
DRAFT LIST OF PRIORITIES FOR THE DEVELOPMENT OF A PROGRAM OF WORK BY THE IOTC WPDCS

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PURPOSE

To ensure that the participants at the 10th Working Party on Data Collection and Statistics (WPDCS10) revise the Draft List of Priorities for the development of a Program of Work by the WPDCS and agree on a course of action by taking into consideration the specific requests of the Commission and Scientific Committee.

BACKGROUND

Scientific Committee

At the 16th Session of the SC:

- (Para. 192) The SC **NOTED** paper IOTC–2013–SC15–16 which outlined the proposed research priorities for each of the Working Party meetings held in 2013, with the aim of developing an IOTC Science Work Plan for 2014, and future years.
- (Para. 193) 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 [of the SC16 Report]. 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.
- (Para. 194) The SC **REQUESTED** that all Working Parties provide their work plans with items prioritised based on the requests of the Commission of the SC.
- (Para. 195) 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 [of the SC16 Report].
- (Para. 196) The SC **REQUESTED** that the IOTC Secretariat develop a template for each working party to use in developing their work plans in 2014, with the aim of standardising the way in which each working party presents a prioritised plan each year for the SC's consideration.

Commission

At Sessions of the Commission, Conservation and Management Measures adopted contain elements that call on the Scientific Committee, via the WPDCS, to undertake specific tasks. In addition, the Commission Recommends specific actions and endorses recommendations from the SC on issues relating with data and statistics. These requests will need to be incorporated into a draft Program of Work for the WPDCS:

Resolution 13/03²: On the recording of catch and effort data by fishing vessels in the IOTC area of Competence

(Para. 12) The Commission shall consider **development of a special program to facilitate the implementation of this Resolution by developing CPCs**. Furthermore, developed and developing CPCs are encouraged to work together to identify opportunities for capacity building to assist the long-term implementation of this Resolution.

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² Resolution objected by India; Resolution 12/03 applies to India instead.

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(Para. 32) The Commission **NOTED** the following in regards to the requests to the SC and WPEB outlined in paragraph 11 of Resolution 12/04:

...

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 as 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.

(Para. 41) The Commission **NOTED** the request from the SC to increase the IOTC Capacity Building budget line so that **capacity building workshops/training can be carried out in 2014 and 2015 on the collection, reporting and analyses of catch and effort data for neritic tuna and tuna-like species**. Where appropriate these training sessions shall include information that explains the entire IOTC process from data collection to analysis and how the information collected is used by the Commission to develop Conservation and Management Measures.

(Para. 85) The Commission **AGREED** that capacity building activities, including **workshops on science** (stock assessment), compliance with IOTC CMMs, **data collection and reporting**, and bridging the gap between IOTC science and management advice, be continued in 2014 and **financially supported through the IOTC budget** and through voluntary contributions from Members and other interested parties.

(Para. 128) The Commission **ADOPTED Recommendation 14/07 To standardise the presentation of scientific information in the annual Scientific Committee report and in Working Party reports** (...)

Excerpt of Recommendation 14/07

Data quality and limitations of the assessment models

- d) A statement qualifying the quality, the reliability and where relevant the representativeness of input data to stock assessments, such as, but not limited to:
- i. Fisheries statistics and fisheries indicators (e.g. catch and effort, catch-at size and catch at age matrices by sex and, when applicable, fisheries dependent indices of abundance);
 - ii. Biological information (e.g. growth parameters, natural mortality, maturity and fecundity, migration patterns and stock structure, fisheries independent indices of abundance);
 - iii. Complementary information (e.g. consistencies among available abundance indices, influence of the environmental factors on the dynamic of the stock, changes in fishing effort distribution, selectivity and fishing power, changes in target species).

Recommendations from the IOTC Scientific Committee endorsed by the Commission:

- **Ecosystems and Bycatch:**

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).

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.

- **Billfish: Recreational and sports fisheries for billfish**

SC16.37 ([para. 82](#))

NOTING that in 2011, the Chair of the WPB, in collaboration with the IOTC Secretariat, participating billfish foundations and other interested parties, commenced a process to **facilitate the acquisition of catch-and-effort and size data from sport fisheries**, by developing and disseminating reporting forms to Sport Fishing Centres in the region, the SC **RECOMMENDED** that the Chair and Vice-Chair work in collaboration with the IOTC Secretariat and the African Billfish Foundation to find a suitable funding source and lead investigator (university or consultant) to undertake the project outlined in Appendix VI of the WPB11 report (IOTC–2013–WPB11–R). The aim of the project will be to enhance data recovery from sports and other recreational fisheries in the western Indian Ocean region. The WPB Chair should circulate the concept note to potential funding bodies on behalf of the WPB. A similar concept note could be developed for other regions in the IOTC area of competence at a later date.

