OUTCOMES OF THE 18th SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT[1], 26 AUGUST 2016

PURPOSE

To inform participants at the 12th Working Party on Ecosystems and Bycatch (WPEB12) of the recommendations arising from the 18th Session of the IOTC Scientific Committee (SC) held from 23-27 November 2015, specifically relating to the work of the WPEB.

BACKGROUND

At the 18th Session of the SC, the SC noted and considered the recommendations made by the WPEB 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 the most commonly caught elasmobranch species.

List of the most commonly caught elasmobranch species

Common name	Species	Code
Manta and devil rays	Mobulidae	MAN
Whale shark	*Rhincodon typus*	RHN
Thresher sharks	*Alopias spp.*	THR
Mako sharks	*Isurus spp.*	MAK
Silky shark	*Carcharhinus falciformis*	FAL
Oceanic whitetip shark	*Carcharhinus longimanus*	OCS
Blue shark	*Prionace glauca*	BSH
Hammerhead shark	Sphyrnidae	SPY
Other Sharks and rays	–	SKH

The recommendations on the deficiencies in data collection, monitoring and reporting by CPCs in relation to bycatch species will be discussed in paper IOTC–2016–WPEB12–07 and are therefore not presented in this paper.

Based on the recommendations arising from the WPEB11, 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–WPEB12–04 addresses the responses and actions of the Commission.

In addition, the SC18 reviewed and endorsed a Program of Work for the WPEB, including a revised assessment schedule, as detailed in Appendix B and Appendix C respectively. A separate paper (IOTC–2016–WPEB12–10) will outline the review and development process for a *Program of Work* for the WPEB for the next five years.

DISCUSSION

In addition to the recommendations outlined in Appendix A, Appendix B and Appendix C, the following extracts from the SC18 Report (IOTC–2015–SC18–R) are provided here for the consideration and action of the WPEB12:

Review of the statistical data available for ecosystems and bycatch species

(Para. 38) **NOTING** the high level of uncertainty in the nominal catches of blue sharks and high proportion caught by Indonesia, the SC **AGREED** that the IOTC consultancy work that is currently taking place to improve the Indonesian nominal catch data series is extended in order to provide sufficient attention to sharks, and for this to be included in the Program of Work as a high priority (Section 13.1).

[1] secretariat@iotc.org; Sarah Martin: sm@iotc.org

IOTC species Identification guides – general

Para 103. **NOTING** that the Commission has approved US$30,000 for the printing of the species identification cards in 2016, as confirmed by the IOTC Secretariat at the 19th Session of the Commission, the SC **REQUESTED** that the species identification cards already translated into languages other than English and French, be printed in the first quarter of 2016 for dissemination.

Para 104. The SC **REQUESTED** that the IOTC Secretariat should ensure that hard copies of the identification cards 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. At this point in time, electronic formats, including 'applications or apps' are only suitable for larger scale vessels, and even in the case of EU purse seine vessels, the use of hard copies is relied upon due to on board fish processing and handling conditions, as well as weather conditions. Electronic versions may be developed as complementary tools.

Para 105. The SC **AGREED** that IOTC CPCs should disseminate the identification cards to their observers and field samplers (Resolution 11/04), and as feasible, to their fishing fleets targeting tuna, tuna-like and shark species. This would allow accurate observer, sampling and logbook data on tuna and tuna-like species to be recorded and reported to the IOTC Secretariat as per IOTC requirements.

Executive summaries for marine turtles, seabirds and shark species

The SC also adopted revised Executive Summaries for bycatch and other 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 WPEB:

1) **NOTE** paper IOTC–2016–WPEB12–03 which outlined the main outcomes of the 18th Session of the Scientific Committee, specifically related to the work of the WPEB.
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 Ecosystems and Bycatch.
Appendix B: Program of Work (2016–2020) for the IOTC Working Party on Ecosystems and Bycatch (WPEB).
Appendix C: Schedule of stock assessment for the WPEB (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 ECOSYSTEMS AND BYCATCH

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

(IOTC–2015–SC18–R; Appendix XXXVII, PAGE 170)

STATUS OF MARINE TURTLES, SEABIRDS AND SHARKS IN THE INDIAN OCEAN

Status of Marine Turtles, Seabirds and Sharks in the Indian Ocean

Sharks

SC18.04 (para. 125) The SC **RECOMMENDED** that the Commission note the management advice developed for a subset of shark species commonly caught in IOTC fisheries for tuna and tuna-like species:

