

OUTCOMES OF THE 25th SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT, 3 AUGUST 2023

PURPOSE

To inform participants at the 21st Working Party on Billfish (WPB21) of the recommendations arising from the 25th Session of the IOTC Scientific Committee (SC) held from 5–9 December 2022, specifically relating to the work of the WPB.

BACKGROUND

At the 25th Session of the SC, the SC noted and considered the recommendations made by the WPB in 2022 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 billfish species.

Billfish caught in the IOTC area of competence

IOTC code	English name	Scientific name
BLM	Black marlin	<i>Makaira indica</i>
BUM	Blue marlin	<i>Makaira nigricans</i>
MLS	Striped marlin	<i>Tetrapturus audax</i>
SFA	Indo-Pacific sailfish	<i>Istiophorus platypterus</i>
SWO	Swordfish	<i>Xiphias gladius</i>

Based on the recommendations arising from the WPB20, the SC25 adopted a set of recommendations, provided at [Appendix A](#) of this paper. The recommendations contained in [Appendix A](#) were provided to the Commission for consideration at its 27th Session held in May 2023.

In addition, the SC25 reviewed and endorsed a Program of Work (2023–27) for the WPB, including a revised stock assessment schedule, as detailed in [Appendix B](#). A separate paper (IOTC–2023–WPB21–08) will outline the review and development process for a Program of Work for the WPB for the next five years (2024–28).

DISCUSSION

In addition to the recommendations outlined in [Appendix A](#), [Appendix B](#) and the SC made several other comments relevant to the WPB, which participants are asked to consider:

Report of the 19th Session of the Working Party on Billfish

43. The SC **NOTED** the report of the 20th Session of the Working Party on Billfish ([IOTC–2022–WPB20–R](#)), including the consolidated list of recommendations provided as an appendix to the report. The meeting was attended by 51 participants (cf. 55 in 2021). No MPF funding was provided as the meeting was held online.
44. The SC **REMINDED** that its previous recommendation on the inclusion of shortbill spearfish (*Tetrapturus angustirostris*) as an IOTC species has not yet been addressed by the Commission and **REQUESTED** the WPB to collate more data on the species to support this recommendation which would require a revision of the IOTC Agreement.
45. The SC **NOTED** that a study was carried out to look at the inclusion of marine subsurface variables on swordfish habit modeling in the Indian Ocean. The study makes use of the Species Distribution Model (SDM), which employs three-dimensional environmental data to estimate species distribution and derive sub-surface parameters.
46. The SC **NOTED** that the next WPB meeting will be preceded by a two-day workshop on billfish reproductive biology studies. If time permits, the SC suggested that the workshop's scope be broadened to incorporate

additional biological components (such as the age and growth research as specified in the program of work). The SC also acknowledged the advantages of compiling available biological studies and requested that a summary table of the CPCs' recent and/or ongoing research on billfish biology be provided at the next WPB meeting.

7.2.1 Blue Marlin stock assessment

47. The SC **NOTED** that a new stock assessment was conducted in 2022 based on two different models: JABBA, a Bayesian state-space production model (age-aggregated); and SS3, an integrated model (age-structured). The SC further **NOTED** that uncertainty in the biological parameters was still apparent and as such the JABBA model ($B_{2020}/B_{MSY} = 0.73$, $F_{2020}/F_{MSY} = 1.13$) was selected as the base case as both models were consistent with regards to stock status.

7.2.2 Indo-Pacific Sailfish stock assessment

48. The SC **NOTED** that in 2022 a new stock assessment was conducted based on JABBA, a Bayesian state-space production model. Data poor methods applied to Indo-Pacific Sailfish in 2019 relied on catch data only, which is highly uncertain for this species, and resulted in the stock status determined to be uncertain. To overcome the lack of abundance indices for this species, this assessment incorporated length-frequency data to estimate annual Spawning Potential Ratio (SPR). Normalised annual estimates of SPR were assumed to be proportional to biomass and incorporated as an index of relative abundance in the JABBA model (assuming no trends in annual recruitment in the long term). This is a novel technique applied to overcome the paucity of abundance data for this species.

49. The SC **NOTED** that the new modelling approach has facilitated the use of additional information available for the species and provided additional insight into the Indo-Pacific sailfish stock status. As such, the SC **NOTED** that the stock status for Indo-Pacific sailfish has been revised from *Unknown*, to *not overfished and not subject to overfishing*.

