



Consideration of Exceptional Circumstances for the Bigeye Tuna MP 2025

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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.

The Exceptional Circumstances Guidelines specify a three-stage process: (i) examining evidence for exceptional circumstances, (ii) determining severity and impact, and (iii) recommending any management or research action that should be taken. A wide range of information is reviewed to examine if there is evidence for exceptional circumstances, e.g., the data inputs to the MP, changes in the knowledge of stock or fishery uncertainties against which the MP was tested, and implementation of MP TAC advice.

The Exceptional Circumstances Guidelines (IOTC–2021–SC24 Appendix 6A) provide a scientific process for developing appropriate management responses to exceptional circumstances and, hence, provide transparency in TAC decision making by the Commission.

The consideration of exceptional circumstances in 2025 applies to the adopted TAC for 2026-2028 from running the MP in early 2025 (slightly delayed from the scheduled MP run in 2024).

The following items were identified:

- New information on growth and natural mortality, that were not used in conditioning the MSE operating models, has been incorporated into the 2025 stock assessment. The new information but does not substantially change estimates of stock status or historical trends, and these parameters are not used in the MP.
- Several small differences to the specified CPUE standardisation are an exceptional circumstance, but severity and impact were considered low because the series predominantly fell within the range of the operating model projections and the CPUE was positive indicating low additional risks to the stock and fisheries. The SC recommended in 2024 that fixed code should be established for use in CPUE standardisation for the MP.
- Catch in 2024 is greater than the adopted TAC for 2024. This is an exceptional circumstance with potentially severe impacts stock status, considering that the stock is estimated to be overfished and subject to overfishing. The proposed recommendation is that the IOTC review 2025 catches as soon as possible and consider enacting the catch reduction mechanisms adopted in Resolution 23/04 to ensure catches remain within the adopted TAC.

The adopted TAC for 2026-2028 may need to be reconsidered if catches are not constrained.

1 Introduction

The IOTC adopted a management procedure (MP) for bigeye tuna which is used to recommend the Total Allowable Catch (TAC) in the Indian Ocean. As part of the MP schedule, the Commission adopted an annual review of evidence of exceptional circumstances that could make implementing the MP TAC advice risky. Exceptional circumstances are conditions or data that fall outside the range of uncertainties that the MP was tested against, i.e., the reference set of operating models used for Management Strategy Evaluation (MSE), and the robustness tests. 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 exceptional circumstances process has three stages:

- 1) determine whether any exceptional circumstances exist,
- 2) determine the severity and impact of the exceptional circumstances on achieving the objectives of the MP, and
- 3) if necessary, identify the research or management actions that could be taken by the IOTC.

2 Examining evidence for the existence of exceptional circumstances in 2025

The guidelines specify the information that should be checked for evidence of exceptional circumstances. The range of uncertainties and conditions that the MP was tested against are the MSE operating models used for the final tuning of the MP (Hillary et al., 2022; Kolody & Jumppanen, 2021), and a set of robustness tests. The data input specification (e.g., standardisation of the CPUE) are specified in Williams et al. (2022) and Kitikado et al. (2022). Total catch is available from the BET stock assessment paper (Phillips and Fu, 2025) and in the data preparation reports and datasets (e.g. IOTC, 2025a). The MP was first run in 2022 to provide TAC advice for 2024 & 2025. The MP was run in 2025 to provide the TAC advice for 2026-2028 that was adopted by the Commission (Williams and Preece, 2025). The MP is next scheduled to provide TAC advice in 2027.

The following items, specified in the Exceptional Circumstances Guidelines, have been examined:

- New knowledge about the stock, population dynamics or biology,
- Changes in fisheries or fishing operations,
- Changes to input data to the MP, or missing data, or
- Inconsistent implementation of the MP advice (e.g., total catch is greater or less than the Total Allowable Catch (TAC)).

