



4WX Herring Industry MSE Update

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Background

- The 4VWX Herring (Southwest Nova Scotia/Bay of Fundy component) MSE process began in 2019 and continues today
- A series of CSAS and stakeholder meetings were held to define objectives, develop the MSE framework and address uncertainties associated with the stock.
- In response to these meetings, the Herring Science Council identified in writing to DFO a number of concerns related to the MSE objectives, input parameters, OM reference set, performance statistics and thresholds, MP selection framework and the overall process.
- From the industry's perspective these issues were not satisfactorily addressed under the process initiated in 2019 and this led to further consultation with senior DFO officials in 2022.
- In June/July of 2022 the Minister of Fisheries approved a postponement in the implementation of the MSE framework and granted a review to address the concerns/uncertainties identified by industry.

MSE Independent Review

- An internationally recognized MSE expert was recruited by industry in August 2022 to conduct/assist with the review, Doug Butterworth who is assisted by another MSE expert, Rebecca Rademeyer
- They now have the MSE computationally operational, so can run simulations.
- Two meetings were held between DFO, the HSC and the MSE experts this past fall and winter to determine how the review will proceed and how a resolution can be achieved with the goal of implementing the MSE for the stock in the near term.
- Although the review is in its early stages, the MSE experts have identified several key issues.

Key Concerns

Thus far, three main issues have been identified within the existing MSE framework that are not in line with customary international practices and need to be revisited.

- 1) The Performance Threshold/Limit Reference Point used for Management Procedure selection
- 2) Management Procedure selection being predicated entirely on the Worst-Case OM,
- 3) DFO apparently considering the MSE to be completed when it is definitely not.

1) Performance Threshold/LRP

- The performance threshold for the MSE was originally determined by a CSAS peer review process that occurred over two meetings between fall 2020 and winter 2021 (0.7 SSB MSY)
- In the fall of 2021, DFO changed the performance threshold for the MSE framework to the Limit Reference Point (i.e., the mean acoustic index estimate between 2005-2010).
- In 2022 it was revised to be the mean model SSB estimate between 2005 and 2010 for each OM.

The issue is that SSBLRP > SSBMSY (LRP 5 to 65% higher than MSY)

- The SSB MSY is the spawning biomass required to support the maximum long-term sustainable yield under the current conditions. Typically, in Canada the Limit Reference Point is set at 40% of SSB MSY and the Upper Stock Reference at 80% of SSB MSY.
- Under the current modelling framework, the stock would be in the critical zone when fishing at the biomass level corresponding to MSY.
- The current framework does not follow standard practices and is unrealistic.. The concept of an LRP appears to be confused with that of a biomass recovery target.
- We are unaware of any case elsewhere in the world where the LRP is set ABOVE SSBMSY. Usually, it is set fairly far below. By definition LRPs correspond to biomasses where recruitment levels may be impaired, which scarcely corresponds to a biomass as high (or higher) than SSBMSY..

2) Worst-case OM Scenario

- Under the current framework, all OMs must pass the performance threshold of maintaining the stock above the LRP with at least 75% probability in years 10-15 of the projection period for an MP to be accepted.
- Although there are currently 12 unique OMs (originally 48) representing a range of uncertainties and alternative realities for the stock, MP selection comes down to whether the MP achieves this threshold for the least productive OM.
- In other words, the outcomes from all other OM's are discarded and the worst-case model is deemed the most plausible. This is inconsistent with our knowledge of the stock.
- This performance criterion is unrealistic and inconsistent with general practices used in other MSE's which usually involves weighting over a balanced range of the more plausible OM's (e.g., mean/median and perhaps a lower percentile of the distribution across all OMs) and represents an extremely pessimistic approach.
- This approach, which is unduly risk averse, unnecessarily sacrifices catch (and employment) for no real additional resource security.

3) The MSE is Incomplete

- The MSE expert was perplexed that the SWNS/BoF herring MSE was apparently considered complete by DFO when there is a lack of thorough investigations of catch variability presented for individual MPs in the short and long term, and the lack of selection and approval of one MP.
- Preliminary analyses by the expert indicates yet further that MP development is incomplete, given there is room to improve catches while remaining within the constraints of even the existing threshold restrictions.
- Standard practice is that industry is consulted to indicate their preference amongst alternative options for future variability in catches, and how these trade-off against the expected average annual catch and the risk to the stock.
- Sufficient time is needed to evaluate the implications of each individual MP for the initial duration of the MSE (likely 5-6 years before review and revision) in terms of the objectives (e.g., catch variability and potential yield).

Proposed Next Steps

- As the review is only in its initial stages, more time is needed to complete a thorough investigation and to accommodate possible future recommendations by the MSE experts.
- Update the input data to 2022 where possible (e.g., acoustic index, catches, growth) and recondition the operating models.
- Work with DFO and stakeholders on a path forward to identify and resolve outstanding issues.
- It is anticipated that the review could be completed by the end of the calendar year in time for a CSAS meeting with all stakeholders, with finalization of MP selection before the 2024 TAC decision.