

OUTCOMES OF THE 26th SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT, 17 MAY 2024

PURPOSE

To inform participants at the 26th Working Party on Tropical Tunas Data Preparatory meeting (WPTT26(DP)) of the recommendations arising from the 26th Session of the IOTC Scientific Committee (SC) held from 6 -10 December 2023, specifically relating to the work of the WPTT.

BACKGROUND

At the 26th Session of the SC, the SC noted and considered the recommendations made by the WPTT in 2023 that included requests to address the deficiencies in data collection, monitoring and reporting by CPCs, as well as to carry out targeted research and analysis on tropical tuna species.

Tropical tunas caught in the IOTC area of competence and under the WPTT mandate

Common name	Species	Code
Bigeye tuna	<i>Thunnus obesus</i>	BET
Skipjack tuna	<i>Katsuwonus pelamis</i>	SKJ
Yellowfin tuna	<i>Thunnus albacares</i>	YFT

The recommendations on the deficiencies in data collection, monitoring and reporting by CPCs in relation to tropical tunas will be discussed in paper IOTC–2024–WPTT26(DP)–07 and are therefore not presented in this paper.

Based on the recommendations arising from the WPTT25, the SC26 adopted a set of recommendations, provide at [Appendix A](#) of this paper.

The recommendations contained in [Appendix A](#) were provided to the Commission for consideration at its 28th Session held in May 2024.

In addition, the SC26 reviewed and endorsed a Program of Work (2024–2028) for the WPTT, including a revised assessment schedule. A separate paper will be reviewed during the WPTT26(AS) and will outline the review and development process for a *Program of Work* for the WPTT for the next five years.

DISCUSSION

In addition to the recommendations outlined in [Appendix A](#), the following extracts from the SC25 Report (2023) are provided here for the consideration and action of the WPTT26(DP):

Report of the 25th Session of the Working Party on Tropical Tunas (WPTT25)

80. The SC **NOTED** the report of the 25th Session of the Working Party on Tropical Tunas (IOTC–2023–WPTT25–R), including the consolidated list of recommendations provided as an appendix to the report. The meeting was attended by 91 participants (cf. 113 in 2022). Four participants received funding through the MPF.
81. The SC **NOTED** the independent review of the 2021 yellowfin tuna stock assessment that took place in Rome from February 6–10, 2023. Participants included independent experts, the IOTC Secretariat, chairs and modelers from the WPM, WPTT, and SC, as well as observers.
82. The SC **NOTED** that the independent panel has thoroughly examined a number of issues raised by the 2021 stock assessment and has offered suggestions for improvement. These issues include, but are not limited to, biological parameters, spatial structure, data weighting, selectivity assumptions, catch uncertainty, and model observations (CPUE indices, length composition, and tagging data). The SC **NOTED** that the recommendations called for a collaborative approach, with continued support from an independent expert, and that they placed more emphasis on the research area and process than on particular model configurations (or solutions).

83. The SC **NOTED** that it is necessary to look into catch uncertainties and that this is starting to come up frequently in IOTC assessments. The SC further **NOTED** that the assessment may be affected differently by the bias in the catch series' trend or scale. The SC suggested that some of the options for addressing catch uncertainty be examined at the data preparation meeting in 2024.
84. The SC **ACKNOWLEDGED** the significance of longline CPUE in the assessment but **NOTED** that there are still many problems with these CPUE indices, such as the unresolved impact of piracy. The SC suggested looking into the possibility of developing indices for other fisheries, like the gillnet fishery. It was noted, nevertheless, that the official gillnet data held by the Secretariat are insufficient for CPUE standardization since they lack geo-reference information and are not operational level. The SC **NOTED** that while some nations (like I.R.Iran) have gillnet data suitable for deriving CPUE indices, these data are typically restricted to coastal waters. Additionally, the Indian Ocean is home to a variety of gillnet fisheries where the data may be different. The SC **SUGGESTED** that some consultancy work be utilised to assess whether developing gillnet CPUE across the Indian Ocean is feasible.
85. The SC **NOTED** that the review did not recommend discarding the RTTO-IO tagging data, rather, it indicated that the data should be examined outside of the assessment model before including it in the assessment.
86. The SC **NOTED** that a new growth curve study for yellowfin tuna (IOTC-2023-WPTT25-11) has just been completed. This study was validated using the post-bomb radiocarbon method, which is a very promising method for age validations and has never been applied to yellowfin tuna before (IOTC-2023-WPTT25-20). This new growth equation is to be confirmed for inclusion in stock assessment in the 2024 WPTT data preparatory meeting.
87. The SC **NOTED** the update of yellowfin catch limits for 2023 and 2024 following resolution 19/01 and 21/01 was provided by the Secretariat.

