Report of the 15th Session of the IOTC Working Party on Data Collection and Statistics

Karachi, Pakistan, 27-30 November 2019

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ACRONYMS

AIS	Automatic Identification System
ALB	Albacore
ABNJ	Areas Beyond National Jurisdiction
BET	Bigeye tuna
BLM	Black marlin
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CMM	Conservation and Management Measure (of the IOTC; Resolutions and Recommendations)
CPCs	Contracting parties and cooperating non-contracting parties of the IOTC
CPUE	Catch Per Unit of Effort
DGCF	Directorate General of Capture Fisheries (Indonesia)
DFAD	Drifting FAD
DFAR	Department of Fisheries and Aquatic Resources (Sri Lanka)
DOI	Digital Object Identifier
EEZ	Exclusive Economic Zone
EMS	Electronic Monitoring System
ERA	Ecological Risk Assessment
EU	European Union
FAD	Fish aggregating device
FAO	Food and Agriculture Organization of the UN
FOB	Floating OBject
GEF	Global Environmental Facility
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IFREMER	Institut Francais de Recherche pour l`Exploitation de la Mer (EU,France)
IOC	Indian Ocean Commission
IOTC	Indian Ocean Tuna Commission
IRD	Institut de Recherche pour le Développement (EU,France)
I.R. Iran	Islamic Republic of Iran
ISSF	International Seafood Sustainability Foundation
MMAF	Ministry of Marine Affairs and Fisheries (Indonesia)
NARA	National Aquatic Resources Research and Development Agency (Sri Lanka)
OFCF	Overseas Fishery Cooperation Foundation (Japan)
OPAGAC	Organización de Productores de Atún Congelado (EU,Spain)
PET	Protected, Endangered and Threatened species
RFMO	Regional Fisheries Management Organization
ROS	Regional Observer Scheme
SFA	Seychelles Fishing Authority (Seychelles)
SSI	Species of Special Interest
Taiwan,China	Taiwan Province of China
USTA	Unité Statistique Thonière d'Antsiranana (Madagascar)
VMS	Vessel Monitoring System
WPB	Working Party on Billfish of the IOTC
WPDCS	Working Party on Data Collection and Statistics of the IOTC
WPEB	Working Party on Ecosystems and Bycatch of the IOTC
WPTmT	Working Party on Temperate Tunas of the IOTC
WPNT	Working Party on Neritic Tunas of the IOTC
WPTT	Working Party on Tropical Tunas of the IOTC
WCPFC	Western and Central Pacific Fisheries Commission
WWF	World Wide Fund for nature
YFT	Yellowfin tuna

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.

HOW TO INTERPRET TERMINOLOGY CONTAINED IN THIS REPORT

Level 1: ***From a subsidiary body of the Commission to the next level in the structure of the Commission:***
RECOMMENDED, RECOMMENDATION: Any conclusion or request for an action to be undertaken, from a subsidiary body of the Commission (Committee or Working Party), which is to be formally provided to the next level in the structure of the Commission for its consideration/endorsement (e.g. from a Working Party to the Scientific Committee; from a Committee to the Commission). The intention is that the higher body will consider the recommended action for endorsement under its own mandate, if the subsidiary body does not already have the required mandate. Ideally this should be task specific and contain a timeframe for completion.

Level 2: ***From a subsidiary body of the Commission to a CPC, the IOTC Secretariat, or other body (not the Commission) to carry out a specified task:***
REQUESTED: This term should only be used by a subsidiary body of the Commission if it does not wish to have the request formally adopted/endorsed by the next level in the structure of the Commission. For example, if a Committee wishes to seek additional input from a CPC on a particular topic, but does not wish to formalize the request beyond the mandate of the Committee, it may request that a set action be undertaken. Ideally this should be task specific and contain a timeframe for the completion.

Level 3: ***General terms to be used for consistency:***
AGREED: Any point of discussion from a meeting which the IOTC body considers to be an agreed course of action covered by its mandate, which has not already been dealt with under Level 1 or level 2 above; a general point of agreement among delegations/participants of a meeting which does not need to be considered/adopted by the next level in the Commission's structure.
NOTED/NOTING: Any point of discussion from a meeting which the IOTC body considers to be important enough to record in a meeting report for future reference.

Any other term: Any other term may be used in addition to the Level 3 terms to highlight to the reader of and IOTC report, the importance of the relevant paragraph. However, other terms used are considered for explanatory/informational purposes only and shall have no higher rating within the reporting terminology hierarchy than Level 3, described above (e.g. **CONSIDERED**; **URGED**; **ACKNOWLEDGED**).

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EXECUTIVE SUMMARY

The 15th Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Data Collection and Statistics (WPDCS) was held in Karachi, Pakistan, from the 27th to the 30th of November 2019. A total of **41** participants attended the Session.

The following are a subset of the complete recommendations and decisions from the WPDCS15 to the Scientific Committee, which are provided at Appendix VI.

Alternative approaches to the revision of official species composition for the Spanish log-associated catch-and-effort data for tropical tuna species in 2018

WPDCS15.01 (para. 61) The WPDCS **RECOMMENDED** that a data preparatory meeting be organized prior to the Working Party on Tropical Tunas in order to ensure sufficient time is dedicated to resolving issues with the quality and preparation of the input data for the stocks assessments.

Revision of the WPDCS Program of work (2019–2023)

WPDCS15.02 (para. 182): The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2020–2024), as provided at Appendix V.

Review of the draft, and adoption of the report of the 15th Session of the WPDCS

WPDCS15.03 (para. 190): The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS15, provided at Appendix VI.

1. OPENING OF THE MEETING

1. The 15th Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Data Collection and Statistics (WPDCS15) was held in Karachi, Pakistan from the 27th to the 30th of November 2019. A total of **41** participants (55 in 2018, 45 in 2017, 32 in 2016, 20 in 2015) attended the Session. The list of participants is provided at Appendix I. The meeting was opened on 27th of November 2019 by the Chairperson, Mr. Stephen Ndegwa (Kenya) and Capt. (R) Jamil Ahmad Khan, the Parliamentary Secretary for the Ministry of Maritime Affairs, Pakistan, who welcomed participants to Karachi.

2. ADOPTION OF THE AGENDA AND ARRANGEMENT FOR THE SESSION

2. The WPDCS **ADOPTED** the Agenda provided at Appendix II. The documents presented to the WPDCS15 are listed in Appendix III.

3. The WPDCS **NOTED** the statement provided by the Republic of Mauritius attached to this report as Appendix VII.

3. THE IOTC PROCESS: OUTCOMES, UPDATES AND PROGRESS

3.1 OUTCOMES OF THE 21ST SESSION OF THE SCIENTIFIC COMMITTEE AND OF THE 23RD SESSION OF THE COMMISSION

4. The WPDCS **NOTED** paper IOTC–2019–WPDCS15–03 which outlined the main outcomes of the 21st Session of the Scientific Committee (SC21), specifically related to the work of the WPDCS.

5. The WPDCS **NOTED** that in 2018, the SC made a number of requests in relation to the WPDCS14 report (noting that updates on Recommendations of the SC21 are dealt with under Agenda item 3.3). Some of those requests and the associated responses from the WPDCS15 are provided below for reference.

- (Para 165) The SC noted a number of issues that may prevent observers from collecting data on all fishing operations. Specifically, the SC noted that it is not possible for some CPCs to check hook by hook information for catch and bycatch.

Response: the WPDCS **NOTED** that hook by hook observation is not necessarily required, as long as coverage through observers onboard longline vessels can reach the minimum prescribed value of 5% of all fishing effort (hooks deployed).

Electronic monitoring systems

- (Para 167) The SC noted results presented to WPDCS14 on tools such as EM that can be used to collect and verify catch data.

Response: the WPDCS **NOTED** that a trial project on the implementation of EM onboard Sri Lanka 4 coastal longline and 2 gillnet-longline vessels is currently ongoing, and that the results from the project will be used to inform the WPDCS about potential standards for implementation, collection and verification of ROS data requirements through crew-based data collection protocols and EM systems for vessels under 24 m LOA. The WPDCS also **NOTED** that Pakistan and I.R. Iran expressed their interest in implementing similar EM trial projects in the future.

Regional Observer Scheme Minimum Standard Data Fields

- (Para 170) The SC noted that there is a lack of data for small-scale fisheries that are currently unable to deploy human observers and other means of data collection are required. The SC requested the WPDCS to continue to evaluate the validity of alternative data collection tools to onboard human observers (such as the use of crew as observers (i.e. self-sampling), electronic monitoring (e.g. cameras) and port sampling), and combinations of these, as potential alternatives to onboard human observer coverage for the collection of the minimum standard data fields for small-scale fisheries. The SC acknowledged that the results of the ROS should inform this evaluation.

Response: the WPDCS **NOTED** that further studies are needed to evaluate the effectiveness and feasibility of using a combination of multiple data collection mechanisms (self-sampling, electronic monitoring, port sampling etc.) as a potential alternative to ROS data collection through onboard human observers. The WPDCS also **ACKNOWLEDGED** that the SC recommended the Commission to adopt the minimum standard data fields endorsed by the WPDCS14, and that these have been used to revise the training and supporting material for the ROS Pilot Project.

Species of special interest

- (Para 171) For the purpose of improving the voluntary collection of information on the post release mortality of discarded species of special interest, the SC considered and endorsed the list of species considered of special interest as proposed by the expert workshop and reported in Appendix VIII of the WPDCS14 report, noting that the SC agreed to simplify the list according to Appendix 6b.
- (Para 172) The Secretariat clarified that these fields for species of special interest are voluntary and are for encouraging better reporting where this is possible.

Response: none.

ROS draft programme standards

- (Para 173) The SC noted the *draft Programme Standards and Guidelines* developed by the ROS Expert Workshop and that there was insufficient time during the meeting as well as a lack of appropriate expertise to fully review these standards. Therefore, the SC requested that the Secretariat work with CPCs and the Compliance Committee to consolidate feedback on scientific and operational aspects of the *draft programme standards*.

Response: the WPDCS **NOTED** that the Commission endorsed the IOTC Regional Observer Scheme (ROS) standards in principle in order for the Secretariat to further comments can be made, and that the standards will be reviewed based on these comments and other feedback made during the implementation phase.

FAD data

- (Para 175) The SC noted concerns around the ongoing paucity of FAD data being requested from CPCs and urged that progress is made towards this issue. The SC further noted that the WPTT20 recommended the harmonisation of FAD category definitions. It was noted that there is a meeting between different RFMOs on FADs which would discuss terminology differences used in different RFMOs. IOTC will participate in this meeting and the outputs from this will help inform harmonisation. The SC further noted that ICCAT has already accepted standard definition terms. The SC suggested that the IOTC Secretariat provide additional resources to CPCs looking to provide FAD data.

  Response: the WPDCS **NOTED** that this topic was discussed at the 21st session of the Working Party on Tropical Tunas (WPTT21, 2019) which in turn encouraged the re-activation of the ad-hoc FAD working group to specifically target this important issue.

6. The WPDCS **NOTED** paper IOTC–2019–WPDCS15–04 which outlined the main outcomes of the 23rd Session of the Commission, specifically related to the work of the WPDCS and **AGREED** to consider how best to provide the Scientific Committee with the information it needs, in order to satisfy the Commission's requests, throughout the course of the current WPDCS meeting.

7. The WPDCS **NOTED** the 7 Conservation and Management Measures (CMMs) adopted at the 23rd Session of the Commission (consisting of 7 Resolutions and 0 Recommendation) as listed below:

IOTC Resolutions

- Resolution 19/01 *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC Area of competence*.
- Resolution 19/02 *Procedures on a fish aggregating devices (FADs) management plan, including a limitation on the number of fads, more detailed specifications of catch reporting from fad sets, and the development of improved fad designs to reduce the incidence of entanglement of non-target species*.
- Resolution 19/03 *On the conservation of mobulid species caught in association with fisheries in the IOTC Area of Competence*.
- Resolution 19/04 *Concerning the IOTC Record of Vessels Authorised to operate in the IOTC Area of Competence*.
- Resolution 19/05 *On a ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna, and non-targeted species caught by purse seine vessels in the IOTC Area of Competence*.
- Resolution 19/06 *On establishing a programme for transhipment by large-scale fishing vessels*.
- Resolution 19/07 *On vessel chartering in the IOTC Area of Competence*.

8. The WPDCS **NOTED** that pursuant to Article IX.4 of the IOTC Agreement, the above mentioned Conservation and Management Measures became binding on Members, 120 days from the date of the notification communicated by the IOTC Secretariat.

9. Participants to WPDCS15 were **ENCOURAGED** to familiarise themselves with the adopted Resolutions, especially those most relevant to the WPDCS.

10. **NOTING** that the Commission also made a number of general comments and requests on the recommendations made by the Scientific Committee in 2018, which have relevance for the WPDCS (details as follows: paragraph numbers refer to the draft report of the Commission (IOTC–2019–S23–R)) the WPDCS **AGREED** that any advice to the Commission would be provided in the relevant sections of the report below.

(Para 28) The Commission NOTED that 7 Contracting Parties and 1 Cooperating Non-Contracting Party did not submit a National Report to the Scientific Committee in 2018, and issues with lack of data and poor-quality data persist. The Commission REITERATED its concerns about the lack and poor quality of data, and again, strongly ENCOURAGED CPCs to take immediate steps to review, and where necessary, improve their performance with respect to the provision of data through improved compliance with Resolutions 15/01 On the recording of catch and effort data by fishing vessels in the IOTC area of competence, and 15/02 Mandatory statistical reporting requirements for IOTC contracting parties and cooperating non-contracting parties.

(Para. 29): The Commission NOTED the stock status summaries for species of tuna and tuna-like species under the IOTC mandate, as well as other species impacted by IOTC fisheries (Appendix 6) and considered the recommendations made by the Scientific Committee to the Commission. The Commission ENDORSED the Scientific Committee's 2018 list of recommendations as its own.

