REVISION OF THE WPTT PROGRAM OF WORK

PREPARED BY: IOTC SECRETARIAT, 03 JUNE 2020

PURPOSE

To ensure that the participants at the 22nd Working Party on Tropical Tunas (WPTT22 (DP)) revise the Program of Work for the WPTT by taking into consideration the specific requests of the Commission and Scientific Committee.

BACKGROUND

Scientific Committee

At the 22nd 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. 141) The SC **NOTED** that the consolidated table of priorities does not replace the full programme of work of each working party (Appendix 35a-g) and that adequate attention and focus should still be allocated to those activities where possible. The SC further **NOTED** that Table 5 has been developed by the SC and working party Chairs to provide more specific direction to the IOTC Secretariat and the SC Chair as to the priorities of the SC so that, if and when external funding becomes available intersessionally, it is possible to clearly prioritise across all working parties based on the objectives of the SC (as agreed in IOTC–2014–SC17–R, para. 179).

(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 WPTT, to undertake specific tasks. These requests will need to be incorporated into a revised Program of Work for the WPTT:

Resolution 15/10 *On target and limit reference points and a decision framework*

Interim Target and Limit Reference Points (TRPs and LRPs)

> (para. 1) When assessing stock status and providing recommendations to the Commission, the IOTC Scientific Committee should, where possible, apply MSY-based target and limit reference points for tuna and tuna-like species and in particular the interim reference points agreed by the Commission in 2013 for albacore, swordfish and the three (3) tropical tunas (Bigeye tuna, Skipjack tuna, Yellowfin tuna) (per Resolution 13/10 *On interim target and limit reference points and a decision framework*) [superseded by Resolution 15/10]), as listed in **Table 1**. B_{MSY} refers to the biomass level for the stock that would produce the Maximum Sustainable Yield; F_{MSY} refers to the level of fishing mortality that produces the Maximum Sustainable Yield.

Table 1. Interim target and limit reference points.

Stock	Target Reference Point	Limit Reference Point
Albacore Yellowfin tuna Swordfish	$B_{TARGET} = B_{MSY}$; $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.40\ B_{MSY}$ $F_{LIM} = 1.40\ F_{MSY}$
Bigeye tuna	$B_{TARGET} = B_{MSY}$ $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.50\ B_{MSY}$ $F_{LIM} = 1.30\ F_{MSY}$
Skipjack tuna	$B_{TARGET} = B_{MSY}$ $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.40\ B_{MSY}$ $F_{LIM} = 1.50\ F_{MSY}$

Alternate interim Target and Limit Reference Points

(para. 2) Where the IOTC Scientific Committee considers that MSY-based reference points cannot be robustly estimated, biomass limit reference points will be set at a rate of B_0. Unless the IOTC Scientific Committee advises the Commission of more suitable limit reference point for a particular species, by default, the interim B_{LIM} will be set at 0.2 B_0 and fishing mortality rate limit reference point at $F_{0.2\ Bo}$ (the value corresponding to this biomass limit reference point). These interim limit reference points will be reviewed no later than 2018.

(para. 3) Where the IOTC Scientific Committee considers that MSY-based reference points cannot be robustly estimated, target reference points based on the depletion proportion (i.e. reference points with respect to the ratio of current biomass to B_0, B_0 being the virgin biomass estimate) should be used as a basis for B_{TARGET} and F_{TARGET}, as follows:

a) the interim biomass target reference point B_{TARGET} could be set at a ratio of B_0, the virgin biomass;

b) the interim fishing mortality rate target reference point F_{TARGET} could be set at a level consistent with the target biomass reference point, the fishing mortality rate corresponding then to the adopted ratio of B_0, the virgin biomass).

(para.4) These target and limit reference points, referred to in paragraphs 1, 2 and 3, shall be further reviewed by the IOTC Scientific Committee according to the program of work at **Annex 1** and in accordance with paragraph 6. The results shall be presented to the Commission for adoption of species-specific reference points.

(para. 5) The IOTC Scientific Committee shall continue to provide advice on the status of stocks and on recommendations for management measures in relation to the reference points referred to in paragraphs 1, 2 and 3, where available, until the Commission adopts other reference points that achieve the IOTC's conservation and management objectives and are consistent with paragraph 6.

