REPORT OF THE 17TH SESSION OF THE IOTC WORKING PARTY ON DATA COLLECTION AND STATISTICS

Virtual meeting, 29 November – 3 December 2021

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Acronyms

ABNJ	Areas Beyond National Jurisdiction
AIS	Automatic Identification System
ALDFG	Abandoned, Lost or otherwise Discarded Fishing Gear
ALB	Albacore tuna
BET	Bigeye tuna
BLM	Black marlin
BLT	Bullet tuna
BUM	Blue marlin
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CECOFAD	Catch, Effort, and eCOsystem impacts of FAD-fishing
CMM	Conservation and Management Measure (of the IOTC; Resolutions and Recommendations)
COM	Narrow-barred Spanish mackerel
CPCs	Contracting parties and cooperating non-contracting parties of the IOTC
CPUE	Catch Per Unit of Effort
CWP	Coordinating Working Party on Fishery Statistics
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
EM	Electronic Monitoring
EMS	Electronic Monitoring System
ERA	Ecological Risk Assessment
ETP	Endangered, Threatened, and Protected species
EU	European Union
FAD	Fish aggregating device
FAO	Food and Agriculture Organization of the UN
FIRMS	Fisheries and Resources Monitoring System
FOB	Floating OBject
FRI	Frigate tuna
GEF	Global Environmental Facility
GUT	Indo-Pacific king mackerel
GTA	FIRMS Global Tuna Atlas
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IEO	Instituto Español de Oceanografía (EU,Spain)
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
KAW	Kawakawa
LOT	Longtail tuna
MLS	Striped marlin
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)
RAV	IOTC Record of Authorised Vessels
RFMO	Regional Fisheries Management Organization
ROS	Regional Observer Scheme

SC	IOTC Scientific Committee
SFA	Seychelles Fishing Authority (Seychelles)
SFA (fish)	Indo-Pacific sailfish
SSI	Species of Special Interest
SWO	Swordfish
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
WGFAD	Ad hoc Working Group on FADs
WGEMS	Ad hoc Working Group on the development of Electronic Monitoring programme Standards
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 formalise 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 readers of IOTC reports 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 17th Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Data Collection and Statistics (WPDCS) was held remotely, from the 29h November to the 3rd December 2021. A total of 94 participants attended the Session.

The following are a subset of the complete recommendations and decisions from the WPDCS17 to the Scientific Committee, which are provided at Appendix VI.

Draft report on the review of re-estimation methodology of Indonesia's annual tuna catch data in IOTC for 2017-2019

WPDCS17.02 (para. 101): Therefore **NOTING** the unusual variabilities in some of Indonesia's official catch statistics prior to the implementation of One Data in 2017, particularly in the case of neritic and tropical tuna species, the WPDCS **REQUESTED** that Indonesia undertake work – in collaboration with the IOTC Secretariat – to reassess their official catches (for the period 2010-2016) to ensure consistency and coherence in the longer-term catch series available for management and stock assessment purposes and **RECOMMENDED** that the Scientific Committee endorse this process.

Data reporting (to the Secretariat)

WPDCS17.03 (para. 116): The WPDCS therefore **RECOMMENDED** that work is undertaken to test an alternative, more flexible, matrix-based approach developed by FAO, to help refine the characterization of fisheries in IOTC at the national and regional level, and **NOTED** that a number of CPCs (including Indonesia, Kenya, Maldives, Pakistan and Sri Lanka) expressed their interest in participating in these studies.

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

WPDCS17.06 (para. 175): For this reason, the WPDCS **RECOMMENDED** the Scientific Committee to finalize the work required to improve current definitions of FAD and FAD activities used by the IOTC, in collaboration with the WPTT and WGFAD.

Update from the consultancy on the development and Implementation of an Observer Training Programme to support the IOTC Regional Observer Scheme

WPDCS17.07 (para. 203): Finally, in order to overcome the practical issues and delays introduced by the onset of the CoViD-19 pandemic and to further guarantee that OTP materials and standards be fully developed, the WPDCS **RECOMMENDED** that the Scientific Committee endorse the proposed process for their revision and finalization, that calls the IOTC Secretariat, the service provider, external peer-reviewers and international experts to contribute to the consolidation of the final outputs in the intersessional period.

Outcomes of the 1st ad hoc IOTC WGEMS - Working Group on Electronic Monitoring Systems

WPDCS17.08 (para. 217): For the reasons above, the WPDCS **RECOMMENDED** that the Scientific Committee continue discussing the terms of references of the group and its continuation in the future, while **CONSIDERING** the possibility of moving the WGEMS under the direct responsibility of the Scientific Committee.

Revision of the WPDCS program of work 2022-2026

WPDCS17.10 (para. 250): The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2022-2026), as provided at Appendix V.

Review of the draft, and adoption of the report of the 17th Session of the WPDCS

WPDCS17.12 (para. 260): The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS17, provided at Appendix VI.

1. Opening of the meeting

1. The 17th Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Data Collection and Statistics (WPDCS17) was held virtually (through the Zoom collaborative platform) from the 29th of November to the 3rd of December 2021. A total of 94 participants (76 in 2020, 41 in 2019, 55 in 2018, 45 in 2017) attended the Session. The list of participants is provided at Appendix I. The meeting was opened on 29th of November 2021 by the Chairperson, Mr. Stephen Ndegwa (Kenya), who welcomed participants to the meeting and proceeded with the arrangements for the session.

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 WPDCS17 are listed in Appendix III.

3. The IOTC Process: outcomes, updates and progress

3.1 Outcomes of the 23rd Session of the Scientific Committee and of the 25th Session of the Commission

3. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-03 which outlined the main outcomes of the 23rd Session of the Scientific Committee (SC23) specifically related to the work of the WPDCS.

4. The WPDCS **NOTED** that in 2020, the SC made a number of requests in relation to the WPDCS16 and other IOTC Working Parties' reports. Some of those requests and the associated responses from the WPDCS17 are provided below for reference.

Report of the Secretariat – Activities in support of the IOTC science process in 2020

- (*Para. 17) The SC NOTED that there may be some discrepancies between the numbers of active vessels reported in the NR and the Active Vessels List (AVL) available for download from the IOTC website and ENCOURAGED al CPCs to carefully check and ensure consistency between both data sources reporting to IOTC any identified discrepancy.*

Response: The WPDCS **REITERATED** the importance of maintaining accurate fleet statistics in the IOTC AVL, **RECALLING** how this source of information could be crucial to explain potential fluctuations in catch levels detected across years.

National Reporting to the Scientific Committee: Contracting Parties (Members)

- *(Para. 36) Noting the 25 National Reports submitted to the IOTC Secretariat in 2020 by Contracting Parties (Members), the SC expressed concern about the difference between the catches submitted in National Reports and total catches, by fleet, in the IOTC database. The IOTC Secretariat uses the information from the National Report to update estimates of nominal catches, in the case of revisions to the data or when CPCs have not submitted any catch data; however, the time available between submission of the National Reports and the Scientific Committee makes it difficult to update the IOTC nominal database prior to the annual Session. (…)*
- *(Para. 37) The SC that scientific and statistical information such as discard levels, observer coverage, fleet statistics etc., which are of particular relevance for several IOTC Resolutions (e.g. 15/02, 16/04, 17/05 etc.), is often only reported by CPCs in their national reports but not made available to the IOTC Secretariat in due time in accordance with the reporting requirements prescribed in the resolutions. For this reason, the SC REQUESTED all CPCs to ensure that the information presented in the respective national reports and the official submissions available to the IOTC are in agreement.*

Response: the WPDCS **RECALLED** how data from National Reports are not a substitute for regular data submissions prescribed by IOTC Resolution 15/02 (and others), and that relevant changes to previously

submitted fishery statistics shall be first presented at the WPDCS and eventually endorsed by the Scientific Committee before being included in the IOTC databases. The WPDCS **REITERATED** with concern that late reporting of fishery statistics not only impacts the level of compliance of concerned CPCs, but also severely hinders the work of all IOTC Working Parties called to assess the status of IOTC stocks. Also, the WPDCS **RECALLED** that one of the key roles of the IOTC Secretariat is to provide technical support to all CPCs that encounter difficulties with current data reporting requirements and formats.

Report of the 10th Session of the Working Party on Neritic Tunas (WPNT10)

- *(Para. 42) The SC NOTED the importance of these neritic tuna species in the structure and functioning of the marine ecosystems as well as exploited stocks for several fisheries, particularly to developing coastal nations in the Indian Ocean. The SC EXPRESSED its concern that assessments can still not be carried out for several species due to the quality of data available.*

Report of the 18th Session of the Working Party on Billfish (WPB18)

- *(Para. 46) The SC NOTED the need to better evaluate the influence of low-quality catch data on billfish stock assessments and to develop CPUE time series for billfish species caught in large gillnet fisheries, as recently initiated for some neritic species in collaboration with I.R. Iran.*
- *(Para. 56) The SC further NOTED the major uncertainties associated with the catches of gillnet fisheries, which target in particular black marlin and Indo-Pacific sailfish, and RECALLED the need for all concerned CPCs to ensure that the catch, effort and size data for these fisheries are systematically reported to the Secretariat in accordance with Resolution 15/02.*

Response: The WPDCS **ACKNOWLEDGED** that the low level of quality and the partial incompleteness of fishery data for several coastal fisheries in the Indian Ocean is still a major concern for IOTC, and **REITERATED** how activities focusing on capacity development and technical assistance in the field of data collection, processing and analysis should be given high priority in the Program of Work for this group.

Report of the 16th Session of the Working Party on Ecosystems and Bycatch (WPEB16)

- *(Para. 64) The SC NOTED that in 2020, a stock assessment was completed for shortfin mako using a JABBA model but that it was not possible to provide scientific advice based on this assessment due to a number of reasons including: issues with model misspecification; the low credibility of nominal catch data; the selection of biological parameters used in the model; and the inability of the aggregated biomass dynamic model to reconcile the significant time delay (around 8 years) between fishing and the effect on future recruitment.*

Response:

- *(Para 67) The SC NOTED a request from Japan for the omission of [bycatch] data for Japan prior to 1992 in assessments as these are not data officially submitted by Japan. The SC further NOTED that Japan is currently working to estimate catches at a species level for these years and will submit these to the Secretariat when available. The SC REQUESTED Japan to prioritise data for blue shark and silky shark to be used in assessments next year.*

Response: An updated time series of catches of sharks by species taken by Japanese longliners covering the period between 1964 and 1993 was reported to the Secretariat in 2021 and endorsed by the WPEB. The methodology and data are described in paper IOTC-2021-WPEB17(DP)-05.

Report of the 22nd Session of the Working Party on Tropical Tunas (WPTT22)

- *(Para. 85) The SC NOTED Para. 24 of Resolution 19/01 states that "The IOTC Secretariat, under advice of the Scientific Committee, shall prepare and circulate a table of allocated catch limits disaggregated as per the conditions set out in paragraphs 5 – 10 for preceding year, in December of the current year." As such, the table of allocated catch limits was presented to the SC and is contained in Appendix 33.*

- *(Para. 86) The SC NOTED that the intention of Res 19/01 is to reduce catch levels to allow the yellowfin tuna stock to rebuild. The SC NOTED, however, that according to Appendix 33, catches have actually increased by 5.22% since 2014. The SC further NOTED that increases in catches by CPCs not bound by Res 19/01 have offset the reductions in catches by CPCs bound by the Resolution. This has led to the overall increase in catches from 2014 – 2019.*

Response: the WPDCS **NOTED** that the IOTC Secretariat has prepared a summary of the current status of yellowfin tuna catches and estimated catch limits for 2022 for all CPCs subject to IOTC Resolutions 18/01, 19/01 and 21/01, and **INVITED** all concerned CPCs to familiarize themselves with the summarized information and the procedure adopted for the calculation of the catch limits according to each binding resolution.

Report of the 16th Session of the Working Party on Data Collection and Statistics (WPDCS16)

- *(Para. 102) The SC NOTED that Electronic Monitoring Systems can be one viable and effective means to collect fishery independent information, including when external circumstances prevent human observers from being deployed onboard, while at the same time ACKNOWLEDGING that data collection through EMS alone cannot fully conform to Res. 11/04 "On a Regional Observer Scheme" requirements.*
- *(Para. 110) The SC NOTED the steps forward in the definition of Electronic Monitoring Programme Standards presented at the WPDCS and ACKNOWLEDGED that these require additional contributions and development for their successful implementation at regional level*

Response: A first ad hoc Working Group on the development of Electronic Monitoring programme Standards (WGEMS01) was held virtually between the 15th and 17th of November 2021, with its terms of references, Program of Work and recommendations to be presented during this meeting.

- *(Para. 103) NOTING that the quality of data available for artisanal fisheries in the Indian Ocean still needs to be greatly improved, the SC reiterated its REQUEST that the WPDCS continue assisting CPCs in improving the implementation of data collection and sampling activities for artisanal, coastal and small-scale fisheries, and SUGGESTED that when re-estimation of original data provided by CPCs are made by the Secretariat, these are revised frequently in close collaboration with national scientists.*

Response: Two technical workshops were held in collaboration with Indonesian representatives on May 25-28, 2021 and September 20-21, 2021 to discuss the issues identified in official historical data submissions, re-estimation procedures adopted by the IOTC Scientific Committee and status of development of new data collection systems.