(Para 31) The Commission NOTED the complications inherent in data collection and analysis for several coastal fisheries and species and in particular, those for neritic tunas. This affects the Scientific Committee's ability to provide management advice for these species and fleets. Coastal states were ENCOURAGED to reflect on the problems they have in data collection so that they can be addressed. The Commission also NOTED the advice from the WPNT and the need to make management decisions based on this advice.

The status of tropical and temperate tunas

(Para 38). The Commission NOTED the considerable use of estimated data in the yellowfin tuna assessment due to the unavailability of data from CPCs, as is the case for all species. The Commission URGED all CPCs to improve their data collection and reporting.

Matters related to ecosystems, bycatch and the status of sharks

(Para 41 The Commission NOTED that the submission of complete, accurate and timely catch records disaggregated by species for sharks and other bycatch species remains low and that this reduces the ability of the Scientific Committee to provide informed management advice for these species.

The status of neritic tunas

(Para 43). The Commission NOTED that catch of neritic species amounts to around 35% of the total catch of IOTC species, and almost all the catch of neritic species is estimated to be taken by coastal States. The Commission NOTED, that around 80% of the catch data available to the Commission on neritic species has to be estimated i.e. only around 20% of the catch data is derived from catch sampling processes and reported to the IOTC Secretariat.

(Para 44) The Commission NOTED that neritic tuna are vital resources for the coastal States. The Commission EXPRESSED concern about the overall lack of information on neritic tunas, and ENCOURAGED CPCs to improve data collection and reporting, and develop measures to underpin sustainable management of IOTC neritic species.

3.2 REVIEW OF CONSERVATION AND MANAGEMENT MEASURES RELEVANT TO THE WPDCS

11. The WPDCS **NOTED** paper IOTC–2019–WPDCS15–05 which encouraged participants at the WPDCS15 to review some of the existing Conservation and Management Measures (CMM) relevant to the WPDCS, noting the CMMs referred to in document IOTC–2019–WPDCS15–04, and as necessary to 1) provide recommendations to the Scientific Committee on whether modifications may be required; and 2) recommend whether other CMMs may be required.

12. The WPDCS **AGREED** that it would consider proposing modifications for improvement to the existing CMMs following discussions held throughout the current WPDCS meeting.

13. In particular, the WPDCS **ENCOURAGED** participants to review the texts of Resolutions 18/07 (On measures applicable in case of non-fulfilment of reporting obligations in the IOTC), 19/01 (On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC Area of competence) and 19/02 (Procedures on a fish aggregating devices (FADs) management plan) to identify aspects that might require further clarification from the SC.

3.3 PROGRESS ON THE RECOMMENDATIONS OF WPDCS14

14. The WPDCS **NOTED** paper IOTC–2019–WPDCS15–06 which provided an update on the progress made in implementing the recommendations from the previous WPDCS meeting which were endorsed by the Scientific Committee, and **AGREED** to provide alternative recommendations for the consideration and potential endorsement by participants as appropriate given any progress.

15. The WPDCS **RECALLED** that any recommendations developed during a Session, must be carefully constructed so that each contains the following elements:

- a specific action to be undertaken (deliverable);
- clear responsibility for the action to be undertaken (i.e. a specific CPC of the IOTC, the IOTC Secretariat, another subsidiary body of the Commission or the Commission itself);
- a desired time frame for delivery of the action (i.e. by the next working party meeting, or other date);
- if appropriate, an approximate budget for the activity, so that the IOTC Secretariat may be able to use it as a starting point for developing a proposal for the Commission's consideration.

16. The WPDCS **NOTED** that the Commission endorsed "in principle" the *ROS draft Programme Standards and Guidelines*, that comments and feedback provided by CPCs during the implementation phase would be used to revise said standards, and that ROS data collection fields were not discussed further.

17. The WPDCS **ACKNOWLEDGED** that the Commission agreed on exempting CPCs whose observer programmes are already accredited by WCPFC from the application of the IOTC standards.

18. The WPDCS **NOTED** that cannery data routinely reported to the Secretariat come in a variety of formats and standards that prevent their proper incorporation within the IOTC databases, and for this reason **REQUESTED** the IOTC Secretariat to liaise with ISSF to explore the possibility of standardizing future data submissions as well as recover the historical data for analysis and cross-validation purposes.

19. The WPDCS **NOTED** that a consultancy dealing with the revisions of size-frequency data from the longline fleets of Japan, Taiwan,China and the Rep. of Korea has completed, and that its results will be presented during Q1 2020.

20. The WPDCS **NOTED** improvements in the engagement and attendance of Indian representatives in the IOTC scientific process, and that a data compliance mission to India is expected in the near future with the aim of facilitating improvements in the submission of data by India according to the mandatory reporting requirements of Resolution 15/02.

21. The WPDCS **ACKNOWLEDGED** the findings of a recent data compliance and support mission to the sultanate of Oman in September 2019, that confirmed the possibility for Oman to standardize and improve the submissions of statistical data to the Secretariat, as well as recover valuable historical data assets known to be held by local institutions (including size-frequency data for neritic and tropical tuna species, and the standardized CPUE series).

22. **RECOGNIZING** recent improvements in submission of time-area catches for several fisheries of Indonesia, although still with a very low level of logbook coverage, the WPDCS **NOTED** that the Indonesian VMS data held by the Global Fishing Watch project is not yet publicly disseminated, and that this data set – once available – could be of vital importance to properly understand the fishing grounds where the Indonesian fleets operate.

23. The WPDCS **RECALLED** that FAO already has an agreement in place with Global Fishing Watch, and that for this reason it might not be necessary to envisage any specific MoU in order get access to the requested information.

24. Also, the WPDCS **NOTED** that there was no update from Indonesia with regard to the issues detected in the number of active vessels reported by the country, and that this information is a key element used to reconstruct (and revise) the catches of fresh tuna longliners.

25. The WPDCS **NOTED** that I.R. Iran has successfully continued to submit time-area catches for its fisheries, that the breakdown of catches for the offshore component of its gillnet fishery is now directly provided by the source and that a number of relatively minor issues still exist (unavailability of Bigeye tuna data in the catch-and-effort dataset and too coarse spatial information for the offshore component of the gillnet fisheries) whose resolution could benefit from additional support by the IOTC Secretariat.

26. **NOTING** that the idea of building a common database of biological information for IOTC species is largely supported by the scientific community, the WPDCS **ACKNOWLEDGED** that limiting the availability of such information to data only sourced from the IOTC ROS will exclude a number of alternative sources of biological data that already exist and are not supposed (nor expected) to be stored in the ROS database (e.g. size measurements taken at the cannery).

27. For this reason, the WPDCS **SUGGESTED** that a proper exchange format is defined to enable exporting ROS-sourced data to a common database of biological information in the future.

28. The WPDCS **NOTED** the recommendation from the WPEB to hold regional workshops to improve the identification of shark species as well the collection and reconstruction of shark data according to IOTC requirements.

29. Considering the need of harmonizing FOB categories and FOB activities definitions, the WPDCS **RECALLED** that the WPTT21 had requested the re-activation of the IOTC ad-hoc FAD working group with the clear mandate of specifically discussing these FAD-related issues.

30. Additionally, **NOTING** the lack of participants from CPCs with a long standing experience in FAD / FOB data management within the region (e.g. Republic of Korea, EU) the WPDCS **ACKNOWLEDGED** that detailed discussions on this topic could not be had during the meeting.

31. The WPDCS **NOTED** that only the initial ToRs for the original FAD working group are available, and that these need to be further updated by agreeing on whether a regular working group is expected rather than another ad-hoc session.

32. The WPDCS **ACKNOWLEDGED** that a number of requests to access sensitive information were received by the IOTC Secretariat during 2019 and that in all circumstances but one (access to raw observer data for the IOTC mobulid project received in October 2019) the data provided to scientists was aggregated according to the requirements dictated by Resolution 12/02.

4. PROGRESS REPORT OF THE SECRETARIAT ON DATA RELATED ISSUES

4.1 IOTC SECRETARIAT REPORT

33. The WPDCS **NOTED** paper IOTC–2019–WPDCS15–07 which provided an overview of the status of data holdings in the IOTC Secretariat, in particular catch, effort, size frequency and other biological data for IOTC species, sharks, and other species that are caught incidentally by fisheries directed at IOTC species.

34. The WPDCS **NOTED** that the quality of the data available by species is highly dependent on the importance of artisanal fisheries (that account for around 60% of total catches), and which tend to be the least well reported fisheries and often require catches to be at least partially (or fully) estimated by the IOTC Secretariat.

35. The WPDCS further **NOTED** that the catch-and-effort and size data for neritic tunas and billfish continue to be poorly reported, and remains a major challenge for stock assessments which in many cases continue to be highly uncertain.

36. The WPDCS **NOTED** that the major drop in data quality for neritic tunas in 2017 was mainly due to the non-provision of data by India which represented about 50% of the neritic catch at that time, and that the lacking information was instead provided in 2018, thus increasing the overall quality of the information available for the species.

37. The WPDCS **NOTED** that provisions of FAD-related data for some CPCs in 2018 have been made difficult by the lack of clarity in the categories of FOB activities and FOB types and further **REQUESTED** that the importance of adopting clearer definitions and (possibly) a new nomenclature for FADs be conveyed to the ad-hoc FAD Working Group once re-activated.

38. The WPDCS **ACKNOWLEDGED** that with the term "data quality", the Secretariat refers to the *completeness*, *timeliness* and *consistency* of the information received by CPCs and how this matches with the IOTC Resolutions that dictate all data collection and reporting requirements. Data transformations regularly performed by the IOTC Secretariat on the original information provided by CPCs, such as breakdown of catches by species and gears when these are reported as aggregates, or the re-estimation of species compositions for specific fisheries, all contribute to reducing the quality (see above) of the concerned data sets.

39. The WPDCS **NOTED** that, as per Resolution 15/02, discards-at-sea are a component of the total catch and may have an impact on indices of abundances estimated from CPUE data for longline fisheries used in stock assessment models, and that systems should be put in place to collect information on discards which cannot be assessed from sampling at landing sites.

40. Furthermore, the WPDCS **NOTED** that the limited information on discards that is reported to the IOTC Secretariat is often lacking relevant details such as the status at release and reason for discard.

41. While the WPDCS **ACKNOWLEDGED** the importance of CPCs to continually improve the quality and coverage of fisheries data collection, the WPDCS also **NOTED** the uncertainty in catch trends over the longer-

term, and the difficulties in revising the historical catch series given the general paucity of information available for many fisheries in the Indian Ocean in previous years.

42. The WPDCS **RECALLED** that the status of the datasets available at the IOTC Secretariat is a cause for concern for a number of important fleets that operate in the Indian Ocean, in particular, but not limited to:

Total catches (including retained catches, discards):

- On-going uncertainty in the total catches, species and gear composition reported for the coastal fisheries of Indonesia in recent years – particularly catches of small tunas around anchored FADs (Rumpons) and possible misidentification of juvenile yellowfin and bigeye tunas as neritic tuna species.
- Uncertain estimates of total catch for the driftnet fishery of Pakistan; handline and driftnet fisheries of Yemen and Oman; coastal fisheries of Madagascar; log-associated catches of EU,Spain (in 2018).
- Very poor reporting of data on the level of discards of tuna and tuna-like species, and incidentally caught species, across the majority of fisheries and time periods.

Catch-and-effort:

- Insufficient implementation of logbooks and minimum requirements for operational catch-and-effort data, which compromise reporting of catch-and-effort statistics to the IOTC – including the longline fisheries of Indonesia (until 2017); driftnet fisheries of Pakistan; gillnet and longline fishery of Sri Lanka (until 2014), handline and gillnet of Oman.
- Lack of catch-and-effort and indices of abundance for coastal fisheries for the major tuna species and particularly neritic tuna species targeted by artisanal fisheries operating in Oman, Pakistan, India and Indonesia (until 2017).
- Possible species composition bias in the time-area catches reported by EU,Spain for 2018, following changes introduced in the statistical methodologies adopted at national level.

Size data:

- Lack of size frequency data for most major coastal fisheries, including the coastal longline fishery of India, the driftnet fishery of Pakistan, and coastal fisheries of Indonesia, India, Yemen and Oman.
- Low levels of coverage of size data for Japan (until recently) and reliability of length frequencies available for longliners flagged in Taiwan,China in recent years. Possible revisions expected by Q1 2020.

Regional observer data:

- Most levels of reporting of (industrial fisheries) observer coverage are below those recommended by the Commission (i.e., a minimum of 5% of the total number of fishing operations shall be covered by scientific observers).
- Little or no observer data collection by CPCs for artisanal fisheries. Ongoing efforts in adopting self-sampling mechanism ("*crew-based data collection programmes*" of Pakistan and Sri Lanka) are being evaluated as possible replacement for scientific observer information when combined with other data collection and validation mechanisms.

43. The WPDCS **ENDORSED** the proposals from the IOTC Secretariat to undertake the necessary actions to address the issues for each fishery, as provided in Appendix IV.

4.2 DISSEMINATION OF IOTC DATASETS AND DOCUMENTS

4.2.1 IOTC Data Summary: Update

4.2.2 IOTC Data Dissemination: Discussion of potential improvements

4.2.3 Alternative data series

Alternative approaches to the revision of official species composition for the Spanish log-associated catch-and-effort data for tropical tuna species in 2018

44. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-10_Rev2 that provides participants to the Working Party on Data Collection and Statistics with the results of a range of alternative scenarios for the re-estimation of

tropical tuna species composition of time-area, log-associated catches reported by the Spanish component of the European Union purse seine fleet for 2018, and the rationale for this re-estimation following the original request from the 21st session of the Working Party on Tropical Tunas.

45. The WPDCS **AGREED** that a review of the statistics provided by EU,Spain for 2018 was required in order to provide a consistent time-series of catch for the assessments of tropical tunas reviewed at the meeting, and the provision of management advice for tropical tunas.

