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## REVISION OF THE WPB PROGRAM OF WORK (2021–2025)

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### PURPOSE

To ensure that participants at the 18<sup>th</sup> Working Party on Billfish (WPB18) revise the Program of Work for the WPB by taking into consideration the specific requests of the Commission and Scientific Committee.

### BACKGROUND

#### *Scientific Committee*

At the 22<sup>nd</sup> Session of the SC:

- (Para. 137) The SC **NOTED** IOTC–2019–SC22–09 which provided the SC with a proposed Program of Work for each of its working parties, including prioritisation of the elements requested by each working party.
- (Para 138) The SC **NOTED** the proposed Program of Work and priorities for the SC and each of the working parties and **AGREED** to a consolidated Program of Work as outlined in Appendix 35a-g. The Chairpersons and Vice-Chairpersons of each working party will ensure that the efforts of their respective working party is focused on the core areas contained within the appendix, taking into account any new research priorities identified by the Commission at its next Session.
- (Para. 140) The SC **AGREED** on the consolidated table of priorities across all working parties, as developed by each working party Chairperson, and **REQUESTED** that the IOTC Secretariat, in consultation with the Chairpersons and vice-Chairpersons of the SC and relevant working parties, develop ToRs for the specific projects to be carried out.
- (Para. 142) The SC **NOTED** that the WPM has selected five species for MSE (albacore, yellowfin, bigeye, skipjack and swordfish), as detailed in document IOTC-2019-SC22-15.
- (Para. 143) The SC **NOTED** Table 3 which outlines the highest priorities from each working party in terms of funding requirements. The complete set of research priorities identified (and ranked according their importance) by each working party are detailed more fully in [Appendix 35a-g](#).

#### *Commission*

At Sessions of the Commission, Conservation and Management Measures adopted contained elements that call on the Scientific Committee, via the WPB, to undertake specific tasks. These requests will need to be incorporated into a revised Program of Work for the WPB:

#### **Resolution 15/11 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties**

*Para. 2: In notifying their vessels fishing for tropical tunas in the area in 2006, and for swordfish and albacore in 2007, the CPCs shall confirm that they have verified the effective presence and fishing activities of their vessels in the IOTC area of competence in 2006 and in 2007, through their VMS records, catch reports, port calls, or other means. The IOTC Secretariat shall have access to such information upon request.*

#### **Resolution 18/05 On management measures for the conservation of the billfishes: striped marlin, black marlin, blue marlin and indo-pacific sailfish**

*Para. 5: Pending advice from the Scientific Committee on a joint and/or a species specific minimum conservation size, notwithstanding Resolution 17/04, CPCs shall not retain on board, trans-ship, land, any specimen smaller than 60 cm Lower Jaw Fork Length (LJFL) of any of the species referred to in paragraph 2, but shall return them immediately to the sea in a manner that maximizes post-release survival potential without compromising the safety of crew.*

Para. 12: *The IOTC Working Party on Billfish and the Scientific Committee shall continue their work on assessing and monitoring the status of Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish and provide advice to the Commission*

Para. 13: *The Scientific Committee and the Compliance Committee shall 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.*

Para. 14: *For each of the four species covered by this Resolution, the Scientific Committee shall provide advice:*

- a. Options to reduce fishing mortality with a view to recover and/or maintain the stocks in the Green zone of the Kobe Plot with levels of probability ranging from 60 to 90% by 2026 at latest. The advice shall be provided on the basis of the current exploitation pattern as well as of its likely change to take into account the advice under point c. below;*
- b. Options for candidate reference points for their conservation and management in the IOTC Area of Competence;*
- c. Species specific minimum conservation sizes by taking into account the size at maturity and the recruitment size to the fishery by gear as well as its practicability. Where adequate, due to considerations on technical interaction of fisheries, advice shall provide also a minimum conservation size common to the four species.*

## **DISCUSSION**

Participants at the WPB18 are requested to consider the priorities set by the Commission and the Scientific Committee, via Conservation and Management Measures, and revise its Program of Work to match those priorities.

