Framework Adjustment 61

To the

Northeast Multispecies Fishery Management Plan

Appendix III

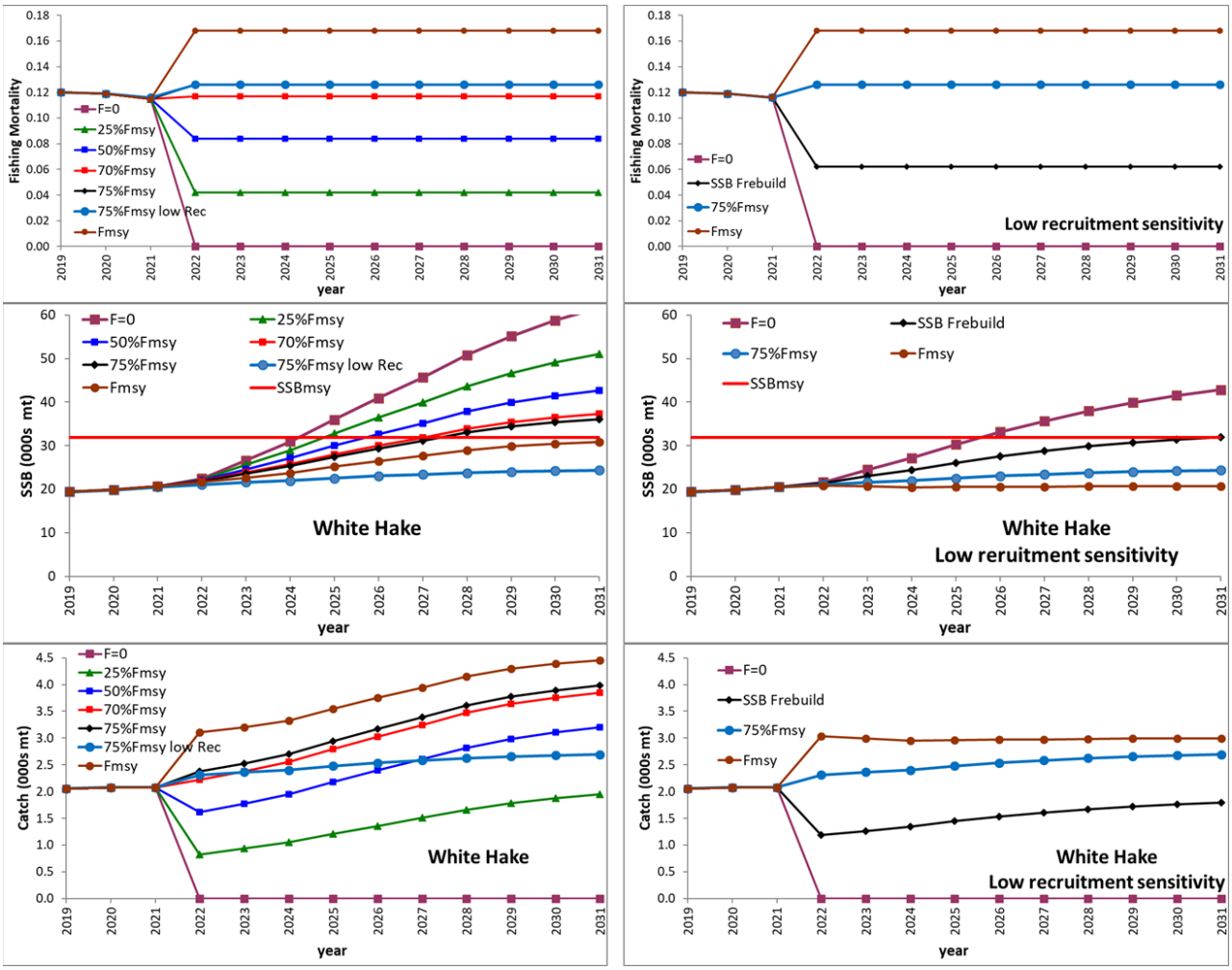
White Hake Rebuilding Plan Analysis

Prior recommendations from the SSC on rebuilding plans as well as white hake specific recommendations (see Appendix I) were considered when developing rebuilding strategies. Specifically, the SSC stated:

