

Appendix I

**ATLANTIC HERRING FISHERY SPECIFICATIONS –
DEFINITIONS AND FORMULAS**

The following definitions/formulas were adopted in the Atlantic Herring FMP (modified in Amendment 4) and are described below as they apply to the 2019-2021 Atlantic herring fishery specifications. These are provided in this appendix as background to summarize what the specific definitions and formulas are for Atlantic herring catch limits.

Overfishing Limit (OFL). The catch that results from applying the maximum fishing mortality threshold to a current or projected estimate of stock size, the F_{MSY} or its proxy.

$$OFL \geq ABC \geq ACL$$

Acceptable Biological Catch (ABC). The maximum catch that is recommended for harvest, consistent with meeting the biological objectives of the management plan. The MSA interpretation of ABC includes consideration of biological uncertainty (stock structure, stock mixing, other biological/ecological issues), and recommendations for ABC should come from the NEFMC SSC. ABC can equal but never exceed the OFL. The SSC is required to recommend the ABC (See Appendix II for a summary of their input for this action).

$$OFL - \text{Scientific Uncertainty} = ABC \text{ (Determined by SSC)}$$

ABC Control Rule (ABC CR). The specified approach to setting the ABC for a stock or stock complex as a function of scientific uncertainty in the estimate of OFL and any other scientific uncertainty. The ABC control rule will consider uncertainty in factors such as stock assessment issues, retrospective patterns, predator-prey issues, and projection results. The ABC control rule will be specified and may be modified based on guidance from the SSC during the specifications process. Modifications to the ABC control rule can be implemented through specifications or framework adjustments to the Herring FMP (in addition to future amendments), as appropriate.

Current (interim) ABC Control Rule: Under the current interim ABC control rule, ABC would be specified for three years based on the annual catch that is projected to produce a probability of exceeding F_{MSY} in the third year that is less than or equal to 50%. For 2016-2018, this value was 110,000 mt.

The current ABC control rule is considered an interim control rule, i.e., a placeholder until the Council can develop a long-term control rule through a more comprehensive management action. The Council initiated Amendment 8 to the Atlantic Herring FMP in January 2015 to consider a range of alternatives to establish a long-term ABC CR for Atlantic herring, including alternatives that explicitly account for Atlantic herring's role in the ecosystem. The Council approved Amendment 8 in December 2018 including an ABC control rule. That action is currently under review and has not been implemented by NMFS yet. Therefore, this action is considering OFL/ABC alternatives that would modify the current interim control rule and replace it with the ABC control rule recommended in Amendment 8 as the new interim control rule (See Section 4.2.1 of Amendment 8 for more detail). This action is also considering a No Action OFL/ABC that would maintain the OFL and ABC values implemented in 2019 for fishing years 2020 and 2021.

Annual Catch Limit (ACL). A stock-wide ACL will be established that accounts for both scientific uncertainty (through the specification of ABC) and management uncertainty (through the specification of the stock-wide ACL and buffer between ABC and the ACL).

The ACL is the annual catch level specified such that the risk of exceeding the ABC is consistent with the management program. The potential sources of management uncertainty in this plan are catches of Atlantic herring in the New Brunswick, Canadian fishery since that catch is considered part of the same stock, catch in state waters, and estimates of discarded catch. The ACL can equal but never exceed the ABC. ACL should be set lower than the ABC as necessary due to uncertainty over the effectiveness of management measures. The stock-wide Atlantic herring ACL equates to the U.S. optimum yield (OY) for the Atlantic herring fishery and serves as the level of catch that determines whether accountability measures (AMs) become effective. The AM for the stock-wide ACL, total fishery closure at 95%, reduces the risk of overfishing.

$$\text{ABC} - \text{Management Uncertainty} = \text{Stock-wide ACL} = \text{OY}$$

Sub-ACL. Area-based sub-divisions of the stock-wide/total Atlantic herring ACL, intended to minimize the risk of overfishing any stock sub-component. The herring plan has four sub-ACLs, one for Area 1A, Area 1B, Area 2 and Area 3 (Figure 2). The Council has chosen to apply AMs to the sub-ACLs (closure of the area at 92%), further reducing the risk of overfishing.

Accountability Measure(s) (AMs). Management measures established to ensure that (1) the ACL is not exceeded during the fishing year; and (2) any ACL overages, if they occur, are mitigated and corrected. During the year, when 92% of any sub-ACL is estimated to be harvested, or 95% of the entire ACL is estimated to be harvested, the herring fishery is limited to 2,000 lb per trip/day to end directed herring trips. This is an in-season accountability measure intended to ensure catch limits are not exceeded. If the sub-ACL for any management area is exceeded at the end of a fishing year, the sub-ACL will be reduced in a subsequent fishing year to account for the overage. Overages are calculated during the year following the fishing year and deducted the next year. For example, any overages in 2015 will be calculated during 2016 and deducted during 2017. If total herring catch does not exceed the stock wide-ACL and if a management area's sub-ACL has not been fully harvested during a fishing year, then the amount of the underage, up to 10% of the sub-ACL, will be carried over and added to the sub-ACL for that management area in a subsequent year. Additional herring harvest added to each sub-ACL will not be added to the stock wide herring ACL. See Section 4.5 for more detail on ACL and sub-ACL underages and overages.

Domestic Annual Harvest (DAH). DAH is established based on the expected catch from U.S. fishing vessels during the upcoming fishing year(s). The Herring FMP, as modified in Amendment 4, specifies that OY may equal DAH.

$$\text{OY} \geq \text{DAH}$$

The Herring FMP, as modified in Amendment 4, also specifies that domestic annual harvest (DAH) will be composed of domestic annual processing (DAP) and the amount of Atlantic herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada (BT).

$$\text{DAH} = \text{DAP} + \text{BT}$$

Domestic Annual Processing (DAP). The amount of U.S. harvest that domestic processors will use, combined with the amount of the resource that will be sold as fresh fish (including bait). The Herring FMP specifies that DAP is a subset of DAH and is composed of estimates of production from U.S. shoreside and at-sea processors. The Herring FMP authorizes the allocation of a portion of DAP for at-sea processing by domestic processing vessels that exceed the current size limits (U.S. at-sea processing, USAP).

U.S. At-Sea Processing (USAP). Domestic at-sea processing capacity by U.S. vessels that exceed current size limits. When determining the USAP allocation, the Council should consider the availability of other processing capacity, development of the fishery, status of the resource, and opportunities for vessels to enter the herring fishery. This has been set at 0 mt in recent specification packages.

Border Transfer (BT). The amount of herring that can be taken in U.S. waters and transferred to Canadian herring carriers for transshipment to Canada, (4,000 mt for 2016-2018 and previous specifications, the 2019 in-season adjustments set it at 0 mt).

Research Set-Aside (RSA). RSAs are allowed in any or all the herring management areas with a sub-ACL of 0-3%. In many years this has been set at 3% of each area, and in some years the RSA set-aside has been set to 0%.

Fixed Gear Set-Aside (FGSA). FGSA can be specified up to 500 mt in Area 1A and will be returned to the 1A sub-ACL if not used by November 1. This set-aside has been set at 500 mt some years, 295mt for some years, and much lower in recent years when total quotas reduced (39 mt in 2019).