

## OUTCOMES OF THE 22<sup>nd</sup> SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT, 20 APRIL 2021

### PURPOSE

To inform participants at the 23<sup>rd</sup> Working Party on Tropical Tunas Data Preparatory meeting (WPTT23(DP)) of the recommendations arising from the 23<sup>rd</sup> Session of the IOTC Scientific Committee (SC) held from 7 -11 December 2020, specifically relating to the work of the WPTT.

### BACKGROUND

At the 23<sup>rd</sup> Session of the SC, the SC noted and considered the recommendations made by the WPTT in 2020 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 under agenda item 4 and in paper IOTC–2021–WPTT23(DP)–08 and are therefore not presented in this paper.

Based on the recommendations arising from the WPTT22, the SC23 adopted a set of recommendations, provide at [Appendix A](#) of this paper.

The recommendations contained in [Appendix A](#) will be provided to the Commission for consideration at its 25<sup>th</sup> Session to be held in June 2021.

In addition, the SC23 reviewed and endorsed a Program of Work (2021–2025) for the WPTT, including a revised assessment schedule, as detailed in [Appendix B](#). A separate paper will be reviewed during the WPTT23(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 SC23 Report (2020) are provided here for the consideration and action of the WPTT23(DP):

#### **Report of the 22<sup>nd</sup> Session of the Working Party on Tropical Tunas (WPTT22)**

68. The SC **NOTED** the report of the 22<sup>nd</sup> Session of the Working Party on Tropical Tunas (IOTC–2020–WPTT22(AS)–R), including the consolidated list of recommendations provided as an appendix to the report. The meeting was attended by 111 participants (cf. 68 in 2019). No MPF funding was provided as the meeting was held online (cf. 13 in 2019).

##### **7.4.1 Skipjack tuna stock assessment**

69. The SC **NOTED** that the 2020 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, despite that the catches have increased in the last three years (the catches in 2018 exceeded the catch limit by as much as 30%).

70. The SC **DISCUSSED** the possible reasons for the improved stock status, e.g. favourable environment conditions which may have resulted in increased recruitment and productivity, as reflected in the recent CPUE trends. The SC

**AGREED** that it is important to explore and understand the underlying ecological and environmental drivers that underpin the stock trend to ensure that the recent overshooting of TAC did not undermine the sustainability of the stock.

71. The SC also **NOTED** that the 2020 skipjack tuna stock assessment captured structural uncertainty through a grid of 24 models covering alternative assumptions on spatial structure, tag data weighting, steepness, and technological effort creep. Statistical uncertainty from individual models was incorporated into the estimates of stock status. 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.

72. The SC **NOTED** paper IOTC–2020–SC23–INF04 which provided a review by the invited scientific expert to WPTT22 of the 2020 skipjack tuna stock assessments, including the following abstract provided by the author:

*“The assessment author should be commended on the work put into this assessment. Despite the need for a video meeting and the possible necessity to abbreviate some aspects of the assessment process, the author and team covered a great amount of breadth and detail. The work and presentations were very complete and identified some of the major uncertainties in the assessment model and data. The overall process of the assessment was seemingly very transparent and comments from the attendees were welcomed and addressed. The assessment document itself was complete and extensive. While I cannot make the determination, I assume that the assessment addressed every comment or issue brought up at the data preparatory meeting”.*

73. The SC **NOTED** that the report by the invited expert provides guidance on how future assessments for skipjack might be improved. The SC **REQUESTED** the Secretariat to work with the Chair of the WPTT and the relevant assessment modellers to consider the salient points raised in the expert review for use in the next assessment.

74. The SC **NOTED** that there were considerable deliberations on the technology effort creep that might have accrued over time in the Purse Seine fleet, and how they should be incorporated into the assessment. The SC **NOTED** that the 1.25% annual effort creep assumption included in the model grid was based on a study that evaluates the difference in catchability trends between Purse Seine and Longline CPUE using the yellowfin and bigeye assessment models, which suggested an effort creep about 1.25– 4% annually since 1990. The SC also **NOTED** disagreement between WPTT scientists as to whether a scenario of 0% effort creep should have been part of the assessment grid.

