REVISION OF THE PROGRAM OF WORK (2024–28) FOR THE IOTC SCIENCE PROCESS

PREPARED BY: IOTC SECRETARIAT, SC CHAIR AND WP CHAIRS, 01 NOVEMBER 2023

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 for 2024–28 which will deliver the information the Commission has requested to meet the objectives of the IOTC.

BACKGROUND

Scientific Committee

At the 25th Session of the SC:

(Para. 179) The SC **NOTED** IOTC–2022–SC25–08 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. 180) 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. 182) 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. 184) 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. 185) The SC **ADOPTED** a revised assessment schedule, ecological risk assessment and other core projects for 2023–27, 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 2024–2028, 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 2023 are referenced in Appendix III.

RECOMMENDATION

That the Scientific Committee:

1) **NOTE** paper IOTC–2023–SC26–08, which encouraged the SC to further develop and refine its Program of Work for 2024–28, 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 2024–28.

APPENDIX I
DRAFT: SCHEDULE OF STOCK ASSESSMENTS FOR IOTC SPECIES AND SPECIES OF INTEREST FROM 2023–2027, AND FOR OTHER WORKING PARTY PRIORITIES

Working Party on Neritic Tunas					
Species	**2024***	**2025****	**2026***	**2027***	**2028***
Bullet tuna	**Assessment**	Data preparation	Data preparation	**Assessment**	Data preparation
Frigate tuna	**Assessment**	Data preparation	Data preparation	**Assessment**	Data preparation
Indo-Pacific king mackerel	**Assessment**	Data preparation	Data preparation	**Assessment**	Data preparation
Kawakawa	Data preparation	Data preparation	**Assessment**	Data preparation	**Assessment**
Longtail tuna	Data preparation	Data preparation	**Assessment**	Data preparation	**Assessment**
Narrow-barred Spanish mackerel	Data preparation	Data preparation	**Assessment**	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.

Working Party on Billfish					
Species	**2024**	**2025**	**2026**	**2027**	**2028**
Black marlin	**Full assessment**			**Full assessment**	
Blue marlin		**Full assessment**			**Full assessment**
Striped marlin	**Full assessment**			**Full assessment**	
Swordfish		Indicators**	**Full assessment**		Indicators**
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	**2024**	**2025**	**2026**	**2027**	**2028**
Bigeye tuna	Indicators **MP to be run**	**Data preparatory meeting** **Full assessment**	Indicators	Indicators	**Data preparatory meeting** **Full assessment**
Skipjack tuna	Indicators	Indicators	**Data preparatory meeting** **Full assessment**	Indicators	Indicators
Yellowfin tuna	**Data preparatory meeting** **Full assessment**	Indicators	Indicators	**Data preparatory meeting** **Full assessment**	Indicators

Working Party on Ecosystems and Bycatch					
Species	**2024**	**2025**	**2026**	**2027**	**2028**
Blue shark	–	Data preparatory meeting Full assessment	-	–	–
Oceanic whitetip shark	Data preparation	Indicator analysis	-	Data preparation	–
Scalloped hammerhead shark	–	–	Data preparatory meeting Full assessment	–	–
Shortfin mako shark	Data preparatory meeting Full assessment	–	-	Data preparatory meeting Full assessment	
Silky shark	-	–	Assessment*	-	Assessment*
Bigeye thresher shark	–	–	Assessment*	–	-
Pelagic thresher shark	–	–	Assessment*	–	-
Porbeagle shark	–	–	-	–	Assessment*
Mobulid Rays	Interactions/ Indicators	–	-	Interactions/ Indicators	-
Marine turtles	–	Indicators	-	–	Indicators
Seabirds	Development of draft workplan	–	Review of mitigation measures in Res. 23/06	–	–
Marine Mammals	• Review of mitigation measures • Review of handling guidelines		-	–	–
Data preparatory meeting	• Methods for using available data for assessments • Considering the shark research plan • Consider effectiveness of mitigation measures for a range of taxa				
Ecosystem Based Fisheries Management (EBFM) approaches	Ecoregions pilot study	ongoing			

*Including data poor stock assessment methods; Note: the assessment schedule may be changed dependent on the annual review of fishery indicators, or SC and Commission requests.

Working Party on Temperate Tunas					
Species	**2024**	**2025**	**2026**	**2027**	**2028**
Albacore		Data preparatory Meeting (4 days) (April/May/June) Stock assessment meeting (5 days) (July/August)	–	–	**TBC**

APPENDIX II

TOP THREE PRIORITY PROJECTS FOR EACH IOTC WORKING PARTY

All priorities come from the 2023 reports of each WP except for the WPDCS which comes from the 2022 report and will be updated for the SC report.

