.

ADDITIONAL COMMENTS AND RESEARCH RECOMMENDATIONS

The Haddock Research Track Assessment is ongoing; it will be reviewed in 2022 and a Management Track Assessment is scheduled for the autumn of 2022, during which the magnitude of the decline in abundance will be evaluated.

SUMMARY OF RECOMMENDATIONS

The SSC supports the PDT recommendation to maintain the current FY 2022 OFLs and ABCs for Gulf of Maine haddock as indicated in the table below:

Fishing Year	OFL (mt)	ABC (mt)
2022	14,834	11,526

White Hake

TERMS OF REFERENCE

Considering the Council's Risk Policy Statement, provide an OFL and an ABC recommendation that will prevent overfishing and meet the management objective to rebuild the stock(s), and that are consistent with the Council's ABC control rule for groundfish stocks for: fishing year 2022 for white hake.

The 2019 stock assessment indicated that white hake was overfished but overfishing was not occurring. Given that the rebuilding plan date had passed and the stock had not been rebuilt, a new rebuilding plan was implemented. Following the Council's ABC control rule, the new rebuilding plan defines F_{rebuild} for white hake as $70\%F_{\text{MSY}}$. The SSC supports revised OFL and ABCs for white hake for fishing year 2022 based on this F_{rebuild} value.

RATIONALE INCLUDING SIGNIFICANT SOURCES OF UNCERTAINTY

Modifying the previous catch advice based on projections at $75\%F_{\text{MSY}}$ to projections based on F_{rebuild} ($70\%F_{\text{MSY}}$) is appropriate given the overfished stock status of white hake and establishment of a new rebuilding plan for white hake in 2021. Sources of uncertainty include a significant retrospective pattern in the white hake assessment that appears to be worsening. Rho adjustments were made for the determination of stock status and for initializing the projections (i.e., 2020) but not carried throughout the projections. The SSC notes that stock utilization is high in recent years (i.e., 77-89% utilization from 2018-2020).

ADDITIONAL COMMENTS AND RESEARCH RECOMMENDATIONS

Delays due to restrictions from the COVID-19 pandemic led to rescheduling the management track stock assessment from 2021 to 2022 for this stock.

SUMMARY OF RECOMMENDATIONS

The SSC supports the PDT recommendation to revise the previous catch advice for white hake in fishing year 2022 based on $75\%F_{\text{MSY}}$ to catch advice based on $70\%F_{\text{MSY}}$. The white hake stock is in year-one of a new rebuilding plan and this change is consistent with the new rebuilding plan, which is expected to rebuild the stock within the rebuilding timeframe. The SSC recommends the following ABC:

Fishing Year	OFL (mt)	ABC (mt)
2022	3,022	2,155

MINORITY REPORT

Georges Bank Cod Minority Report

The SSC did not find consensus on recommendations for FY2022-2024 ABC for Georges Bank cod. There was a minority view from three SSC members regarding the application of the 2021 Georges Bank Cod Management Track Assessment results as the sole basis for recommending ABC advice. These members of the SSC noted that the analysis and information presented by the PDT did not evaluate the economic impacts of the proposed ABC values for the SSC to consider in their deliberations of advice for FY2022-2024.

Results from the 2021 Georges Bank Cod Management Track Assessment indicated a ~60% reduction in ABC advice from FY2021 to FY2022-2024. The minority view did not dispute the Georges Bank Cod Management Track Assessment results as representing Best Scientific Information Available (BSIA) as determined by the assessment Peer Review Panel, but noted that additional factors, such as social and economic objectives as outlined in the New England Fishery Management Council's Risk Policy Road Map, should be considered to set ABC advice for this stock. The Risk Policy Road Map provides a foundation for more explicit risk-based decision making, including the following guidance:

Evaluation of management decisions should consider the probability of an outcome as well as its severity. There may be flexibility to allow for short-term tradeoffs, but the risk of long-term or chronic overfishing should be low.

The risk of overfishing and impacting overall net benefits to the Nation are determined by the cumulative impacts of decisions that range from assessment modeling to estimating reference points, developing ABC control rules, specifying ACLs, ACTs, and all other elements of the management procedure. Focusing a risk-based decision for any one of these elements of the management procedure in isolation is inadequate to address the objectives of the Risk Policy.

Stability is intended to avoid abrupt shifts in fisheries management, to the extent possible, to provide for more stable stocks and more stable fisheries. Standards for performance measures for stability should be determined on a case-by-case basis.

The minority view expressed concern over evidence presented by fishing industry representatives that a ~60% reduction in ABC for FY2022-2024 could result in a "fishery crisis", and the minority view noted that the Council's Risk Policy guidelines suggest that this is a case where (highly uncertain) assessment outcomes alone should not decide the ABC. The 2021 Georges Bank Cod Management Track Assessment states, "the Georges Bank Atlantic cod stock status cannot be quantitatively determined due to a lack of biological reference points associated with the PlanBsmooth approach but is recommended to be overfished due to poor stock condition, while recommended overfishing status is unknown" and further stated, "the smoothed survey biomass is decreasing, but without a biomass reference point it is not known if rebuilding is on schedule." (NOAA, 2021). The PlanBsmooth approach does not incorporate estimates of uncertainty for survey information, and the 2021 Management Track Assessment noted that the missing 2020 spring and fall surveys are a source of uncertainty in the 2021 assessment. The

minority view is that the stock rebuilding benefits of lowering the ABC may not justify the potential damage to local economies in this case. Due to unknown overfishing status, the SSC could not make explicit determinations about potential rebuilding benefits associated with the proposed ABC, and the PDT noted that the Georges Bank cod sub-ACL has not been exceeded in recent years.

The minority view supported an alternative approach to set the Georges Bank cod ABC for FY2022-2024 that was deliberated by the SSC. The SSC considered an alternative application of ABC control rule option d) *“Interim ABCs should be determined for stocks with unknown status according to case-by-case recommendations from the SSC.”* The alternative approach included a ramped decrease in ABC between 2022 to 2024 to account for the potential socioeconomic impacts associated with a ~60% reduction in ABC in a single year. Specifically, the approach included ABC advice for FY2022 to be set equal to CY2020 catch (1,053 mt) with a linear decline over three years to set ABC advice for FY2024 equal to the advice from the 2021 Georges Bank Cod Management Track assessment that applied the PlanBsmooth method with imputed data values for missing 2020 surveys. The Georges Bank cod ABC values supported by the minority were: FY2022: 1,053mt, FY2023: 904mt, and FY2024: 754mt with the OFL considered unknown. Rationale for this approach included i) recognition of the increased uncertainty in the PlanBsmooth method where 2020 survey data were missing, ii) the undetermined overfishing status and lack of information about rebuilding potential, iii) consideration of potential economic impacts of ~60% reduction in ABC advice from FY2021 to FY2022-2024, and iv) guidance from the Risk Policy Road Map.