

OUTCOMES OF THE 18th SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT¹, 6 OCTOBER 2016

PURPOSE

To inform participants at the 18th Working Party on Tropical Tunas (WPTT18) of the recommendations arising from the 18th Session of the IOTC Scientific Committee (SC) held from the 23-27 November 2015, specifically relating to the work of the WPTT.

BACKGROUND

At the 18th Session of the SC, the SC noted and considered the recommendations made by the WPTT in 2015 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-2016-WPTT18-07 and are therefore not presented in this paper.

Based on the recommendations arising from the WPTT17, the SC18 adopted a set of recommendations, provide at [Appendix A](#) of this paper.

The recommendations contained in [Appendix A](#) were provided to the Commission for consideration at its 20th Session held in May 2016. A separate paper, IOTC-2016-WPTT18-04 addresses the responses and actions of the Commission.

In addition, the SC18 reviewed and endorsed a Program of Work (2016-2020) for the WPTT, including a revised assessment schedule, as detailed in [Appendix B](#) and [Appendix C](#). A separate paper (IOTC-2016-WPTT18-08) 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 SC18 Report (2015) are provided here for the consideration and action of the WPTT18:

Yellowfin tuna

The SC **NOTED** that around half of the recent yellowfin tuna catch is harvested by artisanal fisheries, about which there is little information with regards to their catch, their fishing areas and the sizes of their captures. In addition, there is a lack of size frequency data for some industrial longline fleets fishing yellowfin tuna. **NOTING** that these problems contribute to increase the uncertainty in stock assessments, the SC **AGREED** that incorporating this type of uncertainty in future assessments is important to be included in the Program of Work for the WPTT. Moreover, CPCs should comply with IOTC data requirements in Resolutions 15/01 and 15/02. (para. 87 of the SC18 Report)

The SC **NOTED** a series of issues identified with the SS3 stock assessment carried out in 2015 as detailed in the report of the WPTT17 (IOTC-2015-WPTT17-R). Briefly, these include, but are not limited to the following:

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- a. The decline to a low spawning biomass relative to MSY was not preceded by a period of high catch relative to MSY. The model interprets the trend in biomass as originating from low recruitment.
- b. The sudden decrease in estimated recruitment in 2004 and 2005 is not observed in the nominal catch rates of purse seine fisheries using FADs, but it can be observed by other fishery indicators.
- c. The problems related to the representativeness of the Japanese CPUE series, which is localised in a southern area of the distribution of yellowfin tuna and only accounts for 1% of the total catch in recent years.
- d. The adult biomass as estimated by the longline CPUE indices has shown a sudden decline between 2007 and 2008 (piracy onset) whereas the adult yellowfin tuna nominal purse seine CPUE appears to be stable. (para. 88 of the SC18 Report)

NOTING the difficulties with purse seine CPUE standardisation, the SC **REQUESTED** that the European Union place greater importance and effort into standardising their purse seine CPUE series on juveniles and adults, which would contribute to the next stock assessment for yellowfin tuna. (para. 89 of the SC18 Report)

Executive summaries for tropical tuna species

The SC also adopted revised Executive Summaries for the three (3) tropical tuna species that can be found as appendices to the SC18 report, and which can be downloaded from the IOTC website's new **Stock Status Dashboard**, in English and French:

English: <http://iotc.org/science/status-summary-species-tuna-and-tuna-species-under-iotc-mandate-well-other-species-impacted-iotc>

French: <http://iotc.org/fr/science/r%C3%A9sum%C3%A9-de-l%C3%A9tat-des-stocks>

RECOMMENDATION

That the WPTT:

- 1) **NOTE** paper IOTC–2016–WPTT18–03 which outlined the main outcomes of the 18th 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 18th Session of the Scientific Committee to the Commission, relevant to the Working Party on Tropical Tunas.

Appendix B: Program of Work (2016–2020) for the IOTC Working Party on Tropical Tunas (WPTT).

Appendix C: Assessment schedule for the WPTT 2016–2020.