50. The SC **NOTED** that the new assessment used the Just Another Red-List Assessment (JARA) model to link the LB-SPR and the JABBA model. It was **NOTED** that the JARA model was incorporated as an additional modelling step that acts as a smoother over the time series obtained from the LB-SPR and normalizes the time series with respect to the initial state, in order to calculate an estimate of depletion. However, the inclusion of the “JARA” model has a negligible influence on the outcomes of the JABBA assessment. The SC also **AGREED** that the methodology of converting the length data into an index of relative abundance, requires further review.

7.2.3 Revision of catch levels of Marlins under Resolution 18/05

51. The SC **RECALLED** that Resolution [18/05](#) *On management measures for the conservation of billfish, striped marlin, black marlin, blue marlin and Indo-Pacific sailfish* encourages CPCs to “...ensure that the overall catches, of the Indian Ocean Striped Marlin, Black Marlin, Blue Marlin and Indo Pacific Sailfish in any given year do not exceed either the MSY level or, in its absence, the lower limit of the MSY range of central values as estimated by the Scientific Committee...”. Moreover, Resolution 18/05 also requires the SC to “...annually review the information provided and assess the effectiveness of the fisheries management measures reported by CPCs on striped marlin, black marlin, blue marlin and Indo-Pacific sailfish and, as appropriate, provide advice to the Commission”.

52. The SC **NOTED** that reported catches of black marlin and Indo-Pacific sailfish have exceeded the limits set out in Resolution 18/05 for both 2020 and 2021. The SC further noted that catches of both species are predominantly taken by gillnet and as such, **RECOMMENDED** that any revision of Resolution 18/05 should focus mainly on gillnet fisheries, to be effective.

53. The SC **NOTED** that striped marlin and blue marlin assessments indicate these species to be overfished and subject to overfishing, with 100% and 72% probability, respectively. The SC advised that projections and associated Kobe 2 Strategy Matrices (K2SMs) are available for both species and **RECOMMENDED** that any revision of Resolution 18/05 catch limits with respect to these species should be based on projections as opposed to MSY estimates, given the need to rebuild these stocks.

54. The SC **NOTED** that the current minimum size limit in Res 18/05 (60 cm LJFL) is unlikely to be effective for these species, with the possible exception of blue marlin, due to the high at-haul mortality and low post release survival of these species particularly when taken by gillnet. For blue marlin, it is **RECOMMENDED** that further management options relating to limiting retention, including the option of increasing the current minimum size limit, be considered.

RECOMMENDATION/S

That the WPB:

- 1) **NOTE** paper IOTC–2023–WPB21-03 which outlined the main outcomes of the 25th Session of the Scientific Committee (SC25), specifically related to the work of the WPB.
- 2) **CONSIDER** how best to progress these issues at the present meeting.

APPENDICES

[Appendix A:](#) Consolidated set of recommendations of the 25th Session of the Scientific Committee to the Commission, relevant to the Working Party on Billfish.

[Appendix B:](#) Schedule of stock assessments for the WPB (2023–27).

APPENDIX A

CONSOLIDATED SET OF RECOMMENDATIONS OF THE 25th SESSION OF THE SCIENTIFIC COMMITTEE (5– 9 December 2022) TO THE COMMISSION RELEVANT TO THE WORKING PARTY ON BILLFISH

Extract of the Report of the 25th Session of the Scientific Committee

(IOTC–2022–SC25–R; Appendix 38, Page 261)

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

Billfish

SC25.02 (para. 162) The SC **RECOMMENDED** that the Commission note the management advice developed for each billfish species under the IOTC mandate, as provided in the Executive Summary for each species, and the combined Kobe plot for the five species assigned a stock status in 2022 (Fig. 3):

- Swordfish (*Xiphias gladius*) – Appendix 12
- Black marlin (*Makaira indica*) – Appendix 13
- Blue marlin (*Makaira nigricans*) – Appendix 14
- Striped marlin (*Tetrapturus audax*) – Appendix 15
- Indo-Pacific sailfish (*Istiophorus platypterus*) – Appendix 16

