OUTCOMES OF THE 16th SESSION OF THE SCIENTIFIC COMMITTEE

PREPARED BY: IOTC SECRETARIAT, 12 SEPTEMBER 2014

PURPOSE

To inform participants at the 10th Working Party on Ecosystems and Bycatch (WPEB10) of the recommendations arising from the 16th Session of the Scientific Committee (SC16) held from 2–6 December 2013, specifically relating to the work of the WPEB.

BACKGROUND

At the 16th Session of the SC, the SC noted and considered the recommendations made by the WPEB in 2013 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 under agenda item 6 and in paper IOTC–2014–WPEB10–08 and are therefore not presented in this paper.

Based on the recommendations arising from the WPEB09, the SC17 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 18th Session held in May 2014. A separate paper, IOTC–2014–WPEB10–04 addresses the responses and actions of the Commission.

In addition, the SC16 reviewed and endorsed a work plan for the WPEB (*Research recommendation and priorities for IOTC Working Parties*), including a revised assessment schedule, as detailed in Appendix B and Appendix C. A separate paper (IOTC–2014–WPEB10–10) 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 SC16 Report (2013) are provided here for the consideration and action of the WPEB10:

Environmental conditions/functioning

NOTING the importance of the environmental conditions and their inter-annual variability on CPUE indices of IOTC species, and more generally, on recruitment and biomass, the SC **REQUESTED** that the working parties take into account more environment and ecosystem-related issues when undertaking stock assessment analyses. This could be achieved by encouraging a greater participation of oceanographers and ecosystem modellers in the work of the working parties. Additional funds may be needed to attract modellers to IOTC working parties. (para. 140 of the SC16 Report)

At-sea trials of line-weighting options for pelagic longline vessels

The SC **CONGRATULATED** the Government of the Republic of Korea, Sajo Industries and BirdLife International for the highly successful collaborative research undertaken to date. The results demonstrate that Korean-style branchlines can be optimised for a fast sink rate with a weighting regime that appears to have a very low risk of impacting negatively catch rates of target species, with no safety risks to crew and with no operational difficulties. (para. 70 of the SC16 Report)

NOTING that further work is required, preferably in areas of high seabird abundance, to achieve robust sample sizes for assessing the impacts of weights on target and non-target catch rates, the SC strongly **ENCOURAGED** the collaborative research efforts to continue and for the findings to be presented to the WPEB in 2014. (para. 71 of the SC16 Report)

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 SC16 report, and which can be downloaded from the IOTC website in English and French:

English: http://iotc.org/science/scientific-committee

French: http://iotc.org/fr/science/comit%C3%A9-scientifique

RECOMMENDATION

That the WPEB:

1) **NOTE** paper IOTC–2014–WPEB10–03 which outlined the main outcomes of the 16th 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 16th Session of the Scientific Committee (2–6 December 2013) to the Commission, relevant to the Working Party on Ecosystems and Bycatch.
Appendix B: Research recommendations and priorities for the IOTC Working Party on Ecosystems and Bycatch.
Appendix C: Assessment schedule for the WPEB 2014–2018.

APPENDIX A

CONSOLIDATED SET OF RECOMMENDATIONS OF THE 16th SESSION OF THE SCIENTIFIC COMMITTEE (2–6 DECEMBER 2013) TO THE COMMISSION RELEVANT TO THE WORKING PARTY ON ECOSYSTEMS AND BYCATCH

Extract of the Report of the 16th Session of the Scientific Committee

(IOTC–2013–SC16–R; Appendix XXXVIII, PAGES 301–306)

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

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

Sharks

SC16.04 (para. 166) 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

SC16.05 (para. 167) 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

SC16.06 (para. 168) 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, TO SPECIFIC CPCs AND/OR OTHER BODIES

Standardisation of IOTC Working Party and Scientific Committee report terminology

SC16.07 (para. 23) The SC **ADOPTED** the reporting terminology contained in Appendix IV and **RECOMMENDED** that the Commission considers adopting the standardised IOTC Report terminology, to further improve the clarity of information sharing from, and among its subsidiary bodies.