7.4.1 Skipjack tuna stock assessment

88. The SC **NOTED** that the 2023 skipjack tuna assessment (using Stock Synthesis) concluded that the stock is not overfished and is not subject to overfishing. The SC further **NOTED** that the estimated stock status is more optimistic compared to the previous assessment and the overall estimates indicate that the condition of the stock has significantly improved since the last assessment.
89. The SC also **NOTED** that the 2023 skipjack tuna stock assessment captured structural uncertainty through a grid of 36 models covering alternative assumptions on CPUE indices (PL, PSLs, and/or behavior indices), catchability trends (annual increase of 0 or 1.25%), SRR steepness (0.7, 0.8, or 0.9), and growth parameters (Linf fixed or estimated). The SC further **NOTED** that several uncertainty axes included in the grid differed to what was considered in the previous assessment, following detailed revisions of the data and model structure.
90. The SC **NOTED** that there has been a substantial increase of fishery dependent abundance indices (PL and PSLs) in the last few years. The SC further **NOTED** that catches in 2021 (655 114 t) and 2022 (671 317 t) have both exceeded the TAC (513 572 t) by over 30%. The SC **NOTED** that in the assessment model, the increase in abundance was driven primarily by an increase in recruitment which was estimated to be above the long-term average.
91. The SC **NOTED** the growing evidence that environmental conditions may significantly influence recruitment of skipjack tuna and can produce widely varying recruitment levels between years. The SC further **NOTED** that the recent high recruitment estimated in the assessment is correlated with an increased level of surface chlorophyll (an indicator of ocean primary production) and that fluctuations in recruitment and chlorophyll content have been in phase since the early 2000s. However, a lower ocean productivity region (surface chlorophyll) was projected by 2023-2024, which may cause the recruitment to fall below average.
92. The SC **NOTED** that studying environmental factors, such as sea surface chlorophyll and the Indian Ocean Dipole Index, and how they interact with stock dynamics, is beneficial. The SC agreed that it is important to include environmental considerations when developing management recommendations and to make sure that these recommendations are resilient to changes in the environment (such as climate change) through tools like management strategy evaluations.
93. The SC **NOTED** that the three stock-recruitment steepness values included in the skipjack assessment are the same values used in the assessment for bigeye and yellowfin tuna. The SC discussed whether it is suitable or not to apply the same values for all three species of tropical tuna due to their significantly diverse life histories and spawning activities. The SC **SUGGESTED** that the WPTT might consider if the skipjack assessment should

apply a smaller range of steepness values, and **NOTED** that some other RFMOs (such ICCAT and IATTC) seem to follow this approach. The SC **SUGGESTED** that if possible research should be done to provide plausible values.

94. The SC **NOTED** that the assessment is now able to provide an estimate of MSY-based reference point estimates since it has fixed an error that previously caused a flat-top production curve. As such, the SC **AGREED** that the use of the depletion based TRP for Skipjack tuna to define stock status should be reviewed before the next assessment, as part of a broader review of the application of Resolution 15/10, which lacks clarity regarding when MSY or depletion-based reference points should be applied, and the role of the interim LRP within the management framework.
95. The SC **RECALLED** that IOTC Resolution 21/03, which superseded Resolution 16/02 requires the skipjack tuna stock assessment estimates to be used as inputs for the Harvest Control Rule (HCR) to calculate the TAC. The SC therefore **ENDORSED** the stock assessment and that the median estimates from the model ensemble are used to calculate the TAC for skipjack tuna. The SC **RECOMMENDED** that the Commission endorse the calculated annual TAC of 628 606 t for 2024-2026.