- *(Para. 104) RECALLING that Res. 15/02 requires CPCs to provide documents covering sampling and raising procedures by species and type of fishery, the SC REQUESTED the IOTC Secretariat develops, in close collaboration with CPCs, electronic templates to drive the documentation of such sampling procedures for all gears and fleets, focusing on time-area catches and size data, to be revised and discussed at the next session of the WPDCS.*

Response: The IOTC Secretariat is working on the draft of a template to be used by CPCs to report sampling and raising procedures as part of the regular statistical data submissions cycle. See in particular paper IOTC-2021-WPDCS17-27.

- *(Para. 105) Also, the SC NOTED the discussions ongoing at the WPDCS about the requirement (still from Res. 15/02) to sample at least 1 fish / MT, and also on the fact that sampling lengths from live bycatch species (such as sharks) prior to their release is discouraged by some CPCs for crew safety reasons and that this has to be taken into account when assessing the level of compliance of such CPCs.*

Response: The WPDCS noted that this issue has not yet been resolved, and will consider how to best proceed in this regard during the course of the meeting.

5. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-04 which outlined the main outcomes of the 25th Session of the Commission (225), 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.

6. The WPDCS **NOTED** the three Conservation and Management Measures (CMMs) adopted at the 25th Session of the Commission (consisting of 3 Resolutions and 0 Recommendation) as listed below:

   - **Resolution 21/01** *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC area of competence*
   - **Resolution 21/02** *On establishing a programme for transhipment by large-scale fishing vessels*
   - **Resolution 21/03** *On harvest control rules for skipjack tuna in the IOTC area of competence*

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

8. The WPDCS also **NOTED** that six CPCs objected to Resolution 21/01 and **ACKNOWLEDGED** that the newly adopted resolution is not binding for them.

9. Participants to WPDCS17 were **ENCOURAGED** to familiarise themselves with the adopted Resolutions, especially those most relevant to the WPDCS.

10. **NOTING** that the Commission also made general comments and requests on the recommendations made by the Scientific Committee in 2020, which have relevance for the WPDCS (details as follows: paragraph numbers refer to the draft report of the Commission (IOTC–2021–S25–R)) the WPDCS **AGREED** that any advice to the Commission would be provided in the relevant sections of the report below.

    (Para 16). The Commission NOTED that although all scientific meetings had been successfully held virtually in 2020, they were shortened to facilitate the virtual platform. The virtual platforms, however, did result in increased participation to the meetings which the Commission AGREED was beneficial. The Commission further NOTED that the SC proposed that in the future virtual meetings may still be conducted for certain meetings (such as data preparatory meetings) in order to reduce the expenses travel imposes on CPCs as well as the IOTC Meeting Participation fund (MPF), but for those meetings requiring closer, in-person, collaborations, physical meetings will be continued as required. The Commission NOTED that the MPF was not used for science-related meetings in 2020 because they were all convened by videoconference.

    (Para 17). The Commission NOTED that 6 Contracting Parties and 2 Cooperating Non-Contracting Party did not submit a National Report to the Scientific Committee Meeting in 2020, and issues with lack of data and poor-quality data persist. The Commission NOTED that this was an improvement over the previous year, but also 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.

3.2 Review of Conservation and Management Measures relevant to the WPDCS

11. The WPDCS **NOTED** paper IOTC–2021–WPDCS17–05 which encouraged participants at the WPDCS17 to review some of the existing Conservation and Management Measures (CMM) relevant to the WPDCS, **RECALLING** that three new CMMs were discussed during the 25th session of the Commission, 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. Proposed amendments were discussed later in the meeting and are detailed subsequently in this report.

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*), 19/02 (*Procedures on a fish aggregating devices (FADs) management plan*) and 19/03 (*On the conservation of mobulid species caught in association with fisheries in the IOTC area of competence*) to identify aspects that might require further clarification from the SC.

14. The WPDCS **RECALLED** that an overview of the current state-of-play regarding Resolution 19/01 will be discussed later during this meeting, and also that a dedicated agenda item exists to deal with the specificities of Resolution 19/02.

3.3 Progress on the recommendations of WPDCS16

15. The WPDCS **NOTED** paper IOTC–2021–WPDCS17–06 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.

16. The WPDCS **RECALLED** that any recommendation 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).

17. The WPDCS **NOTED** the request from the SC23 that the Secretariat, in collaboration with CPCs, develops electronic templates to drive the documentation of sampling and raising procedure, and **ACKNOWLEDGED** that updates on this matter will be presented during the course of this meeting, through paper IOTC-2021-WPDCS17-27.

18. The WPDCS **NOTED** that the Commission did not provide any direct response to the SC23 recommendation to discuss the scientific nature and the confidentiality aspects which, among other things, limit the possibility of publicly disseminating buoys' positions data, and **RECALLED** that amendments to Resolutions 12/02 and 19/02 might be required to overcome current limitations.

19. The WPDCS **NOTED** that the SC23 provided a clear recommendation to the Commission about how to interpret the ROS data fields marked as "*Optional for reporting*" and **ACKNOWLEDGED** that further discussion on the matter will be held during the ROS-specific agenda items of this meeting.

20. The WPDCS **NOTED** that the 1st ad hoc Working Group on the development of Electronic Monitoring programme Standards (WGEMS01) recommended by the SC23 was successfully held in November 2021 under the supervision of the WPDCS, and that its outcomes will be discussed later during the meeting.

21. The WPDCS **NOTED** that two technical workshops were held remotely between Indonesia, the IOTC Secretariat and the IOTC scientific committee and WPDCS chairs, to discuss the current state-of-play in terms of data collection and reporting systems implemented in Indonesia, and of the procedures applied by the IOTC Secretariat under guidance of the Scientific Committee to produce the best scientific catch estimates.

22. On this same topic, the WPDCS **ACKNOWLEDGED** that the IOTC Secretariat is considering the possibility of disseminating official (i.e., non re-adjusted) data submissions for all IOTC CPCs alongside the best scientific estimates, and will report back on this regard to the WPDCS at its next meeting.

23. The WPDCS **NOTED** that geo-referenced catch and effort data from the gillnet fisheries of Pakistan are not yet available to the IOTC Secretariat and reiterated its **REQUEST** that these be compiled and submitted to the IOTC.

24. Also, the WPDCS **NOTED** that the IOTC Secretariat considered delivering a data compliance and support mission to Pakistan and I.R. Iran to discuss potential catch double-counting issues, and how this could also represent an

opportunity to engage with Pakistan and provide technical support for the compilation of catch and effort data as required.

25. **NOTING** the difficulties that some CPCs still have in adopting the IOTC recommended data submission forms, and the concerns expressed in this regard by the Compliance Committee, the WPDCS **CONSIDERED** with favour the possibility of the IOTC Secretariat delivering remote or face-to-face workshops focusing on the compilation of statistical data submissions for interested CPCs.

26. The WPDCS **ACKNOWLEDGED** that the IOTC Secretariat is considering the inclusion of indicators of the level of implementation of minimum sampling requirements (i.e., number of fish measured per ton of catch, by gear and species) in future versions of the IOTC documents summarizing the status of all available statistical data submissions.

27. The WPDCS **NOTED** that updates to several other important requests issued during its 16th session are still lacking, and **ENCOURAGED** all concerned CPCs to report to this meeting on the issues of their pertinence.

4. Progress report of the Secretariat on data related issues

4.1 IOTC Secretariat report

28. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-07_Rev1 which provided a description and status of the range of data sets collated and managed at the IOTC Secretariat, including catch retained and discarded at sea, fishing effort, size-frequency, socio-economic and other biological data (e.g., mark-recapture data) for IOTC species, sharks, and other species that are caught incidentally by fisheries directed at IOTC species.

29. The WPDCS **NOTED** that buoy position data have to be reported to the IOTC Secretariat for compliance purposes as per IOTC Resolution 19/02, but that their use for scientific purposes has been extensively discussed at the IOTC ad hoc Working Group on FADs (WGFAD02) held virtually between the 4th and 6th of October 2021, **RECALLING** the interest of these data for scientific analysis.

30. The WPDCS **NOTED** that the terms *artisanal and coastal* as well as *small-scale* are used interchangeably by the IOTC to describe all fisheries other than longline and surface fisheries which are composed of fishing vessels registered in the IOTC Record of Authorized Vessels (RAV). The WPDCS further **NOTED** that the criteria used to determine the artisanal nature of the fisheries are based on vessel length (i.e., below or above 24 m length overall) and fishing grounds (i.e., inside the national exclusive economic zones and in the high seas) **ACKNOWLEDGING** the potential confusion surrounding the term *artisanal* which may have other meanings elsewhere.

31. The WPDCS **NOTED** that some countries did not submit nominal catches to the Secretariat in 2021, including catches for yellowfin and skipjack tunas, further **NOTING** that although there have been major improvements in the catch data reported to the IOTC Secretariat over the last decade, part of the data have still to be estimated to derive the best scientific estimates of nominal catches for all species, particularly for billfish and neritic species. The WPDCS also **NOTED** that several data are submitted post deadline, particularly for 2020 due to the CoViD-19 pandemic.

32. The WPDCS **NOTED** that while geo-referenced catch and effort data for industrial purse seine and longline fisheries are regularly submitted, data submissions for several other fisheries, and in particular those of coastal nature, are often late and incomplete.

33. The WPDCS **NOTED** that the size-frequency data for neritic species (i.e., neritic tunas and seerfish) and billfishes are the most poorly reported in past years and that this has negative impacts on the stock assessments.

34. Also, the WPDCS **NOTED** with concern that the overall quality and completeness of data on discards at sea (including ETP species) is very poor, and that information is only available for a few purse seine and longline fleets (e.g., EU,France), although the sampling coverage and level of extrapolation (i.e., raising) are generally not reported to the Secretariat.

35. The Secretariat **NOTED** that size-frequency data from industrial purse seine fisheries have been inconsistently reported in recent years, either as raw or extrapolated, and **RECALLED** that both raw size-frequency data and catch-at-size data (i.e., size data extrapolated for the whole fishery) should be reported to the Secretariat as they provide complementary sources of information for scientific analysis as well as information on the data processing (e.g., strata without samples), **NOTING** that the IOTC data form 4SF has been recently amended to enable the reporting of either raw or extrapolated data.

36. The WPDCS **RECALLED** the interest of the IOTC forms for reporting data to the IOTC Secretariat and **ENCOURAGED** all CPCs to use them and provide feedback for improvement and to streamline the data flow, **NOTING** that the Secretariat is in the process of revising the IOTC reporting guidelines and forms to facilitate data reporting.

37. The WPDCS **ACKNOWLEDGED** the very poor quality of information available for neritic species and **ENCOURAGED** the WPDCS participants to identify the priorities and best approaches to how data collection and reporting may be improved for each gear type through the Program of Work and what level of coordination and support may be required from scientists in collaboration with the Secretariat to improve the situation in line with the main issues identified in Appendix IV.

38. The WPDCS **NOTED** that no in-person data compliance mission has been conducted by the Secretariat since the inception of the CoViD-19 in March 2020 but that the situation is expected to improve in 2022. The WPDCS **NOTED** that the Secretariat should identify, with the help of the CPCs, the main fisheries with poor reporting and data collection issues to conduct priority support missions with the involvement of the national scientists as soon as the situation improves.

39. The WPDCS was reminded that uncertainties in the historical catch data sets are not currently incorporated in the stock assessment or MSE development and it was **SUGGESTED** that the WPDCS could provide advice on how to quantify this uncertainty to ensure that stock assessment and MSE models are robust and that such work could be included in the Program of Work. The WPDCS further **NOTED** that the quality of the catch data is particularly important for neritic species and some billfish species for which the assessments are based on data-limited methods which essentially rely on the time series of nominal catch data.

40. The IOTC Secretariat **INFORMED** the WPDCS that such work could be carried forward through the engagement of a consultant and/or using data-limited methods for stock assessments. Further **NOTING**, that data-limited methods for neritic species have not been able to fully aid with the understanding of several issues and **SUGGESTED** the WPDCS may come up with more practical, hands-on methods to improve data.

41. The WPDCS **ACKNOWLEDGED** that a standard procedure is used by the IOTC Secretariat to estimate the missing nominal catch data by repeating the catch data from the previous year or deriving them from a range of sources, mainly from the FAO FishStat database.

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 and discards):

- On-going uncertainties in the total catches, species and gear composition reported for the coastal fisheries of Indonesia in recent years, and possible misidentification of juvenile yellowfin and bigeye tunas as neritic tuna species;
- Uncertain estimates of total catch of sharks and billfish for the driftnet fishery of Pakistan and I.R. Iran (respectively), 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 total level of discards of tuna and tuna-like species (as well as all other incidentally caught species) across the majority of fisheries and time periods.