- **Tropical Tunas: Length Frequency inter-sessional meeting guidelines**

SC16.41 ([para. 88](#))

NOTING the size data issues (discrepancies in size data (low sampling rate, uneven distribution of sampling in regard to the spatial extent of the fishery) in the Japan and Taiwan,China tropical tuna data sets) identified by the WPTT in 2012 and 2013 and the Scientific Committee in 2012, the SC **RECOMMENDED** that the course of action outlined in para. 105 of this report is undertaken.

- **Data Collection and Statistics:**

SC16.48 ([para. 110](#)) **IOTC Data Summary**

The SC **NOTED** the plans from the IOTC Secretariat to resume publication of the IOTC Data Summary in electronic form, including work on the set-up of an online querying facility in the IOTC Web Site, which will allow site users to filter nominal catch and catch-and-effort data using a range of criteria and visualise the output in table or graphic format, including different types of charts, figures and maps. The work will facilitate the use of information in the IOTC Databases by the general public. The SC **RECOMMENDED** that the IOTC Secretariat carries out this work during 2014 and presents the new system to the next meeting of the WPDCS for suggested improvements.

- **Implementation of the Regional Observer Scheme:**

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.

SC16.66 (para. 178) **Observer programme training**

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.

DISCUSSION

Participants at the WPDCS10 are requested to consider the priorities set by the Commission and the Scientific Committee, via Recommendations and Conservation and Management Measures, and agree on a Program of Work to match those priorities.

RECOMMENDATION/S

That the WPDCS:

- 1) **NOTE** paper IOTC–2014–WPDCS10–09, which includes a Draft list of priorities for the WPDCS to consider when developing its Program of Work for 2015–2019.
- 2) In line with the requests and directives from the Commission and Scientific Committee, **RECOMMEND** a Program of Work for 2015–2019 to the Scientific Committee for its consideration and potential endorsement.

APPENDICES

Appendix A: DRAFT: List of Priorities for the Development of a Program of Work by the IOTC WPDCS (2015–2019)

Appendix B: List of data issues identified by the IOTC Working Parties and endorsed by the IOTC Scientific Committee and the Commission

APPENDIX A

DRAFT: WORKING PARTY ON DATA COLLECTION AND STATISTICS PROGRAM OF WORK (2015–2019)

The following is the Draft List of Priorities for the Development of a Program of Work by the IOTC WPDCS (2015–2019) and is based on the specific requests of the Commission and Scientific Committee. The Draft List of Priorities is presented in Table 1, noting that the Programme of Work and timeline for implementation would be developed by the SC once it has agreed to the priority projects across all of its Working Parties:

Table 1. High priority topics, by project for data collection and statistics in the Indian Ocean.

Topic	Sub-topic and project	Priority
Compliance with IOTC Data Requirements	<p>Data Support Missions</p> <ul style="list-style-type: none"> ➤ Identification of indicators to assess performance of IOTC CPCs against IOTC Data Requirements; evaluation of performance of IOTC CPCs with those Requirements; development of plans of action to address the issues identified, including timeframe of implementation and follow-up activities required. <p>Priority to be given to the following fisheries:</p> <ol style="list-style-type: none"> 1. Iran 2. India 3. Pakistan 4. Yemen 5. Madagascar 6. Mozambique 7. Mauritius 8. Sri Lanka 9. Indonesia 	High
Data Collection Standards ROS	<p>Artisanal Fisheries:</p> <ul style="list-style-type: none"> ➤ Develop minima data requirements for the routine collection of data at the landing place, through sampling by enumerators ➤ Develop General Guidelines for data collection from artisanal fisheries; including development of a set of indicators to be used to assess the quality of data collection and management systems for artisanal fisheries ➤ Develop/Amend Fisheries specific data collection protocols, by country, where necessary ➤ Assist implementation of pilot sampling activities in countries/fisheries not/insufficiently sampled in the past; priority to be given to the following fisheries: <ol style="list-style-type: none"> 1. Coastal fisheries of Indonesia 2. Coastal fisheries of India 3. Coastal fisheries of Pakistan 4. Coastal fisheries of Sri Lanka 5. Coastal fisheries of Yemen 6. Coastal fisheries of Madagascar 7. Coastal fisheries of Comoros 8. Coastal fisheries of Tanzania 9. Coastal fisheries of Thailand 10. Coastal fisheries of Malaysia <p>Industrial fisheries:</p> <ul style="list-style-type: none"> ➤ Develop General Guidelines for data collection by at-sea observers; including development of a set of indicators to be used to assess the quality of data collection and management systems for industrial fisheries ➤ Organize a Regional Workshop on the Implementation of the IOTC Regional Observer Scheme (all IOTC CPCs having industrial fisheries) ➤ Develop/Amend fisheries specific at-sea observer data collection 	High