7.4.2 Update on the WGFAD04 and WGFAD05

96. The SC **NOTED** the report of the 4th and 5th working group meetings on FADs (IOTC-2023-WGFAD04-R and IOTC-2023-WGFAD05-R). The meetings were attended by 75 and 116 participants respectively (cf. 111 in 2022).
97. The SC **NOTED** that, in response to Resolutions 23/02 and 23/03, a workplan was created to assess the effects of FAD closure during WGFAD04. Following the completion of the analyses by scientists, the WPFAD05 examined the findings and requested more analyses, which were subsequently completed and reviewed by WPTT25.
98. The SC **NOTED** that the analysis focused on the recovery of the three species of tropical tuna under various fishery closure modality and assumptions (e.g., whether there is a redistribution of catches among seasons). Nevertheless, the analysis was not meant to address a specific number of days of closure for a specific gear.
99. The SC **NOTED** the quantitative analyses presented during the meeting (IOTC-2023-WGFAD05-13 and IOTC-2023-WPTT25-INF08). The analyses which were all conducted with a 10 year time frame indicated that the most positive impact on the stocks for the three tuna species, in order of the largest to smallest benefits, would be (i) a three-month complete closure for all gears, (ii) a two-month complete closure for all gears, and (iii) a three-month oceanwide PS log school closure. In addition, several scenarios with closures applied to other gears also achieve the objective of recovering bigeye and yellowfin to the green quadrant of the Kobe plot in 10 years. However, the SC **NOTED** that these benefits were estimated under the assumption that there would not be an increase in catches from other gears during this time and further **NOTED** that the full benefits of these closures would only be seen if there is no reallocation of catches to other gears or time periods. The analyses further indicated that the period that would result in the best outcomes from the closure would be during Q1, Q3 and Q4 for BET and YFT and Q3 and Q4 for SKJ. In addition, the SC **RECALLED** that Resolution 23/03 (para. 3) states that “The IOTC Scientific Committee shall provide advice and recommendations no later than 31st December 2023 on appropriate fishing closures applicable to all fishing gears.” As such the SC **RECOMMENDED** the Commission take these analyses into account, with results shown in Annex IX of the WPTT report (IOTC-2023-WPTT25-R) and Figures a-c (below), and **REQUESTED** the WPTT to consider conducting further analysis intersessionally to assess the impacts of all gears on stock status so that this issue can be comprehensively addressed. The SC **NOTED** that some artisanal fleets may struggle to implement closures due to socio-economic dependence on the resources and so **REQUESTED** that the WGFAD look into excluding artisanal fleets from future analyses.
100. The SC **NOTED** that the quantitative analysis was based on the stock assessments for each species and therefore the gear groupings were the same as those used in the stock assessments. The SC also **NOTED** that in the case of BET, the majority of the catch in the gear group BB+PS(AFAD) was contributed by small purse seiners operating on AFADs while catch contributed from BB is small.
101. The SC **NOTED** that the Jelly-FAD is an example of how the implementation of biodegradable DFADs can be achieved, further **NOTING** that other actions have been also carried out in the Indian Ocean for BIOFAD

testing using alternative designs and materials and this work has been presented to the WGFAD and WPEB for many years. The SC further **NOTED** that the IATTC has recently adopted a step-wise approach to the full adoption of biodegradable DFADs (IATTC C-23-04). The SC therefore **RECOMMENDED** that the Commission initiate an ambitious step-wise approach for the implementation of biodegradable DFADs as soon as possible.

102. The SC **NOTED** that some delegations expressed the view that that WGFAD05 was not thought to be optimal in the sense that it is not as purely scientific as it should be. There was also a mixture of scientific and opinion papers and a mixture of debate in those topics, with the opinion papers being disproportionately long. The SC **NOTED** the suggestion that there should be a clear division between scientific and opinion topics at future meetings, that papers should be carefully chosen for each topic at the chair's discretion in collaboration with the IOTC Secretariat, and that sufficient time should be allotted for scientific discussions.
103. On this subject, the SC **NOTED** that an observer presented a different viewpoint, arguing that there shouldn't be a limited definition or viewpoint on what constitutes science and that the availability of data access, the capacity for independent data analysis, and other factors should all be considered in scientific discussions.