Catch and effort:

- Insufficient (or lacking) implementation of logbooks and minimum requirements for operational catch and effort data, which compromise reporting of catch and effort statistics to the IOTC Secretariat, including industrial longline and purse seine fisheries of Indonesia, driftnet fisheries of Pakistan, gillnet and longline fisheries of Sri Lanka (until 2014), handline and gillnet of Oman;
- Lack of catch and effort data and indices of abundance for coastal fisheries for the major tuna species, and particularly neritic 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, the coastal fisheries of Indonesia, India, Yemen, and Oman;
- Low levels of coverage of size data for Japan (after 1990's) and reliability of length frequencies available for longliners flagged in Taiwan,China in recent years;
- Possible repetition of size-frequency distributions for some tropical tuna species across years, and abrupt truncations in size measurements (potentially due to sampling bias) detected for Sri Lanka gillnet fisheries in 2016-2019.

Regional observer (ROS) 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 mechanisms ("*crew-based data collection programmes*" of Pakistan and Sri Lanka) are being evaluated as possible replacements 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

A proposal for an IOTC interactive statistical data browser

44. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-24 that informed participants at the 17th Working Party on Data Collection and Statistics (WPDCS17) about the status of development of a new interactive statistical data browser that would replace the current IOTC Online Querying Services and improve access to the core IOTC datasets through filtering, display, and analysis of all public data records held by the IOTC Secretariat.

45. The WPDCS **THANKED** and **CONGRATULATED** the IOTC Secretariat for the efforts made in designing and implementing the proposed interactive statistical data browsers, and **ACKNOWLEDGED** that it represents a much welcome step forward from the current IOTC Online Querying Service, which is difficult to maintain and is lacking in terms of features and accessible datasets.

46. The WPDCS **NOTED** that access to the data browser is currently password-protected for the sole reason of limiting the number of concurrent users, as the application is hosted on a shared server, and **ACKNOWLEDGED** that the tool is indeed meant for public release and will be advertised as such after the completion of the testing phase and the deployment of the application on a dedicated server.

47. The WPDCS **NOTED** that each of the publicly accessible datasets is categorized by the type of information provided, and enriched by several metadata fields which indicate the date of last update, the number of available records, and the various processing and aggregation criteria used for its production.

48. The WPDCS **NOTED** how each dataset is updated with the same frequency at which new information is received by the Secretariat, and that this is dependent on the type of dataset considered.

49. Also, the WPDCS **NOTED** that the tool can produce various types of charts and maps, which are enriched with labels that indicate the criteria and time at which the outputs were generated, to ensure that when these are embedded elsewhere (reports, external documents, web pages etc.) their end users have a clear understanding of how and when these were produced, and **ACKNOWLEDGED** that the same can also be achieved by assigning a DOI to each filtered dataset and plot.

50. The WPDCS **RECOGNIZED** the need to further advertise the data browser in the IOTC, once released, both at the scientific working parties and at the Commission levels.

51. The WPDCS **NOTED** how the proposed data browser has the potential to become an important tool for managers and policy makers alike, but that for this to happen it has to be complemented by a detailed explanation of how the underlying data sources are processed, and of their more general limits of applicability to the IOTC process.

52. Furthermore, the WPDCS **ACKNOWLEDGED** that the proposed IOTC data browser is built on top of the R libraries developed by the IOTC Secretariat to analyse data from several domains (statistical data, ROS trip data, RAV records, buoys daily positions etc.) and that the source code of these libraries might be publicly released once these are fully decoupled from the IOTC databases.

53. The WPDCS **WELCOMED** the possibility that the IOTC Secretariat publicly shares the IOTC R libraries and their complementing datasets (the latter as standalone R data files, with spatio-temporal aggregation duly applied in agreement with the requirements of IOTC Resolution 12/02) and **NOTED** how the standardization approach fostered by the adoption of the IOTC R libraries will guarantee homogeneity and clarity when disseminating IOTC data across several media and products (IOTC data papers, website, reports, publications, dashboards, etc.).

54. The WPDCS also **ACKNOWLEDGED** that the IOTC Secretariat requested the help of participants to further assess the stability and overall working status of the data browser, and **INVITED** participants to report back in the event that any inconsistency or bug is detected during the trial phase.

55. Finally, the WPDCS **ACKNOWLEDGED** that the proposed data browser will replace the IOTC Online Querying Services once its trial phase is successfully completed and all necessary adjustments are incorporated in the tool.

Fostering the work of the IOTC with socio-economic data sets sourced from FAO-GLOBEFISH and the Pacific Islands Forum Fisheries Agency (FFA)

56. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-25 that suggests future actions to foster the inclusion of socio-economic data from external partners and institutions in the IOTC repositories, including the following abstract provided by the authors:

> "(...) *To date, very little information on the socio-economics of tuna and tuna-like fisheries has been reported to the Secretariat with the notable exception of time series of monthly prices by species, fishing gear, and area reported by Oman since 2005. In 2021, the IOTC Secretariat has started a collaboration with the team of the GLOBEFISH project at FAO and the Fisheries Development Division of the Pacific Islands Forum Fisheries Agency (FFA) who already collate and analyse socio-economic data available at national, regional, and global levels for the monitoring of tuna fisheries and markets, and the dissemination of information to support sustainable exploitation and use of tuna resources. The objective of this document is to inform the participants of the WPDCS17 on the data that can be collated on the socio-economics of tuna fisheries through international collaborations and assess the interest of these new sources of information for the work of the IOTC.*" (see original paper for the full abstract)

57. The Secretariat **REMINDED** the WPDCS that a specific form has been available since 2014 for CPCs to report price data on a voluntary basis, but with little response, and **ENCOURAGED** CPCs to report catch price information to IOTC at their earliest convenience.

58. The WPDCS **NOTED** that several monthly time series of import price for tuna are routinely collated by the Pacific Islands Forum Fisheries Agency (FFA) from the customs of Thailand, Japan, and the USA, which represent the main international markets for tuna caught with longline and purse seine, further **NOTING** that these price data are made publicly available by the FFA.

59. The WPDCS **NOTED** that FAO has developed a Tuna Price Index (TPI) based on international trade statistics to represent the temporal trends in the global value of tuna, and that the Secretariat has recently liaised with the team of the FAO-GLOBEFISH to get access to the TPI and other socio-economic indicators which may be of interest to the IOTC (e.g., country market profiles).

60. The WPDCS **ACKNOWLEDGED** that understanding price information may deliver useful insights into the drivers of patterns observed in IOTC catch histories, further **NOTING** that Australia has recently adopted the same approach that the FFA developed for collecting and using price information (e.g., for studying changes of targeting in longline fisheries) and that Australia would be keen to liaise with the Secretariat to share the data and approaches.

61. The WPDCS **NOTED** that FAO has recently started collecting economic data from countries as part of their annual survey forms, including price data from capture fisheries, **NOTING** however that the response rate has been low and that some work of cleaning and harmonization is required. The WPDCS **THANKED** FAO for proposing to liaise with the IOTC Secretariat and collaborate on the curation of fish price data, including a review of historical data available.

62. The WPDCS **NOTED** that in addition to coarse-scale analyses presented, there may well be additional patterns and processes of interest that regional and sub-regional analyses using market price data could illuminate – particularly given the huge numbers of small-scale vessels and corresponding catches.

63. The WPDCS **NOTED** that Pakistan has been collecting socio-economic data to monitor the regional dynamics of tuna trade since most tuna caught by Pakistani fisheries is exported to I. R. Iran and other countries for canning and the market may be influenced by global and regional factors such as fuel price and political instability.

4.3 Updates on data-related requests from other Working Parties

64. 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 17th session of the Working Party on Ecosystems and Bycatch (data preparatory meeting) (WPEB17(DP))**
    - Para. 58: (...) *the WPEB REQUESTED the WPDCS to explore the possibility of collating raw morphometric data from CPCs to improve the quality and management of conversion factors and relationships at the IOTC Secretariat.*

65. The WPDCS **NOTED** that the IOTC Secretariat is considering implementing this activity as part of its internal Program of Work for 2022.
    - Para. 78: (...) *the WPEB REQUESTED that the WPDCS in conjunction with the IOTC Secretariat develop the concept of an IOTC regional database containing satellite tagging information on shark (and other species) including data use and confidentiality agreements and explore the possibility to compile tagging data from research institutes*.

66. The WPDCS **NOTED** that there was no further discussion on this specific activity, and **ACKNOWLEDGED** that further intersessional work is required to identify data providers and potential external consultants for the implementation of the project.

- **Report of the 17th session of the Working Party on Ecosystems and Bycatch (assessment meeting) (WPEB17(AS))**
    - Para. 93: (...) ACKNOWLEDGING that subsurface setting is becoming a common practice across Indian Ocean gillnet fisheries, the WPEB AGREED on the importance of updating the process for the provision of catch statistics (as per IOTC Resolution 15/02) so as to clearly distinguish catches from the two gear configurations, and REQUESTED the WPDCS to take the lead on this activity and eventually support CPCs in the revision of their historical gillnet catches in that sense

67. The WPDCS **NOTED** that no action was yet taken in this regard, and that further discussion on this specific request is expected to be held during the meeting.

- **Report of the 23rd session of the Working Party on Tropical Tunas (data preparatory meeting) (WPTT23(DP))**
    - Para. 38 and 39: *The WPTT NOTED paper IOTC-2021-WPTT23(DP)-17, introducing the IOTC tuna factory purchases data flow and database (…). The WPTT CONGRATULATED the authors for the study and ENCOURAGED them to pursue the work and present further results at the WPDCS, NOTING the interest of such ancillary and independent sources of information to cross-check and validate official data submissions, as well as to provide benchmark levels of catches in absence of other information*.

68. The WPDCS **NOTED** that the IOTC Secretariat continues to receive quarterly data from ISSF-affiliated canneries, that a database has been created for storage, validation and analysis of all collated information, and that dedicated resources have to be identified within the IOTC Secretariat to properly deal with current and future cannery data submissions to guarantee that these can be processed in time and effectively used to support scientific analysis.
    - Para. 64: *The WPTT DISCUSSED how the quality of size data could be assessed, i.e., if the data is inaccurate or reliable for use in the stock assessment and whether clear guidance can be developed to evaluate size data accuracy for stock assessment inclusion. For example, it could be explored if purse seine size data are congruent with longliners size data. Thus, the WPTT REQUESTED that IOTC Secretariat liaise with interested scientists to develop criteria for size data to be included in the stock assessment.*

69. The WPDCS **NOTED** that a specific activity in this regard has been included and prioritized in the WPDCS Program of Work for 2022-2026.

- **Report of the 23rd session of the Working Party on Tropical Tunas (assessment meeting) (WPTT23(AS))**
    - Para. 11: *Furthermore, the WPTT ACKNOWLEDGED that the current classification of coastal longlines within the "line" fishery group might not accurately reflect the characteristic of the gear, that might be more properly categorized under the "longline" fishery group, and REQUESTED that this issue is brought to the attention of the WPDCS for further discussion.*

70. The WPDCS **NOTED** that there was no further discussion on this specific request, and **REITERATED** the request that CPCs comply with the current IOTC gear classification when presenting aggregated data to the IOTC scientific bodies.
    - Para. 14 and 15: *In particular, the WPTT NOTED that catches of yellowfin tuna from the handline fishery of Oman have more than doubled between 2019 and 2020 (increasing from ~25,000 t to almost ~60,000 t) while at the same time little to no information has been reported by the fleet in terms of georeferenced catch and effort data, which are known to be collected at national level. Therefore, the WPTT REQUESTED that Oman further liaises with the IOTC Secretariat to ensure that all currently missing statistical information be provided according to the existing reporting requirements.*

71. The WPDCS **NOTED** that there is no clear explanation for this rapid increase in catches from Omani handlines, also in light of the fact that no effort information was received by the IOTC Secretariat from this fishery.

72. The WPDCS **REITERATED** the importance that Oman liaise with the IOTC Secretariat to ensure that all available information is submitted according to the deadlines and with all data elements specified by IOTC Resolution 15/02, and **SUGGESTED** a data compliance and assistance mission to Oman is prioritized for 2022.

    - Para. 21: *NOTING how the Italian component of the European Union fleet currently consists of a single vessel and CONSIDERING the constraints on data confidentiality currently expressed by Res. 12/02 (para. 2a in particular), the WPTT SUGGESTED that the WPDCS further discuss these confidentiality issues in collaboration with all CPCs in a comparable situation.*

73. The WPDCS **NOTED** that there was no further discussion on this specific request, and that the confidentiality issue still remains and potentially can also affect other fleets currently operating with a single active vessel in the Indian Ocean.

    - Para. 24: *The WPTT CONSIDERED the possibility that [double-counting] might also be one of the factors explaining the recent increase in catches reported by the handline fishery of Oman, that could potentially include catches originally taken by Yemeni vessels offloading in the country, and for this reason REQUESTED the IOTC Secretariat to investigate this matter further with support of national scientists from the countries involved.*

74. The WPDCS **REITERATED** the importance of both Pakistan and I.R. Iran to liaise with the IOTC Secretariat to ensure that the potential double-counting issue is confirmed, quantified and dealt with when submitting historical and current data to the IOTC Secretariat, and **SUGGESTED** a data compliance and assistance mission to Pakistan and I.R. Iran is prioritized for 2022.

    - Para. 26: *The WPTT RECALLED that the Scientific Committee recommendation that both unraised (raw) and raised (catch-at-size) size-frequency data be reported to the IOTC and REQUESTED all concerned CPCs to liaise with the Secretariat to ensure that historical and new submissions of size data including both types of information are provided for incorporation into the IOTC databases.*

75. The WPDCS **NOTED** that only a limited number of CPCs have complied with the request, and **REITERATED** the importance of receiving (and disseminating) both types of size-frequency datasets to better support the assessment of tropical tuna species.