APPENDIX A

CONSOLIDATED SET OF RECOMMENDATIONS OF THE 18th SESSION OF THE SCIENTIFIC COMMITTEE TO THE COMMISSION RELEVANT TO THE WORKING PARTY ON TROPICAL TUNAS

Extract of the Report of the 18th Session of the Scientific Committee

(IOTC–2015–SC18–R; Appendix XXXVII, PAGES 168–175)

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

Tuna – Highly migratory species

SC18.01 (para. 121) 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 three species assigned a stock status in 2015 (Fig. 4):

- Albacore (*Thunnus alalunga*) – Appendix VIII
- Bigeye tuna (*Thunnus obesus*) – Appendix IX
- Skipjack tuna (*Katsuwonus pelamis*) – Appendix X
- Yellowfin tuna (*Thunnus albacares*) – Appendix XI
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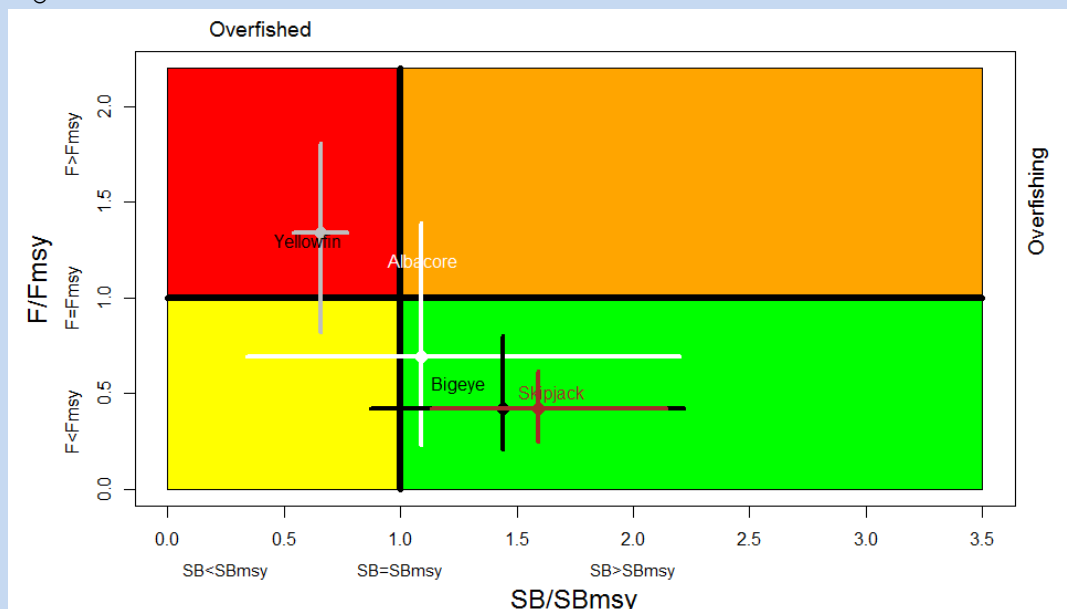


Fig. 4. Combined Kobe plot for bigeye tuna (black: 2013), skipjack tuna (brown: 2014), yellowfin tuna (grey: 2015) and albacore (white: 2014) showing the estimates of current stock size (SB) and current fishing mortality (F) in relation to the interim target spawning stock size and interim target fishing mortality. Cross bars illustrate the range of uncertainty from the model runs. Note that for skipjack tuna, the estimates are highly uncertain as F_{MSY} is poorly estimated, and as suggested for stock status advice it is better to use B_0 as a biomass reference point and $C(t)$ relative to C_{MSY} as a fishing mortality reference point.

GENERAL RECOMMENDATIONS TO THE COMMISSION

Report of the 2nd CPUE workshop on longline fisheries

SC18.22 (para. 83) **NOTING** the advice from the WPTT that differences between the Japan and Taiwan,China longline CPUE indices were examined and attributed to either low sampling coverage of logbook data (between 1982–2000) or misreporting across oceans (Atlantic and Indian oceans) for bigeye tuna catches between 2002–04 for Taiwan,China, the SC **RECOMMENDED** the 1) development of minimum criteria (e.g. 10% using a simple random stratified sample) for logbook coverage to use data in standardisation processes; and 2) identifying vessels through exploratory analysis that were misreporting, and excluding them from the dataset in the standardisation analysis.

SC18.23 (para. 84) The SC **RECOMMENDED** that:

- more credence should be given to CPUE indices based on operational data, since analyses of these data can take more factors into account, and analysts are better able to check the data for inconsistencies and errors.
- Taiwan,China fleets provide all available logbook data to data analysts, representing the best and most complete information possible. This stems from the fact that the dataset currently used by scientists from Taiwan,China is incomplete and not updated with logbooks that arrive after finalisation.
- that vessel identity information for the Japanese fleets for the period prior to 1979 should be obtained either from the original logbooks or from some other source, to the greatest extent possible to allow estimation of catchability change during this period and to permit cluster analysis using vessel level data. During this period there was significant technological change (e.g. deep freezers) and targeting changes (e.g. yellowfin tuna to bigeye tuna).
- examining operation level data across all longline fleets (Rep. of Korea, Japan and Taiwan,China) will give us a better idea of what is going on with the fishery and stock especially if some datasets have low sample sizes or effort in some years, and others have higher sample sizes and effort, so we have a representative sample covering the broadest areas in the Indian Ocean. This will also avoid having no information in certain strata if a fleet were not operating there, and avoid combining two indices in that case.
- that continued work on joint analysis of operational catch and effort data from multiple fleets be undertaken, to further develop methods and to provide indices of abundance for IOTC stock assessments.