- Prior SSC Recommendations
  - *The SSC recommends that management metrics such as $F_{rebuild}$ should be considered as an approach, with rates being used rather than specific values.*
  - *The SSC generally does not prefer setting arbitrary rebuilding dates, though there is some procedural value in having a timeline. There are some mechanisms that could be used to set a timeline that would be less arbitrary and could be customized to the species being investigated, such as surplus production models and/or life history characteristics.*
- White Hake Specific SSC Recommendation
  - *The SSC confirms agreement with the assumptions and set-up proposed by the Groundfish Plan Development Team (documented in the memo) for white hake.*
  - *The SSC also supports developing the sensitivity runs regarding recent (1995-2016) low recruitment for comparison purposes with runs using the full recruitment stanza, and with that also recommends running the simulations through to an updated set of biological reference points that use this assumption.*

Rebuilding projections (left side of Figure 1) were developed for white hake using projections that resample recruitment from the entire times series (1963-2016) of the assessment which is consistent with the projections used to estimate SSB_{MSY}. Projections were done assuming an updated PDT estimated bridge year catch in CY-2019, assumed ACLs plus the Canadian catch assumption in 2020 and 2021, and F_{MSY} (F40% overfishing definition), 75%F_{MSY}, 70%F_{MSY}, 50%F_{MSY}, 25%F_{MSY}, and F=0 for T-min from 2022-2031. The revised rebuilding plan is assumed to start in 2021 but there is no plan to revise the OFL and ABCs already in place for 2021. Short term catch advice for estimating ABCs and OFLs are made using projections that assume a more recent time series (1995-2016) of lower estimates of recruitment in the near term (right side in Figure 2). Rebuilding projections which used the recent low recruitment assumption were also run as a sensitivity to show the implication of recruitment not increasing to the time series mean in 2019. It is not known when recruitment will approach the time series mean but the sensitivity projections suggest that rebuilding will not occur quickly unless there is a rapid increase in recruitment from recent levels. This may suggest that rebuilding projections which use the full time series of recruitment are likely overly optimistic. It is possible to rebuild the stock under the low recruitment sensitivity but the projection suggests 37%F_{MSY} (SSB Frebuild run sensitivity plot) would be needed to rebuild the stock. This suggests that a rebuilding plan closer to a T-max of 10 years may be more realistic rather than a projection closer to a T-min of 4 years.

Figure 1- White Hake rebuilding projection assuming the cumulative distribution function (CDF) of the full times series of recruitment on the left compared to sensitivity projections that assume a CDF of lower recent recruitment on the right. Top plot is the fishing mortality, middle plot is for SSB with the red line indicating the SSBMSY to achieve the rebuilding target, and the bottom plot showing the catches given the fishing mortality rates.



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MEMORANDUM

DATE: August 21, 2020

TO: Scientific and Statistical Committee (SSC)

CC: Groundfish Committee

FROM: Groundfish Plan Development Team (PDT)

SUBJECT: **Developing a White Hake Rebuilding Plan**

The Groundfish Plan Development Team (PDT) met on August 13 and 20, 2020 by webinar to discuss **possible approaches to drafting rebuilding plan options for white hake.**

The Groundfish PDT summarizes its proposed approach and requests feedback from the Scientific and Statistical Committee (SSC).

Background Information Discussed

- Letter GARFO to Council re 2019 stock status (March 5, 2020)
- 2019 Groundfish Operational Update Reports see white hake on pp. 139-150, pre-publication copy, NEFSC (Jan 7, 2020).
- Memo from SSC to Tom Nies re 2020-2021 SSC ABC and OFL recommendations for groundfish stocks (Nov 22, 2019)
- Memo from SSC to Nies re Rebuilding strategies for several groundfish stocks (Sept 4., 2018)
- Memo from Groundfish PDT to SSC re Rebuilding strategies for several groundfish Stocks (Aug. 13, 2018)

Stock Status

White hake is overfished but overfishing is not occurring (GARFO 2020). The current rebuilding plan for white hake ended in 2014, with the stock not achieving rebuilt status.

Overview of the 2019 Assessment

Based on the 2019 peer review, white hake is overfished but overfishing is not occurring (NEFSC 2020). This was a change in status, as the 2017 assessment concluded the stock was not overfished. Retrospective adjustments were made to the model results in the terminal year and the retrospective pattern appears to be worsening. White hake is under a rebuilding plan, but the stock did not rebuild by 2014 as planned. As previously advised by the Regional Office, the SSC

and the Council has continued to set catch limits based on 75%F_{MSY}. The rho adjusted SSB in 2018 (15,891 mt) was at 50% of the rebuilding target SSB (SSBMSY proxy = 31,828 mt).