Report of the Ninth Session of the Working Party on Ecosystems and Bycatch (WPEB09)

Regional review of the current and historical data available for gillnet fleets operating in the Indian Ocean

SC16.14 (para. 38) The SC reiterated its previous **RECOMMENDATION** that the Commission considers allocating funds to support a regional review of the current and historical data available for gillnet fleets operating in the Indian Ocean. As an essential contribution to this review, scientists from all CPCs having gillnet fleets in the Indian Ocean, in particular those from I.R. Iran, Oman, Pakistan and Sri Lanka, should collate the known information on bycatch in their gillnet fisheries, including sharks, marine turtles and marine mammals, with estimates of the likely order of magnitude where more detailed data are not available. A consultant should be hired for 30 days to assist CPCs with this task (budget estimate: Table 3).

Training for CPCs having gillnet fleets on species identification, bycatch mitigation and data collection methods and also to identify other potential sources of assistance – Development of plans of action

SC16.15 (para. 39) The SC **RECOMMENDED** that the Commission allocate funds in its 2014 and 2015 budgets for the IOTC Secretariat to facilitate training for CPCs having gillnet fleets on bycatch mitigation methods, species identification, and data collection methods (budget estimate: Table 4).

Review of new information on the status of sharks and rays

SC16.16 (para. 40) **NOTING** that the information on retained catches and discards of sharks contained in the IOTC database remains very incomplete for most fleets despite their mandatory reporting status, and that catch-and-effort as well as size data are essential to assess the status of shark stocks, the SC **RECOMMENDED** that all CPCs collect and report catches of sharks (including historical data), catch-and-effort and length frequency data on sharks, as per IOTC Resolutions, so that more detailed analysis can be undertaken for the next WPEB meeting.

SC16.17 (para. 41) **NOTING** that there is extensive literature available on pelagic shark fisheries and interactions with fisheries targeting tuna and tuna-like species, in countries having fisheries for sharks, and in the databases of governmental or non-governmental organisations, the SC **AGREED** on the need for a major data mining exercise in order to compile data from as many sources as possible and attempt to rebuild historical catch series of the most commonly caught shark species, in particular blue shark and oceanic whitetip shark. In this regard, the SC **RECOMMENDED** that the Commission allocates funds for this activity, in the 2014 and 2015 IOTC budgets (budget estimate: Table 5).

SC16.18 (para. 42) The SC **RECOMMENDED** that the IOTC Secretariat facilitate a process to develop standardised sampling protocols for bycatch species which are thought to be heavily impacted by IOTC fisheries. The protocols established by the WCPFC may be a useful starting point. Given the lack of staffing resources at the Secretariat to undertake the work directly, the Commission may wish to allocate sufficient funds in its 2014 budget to hire a consultant to undertake this work, under the guidance of the Secretariat. The primary aim would be to assist CPCs to gather information in a consistent way that would lead to improved assessments of fisheries impacts on species, species groups and ecosystems. An approximate budget is provided in Table 6.

Ecological Risk Assessment: review of current knowledge and potential management implications

SC16.19 (para. 43) The SC **RECOMMENDED** that the Commission note the list of the 10 most vulnerable shark species to longline gear (Table 7) and purse seine gear (Table 8) in the Indian Ocean, as determined by a productivity susceptibility analysis, compared to the list of shark species/groups required to be recorded for each gear, contained in Resolution 13/03 o*n the recording of catch and effort by fishing vessels in the IOTC area of competence*. At the next revision to Resolution 13/03, the Commission may wish to add the missing species/groups of sharks and rays.

SC16.20 (para. 46) The SC **RECOMMENDED** that, in line with Recommendation 12/15 on the best available science, the list of shark species (or groups of species) for longline gear under Resolution 13/03 (Table 7) should be supplemented with the silky shark (*Carcharhinus falciformis*), which was estimated to be at risk in longline fisheries by the ERA conducted in 2012 (ranked as the 4th most vulnerable species to longline gear). The SC **REQUESTED** the Commission to define the most appropriate means of collecting this additional information.

TABLE 7. List of the 10 most vulnerable shark species to longline gear compared to the list of shark species/groups required to be recorded in logbooks, as listed in Resolution 13/03 *on the recording of catch and effort by fishing vessels in the IOTC area of competence*.

