

OUTCOMES OF THE 19th SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT, 08 AUGUST 2018

PURPOSE

To inform participants at the 16th Working Party on Billfish (WPB16) of the recommendations arising from the 20th Session of the IOTC Scientific Committee (SC) held from 30 November – 4 December 2017, specifically relating to the work of the WPB.

BACKGROUND

At the 20th Session of the SC, the SC noted and considered the recommendations made by the WPB in 2017 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 WPB15, the SC20 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 22nd Session held in May 2018. A separate paper, IOTC–2018–WPB16–04 addresses the responses and actions of the Commission.

In addition, the SC20 reviewed and endorsed a Program of Work (2018–22) for the WPB, including a revised stock assessment schedule, as detailed in [Appendix B](#) and [Appendix C](#). A separate paper (IOTC–2018–WPB16–08) will outline the review and development process for a Program of Work for the WPB for the next five years (2019–23).

DISCUSSION

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

Report of the 15th Session of the Working Party on Billfish

The SC recalled its previous **RECOMMENDATION** that on the next revision of the IOTC Agreement, the shortbill spearfish (*Tetrapturus angustirostris*) be included as an IOTC species.

Review of the statistical data available for billfish

4Due to on-going uncertainties with the reliability of catches reported by Indonesia, particularly in the case of swordfish, the SC **REQUESTED** that the IOTC Secretariat, in collaboration with Indonesia, review the current methods for estimating catches of billfish for Indonesia in the IOTC database and provide an update at the next meeting of the WPB.

New information on sport fisheries

The SC **AGREED** on the importance in supporting improvements in the data collection and reporting of sports fishing data to the IOTC, within the context of capacity building within national fisheries institutions, but that a full evaluation

of the outcomes of the pilot project (which concluded in September 2017) are required before further resources are considered for follow-up activities

Billfish species identification

The SC **AGREED** on the importance of the hard, waterproof copies of the billfish IOTC species identification guides for observers and port samplers, and again **RECOMMENDED** that funds are allocated for further printing of the species ID guides for distribution to sports fishing clubs and recreational fisheries to improve the quality of data reported, and that additional funds be provided for the translation of these into the priority languages identified by the SC.

Swordfish stock assessment and MSE

The SC noted that the next step of the swordfish MSE is to finalize the OM and present the results to the TCMP02 within the current resource constraints (e.g., staff time and travelling). Noting that the Commission considers the development of an MSE for swordfish to be a high priority activity, the SC **RECOMMENDED** that this is reflected in the 2019 budget of the Commission

Resolution 15/05 conservation measures for billfish

The SC noted that catches for Black Marlin, Blue Marlin, and Striped Marlin have increased in 2016 (and 2015) from the average level of 2009-2014. The catch in 2016 for Blue marlin was 3,510 t higher (27 % larger) than the average 2009-2014, 4,286 t larger (32 %) for Black marlin and 1,398 (36 %) for Striped marlin. Considering the status of these stocks the SC urgently **RECOMMENDED** that measures are agreed to recover the status of the stock of the three marlin species covered by Resolution 15/05 as per the management advice given in the Executive Summaries

Revision of the WPB Program of work

The SC **REQUESTED** that future work continues on the stock assessment of marlins in order to improve current models and that other approaches, such as delay-difference or age-structured production models, are also explored.

RECOMMENDATION/S

That the WPB:

- 1) **NOTE** paper IOTC-2018-WPB16-03 which outlined the main outcomes of the 20th Session of the Scientific Committee (SC20), 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 20th Session of the Scientific Committee to the Commission, relevant to the Working Party on Billfish.

[Appendix B](#): Program of work (2018-2022) for the IOTC Working Party on Billfish (WPB).

[Appendix C](#): Schedule of stock assessments for the WPB (2018-22).

APPENDIX A

CONSOLIDATED SET OF RECOMMENDATIONS OF THE 20th SESSION OF THE SCIENTIFIC COMMITTEE (30 November – 4 December 2017) TO THE COMMISSION RELEVANT TO THE WORKING PARTY ON BILLFISH

Extract of the Report of the 20th Session of the Scientific Committee

(IOTC-2017-SC20-R; Appendix XXXIX, Page 224)

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

Billfish

SC20.02 (para. 179) 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 three species assigned a stock status in 2017 (Fig. 6):

- Swordfish (*Xiphias gladius*) – [Appendix XII](#)
- Black marlin (*Makaira indica*) – [Appendix XIII](#)
- Blue marlin (*Makaira nigricans*) – [Appendix XIV](#)
- Striped marlin (*Tetrapturus audax*) – [Appendix XV](#)
- Indo-Pacific sailfish (*Istiophorus platypterus*) – [Appendix XVI](#)