Priority	1	2	3
WPTT	**Stock assessment priorities** Address the issues identified as priorities by the yellowfin tuna peer review panel (February 2023)	**Abundance indices development** In view of the coming assessments of yellowfin, bigeye, and skipjack develop abundance time series for each tropical tuna stock for the Indian Ocean • Continue to develop CPUE indices from Longline, PS, Pole and line fisheries, and fishery independent indices of abundance such as those derived from echosounder buoys. • Explore and support the development of gillnet CPUE indices for fleets (e.g., Iran, Pakistan and Sri Lanka) • Evaluate effect of changes of spatial coverage on the longline CPUE through the Joint CPUE workshop and estimate spatial temporal abundance distribution through VAST modelling approach	**Analysis of tagging data** Analyze data from IOTC tagging programs outside stock assessment models and evaluate its utility and impact on stock assessments.
WPEB	**Fisheries data collection** 1.1 Catch composition reconstruction (initial focus Sri Lanka, Pakistan and Indonesia) 1.1.2 Historical data mining for the key species and IOTC fleets (e.g., as artisanal gillnet and longline coastal fisheries) including workshops: 1.1.3 Historical data mining for the key species, including the collection of information about catch, effort and spatial distribution of those species and fleets catching them 1.1.4 CPUE standardisation and review of additional abundance indicators series for each key shark species and fishery in the Indian Ocean	**Shark research and management strategy** 2.1 Implementation of work suggested by shark work plan consultancy 2.2 Prioritising shark research based on previous work and including analysing gaps in knowledge	**Ecoregions development** Support for the development and refinement of ecoregions in the Indian Ocean: • Development of a pilot study (focused on two ecoregions: one coastal, the Somali Current ecoregion and one oceanic, the Indian Ocean Gyre ecoregion)
WPNT	**Data mining and collation** Collate and characterize operational level data for the main neritic tuna fisheries in the Indian Ocean to investigate their suitability to be used for developing standardised CPUE indices.	**Stock assessment / Stock indicators** Explore alternative assessment approaches and develop improvements where necessary based on the data available to determine stock status for longtail tuna, Spanish mackerel and kawakawa	**Biological information (parameters for stock assessment) including stock structure (connectivity)** • Quantitative biological studies are necessary for all neritic tunas throughout their range to determine key biological

	The following data should be collated and made available for collaborative analysis: • catch and effort by species and gear by landing site; • operational data: stratify this by vessel, month, and year for the development as an indicator of CPUE over time; and • 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)). • Reconstruction of historical catch by CPCs using recovered or captured information. • Re-estimation of historic catches (with consultation and consent of concerned CPCs) 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)		parameters including age-at-maturity, and fecundity-at-age/length relationships, age-length keys, age and growth, longevity which will be fed into future stock assessments. Priorities for longtail tuna, kawakawa and Spanish mackerel. • Genetic research to determine the connectivity of neritic tunas throughout their distributions (This should build on the stock structure work conducted in other previous studies)
WPTmT	**Biological information (parameters for stock assessment)** 2.1 Biological research (collaborative research to improve understanding of spatio-temporal patterns in age and growth and reproductive parameters) 2.1.1 Age and growth studies: Uncertainty about the growth curve is a primary source of uncertainty in the stock assessment. A preliminary growth curve was developed in 2019, but there is substantial work to be done to ensure that growth curves include data from smaller size classes, and that spatio-temporal patterns in growth are quantified for use in the stock assessment. Collaborative sampling programs, involving a combination of observer- and port-based sampling, are required to ensure that adequate samples are collected. 2.1.2 Quantitative biological studies are necessary for albacore throughout its range to determine spatio-temporal patterns in key reproductive parameters including sex ratio; female length- and age-at-maturity; spawning location, periodicity and frequency; batch fecundity at length and age;	**Size frequency data** 4.1 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.	**CPUE standardisation** 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. 3.1.1 Spatio-temporal structure and target changes need to be considered carefully, as fish density and targeting practices can vary in ways that affect CPUE indices. Developments may include changes to fishery spatial structure, new approaches for area weighting, time-area interactions in the model, and/or indices using VAST.

	spawning fraction and overall reproductive potential, to inform future stock assessments.		
WPB	**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).	**Biological and ecological information** 2.1 Age and growth research 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) 2.2 Spawning time and locations 2.2.1 Collect gonad samples from billfish or utilise any other scientific means to confirm the spawning time and location of the spawning areas that are presently hypothesized for each billfish species. This will also provide advice to the Commission on the request for alternative management measures (Res. 18-05, paragraph 6). Partially supported by EU, on-going support and collaboration from CPCs are required. 2.3 Stock structure (connectivity and diversity) 2.3.1 Continue work on determining stock structure of Billfish species, using complimentary data sources, including genetic and microchemistry information as well as other relevant sources/studies.	**Billfish bycatch mitigation** WPB and CPCs scientists to firstly, review and summarise existing information on billfish bycatch mitigation, including also factors influencing at-haul and post-release mortality of billfish, and secondly to undertake further research to inform gaps in understanding on potential effective mitigation approaches, to provide options for the Commission to reduce fishing mortality for species where that is required (e.g. Black Marlin, Striped Marlin and Sailfish) focusing on gillnet and longline fisheries but also including recreational and sport fishing activities.
WPDCS	**Artisanal fisheries data collection** a) Assist the implementation of data collection and sampling activities for fisheries insufficiently sampled (2023-2024). Priority to be given to the following fisheries: ● Indonesia ● India ● Bangladesh ● Pakistan ● I.R. Iran ● Kenya ● Somalia ● Sri Lanka ● Other CPCs as required	Review of historical nominal catches and catch-and-effort data for all stocks being assessed in the following years to determine the level of uncertainty to be used for stock assessment and management procedures (2023-2024)	
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
IOTC–2023–WPNT13–R	Report of the 13th Session of the Working Party on Neritic Tunas
IOTC–2023–WPB22–R	Report of the 21st Session of the Working Party on Billfish
IOTC–2023–WPEB19–R	Report of the 19th Session of the Working Party on Ecosystems and Bycatch
IOTC–2023–WPM14–R	Report of the 14th Session of the Working Party on Methods
IOTC–2022–WPDCS18–R*	Report of the 18th Session of the Working Party on Data collection and Statistics
IOTC–2023–WPTT25–R	Report of the 25th Session of the Working Party on Tropical Tunas

*2023 report not available at the time of drafting the document.