7.4.3 Bigeye Tuna MP

104. The SC **RECALLED** that Resolution 22/03 adopted the bigeye management procedure and that the application of the bigeye management procedure resulted in a recommended TAC of 80,583 t per year for 2024 and 2025.
105. The SC **NOTED** the consideration of exceptional circumstances for the bigeye tuna MP in 2023 were discussed extensively at WPTT25 and evidence reviewed included new biological parameters and fishery operations, input data, and a comparison of the estimated population trend in the assessment with operating models.
106. The SC agreed with the review findings that there was no evidence for exceptional circumstances and **RECOMMENDED** that the agreed TAC for 2024 and 2025 should remain unchanged.

7.4.4 Other Matters

107. The SC **NOTED** document IOTC–2023–SC26–11 which provided information on a close-kin mark-recapture pilot study for Indian Ocean yellowfin tuna, including the following abstract provided by the authors:

“A close-kin mark-recapture (CKMR) design study completed in 2022 estimated that the collection of approximately 30,000 samples per year from Indian Ocean yellowfin tuna, over a five-year period, would provide an estimate of absolute abundance with an acceptable level of precision. The Working Party on Methods and Working Party on Tropical Tunas noted the logistical challenges in collecting this many samples and suggested a staged approach to the implementation of CKMR for yellowfin tuna. This paper outlines a proposal for the implementation of a CKMR pilot project for Indian Ocean yellowfin tuna to evaluate the logistics and feasibility of sampling, including an assessment of the quality of the DNA collected from key locations. The Scientific Committee is invited to provide feedback on this proposal.”

108. The SC **NOTED** that because the CPUE indices have many uncertainties that are often challenging to resolve, the CKMR can provide an alternative method of providing abundance estimates for tuna assessments.
109. The SC **NOTED** that a full 5-year sampling programme with a target of collecting up to 30,000 samples annually (70% juveniles, 30% adults) is being proposed for the pilot project. The SC further **NOTED** that the proposal was based on a 2020 design study for yellowfin tuna. A secondary goal of the project is to develop an IO-specific epigenetic clock to determine the age of yellowfin tuna.
110. The SC **NOTED** while sampling juvenile fish from the PS fishery is relatively easy upon landing, sampling adults from the longline fishery, which involves longer trips, may be more challenging. The SC **ENCOURAGES** liaising with CPCs to have an early consultation on sample collection from some of the major fisheries.
111. The SC **NOTED** that while fin clip samples are common and are useful for studying stock structure, muscle tissue is better suited for CKMR. Muscle tissue is specifically needed for the epigenetic ageing of yellowfin tuna, which is one of the pilot study's components.
112. The SC **NOTED** that the misidentification of juvenile yellowfin and bigeye tuna can be screened out through the genetic approach as part of the CKMR study.

113. The SC **NOTED** the broad support and expression of interest in cooperation from several CPCs, such as the EU, Kenya, China, Maldives, and Sri Lanka. The SC agreed that the project has the potential to be a significant milestone for the yellowfin assessment.
114. Following the presentation of document IOTC-2023-SC26-11 the SC **RECOMMENDED** that pursuing the development of the Close-Kin Mark Recapture project for yellowfin tuna should be a high priority for the Commission.

RECOMMENDATION

That the WPTT:

- 1) **NOTE** paper IOTC–2024–WPTT26(DP)–03 which outlined the main outcomes of the 26th Session of the Scientific Committee, specifically related to the work of the WPTT.
- 2) **CONSIDER** how best to progress these issues at the present meeting.

APPENDICES

Appendix A: Consolidated set of recommendations of the 26th Session of the Scientific Committee to the Commission, relevant to the Working Party on Tropical Tunas.

APPENDIX A

**CONSOLIDATED SET OF RECOMMENDATIONS OF THE 26TH SESSION OF THE SCIENTIFIC COMMITTEE (6–10
DECEMBER 2023) TO THE COMMISSION**

STATUS OF TUNA AND TUNA-LIKE RESOURCES IN THE INDIAN OCEAN AND ASSOCIATED SPECIES

Tuna – Highly migratory species

SC26.01 (para. 159) The SC **RECOMMENDED** that the Commission note the management advice developed for each tropical and temperate tuna species as provided in the Executive Summary for each species, and the combined Kobe plot for the four species assigned a stock status in 2022 (Fig. 1):

Albacore (*Thunnus alalunga*) – [Appendix 8](#)