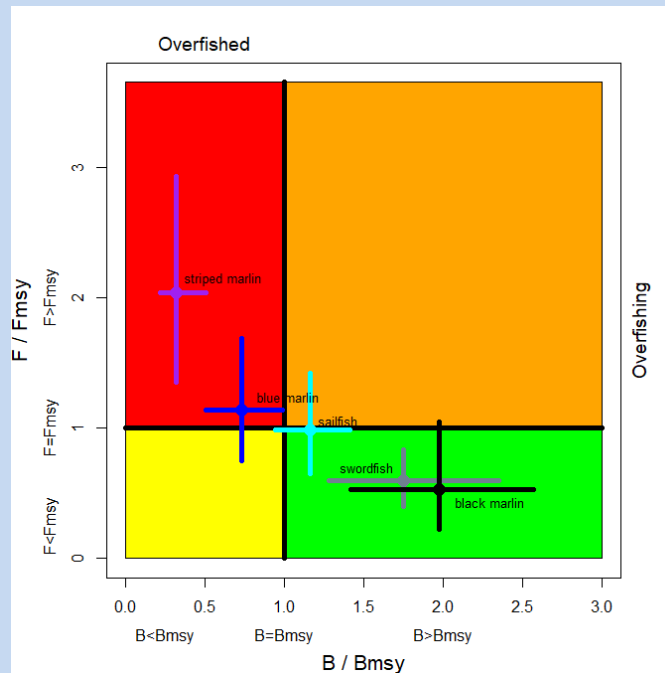


Fig. 3. Combined Kobe plot for swordfish (2018 with assessment conducted in 2020, grey), Indo-Pacific sailfish (2019 with assessment conducted in 2022, cyan), black marlin (2019 with assessment conducted in 2021, black), blue marlin (2020 with assessment conducted in 2022, blue) and striped marlin (2019 with assessment conducted in 2021, purple) showing the estimates of current stock size (SB or B, species assessment dependent) and current fishing mortality (F) in relation to optimal stock size and optimal fishing mortality. Cross bars illustrate the range of uncertainty from the model runs. Given unresolved uncertainty in the assessment, status for black marlin is uncertain.

GENERAL RECOMMENDATIONS TO THE COMMISSION, TO SPECIFIC CPCs AND/OR OTHER BODIES

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

SC25.29 (para. 151) 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.

Meeting participation fund

SC25.30 (para. 153) The SC reiterated its **RECOMMENDATION** that the IOTC Rules of Procedure (2014), for the administration of the Meeting Participation Fund be modified so that applications are due not later than 60 days, and that the full Draft paper be submitted no later than 45 days before the start of the relevant meeting. The aim is to allow the Selection Panel to review the full paper rather than just the abstract, and provide guidance on areas for improvement, as well as the suitability of the application to receive funding using the IOTC MPF. The earlier submission dates would also assist with visa application procedures for candidates.

IOTC species identification guides: Tuna and tuna-like species

SC25.31 (para. 154) 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

SC25.32 (para. 156) **ACKNOWLEDGING** the need to have officers with sufficient experience and capability to serve as Chairs and Vice-chairs of the SC Working Parties and Working Groups, the SC **RECOMMENDED** 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

SC25.33 (para. 157) 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

SC25.34 (para. 172) The SC **RECOMMENDED** that the Commission **ENDORSE** the mandatory reporting of geo-referenced effort data as number of sets/operations for longline and surface fisheries (according to the definitions in Res 15/02) to complement the current requirements of Res. 15/02, in order for the Secretariat to accurately and independently calculate the ROS coverage in agreement with the provisions of Res. 22/04.

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

Consultants

SC25.35 (para. 186) 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

SC25.36 (para. 188) **ACKNOWLEDGING** that holding data preparatory meetings prior to stock assessments is considered to be best practice 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 prior to stock assessment meetings for the major IOTC species. The SC **RECOMMENDED** that data preparatory meetings continue to be held virtually so as not to increase the travel and costs required for the already full IOTC timetable of meetings.

SC25.37 (para. 189) The SC **NOTED** 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. As such, the SC **RECOMMENDED** that future working party and Scientific Committee meetings are held in a hybrid format.

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

SC25.38 (para. 192) The SC **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from SC25, provided at [Appendix 38](#).

APPENDIX B**ASSESSMENT SCHEDULE FOR IOTC SPECIES AND SPECIES OF INTEREST FROM 2023–2027***Extract of the Report of the 25th Session of the Scientific Committee**(IOTC–2022–SC25–R; Appendix 36, Page 257)*

The SC **ADOPTED** a revised assessment schedule, ecological risk assessment and other core projects for 2023–27, for the tuna and tuna-like species under the IOTC mandate, as well as the current list of key billfish species of interest.

Working Party on Billfish					
Species	2023	2024	2025	2026	2027
Black marlin		Full assessment			Full assessment
Blue marlin			Full assessment		
Striped marlin		Full assessment			Full assessment
Swordfish	Full assessment		Indicators**	Full assessment	
Indo-Pacific sailfish			Full assessment*		

* Including data poor stock assessment methods; Note: the assessment schedule may be changed depending on the annual review of fishery indicators, or SC and Commission requests.

** Including biological parameters, standardized CPUE, and other fishery trends