- **Report of the 2nd ad-hoc Working Group on FADs (WGFAD02)**

    - Para. 13 and 14: *The WGFAD RECALLED the currently standing definition of FOB types and FOB activity types in use at the IOTC Secretariat, in particular how these focus on specific elements of FOB-fishing operations (e.g., presence of nets as well as of tracking devices on FOBs) and differ from other internationally adopted classifications (e.g., CECOFAD). For these reasons, the WGFAD ACKNOWLEDGED that further clarity is needed by CPCs to correctly interpret the IOTC classifications and the corresponding reporting requirements and REQUESTED that these aspects be further discussed either intersessionally, or in other IOTC scientific fora such as the WPDCS.*

76. The WPDCS **NOTED** that this activity has been included in the WPDCS Program of Work for 2022-2026 and will be conducted in close collaboration with the WGFAD and WPTT.

    - Para. 36: *Finally, the WGFAD DISCUSSED the possibility of regularly disseminating the datasets prepared for this working group, including those that are either deemed as inaccurate (collation of IOTC forms 3-FA) or still subject to stringent usage requirements (aggregated version of IOTC forms 3-BU, currently to be used for compliance purposes only), and AGREED that there is a need to bring this issue to the attention of other IOTC working parties such as the WPDCS.*

77. The WPDCS **REITERATED** its strong request that the Scientific Committee confirms, with support from the Commission, that daily buoy positions data could be also used for scientific purposes, and **AGREED** that a

necessarily prerequisite to improve the quality of FAD data submissions through forms 3-FA is that all pending activities related to the standardization of FAD / FOB terminology be completed.

5 . Updates 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 Extraction of UK catch data from historic EU catch data

78. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-19 that outlines the rationale and process for extracting *metropolitan* United Kingdom (UK) catch data from historic European Union (EU) catch data in the Indian Ocean Tuna Commission (IOTC) databases, including its abstract as provided by the authors:

> *"Following its exit from the EU on 1 January 2021, the UK is now represented by a single seat in the IOTC. This new situation implies the need to extract and re-label historical 'EUGBR' catches as 'GBR' catches in order that the UK can demonstrate and evidence its historical interest and participation in IOTC fisheries. This will ensure IOTC records of historic catches for both the UK and EU are accurate, and that any processes relying on historic catch data are transparent and robust. For example, catch data form the basis of IOTC fee calculations, so in order to calculate the correct fees for both the UK and EU, UK data will need to be extracted and re-labelled. This data extraction exercise will not impact or change the historic catch data of any other IOTC members and will not result in any change to IOTC's total historical catch values."*

79. The WPDCS **NOTED** that the proposed re-labelling has been agreed by the UK with the European Union, and is not expected to cause any change in total catch levels for any species, gear and year concerned.

80. The WPDCS **NOTED** that the UK is still considering whether or not to also re-assign to GBR (United Kingdom of Great Britain and Northern Ireland, which became an IOTC CPC on 20 December 2020) catches and all other scientific data originally reported to the IOTC by the United Kingdom of Great Britain and Northern Ireland (Overseas Territory), indicated as GBRT, which was an IOTC CPC before being replaced by GBR and for which information - albeit minimal - is still recorded in the IOTC repositories.

81. The WPDCS **NOTED** the potential discrepancies that may arise between the revised information and historical documents that draw on data previously disseminated by the IOTC and therefore **SUGGESTED** that the IOTC Secretariat include all necessary information (e.g., through standard metadata complementing each affected dataset) to transparently communicate this change and the date from which it came into effect, thereby providing continuity between those historical documents and the revised data.

82. The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the process outlined in document IOTC-2021-WPDCS17-19 regarding the re-labelling of historical EU,GBR statistical data assets held and disseminated by the IOTC Secretariat.

5.1.2 Draft report on the review of re-estimation methodology of Indonesia's annual tuna catch data in IOTC for 2017-2019

83. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-20 that provides objections to the methodology endorsed by the IOTC Scientific Committee in 2012 to re-estimate gear and species composition of Indonesian artisanal fisheries and proposes a re-estimation methodology for Indonesia's annual tuna catch data for 2017-2019.

84. The WPDCS **CONGRATULATED** Indonesia on the progress made with implementing One Data and **ACKNOWLEDGED** that the implementation of initiatives such as the e-logbook and streamlining of procedures for the collection and validation of data are expected to lead to long-term improvements in the quality of Indonesia's official fisheries statistics.

85. The WPDCS **NOTED** that the One Data programme has been progressively implemented from 2017 and does not re-estimate or re-assess any information prior to that year, further **NOTING** that the transition to One Data resulted in all purse seiners being recorded as industrial (PS) in 2017 due to missing information on vessels characteristics for that year.

86. The WPDCS **NOTED** the improvement in the adoption of electronic logbooks (e-logbooks) for fishing vessels of GT larger than 5 t, with the number of vessels in the IOTC area of competence activated on the e-logbook platform increasing from 375 in 2018 (174 in the presentation) to 2,603 in 2020 (1,674 in the presentation), further **NOTING** how the reporting rate through e-logbooks increased to 86% in 2020 compared to the 14% of manual logbooks.

87. The WPDCS **ACKNOWLEDGED** the development of the Fishing Port Information Center (PIPP) in 2019, which aims to monitor the activities of fishing vessels in fishing ports (e.g., entries and production), **NOTING** that the number of Indonesian ports using the PIPP has been quickly increasing in recent years.

88. The WPDCS **NOTED** that Indonesia has used a range of data sources to re-estimate the catches by species during the period 2017-2019, including logbooks, port landings, national and scientific observers, and production data collected through the One Data programme, which consists of a combination of daily census in fishing ports and random sampling of the production data from the fisheries business actors.

89. The WPDCS also **NOTED** that the source of species composition data used by Indonesia to produce their re-estimated catches by gear is not fixed, but changes according to gear, is predominantly based on logbook data for several fisheries and does not consider scientific observer data due to their coverage.

90. **NOTING** that the geo-referenced catch data submitted by Indonesia to the IOTC Secretariat are derived from logbook information and cover less than 5% of reported nominal catches during the period 2018-2020, the WPDCS **QUERIED** the logbook coverage for the fleets composed of vessels of gross tonnage larger than 5 t, further **NOTING** that vessels equipped with manual or e-logbook might still represent a very small fraction of the thousands of vessels reported by Indonesia as fishing for tuna and tuna-like species in their coastal waters.

91. The WPDCS **ACKNOWLEDGED** that Indonesia submits annual catches of tuna and tuna-like species to the IOTC and FAO through forms 1RC and NS1, respectively, and **NOTED** that discrepancies in the catches were identified between Indonesia's official data submissions to FAO and the tuna-RFMOs (including IOTC and WCPFC) in recent years. In the case of IOTC, these discrepancies include catches for yellowfin tuna.

92. The WPDCS also **ACKNOWLEDGED** that more general data reporting issues are still found in Indonesia submissions to both FAO and IOTC, including major changes in catches for some species or species groups from one year to the other, and **RECALLED** that several consecutive data revisions have been received by the IOTC Secretariat past the annual reporting deadlines, and that these can introduce marked intra-annual or inter-annual changes in both the total and species-specific catch levels.

93. The WPDCS further **NOTED** that the FAO capture production statistics of Indonesia available through the FishStatJ database are the same as the IOTC best scientific estimates of target and bycatch species.

94. The WPDCS **REITERATED** that the catches re-estimated by the IOTC are referred to as "best scientific estimates", to be used for stock assessment and management purposes and not as a replacement of official catch data submitted by the CPCs.

95. The WPDCS **RECALLED** that the initial rationale of the IOTC Secretariat to re-estimate the catches for Indonesia under advice from the SC was in response to sharp and unexplained fluctuations in Indonesia's official catches in the early-2010s, including the appearance and disappearance of catches for selected species and gears between years.

96. The WPDCS further **RECALLED** that the re-estimation methodology implemented by the IOTC was based, to a large extent, on a comprehensive historical review of the data available for Indonesia (including information

from IOTC, IPTP and DGCF), and that the methodology was first developed in 2012 and approved by the Scientific Committee in 2013.

97. The WPDCS **ACKNOWLEDGED** that the adopted re-estimation methodology does not change the annual total catch levels, which remain the same as those officially reported by Indonesia, and **RECALLED** that a revision to the methodology for fresh-tuna longline fisheries was developed in 2018 in collaboration with national scientists and further endorsed by the IOTC Scientific Committee in the same year.

98. The WPDCS **ACKNOWLEDGED** the need to evaluate, and update if necessary, the current IOTC methodology to incorporate changes to Indonesia's fisheries over the last 10 years by also taking into account the availability of new sources of information such as the data collected by One Data and Indonesia's scientific observer program.

99. The WPDCS **NOTED** that the IOTC re-estimation of catches for Indonesia was always intended as a temporary and short-term measure, until Indonesia was able to provide an update to their official catches which addressed the issues and inconsistencies identified in Indonesia's previous data submission to IOTC.

100. However, the WPDCS **AGREED** that inserting Indonesia's official catches in the IOTC database for 2010-2019, as presented in paper IOTC-2021-WPDCS17-20, without any adjustment would reintroduce extreme volatility and uncertainty in IOTC's catches, adversely impacting the stock status and management advice for a number of neritic and tropical tuna species, and notably:

- Skipjack tuna: 86% increase in catches between 2016 and 2017;
- Bullet tuna: up to +2,800% increase in catches between 2010 and 2011; up to +820% increase in catches for 2017-2019;
- Frigate tuna: no official catches available reported for 2010 and 2011; a 52% decrease in catches between 2017 and 2018.

Table 1. Comparison of current IOTC best scientific estimates of nominal catches for Indonesia with their latest revised official catches (2010-2019) as provided in Table 4.3.12 of document IOTC-2021-WPDCS17-20

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bullet tuna (*Auxis rochei*)										
Indonesia: current IOTC estimates	2,303	2,388	2,365	2,693	2,452	2,407	2,288	2,289	18,201	7,487
Indonesia: revised official data	55,394	70,269	12,131	23,386	27,934	13,429	6,723	21,057	30,397	42,559
% change	2306%	2842%	413%	769%	1039%	458%	194%	820%	67%	468%
Frigate tuna (*Auxis thazard*)										
Indonesia: current IOTC estimates	59,868	62,096	61,334	70,004	63,757	62,566	59,390	59,390	48,664	60,614
Indonesia: revised official data			71,118	73,044	46,690	70,705	77,205	61,220	23,291	54,285
% change	-100%	-100%	16%	4%	-27%	13%	30%	3%	-52%	-10%
Skipjack tuna (*Katsuwonus pelamis*)										
Indonesia: current IOTC estimates	80,621	83,627	88,132	96,240	85,946	84,604	80,256	80,431	78,919	129,042
Indonesia: revised official data	68,466	84,601	87,333	94,437	72,088	80,938	**72,359**	**149,662**	111,190	146,376
% change	-15%	1%	-1%	-2%	-16%	-4%	-10%	86%	41%	13%

101. Therefore **NOTING** the unusual variabilities in some of Indonesia's official catch statistics prior to the implementation of One Data in 2017, particularly in the case of neritic and tropical tuna species, the WPDCS **REQUESTED** that Indonesia undertake work – in collaboration with the IOTC Secretariat – to reassess their official catches (for the period 2010-2016) to ensure consistency and coherence in the longer-term catch series available for management and stock assessment purposes and **RECOMMENDED** that the Scientific Committee endorse this process.

102. The WPDCS **REQUESTED** that this review of the official data should not be limited to the 16 tuna and tuna-like species under the mandate of IOTC, but also include the most commonly caught species of elasmobranchs and other related bycatch, as per IOTC Resolution 15/01, in addition to interactions with cetaceans, turtles and seabirds.

103. In conclusion, the WPDCS **SUGGESTED** that the current IOTC re-estimated catches remain in place until a comprehensive assessment of Indonesia's latest revised official catches are undertaken, to comprehensively understand the extent to which observed fluctuations in the catches are due to improvements in the underlying data collection and reporting systems, rather than actual changes in the levels of abundance; for example the lack of species level information in the early-2010s (e.g., frigate tuna), or the introduction of e-log books and improvements in the estimates of total catches by species (e.g., skipjack tuna).

5.1.3 Statistics of the French purse seine fishing fleet targeting tropical tunas in the Indian Ocean (1981-2020)

104. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-21 that presents an updated summary of the status of statistics (for the period 1981-2020) as collected by the French purse seine fleet operating in the Indian Ocean, including its abstract, as provided by the authors:

> *"This document presents an updated summary of the French purse seine fleet targeting tropical tunas in the Indian Ocean. The statistics cover the period 1981-2020 and specifically focus on the activity of the last year of the fishery. In 2020, a total of 13 French vessels operated in the western Indian Ocean including 10 purse seiners and 3 support vessels. The total capacity weighted by the months of activity for each vessel is 10626t. The total nominal effort in 2020 was of 1,805 fishing days and 2,414 sets with 1,898 sets on floating objects and 516 on free schools. The total catch of the French component of the EU purse seine fleet of the Indian Ocean was 58,149t, being composed of 42.2%, 52.6%, 4.5% and 0.8% of yellowfin tuna, skipjack tuna, bigeye tuna and other species respectively. The most noticeable change in 2020 was the decrease of 17.7% for the total of catches in comparison to 2019, respectively 58,149 t and 70,622 t. Remarkably, yellowfin tuna and skipjack tuna proportion of catches in 2020 for free swimming school returned to the proportion prevailing before 2018, after 2 years of a different fishing strategy targeting skipjack tuna on free swimming school"*

105. The WPDCS **NOTED** the significant decrease in nominal fishing effort and total catches of the French component of the EU purse seine fleet in 2020, partly due to the effects of the CoVid-19 pandemic (e.g., operations of some purse seiners stopped due to outbreaks among the crews).