- Blue shark (*Prionace glauca*) – Appendix XXIII
- Oceanic whitetip shark (*Carcharhinus longimanus*) – Appendix XXIV
- Scalloped hammerhead shark (*Sphyrna lewini*) – Appendix XXV
- Shortfin mako shark (*Isurus oxyrinchus*) – Appendix XXVI
- Silky shark (*Carcharhinus falciformis*) – Appendix XXVII
- Bigeye thresher shark (*Alopias superciliosus*) – Appendix XXVIII
- Pelagic thresher shark (*Alopias pelagicus*) – Appendix XXIX

Marine turtles

SC18.05 (para. 126) The SC **RECOMMENDED** that the Commission note the management advice developed for marine turtles, as provided in the Executive Summary encompassing all six species found in the Indian Ocean:

- Marine turtles – Appendix XXX

Seabirds

SC18.06 (para. 127) The SC **RECOMMENDED** that the Commission note the management advice developed for seabirds, as provided in the Executive Summary encompassing all species commonly interacting with IOTC fisheries for tuna and tuna-like species:

- Seabirds – Appendix XXXI

GENERAL RECOMMENDATIONS TO THE COMMISSION

Report of the 11th Session of the Working Party on Ecosystems and Bycatch (WPEB11)

Pakistan shark bycatch in gillnet fisheries

SC18.12 (para. 39) **NOTING** that gillnets are regularly being used with lengths in excess of 4,000 m (and up to 7,000 m) within and occasionally beyond the EEZ of Pakistan and other IOTC CPCs in the region, and that those used within the EEZ may sometimes drift onto the high seas in contravention of Resolution 12/12, the SC **RECOMMENDED** that the Commission should consider if a ban on large scale gillnets should also apply within IOTC CPC EEZ. This would be especially important given the negative ecological impacts of large scale drifting gillnets in areas frequented by marine mammals and turtles.

Review of seabird mitigation measures in Resolution 12/06

SC18.13 (para. 41) The SC **RECOMMENDED** that CPCs bring data to the WPEB meeting in 2016, as the Commission via Resolution 12/06 required the WPEB and SC to undertake this task in 2015, which has not been possible due to insufficient data, and that a collaborative analysis of the impacts of Resolution 12/06 be undertaken during the WPEB meeting, if feasible. CPC review papers and datasets should include the following information/data from logbooks and/or observer schemes, where appropriate and should cover the period 2011 to 2015:

- Total effort south of 25°S by area and time, at the finest scale possible
- Observed effort south of 25°S by area and time, at the finest scale possible
- Observed seabird mortality rates south of 25°S by area and time, at the finest scale possible
- Descriptions of fleet structure /target species by time and area, and an indication of observer

coverage per fleet/target species for effort south of 25°S

- Data on which seabird bycatch mitigation measures were used, on a set-by-set/cruise basis if possible or per vessel, or at the finest scale possible
- Descriptions of the specifications of seabird bycatch mitigation measures used according to the fields in the Regional Observer Scheme manual and in relation to the specifications given in Res 12/06

Shark fin to body weight ratio and wire leaders/traces

SC18.14 (para. 47) **NOTING** that the Commission, at its 19th Session, considered a range of proposals on sharks which included matters relevant to the shark fin to body weight ratio and wire leaders/traces, the SC **RECALLED** its previous advice to the Commission as follows:

- The SC **RECOMMENDED** the Commission consider, that the best way to encourage full utilisation of sharks, to ensure accurate catch statistics, and to facilitate the collection of biological information, is to revise the IOTC Resolution 05/05 *concerning the conservation of sharks caught in association with fisheries managed by IOTC* such that all sharks must be landed with fins attached (naturally or by other means) to their respective carcass. However, the SC **NOTED** that such an action would have practical implementation and safety issues for some fleets and may degrade the quality of the product in some cases. The SC **RECOMMENDED** all CPCs to obtain and maintain the best possible data for IOTC fisheries impacting upon sharks, including improved species identification.
- On the basis of information presented to the SC in previous years, the SC **RECOGNISED** that the use of wire leaders/traces in longline fisheries may imply targeting of sharks. The SC therefore **RECOMMENDED** to the Commission that if it wishes to reduce catch rates of sharks by longliners it should prohibit the use of wire leaders/traces.

Marine Turtles: Review of Resolution 12/04 on the conservation of marine turtles

SC18.15 (para. 50) The SC reiterated its **RECOMMENDATION** from 2013 and 2014, that at the next revision of IOTC Resolution 12/04 *on the conservation of marine turtles*, the measure is strengthened to ensure that where possible, CPCs report annually on the total estimated level of incidental catches of marine turtles, by species, as provided at Table 3.

TABLE 3. Marine turtle species reported as caught in fisheries within the IOTC area of competence.