	<p>protocols, by country, where necessary</p> <p>➤ Assist implementation of at-sea observer programmes in countries/fisheries not/insufficiently monitored in the past; including:</p> <ul style="list-style-type: none"> • Evaluation of existing observer programmes and arrangements • Coordination of country/fishery specific Training Sessions and Workshops on the ROS • Assistance to data management and reporting <p>Priority to be given to the following fisheries:</p> <ol style="list-style-type: none"> 1. Iran (driftnet; purse seine) 2. Sri Lanka (purse seine; drifting gillnet & longline) 3. Indonesia (longline) 4. Pakistan (driftnet) 5. India (longline) 6. Mauritius (purse seine; longline) 7. Malaysia (longline) 	
Assistance to Implementation of logbook systems and data collection on FADs	<p>Assist developing coastal IOTC CPCs in the implementation of logbook systems on industrial vessels under their flag, in particular: development of logbooks and guidelines for its completion, including provisions for FADs, as per IOTC Resolution 13/08; training of local staff; assistance to data management and reporting.</p> <p>Priority to be given to the following fisheries:</p> <ol style="list-style-type: none"> 1. Iran (driftnet; purse seine) 2. Sri Lanka (purse seine; drifting gillnet & longline) 3. Indonesia (longline) 4. Pakistan (driftnet) 5. India (longline) 6. Mauritius (purse seine; longline) 7. Malaysia (longline) 	High
Review Size Data Longline Fisheries	Assistance to historical review of length frequency data for longline fisheries, in particular longliners from Taiwan,China and Japan.	High
Implementation Data Collection Sport Fisheries	Produce a catalogue of sport fisheries in the Indian Ocean; facilitate collection and reporting of data from sport clubs; training of local staff.	High
IOTC Data Summary	Development of Web Based online querying procedures for nominal catch, fishing craft, and catch-and-effort data.	High

APPENDIX B

MAIN ISSUES IDENTIFIED RELATING TO THE STATISTICS OF IOTC SPECIES

ALBACORE: *Extract from IOTC–2014–WPTmT05–07*

The following list is provided by the Secretariat for the consideration of the WPTmT. The list covers the main issues which the Secretariat considers to negatively affect the quality of the statistics available at the IOTC, by type of dataset and fishery.

1. **Catch-and-Effort data from Industrial Fisheries:**

- Fisheries of **Indonesia**: The catches of albacore estimated for the fisheries of Indonesia, including coastal and offshore fresh-tuna longliners and deep-freezing longliners, account for 33% of the total catches of albacore in the Indian Ocean in recent years (average catch 2010–12; Fig. 2). Following a recommendation from the IOTC Scientific Committee, the Directorate General for Capture Fisheries of Indonesia (DGCF) and the IOTC Secretariat reviewed the estimates of catches of albacore for Indonesia in 2013³. As a result of that review Indonesia reported a revised catch series for albacore for recent years. Although the new catches reported are considered more reliable than the previous catches estimated by the DGCF, the poor quality of the catch-and-effort data available for this fishery compromises the ability of the DGCF to validate the new estimates.
- **Fresh-tuna longline** fishery of **Taiwan,China**: In recent years, the catches of albacore estimated for the fresh-tuna longline fishery of Taiwan,China account for 27% of the total catches of albacore in the Indian Ocean (average catch 2010–12). Although the Secretariat has obtained catch-and-effort data for this fishery in recent years (2007–12), and estimates of total catch since 2000, the catches of albacore before 2000 were estimated using data from alternative sources, including port sampling schemes, and information on the activities of fresh-tuna longliners in coastal countries of the Indian Ocean.
- **Longline** fisheries of **India, Malaysia, Oman, and Philippines**: The catches of albacore estimated for the longline fisheries of India, Malaysia, Oman, and Philippines are uncertain, with current estimates accounting for 3% of the total catches of albacore in the Indian Ocean in recent years (average catch 2010–12). Although catch-and-effort data are available for some of these fleets, they are usually incomplete and fall short of the IOTC standards.
- **Drifting gillnet** fisheries of **I.R. Iran and Pakistan**: Both I.R. Iran and Pakistan have reported nil catches of albacore for their fisheries. To date, the IOTC Secretariat has not received catch-and-effort data for these fisheries which compromises the ability of the IOTC Secretariat to assess the amount of gillnet effort exerted by these fisheries in areas where catches of albacore may occur.

2. **Size data from All Fisheries:**

- **Driftnet** of **Taiwan,China**: No size data available over the entire period of activity of the fishery (1982–92).
- **Longline** fishery of **Indonesia**: Indonesia has reported size frequency data for its fresh-tuna longline fishery for some years. However, data are not available for 2010–12 and, where available, the samples cannot be fully disaggregated by month and fishing area (5x5 grid) and refer mostly to the component of the catch that is unloaded fresh. The quality of the samples in the IOTC database is for this reason uncertain.
- **Fresh-tuna longline** fishery of **Taiwan,China**: While Taiwan,China has provided length frequency data of albacore since 2010, the levels of coverage remain very low, under the minimum recommended by the IOTC.
- **Longline** fishery of **Japan**: The number of samples reported and total number of fish sampled for the longline fishery of Japan since 2000 has been very low.
- Longline fisheries of **India, Malaysia, Oman, and Philippines**: To date, none of these countries has reported size frequency data of albacore.