2.1 New knowledge - Stock, population dynamics or biology

2.1.1 Stock status

Preliminary information on the status of the stock is available from the 2025 stock assessment for bigeye tuna (Phillips and Fu, 2025) which will be discussed and finalised at the WPTT meeting. The preliminary results indicate that the 2025 stock status results are similar to results from the 2022 assessment (Fu et al., 2022), the stock is estimated to be overfished and subject to overfishing. The 2025 assessment includes 3 years of updated data and the key uncertainties considered in the 18 models in the reference set are steepness, growth, natural mortality, and selectivity. We have compared the depletion estimates from the new stock assessment with the range of scenarios included in the bigeye tuna operating models (Figure 1). The stock assessment estimates of depletion are within the 90% probability interval of the projections of the operating models used to test the performance and tune the MP.

There is no evidence of exceptional circumstances in relation to new information on the status of the stock. Any new information on the stock presented at WPTT should also be considered in the review of exceptional circumstances for TAC advice for 2026-2028.

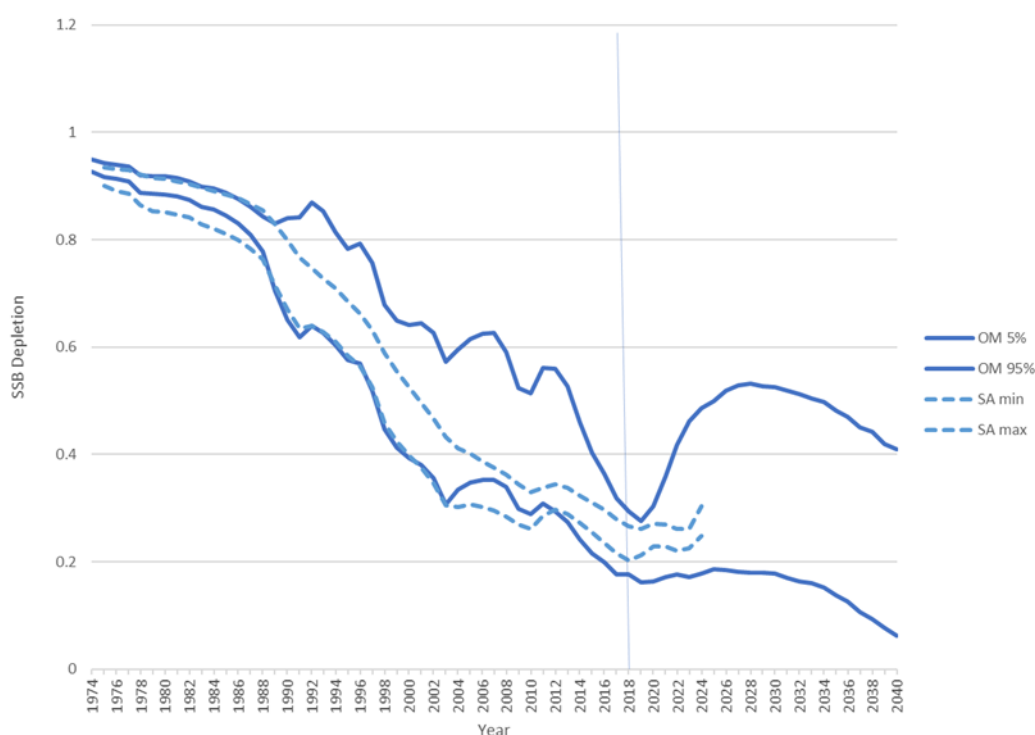


Figure 1 Comparison of the 90% probability interval for SSB depletion from the bigeye tuna MSE operating models (OM) (Hillary et al., 2022) and the minimum and maximum estimates from the 2025 preliminary stock assessment ensemble of models (SA) (Phillips and Fu, 2025). The vertical line at year 2018 indicates the end of the historical years of the operating model and start of projections.

