REVISION OF THE PROGRAM OF WORK (2022–26) FOR THE IOTC SCIENCE PROCESS

PREPARED BY: IOTC SECRETARIAT, SC CHAIR AND WP CHAIRS, 05 NOVEMBER 2021

PURPOSE

To provide the Scientific Committee (SC) with a proposed Program of Work for each of its Working Parties (WP), including preliminary prioritisation of the elements requested by each WP. The aim is to develop an overall Program of Work Plan for 2022–26 which will deliver the information the Commission has requested to meet the objectives of the IOTC.

BACKGROUND

Scientific Committee

At the 23rd Session of the SC:

(Para. 156) The SC **NOTED** IOTC–2020–SC23–08 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. 157) 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 and in accordance with the IOTC Strategic Science Plan 2020-2024. The Chairpersons and Vice-Chairpersons of each working party will ensure that the efforts of their respective working parties 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.

(Para. 159) 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. 160) 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 3 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. 161) 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.

DISCUSSION

The SC is requested to consider the priorities set by the Commission, via Conservation and Management Measures, and consider and revise as necessary, its Program of Work to match those priorities.

The draft schedule of stock assessments for IOTC species and species of interest from 2022–2026, and for other working party priorities is provided in Appendix I. The highest three (3) priority projects by each Working Party are presented in Appendix II and all the priority projects agreed to by each WP meeting in 2021 are referenced in Appendix III.

RECOMMENDATION

That the Scientific Committee:

1) **NOTE** paper IOTC–2021–SC24–08, which encouraged the SC to further develop and refine its Program of Work for 2022–26, which is based on those of its Working Parties, to ensure it is aligned with the requests and directives from the Commission.
2) **ADOPT** a revised Program of Work for 2022–26.

APPENDIX I

DRAFT: SCHEDULE OF STOCK ASSESSMENTS FOR IOTC SPECIES AND SPECIES OF INTEREST FROM 2022–2026, AND FOR OTHER WORKING PARTY PRIORITIES

Working Party on Neritic Tunas					
Species	**2022****	**2023***	**2024***	**2025****	**2026***
Bullet tuna	Data preparation	Data preparation	**Assessment**	Data preparation	Data preparation
Frigate tuna	Data preparation	Data preparation	**Assessment**	Data preparation	Data preparation
Indo-Pacific king mackerel	Data preparation	Data preparation	**Assessment**	Data preparation	Data preparation
Kawakawa	Data preparation	**Assessment**	Data preparation	Data preparation	**Assessment**
Longtail tuna	Data preparation	**Assessment**	Data preparation	Data preparation	**Assessment**
Narrow-barred Spanish mackerel	Data preparation	**Assessment**	Data preparation	Data preparation	**Assessment**

* Including data-limited stock assessment methods;
** Including species-specific catches, CPUE, biological information and size distribution as well as identification of data gaps and discussion of improvements to the assessments (stock structure); one day may be reserved for capacity building activities.
Note: the assessment schedule may be changed dependent on the annual review of fishery indicators, or SC and Commission requests

Working Party on Billfish					
Species	**2022**	**2023**	**2024**	**2025**	**2026**
Black marlin			**Full assessment**		
Blue marlin	**Full assessment**			**Full assessment**	
Striped marlin			**Full assessment**		
Swordfish	**Indicators****	**Full assessment**		**Indicators****	**Full assessment**
Indo-Pacific sailfish	**Full assessment***			**Full assessment***	

* 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 trend.

Working Party on Tropical Tunas					
Species	**2022**	**2023**	**2024**	**2025**	**2026**
Bigeye tuna	**Data preparatory meeting** **Full assessment**	Indicators	Indicators	**Data preparatory meeting** **Full assessment**	Indicators
Skipjack tuna	Indicators	**Data preparatory meeting** **Full assessment**	Indicators	Indicators	**Data preparatory meeting** **Full assessment**
Yellowfin tuna	Indicators	Indicators	**Data preparatory meeting** **Full assessment**	Indicators	Indicators

