Australia's National
Science Agency

An update on Consideration of Exceptional Circumstances for the Bigeye Tuna MP 2025

Ann Preece and Ash Williams

February 2025

IOTC WPM_MSE 2025

Environment

Citation

Preece AL, Williams A. (2025) An update on Consideration of Exceptional Circumstances for the Bigeye Tuna MP 2025. CSIRO, Australia.

Copyright

Important disclaimer

Acknowledgments

This work is funded by CSIRO.

Contents

Abstract

The IOTC's adopted management procedure (MP) for bigeye tuna is used to recommend the Total Allowable Catch (TAC) of bigeye in the Indian Ocean. As part of the implementation schedule, the Commission adopted an annual review of evidence for exceptional circumstances that could make the application of the TAC advice risky to the stock or fishery.

A wide range of information was reviewed at the Working Party on Methods (WPM) 2024 to examine if there was evidence for exceptional circumstances, e.g., the data inputs to the Management Procedure (MP), changes in the knowledge of stock or fishery uncertainties against which the MP was tested, and implementation of MP TAC advice. One exceptional circumstance was detected regarding the standardisation of CPUE data for running the MP. The WPM, SC and joint CPUE working group agreed on action to create the CPUE required.

This paper examines the CPUE standardisation as an input to the MP, to provide updated advice on exceptional circumstances.

1 Introduction

The Exceptional Circumstances Guidelines (IOTC, 2021: IOTC–2021–SC24 Appendix 6A) provide a scientific process for examining evidence for exceptional circumstances, evaluating potential impacts, and developing appropriate management responses if necessary. This process of examining evidence for exceptional circumstances provides a safety-net around the MP TAC advice and transparency in TAC decision making by the Commission.

The IOTC adopted management procedure (MP) for bigeye tuna (BET) was scheduled for calculation of the next BET TAC in October 2024, but the review of Exceptional Circumstances at the WPM noted that a standardised CPUE index based on the agreed methodology (in Resolution 22/03) was not yet available to run the BET MP. This triggered the "changes to input data to the MP" category of exceptional circumstances.

As noted at the WPM2024 and SC, a plan of action to address the issue was developed. The WPM and SC agreed to the following process for action:

- the joint CPUE working group would produce a BET CPUE index, as per the requirements / specifications of Williams et al (2022), in early February 2025
- the WPM_MSE would review MP outcomes, using the new CPUE, 24-25 February 2025
- the Scientific Committee would convene a special session, online (for two hours) on 26 February 2025, to review and if appropriate endorse the BET MP run and its associated BET TAC outcomes.

This paper provides an update to the full review of exceptional circumstances conducted at the WPM in 2024 (Preece et al, 2024). All categories for exceptional circumstances were reviewed in 2024, and none triggered exceptional circumstances, except for the CPUE as an input to the MP.

2 Review of the new CPUE series - MP input data

The CPUE series specified for the MP is created from the spatially stratified CPUE series (e.g., Kitikado et al., 2022) and recombined using area weighting from Hoyle and Langley (2020), to create a single CPUE series used in the MP (Williams et al., 2022). The CPUE standardisation combines operational data from Japan, Korea and Taiwan,China longline fleets. A collaborative international team worked together to develop the time series. We acknowledge and thank the joint CPUE group for the extra work they have conducted in 2025.

Kitikado (pers. comm.) has provided the new CPUE data for 1979-2023. Kitikado and Hoyle (pers. comm.) have confirmed the following details of the models and inputs data:

- operational data
- Log normal models all regions
- R1N, R1S, R2, used Hooks Between Floats (HBFs), and R3 used clusters (based on species mix)
- Some data from 2021-2023 excluded.

We note the following correction to Williams et al 2022 summary of the specification of the CPUE standardisation (Hoyle pers. comm.): The cluster definition should be HBFs for R1N, R1S, and R2 and clusters (based on species mix) for R3 (as above).

We note that the CPUE standardisation in 2025 has differed from the agreed CPUE specification in the following ways:

- Lognormal instead of Delta Lognormal models, because of the difficult time constraints. Hoyle (pers.comm.) noted that lognormal should give similar results to the delta lognormal.
- Some differences in subsampling of data, and excluded data in 2021-2023 from the China,Taiwan fishery.

The 2025 CPUE series is compared with the series used in the MSE up to 2018 (the last year of CPUE used in final tuning of the selected MP) and the range of MSE projected values in Figure 1. The historical period 1979-2018 show similar trends. The 2025 CPUE series is slightly above the 95% confidence bound of the MSE projected range in 2019 and 2020 (the first 2 years of projections) but is within the range for the recent years 2021-2023. Since the CPUE is above the expected range of values in 2019 and 2020, this is a positive exceptional circumstance. The impact may include slightly higher TAC results from the MP, but the 15% TAC change constraint component of the MP will act to constrain any excessive response to these higher CPUE values.