2.1.2 Population dynamics

This review, and the previous reviews of exceptional circumstances, has identified that new information on growth (Farley et al, 2021; Eveson et al, 2025) and natural mortality parameters included in the 2025 and 2022 assessment models (Phillips and Fu, 2025; Fu et al., 2022) were not

included in the MSE operating models. Differences between the MSE operating models (as specified in MP adoption resolution) and parameterisation of stock assessments are expected as new stock assessments explore different models and methods. As noted above (see Figure 1), the SSB depletion timeseries from the new assessment falls within the range of operating models, and the recent estimates are within the range of the projections (which start from 2019).

There are no exceptional circumstances noted in relation to the population dynamics.

2.1.3 Biology

New information on growth was presented to the WPTT DP (Eveson et al, 2025). The new growth information and alternative natural mortality scenarios used in the assessment in 2022 and 2025 do not affect any inputs or parameters for running the MP. None of the stock assessment results are used in the MP to set the TAC. The biomass estimates from the model component of the MP may deviate from the assessment biomass estimates (Kolody & Jumppanen, 2016), but this is expected as different stock assessment methods, data and model structures are explored in future. The MSE testing of the MP demonstrated that even for a wide range of potential real states of the population, the performance objectives of the Commission would be met by using the MP to calculate the TAC. As the new growth information and alternative natural mortality scenarios do not affect any inputs or parameters in the MP, there are no exceptional circumstances associated with this new information.

2.2 Fishery or fishing operations

There were no major changes in fisheries or fishing operations identified in the data reported to IOTC in recent years and no substantial changes in data reporting or quality (IOTC, 2025b: IOTC-2025-WPTT27-07.2).

There are no exceptional circumstances in relation to changes to fishery or fishing operations.

2.3 MP input data

The MP was run in early 2025, after a delay in 2024, to provide TAC advice for 2026-2028 and is next scheduled to be run in 2027. We review the MP inputs in preparation for future MP runs and to detect any anomalies that might require further investigation.

2.3.1 Catch data

The MP uses catch data collated by the IOTC (e.g. IOTC, 2025b) which has been collated using the same methods used when testing the MP. The WPTT(DP) 2024 reviewed recent nominal bigeye tuna catches, fishery features, quality and representativeness of catch data relative to previous years and have noted similar or slightly improved reporting (IOTC, 2025b). There do not appear to be any new issues or evidence for exceptional circumstances in relation to the quality of catch data.

2.3.2 CPUE data

The CPUE series specified for the MP is created from the spatially stratified CPUE series (Kitikado et al., 2022) and recombined using area weighting from Hoyle et al (2019), 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 work together to develop the time series.

The joint CPUE working group produced a BET CPUE index (1979-2023), for use in the BET MP, in early February 2025. The following details of the models and inputs data were confirmed (Kitikado and Hoyle, pers. comm.):

- Operational data
- Log normal models all regions
- R1N, R1S, R2, used Hooks Between Floats (HBFs), and R3 used clusters (based on species mix) – note this is a correction to Williams et al (2022)
- Some data from 2021-2023 excluded.

It was noted that there remained a few small differences from the agreed standardisation specified for the MP:

- Lognormal instead of Delta Lognormal models were used 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 standardised CPUE and exceptional circumstances in relation to running the MP were reviewed by WPM16(MSE) and a special session of the SC in late February 2025. The recommended TAC from the MP was adopted by the TCMP and Commission (Res 25/04). The differences between the specified standardisation and the actual standardisation are exceptional circumstances but the WPM16(MSE) agreed that the CPUE was positive, and the impact on risks for the stock and fisheries was likely to be small, and therefore no further action was needed (Figure 2).