PSA vulnerability ranking	Most susceptible shark species to longline gear	FAO Code	Shark species currently listed in IOTC Resolution 13/03 for longline gear: mandatory recording	FAO Code
1	Shortfin mako (*Isurus oxyrinchus*)	SMA	Blue shark (*Prionace glauca*)	BSH
2	Bigeye thresher (*Alopias superciliosus*)	BTH	Mako sharks (*Isurus* spp.)	MAK
3	Pelagic thresher (*Alopias pelagicus*)	PTH	Porbeagle shark (*Lamna nasus*)	POR
4	Silky shark (*Carcharhinus falciformis*)	FAL	Hammerhead sharks (*Sphyrna* spp.)	SPN
5	Oceanic whitetip shark (*Carcharhinus longimanus*)	OCS	Other sharks	SKH
6	Smooth hammerhead (*Sphyrna zygaena*)	SPZ	Thresher sharks (*Alopias* spp.)	THR
7	Porbeagle (*Lamna nasus*)	POR	Oceanic whitetip shark	OCS

			(*Carcharhinus longimanus*)
8	Longfin mako (*Isurus paucus*)	LMA	
9	Great hammerhead (*Sphyrna mokarran*)	SPM	
10	Blue shark (*Prionace glauca*)	BSH	

SC16.21 (para. 47) The SC **RECOMMENDED** that, in line with Recommendation 12/15 on the best available science, the list of shark species (or groups of species) for purse seine gear under Resolution 13/03 (Table 8) should be supplemented with the silky shark (*Carcharinus falciformis*), mako sharks (*Isurus* spp.), hammerhead sharks (*Sphyrna* spp.), pelagic stingray (*Pteroplatytrygon violacea*), dusky shark (*Carcharhinus obscurus*), tiger shark (*Galeocerdo cuvier*), which were estimated to be at risk in purse seine fisheries by the ERA conducted in 2012. The SC **ADVISED** the Commission to define the most appropriate means of collecting this additional information.

TABLE 8. List of the 10 most vulnerable shark species to purse seine gear compared to the list of shark species/groups required to be recorded in logbooks, as listed in Resolution 13/03 *on the recording of catch and effort by fishing vessels in the IOTC area of competence*.

PSA vulnerability ranking	Most susceptible shark species to purse seine gear	FAO Code	Shark species listed in IOTC Resolution 13/03 for purse seine gear: Mandatory recording	FAO Code
1	Oceanic whitetip shark (*Carcharhinus longimanus*)	OCS	Whale sharks (*Rhincodon typus*)	RHN
2	Silky shark (*Carcharhinus falciformis*)	FAL	Thresher sharks (*Alopias* spp.)	THR
3	Shortfin mako (*Isurus oxyrinchus*)	SMA	Oceanic whitetip shark (*Carcharhinus longimanus*)	OCS
4	Great hammerhead (*Sphyrna mokarran*)	SPM		
5	Pelagic stingray (*Pteroplatytrygon violacea)*	PLS		
6	Scalloped hammerhead (*Sphyrna lewini*)	SPL		
7	Smooth hammerhead (*Sphyrna zygaena*)	SPZ		
8	Longfin mako (*Isurus paucus*)	LMA		
9	Dusky shark (*Carcharhinus obscurus*)	DUS		
10	Tiger shark (*Galeocerdo cuvier*)	TIG		

Review of Resolution 12/04 on the conservation of marine turtles

SC16.22 (para. 51) The SC **RECOMMENDED** 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 9.

TABLE 9. 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*

Resolution 10/02 Mandatory statistical [reporting] requirements for IOTC Members and Cooperating Non-Contracting Parties (CPCs)

SC16.23 (para. 52) **NOTING** that Resolution 10/02 does not make provisions for data to be reported to the IOTC on marine turtles, the SC **RECOMMENDED** that Resolution 10/02 is revised in order to make the reporting requirements coherent with those stated in Resolution 12/04 *on the conservation of marine turtles* and Resolution 13/03 *on the recording of catch and effort by fishing vessels in the IOTC area of competence*.