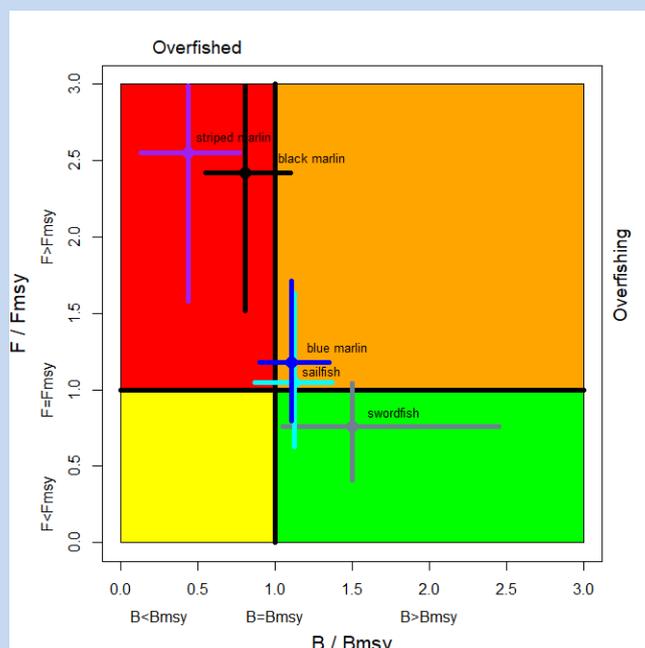


Fig. 6. Combined Kobe plot for swordfish (grey: 2015), indo-pacific sailfish (cyan: 2014), black marlin (black: 2015), blue marlin (blue: 2015) and striped marlin (purple: 2015) showing the estimates of stock size (SB or B, species assessment dependent) and fishing mortality (F) in relation to MSY-based reference points. Numbers in brackets indicate the last year of data available at the time of the assessment. Cross bars illustrate the range of uncertainty from the model runs..

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

Report of the 15th Session of the Working Party on Billfish

SC20.16 (para. 44) The SC recalled its previous **RECOMMENDATION** that on the next revision of the IOTC Agreement, the shortbill spearfish (*Tetrapturus angustirostris*) be included as an IOTC species.

Billfish species identification

SC20.17 (para. 49) The SC **AGREED** on the importance of the hard, waterproof copies of the billfish IOTC species identification guides for observers and port samplers, and again **RECOMMENDED** that funds

are allocated for further printing of the species ID guides for distribution to sports fishing clubs and recreational fisheries to improve the quality of data reported, and that additional funds be provided for the translation of these into the priority languages identified by the SC.

Swordfish stock assessment and MSE

- SC20.18 (para. 55) The SC noted that the next step of the swordfish MSE is to finalize the OM and present the results to the TCMP02 within the current resource constraints (e.g., staff time and travelling). Noting that the Commission considers the development of an MSE for swordfish to be a high priority activity, the SC **RECOMMENDED** that this is reflected in the 2019 budget of the Commission.

Resolution 15/05 conservation measures for billfish

- SC20.19 (para. 58) The SC noted that catches for Black Marlin, Blue Marlin, and Striped Marlin have increased in 2016 (and 2015) from the average level of 2009-2014 as observed in [Appendix VIa](#). The catch in 2016 for Blue marlin was 3,510 t higher (27 % larger) than the average 2009-2014, 4,286 t larger (32 %) for Black marlin and 1,398 (36 %) for Striped marlin. Considering the status of these stocks the SC urgently **RECOMMENDED** that measures are agreed to recover the status of the stock of the three marlin species covered by Resolution 15/05 as per the management advice given in the Executive Summaries.

Summary discussion of matters common to Working Parties (capacity building activities – stock assessment course; connecting science and management, etc.)

Data collection and capacity building

- SC20.39 (para. 122) The SC **AGREED** that, while external funding is helping the work of the Commission, funds allocated by the Commission to capacity building are still too low, considering the range of issues identified by the SC and its Working Parties, particularly in relation to the implementation of the Regional Observer Scheme and data collection and reporting for artisanal fisheries and **RECOMMENDED** that the Commission further increases the IOTC Capacity Building budget to fund these activities in the future.

Invited Expert(s) at the WP meetings

- SC20.40 (para. 124) Given the importance of external peer review for working party meetings, the SC **RECOMMENDED** that the Commission continues to allocate sufficient budget for an invited expert to be regularly invited to all scientific WP meetings.

Meeting participation fund

- SC20.41 (para. 126) 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

- SC20.42 (para. 127) 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 CPCs scientific observers, both on board and port, still do not have smart phone technology/hardware access and need to have hard copies on board.

