

INPUT ON ATLANTIC HERRING ABC CONTROL RULE:
RECOMMENDATIONS FOR A DRAFT DECISION DOCUMENT TO
HELP IDENTIFY A RANGE OF ABC CONTROL RULE ALTERNATIVES

Amendment 8 Purpose and Need // Goals and Objectives: The purpose of Amendment 8 is to establish a long-term control rule for specifying ABC for the Atlantic herring fishery. The ABC CR is needed to provide guidance to the Council's Scientific and Statistical Committee regarding how to specify an annual ABC for Atlantic herring based on scientific uncertainty, stock status, and the Council's risk tolerance. Moreover, the ABC CR is needed to create a buffer between the overfishing limit (OFL) and ABC to account for scientific uncertainty such that there is a low risk in any given year that the OFL for Atlantic herring will be exceeded. The purpose is also to address the biological needs of the Atlantic herring resource as well as the ecological importance of Atlantic herring to the greater Atlantic region in a manner that is consistent with the requirements and intent of the MSA. The importance of Atlantic herring as a forage species is underscored by the Council's specified intent to consider a wide range of alternatives for the ABC CR in Amendment 8, including those that account for Atlantic herring's role in the ecosystem. (Amendment 8 Scoping Notice)

The goals of Amendment 8 include (Council Motion 5, June 16-18, 2015):

1. Account for the role of Atlantic herring within the ecosystem, including its role as forage.
2. Stabilize the fishery at a level designed to achieve optimum yield.

An objective of Amendment 8 is to:

1. Develop and implement an ABC control rule that manages Atlantic herring within an ecosystem context and addresses the goals of Amendment 8.

Decision 1: Select a Control Rule Approach that Accounts for Atlantic Herring's Role in the Ecosystem

Alternative A: Hockey Stick Rule. This approach decreases fishing mortality as biomass decreases below the target level. Fishing ceases temporarily if biomass is at or below a minimum biomass threshold. This produces a hockey stick shaped fishing mortality rate, and is intended to ensure there is sufficient Atlantic herring available as forage for predators. This approach ties yield to stock status (rather than a fixed number). It was favored by the majority of MSE respondents. See MSE Summary Report Draft at 9-11, 17-18; MSE Presentation on "Outcomes of December 2016 MSE Workshop," Herring AP and Committee Meetings, January 10-11, 2017 at slides 5-8.

Note that the Council could choose this Alternative and then choose not to implement a Cutoff Threshold in Decision 3 below, which would effectively eliminate the part of the "hockey stick" shape that gives this approach its name (this shape is sometimes referred to as a "Sliding Rule" (Summary Report at 19)). The slope feature resulting from the changing mortality rate would remain in place.

Alternative B: No Action: Interim (Three-year Constant Catch) Rule. The current ABC control rule specifies ABC in three year blocks 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 is a constant 110,000 mt and results in a fishing mortality rate that increases as biomass decreases (currently, the median $F = .19$ (2016), $.23$ (2017), and $.25$ (2018)). This approach sets catch based on the MSY for a single species (Atlantic herring) and does not account for predators. The rule allows nearly 100% of MSY to be harvested and currently results in a 35-50% probability of overfishing in the third year. See MSE Summary Report at 10-11, 17-18.

Alternatives Considered But Rejected

Alternative C: Constant Catch Perpetuity. Allows for higher fishing mortality at lower biomass levels. Adjustments to catch would be necessary to account for the forage needs of predators.

Alternative D: Constant Fishing Mortality Rate ($F = .5F_{MSY}$). Allows the same fraction to be harvested regardless of biomass. Adjustments to F would be necessary to account for the forage needs of predators.

Alternative E: 15% Restriction on Annual Yield Adjustments. Control rules with a 15% restriction on yield adjustments did not perform well against the performance metrics identified in the MSE (could not respond fast enough to changing conditions) and were considered too risky. See Summary Report at 17.

These approaches were analyzed in the MSE but were found not to be sufficiently responsive to changes in the ecosystem and were considered too risky. See Summary Report at 18; MSE Presentation “Outcomes” at slides 7-8. The PDT and HOC recommended removal of these approaches from further consideration because they do not meet the purpose and need of the Amendment 8.