106. The WPDCS **NOTED** that the proportion of fishing sets made on free swimming schools by the French purse seine fleet has re-increased to 20-25% in 2019-2020 after a major drop to 10% in 2018, due to changes in the strategy of allocating the limit of yellowfin catch by the companies.

107. The WPDCS **NOTED** the major decrease in the number of size samples (n = 85 in 2020 vs. n = 329 in 2019) collected at unloading which only covered the first quarter of the year due to the non-access of the enumerators to the vessels for safety reasons, further **NOTING** that samples from both French and Seychelles-flagged vessels were used in the processing of the data for 2020.

108. Consequently, the WPDCS **NOTED** that the species and size composition of the catch of the French purse seine fishery estimated for 2020 heavily relied on the samples collected for the year 2019 through the substitution scheme implemented in the T3 ("*Traitement des Thons Tropicaux*") processing procedure.

109. The WPDCS **NOTED** that the method implemented by ORTHONGEL to daily monitor the catch of yellowfin tuna by each French purse seiner is only focused on this species and is not adequate to be used for estimating the composition of the catch for the whole fleet, i.e., it cannot be used as a substitute to T3.

6. Review of data requirements in conservation and management measures relevant to the WPDCS

6.1 Data reporting (to the IOTC Secretariat)

110. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-23 that presents the matrix-scoring approach developed by FAO at the level of the fishing units, to support a statistically-sound definition of small-scale fisheries, including its abstract as provided by the authors:

> *"This document presents a proposed approach for the characterization of Small Scale Fisheries to assist national management and enable inter-comparability of data and information on small-scale fisheries issues. The approach uses a matrix scoring approach to address the multi-character complexity and inter-regional diversity of small-scale fishing operations. The matrix is primarily intended as a research tool and with further testing and development, might be used more systematically for national or regional analytical or reporting purposes. CWP members are kindly invited to provide feedback on the proposed methodology and on the potential applicability in their region, including if it could be articulated with related objectives."*

111. The WPDCS **NOTED** that by incorporating multiple dimensions (such as vessel size, motorization, storage, disposal of the catch, and type of ownership), the matrix approach seeks to avoid misleading or inappropriate characterizations of fisheries as small-scale or large-scale which can sometimes occur when a single criterion, such as vessel length or area of operation, is emphasized.

112. The WPDCS **NOTED** that, in the context of the matrix, the definition of a 'fishing unit' is not intended to be prescriptive and can be defined at a number of different levels deemed most appropriate by the authority or entity engaged in harvesting fish. The flexible nature of the matrix means that the fishing unit being assessed can either be an entire fishery or fleet, a part of it, or even at the individual vessel/ fisher level (if considered to be appropriate).

113. The WPDCS **NOTED** that since 2018, over 3,389 fishing units have been scored using the matrix in 58 countries and territories (including nine coastal states in Indian Ocean) as part of the Illuminating Hidden Harvests global study of SSF. However, a much smaller number of these include fisheries targeting tuna or tuna-like species within the IOTC area of competence.

114. The WPDCS **NOTED** that, based on the results from the matrix, there is no one, simple cut-off for distinguishing between small-scale or large-scale fishing activity and therefore the proposal for a universal definition of small-scale fisheries is not considered appropriate. However, the matrix can assist with developing national definitions, and can also provide a common framework for attributing a score to a fishing operation that links it to its scale of operation.

115. The WPDCS **RECALLED** that IOTC currently categorizes fishing vessels as artisanal or industrial by their length overall (LOA) and area of operation, and **ACKNOWLEDGED** that this definition is too simplistic to fully take into consideration the large array of subsistence, semi-industrial and industrial fishing activities that operate within CPC's EEZs.

116. The WPDCS therefore **RECOMMENDED** that work is undertaken to test an alternative, more flexible, matrix-based approach developed by FAO, to help refine the characterization of fisheries in IOTC at the national and regional level, and **NOTED** that a number of CPCs (including Indonesia, Kenya, Maldives, Pakistan and Sri Lanka) expressed their interest in participating in these studies.

117. The WPDCS **AGREED** that, while acknowledging the limitations of the current definition of artisanal and industrial fisheries used by IOTC, any proposal to revise this definition by taking into account additional

characteristics – such as those developed by the matrix approach – should be comprehensively discussed by the Scientific Committee and presented to the Commission, given the implication on a number of compliance and scientific-related CMMs.

6.1.1 Resolution 15/02 On mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)

118. **NOTING** the difficulty for some CPCs to fulfil the mandatory requirement of sampling at least 1 fish per metric ton of catch (by species and gear), particularly in the case of bycatch species that are brought onboard alive and whose handling might put the safety of crew members at risk (e.g., sharks), the WPDCS **RECOMMENDED** the Scientific Committee to further discuss this issue to ensure that CPCs are not penalized from a compliance perspective when the above circumstances arise in their fisheries.

119. The WPDCS reiterated the **REQUEST** from the Scientific Committee that all CPCs with purse seine fisheries operating in the Indian Ocean provide their effort information as number of sets alongside any other effort unit specific to the various fishing modes (e.g., fishing days or hours searching), and **RECALLED** that this was requested not only for future submissions of catch and effort data but also for all historical records currently held by the IOTC Secretariat.

120. Similarly, the WPDCS reiterated the **REQUEST** from the Scientific Committee that all purse seine fisheries report size-frequency data both in raw (i.e., actual measurements) and in raised form (i.e., catch-at-size, if and when available) both for historical and for new submissions.

121. The WPDCS **NOTED** with concern that no update was provided by the EU regarding the expected revision of species composition of tropical tuna catches reported by the Spanish component of the EU purse seine fleet for the year 2018, and **REQUESTED** that the EU present the revised data and the methodology adopted for its revision no later than the next WPDCS in 2022.

122. Also, the WPDCS **NOTED** with concern that no size-frequency data was reported by the Spanish component of the EU purse seine fleet for the year 2020 and **REQUESTED** as a matter of urgency that EU,Spain provide the missing data at their earliest convenience.

123. The WPDCS **NOTED** that the uncertainty in catch data for a range of gears is affecting the quality and reliability of the stock assessments, as already pointed out by various Working Parties of the IOTC (WPNT, WPB and WPTT).

124. Notwithstanding the availability of a scoring system for data quality already implemented by the IOTC Secretariat, the WPDCS **CONSIDERED** that detailed information on sampling schemes developed by CPCs would allow the Scientific Committee to better assess the representativeness of the data submitted to the IOTC.

125. The WPDCS further **NOTED** that uncertainty in catch time-series should properly be considered in stock assessment models like all other sources of uncertainties (e.g., natural mortality, growth, movements, spatial stratification, etc.) and that efforts should be made to ensure that such uncertainty is assessed by all possible means.

126. For this reason, the WPDCS **REQUESTED** that specific activities to estimate and assess the level of uncertainty of historical catches for all species being assessed in a given year be prioritized in the work plan of the group.

127. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-27 which proposes draft guidelines for describing sampling design, sampling performance, and statistical inference for the data sets estimated by the institutes in charge of the monitoring of the fisheries concerned by the IOTC Resolution 15/02.

128. The WPDCS **RECALLED** that Resolution 15/02 para. 4 states that “documents describing the extrapolation procedures (including raising factors corresponding to the logbook coverage) shall be submitted routinely” to the IOTC Secretariat in the case of industrial surface and longline fisheries; in addition, that “size sampling shall be run under strict and well described random sampling schemes which are necessary to provide unbiased figures of the sizes taken”.

129. The WPDCS **NOTED** that in many cases, information on the sampling protocols, processing and extrapolation procedures used by CPCs are not made available to the IOTC Secretariat, but are critical to assess the reliability of the datasets reported to and disseminated by IOTC.

130. The WPDCS **WELCOMED** this initiative presented by the IOTC Secretariat and strongly **AGREED** that the proposal for the use of a standard template by the CPCs would greatly facilitate the comparison of methods across data sets and fisheries and provide a useful resource to better understand the specifics of each data set.

131. The WPDCS **NOTED** that open repositories such as Zenodo could be one solution where protocols of sampling protocols could be shared online and Digital Object Identifiers (DOIs) made available in order to improve the transparency of data reported to IOTC.

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

132. The WPDCS **NOTED** that there was no paper presented or discussion undertaken on this specific agenda item.

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

133. The WPDCS **NOTED** that there was no paper presented or discussion undertaken on this specific agenda item.

6.1.4 Resolution 21/01 On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC area of competence

Updates on yellowfin tuna catch limits according to IOTC Resolution 21/01

134. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-28_Rev1 that informs participants at the 17th Working Party on Data Collection and Statistics (WPDCS17) on the yellowfin tuna catch limits estimated for 2022 in consequence of the application of the criteria set forth by IOTC Resolution 21/01 to the historical catch data of IOTC CPCs.

135. The WPDCS **RECALLED** that six CPCs (India, Indonesia, I.R. Iran, Madagascar, Oman, Somalia) have objected to Resolution 21/01, **NOTED** that for these CPCs Resolution 19/01 (or 18/01, as is the case of India) remains binding, and **ACKNOWLEDGED** that for all other CPCs Resolution 21/01 will enter in effect on December 17 2021.

136. The WPDCS **ACKNOWLEDGED** the differences in limits of applicability between Resolution 21/01, that applies to all yellowfin tuna catches regardless of the artisanal or industrial nature of the fisheries concerned, and Resolution 19/01, that instead applies on a gear-by-gear basis to yellowfin tuna catches from the industrial component of each fishery, defined as the catches reported by vessels of length overall greater than or equal to 24 meters, or lower if fishing outside the EEZ of their flag state.

137. The WPDCS **NOTED** that, regardless of the Resolutions applying to each CPCs, information on yellowfin tuna catches for the statistical year 2021 are necessary to estimate catch limits for 2022, and **ACKNOWLEDGED** that, as this information will only be available starting from 30 June 2022 (according to the current IOTC data reporting cycle), the estimates hereby presented assume that CPC catch levels for 2021 are exactly the same as those reported for 2020 and currently available to the IOTC Secretariat.

138. The WPDCS **RECALLED** that Para. 25 of Resolution 21/01 (see also Para. 24 of Resolution 19/01) asks that "*The IOTC Secretariat under advice of the Scientific Committee shall prepare a table of allocated catch limits disaggregated as per the conditions set out in paragraphs 5-11 for following year, in December of the current year*" and therefore **REQUESTED** CPCs to review the information provided in this document to confirm that their official catches as well as the criteria used to identify potential reductions and future catch limits are in agreement with those determined by the Secretariat within the limits of this analysis.

139. The WPDCS **NOTED** the tables presented in the document and showing the procedures and the data used to calculate the catch limits for 2022 for all IOTC CPCs, and **ACKNOWLEDGED** that due to the objections to Resolution 21/01, the estimation had to be performed differently for the CPCs subject to Resolution 21/01 and for those still subject to Resolution 19/01, while **RECALLING** that over-catches detected for years prior to 2021 are reflected as penalties in 2022 also for the CPCs bound by Resolution 21/01.

140. The WPDCS **NOTED** that Seychelles and Sri Lanka are the only two CPCs to which penalties for over-catches in years prior to 2021 apply in the estimation of catch limits for 2022 according to Resolution 21/01, and that their estimated catch levels for 2022 are therefore reduced by the calculated penalties.

141. The WPDCS **NOTED** how the historical catches used to determine Indonesia's gear-specific catch limits for 2022, as per Resolution 19/01, are taken from the National Reports provided by Indonesia at the 23rd and 24th sessions of the Scientific Committee.

142. The WPDCS also **ACKNOWLEDGED** that the actual breakdown of artisanal and industrial catches required by Resolution 19/01 cannot be inferred from the forms 1-RC provided by Indonesia for the years concerned, as the fishery categorization used by Indonesia is based on vessels' gross tonnage (GT) rather than length overall (LOA) as instead required by Resolution 19/01.

143. Finally, the WPDCS **NOTED** that the determination of catch limits for 2022 for I.R. Iran, and specifically those applying to their offshore gillnet fisheries (which are subject to Resolution 19/01) indicate a negative catch limit for 2022 due to the marked overfishing reported in previous years.

144. The WPDCS **ENCOURAGED** CPCs to review the procedures adopted to produce the outputs of **Table 2 and Table 3** presented by the IOTC Secretariat and confirm the validity of the results, as well as ensure measures are in place to ensure that catches of yellowfin tuna for 2022 do not exceed the limits set overall (or by fishery) by the resolutions they are bound to.