Working Party on Ecosystems and Bycatch					
Species	**2022**	**2023**	**2024**	**2025**	**2026**
Blue shark	-	–	–	Data preparatory meeting Full assessment	-
Oceanic whitetip shark	Indicator analysis	–	Data preparation	Indicator analysis	-
Scalloped hammerhead shark	Assessment*	–	–	–	-
Shortfin mako shark	–		Data preparatory meeting Full assessment	–	-
Silky shark	-	Assessment*	-	–	Assessment*
Bigeye thresher shark	Assessment*	-	–	–	Assessment*
Pelagic thresher shark	Assessment*	-	–	–	Assessment*
Porbeagle shark	–	Assessment*	–	–	-
Mobulid Rays	-	-	Interactions/ Indicators	–	-
Marine turtles	–	Indicators	–	–	-
Seabirds	Review of mitigation measures in Res. 12/06	–	–	–	Review of mitigation measures in Res. 12/06
Marine Mammals	–	–	–	Review of mitigation measures	-
Ecosystem Based Fisheries Management (EBFM) approaches	ongoing	ongoing	ongoing	ongoing	-

*Method to be determined; Note: the assessment schedule may be changed dependent on the annual review of fishery indicators, or SC and Commission requests.

NOTE: (i) the "indicator analysis" is a simple analysis to provide guidance on the stock status based on fishery data such as CPUE, catch, and size frequency data ;(ii) the "full stock assessment" is an assessment to provide the stock status and fishing pressure based on a stock assessment model such as stock synthesis or production model; (iii) the "data preparatory" is a the submission and review by the WP of the fishery data as well as biological parameters for the upcoming stock assessment.

Working Party on Temperate Tunas					
Species	**2022**	**2023**	**2024**	**2025**	**2026**
Albacore	Data preparatory Meeting (4 days) (April/May/June) Stock assessment meeting (5 days) (August/ September)	–	–	–	Data preparatory Meeting (4 days) (April/May/June) Stock assessment meeting (5 days) (August/ September)

APPENDIX II

TOP THREE PRIORITY PROJECTS FOR EACH IOTC WORKING PARTY

All priorities come from the 2021 reports of each WP except for the WPDCS which comes from the 2020 report and will be updated for the SC report.

Priority	1	2	3
WPTT	**Stock assessment priorities – detailed review of the existing data sources, including**: 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. Identify approaches for defining appropriate levels of M for inclusion in stock assessments. iv. Additional growth and other biological studies for Tropical tunas.	**CPUE standardisation** Develop standardised CPUE series for each tropical tuna fleet/fishery for the Indian Ocean • Review period where stock was assessed as being overfished without experiencing overfishing. • Regional scaling parameters • Effect of piracy on CPUE after piracy period	**Fisheries impact analysis** Impact of individual fisheries on stock parameters
WPEB	**Stock structure (connectivity and diversity)** Genetic research to determine the connectivity of select shark species throughout their distribution (including in adjacent Pacific and Atlantic waters as appropriate) and the effective population size. This may include Next Generation Sequencing (NGS), Nuclear markers (i.e. microsatellite) as well as other components of close-kin mark recapture studies (CKMR).	**Biological and ecological information (incl. parameters for stock assessment)** 2.1 Age and growth research (Priority species: blue shark (BSH), shortfin mako shark (SMA) and oceanic whitetip shark (OCS); silky shark (FAL)) 2.2 CPCs to provide further research reports on shark biology, namely age and growth studies including through the use of vertebrae or other means, either from data collected through observer programs or other research programs. Research started in Sri Lanka. Could look at IOTC priority species 2.3 Reproduction research Priority species: blue shark (BSH), shortfin mako shark (SMA) and oceanic whitetip shark (OCS), and silky shark (FAL) 2.4 Ecological Risk Assessment (cetaceans)	**Connectivity, movements, habitat use and post release mortality** Electronic tags (PSATs, SPOT, Splash MiniPAT) to assess the efficiency of management resolutions on non-retention species (BSH in LL, marine turtles and rays in GIL and PS, whale sharks) and to determine connectivity, movement rates and mortality estimates.
WPNT	**CPUE standardization** Develop standardised CPUE series for the main fisheries for longtail, kawakawa, Indo-Pacific King	**Stock assessment / Stock indicators** Explore alternative assessment approaches and develop improvements where necessary based on	**Data mining and collation** Collate and characterize operational level data for the main neritic tuna fisheries in the Indian Ocean