46. The WPDCS **NOTED** that the re-estimation was initially triggered by the unusual spatial distribution detected in Bigeye log-associated catches reported by EU,Spain during 2018, and that these possible inconsistencies (areas with uncommon concentrations of Bigeye tuna, geographically delimited by sharp edges that were not evident during 2017 and previous years) might be the result of some kind of statistical bias introduced by the new estimation methodology for catch composition introduced by EU,Spain in 2018.

47. In this regard, the WPDCS was **INFORMED** that the reason for the discrepancies in the catch-and-effort and size data reported by the EU,Spain originates from the use of two different systems to generate the estimates, with T3 used to obtain the catch-and-effort and length frequency datasets, which were then raised to the amounts recorded on sale slips, and that these datasets are preliminary.

48. The use of the catch-and-effort and size data files reported by EU,Spain for 2018 is not recommended until the flag state finalizes the process of review it has initiated, which may lead to a review of the time-series, and the WPDCS **NOTED** that in the meantime the best estimates of time-area catches for EU,Spain in 2018 produced by the IOTC Secretariat and supported by the WPTT21 / WPDCS15 will be used for scientific purposes.

49. Given the situation, the WPDCS **URGED** EU,Spain to provide a corrected version of its time-area catches data for 2018, considering that the use of this information is of particular importance for several IOTC bodies.

50. The WPDCS **NOTED** that the paper proposes eight alternative scenarios to re-estimate time-area catches on the basis of different proxy fleet providing time-area catches of tropical tunas across the last two reference years (2017 and 2018) and that the results of the different scenarios in terms of changes to the reported species composition tend to be comparable.

51. **ACKNOWLEDGING** that the selection of the most proper re-estimation scenario should take into account expert knowledge and familiarity with the fishing operation of the proxy fleets involved, the WPDCS **AGREED** that, pending clarification from EU,Spain concerning the potential issues identified, the most likely proxying scenario for the re-estimation would be Scenario #4 that uses information from Seychelles (2018), EU,France (2018) and EU,Spain (2017) – in this order – to determine the new species composition in each grid and month for which EU,Spain has reported log-associated captures of tropical tunas in 2018.

52. The WPDCS **AGREED** that the alternative estimates produced for EU,Spain for the year 2018 shall be considered preliminary, until the new system is properly documented and the final datasets endorsed at a future meeting of the WPDCS or WPTT.

53. The WPDCS **ACKNOWLEDGED** that due to the very late submission of catch-and-effort information from EU,Spain (received in its final version by the IOTC Secretariat on September 16th 2019, past the deadline of June 30th 2019) it was only possible to identify and discuss the species composition issue during the days immediately preceding the 21st session of the WPTT and eventually propose the re-estimation approach that is further detailed in this document.

54. The WPDCS **REGRETTED** the lack of participation of scientists from EU,Spain to the WPDCS Meeting.

55. The WPDCS **NOTED** that EU,Spain has modified its statistical data processing system in 2019, following the identification of potential bias in the estimates obtained using the *T3* system adopted so far, and the fact that T3 was not enabling the monitoring of the yellowfin catch limit on a vessel basis.

56. The WDPCS **ACKNOWLEDGED** that the new estimation system relies mainly on data from sales slips, and that an information paper describing the new approach is still under development and is likely to become available at the Scientific Committee.

57. The WPDCS **NOTED** that sales slips, which are expected to be very similar to landing declarations, can become available from days to weeks after the vessel unloaded or transhipped in port when the fish is exported for processing far from landing sites.

58. The WPDCS further **NOTED** that the application of the new processing approach developed by EU,Spain might be difficult to be back-propagated in the past in order to obtain consistent time series of catches for the concerned species, as sales slips were not available prior to 2014 and data available until 2016 might not be fully available.

59. The WPDCS **REQUESTED** the EU and Seychelles to collaboratively work on the size samples collected at unloading in Victoria, Seychelles, and compare the species and size composition of the catch in spatio-temporal strata to investigate the differences observed between the outputs of the T3 processing system and the new methodology adopted by EU,Spain.

60. The WPDCS **AGREED** on the need for EU and Seychelles to consider the implementation of new estimation procedures through which catches by species by set can be estimated, rather than the existing system, which estimates catches by quarter and large fishing area

61. The WPDCS **RECOMMENDED** that a data preparatory meeting be organized prior to the Working Party on Tropical Tunas in order to ensure sufficient time is dedicated to resolving issues with the quality and preparation of the input data for the stocks assessments.

Review of Pakistan's reconstructed catch series for tuna and tuna-like species

62. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-19_Rev2 presented by the IOTC Secretariat regarding the reconstructed catch series submitted by the Government of Pakistan to the IOTC in 2017, including the following abstract:

> "*The paper presents an overview by the IOTC Secretariat of revisions to Pakistan's nominal catch series (1987-2016) submitted by the Government of Pakistan to IOTC in 2017. An evaluation is also provided of the catch reconstruction methodology, including an assessment of the extent to which the reconstructed catches can be validated against known characteristics of Pakistan's fisheries; specifically developments in the gillnet fishery since the late-1990s. The paper also presents an overview of WWF's crew based data collection program conducted since 2012, in the context of one of key datasets used in the catch reconstruction.*"

63. The WPDCS **ACKNOWLEDGED** the efforts of the Government of Pakistan and WWF-Pakistan to improve the status of fisheries data collection in Pakistan in recent years and efforts to comply with IOTC's mandatory data reporting obligations, and **REQUESTED** that the Government of Pakistan to provide funds to ensure the continuation of WWF's crew based observer program.

64. The WPDCS **THANKED** the IOTC Secretariat for the comprehensive appraisal of the reconstructed catches that includes, among others, data sets available to the Government of Pakistan as well as other multipliers, **NOTING** a number of potential concerns raised by the review regarding the input datasets used by the catch reconstruction; in particular uncertainties in the estimates of active vessels, and the extent to which data collected by crew members (between 2012-2016) can be used as to revise the Pakistan's historical gillnet catches back to the mid-1990s.

65. The WPDCS further **NOTED** that lack of access to alternative data, such as logbooks or port sampling, to validate the results of the reconstructed catches was a common issue during the review, but that photographic reports and debriefings with the skippers were generally in good agreement with the self-reported data, and that results from future experiment with Electronic Monitoring (including CCTV cameras) could further contribute to its validation.

66. Nevertheless, the WPDCS **AGREED** that Pakistan's revised catches to be an improvement of over current estimates in the IOTC database and **ENDORSED** the reconstructed catches as the best scientific estimates available for this fishery.

67. The WPDCS **NOTED** that the fisheries in the Arabian sea are usually subject to marked changes in abundance for tropical tunas and other stocks from year to year, and the fact that this might compromise estimates based on short time series such as the ones used in this review.

68. For this reason, the WPDCS **SUGGESTED** that future reviews of these time series take into consideration this fact and consider the use of trends in catch by species for alternative fleets that operate in the same areas, such as Iranian gillnets.

69. The WPDCS **REQUESTED** that the reconstructed catches be incorporated in the IOTC nominal catch database; also that information on time-area catches and fishing effort, and size frequency data also collected by WWF's crew based data collection program be officially submitted to the IOTC Secretariat by the Government of Pakistan.

70. The WPDCS **NOTED** that the catch estimates derived from the reconstruction exercise provide good insight into the uncertainties around catches in Pakistan and could serve as a basis for developing alternative time series of catch for sensitivity analysis in the stock assessment models.

71. The WPDCS further **NOTED** that, related to improvements in the accuracy of fisheries statistics in the region, a number of gillnet vessels may be 'double registered' to Pakistan and I.R. Iran and **REQUESTED** that Pakistan

and I.R. Iran, with facilitation provided by the IOTC Secretariat, take any possible measure (including the definition of a plan of action) to rectify this issue to avoid the possibility of double-counting of vessels and landed catches by these vessels, and to provide an update for the next WPDCS meeting.

4.3 UPDATES ON DATA-RELATED REQUESTS FROM OTHER WORKING PARTIES

72. The WPDCS **NOTED** the summary information provided by the IOTC Secretariat in terms of data-related activities and requests from other Working Parties that are considered of relevance to the WPDCS, including the following:

- Report of the 7th Working party on Temperate Tunas (data preparatory) (WPTmT07-prep)
    - (Para. 45) (…) The WPTmT RECOMMENDED that CPCs submit length-weight data to the IOTC secretariat, so that they may compile a database that represents spatial, seasonal, and sex-based variability in LW.

73. The WPDCS **RECALLED** that having length-weight and other biological data hosted in a common, openly accessible database is one of the priority activities considered by this Working Party, and that the ROS Regional Database can only partially fulfil this requirement as it would be unable – for instance – to accommodate for other sources of information such as biological data collected from canneries.

- Report of the 7th Working party on Temperate Tunas (WPTmT07)
    - (Para. 14) (…) NOTED the importance of catches transshipped through Port Louis, Mauritius (…) and STRESSED the importance of conducting biological data collection initiatives in Mauritius, particularly for length frequency information.

74. The WPDCS **NOTED** that the first phase of a project dealing with collection of Albacore sampling data in Mauritius is now completed, and that its outcomes will be presented at the next session of the Scientific Committee. A second phase of the project is currently under development and aims at establishing a new biological data collection program through onboard observers deployed on vessels operating in the region.

- Report of the 15th Working party on Ecosystems and Bycatch (WPEB15)
    - (Para. 13) NOTED the request from the Commission to identify possible means to improve the submission of complete, accurate and timely catch records for sharks, as well as the collection of species-specific data on catch, biology, discards and trade and DISCUSSED methods to address this issue.
    - (Para. 14) RECOMMENDED that several initiatives be implemented to address this problem, including (i) holding regional workshops to improve shark species identification, shark data sampling and collection (fisheries and biological) and IOTC data reporting requirements. (ii) data mining to fill historical data gaps (iii) develop alternative tools to improve species identification (genetic analyses, machine learning, and artificial intelligence).

75. The WPDCS **CONFIRMED** the importance of improving statistical and biological data collection for sharks species and **ACKNOWLEDGED** the range of initiatives that might contribute to reach this target as indicated by the WPEB.

- Report of the 17th Working party on Billfish (WPB17)

76. (Program of Work) High priority activity: The WPDCS to Continue the work with coastal countries to address recent changes and/or increases of marlins catches especially in some coastal fleets. The historical review should include as much explanatory information as possible regarding changes in fishing areas, species targeting, gear changes and other fleet characteristics to assist the WPB understand the current fluctuations observed in the data and very high increases in some species (e.g., black marlin mainly due to very high catches reported by India in recent years). The possibility of producing alternative catch histories should also be explored. Priority countries: India, Pakistan, Iran, I.R., Indonesia.

77. The WPDCS **RECOGNIZED** the importance of performing historical reviews of catches for all billfish species, and that improvement of national data collection systems that will help understand the changes in fleet characteristics and explain the detected fluctuations in catch series reported by the identified target countries, is one of the priorities identified by the Working Party.

- Report of the 21st Working party on Tropical Tunas (WPTT21)

78. (Para. 50) NOTED the effort of the Pakistan fleet to change from surface to sub-surface gillnets which is expected to reduce the bycatch of sensitive species without decreasing the target tuna catch as suggested in

Resolution 19/01. However, the completeness of this move to a new setting strategy is not known and the WPTT REQUESTED Pakistan to provide details in future meetings.

79. (Para. 105) AGREED that a methodology to revise the bigeye tuna catches reported by EU,Spain in 2018 (limited to their log-associated school component) should be identified and discussed, and that the chosen approach adopted to produce such revision be clearly documented for further reference and reviewed by the WPDCS.

80. (Para. 106) NOTED that the reconstructed, official catch series reported by Pakistan for its gillnet fishery is still awaiting endorsement from the WPDCS and SC.

81. (Para. 219) the WPTT RECOGNIZED that the collaborative effort represents an ambitious attempt to improve the assessment, and was successful for increasing the number of people that have a reasonable understanding of Stock Synthesis, the yellowfin assessment issues, and the application of standard model diagnostic techniques. Considerations for future assessments include (among others):

82. Completing comprehensive review of size composition data;

83. Addressing all data issues at the WPDCS prior to the WPTT;

84. The WPDCS **NOTED** that paper IOTC-2019-WPDCS15-18 is specifically addressing the issues encountered (and the main results obtained) by introducing changes in the gillnet fisheries of Pakistan to reduce bycatch, and that a switch from gillnet to longline gears might be another viable options for a future sustainable development of the fishery.

85. The WPDCS **NOTED** that paper IOTC-2019-WPDCS15-10 was presented during the Working Party with the purpose of further documenting the rationale and methodology for the re-estimation of EU,Spain log-associated catches for 2018 and extend its approach to time-area catches as well.

86. **ACKNOWLEDGING** that species of interest to several Working Parties are affected by the changes introduced by the reconstructed catch series of Pakistan, the WPDCS **NOTED** that the re-estimation procedure was presented for endorsement during the meeting and that the results of the revised catches, when incorporated in the IOTC databases, will be presented to the respective Working Parties in due course.

87. **NOTING** the issues related to size composition data for tropical tunas and more general data issues (e.g., catch re-estimations) discussed during the meeting, the WPDCS **CONSIDERED** the possibility of addressing such issues through a dedicated data-preparatory meeting to be held prior to the regular WPTT session.

5. UPDATE ON NATIONAL STATISTICS SYSTEMS

5.1 UPDATE ON NATIONAL STATISTICAL SYSTEMS, INCLUDING THE MAIN CHALLENGES IN COLLECTING AND REPORTING DATA TO THE IOTC SECRETARIAT AND PROPOSALS TO IMPROVE FUTURE LEVELS OF COMPLIANCE WITH IOTC DATA REQUIREMENTS

5.1.1 Actions taken by Iran to improve catch & effort data in 2018

88. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-11 that provides an overview of the actions taken to improve the catch and effort in I.R. Iran, including the following abstract provided by the author:

> "*This document presents summary information about fisheries statistical data in Iran, according to IOTC resolutions and recommendations concerning mandatory minimum data submit to IOTC and basic actions to improving Data collection system with approvals and recommendations of the Scientific Committee and WPDCS… For better collaboration with IOTC, much effort have been carried out to extract all necessary outputs required to meet the concerned IOTC, Resolutions such as submission catch and effort data by gear, costal fishing ground and High seas fishery. Developing our data collection system and software is in progress to meet mandatory minimum statistics requirements and submission catch and effort data by gear, costal fishing ground and high seas fishery for recent 10 years. We have taken various actions to implement the Scientific Committee and IOTC Resolutions and Recommendations.*" - see paper for full abstract.