Table 2. Estimates of total catch limits (t) of yellowfin tuna for 2022 for CPCs bound to Res. 21/01 for all their fisheries

CPC	Limit (t)
CHN – China	10,557
EU – European Union	73,146
KOR – Republic of Korea	9,056
LKA – Sri Lanka	31,066
PAK – Pakistan	14,468
YEM – Yemen	26,262
MDV – Maldives	47,195
SYC – Seychelles	34,917
MUS – Mauritius	10,490
COM – Comoros	5,279
JPN – Japan	4,003
KEN – Kenya	3,654
TZA – Tanzania	3,905
AUS – Australia	2,000
BGD – Bangladesh	2,000
ERI – Eritrea	2,000
MOZ – Mozambique	2,000

MYS – Malaysia	2,000
SDN – Sudan	2,000
THA – Thailand	2,000
ZAF – South Africa	2,000
FRA – France (territories)	500
GBR – United Kingdom	500
PHL – Philippines	700

Table 3. Estimates of total catch limits (t) of yellowfin tuna for 2022 for CPCs having objected to Res. 21/01 and subject to Resolution 19/01

CPC	Limit (t) for purse seine	Limit (t) for longline	Limit (t) for gillnet	Limit (t) for all other gears	Limit (t)
IDN – Indonesia	2,308	11,381	-	-	13,689
IND – India	-	-	-	-	-
IRN – I.R. Iran	-	-	**-27,553**	-	**-27,553**
OMN – Oman	-	-	-	-	-
MDG – Madagascar	-	-	-	-	-
SOM – Somalia	-	-	-	-	-

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

145. The WPDCS **NOTED** that silky shark (*Carcharhinus falciformis*) is a bycatch species frequently interacted with by the gillnet fisheries operating in the Indian Ocean and therefore **RECOMMENDED** that the Scientific Committee discuss its inclusion in the list of 'other' species for which information should be recorded by gillnet fisheries (paragraph 2.3 of Resolution 15/01).

An android based application to collect catch and effort data from the coastal fisheries of Sri Lanka to minimize the gap of data availability

146. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-16_Rev1 that presents the current status in the development of electronic tools to support fishermen in collecting catch and effort data in the coastal fisheries of Sri Lanka, including its abstract as provided by the authors:

> *"Coastal fisheries provide livelihoods for millions of people in many countries however are often poorly documented or the data of the same are poorly reported. This issue is critical in many small-scale inshore fisheries operated in areas contain high marine biodiversity, Therefore, Novel and cost-effective approaches to obtain fisheries data are required to monitor these activities and help inform sustainable fishery and marine ecosystem management. Sri Lanka made an effort to achieve the above requirement via an android application, while asking the officers who collect costal data to submit catch and effort data via a simple smartphone interface. The data floor of the software were designed in accordance with the manual data collection process practiced by the fisheries officer in the filed level. The application can be accessed by all*

filed officers incorporated in the duties of each Fisheries Inspection (FI) Division to submit data from more than 950 landing sites are there in the coastal belt. The application was only tested as a pilot project in order to identify the gaps in the system. Number of adjustments were made according to the findings via the pilot project. However this attempt was heavily affected by the prevailing CoViD 19 pandemic. Currently the database structure and the mobile app can be considered as stable and it was expected to undergo another pilot phase after conducting a comprehensive training to the officers."

147. The WPDCS **CONGRATULATED** Sri Lanka for the recent developments in implementing this initiative, which demonstrates the potential for collecting data in digital format directly in the field, and the improvements that could be expected in the validation and timeliness of fisheries data analysis for coastal fisheries.

148. The WPDCS **NOTED** that the application has the flexibility to record the times of separate fishing activities during the day (including search times and time fishing), as well the activities of multi-gear vessels which may be operating different gears at different times of the day during a single fishing trip.

149. The WPDCS **NOTED** that the application was only tested in a pilot trial in order to identify gaps in the system and also **NOTED** that some improvement could be performed (e.g., inclusion of discards data) to be tested in the second pilot phase after conducting a comprehensive training to the officers and as part of the next update of the software.

150. The WPDCS **NOTED** that the coverage for catch data and effort data in the pilot trial is above 90% while the coverage of length-weight data is still low (14%) due to the restriction imposed by CoViD-19 pandemic.

Improving data in artisanal IOTC fisheries using electronic monitoring tools

151. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-17 that presents the rationale and current status of a suite of electronic tools to support data recording and monitoring of fisheries data for artisanal fisheries, including its abstract as provided by the authors:

"The parlous data situation for artisanal tuna fisheries in tuna commissions, including the IOTC, is due in part to reliance on technology that is literally thousands of years old - handwriting on paper - to record data. Fisheries management bodies (business, national and inter-governmental, including in IOTC) are transitioning to electronic fisheries information systems. However, the IOTC data holdings and management are reliant on actions taken by Parties to the Commission (CPCs). Primary data recording for logbooks, monitoring or catch documentation schemes remains overwhelmingly paper-based. Information on paper must be captured into an electronic system by CPCs before it can be shared or used for national reporting purposes. This is a cumbersome, expensive and error-strewn process. Furthermore, paper-based systems are highly scale-dependent, meaning that as the scale of the data requirements grows (more fishing operations, more volumes and types of information), so too does the effort to meet those requirements. Not all coastal CPCs consistently meet their data submission and reporting obligations to the IOTC. ABALOBI is a social enterprise working with artisanal fisheries, and has developed a suite of electronic tools for fishing data recording, including for monitors recording catch information at landing. (...)" (see original document for the full abstract)

152. The WPDCS **ACKNOWLEDGED** that the ABALOBI platform supports data collection both onboard and at landing site, and includes a robust data management and analysis workflow that enables real-time decision making for managers and stakeholders alike.

153. The WPDCS also **ACKNOWLEDGED** that the platform is provided to end users as a commercial service managed by ABALOBI, which also is responsible for the data storage.

154. The WPDCS **NOTED** that the platform implements a flexible approach to data storage, that uses the cloud to enforce confidentiality aspects and guarantee that the data is stored in jurisdictions that protect its ownership.

155. The WPDCS **NOTED** that the terms "*electronic reporting*" and "*electronic observation*" are often used interchangeably, and highlighted the need to distinguish between the two concepts in the context of fisheries

data collection (e.g., where electronic observation is generally associated with the capture and automated or manual analysis of photos, videos or other forms of electronic data capture).

156. The WPDCS **EXPRESSED** its strong support for the adoption of electronic tools for data collection and reporting in poorly sampled fisheries, **ACKNOWLEDGING** that these can significantly contribute to increasing the level of coverage and the accuracy of the information available for scientific and management purposes.

157. The WPDCS **RECALLED** that while it cannot be prescriptive on the specific electronic data collection tool to adopt, it can **ENCOURAGE** the development of artisanal fisheries data collection minimum standards, which will guarantee that the information could be effectively submitted to the IOTC Secretariat regardless of the tool adopted for its collection.

Observer Programme for Small Scale Tuna Fisheries: Is Crew Based Observer Programme an implementable option

158. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-18 that presents an assessment of the results of crew-based data collection programmes, as implemented in the gillnet fisheries of Pakistan between 2012 and 2019, as a viable alternative to the deployment of scientific observers onboard, including its abstract as provided by the authors:

> *"Although IOTC Resolution 11/04 requires that at least 5 % of the number of operations/sets for each gear type by the fleet of each Contracting Parties and Cooperating Non-Contracting Parties (CPCs) while fishing in the IOTC area of competence of 24 meters overall length and over, and under 24 meters if they fish outside their Exclusive Economic Zone (EEZ) shall be covered by this observer scheme. However, this Resolution could not be effectively implemented in case of small scale fisheries by any of the CPCs although they have a fleet of 24 m and under 24 m that operate and fish outside their EEZ. This is mainly because of the small size and the prevailing working conditions on board these vessels. A Crew Based Observer Programme was implemented during 2012 and 2019 by WWF-Pakistan which helped in generation of information about tuna fisheries of Pakistan required under IOTC Resolution 11/04. Considering the success, effectiveness and simplicity of the Crew Based Observer Programme, it seems an appropriate option for circumventing deployment of "external" observers and the task of collection of information/data required to be collected under Resolution 11/04. This will enable generation of reliable data from small scale fisheries which is believed to be contributing substantially to the catches of tuna and tuna like species in the IOTC area of Competence. It is proposed to adopt the template already developed for the Crew Based Observer Programme by WWF-Pakistan or development a new template for the purpose for collection of information from small scale fisheries."*

159. The WPDCS **ACKNOWLEDGED** the difficulties of deploying scientific observers on-board vessels less than 24 m length overall and **THANKED** Pakistan and WWF-Pakistan for their continued efforts to establish a functioning crew-based data collection programme on their gillnet fleet.

160. The WPDCS **NOTED** that the term *observer* used to describe the program may be misleading as the data are collected by crew members who are not scientific observers and **SUGGESTED** that the name be changed to *self-reporting* and included as such in the IOTC databases consistently with similar programs.

161. The WPDCS **NOTED** that, in relation to gillnet fleets operating within the IOTC Area of Competence, the WPEB had discussed the possibility of updating the IOTC code list of gears to include surface and sub-surface gillnets in order to better understand and monitor the impacts of sub-surface gillnets and their interaction with bycatch – subject to confirmation of availability of this data by CPCs.

162. The WPDCS **NOTED** that while self-reported data should be distinguished from other types of data – notably data collected by independent and scientific observers – the information collected by crews should still be fully utilized, wherever possible and whenever considered appropriate, and **ACKNOWLEDGED** the value of these data particularly in the case of data-poor fisheries where there may be limited official or other alternative sources of independent scientific data available.

163. The WPDCS **ACKNOWLEDGED** the possibility that estimates of bycatch derived from the crew-based observer programme may be biased in some cases due to mis-reporting which might occur for several reasons.

164. The WPDCS **NOTED** that some trials of CCTV have been conducted to complement the crew-based observer program and that small differences were found between the two data sources while some technical issues were encountered with the technology onboard the vessels.

165. The WPDCS **NOTED** the commitment of the IOTC Secretariat to continue reviewing the crew-based observer programme of Pakistan and assess its ability to address the ROS requirements for their fisheries, **NOTING** that progress in data validation has been slow.

166. The WPDCS **NOTED** that the data collected through the crew-based program could be used to break down the gillnet fisheries data into coastal and offshore components as the data currently available at the Secretariat are aggregated.

167. The WPDCS further **NOTED** that the information could also be used to provide geo-referenced catch and effort data as required per Resolution 15/02 and **ENCOURAGED** Pakistan to liaise with the Secretariat if required.

168. **NOTING** that WWF has provided some size-frequency and CPUE data to the government of Pakistan, the WPDCS **REQUESTED** Pakistan to submit these data to the IOTC Secretariat at its earliest convenience.

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

169. The WPDCS **NOTED** that the 2nd ad hoc Working Group on FADs (WGFAD02) was held remotely from October 4-6 2021 and that several aspects specifically dealing with Resolution 19/02 were discussed on that occasion.

170. The WPDCS **RECALLED** that all CPCs having purse seine fleets fishing on FAD/log-associated schools are bound to the requirement of reporting to the IOTC Secretariat, through IOTC Form 3-BU, the daily positions of the electronic buoys followed by their vessels, with the data elements and deadlines for reporting indicated in paragraph 24 of Resolution 19/02.

171. Notwithstanding the above, the WPDCS **NOTED** with concern that some CPCs do not respect the deadlines for the reporting of buoy data, while other CPCs have yet to submit any information since the Resolution entered in force.

172. Therefore, the WPDCS **URGED** all concerned CPCs to provide the required data to the IOTC Secretariat as a matter of priority, or clarify the reasons why no information in that regard is available for their purse seine fisheries when these are actively fishing in the Indian Ocean.

173. The WPDCS **NOTED** the discussions currently ongoing at the Scientific Committee and Commission level on the necessity of amending Resolution 19/02 to guarantee that buoy data can be used for scientific purposes, and **RECALLED** that confidentiality aspects should also be taken into due consideration before deciding how to disseminate this information, if and when agreed.

174. The WPDCS **NOTED** that the provision of FAD-related information through IOTC form 3-FA (efforts, interactions, deployments, etc.) is currently hampered by a general lack of clarity on the classification of FAD types and FAD activities.

175. For this reason, the WPDCS **RECOMMENDED** the Scientific Committee to finalize the work required to improve current definitions of FAD and FAD activities used by the IOTC, in collaboration with the WPTT and WGFAD.