Requests contained in IOTC Conservation and Management Measures

SC16.24 (para. 53) The SC **RECOMMENDED** that the Commission note the following in regards to the requests to the SC and WPEB outlined in paragraph 11 of Resolution 12/04:

a) *Develop recommendations on appropriate mitigation measures for gillnet, longline and purse seine fisheries in the IOTC area*

Gillnet: The absence of data for marine turtles, fishing effort, spatial deployment and bycatch in the IOTC area of competence makes it difficult to provide management advice for gillnets. However, possible mitigation measures to avoid marine turtle mortality in gillnets would be possible and, thus, the group suggested that research in gillnet mitigation measures (e.g. using lights on gillnets) will be considered as a research priority. Moreover, improvements in data collection and reporting of marine turtle interactions with gillnets, and research on the effect of gear types (i.e. net construction and colour, mesh size, soak times, light deterrents) are necessary.

Longline: Current information suggests inconsistent spatial catches (i.e. high catches in few sets) and by gear/fishery. The most important mitigation measures relevant for longline fisheries are to:

1. Encourage the use of circle hooks, whilst developing further research into their effectiveness using a multiple species approach.
2. Release live animals after careful dehooking/disentangling/line cutting (See handling guidelines in the *Marine turtle identification cards for Indian Ocean fisheries*).

Purse seine: see c) below

b) *Develop regional standards covering data collection, data exchange and training*

1. The development of standards using the IOTC guidelines for the implementation of the Regional Observer Scheme should be undertaken, as it is considered the best way to collect reliable data related to marine turtle bycatch in the IOTC area of competence.
2. The Chair of the WPDCS to work with the IOSEA MoU Secretariat, which has already developed regional standards for data collection, and revise the observer data collection forms and observer reporting template as appropriate, as well are current recording and reporting requirements through IOTC Resolutions, to ensure that the IOTC has the means to collect quantitative and qualitative data on marine turtle bycatch.
3. Encourage CPCs to use IOSEA expertise and facilities to train observers and crew to increase post-release survival rates of marine turtles.

c) *Develop improved FAD designs to reduce the incidence of entanglement of marine turtles, including the use of biodegradable materials*

All FAD-directed purse seine fisheries should rapidly change to only use ecological FADs[1] based on the principles outlined in Annex III of Resolution 13/08 *Procedures on a fish aggregating devices (FADs) management plan, including more detailed specification of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species*.

Review of Resolution 00/02 On a survey of predation of longline caught fish

SC16.25 (para. 54) **NOTING** that the requirements contained in Resolution 00/02 o*n a survey of predation of longline caught fish* was completed by the WPEB and SC in past year's, the SC **RECOMMENDED** that Resolution 00/02 be revoked by the Commission.

Development of technical advice for marine mammals

SC16.26 (para. 55) The SC **RECOMMENDED** that depredation events be incorporated into Resolution 13/03 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.

Employment of a Fisheries Officer (Bycatch)

SC16.27 (para. 56) **NOTING** the rapidly increasing scientific workload at the IOTC Secretariat, including a wide range of additional duties on ecosystems and bycatch assigned to it by the SC and the Commission, and that the new Fishery Officer (Science) supporting the IOTC scientific activities has not been given a mandate by the Commission to work on ecosystems and bycatch matters, the SC **RECOMMENDED** that the Commission approve the hiring of a Fishery Officer (Bycatch) to work on bycatch matters in

[1] This terms means improved FAD designs to reduce the incidence of entanglement of bycatch species, using biodegradable material as much as possible.

support of the scientific process.

Invited Expert/s at the next Working Party on Ecosystems and Bycatch meeting

SC16.28 (para. 60) The SC **RECOMMENDED** that two Invited Experts be brought to the WPEB in 2014 so as to further increase the capacity of the WPEB to undertake work on sharks at the next meeting, and for this to be included in the IOTC budget for 2014.

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

SC16.29 (para. 63) The SC **RECOMMENDED** that the Commission note the updated status of development and implementation of National Plans of Action for seabirds and sharks, and the implementation of the FAO guidelines to reduce marine turtle mortality in fishing operations, by each CPC as provided at Appendix VI.

Best practice guidelines for the safe release and handling of encircled cetaceans

SC16.30 (para. 65) The SC **RECOMMENDED** that the Commission allocates funds in its 2014 and 2015 budgets, 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*".