3. **Biological data:**

- Industrial **longline** fisheries, in particular **Taiwan,China, Indonesia, and Japan**: The IOTC Secretariat had to use length-age keys, length-weight keys, and processed weight-live weight keys for albacore from other oceans due to the general paucity of biological data available from the fisheries indicated.

³ <http://www.iotc.org/documents/report-review-catches-albacore-fisheries-indonesia>

NERITIC TUNAS: Extract from IOTC–2014–WPNT04–07 Rev_1

The following list is provided by the IOTC Secretariat for the consideration of the WPNT. The list covers the main issues which the IOTC Secretariat considers affect the quality of the statistics available at the IOTC, by type of dataset and type of fishery.

1. Catch-and-Effort data from Coastal Fisheries:

- **Coastal fisheries of Yemen, Madagascar, Mozambique, and Myanmar:** The catches of neritic tunas for these fisheries have been estimated by the IOTC Secretariat in recent years. The quality of the estimates is thought to be poor due to the paucity of the information available about the fisheries operating in these countries.
- **Coastal fisheries of Sri Lanka, Indonesia, India, Oman, Thailand and Malaysia:** These countries do not fully report catches of neritic tunas by species and/or gear, as per the IOTC standards. The IOTC Secretariat allocated catches by gear and species where necessary. In the case of Indonesia, Thailand and Malaysia, the IOTC Secretariat – in collaboration with BOBLME and OFCF – are currently engaged in projects and data mining activities to improve the quality of data collected and estimation of catch-and-effort for fisheries targeting neritic species in each of the three countries.

2. Catch-and-Effort data from Surface and Longline Fisheries:

- **Drifting gillnet fisheries of I.R. Iran and Pakistan, and Gillnet and Longline fishery of Sri Lanka:** A substantial component of these fleets operate in offshore waters, including waters beyond the EEZs of the flag countries concerned. Although all countries have reported total catches of neritic tunas, they have not reported catch-and-effort data as per the IOTC standards.
- **All industrial tuna purse seine fisheries:** The total catches of frigate tuna, bullet tuna and kawakawa reported for industrial purse seine fleets are considered to be very incomplete, as they do not account for all catches retained onboard and do not include amounts of neritic tuna discarded⁴. The same applies to catch-and-effort data.
- **Discard levels for all fisheries:** The total amount of neritic tunas discarded at sea remains unknown for most fisheries and time periods, other than EU purse seine fisheries during 2003–07.

3. Size data from All Fisheries:

- **Coastal fisheries of Sri Lanka, Indonesia, India, Oman, Thailand, Malaysia, Yemen, Madagascar, Mozambique, and Myanmar:** None of these countries has reported length frequency data for neritic tuna species in recent years.
- **Drifting gillnet fisheries of I.R. Iran and Pakistan, and Gillnet and Longline fishery of Sri Lanka:** A substantial component of these fleets operate in offshore waters, including waters beyond the EEZs of the flag countries concerned. Although all countries have reported total catches, and I.R. Iran and Sri Lanka have provided some data on the sizes of neritic tunas caught by their fisheries, the length frequency data has not been provided as per the IOTC standards.
- **All industrial tuna purse seine fisheries:** There is a generalised lack of length frequency data of neritic tuna species retained catches and discards from industrial purse seine vessels, in particular frigate tuna, bullet tuna and kawakawa (all purse seine fleets).

4. Biological data for all tropical tuna species:

- **All fisheries:** There is a generalised lack of biological data for most neritic tuna species in the Indian Ocean, in particular the basic data that would be used to establish length-weight-age keys, non-standard measurements-fork length keys and processed weight-live weight keys for these species.

⁴ This information is available for purse seiners operating under EU flags for 2003-07, as estimated using data collected by observers.

BILLFISH: *Extract from IOTC–2014–WPB12–07 Rev_2*

The following list is provided by the Secretariat for the consideration of the WPB. The list covers the main issues which the Secretariat considers to negatively affect the quality of the statistics available at the IOTC, by type of dataset and fishery.

1. Catch-and-Effort data from Artisanal Fisheries:

- **Drifting gillnet** fisheries of **I.R. Iran** and **Pakistan**: In recent years I.R. Iran has reported catches of marlins and swordfish for its gillnet fishery, including catches for the years 2012 and 2013. The IOTC Secretariat used the new catches reported by I.R. Iran to re-build the historical series of catches of billfish for its offshore gillnet fishery. In addition, the catches reported by Pakistan for recent years, including swordfish and black marlin, differ markedly from alternative estimates received by the IOTC Secretariat. In recent years both fisheries have reported catches of billfish at around 20,000 t (20% of the total catches). Catches for this component remain very uncertain.
- **Gillnet/longline** fishery of **Sri Lanka**: In recent years Sri Lanka has caught over 10% of the catches of marlins in the Indian Ocean. Although Sri Lanka has reported catches of marlins by species for its gillnet/longline fishery, the catch ratio of blue marlin to black marlin has changed dramatically over time. This is thought to be a sign of frequent misidentification rather than the effect of changes in catch rates for this fishery. Although the IOTC Secretariat adjusted the catches of marlins using proportions derived from years with good monitoring of catches by species, the catches estimated remain uncertain.
- **Artisanal** fisheries of **Indonesia**: The catches of billfish reported by Indonesia for its artisanal fisheries in recent years are considerably higher than those reported in the past, and represent around 5% of the total catches of billfish in the Indian Ocean. In 2011 the Secretariat revised the complete nominal catch dataset for Indonesia, using information from various sources, including official reports. However, the quality of the dataset for the artisanal fisheries of Indonesia is thought to be poor, with a likely underestimation of catches of billfish in recent years.
- **Artisanal** fisheries of **India**: In early 2012 the IOTC Secretariat revised the complete nominal catch dataset for India, using new information available. The catches of billfish estimated in recent years represent around 8% of the total catches in the Indian Ocean, and refer mainly to Indo-Pacific sailfish and black marlin. To date, India has not reported catch-and-effort data for its artisanal fisheries.