(para. 6) The IOTC Scientific Committee shall recommend to the Commission for its consideration options for harvest control rules for IOTC species in relation to agreed reference points and, in doing so, shall take into account:

c) the provisions set forth in the UNFSA and in Article V of the IOTC Agreement;

d) the following objectives and any other objective identified through the Science and Management Dialogue process designed in Resolution 14/03 [superseded by Resolution 16/09] (or any revision thereof) and agreed thereafter by the Commission:

i. Maintain the biomass at or above levels required to produce MSY or its proxy and maintain the fishing mortality rate at or below F_{MSY} or its proxy;

ii. Avoid the biomass being below B_{LIM} and the fishing mortality rate being above F_{LIM};

e) the following guidelines:

i. For a stock where the assessed status places it within the lower right (green) quadrant of the Kobe Plot, aim to maintain the stock with a high probability within this quadrant;

ii. For a stock where the assessed status places it within the upper right (orange) quadrant of the Kobe Plot, aim to end overfishing with a high probability in as short a period as possible;

iii. For a stock where the assessed status places it within the lower left (yellow) quadrant of the Kobe plot, aim to rebuild these stocks in as short a period as possible;

iv. For a stock where the assessed status places it within the upper left quadrant (red), aim to end overfishing with a high probability and to rebuild the biomass of the stock in as short a period as possible.

Final Clauses

(para 7.) Bearing in mind Article 64 of UNCLOS and Article 8 of UNFSA, the entirety of this Resolution is subject to Article XVI (Coastal States' Rights) of the IOTC Agreement for the Establishment of the Indian Ocean Tuna Commission, and Articles 87 and 116 of the UN Convention of the Law of the Sea regarding the right to fish on the high seas;

(para. 8) The IOTC Scientific Committee is requested to evaluate the performance of any harvest control rules with respect to the species specific target and limit reference points adopted for IOTC species, but not later than 10 years following their adoption, and the Commission will consider, as appropriate and consistent with the scientific advice, these harvest control rules.

(para 9.) As soon as advice from the IOTC Scientific Committee regarding the appropriateness of TRPs and LRPs, as required under **Annex 1**, is available to the Commission, and where possible no later than at the IOTC Commission meeting in 2020, this Resolution will be reviewed with the view to adopting revised TRPs and LRPs.

Resolution 19/01 ***On an interim plan for rebuilding the Indian Ocean Yellowfin tuna stock in the IOTC area of competence***

(para 19) CPCS shall report by 1 March 2019, the number of FADs that were deployed in 2018 and 2019 by purse seine vessels and associated supply vessels per 1°x1° grid..

(para 22) CPCs are encouraged to increase their observer coverage or field sampling in gillnet fishing vessels by 10% using alternative data collection methodologies (electronic or human) verified by the IOTC Scientific Committee by 2023. .

(para 25) CPCs shall monitor the yellowfin tuna catches from their vessels in conformity with Resolution 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence* and Resolution 15/02 *Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non Contracting Parties (CPCs)* and will provide a summary of most-recent yellowfin catches for the consideration of the IOTC Compliance Committee.

(para 28) The Scientific Committee via its Working Party on Tropical Tunas shall implement the "Workplan to improve current assessment of yellowfin tuna" and shall advice the Commission the financial and administrational requirements to further strengthen the work undertaken to minimize the issues and complexities regarding yellowfin tuna stock assessment.

(para 29) The Scientific Committee via its Working Party on Tropical Tunas shall in 2019 undertake an evaluation of the effectiveness of the measures detailed in this Resolution, taking into account all sources of fishing mortality possible aiming at returning and maintaining biomass levels at the Commission's target level

Resolution 16/02 ***On harvest control rules for skipjack tuna in the IOTC Area of Competence***

(para. 15) The IOTC Scientific Committee shall:

a) Include the LRP and TRP as part of any analysis when undertaking all future assessments of the status of the IOTC skipjack tuna stock.

b) Undertake and report to the Commission a model-based skipjack tuna stock assessment every three (3) years, commencing with the next stock assessment in 2017.

c) Undertake a programme of work to further refine Management Strategy Evaluation (MSE) for the IOTC skipjack tuna fishery as required in paragraph 12, including, but not limited to,

i. Refinement of operating model(s)/ used,

ii. Alternative management procedures,

iii. Refining performance statistics.

Overview of the 2018 SC Report by the Commission

To date the 2019 SC report has not been reviewed by the Commission due to the delay of the 2020 Session as a result of the global Covid-19 pandemic.

In addition, several other items were raised by the Commission that require the WPTTs attention and planning.