Best practice guidelines for the safe release and handling of encircled whale sharks

SC16.31 (para. 67) The SC **RECOMMENDED** the following *Guidelines for the safe release and handling of encircled whale* sharks, that should be added as an additional page in the IOTC shark identification guides:

The methods listed below depend on the condition of the particular purse seine set, e.g. the size and orientation of the encircled animal, size of fish in the purse seine set and operation style.

- Cutting the net when the whale shark is at the surface and separated from the tuna and when the operation presents no danger for the crew;
- Standing the animal on the net and rolling it outside the bunt. A rope placed under the animal and attached to the float line could help rolling the whale shark out of the net;
- Brailing sharks (only for small individual less than 2–3 meters).

The crew should never:

- Pull up the shark by its tail;
- Tow the shark by its tail.

SC16.32 (para. 68) The SC **RECOMMENDED** that the Commission allocates funds in its 2014 budget, to produce and print the IOTC best practice guidelines for the safe release and handling of encircled whale sharks, and for these to be incorporated into the existing IOTC "*Shark and ray identification in Indian Ocean pelagic fisheries*", identification cards.

Shark Year (multi-year research) Program

SC16.33 (para. 74) The SC **ENDORSED** the Indian Ocean Shark Year Program (multi-year research initiative) provided at Appendix I of paper IOTC–2013–SC16–18 and **RECOMMENDED** that a detailed multi-year shark research program be prepared (by a small group of shark experts and the IOTC Secretariat) covering the various aspects raised in paper IOTC–2013–SC16–18. The IOTC budget for 2014 should include funding support to allow the small group of shark experts and the IOTC Secretariat to attend a short ad-hoc meeting (Table 10).

Summary discussion of matters common to Working Parties

IOTC species identification cards

Seabirds, shark and marine turtles

SC16.59 (para. 143) The SC **EXPRESSED** its thanks to the IOTC Secretariat and other experts involved in the development of the identification cards for marine turtles, seabirds and sharks and **RECOMMENDED** that the cards be translated into the following languages, in priority order: Farsi, Arabic, Spanish, Portuguese and Indonesian, and that the Commission allocate funds for this purpose.

SC16.60 (para. 144) The SC **RECOMMENDED** that the Commission allocate additional funds in 2014–15 to translate and print further sets of the shark, seabird and marine turtle identification cards (budget estimate: Table 14).

Fishing hook identification cards

SC16.62 (para. 147) **NOTING** the continued confusion in the terminology of various hook types being used in IOTC fisheries, (e.g. tuna hook vs. J-hook; definition of a circle hook), the SC **RECOMMENDED** that the Commission allocate funds in the 2014-15 IOTC Budget to develop an identification guide for fishing hooks and pelagic fishing gears used in IOTC fisheries. The total estimated production and printing costs for the first 1000 sets of the identification cards is around a maximum of US$16,500 (Table 16). The IOTC Secretariat shall seek funds from potential donors to print additional sets of the identification cards at US$5,500 per 1000 sets of cards.

Implementation of the Regional Observer Scheme

SC16.64 (para. 176) The SC **RECOMMENDED** that the Compliance Committee and the Commission consider how to address the continued lack of compliance with the implementation of regional observer schemes by CPCs for their fleets and lack of reporting to the IOTC Secretariat as per the provision of Resolution 11/04 *on a Regional Observer Scheme*, noting the update provided in Appendix XXXII.

SC16.65 (para. 177) The SC **RECOMMENDED** that as a priority, the IOTC Secretariat should immediately commence work with CPCs that are yet to develop and implement a Regional Observer Scheme that would meet the requirements contained in Resolution 11/04, and provide an update at the next session of the WPEB.

Observer programme training

SC16.66 (para. 178) The SC **RECOMMENDED** that the Commission considers funding of future activities under the Regional Observer Scheme, by allocating specific funds to the implementation of capacity building activities in developing coastal countries of the IOTC Region, as detailed in Table 17.

