



New England Fishery Management Council

50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116

Ernest F. Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

To: Tom Nies, Executive Director

From: Scientific and Statistical Committee

Date: November, 20 2018

Subject: Overfishing levels (OFLs) and acceptable biological catch (ABC) recommendations for Atlantic herring.

The SSC met on October 10, 2018 in Boston, Massachusetts, to address the following term of reference (TOR):

1. OFL and ABC recommendations for Atlantic herring

Review information provided by the Council's Herring Plan Development Team, the results of recent Atlantic herring benchmark stock assessment (SAW 65, 2018), and using the acceptable biological catch (ABC) control rule selected by the Council in Amendment 8, recommend the overfishing level (OFL) and the ABCs for Atlantic herring for 2019-2021.

To address this TOR, the SSC considered the following information:

1. Stock Assessment Workshop 65 for Atlantic Herring, Executive Summary
2. Presentation slides, Assessment
3. Herring PDT Report (Draft)
4. Presentation slides, Amendment 8 control rule and OFL/ABC recommendations
5. SSC Final Report for Atlantic Herring Specifications (2016-2018), May 2015

The SSC received a thorough overview of the operational assessment from Dr. Jon Deroba detailing the available fishery dependent and independent data, updated analyses of herring consumption, stock assessment results, calculation of reference points, and recommendations regarding the stock status, stock projections, and stock structure of herring. The SSC also received a report on the PDT analyses from Dierdre Boelke. This included a summary of the MSE process conducted through Amendment 8 as well as current management actions taken by NOAA fisheries to reduce 2018 catch limits in response to the recent results of the benchmark stock assessment, and the herring PDT recommendations for OFL and ABC for 2019-2021.

The results of the Atlantic herring benchmark stock assessment (SAW 65, 2018) indicated that the stock status for Atlantic herring was not overfished and no overfishing was occurring. The stock assessment used the Age Structured Assessment Model (ASAP) which was used in previous assessments, with several structural changes. The structural changes in the 2018 benchmark assessment included: 1) natural mortality, which was previously thought to vary by time and age, but SAW65 concluded that M should be held constant for all years and ages (set at 0.35), 2) stock recruit relationship, it was no longer possible to fit a stock-recruit relationship so reference points were subsequently based on MSY proxies ($F_{40\%}$), and 3) several likelihood penalties that were previously used to aid convergence were removed as they were no longer required. Short-term projections of future stock status were carried out using ASAP and assumed that age 1 recruitment for 2018 was derived from the estimated recruitments for 2013-2017, whereas recruitment for 2019-2021 was drawn from estimates spanning 1965-2015. The key concern for this stock is the relatively poor recruitment in 2013-2017. If the estimated recent low recruitment continues, then the SSB is likely to remain relatively low in the near term, putting the stock at relatively high risk of becoming overfished in years 2019-2021.

The ABC recommendations made by the PDT were based on the Council-selected ABC control rule which was informed by the MSE process. The control rule is biomass based, with a maximum fishing mortality of 0.8 when biomass is greater than 0.5. When biomass falls below 50% SSB/SSB_{msy}, fishing mortality declines linearly until 0.1, when fishing mortality is set to zero, or a fishery cutoff at 0.1. The ABC control rule was applied to projected biomass estimates for 2019-2021.

The SSC was prepared to implement the harvest control rule selected through the Amendment 8 MSE process. However, the SSC had reservations about the projections for Atlantic herring and were concerned about the assumptions regarding future recruitment. The SSC was concerned that age 1 recruitment in projections for 2019-2021 was drawn from 1965-2015 and the resulting projected biomass which showed a substantial increase over time. The SSC did not have confidence in the projected increase in biomass in 2021 and were concerned about setting ABC based on this value. Following an extensive discussion on this topic, the SSC resolved to make ABC recommendations for 2019 and 2020 based on the ABC control rule but recommended keeping ABC in 2021 the same as 2020 due to the uncertainty in the projections. The SSC recommended the NEFMC request an update assessment in 2020 based on the existing benchmark assessment. The objective of this update will be to verify projected trend in biomass and recruitment with the aim of revising advice for 2021 based on more informed estimates of recent recruitment.

In response to TOR1, OFL and ABC values (expressed in metric tons) resulting from these deliberations are as follows:

Year	OFL	ABC
2019	30,668	21,266
2020	38,878	16,131
2021	59,788	16,131

Summary of recommendations

1. The SSC recommends an OFL for Atlantic herring of 30,668 mt in 2019, 38,878 mt in 2020, and 59,788 in 2021.
2. The SSC recommends the ABC for Atlantic herring should not exceed 21,266 mt in 2019, 16,131 mt in 2020, and 16,131 mt in 2021.
3. The SSC recommends an update stock assessment for Atlantic herring in 2020 based on the recent benchmark assessment.
4. The SSC recommends further investigation into understanding the recent low recruitment of Atlantic herring and possible drivers.