(Para. 37) The Commission **NOTED** the uncertainty in the yellowfin tuna assessment and that the Scientific Committee had not recommended any concrete catch advice due to the uncertainty in the projections and the associated Kobe II strategy matrix (K2SM). The Commission was informed that uncertainty is inherent in all assessments, and is not specific to yellowfin tuna. The Commission **NOTED** that the Scientific Committee has developed a yellowfin tuna workplan which aims to address and reduce many of the uncertainties in the 2019 assessment. This is expected to result in the provision of more robust advice on stock status and catch forecasts for this species in the future.

(Para 38) The Commission **NOTED** the considerable use of estimated data in the yellowfin tuna assessment due to the unavailability of data from CPCs, as is the case for all species. The Commission URGED all CPCs to improve their data collection and reporting..

DISCUSSION

Participants at the WPTT21 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 (previously outlined in paper IOTC–2019–WPTT21–03) to match those priorities.

RECOMMENDATION/S

That the WPTT:

1) **NOTE** paper IOTC–2020–WPTT22(DP)–09, which encouraged the WPTT 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: DRAFT: Working Party on Tropical Tunas Program of Work (2021–2025)

APPENDIX A

DRAFT: WORKING PARTY ON TROPICAL TUNAS PROGRAM OF WORK (2021–2025)

The following is the Draft WPTT Program of Work (2021–2025) and is based on the specific requests of the Commission and Scientific Committee, and will need to be modified to incorporate topics identified during the WPTT21. 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**: Priority topics for obtaining the information necessary to develop stock status indicators for tropical tunas in the Indian Ocean;
- **Table 2**: Stock assessment schedule.

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

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	TIMING				
					2021	2022	2023	2024	2025
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.	Ongoing	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.								

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	TIMING				
					2021	2022	2023	2024	2025
	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 species distribution, making use of conventional and electronic tagging (P-SAT).	Medium		US$?? (TBD)					
	1.2.2 Investigation into the degree of local or open population in main fishing areas (e.g,, the Maldives and Indonesia – archipelagic and open ocean) by using techniques such flux in FAD arrays or used of morphological features such as shape of otoliths.	Medium		Some work ongoing – MDV, IDN					
2. Biological and ecological information (incl. parameters for stock assessment)	2.1 Biological sampling								
	2.1.1 Design and develop a plan for a biological sampling program to support research on tropical tuna biology. The plan would consider the need for the sampling program to provide representative coverage of the distribution of the different tropical tuna species within the Indian Ocean and make use of samples and data collected through observer programs, port sampling and/or other research programs. The plan would also consider the types of biological samples that could be collected (e.g. otoliths, spines, gonads, stomachs, muscle	High	CPCs directly with secretariat	US$?? (TBD)					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	TIMING				
					2021	2022	2023	2024	2025
	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.								
	2.1.2 Collect gonad samples from tropical tunas to confirm the spawning periods and location of the spawning area that are presently hypothesised for each tropical tuna species.	High		US$?? (TBD)					
3. Historical data review	3.1 Changes in fleet dynamics need to be documented by fleet								
	3.1.1 Provide an evaluation of fleet-specific fishery impacts on the stock of bigeye tuna, skipjack tuna and yellowfin tuna. Project potential impact of realizing fleet development plans on the status of tropical tunas based upon most recent stock assessments.	Medium	CPCs and secretariat	US$TBD					
4 CPUE standardisation	4.1 Develop standardised CPUE series for each tropical tuna fleet/fishery for the Indian Ocean								
	4.1.1 Further development and validation of the collaborative longline CPUE indices using the data from multiple fleets and to provide joint CPUE series for longline fleets where possible	Ongoing	SC and consultants	US$40K (IOTC)					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	TIMING				
					2021	2022	2023	2024	2025
	4.1.2 That standardised CPUE index for juvenile yellowfin tuna and bigeye tuna caught by the EU purse seiner fleets, be estimated and submitted to the WPTT before the next round of stock assessments of tropical tunas.	Ongoing	CPCs directly	US$?? (EU Grant)					
	4.1.3 Development of minimum criteria (e.g. 10% using a simple random stratified sample) for logbook coverage to use data in standardisation processes; and 2) identifying vessels through exploratory analysis that were misreporting, and excluding them from the dataset in the standardisation analysis.	Ongoing	CPCs directly	US$?? (TBD)					
	4.1.4 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.	Ongoing	Japan	US$?? (TBD)					
	Bigeye tuna: High priority fleets	High	CPCs directly						
	Skipjack tuna: High priority fleets	High	CPCs directly						
	Yellowfin tuna: High priority fleets	High	CPCs directly						
	4.1.5 Gillnet CPUE standardization including further investigate and use of gillnet CPUE series from Sri Lankan gillnet fishery	High	CPCs directly	TBD					
	4.2 That methods be developed for standardising purse seine catch	High	Consultant and CPCs	US$??					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	TIMING				
					2021	2022	2023	2024	2025
	species composition using operational data, so as to provide alternative indices of relative abundance (see Terms of Reference, Appendix IXb IOTC-2017-WPTT19-R).		directly	(TBD)					
	4.3 Investigate the potential to use the Indian longline survey as a fishery-independent index of abundance for tropical tunas.	High	Consultant And CPCs directly	US$30K (TBD)					
5 Stock assessment / stock indicators	5.1 Develop and compare multiple assessment approaches to determine stock status for tropical tunas	Medium	Consultant and CPCs directly						
	5.2 Scoping of ongoing age composition data collection for stock assessment	Medium							
	5.3 Develop a high resolution age structured operating model that can be used to test the spatial assumptions including potential effects of limited tags mixing on stock assessment outcomes (see Terms of Reference, Appendix IXa IOTC-2017-WPTT19-R).	Ongoing	CPC directly						
	5.4 Stock assessment priorities – detailed review of the existing data sources, including:	High	Consultant and secretariat						
	i. Size frequency data: Evaluation of the reliability of length composition from the longline fisheries (including recent and historical data), and the need for a thorough review of the size frequency data held by IOTC, in collaboration with the fleets involved, to improve the utilization of these data in tropical tuna stock assessments.								
	ii. Tagging data: Further analysis of the tag release/recovery data set.								
	iii. Organisation of expert group to investigate tagging mortality								
	iv. Re-estimation of M using updated tagging data.								