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

Meeting participation fund

SC18.24 (para. 98) The SC **RECOMMENDED** 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.

Capacity building activities

SC18.25 (para. 99) 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, and **RECOMMENDED** that the Commission consider allocating more funds to these activities in the future.

SC18.26 (para. 100) The SC **RECOMMENDED** that Commission further increases the IOTC Capacity Building budget line so that capacity building training on data analysis and applied stock assessment approaches, with a priority being data poor approaches, can be carried out in 2016.

IOTC species identification guides: Marine mammal and Best practice guidelines for the safe release and handling of encircled cetaceans

SC18.27 (para. 102) The SC **RECOMMENDED** that the Commission allocate funds in its 2016/2017 budget, to produce and print the IOTC best practice guidelines for the safe release and handling of encircled cetaceans. The guidelines could be incorporated into a set of IOTC cetacean identification cards: “*Cetacean identification for Indian Ocean fisheries*”.

IOTC Secretariat staffing

SC18.28 (para. 106) **NOTING** the very heavy and constantly increasing workload on the IOTC Secretariat, and the current staffing capacity to respond to requests for assistance by countries, the SC strongly **RECOMMENDED** that at least three (3) additional staff (Science/Data) be hired to join the IOTC Secretariat to work on tasks including but not limited to 1) science and capacity building to improve understanding of IOTC processes; and 2) data quality/exchange improvement, to commence work by 1 January 2017. Funding for these new positions should come from both the IOTC regular budget and from external sources to reduce the direct financial burden on the IOTC membership.

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

SC18.29 (para. 107) 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 VII.

Implementation of the Regional Observer Scheme

SC18.30 (para. 138) **NOTING** that training of observers and crew is long-term and necessarily meticulous work that should be done in a recurrent way in order to optimise the efficiency of observers, the SC **RECOMMENDED** that the IOTC Secretariat increases its effort in training observers, including species identification. This would only be possible if the Commission were to increase staffing at the IOTC Secretariat and allocate specific funding for the Regional Observer Scheme implementation.

Resolution 11/04 On a regional observer scheme

SC18.31 (para. 145) **NOTING** that the objective of the Regional Observer Scheme contained in Resolution 11/04, and the rules contained in Resolution 12/02 *On data confidentiality policy and procedures* makes no reference to the data collected not being used for compliance purposes, the SC **RECOMMENDED** that at the next revision of Resolution 11/04, it be clearly stated that the data collected within the Regional Observer Scheme shall not be used for compliance purposes.

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

SC18.32 (para. 151) The SC **RECOMMENDED** that the Commission note the updates on progress regarding Resolution 09/01 *on the performance review follow-up*, as provided at Appendix XXXIII.

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

Consultants

SC18.33 (para. 157) **NOTING** the highly beneficial and relevant work done by IOTC stock assessment consultants in 2015 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. The draft budget provided in Table 5, shall be incorporated into the overall IOTC Science budget for the consideration of the Commission.

TABLE 5. Estimated budget required to hire a consultant to carry out stock assessments on tuna and tuna-like species under the IOTC mandate, sharks frequently caught by IOTC fisheries, and capacity building, in 2017 and 2018, noting that the 2016 budget has already been approved by the Commission.

Description	Unit price	Units required	2017 Total (US\$)	2018 Total (US\$)
Workshops on data poor techniques for stock assessment: Develop materials for training workshops and delivery (facilitated by the IOTC stock assessment scientist) (fees)	450	15	6,750	6,750
Workshops on data poor techniques for stock assessment: Develop materials for training workshops and delivery (facilitated by the IOTC stock assessment scientist)(travel)	5,000	1	5,000	5,000
WPNT				
CPUE workshops: CPUE standardisation from the neritic tuna fleets (Indonesia, I.R. Iran and India (3 total) (fees)	450	50	22,500	22,500
CPUE workshops: CPUE standardisation from the neritic tuna fleets (Indonesia, I.R. Iran and India (3 total) (travel)	5,000	3	15,000	15,000
Neritic tuna data poor stock assessment and capacity building (fees)	450	25	11,250	11,250
Neritic tuna data poor stock assessment and capacity building (travel)	5,000	1	5,000	5,000
WPB				
Billfish data poor stock assessment, including the development of CPUE series for coastal gillnet and fisheries other than industrial longline (fees)	450	25	11,250	11,250
Billfish data poor stock assessment (travel)	5,000	1	5,000	5,000