	mackerel and Spanish mackerel in the Indian Ocean, with the aim of developing CPUE series for stock assessment purposes. • Sri Lanka (priority species: Frigate tuna, Kawakawa, bullet tuna) • Indonesia (priority species: Kawakawa, Bullet tuna, Frigate tuna) • Pakistan (priority species: Longtail tuna, Kawakawa, narrow-barred Spanish mackerel) • Iran gillnet CPUEs for all species • India available CPUEs to be provided to next assessment session Capacity building support for CPCs to develop standardised CPUEs for their fisheries	the data available to determine stock status for longtail tuna, kawakawa and Spanish mackerel • The Weight-of-Evidence approach should be used to determine stock status, by building layers of partial evidence, such as CPUE indices combined with catch data, life-history parameters and yield-per recruit metrics, as well as the use of data poor assessment approaches. • Exploration of priors and how these can be quantifiably and transparently developed • Take into consideration the outputs of genetic studies to investigate stock structure and regional differences in populations Improve the presentation of management advice from different assessment approaches to better represent the uncertainty and improve communication between scientists and managers in the IOTC.	to investigate their suitability to be used for developing standardised CPUE indices. The following data should be collated and made available for collaborative analysis: 1) catch and effort by species and gear by landing site; 2) operational data: stratify this by vessel, month, and year for the development as an indicator of CPUE over time; and 3) operational data: collate other information on fishing techniques (i.e. area fished, gear specifics, depth, environmental condition (near shore, open ocean, etc.) and vessel size (length/horsepower)). 4) Reconstruction of historical catch by CPCs using recovered or captured information. 5) Re-estimation of historic catches for assessment purposes (taking into account updated identification of uncertainties and knowledge of the history of the fisheries) • (Data support missions to priority countries: India, Oman, Pakistan)
WPTmT	**2.1.** Biological research (collaborative research to improve understanding of spatio-temporal patterns in age and growth and reproductive parameters).	**3.1.** Continue the development of standardized CPUE series for each albacore fishery for the Indian Ocean, with the aim of developing appropriate CPUE series for stock assessment purposes.	**5.1.** Further investigate the size information provided by CPCs in order to better understand the stock dynamics and inputs into the assessment models. This is particularly necessary for the purse seine data
WPB	**Data mining and processing – (Development of subsequent CPUE indices)** Data on gillnet fisheries are available in Pakistan (and potentially other CPCs) and the recovery of this information and the development of gillnet CPUE indices would improve species assessments, particularly for: • Black marlin • Sailfish	**Biological and ecological information (incl. parameters for stock assessment and provide answers to the Commission)** Reproductive biology study 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 (Res 18-05, paragraphs 5 and 14c). (Priority: marlins and sailfish). Propose to have a two-day workshop to discuss the standard of billfish maturity staging inter-sessionally 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.	**Stock structure (connectivity and diversity)** Continue work on determining stock structure of Swordfish, using complimentary data sources, including genetic and microchemistry information as well as other relevant sources/studies.

WPDCS	**5.4** Evaluate the combination of alternative data collection systems and protocols for the collection of scientific observer data	**1.1** Assist the implementation of data collection and sampling activities of coastal fisheries in countries/fisheries insufficiently sampled in the past; priority to be given to the following fisheries: • Coastal fisheries of Indonesia • Coastal fisheries of I.R. Iran • Coastal fisheries of Pakistan • Coastal fisheries of Sri Lanka • Coastal fisheries of Kenya	**4.2** Review of the extent of discarding practices in deep-freezing longline fleets
WPM	**MSE** Continuation of Management Strategy Evaluation for Albacore, Skipjack, Yellowfin, Bigeye tunas as well as Swordfish		

APPENDIX III
REFERENCES TO THE INDIVIDUAL IOTC WORKING PARTY PROGRAMS OF WORK

Report number	Report title	Appendix number
IOTC–2021–WPNT11–R	Report of the 11th Session of the Working Party on Neritic Tunas	Appendix VI
IOTC–2021–WPB19–R	Report of the 19th Session of the Working Party on Billfish	Appendix XI
IOTC–2021–WPEB17–R	Report of the 17th Session of the Working Party on Ecosystems and Bycatch	Appendix XIX
IOTC–2021–WPM12–R	Report of the 12th Session of the Working Party on Methods	Appendix IV
IOTC–2020–WPDCS16–R*	Report of the 16th Session of the Working Party on Data collection and Statistics	Appendix V
IOTC–2021–WPTT23–R	Report of the 23rd Session of the Working Party on Tropical Tunas	Appendix IX

*2021 report not available at the time of drafting the document.