Topic		Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	TIMING				
						2021	2022	2023	2024	2025
6	Fishery independent monitoring	6.1 Develop fishery independent estimates of stock abundance to validate the abundance estimates of CPUE series.		Consultant and CPCs directly	US$?? (TBD)					
		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. There are various options, among which some are already under test. Not all of these options are rated with the same priority, and those being currently under development need to be promoted, as proposed below:	Ongoing		US$60K US$?? (TBD)					
		i. Acoustic FAD monitoring, with the objective of deriving abundance indices based on the biomass estimates provided by echo-sounder buoys attached to FADs	High							
		ii. Longline-based surveys (expanding on the Indian model) or "sentinel surveys" in which a small number of commercial sets follow a standardised scientific protocol	Medium							
		iii. Aerial surveys, potentially using remotely operated or autonomous drones	Medium							
		iv. Studies (research) on flux of tuna around anchored FAD arrays to understand standing stock and independent	High							

Topic		Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	TIMING				
						2021	2022	2023	2024	2025
		estimates of the stock abundance. v. Scoping study to investigate genetics-based tagging techniques using recaptured individuals or identification of close-related pairs. Use of Close Kin Mark Recapture (CKMR) methods to study fishery independent methods of generating spawner abundance estimates based on genotyping individuals to a level that can identify close relatives (e.g. parent-offspring or half-siblings). The method avoids many of the problems of conventional tagging, e.g. live handling is not required (only catch needs to be sampled), tag shedding, tag-induced mortality and recovery reporting rates are irrelevant. It has been cost-effective in a successful application to southern bluefin tuna, but it remains unknown how the cost scales with population size. It would be valuable to conduct a scoping exercise to evaluate the applicability to the tropical tuna species vi. Investigate the possibility of conducting ongoing ad hoc, low level tagging in the region								
7	Target and Limit reference points	7.1 To advise the Commission, on Target Reference Points (TRPs) and Limit Reference Points (LRPs). 8.1.1 Used when assessing tropical tuna stock status and when establishing the Kobe plot and Kobe matrices	High	CPC's directly	US$?? (TBD)					

Table 2. Assessment schedule for the IOTC Working Party on Tropical Tunas (WPTT)

Species	2021	2022	2023	2024	2025
Bigeye tuna	Indicators	**Full assessment**	Indicators	Indicators	**Full assessment**
Skipjack tuna	Indicators	Indicators	**Full assessment**	Indicators	Indicators
Yellowfin tuna	**Full assessment**	Indicators	Indicators	**Full assessment**	Indicators