75. The SC **AGREED** that the technological effort creep represents a key source of uncertainty although in case of skipjack tuna it is influential, but not a main driver of the assessment results. The SC **NOTED** similar debate is likely to occur for other species if the PS CPUE is going to be applied, and therefore urge the scientists to undertake additional analysis to fully understand the extent of the effort creep to the PS fleet and to resolve the issue quickly.

76. The SC **NOTED** that for skipjack tuna target and limit reference points for unfished spawning biomass level have been agreed, in accordance with the HCR (16/02), which differ considerably to the MSY based reference points defined in Resolution 15/10. The SC further **NOTED** that when the skipjack tuna stock is maintained to fluctuate around its target, there is still a very large probability for the stock to be classified as being overfished, despite that the biomass is well above BMSY.

77. The SC discussed the plausibility of the provision of both depletion based as well as MSY based stock status plots for skipjack tuna. The SC **NOTED** the ad hoc reference point working group is mandated to review the definition of overfished and overfishing stock status, and possible revisions of the Kobe plots, and therefore provides a better forum on how to best present the stock status for skipjack.

78. The SC **NOTED** that the reference points for skipjack tuna are defined with respect to unfished spawning biomass only in resolution 16/02; nonetheless the notation is in terms of B (total exploitable biomass) instead of SB (spawning biomass). Although the resolution also specified  $E_{tag}$  (annual equilibrium exploitation rate associated with the unfished target spawning biomass), it was intended as a control parameter for the harvest control rule, rather than as an explicit target. Meanwhile Resolution 16/02 did not define a limit exploitation rate ( $E_{lim}$ ). The SC further **NOTED** that resolution 15/10 had specified a default depletion-based target and limit fishing mortality rate but it was discussed whether these are appropriate for skipjack tuna (the default values are defined only when MSY-based reference points can not be estimated robustly according to 15/10). As such the SC **RECOMMENDED** that the skipjack MSE project to revisit these reference points, including to investigate the plausibility of establishing a limit reference point for fishing mortality (or exploitation rate). ) and to evaluate the differences on the catch forecasts by using total biomass instead of spawning biomass in the HCR.

79. The SC **RECALLED** that the first iteration of the skipjack HCR was implemented in 2017 and an annual Catch Limit was established for 2018-2020. The SC **ENDORSED** the 2020 skipjack tuna assessment results for updating the catch limit for the period 2021-2023 using the Harvesting Control Rule stipulated by the Resolution 16/02.

#### 7.4.2 Yellowfin tuna assessment update

80. The SC **RECALLED** that the yellowfin stock assessment conducted in 2018 concluded that the stock is overfished and is subject to overfishing. The SC further **RECALLED** that the assessment was not used to provide management advice due to the insufficient uncertainty considered, as well as the poor predictive capability of the model. Consequently, a yellowfin workplan was initiated to reduce the uncertainty and improve the predictive capability of the model.

81. The SC **NOTED** that the yellowfin modelling team has made considerable progress in addressing the array of tasks under the workplan, which were scrutinized in more details during the WPTT, including: the investigation of alternative (annual) temporal structure; the development of an objective procedure towards the selection of models based on diagnostics scores; a close examination of the issues in the projections.

82. The SC **NOTED** there is a structure issue in the projection which is related to how the regional recruitment distribution is propagated through the projection period. The SS3 software has assumed the long-term average values for the regional recruitment distribution parameters in the projection, which differed considerably to the recent values in case of yellowfin tuna. Consequently, this would have imposed a constraint on available biomass in regions with large catches and led to biomass collapse for some of the more pessimistic modes, resulting in biased estimates of K2SM probabilities.

83. The SC **NOTED** that the yellowfin modelling team is working collaboratively with the SS3 developer to resolve this issue by allowing for more flexible options in configuring time-varying parameters for the projections. The SC **AGREED** that until a solution is provided, the estimated K2SM probabilities should be not used for providing management advice for yellowfin tuna in order to avoid confusions.