89. The WPDCS **NOTED** the ≈30% increase in catches in Iran's gillnet fisheries between 2013 – 2018, despite a 20% decrease in fishing effort over the same period (from 916,000 days in 2013 to 734,000 days in 2018).

90. The WPDCS **REQUESTED** I.R. Iran to clarify the reasons for the apparent inverse relationship between declining fishing effort and increasing gillnet catches in recent years and to provide an update for the next WPDCS meeting – specifically whether the increase in catches is related to improvements in the processing and reporting (such as the estimation of disaggregation of catches between tuna and non-tuna like species), or alternatively the impact of fuel subsidies or changes in fishing grounds.

91. The WPDCS **NOTED** that yellowfin and common dolphinfish represent about 99% and 1% of the retained catches by Iran's coastal longline fishery, respectively, and that the amount of discards is small and mainly concerns interactions with turtles and shark species.

92. The WPDCS **NOTED** Iranian purse seiners essentially set on free-swimming schools as the economic sanctions on the country have resulted in increased prices of satellite transmission, which prevents the use of instrumented buoys for monitoring FADs.

93. Finally, the WPDCS **NOTED** with interest a project proposal drafted by IFO (Iran fisheries Organization) in combination with IRD (Pelagic Ecosystem Observatory) for a scoping study to set up a high-resolution data collection framework for small-scale gillnet and longline tuna vessels in the Gulf of Oman (IOTC-2019-WPDCS15-INF07).

94. **ACKNOWLEDGING** the potential of this project, the WPDCS **AGREED** that discussion on the prioritization of the activity as well as a feasible timeline for its possible implementation will be conducted during the review of the WPDCS program of work.

5.1.2 Instauration du systeme Openartfish dans la collecte de donnees de la peche traditionnelle a Madagascar

95. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-12 which provided an update on the development and implementation of OpenArtfish in three northern provinces in Madagascar, including the following abstract provided by the authors:

"*L'élaboration des statistiques fiables et exploitables des principales productions du secteur pêche est indispensable et incontournable pour mesurer et évaluer les changements sur le secteur à Madagascar. A cet effet, le Service Statistique au niveau central du Ministère en charge de la Pêche renforce ses systèmes d'Information par l'utilisation de la nouvelle technologie moderne pour les différentes phases en partant de la collecte, du traitement des données, du stockage jusqu'à la phase de diffusions des informations officielles et validées par l'Administration en charge de la Pêche et de l'Aquaculture à toutes les parties prenantes. Le développement et la mise en oeuvre du système de collecte de données pour la petite pêche, y compris une stratégie d'échantillonnage appropriée sont déjà parmi les activités majeures. Pour le moment la production de la petite pêche est encore basée sur la commercialisation. Mais à l'issu de l'enquête pilote réalisée dans la région de Diana concernant le système de collecte de données utilisant l'application mobile avec le système OPENARTFISH, la méthodologie serait adopté dans toutes les régions de la Grande Ile.*"

96. The WPDCS **NOTED** that the nominal catches for artisanal fisheries in Madagascar have been repeated in the IOTC database since 2009 – due to the non-reporting of catches – and **ENCOURAGED** Madagascar to finalize the implementation of *OpenArtFish* in all provinces in order to establish a routine mechanism for the collection and reporting of artisanal fisheries catches to the IOTC Secretariat.

97. The WPDCS also **NOTED** that Madagascar expects to provide comprehensive data for its artisanal fisheries not earlier than 2023, pending reaching an adequate level of coverage in the implementation of the new tools and methodologies.

5.1.3 Data collection and statistics in Mauritius

98. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-13 which provides an overview of the data collection and latest fisheries statistics in Mauritius, including the following abstract provided by the authors:

"*The main data source for the data collection system for Mauritius comes from harvest, that is at the level where the fish is caught. The catch, effort and fishing positions are recorded in logbooks by both foreign and local fishing vessels unloading at Port Louis which are submitted to the Port State Control Unit (PSCU) prior to unloading. As per license condition submission of logbook is mandatory and failure to submit logbook or submission of inaccurate logbooks may entail penalties such as payment of a fine or the vessel may become ineligible for any future licence. Tuna statistics are derived from raw fishing data that are compiled from fishing logbooks obtained from fishing vessels. Prior to logbook entry in the database, the logbook catches are verified against the landing catches that are recorded by the Fisheries Protection Officers at the port during unloading and transshipment (Port State Control Unit). In addition, the fishing positions are also validated using the Vessel Monitoring System of the Fisheries Monitoring Centre. For the time being, data entry, compilation and analysis is done using the excel spreadsheet. Specific data sets are then prepared according to the demands of national, regional and international organizations."*

99. The WPDCS **NOTED** that Mauritius expects to achieve 5% observer coverage of longline fishing operations, starting from 2019, in compliance with the minimum observer coverage rates required by Resolution 11/04 *On a Regional Observer Scheme*.

100. The WPDCS further **NOTED** that while Mauritius' purse seine fleet and the European purse seine fleet may share some common fishing grounds, the processing of Mauritius purse seine data is conducted independently from the main EU purse seine fleet and taken directly from the logbooks rather than alternative systems such as T3 or sale slips.

5.1.4 Way forward for an improved data collection and data management system for marine fisheries in Sri Lanka

101. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-14 which describes the range of data collection mechanisms currently implemented or in development in Sri Lanka, focused on improving the data collection and reporting of fishery statistics for coastal and off-shore fisheries, including the following abstract provided by the authors:

"*The coastal and off-shore fisheries in Sri Lanka are rather complex due to its multi-gear, multi-craft and multi-species nature. Collection of fishery dependent data is therefore a challenging task. This paper discusses the existing data collection and data management systems practicing at present in the marine fishery of Sri Lanka: Port Sampling Program (PSP), Log Book Data Collection Programme (LBDCP), Observer Program (OP) and Vessel Monitoring System (VMS). It is also discussed in detail about new PSP, which is currently in progress under Sri Lanka- Norway bi-lateral project*" – see paper for full abstract.

102. The WPDCS **ACKNOWLEDGED** the substantial progress in developing the fisheries data collection and reporting systems for Sri Lanka's coastal fisheries in recent years, notably the implementation of electronic logbook and mobile data collection systems, and that the approaches taken could be of potential interest for several other CPCs in the region that are looking forward to improve and rationalize their own data collection processes.

5.1.5 Fisheries data collection and recent fisheries statistics in Thai waters: a case of Andaman Sea

103. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-15 which provides an overview of the data collection systems and fisheries statistics in Thailand, including the following abstract provided by the authors:

"*Marine Fisheries in Thailand can be categorized into two sectors, i.e., artisanal fishery and commercial fishery. The artisanal fishery is characterized by fishing operation using a fishing vessel which the size is less than 10 gross ton (GT) or without a fishing vessel. While, the commercial fishery means fishing operation using a fishing vessel which the size is equal or larger than 10 GT. In addition, fishing vessels operating trawls (i.e., pair trawl, otter board trawl, and beam trawl), purse seine, anchovy purse seine, and clam dredges (i.e., short-necked clam dredge, blood clam dredge, and other clam dredge) and fishing vessels equipped with an engine of more than 280 horse power are considered to be commercial fisheries. There are all together 22 types of fishing gears used in Thai waters. Beside eight commercial fishing gears, squid falling net, squid trap, octopus trap, fish trap, crab trap, krill push net, longline, handline, gill net, pomfret lift net, red frog crab lift net, anchovy falling net, and anchovy lift net are among them. Light luring vessel is also considered to be a type of fishing gear. The Department of Fisheries is responsible for fisheries data collection. Basic fisheries statistics includes catch and effort by species, gears, months, fishing grounds, and sectors, i.e., artisanal and commercial fishery. This information is mainly used for development of marine fisheries management plan and scientific research.*" – see paper for full abstract.

104. The WPDCS **NOTED** that no catch of tropical tunas was reported in the nominal catches of coastal purse seiners fishing in the Andaman Sea, despite reports of length frequencies for skipjack tunas by Thailand to IOTC, and **REQUESTED** that Thailand provide an update on the catch of coastal purse seiners at the next WPDCS meeting.

5.1.6 Improvement on the implementation of the new Malaysia e-Logbook for tuna fisheries in Indian Ocean

105. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-16 which provides an update on the implementation of electronic logbooks by the Department of Fisheries in Malaysia, including the following abstract provided by the authors:

"*As the need for conservation of the national marine resources increases, the need for more and better-quality data on how these resources are utilized also increases. One of the most crucial data is the data for*

catch per unit effort. To meet these needs, Department of Fisheries Malaysia (DOFM) will be implementing e-logbook programmes starting year 2020 and these programs were initiated for deep sea and tuna fisheries. Fishermen are required to report the numbers of each species caught, the numbers of animals retained or discarded alive or discarded dead (longline gear is non-selective and unwanted or prohibited species such as, billfishes, sea turtles, etc., must be returned to the water), the location of the set, the types and size of gear, and the duration of the set. Previously all of those data were recorded in the manual logbook form provided by DOFM. Starting year 2020, a system called e-logbook will be implement and all recorded data will be updated in the online system. This include data recording by vessel's captain, reporting and monitoring of data by vessels owner, Fisheries Development Authority of Malaysia (LKIM) and Department of Fisheries (DOFM). All those data that will be recorded using the new e-logbook comply to the IOTC requirement and regulation." – see paper for full abstract.

106. The WPDCS **THANKED** Malaysia for their efforts to improve their fisheries data collection and notably the transition to electronic data collection, which should cover all fisheries and implement close to a real time data collection and monitoring.

107. The WPDCS **NOTED** that Malaysia collects both weight and quantity of catches, in addition to the collection of length measurements of one fish per 0.8 tonne of catches (i.e., above the minimum standard of 1 fish per tonne recommended by IOTC guidelines).

108. The WPDCS **ACKNOWLEDGED** that the reasons for choosing the specific sampling frequency are related to ensuring sufficient samples are measured to meet IOTC requirements.

109. The WPDCS **NOTED** that Malaysia had expressed its interest in participating in the ROS Pilot Project in order to train personnel and facilitate the implementation of their observer programme. However, at this stage, Malaysia were not able to fully commit to the Project due to difficulties finding candidates to participate in the training and manage the programme; as such Malaysia were not in a position to sign the LoU and participate in the ROS Pilot Project at this time.

5.1.7 Issues with data collection of tuna and tuna-like species in Pakistan and introduction of logbook system for small scale fisheries

110. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-17 which described the current status of data collection in Pakistan and proposals to develop a logbook system for small-scale fisheries, including the following abstract provided by the authors:

"*At present, there is no fisheries data collection system in place in Pakistan. The data being published as Handbook of Fisheries Statistics of Pakistan is mainly based on mere speculation and extrapolation of the data of previous years. Considering these lacunae, it is planned to establish a logbook system for tuna gillnetters being operated in coastal and offshore waters. In addition, a data collection system will be established at four tuna landing centres including Karachi, Ibrahim Hayderi, Gwadar and Jiwani. WWF-Pakistan in collaboration with Federal Government will help in establishment of logbook and data collection systems and also train concerned officers and staff of Federal and Provincial Governments.*"

111. The WPDCS **ACKNOWLEDGED** the valuable collaboration between WWF-Pakistan and the Ministry of Maritime Affairs aimed at improving the quality of the information available for the fisheries of Pakistan, notably through proposals for the establishment of a logbook for tuna gillnetters and of fisheries data collection systems at four landing centres (including Karachi, Ibrahim Hayderi, Gwadar and Jiwani).

112. The WPDCS further **NOTED** that Pakistan is in the process of developing a National Fisheries Strategy that includes proposals to improve the fisheries management systems of all Pakistan's capture fisheries, and **REQUESTED** that the Government of Pakistan collaborate with WWF-Pakistan, FAO-Pakistan, and the IOTC Secretariat for assistance and technical support as necessary.

5.1.8 Problems and issues of conversion of gillnetting fleet of Pakistan to longlining with the aim to reduce bycatch

113. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-18 which provides an overview of initiatives in Pakistan to convert tuna gillnet vessels to longline, including the following abstract provided by the authors:

"*WWF-Pakistan in collaboration with Government of Pakistan is in process of conversion from tuna gillnetting to longlining. Tuna gillnetting is known to have high bycatch of ETP species as well as tuna caught through this method fetches very low prices in the international market. There are a number of issues that is expected to be faced if conversion from gillnetting to longlining, however, these issues and obstacles can be addressed adequately and tuna longlining in Pakistan will be a successful operation. Experimental*

longlining was conducted by WWF-Pakistan which indicated adequate potential of tuna longlining in Pakistan."

114. The WPDCS **NOTED** IOTC-2019-WPDCS15-18 that describes the interest and feasibility of converting some gillnetters to longliners in Pakistan to reduce bycatch levels of Endangered, Threatened and Protected (ETP) species and increase the value of the tuna catch [MERGE WITH 97].

115. The WPDCS further **NOTED** that the UNGA resolution 46/215 was adopted on to limit the lengths of gillnets in the high-seas due to the harmful impact on marine ecosystems, and that the implementation of sub-surface gillnetting since 2016 has significantly reduced the amount of bycatch in the Pakistani gillnet fishery of over 95% for turtles and cetaceans (see IOTC-2019-WPEB15-13 and IOTC-2019-WPEB15-48 for further information).

116. The WPDCS also **NOTED** and that the conversion to longline is primarily driven by economic factors, i.e., lower operational costs and higher market value.

117. The WPDCS **NOTED** that nets longer than 2.5 km (lengths between 5 and 12 km) are commonly used by Pakistani gillnetters to cover the high operational costs of the fishery and that an economic study would be useful to understand the main drivers of the gillnet fishery, economic implications of transitioning to gillnets 2.5 km in length, and to assess support for the conversion of gillnetters to longliners.