Bigeye tuna (*Thunnus obesus*) – [Appendix 9](#)

Skipjack tuna (*Katsuwonus pelamis*) – [Appendix 10](#)

Yellowfin tuna (*Thunnus albacares*) – [Appendix 11](#)

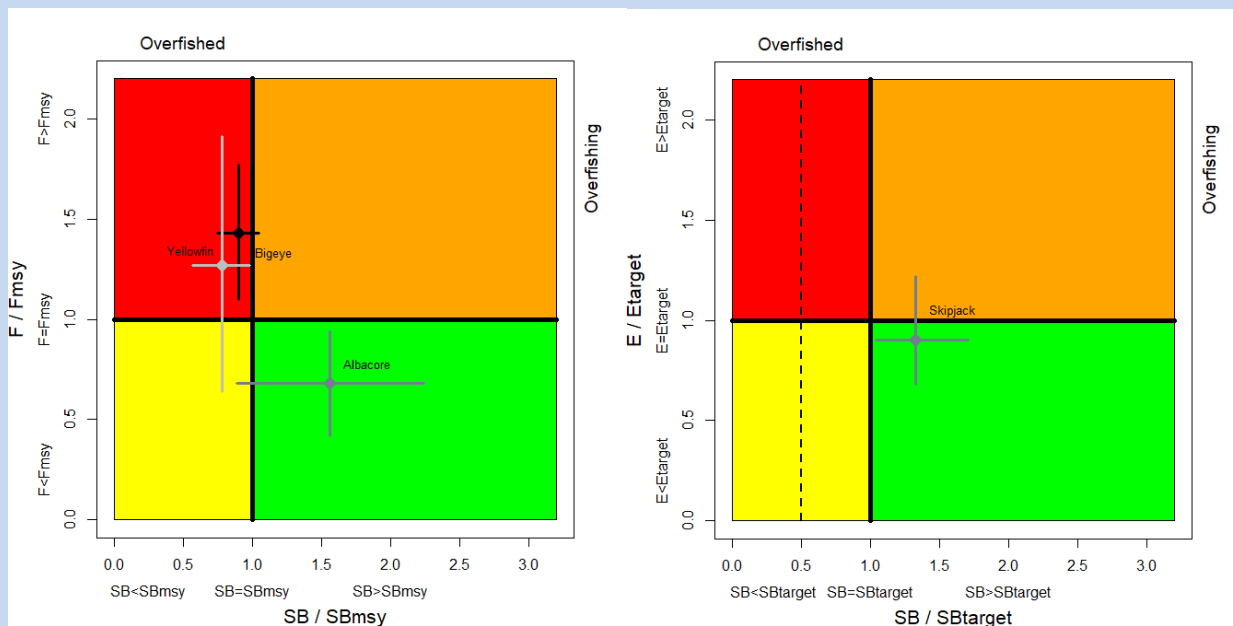


Fig. 1. (Left) Combined Kobe plot for bigeye tuna (black: status in 2021, with assessment conducted in 2022), and yellowfin tuna (light grey: 2020, with assessment conducted in 2021) and albacore (dark grey: 2020 with assessment conducted in 2022) showing the estimates of current spawning biomass (SB) and current fishing mortality (F) in relation to optimal spawning stock size and optimal fishing mortality. (Right) Kobe plot for skipjack tuna (2022 with assessment conducted in 2023) showing the estimates of the current stock status (the dashed line indicates the limit reference point at 20%SB0 while SBtarget=0.4 SB0). Cross bars illustrate the range of uncertainty from the model runs with an 80% CI (95% CI for albacore).

GENERAL RECOMMENDATIONS TO THE COMMISSION

Bigeye Tuna MP

SC26.18 (para. 106) The SC agreed with the review findings that there was no evidence for exceptional circumstances and **RECOMMENDED** that the agreed TAC for 2024 and 2025 should remain unchanged.

Other Matters

SC26.19 (para. 114) Following the presentation of document IOTC-2023-SC26-11 the SC **RECOMMENDED** that pursuing the development of the Close-Kin Mark Recapture project for yellowfin tuna should be a high priority for the Commission.

SUMMARY DISCUSSION OF MATTERS COMMON TO WORKING PARTIES (CAPACITY BUILDING ACTIVITIES – STOCK ASSESSMENT COURSE; CONNECTING SCIENCE AND MANAGEMENT, ETC.)