2. Catch-and-Effort data from Sport Fisheries:

- **Sport** fisheries of **Australia, EU,France(Reunion), India, Indonesia, Madagascar, Mauritius, Oman, Seychelles, Sri Lanka, Tanzania, Thailand** and **UAE**: To date, no data have been received from any of the referred sport fisheries. Sport fisheries are known to catch billfish species, in particular blue marlin, black marlin and Indo-Pacific sailfish. Although data are available from other sport fisheries in the region (Kenya, Mauritius, Mozambique, South Africa), this information cannot be used to estimate levels of catch for other fisheries.

3. Catch-and-Effort data from Industrial Fisheries:

- **Longline** fishery of **Indonesia**: The catches of swordfish and marlins for the fresh tuna longline fishery of Indonesia may have been underestimated in the past due to them not being sampled sufficiently in port and to the lack of logbook data from which to derive estimates. The catches of billfish estimated in recent years (all species combined) represent around 10% of the total catches in the Indian Ocean, especially swordfish and blue marlin. Catches for this component are highly uncertain.
- **Longline** fishery of **India**: In recent years, India has reported very incomplete catches and catch-and-effort data for its commercial longline fishery. The IOTC Secretariat has estimated total catches for this period using alternative sources, the final catches estimated considerably higher than those reported (representing 2% of the total catches of billfish in recent years).
- **Longline** fishery of the **Rep. of Korea**: The nominal catches and catch-and-effort data series for billfish for the longline fishery of Rep. of Korea are conflicting, with nominal catches of swordfish and marlins lower than the catches reported as catch-and-effort for some years. Although in 2010 the IOTC Secretariat revised the nominal catch dataset to account for catches reported as catch-and-effort, the quality of the estimates remains unknown. However, the catches of longliners of the Rep. of Korea in recent years are very small.
- **Longline** fishery of **EU,Spain**: To date, the IOTC Secretariat has not received catch-and-effort data in the format required for time/area for billfish for the longline fishery of EU,Spain.

- **Purse seine** fisheries of **Seychelles, Thailand, I.R. Iran** and **Japan**: To date, the referred countries have not reported catches of billfish from purse seiners, although they are thought to be very low.

4. Size data from All Fisheries:

- Size data for all billfish species is generally considered unreliable and insufficient to be of use for stock assessment purpose, as sampling numbers for all species are below the minimum sampling coverage one fish per tonne of catch recommended by IOTC; and the quality of the samples collected by fishermen on commercial boats cannot be verified.
- **Longline** fishery of **Taiwan,China**: Size data have been available for the longline fishery of Taiwan,China since 1980; however, the IOTC Secretariat has identified some issues in the length frequency distributions, in particular fish recorded under various types of size class bins (e.g. 1cm, 2cm, 10cm, etc.) all reported under a unique class bin (e.g. 2cm, with all fish between 10-20 cm reported as 10-12cm). For this reason, the average weights estimated for this fishery are considered unreliable.
- **Gillnet** fisheries of **Iran** and **Pakistan**: To date, Iran and Pakistan have not reported size frequency data for their gillnet fisheries.
- **Gillnet/longline** fishery of **Sri Lanka**: Although Sri Lanka has reported length frequency data for swordfish and marlins in recent years, the lengths reported are considered highly uncertain, due to misidentification of marlins and likely sampling bias (large specimens of swordfish and marlins are highly processed and not sampled for length, while small specimens are sampled).
- **Longline** fisheries of **India** and **Oman**: To date, India and Oman have not reported size frequency data for their commercial longline fisheries.
- **Longline** fishery of **Indonesia**: Indonesia has reported size frequency data for its fresh-tuna longline fishery in recent years. However, the samples cannot be fully disaggregated by month and fishing area (5x5 grid) and refer mostly to the component of the catch that is unloaded fresh. The quality of the samples in the IOTC database is for this reason uncertain.
- **Fresh-tuna longline** fishery of **Taiwan,China**⁵: Data are only available for striped marlin and swordfish for the year 2010, with no size data available for other species or years.
- **Longline** fishery of **Japan**: The number of samples reported and total number of fish sampled for the longline fishery of Japan since 2000 has been very low.
- **Artisanal** fisheries of **India** and **Indonesia**: To date, India and Indonesia have not reported size frequency data for their artisanal fisheries.