118. The WPDCS further **NOTED** that an experimental study on LEDs in Indonesia by NOAA demonstrates that artificial lights can be used as a mitigation method for sea turtles and cetaceans bycatch in gillnet fisheries.

119. The WPDCS further **NOTED** that these experiments have been undertaken on 700 to 1000 meters gillnets in Indonesian territorial waters.

120. The WPDCS **NOTED** Resolution 16/07 (*On the use of artificial lights to attract fish*) and that a request by a CPC can be made to the Commission to assess the use of artificial lights as part of a scientific experiment that would be devoted to assessing the interest and efficiency of lights as mitigation measures for some ETP species.

5.1.9 Collecting information on the pelagic phase of marine turtles from at-sea observations: the case of purse seine fisheries in the Indian Ocean

121. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-20 which explains how data collected on the bycatch of turtles in the purse seine fishery can be described through well-established data and metadata standards to facilitate their dissemination and use for biodiversity studies, including the following abstract provided by the authors:

"*Observations of turtles in the open-ocean are essential to complement the information collected at nesting sites and rookeries, especially during the 'lost years' of their surface-pelagic juvenile phase. We used a large dataset of observations at sea collected onboard Seychelles, Spanish and French purse seiners over the period 2003-2019 to describe the occurrence of five species of turtles in the Western Indian Ocean: green (Chelonia mydas), loggerhead (Caretta caretta), leatherback (Dermochelys coriacea), Olive ridley (Lepidochelys olivacea) and hawksbill (Eretmochelys imbricata). A total of 895 turtles were recorded by human observers, 487 turtles after having been caught in the purse seine and hauled onboard the vessels and 408 turtles swimming around or lying on floating objects.*" – see paper for full abstract.

122. The WPDCS **NOTED** that few drifting ghost nets from gillnet fisheries have been reported to be found in the Seychelles but that old nets used in the subsurface structure of FADs may result in some ghost mortality, although it's particularly difficult to assess to what extent.

123. The WPDCS **NOTED** that entangling of turtles could take place on the surface of the floating object where their claws could be caught (if the right material is not used) in the nets covering the FAD, and that the materials used for the net have been changed to substantially reduce this source of mortality.

124. The WPDCS also **NOTED** that the *FADWatch* project aimed at preventing and monitoring the stranding of FADs in some islands of the Seychelles, has now been extended to the 42 purse seiners involved in the SIOTI Fisheries Improvement Project.

125. Furthermore the WPDCS **NOTED** that the extent of association of the turtles with FADs might be linked to the design of the FADs and to the timing of interactions, and that these factors should be further explored.

126. Finally, the WPDCS **ACKNOWLEDGED** that the Seychelles have collected some valuable information on bycatch and discards from the observer program, including on turtles, and **REQUESTED** Seychelles to provide data on discards to the Secretariat as per the IOTC form 1DI.

5.1.10 Statistics of the French purse seine fishing fleet targeting tropical tunas in the Indian Ocean (1981-2018)

127. The WPDCS **NOTED** paper IOTC-2019-WPTT21-11 which described a number of statistics for the French purse seine fishing fleet targeting tropical tunas in the Indian Ocean in the 1981-2018 period, including the following abstract provided by the authors:

"*In 2018, a total of 14 French vessels operated in the eastern Indian Ocean including 12 purse seiners and 2 supplies. The total capacity weighted by the months of activity for each vessel is 11686t. The total nominal effort in 2018 was of 2885 fishing days and 2723 sets with 2463 sets on floating objects and 260 on free schools. In 2018, the percentage of sets on FOB was 90% and the catches reached 91%. The total catch of the French component of the EU purse seine fleet of the Indian Ocean was 84,729 t, being composed of 36%, 58%, and 6% of yellowfin tuna, skipjack tuna, and bigeye tuna respectively. Thus, the most noticeable change in 2018 is the shift of catches from the free school sets, dominated by yellowfin, to the associated school sets, dominated by skipjack. As a consequence, the increase in total catches mainly concerned the skipjack catches.*" – see paper for full abstract.

128. The WPDCS **NOTED** that the total catch of the EU,France purse seine fleet increased in 2018 while the effort decreased similarly to what was observed for the EU,Spain fleet.

129. The WPDCS **NOTED** that the shift of some of the effort exerted on free-swimming schools to FAD-fishing resulted in increased catch because of increased successful sets and high catch rates in 2018 which could be due to better selection of the schools thanks to better use of echo-sounders combined with optimized sharing of buoys within fishing companies.

5.1.11 Species composition, abundance and preliminary Spawning Potential Ratio (SPR) assessment for tuna and tuna like species: some results from application of mobile phone Catch Assessment Survey, Kenya

130. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-23 which provides an overview of Kenya's Catch Assessment Survey using mobile application technology, and provisional results of the species composition, abundance and other indicators for selected landing sites, including the following abstract provided by the authors:

"*This papers looks at data catch assessment survey data collected from the period June 2018-May 2019 with aim to strengthen the monitoring plans for tuna species and improve artisanal tuna data collection. A one-year electronic data collection using a mobile application was piloted at eleven (11) sites with landing sites as the primary sampling unit (PSU) and vessel gear combination as secondary sampling unit (SSU)…The results from this catch assessment survey contributes to enhancing monitoring of these key fish species and also an opportunity to strengthen the monitoring plans for those species and gather more information on the size at maturity which is important in the SPR assessment*." – see paper for full abstract.

131. The WPDCS **NOTED** that the provisional results of the Catch Assessment Survey using mobile technology have highlighted gaps in the coverage and representative of vessels landings, and estimation (i.e., possibility of under-reporting) of catches and catches-by-species and also provided size-frequency data from coastal fisheries.

132. The WPDCS **SUGGESTED** that Kenya liaise with FAO Kenya and/or the IOTC Secretariat to explore the possibility of future support and technical assistance regarding improvements in the Kenya's fisheries data collection and reporting systems, validation of the results of the Catch Assessment Survey for 2019, and revisions to the historical catches as required to minimise discontinuities in the catch series as result of changes in the data collection system.

5.1.12 Study on the sampling of catch species composition and size distribution in the purse seine fisheries

133. The WPDCS **NOTED** that paper IOTC-2019-WPDCS15-26 which describes the contents of a project aimed at studying the sampling of species and size composition of purse seine catch, including the following abstract provided by the author:

"*Obtaining accurate estimates of species and size composition of tuna catches is essential in order to provide accurate scientific advices for management of tuna resources. Experience has shown that this requires dedicated sampling programs, particularly when species are difficult to identify except by a trained observers (Fonteneau 1975, Báez et al. 2019). For the Atlantic and Indian ocean, species composition and size distribution of tuna targeted species (skipjack, yellowfin and bigeye) are estimated from the T3 methodology, developed by IRD and IEO (Pallarés and Hallier 1997, Pallarés and Petit 1998). The*

efficiency of this data processing depends on the quality of the sampling data (Duparc et al. 2018, Herrera and Baez 2019). Recent results (Duparc et al. 2018, 2019a, 2019b) pointed out the importance of the sampling at landing for the assessment of the species composition that lead to the final estimation of PS catches for several CPCs (EU,SP, EU,FR, EU,IT, SYC)" – see paper for full abstract.

134. The WPDCS **NOTED** that the project could provide valuable inputs to resolve the issues with observed differences in the species composition derived from the heterogeneous statistical systems used by EU,Spain and EU,France, EU,Italy and Seychelles.

135. The WPDCS **ACKNOWLEDGED** the difficulties encountered by observers in the Western-Central Pacific ocean in estimating the species composition at sea due to the logistical issues in sampling the catch from brailing operations and manipulating large individuals (>80-100 kg in some circumstances).

136. The WPDCS **ACKNOWLEDGED** that information collected from Electronic Monitoring constitute a valuable, additional source of data to estimate the species composition of the catch at the level of the fishing set, although other inherent difficulties with this approach have been highlighted by previous trials.

5.2 FURTHER ANALYSIS OF LENGTH FREQUENCY DATA AND LIKELY IMPACTS ON THE ASSESSMENTS

137. The WPDCS **NOTED** that paper IOTC-2019-WPDCS15-25 providing a review of new and historical data on the growth performance and age of yellowfin tuna, as determined from information collected by the Federal Ministry of Animal Resources Red Sea fisheries Research Center and Fisheries data Red Sea Fisheries Research Station of Sudan in 2017 was not presented.

"*Result shows that the yellowfin tuna, Thunnus albacares, is an important species in tuna isheries worldwide is a commercially important species of tuna inhabiting tropical and subtropical seas . In Sudan Red Sea there are 7 Tuna fish species. Knowledge of life history parameters was essential for understanding the population dynamics of yellowfin tuna (Schaefer, 1996). Several approaches were often used to determine the age and growth of the species, growth parameters, growth pattern and age. Determination of age by the analysis of marks on scales the fork length (cm) and wet weight (kg) of yellowfin the length-weight relationship was calculated as in Le Cren (1951). Estimated size of yellowfin at first maturity, calculation of the instantaneous annual mortality rate (Z), natural mortality calculations equation and mortality and exploitation rate.*" – see paper for full abstract.

6. REVIEW OF DATA REQUIREMENTS IN CONSERVATION AND MANAGEMENT MEASURES RELEVANT TO THE WPDCS

6.1 DATA REPORTING

6.1.1 Resolution 15/02 Mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPCs)

138. The WPDCS **NOTED** paper IOTC-2019-WPTT21-40 that provides the results of a Genomic analysis which reveals multiple mismatches between biological and management units in yellowfin tuna (*Thunnus albacares*), including the following abstract provided by the authors:

"*The South African (SAF) yellowfin tuna (Thunnus albacares) fishery represents a potential example of misalignment between management units and biological processes. The SAF fishery spans an operational stock with a boundary at 20◦E, either side of which fish are considered part of Atlantic or Indian Ocean regional stocks. However, the actual recruitment of fish from Atlantic and Indian Ocean spawning populations into SAF waters is unknown. To address this knowledge gap, genomic analysis (11 101 SNPs) was performed on samples from Atlantic and Indian Ocean spawning sites, including SAF sites spanning the current stock boundary. Outlier loci conferred high discriminatory power to assignment tests and revealed that all SAF fish were assigned to the Indian Ocean population and that no Atlantic Ocean fish appeared in the SAF samples. Additionally, several Indian Ocean migrants were detected at the Atlantic spawning site demonstrating asymmetric dispersal and the occurrence of a mixed-stock fishery in Atlantic waters. This study highlights both the spatial inaccuracy of current stock designations and a misunderstanding of interactions between the underlying biological units, which must be addressed in light of local and global declines of the species. Specifically, the entire SAF fishery must be managed as part of the Indian Ocean stock*" – see paper for full abstract.

139. The WPDCS **NOTED** that the results of the genomic analysis might be due to the cold upwelling that isolates the individuals in the South from those in the North, suggesting that the entire population of the South African coast is in reality entirely sourced from the Indian Ocean.

140. The WPDCS **NOTED** that if this findings are confirmed, then all Yellowfin tuna reported by South Africa to ICCAT should be reported to IOTC as well.

141. For this reason, the WPDCS **REQUESTED** the IOTC Secretariat to liaise with ICCAT in order to regularly receive this information in view of using the data for future stock assessments of the Indian Ocean Yellowfin tuna.

142. In light of these results from South Africa, the WPDCS **REQUESTED** that similar projects are implemented for fleets that operate in the South-eastern waters of the Atlantic ocean to assess the extent of distribution of the stock.

6.1.2 Resolution 17/05 On the conservation of sharks caught in association with fisheries managed by IOTC

6.1.3 Resolution 18/07 On measures applicable in case of non-fulfilment of reporting obligations in the IOTC

143. The WPDCS **ACKNOWLEDGED** that the recommended IOTC forms for reporting mandatory statistical information are sometimes difficult for CPCs to fill, due to the way in which these are designed (macro-enabled Excel spreadsheets that at times do not work as expected on all client machines).

144. At the same time the WPDCS **NOTED** that the e-MARIS platform (electronic Monitoring And Reporting Information System) has now entered the development phase. Once e-MARIS is fully rolled-out, it will enable CPCs to directly upload all types of IOTC required information (including, but not limited to, statistical data) through a web interface that will provide immediate feedback on the correctness of the information uploaded, and that for this reason the statistical data upload templates will be made more user-friendly and simplified

6.1.4 Resolution 19/01 On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock

145. The WPDCS **RECALLED** that Resolution 19/01 (similarly to what already dictated by Resolution 16/01 and its superseding resolutions) expects a reduction on Yellowfin tuna catches to only apply to captures of the species reported by vessels of over 24m LOA or fishing outside their flag state EEZ.

146. For what concerns the identification of the catch levels subject to said reductions for fisheries employing vessels in the categories above, the WPDCS **ACKNOWLEDGED** that the Secretariat took a multi-step approach that involved a number of activities presented here in chronological order:

i. Estimate the fraction of total Yellowfin tuna nominal catches subject to Resolution 16/01 by gear and CPCs on the basis of known characteristics of the fleet (artisanal / semi-artisanal / industrial and area of operation);

ii. Present the results in IOTC circular 2017-057 ("*Confirmation of catch limits for Yellowfin tuna under Resolution 16/01*") released on May 16th 2017 and inviting involved CPCs to explicitly confirm (or contest) the reported Yellowfin catch levels estimated by the IOTC Secretariat as being subject to Resolution 16/01;

iii. Correct the estimations in i) on the basis of the feedback received by CPCs;

iv. Explicitly request CPCs to submit the breakdown of their Yellowfin tuna catches as already separated between the components subject to and exempted from the catch reductions dictated by Resolution 17/01 (and superseding);

v. Adopt the new, revised catch levels – resulting from a combination of estimated and officially reported data as in iv) – as the basis from which determining the fraction of catches subject to Resolution 18/01 (and superseding) for all purposes explicitly indicated by the Resolution itself.