The WPTT_DP noted a minor error in the CPUE standardisation used in the MP: “a small constant adjustment, to avoid taking the logarithm of zero, was not applied in the final computation of standardized CPUEs” (IOTC–2025-WPTT27(DP)-09). Kitakado et al 2025 noted the effect on the MP would be minimal. A comparison of the new CPUE described in paper IOTC–2025-WPTT27(DP)-09 and the CPUE index used in the MP were described as similar. The new CPUE has also been updated with new data through to 2024, uses the delta-lognormal models (as specified for the MP) and includes a change to fleet specific HBF effects, all of which may be contributing to the small differences detected between the two CPUE series. The minor error does not change the outcome determined by the WPM16(MSE) in early 2025 regarding exceptional circumstances, low impact and no recommendation for further action.

The differences between the specified standardisation and the actual standardisation are exceptional circumstances but the WPM16(MSE) agreed that the CPUE was positive, and the impact was likely to be small, and therefore no further action was needed. A recommendation from the WPM and SC in 2024 was that a fixed set of code for CPUE standardization is developed to ensure that the CPUE index is constructed as specified for the MP. The CPUE working group should still be encouraged to explore other standardisation methods, for exploration of uncertainty and for use as alternative series in the stock assessment, but not for use in the MP.

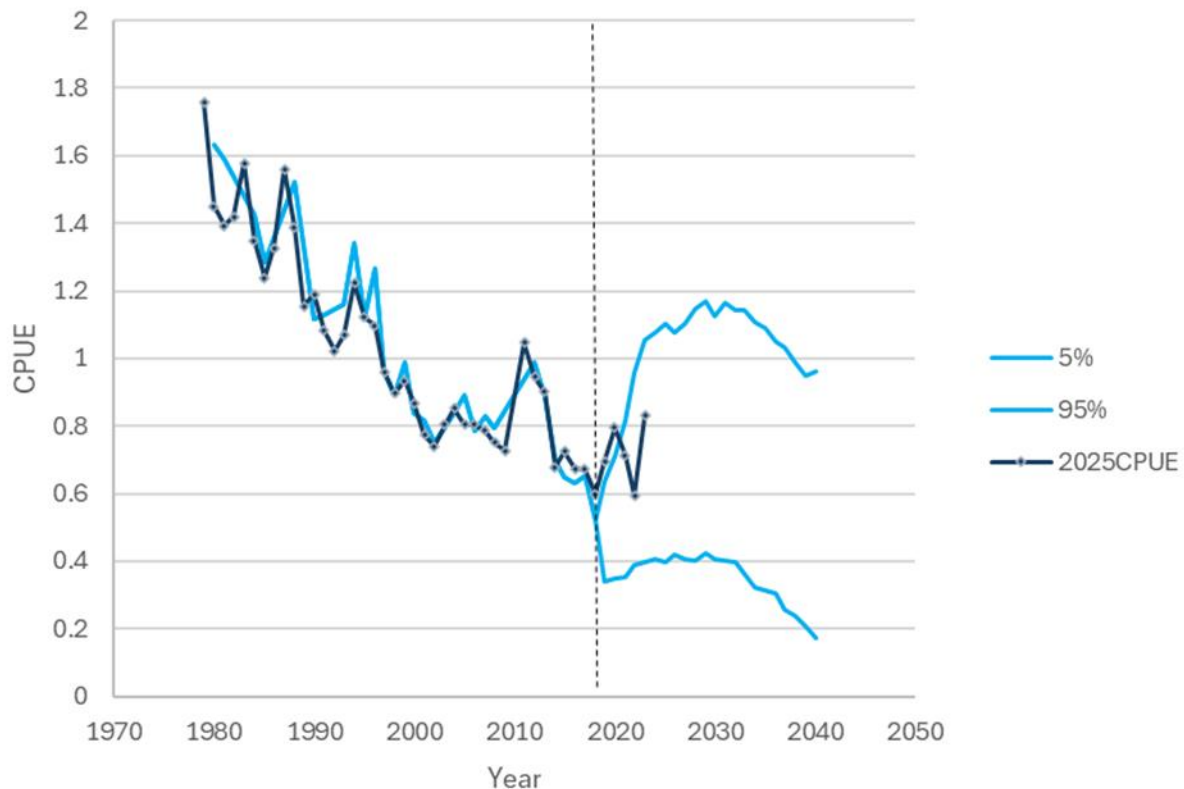


Figure 2 Comparison of the 90% probability interval for the CPUE from the bigeye tuna MSE operating models (pale blue lines) (Hillary et al, 2022) and from the 2025 CPUE series used in the MP (dark blue line). The vertical dashed line at year 2018 indicates the end of the historical years of the operating model and projections start in 2019.