5. Biological data for all billfish species:

- Industrial **longline** fisheries, in particular **Taiwan,China, Indonesia, EU, China** and the **Rep. of Korea**: The Secretariat had to use length-age keys, length-weight keys, and processed weight-live weight keys for billfish species from other oceans due to the general paucity of biological data available from the fisheries indicated.
- Industrial **longline** fisheries, in particular **Taiwan,China, Indonesia, EU, and China**: There has not been regular reporting of length frequency data by sex from any of the referred fisheries.

⁵ Refers to Taiwan Province of China.

TROPICAL TUNAS: Extract from IOTC–2013–WPTT15–07 Rev_2

The following list is provided by the Secretariat for the consideration of the WPTT. The list covers the main issues which the Secretariat considers affect the quality of the statistics available at the IOTC, by type of dataset and type of fishery.

1. Catch-and-Effort data from Coastal Fisheries:

- **Drifting gillnet fishery of Iran:** In 2013 Iran reported catches of bigeye tuna for its drifting gillnet fishery for the first time, for the years 2012 and 2013. Although Iran has reported catches of yellowfin tuna and skipjack tuna (average catches at around 60,000 t during 2008–12) it has not reported catch-and-effort data as per the IOTC standards, in particular for those vessels that operate outside of its EEZ. In addition, the IOTC Secretariat estimated catches of bigeye tuna for Iran for years before 2012, assuming various levels of activity of vessels using driftnets on the high seas, depending on the year, and catch ratios bigeye tuna:yellowfin tuna recorded for industrial purse seiners on free-swimming tuna schools in the northwest Indian Ocean. Catches of bigeye tuna were estimated for the period 2005–11, at around 700 t per year.
- **Drifting gillnet fishery of Pakistan:** To date, Pakistan has not reported catches of bigeye tuna for its gillnet fishery, although a component of the fleet is known to operate on the high seas, where catches of bigeye tuna are reported by other fleets operating the same area. In addition, Pakistan has not reported catch-and-effort data for its drifting gillnet fishery, in particular for those vessels that operate outside its EEZ. The IOTC Secretariat did not estimate catches of bigeye tuna for Pakistan. Pakistan reported catches of yellowfin tuna and skipjack tuna at around 9,500 t per year during 2008–13.
- **Gillnet/longline fishery of Sri Lanka:** Although Sri Lanka has reported catches of bigeye tuna for its gillnet/longline fishery the catches are considered to be too low (average catches at around 560 t during 2008–12). This is probably due to the mislabelling of catches of bigeye tuna as yellowfin tuna. The IOTC Secretariat estimated catches of bigeye tuna for Sri Lanka in 2012 with recent catches estimated at around 2,500 t per year. In addition, Sri Lanka has not reported catch-and-effort data as per the IOTC standards, including separate catch-and-effort data for longline and gillnet and catch-and-effort data for those vessels that operate outside its EEZ.
- **Pole-and-line fishery of Maldives:** Although the pole-and-line fishery of Maldives catches bigeye tuna, up to 2013 both yellowfin tuna and bigeye tuna were aggregated and reported as yellowfin tuna. The IOTC Secretariat has previously used the proportion of bigeye tuna in samples collected in the Maldives in the past to break the catches of yellowfin tuna, into yellowfin tuna and bigeye tuna, per year, with average catches of bigeye tuna estimated at around 850 t per year – although Maldives is currently developing more accurate estimates of catches of bigeye tuna based on tagging releases during the Regional Tuna Tagging Project.
- **Coastal fisheries of Indonesia, Madagascar, Sri Lanka (other than gillnet/longline) and Yemen:** The catches of tropical tunas for these fisheries have been estimated by the IOTC Secretariat in recent years. The quality of the estimates is thought to be very poor due to the paucity of the information available about the fisheries operating in these countries. Since June 2014 the Directorate General for Capture Fisheries of Indonesia has been receiving support from BOBLME/OFCF and the IOTC for the implementation of Pilot sampling in North Sumatra and West Sumatra. The main goal is to assist Indonesia in the implementation of provisions of the IOTC Regional Observer Scheme for its artisanal fisheries, in particular to achieve the levels of coverage agreed by the Commission (sampling of at least 5% of the fishing activities). It is expected that Indonesia takes over sampling in North and West Sumatra at the end of the Project and considers extending sampling to other provinces in the Indian Ocean in the near future.
- **Coastal fisheries of Comoros:** In 2011-12 the IOTC and the OFCF provided support to the strengthening of data collection for the fisheries of Comoros, including a Census of fishing boats and the implementation of sampling to monitor the catches unloaded by the fisheries in selected locations over the coast. The IOTC Secretariat and the *Centre National de ressources Halieutiques* of Comoros derived estimates of catch using the data collected and the new catches estimated are at around half the values reported in the past by Comoros (around 5,000 t per year instead of 9,000 t). The IOTC Secretariat revised estimates of catch for the period 1995-2010 using the new estimates.