147. For what concern point iv) above, the WPDCS **ACKNOWLEDGED** that several CPCs (e.g., Sri Lanka, I.R. Iran, Maldives, India etc.) are now reporting their Yellowfin tuna catches from concerned gears (mostly Gillnets, Bait boats and Handlines) as already separated between the components subject to and exempted from Resolution 18/01 (and superseding) and that this facilitates the analysis of the status of its implementation.

148. Additionally, the WPDCS **NOTED** that it might be possible for vessels using drifting gillnets to operate in the EEZ of the flag state as well as in the high seas during the same fishing operation, and that for this reason is particularly important that these vessels adopt proper data recording mechanisms (logbook and similar) to

ensure the location of each fishing set is properly recorded and used to determine whether subsequent Yellowfin tuna catches shall count against the limits established by Resolution 19/01 or not.

149. The WPDCS further **NOTED** that CPCs that are already part of a chartering agreement (or are planning to participate to such agreements in the future) shall ensure that all the General Provisions reported in paragraph 3 of Resolution 19/07 (*On vessels chartering in the IOTC area of competence*) are respected, in particular those reported under sub-paragraphs 3.6 – 3.11 that are of special relevance to this Working Party.

6.2 DATA RECORDING (LOGBOOKS)

6.2.1 Resolution 15/01 On the recording of catch and effort data by fishing vessels in the IOTC area of competence

6.2.2 Resolution 19/02 Procedures on a fish aggregating devices (FADs) management plan, including a limitation on the number of FADs, more detailed specifications of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species

150. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-21 that provides information on a major reduction in the number of FADs used in the Seychelles purse seine fishery following IOTC limitations, including the following abstract provided by the authors:

> "*Positions of satellite-tracked buoys used to follow Fish Aggregating Devices (FADs) and natural floating objects at sea are essential to fulfill the mandatory statistical requirements of the IOTC and monitor the number of floating objects followed by each purse seiner at any time. The fishing companies owning purse seiners and support vessels flying the Seychelles flag have recently provided to the Seychelles Fishing Authority the GPS buoy positions covering the period 2015-2018. The raw data set, composed of almost 10 million positions, was pre-processed to generate daily positions and filtered to remove duplicates, errors of transmission, etc. A speed filter was used to remove buoys onboard vessels and build trajectories of floating objects at sea. Next steps of the work will include the use of a random forest algorithm to improve the separation of onboard from at-sea positions and the development of a database to manage the data. Combined with the information on deployments, retrieval, and FAD design collected through the Seychelles observer program that covered 70% of the Seychelles purse seiner's activities in 2018, this new data set provides a major step in the advancement of more transparency and sustainability in the Indian Ocean purse seine fishery*."

151. The WPDCS **NOTED** the difference between the number of activated buoys vs. buoys transmitting signals to the satellites at a given time and **ACKNOWLEDGED** that, notwithstanding these differences (with the former being constantly in higher numbers than the latter) the requirements of Resolutions 16/01, 17/01 and 18/01 in terms of number of active buoys at sea are fully respected by the considered Seychellois vessels.

152. Also, the WPDCS **NOTED** that the availability of the GPS positions transmitted by the buoys could be effectively used to assess the spatial distribution of the monitored floating objects, as well as track the drifting behaviour and predict potential risks with deployment in specific areas and seasons.

7. REGIONAL OBSERVER SCHEME

7.1 RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

153. The WPDCS **NOTED** document IOTC-2019-WPDCS15-INF06 that describes the outcomes and recommendations of the capacity building workshop on observer data collection for tuna fisheries in the Indian Ocean (ROS II workshop) held in Karachi, Pakistan from December 11-13 2018.

154. The WPDCS **NOTED** that the workshop highlighted and identified the major challenges and issues related to implementing scientific observer programs in small-scale fisheries, and encouraged the coupling of technologies for data collection, verification and validation to overcome logistical limitations preventing the possibility of having independent human observers onboard.

155. The WPDCS also **NOTED** that the workshop reiterated the need of a better classification of artisanal (small-scale) and (semi)industrial vessels, in consideration of the fact that many vessels exist in the latter category that are in the range of 20-24m LOA (i.e., not subject to several IOTC Resolutions such as 11/04, 19/01 and similar).

156. The WPDCS **NOTED** that WWF-Pakistan crew-based observer programme is based on data collection mechanisms supported by skippers or captains, primarily onboard small-scale fishing vessels and is not intended to replace, but complement, the independent scientific observer coverage as determined by the IOTC ROS, and

that the Government of Pakistan is looking for funds to adopt the WWF-Pakistan crew-based observer programme for the next five years (2020-2024).

7.2 RESOLUTION 16/04 ON THE IMPLEMENTATION OF A PILOT PROJECT IN VIEW OF PROMOTING THE REGIONAL OBSERVER SCHEME OF IOTC

157. The WPDCS **NOTED** that a several discussions pertinent to the Regional Observer Scheme of IOTC and the Pilot Project for its implementation (Resolution 16/04) were held during its 14th session in 2018, including updates on the outcomes of the ROS Expert Consultation Workshop held in Victoria, Seychelles (September 2018) and detailed analysis and endorsement of the new set of ROS minimum standard data fields for data collection and reporting.

158. For this reason, and considering the discussions expected during the current session of this Working Party on issues of relevance to the ROS (e.g., alternative tools to complement crew-based data collection programmes, EMS trials, capacity building activities etc.) the WPDCS **ACKNOWLEDGED** that no further ROS-related topics will be discussed under this agenda item unless strictly necessary.

7.3 UPDATES ON THE ROS SUPPORTING TOOLS AND THE REGIONAL OBSERVER DATABASE

7.3.1 Outcomes of the national workshops on the adoption of the ROS supporting tools

159. The WPDCS **NOTED** that the information presented during the ROS workshop in Mauritius (April 2019) including presentations, training materials and the final workshop report, is publicly available for consultation and could be used as reference for similar initiatives to be delivered to other interested CPCs.

8. CAPACITY BUILDING ACTIVITIES: DATA COLLECTION AND PROCESSING IN COASTAL COUNTRIES, AND COMPLIANCE WITH MINIMUM REQUIREMENTS

160. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-08 on the capacity building activities of the Secretariat in 2019 - 2020 including the following abstract provided by the authors:

> "*Since its inception the Commission has allocated funds from its regular budget to assist developing coastal CPCs in the Indian Ocean in the implementation of the IOTC data requirements. In addition to the funds allocated by the Commission, the IOTC Secretariat has also secured funding from external sources; in recent years, funds sourced from third parties have been well above those allocated by the Commission. Since April 2002, the Overseas Fisheries Cooperation Foundation of Japan has been assisting developing coastal states in the IOTC Area of Competence with their statistical data collection, processing, and reporting systems, with a view to enhancing the capacity of institutions in those countries and improve their compliance with IOTC requirements for statistics and other scientific data used on the assessments of IOTC species. In recent years, the IOTC has also received substantial funding for capacity building activities from other sources, including the Bay of Bengal Large Marine Ecosystems Project (BOBLME), the IOC-SmartFish Project and, more recently, the GEF-Areas Beyond National Jurisdiction Project (ABNJ) and EU DG-Mare. This document presents the activities undertaken by the IOTC and its partners during the last year (2019), including those activities that will extend to 2020 and following years, where appropriate.*"

161. The WPDCS **THANKED** the IOTC Secretariat for the delivery of capacity building activities to support the data collection and reporting systems of developing coastal CPCs, and **ACKNOWLEDGED** in particular the progress achieved in further implementing the Regional Observer Pilot Project activities, including development of the IOTC Regional Database, finalization of electronic data collection and reporting tools within national CPCs, procurement of the Electronic Monitoring Systems for Sri Lanka and support to the implementation of the ROS training programme, that should lead to sensible improvements in the coverage and quality of observer data reported to the IOTC.

162. The WPDCS **NOTED** again with concern that non-reporting of mandatory data continued to fundamentally affect the quality of stock assessments and management of IOTC species (particularly neritic tunas and billfish), and that the overall quality and reporting coverage is disproportionately related to a number of CPCs important for artisanal fisheries such as Indonesia, India and Pakistan.

163. The WPDCS **NOTED** that the results of the review and analysis of the distant water longline fleet size data conducted in 2019 (for Japan, Rep. of Korea, Seychelles, Taiwan,China) will be provided to the IOTC Working Parties during Q1 2020.

164. The WPDCS also **NOTED** that two countries (Indonesia and Tanzania) were visited in 2019 by the IOTC Secretariat in conjunction with the consultants selected by the FAO/CITES Artisanal Fishery project to conduct

a review of the current status of data available and data collection systems currently in place for monitoring artisanal fisheries across the Indian Ocean.

165. The WPDCS **ACKNOWLEDGED** the support of OFCF for the finalization of the Seychelles' fisheries satellite account (addressing the needs of understanding the dependencies of national economy on fish resource utilization), including arrangements for the handover of the work and dissemination of the results.

166. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-22 on the FAO methodologies and tools to support Member Countries to reinforce their fisheries statistics supply chain (from data collection to statistics reporting)including the following abstract provided by the authors:

> "*FAO Fisheries Statistics and Information Branch is presenting its core activities in terms of support to Member Countries to reinforce their capacity to produce fisheries statistics for the benefit of FOA but also IOTC. First, the role of FAO related to SDG indicators is recalled, with the source of data coming from national and regional level. Secondly, the role of FAO as standard owners and providers is recalled. Some of these standards are endorsed by IOTC and are supporting harmonization and standardization of statistics. Finally, the mandate of FAO to provide technical support to Member Countries is presented. The different tools to reinforce countries capacities to produce fisheries statistics are listed, from technical papers, international course on fisheries statistics to IT solutions in support to streamlined fisheries statistics supply chain. Convergence of activities and support between FAO and IOTC is highlighted in the conclusion*".

167. The WPDCS **NOTED** the capacity building strategies and methods proposed by FAO in the context of reporting on the four Strategic Development Goals the department of Fisheries is custodian for and **ACKNOWLEDGED** that several challenges are in common for many member countries for what concerns the collation of fisheries information data and statistics.

168. Furthermore, the WPDCS **NOTED** that the key activities that FAO has been implementing to reinforce member states' capacity include the development of standard concepts, definitions and classifications in support of harmonization and standardization of statistics production and exchange at national, regional and international level.

169. The WPDCS also **NOTED** that FAO / FI has already a number of tools in support of the implementation of the proposed standards for data collection, storage, process, report and exchange: *OpenArtFish* to produce catch and effort data, *SmartForms* to design and create mobile forms for field data collection activities and the more advanced, web-based *Calipseo* platform to deploy national Fisheries Statistics and Management Information Systems.

170. Finally, the WPDCS **ACKNOWLEDGED** that three countries (Mauritius, Pakistan and Kenya) expressed the need to receive support and technical assistance from FAO and IOTC for several aspects related to the national capacity in managing fisheries statistics, such as: extending the WWF crew-based data collection programme (Pakistan), drafting the specification for the development of a centralized fisheries management information system (Mauritius) and improving the processing of catch-and-effort data (Kenya).

9. FISHERIES INFORMATION AND DISSEMINATION SYSTEMS

9.1 PROPOSED METADATA STANDARDS FOR THE FISHERIES DOMAIN

171. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-24 that describes the rationale for assigning Digital Object Identifiers (DOIs) to publicly-accessible IOTC documents and assets and how their publication on the open-access data repository Zenodo could increase their accessibility, including the following abstract provided by the authors:

> "*DOIs are persistent, unique identifiers that are increasingly becoming a standard method to help identify research objects. They give a digital 'footprint' that follows the research object throughout its lifespan, regardless of where it is physically hosted. A workshop was held in April 2019 at the Indian Ocean Tuna Commission (IOTC) Secretariat in Victoria, Seychelles called by the Institut de Recherche pour le Développement (IRD) as part of the "Fisheries and aquaculture" use case of the European OpenAire-Connect H2020 project. The aim of this 'use case' is to publish the publicly-accessible IOTC documents that are of scientific interest to the "Fisheries and aquaculture" community on the open-access data repository, Zenodo (i.e. assign digital object identifiers, or DOIs to IOTC documents).*" – see paper for full abstract.

172. The WPDCS **NOTED** that the ad-hoc and unstructured nature of the metadata available for all resources of scientific interest published through the IOTC website (meeting documents, reports, data sets, etc.) results in reduced accessibility to such information for the scientific community.

173. For this reason, the WPDCS **ACKNOWLEDGED** that the proposed approach is beneficial to guarantee better metadata management (in accordance with the *DataCite* schema) and improve the discoverability of all information assets hold by the IOTC and with a DOI assigned.

174. The WPDCS **NOTED** that, in the exercise of assigning DOIs to historical information assets already published through the IOTC website, a considerable effort was required to filter out all the unwanted elements from the list of assets to be published on the *Zenodo* repository and **ACKNOWLEDGED** that properly trained authors and scientists could provide their documents to the IOTC Secretariat with properly structured metadata already at submission time.

175. **ACKNOWLEDGING** that a number of scientific resources held by the IOTC Secretariat are still in need of receiving a DOI (and therefore are prevented from sharing the same level of interoperability that proper metadata and a persistent identifier would guarantee), the WPDCS **NOTED** that potential funding might be needed to continue this activity.

176. The WPDCS **AGREED** that the adoption of standard metadata would be particularly useful to enable proper referencing of all IOTC scientific assets, and that the harmonization of keywords to describe the asset contents would benefit from the results of similar exercises already performed by other RFMOs.

9.2 BEST PRACTICES FOR (META)DATA ACCESS AND VISUALIZATION

177. The WPDCS **NOTED** document IOTC-2019-WPDCS15-INF05 describing the online data platform currently being developed by WWF-Pakistan.

178. The WPDCS **NOTED** that the platform can be used to analyse the geospatial characteristics of fisheries data collected from the WWF-supported crew-based data collection program, which draws out a spatial inventory of catch and bycatch data**.**

179. **ACKNOWLEDGING** that the platform is still at its prototypical stage, the WPDCS **ENCOURAGED** the authors to continue the excellent work and share the final product at the next WPDCS meeting in 2020.