2.4 Catch relative to TAC

The bigeye tuna TAC and catch limits for the years 2024 and 2025 were adopted by the Commission (based on advice from running the MP in 2022, Resolution 23/04).

The estimated catch for 2024 is 100,722t (Phillips and Fu, 2025) (or 108,556t in IOTC, 2025b) which is greater than the 2024 TAC of 80,583t (Res 23/04).

This is an exceptional circumstance. The catch in 2024 is substantially greater than the TAC, and therefore we consider that this may have a severe impact on stock status, especially considering that the stock is estimated to be overfished and subject to overfishing. The proposed recommendation is that the IOTC review 2025 catches as soon as possible and consider enacting the catch reduction mechanisms adopted in the Resolution 23/04.

3 Discussion and Conclusion

The Exceptional Circumstances Guidelines make it clear that identifying exceptional circumstances does not necessarily result in changes to the recommended TAC. In fact, changes to the recommended TAC should be avoided except in situations where the TAC advice would pose a risk to the stock or the fishery if implemented. The alternatives are to collect more information, or do research, to inform review of evidence of exceptional circumstances in the next year or years. Another alternative is to proceed with the TAC advice (or precautionary advice) and trigger a review of the MP earlier than planned. Recommending a change to the TAC is appropriate if there is a high risk to the stock. If the TAC is to be adjusted, further evaluation of the scale and severity of the exceptional circumstance provides guidance (% change) on how to calculate an adjustment to the TAC.

A wide range of items are reviewed to examine if there is evidence for exceptional circumstances, i.e., the data inputs to the MP, the range of uncertainties against which the MP was tested, and implementation of MP TAC advice. This review is conducted annually to provide advice to the SC on any risks with the operation of the MP and TAC advice.

The annual review of exceptional circumstances is an important component of providing management advice using an adopted management procedure. It is the safety net process that evaluates the extent to which the MP is operating as expected (from the MP testing) and identifies any risks associated with implementing the MP TAC advice. It requires consideration of evidence for exceptional circumstances. It provides a scientific process for developing appropriate management responses if any exceptional circumstances are identified and, hence, provides transparency in TAC decision making by the Commission.

In 2025, we are evaluating if there are any exceptional circumstances in relation to the adopted TAC for 2026-2028 from running the MP in (early) 2025 (delayed from 2024).

The preliminary stock assessment in 2025 does not provide any new or different knowledge on the population dynamics or status of the stock. New information on growth and an alternative natural mortality scenario was incorporated into the 2025 assessment, but these factors do not substantially change estimates of stock status or historical trends. These data are not used in running the MP, and therefore no research or management action on TAC is recommended in relation to this new information for the 2026-2028 TAC.

There was no information on changes in fisheries or fishing operations.

There is a small amendment to the CPUE standardisation used in the MP in early 2025, which is technically an exceptional circumstance, but severity and impact are considered minor. The SC recommended in 2024 that fixed code should be established for use in CPUE standardisation for the MP.

Catch in 2024 is greater than the adopted TAC for 2024. This is an exceptional circumstance with potentially severe impacts on stock status, considering that the stock is estimated to be overfished and subject to overfishing. The proposed recommendation is that the IOTC review 2025 catches as soon as possible and consider enacting the catch reduction mechanisms adopted in the Resolution 23/04 to ensure catches remain within the adopted TAC.

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