84. The SC commended the yellowfin modelling team for their efforts and excellent contributions to identify the issues in the yellowfin assessment model. The SC **NOTED** that the work will continue in 2021 to provide a model that is sufficiently improved to justify its use for providing new management advice on catch limit. The SC **NOTED** that the work is expected to be complete in time for the WPTT meeting in 2021 and any progress made intersessionally will be reported to the special session of the Commission scheduled in March 2021.

#### 7.4.3 Status of Yellowfin catches

85. The SC **NOTED** Para. 24 of Resolution 19/01 states that “The IOTC Secretariat, under advice of the Scientific Committee, shall prepare and circulate a table of allocated catch limits disaggregated as per the conditions set out in paragraphs 5 – 10 for preceding year, in December of the current year.” As such, the table of allocated catch limits was presented to the SC and is contained in Appendix 33.

86. The SC **NOTED** that the intention of Res 19/01 is to reduce catch levels to allow the yellowfin tuna stock to rebuild. The SC **NOTED**, however that according to Appendix 33, catches have actually increased by 5.22% since 2014. The SC further **NOTED** that increases in catches by CPCs not bound by Res 19/01 have offset the reductions in catches by CPCs bound by the Resolution. This has led to the overall increase in catches from 2014 – 2019.

#### 7.4.4 Other Matters

87. The SC **NOTED** the WPTT Program of work, with high priorities being given to stock assessment model data review, fishery-independent monitoring including acoustic FAD monitoring, and MSE, CPUE standardisations, Biological sampling, Historical data review, and Target and limit reference points review..

### RECOMMENDATION

That the WPTT:

- 1) **NOTE** paper IOTC–2021–WPTT23(DP)–03 which outlined the main outcomes of the 23<sup>rd</sup> 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 23<sup>rd</sup> Session of the Scientific Committee to the Commission, relevant to the Working Party on Tropical Tunas.

**Appendix B:** Assessment schedule for the WPTT 2021–2025.

APPENDIX A

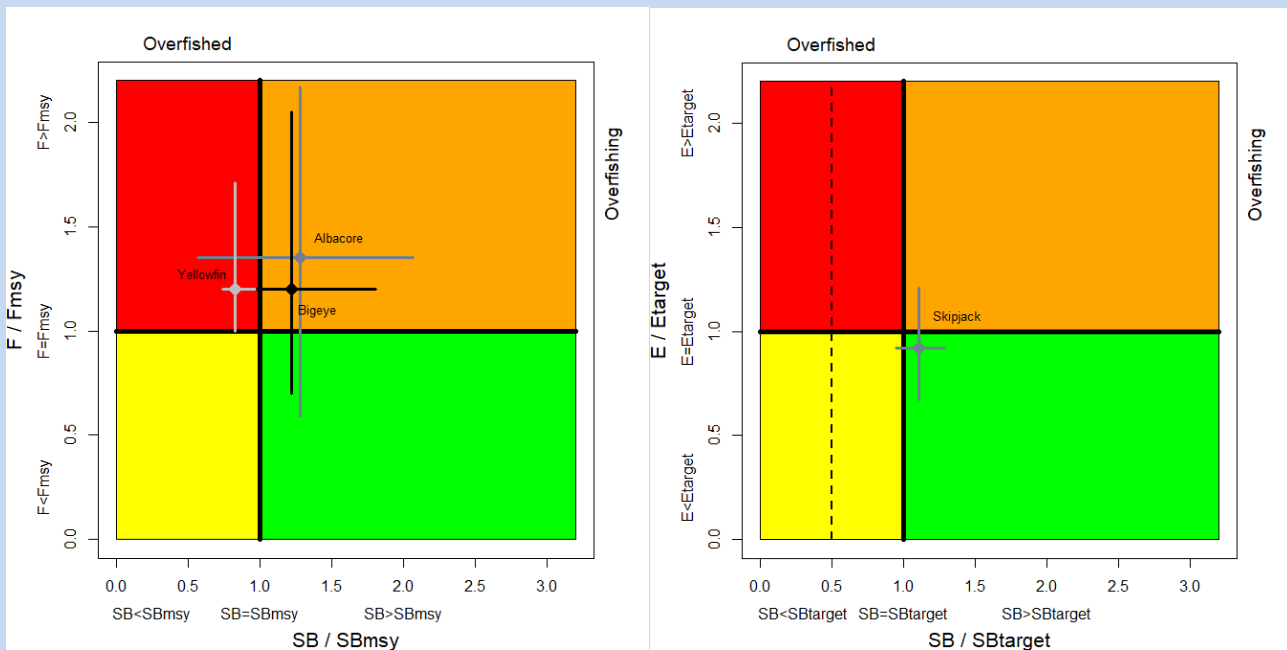
CONSOLIDATED SET OF RECOMMENDATIONS OF THE 23<sup>RD</sup> SESSION OF THE SCIENTIFIC COMMITTEE (7–11 DECEMBER 2021) TO THE COMMISSION