7. Regional Observer Scheme

7.1 Updates on the status of the ROS and its Pilot Project

176. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-10_Rev2 that informs the WPDCS17 of the status of implementation and reporting to the IOTC Secretariat of the Regional Observer Scheme (ROS) set out by

Resolution 11/04 *on a Regional Observer* Scheme at the 15th Session of the Commission in 2011, including its abstract as provided by the authors:

> *"Fisheries observer data is important for fisheries management, providing an independent source of detailed, high-quality information on fishing activities and catches at a sufficient level of resolution to be used for analyses such as the standardisation of catch rates and analysis of bycatch mitigation measures. (...). The main objective of the IOTC Regional Observer Scheme is to 'collect verified catch data and other scientific data related to the fisheries for tuna and tuna-like species in the IOTC area of competence'. Resolution 11/04 On a Regional Observer Scheme makes provision for the development and implementation of national observer schemes among the IOTC CPCs starting in July 2010 and covering "at least 5 % of the number of operations/sets for each gear type by the fleet of each CPC while fishing in the IOTC Area of competence of 24 meters overall length and over, and under 24 meters if they fish outside their EEZs shall be covered by this observer scheme. For vessels under 24 meters if they fish outside their EEZ, the above-mentioned coverage should be achieved progressively by January 2013". (...). Several national observer programmes have now been established for industrial fleets across the Indian Ocean and these are used to collect scientific fisheries data by onboard observers, according to specific research requirements specified by each of the coordinating organisations. Data are collected and reported at the regional level to the IOTC Secretariat as part of the mandate of the ROS and are summarised in this paper."* (see original document for the full abstract)

177. The WPDCS **NOTED** that a preliminary version of this document was recently presented at the 1st ad hoc Working Group on the development of Electronic Monitoring programme Standards (WGEMS01), and that its current version will eventually be presented at the forthcoming 24th session of the Scientific Committee.

178. The WPDCS **ENCOURAGED** all CPCs that have implemented scientific observer programmes in their fisheries in years between 2016 and 2020 to verify that the summarized information accurately reflects their current status of development, implementation and reporting of the ROS.

179. Eventually, the WPDCS **RECALLED** how the information on the level of observed efforts presented for the Australian longline fleet originates from Electronic Monitoring Systems and that therefore, notwithstanding the high level of coverage, it cannot yet be formally considered as fully compliant with the ROS.

180. The WPDCS **NOTED** that the levels of coverage hereby presented for several longline and purse seine fleets are estimated on the basis of the information available to the IOTC Secretariat, including those submissions which are not in a format immediately suitable for data extraction and processing.

181. The WPDCS also **RECALLED** how, in order to estimate the ROS coverage, the Secretariat compares the information on the observed effort (trips, sets, fishing days, hooks) with the total effort reported by each fleet through the mandatory annual statistical submissions in agreement with IOTC Resolution 15/02.

182. For this reason, the WPDCS **ACKNOWLEDGED** that the estimated effort coverage for the longline fleets is calculated as the total number of hooks observed (as reported through the ROS data submissions) divided by the total number of hooks deployed (as reported through IOTC form 3-CE).

183. The WPDCS **RECALLED** how the total number of hooks deployed is the only unit of effort currently required by (and systematically provided through) the official submissions of annual catch and effort data for longline fisheries, and that therefore it is not possible for the IOTC Secretariat to estimate the ROS coverage in terms of number of trips, number of sets or number of fishing days observed vs. the total effort expressed through such units, as this is generally unavailable.

184. At the same time, and even though Resolution 11/04 indicates that the target minimum level of coverage should be "*at least 5 % of the number of operations/sets*", the WPDCS **REQUESTED** that when finer-grained information is available to the ROS (e.g., the number of observed hooks in the case of longline fisheries) this should be provided to the IOTC Secretariat and preferred for the estimation of the actual level of coverage of ROS data submissions.

185. The WPDCS **NOTED** with concern that no information is available in terms of observer coverage for the large-scale gillnet fleets operating in the Indian Ocean, and that the information received for observers deployed on Maldivian pole-and-line vessels is still in the process of being summarized and considered for inclusion in future versions of this document.

186. In general, and with few exceptions, the WPDCS **NOTED** with concern that the level of coverage of the ROS remains low among CPCs, and that while longline fleets present a wide range of different coverage levels (from 0% to ~14% estimated on the average of the last five years in all concerned CPCs), in the case of purse seine fleets either CPCs are fully compliant (i.e., their coverage is estimated at well above the requested 5%) or they are not providing any information at all (i.e., the coverage level is estimated to be 0%).

187. The WPDCS **NOTED** the impacts of the CoViD-19 pandemic on the work streams implemented in the context of the ROS pilot projects on observer training and EMS project, and **ACKNOWLEDGED** that one component of the pilot project, namely the provision of support for scientific observations in port, has not been implemented due to lack of funding.

188. In this regard, the WPDCS **NOTED** with thanks that Australia expressed their interest in providing support to this specific Pilot Project work stream by contributing to assess the capability of in-port data collection programmes to collect core ROS data elements, and that this will be confirmed after internal agency discussion and reported back to the next session of the Scientific Committee.

189. The WPDCS **ACKNOWLEDGED** the status of development and implementation of the five main work streams supported by the IOTC Pilot Project (Resolution 16/04) and **CONSIDERED** how to best take this into account in the formulation of its work plan for the next five years.

Update from the consultancy on the development and Implementation of an Observer Training Programme to support the IOTC Regional Observer Scheme

190. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-11 that presents an overview of the current development of the observer training programme in support of the IOTC ROS, including its abstract as provided by the authors:

> *"This document presents an up-to-date summary of the consultancy on the development and implementation of an observer training programme to support the IOTC Regional Observer Scheme (ROS) implemented by CapMarine . CapMarine addresses the 17th WPDCS to request it to review and endorse documents developed under the consultancy and to address proposed changes to Minimum Standard Data Fields adopted by the 23rd Session of the Commission."*

191. The WPDCS **NOTED** the outputs of the consultancy developing and implementing an Observer Training Programme (OTP) in support of the IOTC ROS, and **CONGRATULATED** the authors for the results achieved.

192. The WPDCS **ACKNOWLEDGED** the list of materials developed during the consultancy and provided as information papers for this meeting, further **NOTING** that these still require some work and input from experts in order to be finalised.

193. The WPDCS **NOTED** that currently the ROS requirements for longline fisheries call for the recording of "*one specimen at most per catch detail*", implicitly requiring the linking of biometric information to a particular specimen recorded in the catch details, which is not straightforward on longline vessels due to the fact that the observer must prioritise the observation of the line above any sampling, which therefore tends to be done during gaps in the line observation at which point it may not be possible to associate a specific specimen to its catch identifier.

194. The WPDCS **NOTED** that due to the lower frequency of catch of non-target species, especially species of particular interest, it is easier for the observer to couple the catch identifier with the sampled specimen in that case.

195. The WPDCS **RECALLED** that the observer data requirements were agreed on during the workshop held in 2018 and it is thought that the requirements were set in this way in an attempt to reduce the recording effort required by observers by reducing the need for repeating information such as catch details and species.

196. Therefore, the WPDCS **SUGGESTED** that this issue be discussed in more detail with longline experts, and the results of the discussion reflected in changes to the current data collection fields structure if necessary.

197. The WPDCS **NOTED** the suggestion of the authors to update the ROS data field specifications in order to decouple the fields under the "*detailed specimen information*" from the "*catch details*" section of the longline reporting requirements, and **AGREED** that the proposed changes align with the current structure of the PS, GN and PL "*Catch details*" sections.

198. The WPDCS **RECALLED** the issues encountered by CPCs with some reporting definitions, in particular those relating to "*mandatory for reporting*" and "*optional for reporting*", further **NOTING** that this was previously discussed at the Scientific Committee.

199. The WPDCS **NOTED** the suggestion from the authors to change the labelling of "*Optional for reporting"* to "*Mandatory for reporting (when collected)*" and **AGREED** that this labelling be used in all documents, forms and tools dealing with ROS data collection requirements.

200. The WPDCS **NOTED** a number of suggestions from the authors regarding observer sampling for discussion and eventual inclusion in the observer guideline documents, including:

    a. the need to decide on a clear definition for a minimum sample size;

    b. the inclusion of discarded target species in biometric sampling;

    c. the extension of monitoring and sampling of retained target catch to include non-tuna species (due to the targeting of billfish and sharks in some fleets); and

    d. the exclusion from the required monitoring of retained target catch by onboard observers for CPCs with a port sampling scheme.

201. The WPDCS **NOTED** that these issues are gear-specific and **REQUESTED** that they are further discussed intersessionally between the authors and experts in these fisheries.

202. The WPDCS **NOTED** that the observer guideline documents produced by the authors as part of the consultancy have been peer reviewed by several experts for each gear and **ENCOURAGED** any other experts and national observer coordinators to provide feedback on these documents.

203. Finally, in order to overcome the practical issues and delays introduced by the onset of the CoViD-19 pandemic and to further guarantee that OTP materials and standards be fully developed, the WPDCS **RECOMMENDED** that the Scientific Committee endorse the proposed process for their revision and finalization, that calls the IOTC Secretariat, the service provider, external peer-reviewers and international experts to contribute to the consolidation of the final outputs in the intersessional period.

Revised electronic templates for the submission of IOTC ROS data

204. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-12 that informs participants at the 17th Working Party on Data Collection and Statistics (WPDCS17) about the development of new standard electronic templates for the reporting of ROS scientific observer data to the IOTC Secretariat, including its abstract as provided by the authors:

    "*(...) The minimum set of information fields for scientific data reporting purposes is described by documents **IOTC-2021-WPDCS17-INF10** and **IOTC-2021-WPDCS17-INF11**, with the latter providing a more detailed overview of the structure, data type and constraint of each data field.*

Observer data must be sent to the IOTC Secretariat no later than 150 days following the disembarkation of the observer from the vessel that was monitored, and shall be provided in an electronic format suitable for data processing, such as (in decreasing order of preference):

- *ROS e-collection output files;*
- *Standardized ROS Excel form (discussed within this document);*
- *Proprietary electronic formats (e.g., ST09) when readily available, although not recommended.*

In the past, observer data has been submitted to the Secretariat in a range of templates in Excel and other formats, many of which were not suitable for data processing with the IOTC Secretariat databases. Many CPCs also encountered difficulties with entering data for multiple sets in these forms which required worksheets to be cloned for each new fishing event. These templates were based on the old data specifications and therefore, these new data collection forms are improving the structure of the data submissions, ensuring they can be easily integrated into the Secretariat's databases, as well as ensuring compliance with the updated minimum data reporting requirements of the ROS." (see original document for the full abstract)

205. The WPDCS **ACKNOWLEDGED** that the presented templates have been developed in order to standardize and streamline ROS data reporting from CPCs to the IOTC Regional Observer Database, **NOTING** that currently the IOTC Secretariat receives these data in a range of different formats that often change across CPCs as well as across subsequent submissions from the same CPCs, which renders the data incorporation process extremely time consuming and error prone.

206. The WPDCS **ENCOURAGED** CPCs to start using these data reporting templates for their next ROS data submissions, **NOTING** how these implement the officially endorsed ROS data reporting requirements, and that therefore any difficulty in reporting data through these forms should be attributed to the partial compliance of national observer programmes with respect to the endorsed ROS standards.

207. The WPDCS **NOTED** the intention of the Secretariat to stop accepting data submissions received via non-structured or previously adopted formats (ad-interim ROS trip reports in Microsoft Word or PDF format, old IOTC data reporting templates in Excel format).

208. The WPDCS **ACKNOWLEDGED** that non-standard formats already adopted by CPCs for ROS data exchange (e.g., ICCAT ST09 and other structured tabular formats) will be temporarily accepted during the transitional period and **REQUESTED** that for consistency's sake CPCs resubmit historical ROS data using the newly developed templates in the future.

209. The WPDCS **NOTED** that the Secretariat remains available to provide technical support to CPCs for the adoption of the new ROS data reporting templates and ROS e-tools XML format.

210. The WPDCS **NOTED** that the IOTC ROS e-collection tool is in the process of being further extended and improved to account for the feedback on usability received by end users. The WPDCS **ACKNOWLEDGED** that this tool is not designed to be utilised on deck while the observers are activity collecting the data. During the actual fishing operations, the paper forms provided as part of the ROS training programme, remain the preferred way of collecting the required information.

211. The WPDCS further **NOTED** that this does not prevent nor disencourage CPCs from adopting other tools that can support digital entry of information directly during the observation phase, and **ACKNOWLEDGED** that these tools might indeed replace the paper based forms and the ROS e-collection tool provided that they can guarantee the implementation of all ROS data collection and reporting requirements.

212. The WPDCS **REQUESTED** that the new reporting templates be **ADOPTED** by the Scientific Committee as one of the two standard data reporting formats for the ROS, the other being the ROS XML format produced by the ROS e-tools.

7.2 Electronic Monitoring Systems in support of the IOTC ROS

Outcomes of the 1st ad hoc IOTC WGEMS - Working Group on Electronic Monitoring Systems

213. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-13 that reports the Recommendations, Terms of References and work plan adopted at the 1st ad hoc Working Group on the development of Electronic Monitoring programme Standards (WGEMS01), including its abstract as provided by the authors:

> *"The 1st Ad hoc Working Group on the Development of Electronic Monitoring Programme Standards (WGEMS) was held online on Zoom from 15 to 17 November. The WGEMS did not adopt the report during the online meeting and planned to do so via correspondence. The WGEMS reports to the WPDCS and, because the report was not going to be available for the WPDCS17 on time, the WGEMS adopted key recommendations and priorities to ensure its functioning and future progress to be presented at the WPDCS."*

214. The WPDCS **NOTED** and **ENDORSED** the recommendations, terms of references and program of work proposed during the 1st ad hoc Working Group on the development of Electronic Monitoring programme Standards.