Decision 2: Select a Target Biomass

Scientific Sources including the National Standard 1 guidelines recommend councils maintain adequate forage for all components of the ecosystem by managing forage stocks for higher biomass than B_{MSY} , and that MSY be reduced to account for ecological factors.

Alternative A: $B_{target} = 75\%$ unfished biomass (“ $0.75B_0$ ”). Maintaining 75% of B_0 is recommended emerging as best available science for managing forage species and is consistent with the NS 1 guidelines.

Alternative B: $B_{target} = 80\%$ unfished biomass, or $.8B_0$. This would reduce risk because the ecological consequences of overfishing forage species can be “very severe” even at relatively low levels of depletion.

Alternative C: $B_{target} = 70\%$ unfished biomass, or $.7B_0$. This would allow for more yield but increase risk.

No Action: No Control Rule Target Biomass. The Interim Rule does not manage to a biomass-based target. The most recent assessment estimated that SSB is currently at 74% of unfished biomass. See Summary Report at 10.

Decision 3: Select a Cutoff Threshold

Reducing fishing pressure when a species is in steep decline is standard fisheries policy. This safeguard is especially important for forage fish like herring which play an important role in the ecosystem and are vital to the success of other fisheries. A collapse could cascade throughout the ecosystem and harm other fisheries.

Alternative A: Bthreshold = 40% unfished biomass, or 0.4B₀. Consistent with the scientific consensus on a general rule for managing forage fish and protecting the ecosystem.

Alternative B: Bthreshold = 50% unfished biomass, or 0.5B₀. Decreased risk, accounting for high annual variation of Atlantic herring biomass, but decreases yield.

Alternative C: Bthreshold = 30% unfished biomass, or 0.3B₀. Increased yield, but increased risk.

Alternative D: No Action, Bthreshold = 0%. The Interim Rule does not have a biomass-based threshold. See MSE Summary Report at 11.

Decision 4: Determine how often Biomass is Re-estimated and Catch is Re-Set.

These alternatives assume that a benchmark or update to the stock assessment will be performed every three years.

Alternative A: Annual Estimates and Catch Adjustments Through Specifications: (1) biomass estimated annually by PDT using available data and reported to Council; and (2) adjusted catch limits implemented through annual specifications:

- Lowest frequency of overfished. See MSE Presentation “Now What?” at slide 35.
 - Least variation in yield. See id. at slide 36; MSE Summary Report at 10.
 - Lowest frequency of fishery closures. See MSE Presentation “Now What?” at slide 37.
- “There was substantial support for this approach in the MSE, as it would be responsive to the latest information on environmental and fishery conditions.” See Summary Report at 17.

Alternative B: Annual Estimates with Triggered Catch Adjustments: (1) biomass estimated annually by PDT using available data and reported to Council; and (2) PDT would develop appropriate triggers for mid-specification adjustments in Catch. For example, a decrease in estimated biomass of 5% would trigger an automatic adjustment to the appropriate F and corresponding catch level. New catch limits would be implemented in a three-year specifications process.

Alternative C: Triggered Annual Estimates and Catch Adjustments and Annual Reports: If the benchmark or full stock assessment estimate of biomass is below the target biomass, then either Alternative A or Alternative B described above applies (Council chooses one). Annual biomass monitoring reports from the PDT to the Council are required, which would allow the Council to require additional analysis and take action more quickly, if appropriate.

No Action: Catch Specifications Every 3 Years Consistent with Stock Assessments: Biomass assessed in the stock assessment which occurs approximately every 3 years (benchmark or update) and catch limits are established in 3 year specifications. May be the “most feasible, due to logistical concerns about setting specifications every year.” See Summary Report at 17.

Alternatives Considered But Rejected

Alternative E: Catch Adjusted Every Five Years. Control rules with catch set every 5 years did not perform well against the performance metrics identified in the MSE (could not respond fast enough to changing conditions) and were considered too risky. See Summary Report at 17. The HOC recommended removing this Alternative from further consideration.

DRAFT