IOTC Secretariat staffing

- SC20.43 (para. 128) Noting the very heavy workload at the IOTC Secretariat and the ever increasing demands by the Commission and the Scientific Committee, and also the capacity to respond to requests for assistance by countries, the SC **RECOMMENDED** that the recommendation from the Performance Review PRIOTC02.07(g) is implemented, and that permanent staff of the IOTC Data and Science Section be increased by two (2) (1 x P4 and 1 x P3 level positions), supplemented by additional short-term consultants, to commence work by late-2018 or earlier, and that funding for these new positions should come from both the IOTC regular budget and from external sources to reduce the financial burden on the IOTC membership.

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

SC20.44 (para. 132) 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 VII.

Implementation of the Regional Observer Scheme

SC20.47 (para. 197) The SC therefore **RECOMMENDED** that the EMS standards presented for purse seine fisheries (IOTC-2016-SC19-15) are adopted and **REQUESTED** that draft standards are similarly proposed for the longline fleets by CPCs currently trialling and implementing EMS on these vessels and that draft standards are also developed for gillnet fleets through the ROS Pilot Project..

Progress on the Implementation of the Recommendations of the Second Performance Review Panel

SC20.48 (para. 212) The SC **RECOMMENDED** that the Commission note the updates on progress regarding Resolution 16/03, as provided at Appendix XXXIII.

*Program of work and schedule of Working Party and Scientific Committee meetings**Consultants*

SC20.49 (para. 212) Noting the highly beneficial and relevant work done by IOTC stock assessment consultants in 2016 and 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.

*Other Business**Template for Invited Experts*

SC20.50 (para. 237) Noting the recommendation of the IOTC Performance Review (PRIOTC02.02d), the SC **AGREED** that a comprehensive, formal external peer review is sometimes important for important or contentious assessments. Thus, the SC **RECOMMENDED** that a process is established and that the Commission allocates funding for external peer review of stock assessments to take place periodically, based on priorities identified by the SC, and **REQUESTED** that the Secretariat develop ToRs for these, with input from the SC Chair and Vice-Chair, and potentially based on a framework similar to that established for the Center for Independent Experts.

APPENDIX B**PROGRAM OF WORK (2018–2022) FOR THE SCIENTIFIC COMMITTEE AND ITS
SUBSIDIARY BODIES**

The SC **NOTED** the proposed Program of Work and priorities for the Scientific Committee and each of the Working Parties and **AGREED** to a consolidated Program of Work as outlined in Appendix XXXVIa-g.

The Chairpersons and Vice-Chairpersons of each working party shall ensure that the efforts of their working party are focused on the core areas contained within the appendix, taking into account any new research priorities identified by the Commission at its next Session (IOTC–2017–SC20–R, Para. 204).

Working Party on Billfish (WPB)

(Extracts from IOTC-2017-SC20-R: Appendix XXXVIc, Page 197)

Table 1. Priority topics for obtaining the information necessary to develop stock status indicators for billfish in the Indian Ocean

Topic	Sub-topic and project	Priority ranking	Est. budget and/or potential source	Timing				
				2018	2019	2020	2021	2022
1. Stock structure (connectivity and diversity)	1.1 Genetic research to determine the connectivity of billfish throughout their distribution (including in adjacent Pacific and Atlantic waters as appropriate) and the effective population size.	High (4)	1.3 m Euro: (European Union)					
	1.1.1 Next Generation Sequencing (NGS) to determine the degree of shared stocks for billfish in the Indian Ocean with the southern Atlantic Ocean and Pacific Ocean, as appropriate. Population genetic analyses to decipher inter- and intraspecific evolutionary relationships, levels of gene flow (genetic exchange rate), genetic divergence, and effective population sizes.	High (4)						
	1.1.2 Nuclear markers (i.e. microsatellite) to determine the degree of shared stocks for billfish (highest priority species: blue, black, striped marlin and sailfish) in the Indian Ocean with the southern Atlantic Ocean and Pacific Ocean, as appropriate.	High (4)						
	1.1.3 Develop a close-kin mark recapture method (<i>Bravington et al.</i> 2016) on marlins to estimate population size and other important demographic parameters. This method includes the sampling of juveniles and adult fish and genetic parenting analyses to estimate the population size from mark-recapture models.	High (4)						
	1.2 Tagging research to determine connectivity, movement rates and mortality estimates of billfish.	High (4)		US\$100,000				