WPEB				
Shark stock assessment data preparation (fees)	450	20	9,000	–
Shark stock assessment data preparation (travel)	5,000	1	5,000	–
Shark stock assessment (fees)	450	25	–	11,250
Shark stock assessment (travel)	5,000	1	–	5,000
WPTT				
Tropical tuna stock assessment (fees)	500	35	17,500	17,500
Tropical tuna stock assessment (travel)	5,000	1	5,000	5,000
WPTmT				
Temperate tuna stock assessment (fees)	450	35	–	15,750
Temperate tuna stock assessment (travel)	5,000	1	–	5,000
WPM				
External peer review of the yellowfin tuna MSE	450	10	4,500	4,500
External peer review of the bigeye tuna MSE	450	10	4,500	4,500
TOTAL			116,000	150,250

Schedule of meetings for 2016 and 2017

SC18.34 (para. 160) The SC **RECOMMENDED** that the Commission discuss the merits of moving the annual Scientific Committee meeting to February each year. This would allow the species working parties to be moved later in the year, thus ensuring that the most recent data is available for assessment purposes. If the Commission were to approve a February date, it may wish to fix its own meeting date in June each year, thus allowing sufficient consultation time between the Scientific Committee and the Commission meeting.

Review of publication deadlines for IOTC data summaries and other datasets for use by Working Parties

SC18.35 (para. 165) The SC **RECOMMENDED** that the reporting deadline for stock assessment inputs (index of abundance, catch reconstructions, size data, etc.) be 45 days prior to the meeting in which the species is to be assessed.

APPENDIX B

PROGRAM OF WORK (2016–2020) 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 XXXIV. 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-2015-SC18-R, Para. 153).

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

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
1. Stock structure (connectivity and diversity)	1.1 Genetic research to determine the connectivity of tropical tuna species throughout their distribution (including in adjacent Pacific Ocean waters as appropriate) and the effective population size.	Funded	CSIRO/AZTI /IRD/RITF	1.3 m Euro: (European Union; 20% additional co-financing)					
	1.1.1 Next Generation Sequencing (NGS) to determine the degree of shared stocks for tropical tuna species in the Indian Ocean. Population genetic analyses to decipher inter- and intraspecific evolutionary relationships, levels of gene flow (genetic exchange rate), genetic divergence, and effective population sizes.								
	1.1.2 Nuclear markers (i.e. microsatellite) to determine the degree of shared stocks for tropical tuna species in the Indian Ocean with the Pacific Ocean, as appropriate.								
	1.2 Connectivity, movements and habitat use								
	1.2.1 Connectivity, movements, and habitat use, including identification of hotspots and investigate associated environmental conditions affecting the tropical tuna	(4)		US\$?? (TBD)					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	species distribution, making use of conventional and electronic tagging (P-SAT).								
2. Biological and ecological information (incl. parameters for stock assessment)	2.1 Age and growth								
	2.1.1 Design and develop a plan for a biological sampling program to support research on tropical tuna biology. The plan would consider the need for the sampling program to provide representative coverage of the distribution of the different tropical tuna species within the Indian Ocean and make use of samples and data collected through observer programs, port sampling and/or other research programs. The plan would also consider the types of biological samples that could be collected (e.g. otoliths, spines, gonads, stomachs, muscle and liver tissue, fin clips etc), the sample sizes required for estimating biological parameters, and the logistics involved in collecting, transporting and processing biological samples. The specific biological parameters that could be estimated include, but are not limited to, estimates of growth, age at maturity, fecundity, sex ratio, spawning season, spawning fraction and stock structure.	(3)	CPCs directly	US\$?? (TBD)					
	2.2 Age-at-Maturity								
	2.2.1 CPCs to provide further research reports on tropical tuna biology, namely age and growth studies including using through the use of fish otoliths, either from data collected through observer programs or other research programs.	(6)	CPCs directly	US\$?? (TBD)					
3. Ecological information	3.1 Spawning time and locations								
	3.1.1 Collect gonad samples from tropical tunas to confirm the spawning time and location of the spawning area that are presently hypothesised for each tropical tuna species.	(7)		US\$?? (TBD)					
4. Historical data review	4.1 Changes in fleet dynamics need to be documented by fleet								