Recommendations from the SSC for FY2020-FY2022 OFLs and ABCs for White Hake

Framework Adjustment 59 (FW59) to the Northeast Multispecies (Groundfish) Fishery Management Plan implemented the most recent specifications for white hake for fishing years (FY) 2020-2022. Table 1 summarizes the SSC's recommendations for OFLs and ABCs for white hake for FY2020 to FY2022.

Table 1- OFLs and ABCs (mt) for FY2020- FY2022 for white hake. Projected F and SSB provided. For reference, SSB_{MSY} = 31,828mt, F_{MSY} = 0.1677.

Year	OFL	ABC	F	SSB
2020	2,857	2,186	0.13	19,758
2021	2,906	2,186	0.12	20,308
2022	2,986	2,186	0.12	20,826

The SSC (2019) stated:

> *The SSC supports the continued use of the ASAP model to provide catch advice for white hake. This method is an analytical assessment, from which reference points are derived. The SSC recommends the values of OFL be based on stock projections with the F_{MSY} proxy. The SSC recommends a constant ABC for three-years, corresponding to the lowest ABC in the first year (2020) of the 75%F_{MSY} projections.*

Recommendations from the SSC for the Next White Hake Stock Assessment

White hake is scheduled for a management track stock assessment in 2021.

The SSC (2019) advised:

> *The SSC recommends a level 3 Management Track assessment for next cycle with the following advice on things to change or test (note: these may or may not be possible in newest ASAP version):*
>
> 1. *Incorporation of aging error (likely requires strong prior on selectivity);*
> 2. *Incorporating a low sample size to reflect reality of the commercial harvest samples coupled with switching to a Dirichlet likelihood for the age compositions may be worth investigating;*
> 3. *Using methods that account for market categories instead of size categories to convert to age composition;*
> 4. *Adding a new selectivity block;*
> 5. *Adding new survey information to the model if available.*
>
> *On the data side, improving commercial sampling would help characterize catch better, and processing the existing age structures to augment age and length info would benefit the next assessment.*

PDT Proposed Approach to Developing Rebuilding Plan Options for White Hake

Overview - For white hake, the PDT plans to follow the most recent SSC advice for the development of rebuilding plans by basing $F_{rebuild}$ on a fixed fishing mortality rate (SSC 2018). The PDT does not intend to develop new plans based on achieving an SSB target in a particular year.

In summary regarding the technical basis for rebuilding strategies, the SSC (2018) stated:

> *The SSC recommends that management metrics such as Frebuild should be considered as an approach, with rates being used rather than specific values.*
>
> *The SSC generally does not prefer setting arbitrary rebuilding dates, though there is some procedural value in having a timeline.*
>
> *There are some mechanisms that could be used to set a timeline that would be less arbitrary and could be customized to the species being investigated, such as surplus production models and/or life history characteristics.*
>
> *The SSC recommends continuing to investigate ways to improve the performance of stock assessment projections as a high priority for the species under the NEFMC's jurisdiction.*
>
> *Finding ways to incorporate economic and social risk factors is also important to consider in the rebuilding strategies.*

Assumptions/setting up the projections – The following summarizes the PDT's plan to set up the rebuilding projection options:

- Bridge year - Rebuilding plans would assume an updated estimated bridge year catch in CY2019 and FY ACLs plus the Canadian catch assumption in 2020 and 2021.

- Year one - The first year of the rebuilding plan would be 2021. The PDT is not planning on revising the catch advice already set for 2021 through FW59.

- Recruitment – The rebuilding plans would be based on projections that assumes a CDF of recruitment from the full time series to be consistent with the estimated SSB_{MSY} from the benchmark assessment.
    - The PDT also plans to run sensitivity projections to examine the implications of recruitment not increasing to the time series mean. These sensitivity projections may help inform the time span chosen for rebuilding plans.
    - In FW59, the constant ABCs for white hake were based on a CDF of recent low recruitment (1995-2016) for the short term. This provides some justification for maintaining the ABCs from FW59 in year 2021 when developing longer term rebuilding plans using a different recruitment assumption.

- Fishing Mortality/ $F_{rebuild}$ – The PDT plans to use the following fishing mortality rates to develop a range of options with some projection runs conducted for comparison purposes:

  F0, F25, F50, F70, F75, and F_{MSY}.

The PDT requests SSC feedback on the proposed approach and assumptions.