

## OUTCOMES OF THE 24<sup>th</sup> SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT, 11 AUGUST 2022

### PURPOSE

To inform participants at the 20<sup>th</sup> Working Party on Billfish (WPB20) of the recommendations arising from the 24<sup>th</sup> Session of the IOTC Scientific Committee (SC) held from 6–10 December 2021, specifically relating to the work of the WPB.

### BACKGROUND

At the 24<sup>th</sup> Session of the SC, the SC noted and considered the recommendations made by the WPB in 2021 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 WPB19, the SC24 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 26<sup>th</sup> Session held in May 2022.

In addition, the SC24 reviewed and endorsed a Program of Work (2022–26) for the WPB, including a revised stock assessment schedule, as detailed in [Appendix B](#). A separate paper (IOTC–2022–WPB20–08) will outline the review and development process for a Program of Work for the WPB for the next five years (2023–27).

### 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 19<sup>th</sup> Session of the Working Party on Billfish**

41. The SC **NOTED** the report of the 19<sup>th</sup> Session of the Working Party on Billfish ([IOTC–2021–WPB19–R](#)), including the consolidated list of recommendations provided as an appendix to the report. The meeting was attended by 55 participants (cf. 55 in 2020). No MPF funding was provided as the meeting was held online.
42. **RECALLING** that one of the Indian Ocean billfish species (shortbill spearfish, *Tetrapturus angustirostris*) is currently not listed among the species managed by IOTC, and considering the ocean-wide distribution of this species, its highly-migratory nature, and that it is a common bycatch in IOTC managed fisheries, the SC reiterated its previous **RECOMMENDATION** that shortbill spearfish be included as an IOTC species.
43. The SC further **NOTED** that this would require the revision of the IOTC Agreement and the Commission to include some flexible mechanism to allow for changes in the list of species under the IOTC mandate in the future.
44. The SC **ACKNOWLEDGED** the potential interest of considering size limits (e.g., approximated by size at maturity) as a complementary management measure for billfish species but **NOTED** that this was not discussed at the WPB. As such, the SC **REQUESTED** the WPB to review the available information on size at its next session

to be held in 2022, further **NOTING** that information on post-release mortality would be required for assessing the efficacy of such measures.

### **7.2.1 Black Marlin stock assessment**

45. The SC **NOTED** that a single assessment model was applied to the Indian Ocean stock of black marlin (BLM) in 2021; the Bayesian State-Space Surplus Production Model ([JABBA](#)). Catch data were available up to 2019 and four time series of standardised CPUE derived from longline fisheries of Japan, Taiwan, China (NW and NE) and Indonesia ending in 2019.
46. The SC **NOTED** that the increasing trends in CPUE time series observed consistently over the four series throughout the 2000s and 2010s are inconsistent with the major increase in total catches of BLM reported during the same period, with the model showing some strong, systematic retrospective pattern, compensating for simultaneous increases in catch and relative abundance by inflating the pristine biomass estimate (parameter K of the model).
47. Consequently, the SC **ACKNOWLEDGED** the large uncertainties in the model and the little confidence in the model's predictive capabilities, **AGREEING** that the stock status should remain "Not assessed/Uncertain" and **NOTING** that CPUE indices from coastal gillnet fleets would be required to provide more accurate information on the temporal trends in BLM abundance.
48. The SC **NOTED** that the causes of conflicting information in the data could be due to (i) increased and/or improved reporting of catches by coastal CPCs over time and/or (ii) to the fact that catches mostly come from coastal gillnet fisheries while CPUE time series were derived from longline fisheries operating predominantly in the high seas.

### **7.2.2 Striped Marlin stock assessment**

49. The SC **NOTED** that two assessment models were applied to the Indian Ocean stock of striped marlin (MLS) in 2021 using Stock Synthesis ([SS3](#)) and Bayesian State-Space Surplus Production Model ([JABBA](#)), with the catch data and the four time series of standardised CPUE derived from longline fisheries of Japan and Taiwan, China available up to 2019.
50. The SC **NOTED** that the two models (JABBA and SS3) applied to MLS both indicated that there is 100% probability that the stock was overfished and subject to overfishing in 2019 and **ENDORSED** the stock status determined by the WPB.
51. The SC **NOTED** that both surplus production models and age-structure models showed very similar results with low uncertainty, indicating that the estimate of stock status is robust.
52. The SC **NOTED** with concern the status of the stock of MLS which has been estimated to be in the red quadrant of the Kobe plot (i.e., overfished and subject to overfishing) for over 10 years, calling for management measures to be taken urgently.
53. The SC **QUERIED** whether there are any hotspots of catch that could be used to propose time-area closures and **NOTED** that most catches come from the coastal areas between Somalia and Indonesia, although a closer review of the catch data would be useful to provide more information on the matter.
54. The SC **NOTED** the mismatch in Catch and CPUE trends as well as the clarification that those trends are from different fleets (catch is mainly from gillnet) and CPUE from longline. The mismatch may result from improved catch reporting.

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

55. 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". The SC further **NOTED** that the MSY for several of these species was updated after the Resolution came into force based on the updated stock assessments for these species.