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

Tuna – Highly migratory species

SC23.01 (para. 130) 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 2020 (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 2018, based on the assessment conducted in 2019), and yellowfin tuna (light grey: 2017, with assessment conducted in 2018) and albacore (dark grey: 2017 with assessment conducted in 2019) 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 (assessment conducted in 2020) 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

*Skipjack tuna Stock Assessment*

SC23.11 (para. 78) The SC **NOTED** that the reference points for skipjack tuna are defined with respect to unfished spawning biomass only in resolution 16/02; nonetheless the notation is in terms of B (total exploitable biomass) instead of SB (spawning biomass). Although the resolution also specified Etarg (annual equilibrium exploitation rate associated with the unfished target spawning biomass), it was intended as a control parameter for the harvest control rule, rather than as an explicit target. Meanwhile Resolution 16/02 did not define a limit exploitation rate (Elim). The SC further **NOTED** that resolution 15/10 had specified a default depletion-based target and limit fishing mortality rate but it was discussed whether these are appropriate for skipjack tuna (the default values are defined only when MSY-based reference points can not be estimated robustly according to 15/10). As such the SC **RECOMMENDED** that the skipjack MSE project to revisit these reference points, including to investigate the plausibility of establishing a limit reference point for fishing mortality (or exploitation rate). ) and to evaluate the differences on the catch forecasts by using total biomass instead of spawning biomass in the HCR.

***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***

SC23.15 (para. 114) 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***

SC23.16 (para. 116) 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***

SC23.17 (para. 117) 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.

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

SC23.18 (para. 118) 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***

SC23.19 (para. 163) 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 23<sup>RD</sup> SESSION OF THE SCIENTIFIC COMMITTEE***

SC23.20 (para. 168) The SC **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from SC23, provided at [Appendix 38](#).



**APPENDIX B**

**SCHEDULE OF STOCK ASSESSMENTS FOR IOTC SPECIES AND SPECIES OF INTEREST FROM 2021–2025, AND FOR OTHER WORKING PARTY PRIORITIES**

The SC **ADOPTED** a revised assessment schedule, ecological risk assessment and other core projects for 2021–25, for the tuna and tuna-like species under the IOTC mandate, as well as the current list of key shark species of interest, as outlined in Appendix 36. (IOTC–2020–SC23–R, Para. 161)

*Extract of the Report of the 23<sup>rd</sup> Session of the Scientific Committee*

*(IOTC–2020–SC23–R; Appendix 36, Pages 203 to 205)*

<b>Working Party on Tropical Tunas</b>					
<b>Species</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Bigeye tuna	Indicators	<b>Data preparatory meeting</b>  <b>Full assessment</b>	Indicators	Indicators	<b>Data preparatory meeting</b>  <b>Full assessment</b>
Skipjack tuna	Indicators	Indicators	<b>Data preparatory meeting</b>  <b>Full assessment</b>	Indicators	Indicators
Yellowfin tuna	<b>Data preparatory meeting</b>  <b>Full assessment</b>	Indicators	Indicators	<b>Data preparatory meeting</b>  <b>Full assessment</b>	Indicators