## **RECOMMENDATION/S**

That the WPB:

- 1) **NOTE** paper IOTC–2020–WPB18–08, which encouraged the WPB to further develop and refine its Program of Work for 2021–2025 to align with the requests and directives from the Commission and Scientific Committee.
- 2) **RECOMMEND** a revised Program of Work for 2021–2025 to the Scientific Committee for its consideration and potential endorsement.

## **APPENDICES**

[Appendix A](#): Working Party on Billfish Program of Work (2020–2024)

**APPENDIX A**
**WORKING PARTY ON BILLFISH PROGRAM OF WORK (2020–2024)**

The Program of Work consists of the following, noting that a timeline for implementation would be developed by the SC once it has agreed to the priority projects across all of its Working Parties:

- **Table 1:** High priority topics for obtaining the information necessary to develop stock status indicators for billfish in the Indian Ocean; and
- **Table 2:** Stock assessment schedule.

**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 |      |      |      |      |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------|--------|------|------|------|------|
|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                     | 2020   | 2021 | 2022 | 2023 | 2024 |
| 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 (15)        | 1.3 m Euro: (European Union)        |        |      |      |      |      |
|                                                 | 1.1.1 Next Generation Sequencing (NGS) and nuclear markers (i.e. microsatellites) to determine the degree of shared stocks for billfish within the Indian Ocean and 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. Highest priority species: blue, black, striped marlin and sailfish. |                  |                                     |        |      |      |      |      |
|                                                 | 1.1.2 Initiate discussion (e.g., small workshop for CSIRO or request to present results in WPB) on the possibility to develop a close-kin mark recapture method (see <i>Bravington et al.</i> 2016) on marlins                                                                                                                                                                                                                                                                                            |                  |                                     |        |      |      |      |      |

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|                                                                                                                                                                                                                                                                                                                      | to estimates population size and other important demographic parameters..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |                                     |  |  |  |
|                                                                                                                                                                                                                                                                                                                      | 1.2 Tagging research (PSAT tags) to determine connectivity, movement rates and mortality estimates of billfish (Priority species: swordfish). Similar projects have been partially funded by EU, with a focus on epipelagic species. More tags are needed for swordfish.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | High (1)                       | US\$400,000                         |  |  |  |
| 2. Biological and ecological information (incl. parameters for stock assessment and provide answers to the Commission)                                                                                                                                                                                               | 2.1 Age and growth research                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | High (3)                       |                                     |  |  |  |
|                                                                                                                                                                                                                                                                                                                      | 2.1.1 CPCs to provide further research 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, port sampling or other research programs. (Priority: all billfishes: swordfish, marlins and sailfish)                                                                                                                                                                                                                                                                                                                                                                                                                      |                                | (CPCs: age & growth study = 50,000) |  |  |  |
|                                                                                                                                                                                                                                                                                                                      | 2.2 Reproductive biology study                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | High (2)                       |                                     |  |  |  |
|                                                                                                                                                                                                                                                                                                                      | CPCs to conduct reproductive biology studies, which are necessary for billfish throughout its range to determine key biological parameters including length-at-maturity, age-at-maturity and fecundity-at-age, which will be fed into future stock assessments, as well as provide advice to the Commission on the established Minimum Retention Sizes ( <u>Res 18-05, paragraphs 5 and 14c</u> ). (Priority: marlins and sailfish). Propose to have a two-day workshop to discuss the standard of billfish maturity staging intersessionally prior to the next WPB. Funding are needed to support the workshop participation of CPCs and expert(s) on billfish reproduction (expecting to have confirmation from the host organization). |                                | (CPCs: Maturity study = 30,000)     |  |  |  |
| 2.3 Spawning time and locations                                                                                                                                                                                                                                                                                      | High (4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |                                     |  |  |  |
| 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. This will also provide advice to the Commission on the request for alternative management measures ( <u>Res. 18-05, paragraph 6</u> ). Partially |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (CPCs: Spawning study =30,000) |                                     |  |  |  |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                 |  |  |  |  |  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|--|--|--|--|--|
|                           | supported by EU, on-going support and collaboration from CPCs are required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                 |  |  |  |  |  |
| 3. Historical data review | 3.1 Changes in fleet dynamics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                 |  |  |  |  |  |
|                           | 3.1.1 Continue the work with coastal countries to address recent changes and/or increases of marlins catches especially in some coastal fleets. 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 and very high increases in some species (e.g., black marlin mainly due to very high catches reported by India in recent years). The possibility of producing alternative catch histories should also be explored. Priority countries: India, Pakistan, Iran, I.R., Indonesia. | High (5) | WPDCS           |  |  |  |  |  |
|                           | 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 mis-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. Consider the application of DNA-Barcoding technology for billfish species identification.                                                                                                                                                                                                                                        | High     | (CPCs directly) |  |  |  |  |  |
| 4. CPUE standardization   | 4.1 Develop and/or revise standardized CPUE series for each billfish species and major fisheries/fleets for the Indian Ocean.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                 |  |  |  |  |  |
|                           | 4.1.1 Swordfish: Priority LL fleets: Taiwan,China, EU(Spain, Portugal, France), Japan, Indonesia, South African                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | High     | (CPCs directly) |  |  |  |  |  |
|                           | 4.1.2 Striped marlin: Priority fleets: Japan, Taiwan,China                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | High     | (CPCs directly) |  |  |  |  |  |
|                           | 4.1.3 Black marlin: Priority fleets: Longline: Taiwan,China; Gillnet: I.R. Iran, Sri Lanka, Indonesia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | High     | (CPCs directly) |  |  |  |  |  |
|                           | 4.1.4 Blue marlin: Priority fleets: Japan, Taiwan,China, Indonesia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | High     | (CPCs directly) |  |  |  |  |  |