10. WPDCS PROGRAM OF WORK

10.1 REVISION OF THE WPDCS PROGRAM OF WORK (2020–2024)

180. The WPDCS **NOTED** paper IOTC-2019-WPDCS15-09 which provided an opportunity to consider and revise the WPDCS Program of Work (2020–2024), by taking into account the specific requests of the Commission, Scientific Committee, and the resources available to the IOTC Secretariat and CPCs.

181. The WPDCS **RECALLED** that the SC, at its 18th Session, made the following request to its working parties:

> "*The SC REQUESTED that during all future Working Party meetings, each group not only develop a Draft Program of Work for the next five years containing low, medium and high priority projects, but that all High Priority projects are ranked. The intention is that the SC would then be able to review the rankings and develop a consolidated list of the highest priority projects to meet the needs of the Commission. Where possible, budget estimates should be determined, as well as the identification of potential funding sources*." (SC18. Para 154)

182. The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2020–2024), as provided at Appendix V.

183. The WPDCS **RECALLED** that, compared to staffing resources in other tRFMOS, the IOTC Secretariat is still under-resourced and limited in its current capacity to provide support for the following core functions:

- Assist countries to facilitate reporting and improve compliance in terms IOTC mandatory statistical data collection and reporting requirements, including the Regional Observer Scheme.
- Improve the quality and transparency of data in the IOTC database, including documentation of data reviews and dataset processing procedures, development of data quality indicators and quantifying uncertainty in catch estimates.
- Provide technical support to countries in the region in establishing and maintaining statistical systems for collecting and reporting data to the IOTC, particularly in relation to sampling of artisanal fisheries.
- Support for new priorities identified by the Scientific Committee and Commission, including the Regional Observer Scheme pilot project, Electronic-monitoring, and catch monitoring in support of Resolution 19/01 *On an Interim Plan for Rebuilding the Indian Ocean Yellowfin tuna Stock in the IOTC area of competence*.

- Dissemination of information on data-related Commission activities through the IOTC website, assigning standard metadata and DOIs, data exchange between tRFMOs and related organizations.

11. OTHER BUSINESS

11.1 DATE AND PLACE OF THE 16TH AND 17TH SESSIONS OF THE WPDCS: 2020 & 2021

184. The WPDCS **THANKED** Pakistan for hosting the 15th Session of the WPDCS and commended the IOTC Secretariat on the warm welcome, the excellent facilities and assistance provided to participants in the organisation and running of the Session.

185. The WPDCS **REQUESTED** that the IOTC Secretariat liaise with CPCs to determine the host country for the 16th and 17th sessions of the WPDCS respectively (Table 1).

Table 1. Draft meeting schedule for the WPDCS (2020 and 2021)

	2020			2021		
Meeting	**No.**	**Date**	**Location**	**No.**	**Date**	**Location**
Working Party on **Data Collection and Statistics** (WPDCS)	16th	TBD	TBD	17th	TBD	TBD

11.2 ELECTION OF A CHAIRPERSON AND VICE-CHAIRPERSON FOR THE NEXT BIENNIUM

Chairperson

186. The WPDCS **NOTED** that the first term of the current Chairperson, Mr. Stephen Ndegwa (Kenya) expired at the close of the WPDCS15 meeting and, as per the IOTC Rules of Procedure (2014), participants are required to elected a new Chairperson of the WPDCS for the next biennium.

187. **NOTING** the Rules of Procedure (2014), the WPDCS **CALLED** for nominations for the position of Chairperson of the IOTC WPDCS for the next biennium. Mr. Stephen Ndegwa was nominated, seconded and re-elected as Chairperson of the WPB for the next biennium.

Vice-Chairperson

188. The WPDCS **NOTED** that the first term of the current Vice-Chairperson, Dr. Julian Barde (EU,France) expired at the close of the WPDCS15 meeting and, as per the IOTC Rules of Procedure (2014), participants are required to elected a new Vice-Chairperson of the WPDCS for the next biennium.

189. **NOTING** the Rules of Procedure (2014), the WPDCS **CALLED** for nominations for the position of Vice-Chairperson of the IOTC WPDCS for the next biennium. Dr. Julian Barde was nominated, seconded and re-elected as Chairperson of the WPDCS for the next biennium.

11.3 REVIEW OF THE DRAFT, AND ADOPTION OF THE REPORT OF THE 15TH SESSION OF THE WPDCS

190. The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS15, provided at Appendix VI.

191. The report of the 15th Session of the Working Party on Data Collection and Statistics (IOTC-2019-WPDCS15-R) was **ADOPTED** on the 30th November 2019.

APPENDIX I
LIST OF PARTICIPANTS

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APPENDIX II
AGENDA FOR THE 15TH WORKING PARTY ON DATA COLLECTION AND STATISTICS

Date: 27th – 30th November 2019
Location: Karachi, Pakistan
Venue: Marriot Hotel conference room
Time: 09:00 – 17:00 daily

Chair: Mr Stephen Ndegwa (Kenya); **Vice-Chair:** Dr Julien Barde (EU,France)

1. **OPENING OF THE MEETING** (Chair)
2. **ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION** (Chair)
3. **THE IOTC PROCESS: OUTCOMES, UPDATES AND PROGRESS** (IOTC Secretariat)
   - 3.1 Outcomes of the 21st Session of the Scientific Committee and of the 23nd Session of the Commission
   - 3.2 Review of Conservation and Management Measures relevant to the WPDCS
   - 3.3 Progress on the recommendations of WPDCS14
4. **PROGRESS REPORT OF THE SECRETARIAT ON DATA RELATED ISSUES** (IOTC Secretariat)
   - 4.1 IOTC Secretariat Report
   - 4.2 Dissemination of IOTC data sets and documents
     - 4.2.1 IOTC Data Summary: updates
     - 4.2.2 IOTC Data Dissemination: discussion of potential improvements
     - 4.2.3 Alternative data series
   - 4.3 Updates on data-related requests from other Working Parties
5. **UPDATE ON NATIONAL STATISTICAL SYSTEMS** (CPCs)
   - 5.1 Update on national statistical systems, including the main challenges in collecting and reporting data to the IOTC Secretariat and proposals to improve future levels of compliance with IOTC data requirements.
   - 5.2 Further analysis of length frequency data and likely impacts on the assessments (IOTC Secretariat & CPCs)
6. **REVIEW OF DATA REQUIREMENTS IN CONSERVATION AND MANAGEMENT MEASURES RELEVANT TO THE WPDCS** (IOTC Secretariat)
   - 6.1 Data reporting (to the IOTC Secretariat)
     - 6.1.1 Resolution 15/02 *On mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)*
     - 6.1.2 Resolution 17/05 On the conservation of sharks caught in association with fisheries managed by IOTC
     - 6.1.3 Resolution 18/07 *On measures applicable in case of non-fulfilment of reporting obligations in the IOTC*
     - 6.1.4 Resolution 19/01 *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC area of competence*
   - 6.2 Data recording (logbooks)
     - 6.2.1 Resolution 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence*

6.2.2 Resolution 19/02 *Procedures on a fish aggregating devices (FADs) management plan*

7 REGIONAL OBSERVER SCHEME (IOTC Secretariat & CPCs)

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

7.2 Resolution 16/04 *On the implementation of a pilot project in view of promoting the Regional Observer Scheme of IOTC*

7.3 Updates on the ROS supporting tools and the Regional Observer Database

7.3.1 Outcomes of the national workshops on the adoption of the ROS supporting tools

8 CAPACITY BUILDING ACTIVITIES: DATA COLLECTION AND PROCESSING IN COASTAL COUNTRIES, AND COMPLIANCE WITH MINIMUM REQUIREMENTS (Chair & IOTC Secretariat)

9 FISHERIES INFORMATION AND DISSEMINATION SYSTEMS (Chair & IOTC Secretariat)

9.1 Proposed metadata standards for the fisheries domain

9.2 Best practices for (meta)data access and visualization

10 WPDCS PROGRAM OF WORK (Chair & IOTC Secretariat)

10.1 Revision of the WPDCS Program of Work 2020–204

11 **OTHER BUSINESS**

11.1 Date and place of the 16th and 17th Sessions of the WPDCS: 2020 & 2021 (Chair)

11.2 Election of a Chairperson and Vice-Chairperson for the next biennium (IOTC Secretariat)

Review of the draft, and adoption of the report of the 15th Session of the WPDCS (Chair)

APPENDIX III
LIST OF DOCUMENTS

Document	Title
IOTC-2019-WPDCS15-01a	Agenda of the 15th Working Party on Data Collection and Statistics
IOTC-2019-WPDCS15-01b	Annotated agenda of the 15th Working Party on Data Collection and Statistics
IOTC-2019-WPDCS15-02	List of documents of the 15th Working Party on Data Collection and Statistics
IOTC-2019-WPDCS15-03	12. OUTCOMES OF THE 21ST SESSION OF THE SCIENTIFIC COMMITTEE (IOTC SECRETARIAT)
IOTC-2019-WPDCS15-04	13. OUTCOMES OF THE 23RD SESSION OF THE COMMISSION (IOTC SECRETARIAT)
IOTC-2019-WPDCS15-05	Review of current Conservation and Management Measures relating to the WPDCS (IOTC Secretariat)
IOTC-2019-WPDCS15-06	Progress on the recommendations of WPDCS14 (IOTC Secretariat)
IOTC-2019-WPDCS15-07	IOTC data capacity building activities in 2019 (IOTC Secretariat)
IOTC-2019-WPDCS15-08	IOTC capacity building activities in support of developing coastal IOTC CPCs (IOTC Secretariat)
IOTC-2019-WPDCS15-09	Revision of the WPDCS Program of Work (2020–2024) (IOTC Secretariat, Chairperson & Vice-Chairperson)
IOTC-2019-WPDCS15-10	Alternative approaches to the revision of official species composition for the Spanish log-associated catch-and-effort data for tropical tuna species in 2018 (IOTC Secretariat)
IOTC-2019-WPDCS15-11	Actions taken by Iran to Improve Catch & Effort Data in 2018 (Khorshidi S)
IOTC-2019-WPDCS15-12	Instauration Du Systeme Openartfish Dans La Collecte De Donnees De La Peche Traditionnelle A Madagascar (Rasolomampionona M)
IOTC-2019-WPDCS15-13	Data Collection and Statistics in Mauritius (Sheik Mamode A, Lim Shung C and Jhummun Foolheea H)
IOTC-2019-WPDCS15-14	Way forward for an improved data collection and management system for fisheries data in Sri Lanka (Weerasekera S, Gunawardane N, Wimalasiri H, Balawardhana B, Haputantri S, Perera U, Nilanka K and Chandrakumara K)
IOTC-2019-WPDCS15-15	Fisheries Data Collection and Recent Fisheries Statistics in Thai Waters: A case of Andaman Sea (Noranarttragoon P)
IOTC-2019-WPDCS15-16	Improvement on the implementation of the new Malaysia e-Logbook for tuna Fisheries in Indian Ocean (Sallehudin J, Noor Hanis A, Tengku Balkis T and Nor Azlin M)
IOTC-2019-WPDCS15-17	Issues with Data Collection of Tuna and Tuna like Species in Pakistan and Introduction of Logbook System for Small Scale Fisheries (Moazzam M)
IOTC-2019-WPDCS15-18	Problems and issues of conversion of gillnetting fleet of Pakistan to longlining with the aim to reduce bycatch (Moazzam M)
IOTC-2019-WPDCS15-19	A review of historical Pakistan catch series for Yellowfin and Skipjack tuna (IOTC Secretariat)
IOTC-2019-WPDCS15-20	Fishermen as observers of the pelagic ocean: The example of marine turtles observed in the Indian Ocean purse seine fishery (Chassot E, Ruiz J, Ramos ML, Barreau E, Mein M, Tirant A, Salgado A, Baez JC, Grande M, Lucas J)
IOTC-2019-WPDCS15-21	Major reduction in the number of FADs used in the Seychelles purse seine fishery following IOTC limitations (Chassot E, Lucas V, Assan C, Lucas J, Louys J)
IOTC-2019-WPDCS15-22	FAO methodologies and tools to support Member Countries to reinforce their fisheries statistics supply chain (from data collection to statistics reporting) (Laurent Y)

Document	Title
IOTC-2019-WPDCS15-23	Species composition, abundance and preliminary spawning potential Ratio (SPR) assessment for tuna and tuna like species: Some results from application of mobile phone -Catch Assessment Survey, Kenya (Mueni E, Ndegwa S, Magak C, Omukoto J, Okemwa G, Imam R, Wachira K, Mwasi L, Kapombe L, Bandari S and Kimakwa E)
IOTC-2019-WPDCS15-24	Assigning DOIs to publically-accessible IOTC documents and their publication on the open-access data repository Zenodo (Nieblas A-E, Fiorellato F, Blondel E, de Bruyn P and Barde J)
IOTC-2019-WPDCS15-25	Review of historical and new data on Growth parameters and age of Yellowfin tuna, Thunnus albacores (Zeinlabdien G)
IOTC-2019-WPDCS15-26	Study on the sampling of catch species composition and size distribution in the purse seine fisheries (Duparc A, Baez J-C, Ruiz J, Maufroy A, Assan C, Lucas J, Pernak M, Bach P)
IOTC-2019-WPTT21-11	Statistics of the French Purse Seine Fishing Fleet Targeting Tropical Tunas in the Indian Ocean (1981-2018) (Floch L, Depetris M, Dewals P , Duparc A, Lebranchu J, Pernak M and Bach P)
IOTC-2019-WPTT21-40	Genomic analysis reveals multiple mismatches between biological and management units in yellowfin tuna (Thunnus albacares) (Mullins R, McKeown N, Sauer W and Shaw P)
IOTC-2019-WPDCS15-INF01	Monitoring artisanal fisheries in the Indian Ocean - final project report (MRAG Ltd)
IOTC-2019-WPDCS15-INF02	Reliance of national economy on IOTC resources: Case studies using Fishery Satellite Account (Tsuji S)
IOTC-2019-WPDCS15-INF03	Progress Report of the IOTC-OFCF Collaborative Project, Phase V (Tsuji S)
IOTC-2019-WPDCS15-INF04a	Global Atlas of AIS-based fishing activity: Challenges and opportunities (Taconet M, Kroodsma D, Fernandes J-A)
IOTC-2019-WPDCS15-INF04b	AIS-based fishing activity in Western Indian Ocean (Murua H, Granado I, Gee J, Kroodsma D, Miller N-A, Taconet M, Fernandes J-A)
IOTC-2019-WPDCS15-INF04c	AIS-based fishing activity in the Eastern Indian Ocean (Grande M, Murua H, Granado I, Taconet M, Kroodsma D, Miller N-A, Fernandes J-A)
IOTC-2019-WPDCS15-INF05	Online Data Platform: An interactive fisheries management tool (Kazmi S M R, Akram U, Shahid U, Razzaque S A, Khan J U, Khan B, Nawaz R, Ayub S)
IOTC-2019-WPDCS15-INF06	Capacity Building Workshop On Observer Data Collection For Tuna Fisheries In The Indian Ocean
IOTC-2019-WPDCS15-INF07	Project proposal: improving the data collection system for tuna and bycatch species in Iran