2. Catch-and-Effort data from Surface and Longline Fisheries:

- **Longline fishery of India:** In the past India informed the IOTC that it had not reported catches and catch-and-effort data for all of its commercial longline fishery, as a component of its longline fleet had not provided this information.. Although in recent years levels of reporting are improving, the IOTC Secretariat had to derive scientific estimates of catch for the component of the fleet not reporting catches, with total catches of tropical tunas at around 4,000 t per year (average for 2008-12).

- **Longline fisheries of Indonesia and Malaysia:** Indonesia and Malaysia have not reported catches for longliners under their flag that are not based in their ports. In addition Indonesia has not reported catch-and-effort data for its longline fishery to date.
- **Industrial tuna purse seine fishery of Iran:** Although Iran has reported catch-and-effort data for its purse seine fishery in recent years, data are not as per the IOTC standards.
- **Discard levels for all fisheries:** The total amount of tropical tunas discarded at sea remains unknown for most fisheries and time periods. Discards of tropical tunas are thought to be significant during some periods on industrial purse seine fisheries using fish aggregating devices (FADs) and may also be high due to depredation of catches of longline fisheries, by sharks or marine mammals, in tropical areas.

3. Size data from All Fisheries:

- **Longline fisheries of Japan and Taiwan,China:** In 2010, the IOTC Scientific Committee identified several issues concerning the size frequency statistics available for Japan and Taiwan,China, which remain unresolved. In 2013 the IOTC Secretariat presented a paper to WPTT-15 documenting the current data quality issues and inconsistencies between the length frequency data and catch-and-effort reported in particular by Taiwan,China since the mid-2000s⁶. The WPTT recommended an inter-sessional meeting attached to the WPDCS and WPM on *data collection and processing systems for size data from the main longline fleets in the Indian Ocean*, be carried out in early 2014. Arrangements and timing for the inter-sessional meeting are in the process of being confirmed.
- In addition, the number of specimens sampled for length onboard longliners flagged in Japan in recent years remains under the minimum recommended by the IOTC, which is at least 1 fish per metric ton of catch measured for length (0.06 fish per metric ton of catch for all tropical tuna species combined).
- **Gillnet fisheries of Iran and Pakistan:** Even though both countries have reported size frequency data for its gillnet fisheries in recent years, data are not reported by geographic area and the numbers measured are under the minimum sample size recommended by the IOTC (0.16 fish measured per metric ton of catch for Iran and 0.02 for Pakistan).
- **Longline fisheries of India and Oman:** To date, these countries have not reported size frequency data for their longline fisheries.
- **Gillnet/longline fishery of Sri Lanka:** Although Sri Lanka has reported length frequency data for tropical tunas in recent years, sampling coverage is below recommended levels (0.17 fish measured per metric ton of catch) and lengths are not available by gear type or fishing area⁷.
- **Longline fisheries of Indonesia and Malaysia:** Indonesia and Malaysia have reported some size frequency data for its fresh-tuna longline fishery in recent years. However, the samples cannot be fully broken by month and fishing area (5x5 grid) and they refer exclusively to longliners based in ports in those countries.
- **Coastal fisheries of India, Indonesia and Yemen:** To date, these countries have not reported size frequency data for their coastal fisheries, although in the case of Indonesia size data is currently being collected by DGCF through the IOTC-OFCF, and BOBLME pilot sampling project and may be available in 2015. In addition size samples are also being collected in Indonesia in collaboration with CSIRO and USAID.

4. Biological data for all tropical tuna species:

- Surface and longline fisheries, in particular **Taiwan,China, Indonesia, Japan, and China:** The IOTC database does not contain enough data to allow for the estimation of statistically robust length-weight or non-standard size to standard length keys for tropical tuna species due to the general paucity of biological data available from the Indian Ocean. A summary of the current biological length-weight equations and availability of alternative sources are documented in Appendix II for the consideration of the WPTT, following the recommendation of the SC.

⁶ See IOTC Secretariat, IOTC-2013-WPTT15-41 Rev_1, for more details.

⁷ In 2012-13 the Ministry of Fisheries and Aquatic Resources Development of Sri Lanka received support from IOTC, the OFCF and BOBLME to strengthen its data collection and processing system, including collection of more length frequency data from the fisheries.

SHARKS AND OTHER BYCATCH: *Extract from IOTC–2014–WPEB10–07 Rev_1***General issues**

There are a number of key issues with the data that are apparent from this summary (discussed below). The main consequence of this is that the estimation of total catches of sharks in the Indian Ocean is compromised by the paucity of the data available.

Unreported catches

Although some fleets have been operating since 1950, there are many cases where historical catches have gone unreported as many countries were not collecting fishery statistics in years prior to 1970. It is therefore thought that important catches of sharks might have gone unrecorded in several countries. There are also a number of fleets which are still not reporting on their interactions with bycatch species, despite fleets using similar gears reporting high catch rates of bycatch.