	1.2.1 Tagging studies (PSAT)		(TBD)					
2. Biological and ecological information (incl. parameters for stock assessment)	2.1 Age and growth research		High (7)					
	2.1.1 CPCs to provide further research reports on billfish biology, namely age and growth studies including through the use of fish otolith or other hard parts, either from data collected through observer programs or other research programs.			(CPCs directly)				
	2.2 Age-at-Maturity		High (8)					
	2.2.1 Quantitative biological studies are necessary for billfish throughout its range to determine key biological parameters including age-at-maturity and fecundity-at-age/length relationships, age-length keys, age and growth, which will be fed into future stock assessments.			(CPCs directly)				
	2.3 Spawning time and locations		High (9)					
	2.3.1 Collect gonad samples from billfish to confirm the spawning time and location of the spawning area that are presently hypothesized for each billfish species.			(CPCs directly)				
3. Historical data review	3.1 Changes in fleet dynamics							
	3.1.1 Japan and Taiwan,China to undertake an historical review of their longline fleets and to document the changes in fleet dynamics. The historical review should include as much explanatory information as possible regarding changes in fishing areas, species targeting, gear changes and other fleet characteristics to assist the WPB understand the current fluctuations observed in the data.		High (6)	(CPCs directly)				
	3.2 Species identification							
	3.2.1 The quality of the data available at the IOTC Secretariat on marlins (by species) is likely to be compromised by species miss-identification. Thus, CPCs should review their historical data in order to identify, report and correct (if possible) potential identification problems that are detrimental to any analysis of the status of the stocks.		High (5)	(CPCs directly)				

4. Sports/recreational fisheries	4.1 Fishery trends					
	4.1.1 The catch and effort data for sports/recreational fisheries targeting marlins and sailfish in the Indian Ocean should be submitted to the IOTC Secretariat to assist in future assessments for these species. CPCs with active sports/recreational fisheries targeting marlins and sailfish should undertake a comprehensive analysis for provision to the WPB.	High (First phase to be finalized in 2017)	Consultant US\$TBD			
5. CPUE standardization	5.1 Develop and/or revise standardized CPUE series for each billfish species and major fisheries/fleets for the Indian Ocean.					
	5.1.1 Swordfish: Priority LL fleets: Taiwan,China, EU(Spain, Portugal, France), Japan, Indonesia	High (20)	(CPCs directly)			
	5.1.2 Striped marlin: Priority fleets: Japan, Taiwan,China	High (21)	(CPCs directly)			
	5.1.3 Black marlin: Priority fleets: Longline: Taiwan,China; Gillnet: I.R. Iran, Sri Lanka	High (13)	(CPCs directly)			
	5.1.4 Blue marlin: Priority fleets: Japan, Taiwan,China	High (14)	(CPCs directly)			
	5.1.5 I.P. Sailfish: Priority fleets: Priority gillnet fleets: I.R. Iran and Sri Lanka; Priority longline fleets: EU(Spain, Portugal, France), Japan, Indonesia;	High (12)	(CPCs directly)			
6. Stock assessment / Stock indicators	6.1 Develop and compare multiple assessment approaches to determining stock status for swordfish (SS3, ASPIC, etc.).	High (15)	US\$??			
	6.2 Stock assessment on billfish species in 2018 and 2019	High (2)	Consultant/ US\$16,250			
	6.3 Workshops on techniques for assessment including CPUE estimations for billfish species in 2018 and 2019.	High (3)	Consultant US\$11,750			
7 Target and Limit reference points	7.1 To advise the Commission, by end of 2016 at the latest on Target Reference Points (TRPs) and Limit Reference Points (LRPs).	High (16)				
	7.1.1 Assessment of the interim reference points as well as alternatives: Used when assessing the Swordfish stock status and when establishing the Kobe plot and Kobe matrices.		WPM			

8 Management measure options	8.1 To advise the Commission, by end of 2016 at the latest, on potential management measures having been examined through the Management Strategy Evaluation (MSE) process.	High (17)					
	8.1.1 These management measures will therefore have to ensure the achievement of the conservation and optimal utilization of stocks as laid down in article V of the Agreement for the establishment of the IOTC and more particularly to ensure that, in as short a period as possible and no later than 2020, (i) the fishing mortality rate does not exceed the fishing mortality rate allowing the stock to deliver MSY and (ii) the spawning biomass is maintained at or above its MSY level.		WPM				

APPENDIX C

ASSESSMENT SCHEDULE FOR IOTC SPECIES AND SPECIES OF INTEREST FROM 2018–2022

Extract of the Report of the 20th Session of the Scientific Committee

(IOTC–2017–SC20–R; Appendix XXXVII, Page 221)

The SC **ADOPTED** a revised assessment schedule, ecological risk assessment and other core projects for 2018–22, for the tuna and tuna-like species under the IOTC mandate, as well as the current list of key billfish species of interest, as outlined in Appendix XXXVII (IOTC–2017–SC20–R, Para. 210).

<i>Working Party on Billfish</i>					
Species	2018	2019	2020	2021	2022
Black marlin	Full assessment		Full assessment		Full assessment
Blue marlin		Full assessment			Full assessment
Striped marlin	Full assessment			Full assessment	
Swordfish		Indicators	Full assessment		
Indo-Pacific sailfish		Full assessment*		Full assessment*	