Common name	Scientific name
Flatback turtle	*Natator depressus*
Green turtle	*Chelonia mydas*
Hawksbill turtle	*Eretmochelys imbricata*
Leatherback turtle	*Dermochelys coriacea*
Loggerhead turtle	*Caretta caretta*
Olive ridley turtle	*Lepidochelys olivacea*

Marine mammals

SC18.16 (para. 53) The SC reiterated its previous **RECOMMENDATION** that depredation events be incorporated into Resolution 15/01 at its next revision, so that interactions may be quantified at a range of spatial scales. Depredation events should also be quantified by the regional observer scheme.

Status of development and implementation of National Plans of Action for seabirds and sharks, and implementation of the FAO guidelines to reduce marine turtle mortality in fishing operations

SC18.17 (para. 55) The SC **RECOMMENDED** that the Commission note the current status of development and implementation of National Plans of Action (NPOAs) for sharks and seabirds, and the implementation of the FAO guidelines to reduce marine turtle mortality in fishing operations, by each CPC as provided at Appendix V, recalling that the IPOA-Seabirds and IPOA-Sharks were adopted by the FAO in 1999 and 2000, respectively, and required the development of NPOAs. Despite the time that has elapsed since then, very few CPCs have developed NPOAs, or even carried out assessments to ascertain if the development of a Plan is warranted. Currently only 16 of the 37 IOTC CPCs have an NPOA-Sharks (8 more in development), while only 6 CPCs have an NPOA-Seabirds (2 more in development). A single CPC has determined that an NPOA-Sharks is not needed, and 5 have similarly determined that an NPOA-Seabirds is not needed. Currently only 9 of the 37 IOTC CPCs have implemented the FAO guidelines to reduce marine turtle mortality in fishing operations (2 more in progress), and two CPCs (European Union,

France (OT)) have implement a full NPOA in 2015.

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 postions 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.

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).

Working Party on Ecosystems and Bycatch (WPEB)

(Extracts from IOTC–2015–SC18–R: Appendix XXXIVe, *Table 1)*

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				
					2016	2017	2018	2019	2020
SHARKS									
1. Stock structure (connectivity and diversity)	1.1 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.	High (13)	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 select shark species (highest priority species: blue shark, scalloped hammerhead shark, oceanic whitetip shark and shortfin mako shark) in the Indian Ocean with the southern Atlantic Ocean and Pacific Ocean, as appropriate. 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								

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	degree of shared stocks for select shark species (highest priority species: blue shark, scalloped hammerhead shark and oceanic whitetip shark) in the Indian Ocean with the southern Atlantic Ocean and 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 sharks distribution, making use of conventional and electronic tagging (PSAT).	High (1)	AZTI, IRD, Others	US$80K each species (TBD)	BSH SMA	BSH SMA OCS	SMA OCS		
	1.2.2 Whale sharks (RHN): Connectivity, movements, and habitat use, including identification of hotspots and investigate associated environmental conditions affecting distribution, making use of conventional and electronic tagging (P-SAT).	High (24)	IRD	US$50,000 (available from IRD)	RHN	RHN			
2. Fisheries data collection	2.1 Historical data mining for the key species and IOTC fleets (e.g. as artisanal gillnet and longline coastal fisheries) and implementation of Regional Observer Schemes, including:								
	2.1.1 Capacity building of fisheries observers (including the provision of ID guides, training, etc.)	High (20)		US$?? (TBD)					
	2.1.2 Define observer scheme (including minimum requirements) for fleets which are believed to have large catches on pelagic sharks (i.e. various longline and gillnet coastal fisheries) and where those statistics are mostly absent	High (21)		US$?? (TBD)					
	2.1.3 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	High (5)	TBD	US$80K (CITES)	OCS SPL				
	2.1.4 Integration of data mining with observer programs to	Medium		US$??					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	reconstruct species composition and catches of sharks	(26)		(TBD)					
	2.1.5 Electronic monitoring (NOTING the recommendation from the Scientific Committee (SC17.43) that the Commission considers assigning the IOTC Secretariat, in consultation with interested IOTC scientists, to develop a project on electronic monitoring in the IOTC area of competence, the Commission NOTED that a concept note/proposal should be developed to allow an evaluation of the efficacy of electronic monitoring in the collection of information on catch, discards and fishing effort as a means to supplement scientific observer coverage for large-scale gillnet vessels. The concept note should include a detailed budget and be communicated to a range of potential funding organisations. (para. 41 of the S19 report))	High (12)		US$?? (TBD)					
3. Biological and ecological information (incl. parameters for stock assessment)	3.1 Age and growth research (Priority species: blue shark (BSH), shortfin mako shark (SMA) and oceanic whitetip shark (OCS); Silky shark (FAL))			US$?? (TBD)					
	3.1.1 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.	High (4)	CPCs directly	US$?? (TBD)	BSH SMA OCS	SMA OCS	OCS		
	3.2 Post-release mortality								
	3.2.1 Post-release mortality (electronic tagging), to assess the efficiency of management resolutions on no retention species (i.e. oceanic whitetip shark (OCS) and thresher sharks), shortfin mako shark SMA) ranked as the most vulnerable species to longline fisheries, and blue shark as the most frequent in catches.	High (2)	IRD/ NRIFSF	US$170K per species (TBD)	THR, OCS	BSH, SMK			
	3.2.2 Post-release mortality (electronic tagging), to assess the	High (3)	IRD/AZTI	US$80K	OCS				