APPENDIX B

RESEARCH RECOMMENDATIONS AND PRIORITIES FOR IOTC WORKING PARTIES IN 2013 AND 2014

Extract of the Report of the 16th Session of the Scientific Committee

(IOTC–2013–SC16–R; Appendix XXXIV, PAGES 283–285)

The SC **NOTED** the proposed work plans and priorities of each of the Working Parties and **AGREED** to the revised work plans as outlined in Appendix XXXIV. The Chairs and Vice-Chairs of each working party shall ensure that the efforts of their 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. (IOTC–2014–SC16–R, Para. 193)

Working Party on Ecosystems and Bycatch (WPEB)

(Extracts from IOTC–2013–WPEB09–R)

Requests from the Commission

At Sessions of the Commission, Conservation and Management Measures adopted contained elements which call on the Scientific Committee, via the WPEB, to undertake specific tasks.

Resolution 13/04 ***On the conservation of cetaceans***

(para. 6) The Commission requests that the IOTC Scientific Committee develop best practice guidelines for the safe release and handling of encircled cetaceans, taking into account those developed in other Regional Fisheries Management Organisations, including the Western and Central Pacific Fisheries Commission, and that these guidelines be submitted to the 2014 Commission meeting for endorsement.

Resolution 13/05 ***On the conservation of whale sharks (Rhincodon typus)***

(para. 6) The Commission requests that the IOTC Scientific Committee develop best practice guidelines for the safe release and handling of encircled whale sharks, taking into account those developed in other regional fisheries management organisations including the Western and Central Pacific Fisheries Commission, and that these guidelines be submitted to the 2014 Commission meeting for endorsement.

Resolution 13/06 ***On a scientific and management framework on the Conservation of sharks species caught in association with IOTC managed fisheries***

(para. 2) The SC recommendation or advice shall be conducted taking account of:

a) full stock assessments on sharks, stock assessment and Ecological Risk Assessments (ERAs) by fishing gears, using available best scientific data/information;

b) trend of fishing effort by fishing gear on each shark species;

c) effective IOTC Conservation and Management Measures for certain fishing gears with high risk by shark species;

d) priority in shark species with high risk;

e) review of practical implementation of prohibition to retain on board of shark species;

f) feasibility of implementation of prohibition to retain on board including identification of shark species;

g) impact and bias of IOTC Conservation and Management Measures of sharks on fishing operations and sharks data/information collected and reported by CPCs;

h) further improvement of level for sharks data/information submitted by CPCs, particularly developing CPCs.

(para. 7) Scientific observers shall be allowed to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs, skin samples, spiral valves, jaws, whole and skeletonised specimens for taxonomic works and museum collections) from oceanic whitetip sharks taken in the IOTC area of competence that are dead at haulback, provided that the samples are a part of a research project approved by the IOTC Scientific Committee (SC)/the IOTC Working Party on Ecosystems and Bycatch (WPEB). In order to obtain the

approval, a detailed document outlining the purpose of the work, number of samples intended to be collected and the spatio-temporal distribution of the sampling effect must be included in the proposal. Annual progress of the work and a final report on completion shall be presented to the SC/WPEB.

(para. 9) The provisional measures stipulated in this Resolution shall be evaluated in 2016 by the IOTC Scientific Committee to deliver more appropriate advice on the conservation and management of the stocks for the consideration of the Commission.

Resolution 13/08 ***Procedures on a fish aggregating devices (FADs) management plan, including more detailed specification of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species***

(para. 7) The IOTC Scientific Committee will analyse the information, when available, and provide scientific advice on additional FAD management options for consideration by the Commission in 2016, including recommendations on the use of biodegradable materials in new and improved FADs and the phasing out of FAD designs that do not prevent the entanglement of sharks, marine turtles and other species. When assessing the impact of FADs on the dynamic and distribution of targeted fish stocks and associated species and on the ecosystem, the IOTC Scientific Committee will, where relevant, use all available data on abandoned FADs (i.e. FADs without a beacon).

Resolution 12/04 ***On the conservation of marine turtles***

(para. 11) 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;
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.

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 species catch rates, marine turtle mortalities and other bycatch species.

(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.

Resolution 12/06 ***On reducing the incidental bycatch of seabirds in longline fisheries***

(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.