56. The SC **NOTED** that catches in recent years for black marlin and Indo-Pacific sailfish have exceeded all recent MSY estimates and catch limits set by Resolution 18/05 (para 3), and that the current catch trends for the two species show no signs of decline - these catch limits will likely be exceeded again in 2021. Furthermore, results from the 2021 assessment of striped marlin provided certainty that the stock is overfished and subject to overfishing (100% probability) and that biomass has been below that which would produce MSY for over a decade. The biomass of striped marlin is considered severely depleted. As such, the SC **NOTED** the inadequacy of Resolution 18/05 in limiting the catches of billfishes and **RECOMMENDED** the Commission to review the Resolution to update catch limits and provide mechanisms to ensure these limits are adhered to.
57. The SC further **NOTED** the major uncertainties associated with the catches of gillnet fisheries, which catch in particular black marlin, striped marlin and Indo-Pacific sailfish, and **RECALLED** the need for all concerned CPCs to ensure that the catch, effort and size data for these fisheries are systematically reported to the Secretariat in accordance with Resolution 15/02.

#### **RECOMMENDATION/S**

That the WPB:

- 1) **NOTE** paper IOTC–2022–WPB20-03 which outlined the main outcomes of the 24<sup>th</sup> Session of the Scientific Committee (SC24), 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 24<sup>th</sup> Session of the Scientific Committee to the Commission, relevant to the Working Party on Billfish.

[Appendix B:](#) Schedule of stock assessments for the WPB (2022–26).

## APPENDIX A

**CONSOLIDATED SET OF RECOMMENDATIONS OF THE 24<sup>th</sup> SESSION OF THE SCIENTIFIC COMMITTEE (6– 10 December 2021) TO THE COMMISSION RELEVANT TO THE WORKING PARTY ON BILLFISH**

*Extract of the Report of the 24<sup>th</sup> Session of the Scientific Committee*

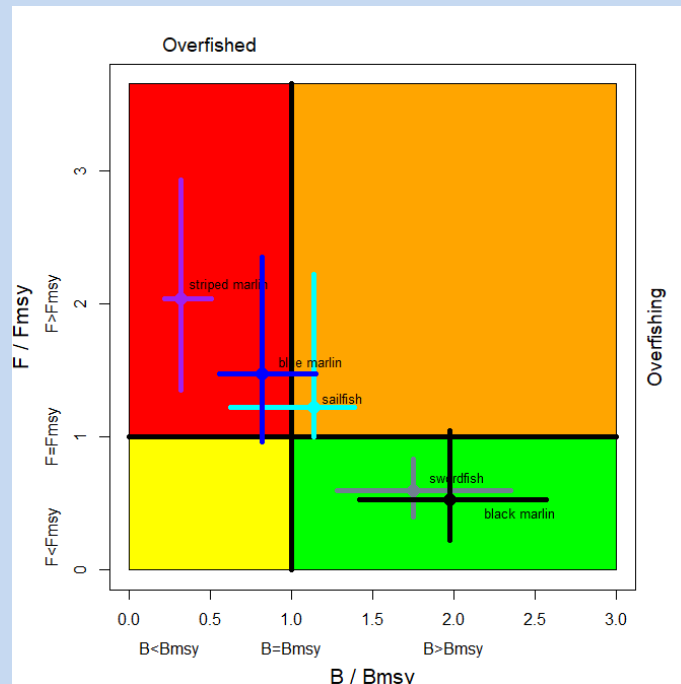
*(IOTC–2021–SC24–R; Appendix 38, Page 221)*

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

**Billfish**

SC24.02 (para. 157) 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 2021 (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 (2017 with assessment conducted in 2019, cyan), black marlin (2019 with assessment conducted in 2021, black), blue marlin (2017 with assessment conducted in 2019, blue) and striped marlin (2019 with assessment conducted in 2021, purple) showing the estimates of current stock size ( $B$  or  $S_B$ , 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 and sailfish should be interpreted with caution.

## 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***

SC24.23 (para. 145) Given the importance of external independent review for working party meetings, the SC **RECOMMENDED** the Commission continues to allocate sufficient budget for invited scientific experts to be regularly invited to scientific working party meetings.

#### ***Meeting participation fund***

SC24.24 (para. 147) 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***

SC24.25 (para. 148) 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***

SC24.26 (para. 150) 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](#).

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

#### ***Consultants***

SC24.27 (para. 181) 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.

### ***REVIEW OF THE DRAFT, AND ADOPTION OF THE REPORT OF THE 24<sup>TH</sup> SESSION OF THE SCIENTIFIC COMMITTEE***

SC24.28 (para. 190) The SC **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from SC24, provided at [Appendix 38](#).

## APPENDIX B

## ASSESSMENT SCHEDULE FOR IOTC SPECIES AND SPECIES OF INTEREST FROM 2022–2026

*Extract of the Report of the 24<sup>th</sup> Session of the Scientific Committee*

*(IOTC–2021–SC24–R; Appendix 36, Page 217)*

The SC **ADOPTED** a revised assessment schedule, ecological risk assessment and other core projects for 2022–26, for the tuna and tuna-like species under the IOTC mandate, as well as the current list of key billfish species of interest.

<b>Working Party on Billfish</b>					
<b>Species</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>
Black marlin			Full assessment		
Blue marlin	Full assessment			Full assessment	
Striped marlin			Full assessment		
Swordfish	Indicators**	Full assessment		Indicators**	Full assessment
Indo-Pacific sailfish	Full assessment*			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