Invited Expert(s) at the WP meetings

SC26.22 (para. 153) Given the importance of external independent review for working party meetings, the SC **RECOMMENDED** the Commission continue to allocate sufficient budget for invited scientific experts to be regularly invited to scientific working party meetings.

IOTC species identification guides: Tuna and tuna-like species

SC26.23 (para. 155) The SC reiterated its **RECOMMENDATION** that the Commission allocates budget towards continuing the translation and printing of the IOTC species ID guides so that hard copies of the identification cards can continue to be printed as many CPC scientific observers, both on board and at port, need to have hard copies.

Chairpersons and Vice-Chairpersons of the SC and its subsidiary bodies

SC26.24 (para. 157) The SC **RECALLED** its recommendation in 2022 that the Commission revise the current Rules of Procedure (if necessary) to allow Chairs to serve an additional year or years beyond two terms if no suitable candidates are available to replace them once their terms are completed. The SC **NOTED** that the Commission endorsed the SC recommendations as its own and that therefore this recommendation was approved. In light of this recommendation the terms of several Working Party Chairs as well the SC Chair was extended beyond their two terms and the SC **RECOMMENDED** that this be noted and endorsed by the Commission.

SC26.25 (para. 158) The SC **RECOMMENDED** that the Commission note and endorse the Chairpersons and Vice-Chairpersons for the SC and its subsidiary bodies for the coming years, as provided in [Appendix 7](#).

IMPLEMENTATION OF THE REGIONAL OBSERVER SCHEME

SC26.26 (para. 175) The SC **ACKNOWLEDGED** that the estimated levels of coverage provided in Appendix B.1 of IOTC-2023-SC26-07_rev1 are based on the number of hooks (observed and total), as this effort unit is the only one generally available to the IOTC Secretariat. The SC further **NOTED** that the issue had been previously raised during SC25 and therefore **REITERATED** its **RECOMMENDATION** (SC25.34 (Para. 172)) that at the next revision of Res. 15/02 this is amended to include the mandatory reporting of sets/operations as a additional unit of effort for longline fisheries.

PROGRAM OF WORK AND SCHEDULE OF WORKING PARTY AND SCIENTIFIC COMMITTEE MEETINGS

Consultants

SC26.27 (para. 187) Noting the highly beneficial and relevant work done by IOTC stock assessment consultants in previous years, the SC **RECOMMENDED** that the engagement of consultants be continued for each coming year based on the Program of Work. Consultants will be hired to supplement the skill set available within the IOTC Secretariat and CPCs.

Data preparatory meetings and Hybrid meetings

SC26.28 (para. 189) **ACKNOWLEDGING** that holding data preparatory meetings prior to stock assessments is considered to be best practice (as identified by the yellowfin stock assessment external reviewer, the WPTT and the WPDCS) and noting that since 2019 data preparatory meetings were successfully held for the WPTmT, WPTT and

WPEB, the SC **AGREED** to continue the practice of having data preparatory meetings in addition to stock assessment meetings for the major IOTC species. The SC **RECOMMENDED** that data preparatory meetings could continue to be held virtually so as not to increase the travel and costs required for the already full IOTC timetable of meetings..

SC26.29 (para. 190) The SC **NOTED** that there had been a few teething problems holding meetings in a hybrid format in 2023, especially related to the costs associated with the audio-visual equipment required, as well as the issues associated with ensuring the equipment was suitable to ensure full participation of both those in person as well as those connecting virtually. However, the SC **AGREED** on the utility of facilitating both in-person and virtual participation at future meetings to ensure increased participation and reduce the logistical costs for many CPCs and observers. As such, the SC **RECOMMENDED** that future Scientific Committee meetings continue to be held in a hybrid format, as well as working parties if possible. The SC further **RECOMMENDED** that all presentations at these meetings be made in person to ensure the aforementioned issues did not adversely affect the quality of the advice being provided.

REVIEW OF THE DRAFT, AND ADOPTION OF THE REPORT OF THE 25TH SESSION OF THE SCIENTIFIC COMMITTEE

SC26.30 (para. 196) The SC **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from SC25, provided at [Appendix 38](#).