5. SEDAR 38 KING MACKEREL ASSESSMENT UPDATE REVIEW

5.1. Documents

Attachment 8. SEDAR 38 Update Assessment Report
Attachment 9. SEDAR 38 Update Assessment Presentation*

5.2. Presentation

SEDAR 38 Update Assessment Overview: Dr. Matt Lauretta, SEFSC

5.3. Overview

The Committee is asked to review the King Mackerel Update assessment prepared through the SEDAR 38 Update and provide fishing level recommendations (Attachment 8). King Mackerel

was last assessed in 2014 during SEDAR 38, where the stock was found to have not been overfished and not undergoing overfishing.

5.4. Public Comment

5.5. Action

- Review assessment
  - Does the assessment address the ToRs to the SSCs satisfaction?
    - ➢ ***The SSC agrees that the assessment appropriately addresses the ToRs.***
  - Does the assessment represent Best Scientific Information Available?
    - ➢ ***The SSC considers this assessment as BSIA given the ToRs.***
  - Does the assessment provide an adequate basis for determining stock status and supporting fishing level recommendations?
    - ➢ ***The SSC considers the assessment an adequate basis for determining stock status and supporting fishing level recommendations.***
- Identify, summarize, and discuss assessment uncertainties
  - Review, summarize, and discuss the factors of this assessment that affect the reliability of estimates of stock status and fishing level recommendations.
    - ➢ *Although the base model converged on a stable solution, the maximum gradient (a standard model performance diagnostic) was 0.015, which is higher than the widely accepted threshold of 0.001. This typically occurs when two or more parameters in the model are very highly correlated (>0.95) and not well estimated.*
    - ➢ *There is uncertainty surrounding how the winter mixing zone landings were assigned to the Gulf and Atlantic stocks, given there is spatial and temporal variability in how mixing actually occurs. In addition, the dynamics of the fishing fleet can vary annually, which contributes to the difficulty in assigning landings in the mixing zone.*
  - Describe the risks and consequences of the assessment uncertainties with regard to status and fishing level recommendations.
    - ➢ *Given diagnostics (max gradient >0.001) indicated that the assessment model is having difficulty estimating all parameters, it is likely that the model configuration is not ideal given the available data. However, modifying the model's configuration was deemed outside the bounds of a SEDAR update assessment. Although the impact could be minor, the SSC cannot be more explicit about the potential risks and consequences of this assessment uncertainty without knowing which parameters are affected. Our research recommendation for addressing this issue can be found below.*

- Are methods of addressing uncertainty consistent with SSC expectations and the available information?
  - ➢ *Methods of addressing uncertainty are consistent with the available information. However, parameter uncertainty was not characterized as fully as in other SEFSC assessments (e.g., using Monte Carlo bootstrap method used by the Beaufort Laboratory); therefore, the Tier II uncertainty score used in setting the ABC was lowered to medium.*
- List (in order of the greatest contribution to risk and overall assessment uncertainty) and comment on the effects of those assessment factors that most contribute to risk and impact status determinations and future yield predictions.
  - ➢ *As mentioned above, the SSC cannot be more explicit about the potential risks and consequences of uncertainty in this assessment without additional information on the cause of model convergence issues. There is also uncertainty surrounding how the winter mixing zone landings were assigned to the Gulf and Atlantic stocks. These issues could not be explored during an update assessment; therefore, the degree to which these factors impact status determination and future yield predictions is unknown at this time.*

- Provide fishing level recommendations
  - Apply the ABC control rule and complete the fishing level recommendations table.
    - ➢ *Tier I: 2 (2.5%)*
    - ➢ *Tier II: 3 (5%)*
    - ➢ *Tier III: 1 (0%)*
    - ➢ *Tier IV: 1 (0%)*
    - ➢ *Adjustment: 7.5%*
    - ➢ *P* = 42.5%*
    - ➢ ***The SSC recommends projections at P*=50% for the OFL and P*=42.5% for the ABC for King Mackerel.***
    - ➢ *Note that the stock is currently well above the biomass target (SPR30%) due in part to unusually high recruitment in recent years (2013-16). Thus, OFL recommendations listed in Table 2 begin at higher than current catches and then decrease over time as SSB declines from well above the target down toward the target.*
  - Comment on any difficulties encountered in applying the Control Rule, including any required information that is not available.
    - ➢ *The SSC does not concur with the MRAG PSA findings that King Mackerel is a high risk stock.*
      - *This stock has never been overfished nor has it undergone overfishing.*