APPENDIX IV
MAIN DATA ISSUES IDENTIFIED BY THE WPDCS AND ACTIONS PROPOSED TO ADDRESS THEM

Nominal catches	
Main Issues	**Proposed Actions**
Indonesia: coastal fisheries. Issue: Improve estimates of total catch and species composition of artisanal fisheries.	• Continue ad-hoc collaboration with DGCF (dependent on available funds/resources) and support for sampling of artisanal fisheries, to ensure Indonesia has capacity to monitor artisanal fisheries and fulfill IOTC data reporting requirements.
Sri Lanka: Coastal and offshore fisheries. Issue: Support for implementation of ROS / ROS pilot project.	• IOTC Secretariat to continue support for Sri Lanka, primarily through development of the Regional Observer Scheme. • Support the implementation of the ROS e-Reporting system; also completion of the trialing of electronic monitoring systems (for 6 gillnet/longline vessels) commenced in Q3-2019.
Yemen: Handline fishery. Issue: Improve quality of catch estimates.	• FAO catch estimates currently used; the IOTC Secretariat to explore options for further improvements in the catch estimates.
India: Commercial longline fishery and coastal fisheries Issue: Inconsistencies in reported catches.	• Conflicting catches reported by India's national fisheries institutions continue to be noted by the IOTC Secretariat, and brought to the attention of the IOTC WP and SC. • India has indicated that the IOTC shall use official figures, irrespective of how incomplete (or inconsistent) they may be. • In 2017 data was submitted late (October), while no data has been reported in 2018 and partial data has been reported in 2019. • Notable improvement in engagement from national scientists and stakeholders detected during 2019.
Pakistan: Drifting gillnet fishery. Issue: Validation of revised catch series; improvements in data collection and reporting of IOTC data.	• ABNJ-WWF Project crew-based data collection pilot programme initiated in 2014; IOTC Secretariat liaising with Pakistan in terms of support for appraisal of the data. • Revised catch series submitted starting from 2017 for the last 30 years have been evaluated by the IOTC Secretariat and await final endorsement prior to be uploaded to the IOTC database.
Madagascar: Coastal fisheries and longline fisheries Issue: Lack of data collection, including catch and effort and size data (longline fleet).	• Provide assistance in the sampling of artisanal fisheries upon request (dependent on staff / funds available). Liaise with FAO / FI to assess possible options for combined interventions in the country.
Catch-and-Effort	
Main Issues	**Proposed Actions**
Implementation of minimum requirements for operational data (logbook)	
Indonesia: Longline Issue: Inconsistencies between logbook and VMS data.	• IOTC to encourage strengthening management and validation of logbook data – particularly inconsistencies with VMS data and issues of low reporting rates of submitted logbooks (<10% in recent years).
India, **Malaysia** and **Oman** Longlines **Pakistan**: Driftnets	• As part of the IOTC Data Compliance and Support missions, provide assistance to CPCs to understand the IOTC data

Issue: Data either not submitted, or falls short of the IOTC data reporting requirements.	requirements and processing of information and urge them to implement requirements and report data to the IOTC.
Most fisheries	• Implement minimum data requirements for sharks (noting that those for India are different as it has objected the logbook Resolution).
Catch-and-effort not available for coastal fisheries	
Issue: Many CPCs have failed to report catches and effort per month for their coastal fisheries.	• As a minimum, request CPCs to report catches and fishing by species, gear, and month, in addition to the total numbers of fishing craft operated by gear, and month (or year). • Follow-up to 2019-09 mission to Oman to finalize proper standardization of the statistical information available for handlines and gillnets, and eventually submission of C-E data according to Res. 15/02

Observer Schemes	
Main Issues	**Proposed Actions**
Observer reports. Issue: Very poor rates of reporting.	• Explore ways of facilitating reporting of data using the new IOTC ROS electronic reporting tool. • Organize ROS training and workshops to assist CPCs with implementation of the ROS data reporting requirements. • Implementation of the pilot study of electronic monitoring systems in Sri Lanka for coastal fisheries for which there are difficulties placing on-board observers.
Size Frequency	
Issue: Data not reported	
Coastal fisheries of **India**, **Indonesia**, **Malaysia**, **Oman**, **Yemen**, and longlines of **India**	• Assist CPCs to understand data requirements, and provide support to pilot sampling and processing of fisheries data and urge them to strictly implement IOTC mandatory data reporting requirements.
Driftnets of **Pakistan**	• ABNJ-WWF Project crew-based data collection pilot programme initiated in 2014 includes collection of size frequency samples. • IOTC Secretariat liaising with Pakistan in terms of possible assistance for data entry, processing and submission of data via the Pakistan government.
Issue: Data poor quality	
Longline fisheries of **Japan** and **Taiwan,China**: Catch-and-effort and size data conflicting over the time series.	• A project planned for 2019 is now completed: it examined the inconsistencies in size frequency data reported by distant water fishing nations and resolved longstanding inconsistencies between average weights derived from length frequencies and catch-and-effort between fleets operating in comparable time-area strata. Final outputs expected by Q1 2020
Data not by IOTC standards for the gillnet fishery of **I.R. Iran.**	• The IOTC Secretariat to continue to provide assistance to I.R. Iran to submit size data according to fishing ground (rather than landing site) based on port sampling (as logbooks are currently being piloted on a limited number of vessels).
Socio-Economic Data	

Issue: Limited data available, and collated within the IOTC database.	• A scoping study was initiated by the IOTC Secretariat in 2019, at the request of the Commission, to identify the social and economic data that are relevant to CPCs and IOTC and to recommend comprehensive methods to acquire these data. • IOTC-OFCF project reached the finalization phase for the fisheries satellite national account of Seychelles, and is now expected to continue providing support to other CPCs (where applicable).

APPENDIX V
WORKING PARTY ON DATA COLLECTION AND STATISTICS PROGRAM OF WORK (2020–2024)

The Program of Work consists of the following, noting that a 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. Priority topics for obtaining the information necessary to deliver the necessary advice to the Commission.

Topic	Sub-topic and project	Priority ranking	Timing				
			2020	2021	2022	2023	2024
1. Artisanal fisheries data collection	1.1 Assist the implementation of data collection and sampling activities of coastal fisheries in countries/fisheries insufficiently sampled in the past; priority to be given to the following fisheries:	2					
	• Coastal fisheries of Indonesia						
	• Coastal fisheries of I.R. Iran[1]						
	• Coastal fisheries of Pakistan						
	• Coastal fisheries of Sri Lanka						
	• Coastal fisheries of Kenya						
2. Compliance with IOTC Data Requirements	2.1 Data support missions						
	2.1.1 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						

[1] See document IOTC-2019-WPDCS15-INF07

	implementation and follow-up activities required. Priority to be given to the following fisheries:		
	• Pakistan		
	• Indonesia		
	• Sri Lanka		
	• India		
	• Yemen		
3. IOTC Data access	3.1 Improving discoverability of IOTC scientific assets through standard metadata and DOIs		
4. Improvement of scientific data for stock assessment purposes	4.1 Revision of PS size frequency and species composition data	4	
	4.2 Review of the extent of discarding practices in deep-freezing longline fleets	3	
5. ROS – Support for the implementation of the IOTC Regional Observer Scheme	5.1 ROS tools		
	5.1.1 Support the adoption of the ROS e-Reporting and ROS national database tools by countries not having any existing observer data collection and management system in place		
	5.2 ROS Regional Database		
	5.2.1 Incorporate all historical observer data currently available in other proprietary data formats (e.g. ObServe database dumps, ICCAT ST09 and other custom observer forms)		
	5.2.2 Implement dissemination best-practices for all data collected by the ROS Regional Database		

5.3 ROS Electronic Monitoring Systems						
5.3.1 Implement pilot EMS system on gillnet / coastal longline vessels for fleets insufficiently covered by on-board observers						
5.4 Evaluate the combination of alternative data collection systems and protocols for the collection of scientific observer data	1					

APPENDIX VI
CONSOLIDATED RECOMMENDATIONS OF THE 15TH SESSION OF THE WORKING PARTY ON DATA COLLECTION AND STATISTICS

Note: Appendix references refer to the Report of the 15th Session of the Working Party on Data Collection and Statistics (IOTC-2019-WPDCS15-R)

Alternative approaches to the revision of official species composition for the Spanish log-associated catch-and-effort data for tropical tuna species in 2018

WPDCS15.01 (para. 61) The WPDCS **RECOMMENDED** that a data preparatory meeting be organized prior to the Working Party on Tropical Tunas in order to ensure sufficient time is dedicated to resolving issues with the quality and preparation of the input data for the stocks assessments

Revision of the WPDCS Program of work (2019–2023)

WPDCS15.02 (para. 182): The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2020–2024), as provided at Appendix V.

Review of the draft, and adoption of the report of the 15th Session of the WPDCS

WPDCS15.03 (para. 190): The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS15, provided at Appendix VI.

APPENDIX VII – STATEMENT FROM THE REPUBLIC OF MAURITIUS

On 22 May 2019, the United Nations General Assembly adopted Resolution 73/295 relating to the Advisory Opinion rendered on 25 February 2019 by the International Court of Justice (ICJ) on the legal consequences of the separation of the Chagos Archipelago from Mauritius in 1965. In this Resolution, the General Assembly has, *inter alia*, affirmed, in accordance with the Advisory Opinion of the ICJ, that the Chagos Archipelago forms an integral part of the territory of the Republic of Mauritius and that since the decolonization of the Republic of Mauritius was not lawfully completed, the continued administration of the Chagos Archipelago by the United Kingdom constitutes a wrongful act entailing the international responsibility of that State. The General Assembly has also demanded that the United Kingdom withdraw its colonial administration from the Chagos Archipelago unconditionally within a period of no more than six months. The Republic of Mauritius is deeply disappointed that the United Kingdom has failed to withdraw its administration from the Chagos Archipelago by 22 November 2019, as requested by the General Assembly.

The General Assembly has further called upon the United Nations and all its specialized agencies as well as all other international, regional and intergovernmental organizations to recognize that the Chagos Archipelago forms an integral part of the territory of the Republic of Mauritius, to support the decolonization of the Republic of Mauritius as rapidly as possible, and to refrain from impeding that process by recognizing, or giving effect to any measure taken by or on behalf of, the so-called "British Indian Ocean Territory" ("BIOT"). Moreover, the General Assembly has affirmed that all Member States of the United Nations are under an obligation to cooperate with the United Nations in order to complete the decolonization of the Republic of Mauritius.

It follows that under the rules and principles of international law, the Republic of Mauritius is the sole State lawfully entitled to exercise sovereignty and sovereign rights over the Chagos Archipelago and its maritime zones. This position has been consistently maintained by the Republic of Mauritius.

The Republic of Mauritius reiterates that the United Kingdom is not entitled to be a member of the Indian Ocean Tuna Commission (IOTC) as a "coastal State situated wholly or partly within the Area [of competence of the Commission]".

The Republic of Mauritius [also] strongly objects to any reference to "UK Territories", "UK Overseas Territories", "UK (OT)", "British Indian Ocean Territory", "BIOT" or to the Chagos Archipelago as a British territory in any documents of the IOTC, including those of this meeting.

Moreover, the Republic of Mauritius rejects the sovereignty claim of France over the Island of Tromelin as well as France's claim to any sovereign right or jurisdiction over the Exclusive Economic Zone adjacent to the Island of Tromelin. Further, the Republic of Mauritius does not recognize the validity of the inclusion of the Island of Tromelin in the French Southern and Antarctic Lands (TAAF) or the Scattered Islands/Iles Eparses. The Republic of Mauritius reaffirms that it has full and complete sovereignty over the Island of Tromelin, including its maritime zones.

The Republic of Mauritius also objects to the use of terms such as “France (OT)” and “France (territories)” in the documents which have been circulated for this meeting, in so far as these terms purport to refer to the Island of Tromelin as a French territory.

Consideration by this meeting of any document which purports to refer to the Chagos Archipelago as the so-called “BIOT” or as a British territory or to the Island of Tromelin as a French territory, as well as any action or decision that may be taken on the basis of any such document, cannot and should not be construed in any way whatsoever as implying that the United Kingdom has sovereignty or analogous rights over the Chagos Archipelago or that the United Kingdom is entitled to be a member of the IOTC as a “coastal State situated wholly or partly within the Area [of competence of the Commission]”, or that France has sovereignty or analogous rights over the Island of Tromelin.

Subject to the foregoing, the delegation of the Republic of Mauritius has no objection to the adoption of the draft agenda.

The Republic of Mauritius also reserves all its rights under international law, including under Article XXIII of the Agreement for the Establishment of the Indian Ocean Tuna Commission.

This statement is applicable to all agenda items and all documents of this meeting.