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	efficiency of management resolutions on no retention species (i.e. oceanic whitetip shark (OCS) for purse seine fisheries			(TBD)					
	3.2.3 Post-release survivorship (electronic tagging) on whale shark to assess the effect of unintended interaction and efficiency of management resolution of non-intentioned encirclement on purse seine	High (23)	IRD/AZTI	US$50,000 IRD (commenced)	RHN	RHN			
	3.3 Reproduction research Priority species: blue shark (BSH), shortfin mako shark (SMA) and oceanic whitetip shark (OCS), and silky shark (FAL))	High (11)	CPCs directly	US$?? (TBD)	BSH SMA OCS FAL	SMA OCS FAL	OCS		
4. Shark bycatch mitigation measures	4.1 Develop studies on shark mitigation measures (operational, technological aspects and best practices)								
	4.1.1 Longline selectivity, to assess the effects of hooks styles, bait types and trace materials on shark catch rates, hooking-mortality, bite-offs and fishing yield (socio-economics)	High (14)		US$?? (TBD)					
	4.1.2 Gillnet selectivity, to assess the effect of mesh size, hanging ratio and net twine on sharks catches composition (i.e. species and size), and fishing yield (socio-economics)	High (15)	WWF-Pakistan	US$?? (WWF)					
	4.1.3 Develop guidelines and protocols for safe handling and release of sharks caught on longlines and gillnets fisheries	Med (25)							
5. CPUE standardisation / Stock Assessment / Other indicators	5.1 Develop standardised CPUE series for each key shark species and fishery in the Indian Ocean			US$?? (TBD)					
	5.1.1 Blue shark: Priority fleets: TWN,CHN LL, EU,Spain LL,	High	CPCs	US$??					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	Japan LL; Indonesia LL; EU,Portugal LL	(17)	directly	(TBD)					
	5.1.2 Shortfin mako shark: Priority fleets: Longline and Gillnet fleets	High (19)	CPCs directly	US$?? (TBD)					
	5.1.3 Oceanic whitetip shark: Priority fleets: Longline fleets; purse seine fleets	High (18)	CPCs directly	US$?? (TBD)					
	5.1.4 Silky shark: Priority fleets: Purse seine fleets	Med (27)	CPCs directly	US$?? (TBD)					
	5.2 Stock assessment and other indicators								
	5.2.1 Develop and compare multiple assessment approaches to determining stock status for key shark species (see Table 2)	High (22)	TBD	Part of: 600K Euro (European Union)					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	MARINE TURTLES								
6. Marine turtle bycatch mitigation measures	6.1 Review of bycatch mitigation measures								
	6.1.1 Res. 12/04 (para. 11) Part I. The IOTC Scientific Committee shall request the IOTC Working Party on Ecosystems and Bycatch to: a) Develop recommendations on appropriate mitigation measures for gillnet, longline and purse seine fisheries in the IOTC area; [mostly completed for LL and PS] b) Develop regional standards covering data collection, data exchange and training; c) Develop improved FAD designs to reduce the incidence of entanglement of marine turtles, including the use of biodegradable materials. [partially completed for non-entangling FADS; ongoing or biodegradable FADs)]	High (9)	CPCs directly	US$?? (TBD)					
	6.1.2 Res. 12/04 (para. 11) Part II. The recommendations of the IOTC Working Party on Ecosystems and Bycatch shall be provided to the IOTC Scientific Committee for consideration at its annual session in 2012. In developing its recommendations, the IOTC Working Party on Ecosystems and Bycatch shall examine and take into account the information provided by CPCs in accordance with paragraph 10 of this measure, other research available on the effectiveness of various mitigation methods in the IOTC area, mitigation measures and guidelines adopted by other relevant organizations and, in particular, those of the Western and Central Pacific Fisheries Commission. The IOTC Working Party on Ecosystems and Bycatch will specifically consider the effects of circle hooks on target	Low (28)	CPCs directly	US$?? (TBD)					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	species catch rates, marine turtle mortalities and other bycatch species.								
	6.1.3 Res. 12/04 (para. 17) The IOTC Scientific Committee shall annually review the information reported by CPCs pursuant to this measure and, as necessary, provide recommendations to the Commission on ways to strengthen efforts to reduce marine turtle interactions with IOTC fisheries.	High (10)	CPCs directly	Nil					
	SEABIRDS								
7. Seabird bycatch mitigation measures	7.1 Review of bycatch mitigation measures								
	7.1.1 Res. 12/06 (para. 8) The IOTC Scientific Committee, based notably on the work of the WPEB and information from CPCs, will analyse the impact of this Resolution on seabird bycatch no later than for the 2016 meeting of the Commission. It shall advise the Commission on any modifications that are required, based on experience to date of the operation of the Resolution and/or further international studies, research or advice on best practice on the issue, in order to make the Resolution more effective.	High (6)	Rep. of Korea, Japan, Birdlife International	US$?? (TBD)					
	DISCARDS								
8. Bycatch mitigation measures	8.1 Review proposal on retention of non-targeted species								
	8.1.1 The Commission requested that the Scientific Committee review proposal IOTC–2014– S18–PropL Rev_1, and to make recommendations on the benefits of retaining non-targeted species catches, other than those prohibited via	High (8)	Consultant	US$?? (TBD)					