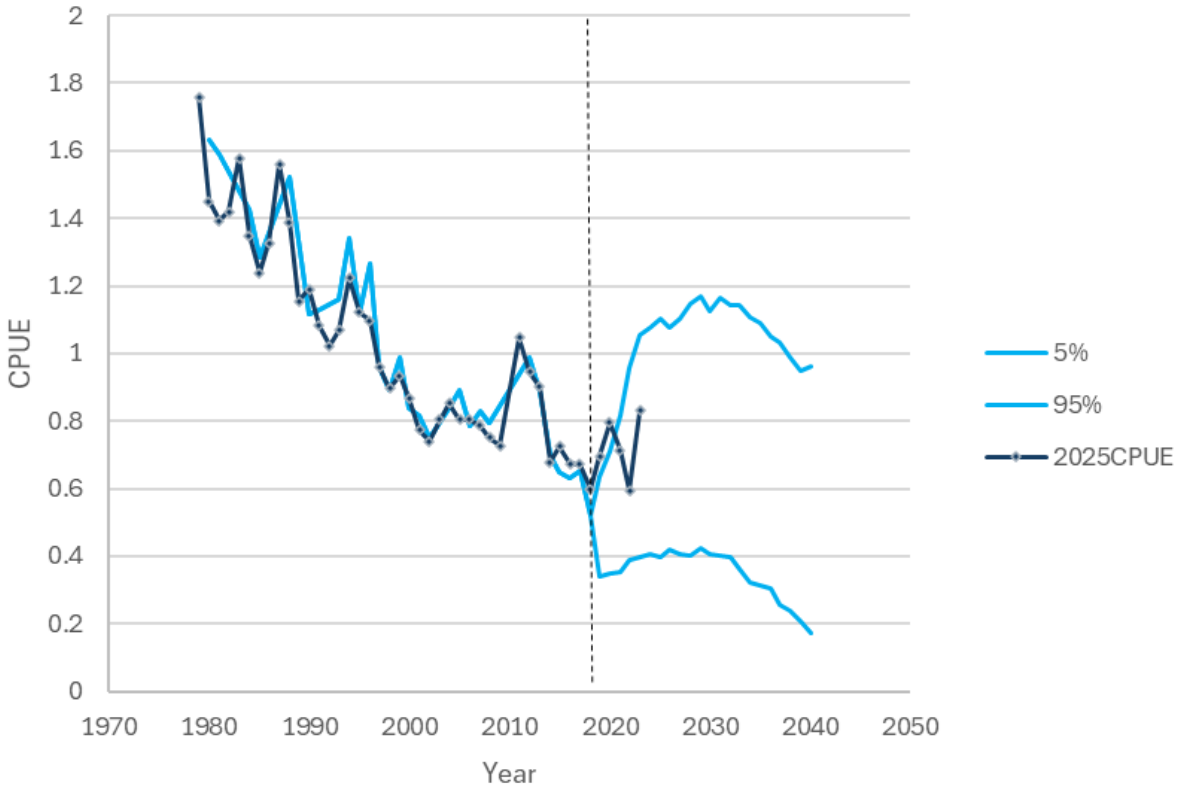

Figure 1 Comparison of the 90% probability interval for the CPUE from the bigeye tuna MSE operating models (pale blue lines) (Hillary et al, 2022) and from the 2025 CPUE series used in the MP (dark blue line). The vertical dashed line at year 2018 indicates the end of the historical years of the operating model and projections start in 2019.

The new 2025 CPUE series produced by the joint CPUE working group has been used in the MP and no additional issues were detected. We suggest that no further actions are required to proceed with the recommended TAC from the BET MP. These results can be further reviewed following the assessment of stock status in October 2025. Further work to have fixed code and data collation and method for CPUE standardisation should be discussed, as part of a highly specified MP.

References

Hillary, RM, A. Williams, A. Preece, and P. Jumppanen. 2022. Update of Indian Ocean Bigeye Tuna MSE. IOTC-2022-WPM13(MSE)-05

Hoyle SD, Langley AD (2020). Scaling factors for multi-region stock assessments, with an application to Indian Ocean tropical tunas. Fisheries Research, 228, 105586. https://doi.org/10.1016/j.fishres.2020.105586

IOTC, 2021. Report of the 24th Session of the IOTC Scientific Committee. IOTC–2021–SC24 Appendix 6A.

Kitakado, T., et al., 2022. Update of joint CPUE indices for the bigeye tuna in the Indian Ocean based on Japanese, Korean and Taiwanese longline fisheries data up to 2021. IOTC–2022-WPM13-14. Indian Ocean Tuna Commission.

Preece AL, Williams A. (2024) Consideration of Exceptional Circumstances for the Bigeye Tuna MP 2024. IOTC-2024-WPM15-10.

Williams, A.J., Preece, A.L., Hillary, R.M. 2022. Specifications of the IOTC Bigeye Tuna Management Procedure. IOTC-2022-WPM13-11.

As Australia's national science agency and innovation catalyst, CSIRO is solving the greatest challenges through innovative science and technology.

CSIRO. Unlocking a better future for everyone.

Contact us

1300 363 400
+61 3 9545 2176
csiroenquiries@csiro.au
www.csiro.au

For further information

E**nvironment**
Ann Preece
+61 3 6**232** 5**336**
a**nn.preece**@csiro.au