- *There is no evidence of age or size truncation.*
- *This species matures early (fully mature at age 2).*
- *Due to these factors, the Committee recommends a score for Tier IV of Low.*
- *Productivity and Susceptibility considerations are being addressed during the ABC Control Rule Amendment development and the SSC recommends that process continue as expediently as possible.*

- Is adequate rebuilding progress being made? Comment on reasons why progress differs from projections.
  - ➢ *N/A.*

- Provide advice on monitoring the stock until the next assessment
  - What indicators or metrics should the council monitor and could the SSC use to evaluate the stock until the next assessment?
    - ➢ *Identify if sampling of the commercial handline fleet off NC can be brought back to sampling levels that occurred before recent years of frequent hurricanes.*
    - ➢ *If the model is found to be sensitive to the mixing zone composition, monitor the mixing zone for the relative contribution of Atlantic and Gulf of Mexico fish.*
    - ➢ *Monitor the SEAMAP index for future recruitment signals.*
  - Is there a recommended trigger level for these metrics? How should the Council respond if a trigger is activated?
    - ➢ *No recommendation.*
- Provide research recommendations and guidance on the next assessment
  - Review the included research recommendations and indicate those most likely to reduce risk and uncertainty in the next assessment.
    - ➢ *Research aimed at improving the documentation of data series formatting, including index standardization, for SS3 would improve modeling efficiency. This includes statistical coding for consistent database querying and data processing.*
    - ➢ *An evaluation of alternative age references, or age-specific time series, for the SEAMAP fishery independent survey was recommended by the data providers and noted by the analyst for future assessments. Specifically, separate age-0 vs. age-1 indices should be evaluated and compared with an index that pools ages.*
    - ➢ *An analysis of the effect of excluding sublegal fish size observations on the assessment should be undertaken.*

- ➢ *Information on the age-composition of discarded fish from all fleets is needed to validate the assumption of exclusively age-0 discards.*
- ➢ *The conditional age-at-length data had a significant influence on recent recruitment estimates. Future research assessments should evaluate model sensitivity to the age-data and explore alternative parameterizations (such as inverse age-length key), as the fleet coverage was suboptimal with zero information available for several fleets and years.*

- Provide any additional research recommendations the SSC believes will improve future stock assessments.
  - ➢ *The SSC recommends model sensitivity to the mixing zone catch ratio be investigated.*
  - ➢ *The SSC recommends that the source of poor model convergence (i.e., max gradient >0.001) be identified prior to the next assessment and communicated to the SSC. We suggest examining the .cor file for very highly correlated parameters to help diagnose the problem.*
  - ➢ *Examine sensitivity in start date between current start date when only catch data available versus later start date when multiple data sources are available.*
  - ➢ *Examine sensitivity to the choice of M vs body size schedule (Lorenzen vs Charnov schedule).*
  - ➢ *Examine sensitivity to fitting the indices of abundance better. The fits were not up-weighted during SEDAR 38 or during this update.*
  - ➢ *The SSC recommends that the findings of the South Atlantic Climate Vulnerability Assessment for King Mackerel be taken into consideration during the next assessment, with respect to whether anticipated climate change impacts could affect recruitment, timing of migration, and distribution of all life stages of the species within the South Atlantic and beyond.*
- Provide guidance on the next assessment, addressing its timing and type.
  - ➢ *The SSC recommends waiting to see the results of the exploration regarding the convergence issue listed above before deciding on the type and timing of the next assessment. Knowing the cause of the problem will help the SSC recommend an appropriate SEDAR track for the next assessment.*

SSC RECOMMENDATION:

Table 3. King Mackerel Recommendations

Criteria		Deterministic		Probabilistic
Overfished evaluation ($SSB/SSB_{30\% SPR}$)		1.7		NA
Overfishing evaluation		0.29		NA
MFMT ($F_{30\% SPR}$)		0.14		NA
SSB_{MSY} (Units)		2,439 (millions of eggs)		NA
MSST (Units)		2,049 (millions of eggs)		NA
MSY (million lbs.)		18.3		NA
Y at 75% $F_{30\% SPR}$ (1000 lbs.)				NA
ABC Control Rule Adjustment		7.5%		NA
P-Star		42.5%		NA
M		0.16		NA
OFL RECOMMENDATIONS				
Year	Landed LBS	Discard LBS	Landed Number	Discard Number
2021	34,300,000			
2022	29,500,000			
2023	26,300,000			
2024	24,200,000			
2025	22,700,000			
ABC RECOMMENDATIONS				
Year	Landed LBS	Discard LBS	Landed Number	Discard Number
2021	33,300,000			
2022	28,500,000			
2023	25,400,000			
2024	23,300,000			
2025	21,800,000			