Some fleets have also been noted to report catches by species only for those that have been specifically identified by the Commission and do not report catches of other species even in aggregate form. This creates problems for the estimation of total catches of all sharks and for attempts to apportion aggregate catches into species groups at a later date. The changing requirements for species-specific reporting also complicates the interpretation of these data.

Errors in reported catches

For the fleets that do report interactions, there are a number of issues with these estimates. The estimates are sometimes based on retained catches rather than total catches, and so if discarding is high then this is a major source of error. Errors are also introduced due to the processing of the retained catches that is undertaken. This creates problems for calculating total weight or numbers, as sometimes dressed weight might be recorded instead of live weights. For high levels of processing, such as finning where the carcasses are not retained, the estimation of total live weight is extremely difficult.

Poor resolution of data

Historically, shark catches have not been reported by species but simply as an aggregated total, however, the proportion of catches reported by species has increased substantially in recent years. Misidentification of shark species is also common. Processing creates further problems for species identification, requiring a high level of expertise and experience in order to be able to accurately identify specimens, if at all. The level of reporting by gear type is much higher and catches reported with no gear type allocated form a small proportion of the total.

The following list covers the main issues which the IOTC Secretariat considers affect the quality of the statistics available at the IOTC, by species group, type of dataset and type of fishery.

SHARKS**4. Catch-and-Effort data from gillnet fisheries:**

- Drifting gillnet fisheries of Iran and Pakistan: To date, Iran and Pakistan have not reported catches of sharks, by species, for their gillnet fisheries.
- Gillnet/longline fishery of Sri Lanka: Sri Lanka has not reported catch-and-effort data for sharks as per the IOTC standards.
- Driftnet fishery of Taiwan,China (1982–92): Catch-and-effort data does not include catches of sharks by species.

5. Catch-and-Effort data from Longline Fisheries:

- Historical catches of sharks from major longline fisheries: To date, Japan, Taiwan,China, Indonesia and Rep. of Korea, have not provided estimates of catches of sharks, by species, for years before 2006.
- Fresh-tuna longline fisheries of Indonesia and Malaysia: Indonesia and Malaysia have not reported catches of sharks by IOTC standards for longliners under their flag. In addition Indonesia has not reported catch-and-effort data for its longline fishery to date.
- Freezing longline fisheries of EU-Spain, India, Indonesia, Malaysia, and Oman: These countries have not reported catch-and-effort data of sharks by species for longliners under their flag.

6. Catch-and-Effort data from coastal fisheries:

- Coastal fisheries of India, Indonesia, Madagascar, Sri Lanka and Yemen: To date, these countries have not provided detailed catches of sharks to the IOTC, in particular Thresher and other pelagic shark species caught by their coastal fisheries.

7. Discard levels from surface and longline fisheries:

- Discard levels of sharks from major longline fisheries: To date the EU(Spain), Japan and Indonesia, have not provided estimates of total discards of sharks, by species, in particular thresher sharks and oceanic whitetip sharks, although the EU, Japan and Rep. of Korea are reporting observer data.
- Discard levels of sharks for industrial purse seine fisheries: To date, the European Union (before 2003), Iran, Japan, Seychelles, and Thailand, have not provided estimates of total quantities of discards of sharks, by species, for industrial purse seiners under their flag, although the EU and Japan are reporting observer data.

8. Size frequency data:

- Gillnet fisheries of Iran and Pakistan: To date, Iran and Pakistan have not reported size frequency data for their driftnet fisheries.
- Longline fisheries of India, Malaysia, Oman and Philippines: To date, these countries have not reported size frequency data for their longline fisheries, including length frequency of discards of thresher sharks.
- Coastal fisheries of India, Indonesia, Madagascar, Sri Lanka and Yemen: To date, these countries have not reported size frequency data for their coastal fisheries.

9. Biological data:

- Surface and longline fisheries, in particular China, Taiwan,China, Indonesia and Japan: The Secretariat had to use length-age keys, length-weight keys, ratios of fin-to-body weight, and processed weight-live weight keys for sharks from other oceans due to the general paucity of biological data available from the Indian Ocean.

OTHER BYCATCH**1. Incidental catches of SEABIRDS:**

- Longline fisheries operating in areas with high densities of seabirds. Seychelles has not reported incidental catches of seabirds for longliners under their flag.

2. Incidental catches of MARINE TURTLES:

- Gillnet fisheries of Pakistan: to date, there have been no reports on incidental catches of marine turtles for the driftnet fisheries.
- Longline fisheries of Malaysia, Oman, Philippines, and Seychelles: To date, these countries have not reported incidental catches of marine turtles for their longline fisheries.
- Purse seine fisheries of the EU (excluding 2003–07 and EU-France), Iran, Japan, Seychelles, and Thailand: To date these countries have not reported incidental catches of marine turtles for their purse seine fisheries, including incidental catches of marine turtles on Fish Aggregating Devices.