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	4.1.1 Provide an evaluation of fleet-specific fishery impacts on the stock of bigeye tuna, skipjack tuna and yellowfin tuna. Project potential impact of realizing fleet development plans on the status of tropical tunas based upon most recent stock assessments.	(8)	Consultant	US\$30K					
5. CPUE standardisation	5.1 Develop standardised CPUE series for each tropical tuna fleet/fishery for the Indian Ocean								
	5.1.1 There is an urgent need to establish procedures for annually developing longline CPUE indices using the combined data from multiple fleets, and to further develop and validate the methods used in these analyses.	(1)	Scientific Committee and consultants	US\$40K (IOTC)					
	5.1.2 Development of minimum criteria (e.g. 10% using a simple random stratified sample) for logbook coverage to use data in standardisation processes; and 2) identifying vessels through exploratory analysis that were misreporting, and excluding them from the dataset in the standardisation analysis.		CPCs directly	US\$?? (TBD)					
	5.1.3 Vessel identity information for the Japanese fleets for the period prior to 1979 should be obtained either from the original logbooks or from some other source, to the greatest extent possible to allow estimation of catchability change during this period and to permit cluster analysis using vessel level data.		Japan	US\$?? (TBD)					
	5.1.4 The standardisation of purse seine CPUE be made where possible using the operational data on the fishery.	(2)	CPCs directly	US\$?? (TBD)					
	Bigeye tuna: High priority fleets		CPCs directly	US\$?? (TBD)					
	Skipjack tuna: High priority fleets		CPCs directly	US\$?? (TBD)					
	Yellowfin tuna: High priority fleets		CPCs directly	US\$?? (TBD)					
	5.1.5 That methods be developed for standardising purse seine catch	(10)	Consultant	US\$??					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	species composition using operational data, so as to provide alternative indices of relative abundance.		and CPCs directly	(TBD)					
	5.1.6 Investigate the potential to use the Indian longline survey as a fishery-independent index of abundance for tropical tunas.		Consultant And CPCs directly	US\$30K (TBD)					
6. Stock assessment / stock indicators	6.1 Develop and compare multiple assessment approaches to determine stock status for tropical tunas		CPCs directly	US\$?? (TBD)					
7. Fishery independent monitoring	7.1 All of the tropical tuna stock assessments are highly dependent on relative abundance estimates derived from commercial fishery catch rates, and these could be substantially biased despite efforts to standardise for operational variability (e.g. spatio-temporal variability in operations, improved efficiency from new technology, changes in species targeting). Accordingly, the IOTC should continue to explore fisheries independent monitoring options which may be viable through new technologies. Possibilities include: <ul style="list-style-type: none"> • Aerial surveys, potentially using remotely operated or autonomous drones • Acoustic FAD monitoring • Genetics-based tagging techniques using recaptured individuals or identification of closely-related pairs • Longline-based surveys (expanding on the Indian model) or “sentinel surveys” in which a small number of commercial sets follow a standardised scientific protocol 		CPCs directly	US\$?? (TBD)					
8 Target and Limit reference points	8.1 To advise the Commission, by end of 2016 at the latest on Target Reference Points (TRPs) and Limit Reference Points (LRPs).								
	8.1.1 Used when assessing tropical tuna stock status and when		CPCs	US\$??					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	establishing the Kobe plot and Kobe matrices		directly	(TBD)					
9	Management measure options								
	9.1 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.								
	9.1.1 These management measures will therefore have to ensure the achievement of the conservation and optimal utilisation 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 (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.		CPCs directly	US\$?? (TBD)					

APPENDIX C

SCHEDULE OF STOCK ASSESSMENTS FOR IOTC SPECIES AND SPECIES OF INTEREST FROM 2016–2020, AND FOR OTHER WORKING PARTY PRIORITIES

The SC **ADOPTED** a revised assessment schedule, ecological risk assessment and other core projects for 2016–20, 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 XXXV. (IOTC-2015-SC18-R, Para. 155)

*Extract of the Report of the 18th Session of the Scientific Committee
(IOTC-2015-SC18-R; Appendix XXXV, PAGE 165-166)*

<i>Working Party on Tropical Tunas</i>					
Species	2016	2017	2018	2019	2020
Bigeye tuna	Full assessment	Indicators	Indicators	Full assessment	Indicators
Skipjack tuna	Indicators	Full assessment	Indicators	Indicators	Full assessment
Yellowfin tuna	Indicators	TBD	Full assessment	Indicators	Indicators

Note: the assessment schedule may be changed dependant on the annual review of fishery indicators, or SC and Commission requests.