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	IOTC Resolutions, for consideration at the 19th Session of the Commission. (S18 Report, para. 143). Noting the lack of expertise and resources at the WPEB and the short timeframe to fulfil this task, the SC RECOMMENDED that a consultant be hired to conduct this work and present the results at the next WPEB meeting. The following tasks, necessary to address this issue, should be considered for the terms of reference, taking into account all species that are usually discarded on all major gears (i.e., purse-seines, longlines and gillnets), and fisheries that take place on the high seas and in coastal countries EEZs: i) Estimate species-specific quantities of discards to assess the importance and potential of this new product supply, integrating data available at the Secretariat from the regional observer programs, ii) Assess the species-specific percentage of discards that is captured dead versus alive, as well as the post-release mortality of species that are discarded alive, in order to estimate what will be the added fishing mortality to the populations, based on the best current information, iii) Assess the feasibility of full retention, taking into account the specificities of the fleets that operate with different gears and their fishing practices (e.g., transhipment, onboard storage capacity). iv) Assess the capacity of the landing port facilities to handle and process this catch. v) Assess the socio-economic impacts of retaining non-target species, including the feasibility to market those species that are usually not retained by those gears, vi) Assess the benefits in terms of improving the catch statistics through port-sampling programmes, vii) Evaluate the impacts of full retention on the								

Topic	Sub-topic and project	Priority ranking	Lead	Est. budget (potential source)	Timing				
					2016	2017	2018	2019	2020
	conditions of work and data quality collected by onboard scientific observers, making sure that there is a strict distinction between scientific observer tasks and compliance issues.								
9. Ecosystems	9.1 Develop a plan for Ecosystem Based Fisheries Management (EBFM) approaches in the IOTC	High (16)	WPEB	US$?? (TBD)					
	9.2 Create an ecosystem model (SEAPODYM) for the main shark species (BSH)	High (7)	Consultant CLS)	43,000€					

.

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)

Species	2016	2017	2018	2019	2020
Working Party on Ecosystems and Bycatch					
Blue shark	Data prep.	**Full assessment***	Indicators; Revisit ERA	**Full assessment***	Indicators
Oceanic whitetip shark	Indicators; Review of mitigation measures in Res. 13/06	Indicators	Revisit ERA	Indicators	**Full assessment***
Scalloped hammerhead shark	–	Indicators	Revisit ERA	Indicators	–
Shortfin mako shark	–	Indicators	Revisit ERA	–	–
Silky shark	–	Indicators	Indicators; Revisit ERA	**Full assessment***	–
Bigeye thresher shark	–		Revisit ERA	–	–
Pelagic thresher shark	–	Indicators	Revisit ERA	–	–
Porbeagle shark	–	tRFMO assessment	–	–	–
Marine turtles	–	Review of mitigation measures in Res. 12/04	Revisit ERA	–	Review of mitigation measures in Res. 12/04
Seabirds	Review of mitigation measures in Res. 12/06	–	–	Review of mitigation measures in Res. 12/06	–
Marine Mammals	–	–	–	–	–
Ecosystem Based Fisheries Management (EBFM) approaches	tRFMO approaches: workshop				

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