Resolution 12/09 ***On the conservation of thresher sharks (Family Alopiidae) caught in association with fisheries in the IOTC area of competence***

(para. 7) Scientific observers shall be allowed to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs, skin samples, spiral valves, jaws, whole and skeletonised specimens for taxonomic works and museum collections) from thresher sharks that are dead at haulback, provided that the samples are part of the research project approved by the IOTC Scientific Committee (or IOTC Working Party on Ecosystems and Bycatch (WPEB)). In order to obtain the approval, a detailed document outlining the purpose of the work, number and type of samples intended to be collected and the spatio-temporal distribution of the sampling work must be included in the proposal. Annual progress of the work and a final report on completion of the project shall be presented to the IOTC WPEB and the IOTC Scientific Committee.

Resolution 11/04 ***On a regional observer scheme***

(para. 15) The elements of the Observer Scheme, notably those regarding its coverage, are subject to review and revision, as appropriate, for application in 2012 and subsequent years. Basing on the experience of other Tuna RFMOs, the IOTC Scientific Committee will elaborate an observer working manual, a template to be used for reporting (including minimum data fields) and a training program.

Resolution 05/05 ***Concerning the conservation of sharks caught in association with fisheries managed by IOTC***

(para. 2) In 2006 the IOTC Scientific Committee (in collaboration with the IOTC Working Party on Ecosystems and Bycatch) provide preliminary advice on the stock status of key shark species and propose a research plan and timeline for a comprehensive assessment of these stocks.

(para. 5) The ratio of fin-to-body weight of sharks described in paragraph 4 shall be reviewed by the IOTC Scientific Committee and reported back to the Commission in 2006 for revision, if necessary.

Core topics for research

The WPEB **RECOMMENDED** that the following core topic areas as priorities for research over the coming years, taking into account data gaps, capacity among CPCs, and areas for implementation:

High Priority:

- ***Shark stock status analyses (development of abundance indices)***
    i. Develop/improve accurate standardised CPUE indices for each shark species for the Indian Ocean as a whole or by sub-region as appropriate, once stock structure and management units have been determined.
    ii. Develop methods to estimate historical catch series by gear.
    iii. Develop life history and biological patterns for the species (namely migration patterns and distribution patterns).
- ***Capacity building***
    i. Scientific assistance to CPCs and specific fleets considered to have the highest risk to bycatch species (e.g. gillnet fleets and longline fleets).
- ***Stock assessment***
    i. There is a clear request from the Commission to carry out stock status determinations for sharks in the Indian Ocean, and that at present the data held at the IOTC Secretariat would be insufficient to undertake integrated stock assessments for any stock.
    ii. Alternative approaches should be explored as options 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.
- ***Bycatch mitigation***
    i. Sharks
    ii. Seabirds – line weighting
    iii. Marine turtles
    iv. Marine mammals

Medium Priority

- ***Depredation***
    i. Longline fishery depredation
- ***Stock structure***
    i. genetic research to determine the connectivity of species throughout their distributions: such studies should be developed at the sub-regional level.

ii. tagging research to better understand and estimate exploitation rates, the movement dynamics, possible spawning locations, natural mortality, fishing mortality and post-release mortality of stocks from various fisheries in the Indian Ocean.

- ***Biological information***

i. Quantitative biological studies are necessary for all species throughout their range to determine key biological parameters including age-at-maturity and fecundity-at-age/length relationships, age-length keys, age and growth, which will be fed into future stock assessments.

APPENDIX C
ASSESSMENT SCHEDULE FOR IOTC WORKING PARTIES

Extract of the Report of the 16th Session of the Scientific Committee

(IOTC–2013–SC16–R; Appendix XXXV, PAGE 297)

The SC **ADOPTED** a revised assessment schedule, ecological risk assessment and other core projects for 2014–18, 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–2014–SC16–R, Para. 195–196)

Species	2014	2015	2016	2017	2018
Working Party on Ecosystems and Bycatch					
Blue shark	Indicators	**Full assessment**		Indicators & data poor approaches	
Oceanic whitetip shark	Indicators		**Full assessment**		
Scalloped hammerhead shark		Indicators			Revisit ERA
Shortfin mako shark			Indicators		Revisit ERA
Silky shark		Indicators			Revisit ERA
Bigeye thresher shark				Indicators	Revisit ERA
Pelagic thresher shark			Indicators		Revisit ERA
Marine turtles		Review of mitigation measures in 12/04		Revisit ERA	
Seabirds		Review of mitigation measures in 12/06		Review of mitigation measures in 12/06	
Marine Mammals					