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                       |  |  |  |  |  |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------|--|--|--|--|--|
|                                        | 4.1.5 I.P. Sailfish: Priority fleets: Priority gillnet fleets: I.R. Iran and Sri Lanka; Priority longline fleets: EU(Spain, Portugal, France), Japan, Indonesia;                                                                                                                                                                                                                                                                                                                                   | High | (CPCs directly)       |  |  |  |  |  |
|                                        | 4.1.6 Joint analysis of operational catch and effort data from Indian Ocean longline fleets as recommended by WPM                                                                                                                                                                                                                                                                                                                                                                                  | High | Consultant/ US\$40K   |  |  |  |  |  |
| 5. Stock assessment / Stock indicators | 5.1 Workshops on techniques for assessment including CPUE estimations for billfish species in 2019 and 2020. Priority fleets: Gillnet fisheries                                                                                                                                                                                                                                                                                                                                                    | High | Consultant US\$11,750 |  |  |  |  |  |
| 6 Target and Limit reference points    | 6.1 To advise the Commission, by end of 2016 at the latest on Target Reference Points (TRPs) and Limit Reference Points (LRPs).                                                                                                                                                                                                                                                                                                                                                                    | High | WPM                   |  |  |  |  |  |
|                                        | 6.1.1. 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.                                                                                                                                                                                                                                                                                                                   |      |                       |  |  |  |  |  |
| 7 Management measure options           | 7.1 To advise the Commission, on potential management measures having been examined through the Management Strategy Evaluation (MSE) process.                                                                                                                                                                                                                                                                                                                                                      | High | WPM                   |  |  |  |  |  |
|                                        | 7.1.1 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. |      |                       |  |  |  |  |  |

**Table 2.** Assessment schedule for the IOTC Working Party on Billfish (WPB)

| <i>Working Party on Billfish</i> |                        |                        |                         |                        |                        |
|----------------------------------|------------------------|------------------------|-------------------------|------------------------|------------------------|
| <b>Species</b>                   | <b>2020</b>            | <b>2021</b>            | <b>2022</b>             | <b>2023</b>            | <b>2024</b>            |
| Black marlin                     |                        | <b>Full assessment</b> |                         |                        | <b>Full assessment</b> |
| Blue marlin                      |                        |                        | <b>Full assessment</b>  |                        |                        |
| Striped marlin                   |                        | <b>Full assessment</b> |                         |                        | <b>Full assessment</b> |
| Swordfish                        | <b>Full assessment</b> |                        | <b>Indicators**</b>     | <b>Full assessment</b> |                        |
| Indo-Pacific sailfish            |                        |                        | <b>Full assessment*</b> |                        |                        |

\* 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