215. The WPDCS **NOTED** that EMS is a complex topic both in terms of technical development and definition of objectives and **SUGGESTED** that IOTC science and compliance bodies jointly contribute to the EM program in the future.

216. The WPDCS further **NOTED** the interest of consulting other RFMOs in the process and **ACKNOWLEDGED** that this consultation is covered by the Terms of Reference proposed by the 1st ad hoc Working Group on the development of Electronic Monitoring programme Standards (WGEMS01).

217. For the reasons above, the WPDCS **RECOMMENDED** that the Scientific Committee continue discussing the terms of references of the group and its continuation in the future, while **CONSIDERING** the possibility of moving the WGEMS under the direct responsibility of the Scientific Committee.

Pilot Project on Electronic Monitoring System (EMS) for small fishing vessels (<24 m) operating in Sri Lanka

218. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-14 that presents the results of a pilot project for the implementation of Electronic Monitoring Systems onboard six semi-industrial gillnet/longline vessels in Sri Lanka, including its abstract as provided by the authors:

> *"The resolution 11/04 on Regional Observer Scheme (ROS) is adapted by the Indian Ocean Tuna Commission (IOTC) "to improve the collection of scientific data, at least 5% of the number of operations/sets for each gear type by the fleet of each Contracting and Cooperating Non-Contracting Parties (CPC) in the IOTC area of competence of 24 meters overall length and over, and under 24 meters if they fish outside their Exclusive Economic Zone (EEZ)". Accordingly, the Department of Fisheries and Aquatic Resources (DFAR) initiated the National Observer Scheme in Sri Lanka for vessels over 24m in length in 2014.This program continues under the supervision of the IOTC, and relevant reports are submitted to the IOTC as per Resolution 11/04 annually. However, more than 95% of the total fleet of Lanka consists of vessels less than 15 meters overall length. The size and the structure of these vessels constrain provision of minimum facilities for an on-board Observer, such as accommodation, working space and safety conditions. Therefore, the Sri Lanka was not able to implement the mentioned on-board observer program in the small vessels. Sri Lanka informed to the IOTC and other relevant parties the difficulties to comply with Resolution 11/04. As result, Sri Lanka proposed and presented a couple of alternatives to the IOTC to fulfil the requirements of this resolution for vessels less than 24m in length. In consequence, Sri Lanka is rated as fulfilling a partial compliance for the implementation of Resolution 11/04 in previous years' compliance reports ."* (see original document for the full abstract)

219. The WPDCS **NOTED** that this paper covers the following topics: initiation of the EMS pilot project, installations of EMS equipment, data analysis and training course, issues identified, and further developments.

220. The WPDCS **RECALLED** that the document was originally presented and discussed in detail at the WGEMS, and **ACKNOWLEDGED** the outputs of this project (EMS equipment delivery and onboard installation, procurement

and installation of hardware and software tools to support the work of dry observers, training of dry observers using sample data collected from test trips) together with their current level of development.

221. The WPDCS **NOTED** the technical issues (radio interferences and high battery drain) encountered by the vessels participating in this pilot project, as well as the solutions proposed by the service provider to overcome them.

222. The WPDCS **NOTED** that Australia encountered similar issues when implementing EM onboard Australian tuna longline vessels and **ACKNOWLEDGED** with thanks the offer of support to the project team in Sri Lanka from the service providers in Australia.

223. Furthermore, The WPDCS **NOTED** that due to the CoViD-19 pandemic and the consequent restrictions on travel which still persist as of today, the completion of this project was severely delayed and for this reason **ACKNOWLEDGED** that work shall continue in order to deliver further training to dry observers and establish mechanisms to exchange data with the IOTC Regional Observer Database.

224. Therefore the WPDCS strongly **AGREED** that the project continuation should be included in the list of activities for 2022-2026 provided by the Programme of Work for this working party.

ACAP Guidelines on Fisheries Electronic Monitoring Systems

225. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-15 that proposes guidelines for EM systems to meet the objectives of monitoring seabird interactions more effectively, including its abstract as provided by the authors:

> *"As fisheries with seabird interactions increasingly use electronic monitoring (EM) systems to meet monitoring requirements, ACAP recognizes the need for guidelines for EM systems to meet objectives of monitoring seabird interactions. These can then serve to inform and strengthen the development of guidelines and minimum standards for full EM systems (e.g., under development by some of the tuna regional fisheries management organisations) by accounting for the partial, seabird-related requirements of EM systems. Fisheries monitoring programmes supply data required for fundamental scientific, compliance monitoring and ecological and social sustainability assessment applications. EM systems are increasingly being used to complement and replace conventional human onboard observer programmes and to initiate at-sea monitoring where none previously existed. There have been 100 fisheries EM pilot projects since the first in 1999. There are now 12 fully implemented programmes. EM has the capacity to fill a vast gap in monitoring the world's 4.6 million fishing vessels. (...). These voluntary guidelines define how fisheries EM systems can be designed to meet three common objectives of fisheries monitoring programmes of (1) scientific, (2) compliance, and (3) management performance assessment as they relate to seabird interactions. However, ACAP recognises that not all EM systems are employed to meet all three of these objectives, where a subset of the full suite of data fields identified in ACAP's guidelines would need to be included for an EM system selecting a narrower subset of objectives. (...)"* (see original document for the full abstract)

226. The WPDCS **NOTED** the guidelines provided by ACAP to monitor seabird bycatch for pelagic longline, demersal longline and drift gillnet, including guidelines for data collection fields, data collection protocols and EM installation, that could serve both for science and for compliance needs.

227. The WPDCS **ACKNOWLEDGED** the importance of addressing seabird bycatch in an ecosystem approach to fisheries, further **NOTING** that Australian researchers consider EMS to be an important tool for seabird bycatch mitigation, and that the experience gathered from EMS implemented onboard vessels engaged in tuna fishery has provided valuable information on how to adapt mitigation measures on a vessel-by-vessel basis.

228. The WPDCS **NOTED** the new work conducted with support of genetic analysis of feather samples from seabirds which have died after having been caught incidentally, and how this can aid with species identification.

8. Capacity building activities: data collection and processing in coastal countries, and compliance with minimum requirements

IOTC capacity building activities in support of developing coastal IOTC CPCs

229. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-08 on the implemented (and scheduled) capacity building activities of the IOTC Secretariat for the biennium 2021 - 2022, 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 with funds sourced from third parties that in recent years 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 (2020), including those activities that will extend to 2021 and following years, where appropriate."

230. The WPDCS **THANKED** the IOTC Secretariat for the efforts in delivering on-site and remote capacity building activities to support data collection and reporting in developing coastal CPCs, and **RECALLED** how several external agencies and stakeholders contributed over the years to the successful implementation of these activities in the region, both through the provision of funding and through projects implemented directly at national level.

231. The WPDCS **ACKNOWLEDGED** how, due to travel restrictions still applying in 2021, it was not possible for the IOTC Secretariat to deliver any on-site activity, and that therefore these had to be replaced with remote workshops and meetings, which still contributed to measurable advancements on the topics of interest.

232. The WPDCS further **ACKNOWLEDGED** the continuous progress achieved in the implementation of the Regional Observer Pilot Project, including the development of the ROS electronic tools and the delivery of training workshops and ad hoc support on their adoption, the completion of the procurement of Electronic Monitoring Systems for Sri Lanka and the 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.

233. The WPDCS also **NOTED** the tentative list of data compliance and support missions drafted by the IOTC Secretariat for 2022, that includes Indonesia, India, Pakistan, I.R. Iran, and Oman among others, and **ACKNOWLEDGED** the rationale and objective of each activity **RECALLING** how their effective delivery will depend on the possibility of safely travelling across the identified target countries.

234. **NOTING** with concern that non-reporting of fishery data continues 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, the WPDCS **AGREED** to reflect the urgent need for improvements in this regard in its program of work, by prioritizing those activities that focus on data collection and management of artisanal and small-scale fisheries.

IOTC-OFCF Project

235. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-29_Rev1 that presents a request for endorsement of the signing of a Memorandum of Understanding concerning the continuation of the IOTC-OFCF Project from 2022.

236. The WPDCS **NOTED** that OFCF has been collaborating productively with the Secretariat for 20 years and **ACKNOWLEDGED** with thanks the renewed support provided by OFCF with the commencement of Phase VI of the IOTC-OFCF project, that focuses on the sustainable utilization of tuna resources by improving the accuracy of data collection and statistical analysis of the catch and resources of tuna in the Indian Ocean.

237. The WPDCS **NOTED** how several IOTC coastal states (Thailand and Indonesia, among others) have effectively benefited from capacity building activities supported and delivered by OFCF during the years.

238. Therefore, The WPDCS **RECOMMENDED** the Scientific Committee to endorse the signing of the agreement between FAO / IOTC and OFCF concerning the continuation of the IOTC-OFCF project in 2022.

9. Fisheries information and dissemination systems

Development of an online ocean digital atlas for the Seychelles EEZ and neighbouring ocean regions

239. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-22 that presents the status of development of of an electronic atlas of oceanic data with a wide range of potential purposes and targets, including its abstract as provided by the authors:

> *"Variability and trends in the ocean conditions form a set of information that can be used in fisheries management, inshore and offshore, and assist in spatial planning to design specific boundaries in the areas under national jurisdiction of the coastal states. A French funding (FSPI) dedicated to develop innovative projects in the Blue Economy space in 2021-2022, has been the opportunity to develop an online digital ocean atlas for Seychelles . This project is run jointly by a locally-based software development company and a research institute. The project is developing a web-based application to produce a variety of outputs, such as maps, line plots, hovmoller plots and vertical profiles. Here, we present the variables handled by the atlas, the various functionalities, the expected deliverables and the requirements set for the database management and the programming language in order to conform with international standards"*

240. The WPDCS **CONGRATULATED** the authors for the developments of the Seychelles Digital Ocean Atlas (SDOA), **NOTING** how these are part of the "*Blue year of the Indian Ocean*" initiative in support of the blue economy of coastal SWIO states.

241. The WPDCS **NOTED** the wide range of oceanographic indicators considered by the study, and the proposed approaches for their filtering, analysis and display which include geospatial maps, line plots, Hovmoller (space-time) plots, and vertical profile plots.

242. The WPDCS **NOTED** the details of the technical infrastructure supporting the implementation of the SDOA for Seychelles and their EEZ and the delivery of its key objectives.

243. The WPDCS **ACKNOWLEDGED** that the SDOA is indeed a generic platform that could be extended to cover areas larger than the EEZ of Seychelles, but that this will require increased efforts to maintain, manage and update the underlying datasets.

244. In light of the above, the WPDCS **CONSIDERED** the possibility of the IOTC website hosting an Indian Ocean-wide version of the SDOA, but **AGREED** that further resources (both financial and human) are necessary for this to be sustainable in the long term.

245. Finally, the WPDCS also **NOTED** that the SDOA requires users to be registered on the platform, but **ACKNOWLEDGED** that this is only required in order to analyze the target audience and that the tool is indeed non-commercial in nature and de-facto intended to be publicly accessible without restrictions.

Harnessing the information available on morphometric traits to build robust relationships and conversion factors for the IOTC

246. The WPDCS **NOTED** that paper IOTC-2021-WPDCS17-26 that discussed the use of available morphometric data to build length-weight relationships and conversion factors was withdrawn by the authors (IOTC Secretariat), which confirmed that work in this regard will continue and be presented at the next WPDCS in 2022.

10. WPDCS program of work

10.1 Revision of the WPDCS program of work 2022-2026

247. The WPDCS **NOTED** paper IOTC-2021-WPDCS17-09 which provides an opportunity to consider and revise the WPDCS Program of Work (2022-2026), by taking into account the specific requests of the Commission, Scientific Committee, and the resources available to the IOTC Secretariat and CPCs.

248. 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)

249. The WPDCS **REQUESTED** that the Chairperson and Vice-Chairperson of the WPDCS, in consultation with the IOTC Secretariat, develop Terms of Reference (TOR) for each of the high priority projects that are yet to be funded, for circulation to potential funding sources.

250. The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2022-2026), as provided at Appendix V.

251. The WPDCS **ACKNOWLEDGED** that additional staffing capacity might be required for the IOTC Secretariat to continue providing support for the following core functions:

- Assist countries to facilitate reporting and improve compliance in terms of 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, 19/02 and 21/01;
- Dissemination of information on data-related Commission activities through the IOTC website, assigning standard metadata and DOIs, data exchange between tRFMOs and related organizations.

252. In light of the above, and **NOTING** also how the number of new working groups and working parties (now including data preparatory sessions) has markedly increased the workload of the Data Section of the Secretariat in recent years, the WPDCS **RECOMMENDED** that the Scientific Committee discuss this resourcing issue and seek a solution from the Commission to address it.

11. Other business

11.1 Election of a Chairperson and a Vice-Chairperson of the WPDCS for the next biennium

Chairperson

253. The WPDCS **NOTED** that the second term of the current Chairperson, Mr Stephen Ndegwa (Kenya) expired at the close of the WPDCS17 meeting and, as per the IOTC Rules of Procedure (2014), participants are required to elect a new Chairperson of the WPDCS for the next biennium.

254. **NOTING** the Rules of Procedure (2014), the WPDCS **CALLED** for nominations for the position of Chairperson of the IOTC WPDCS for the next biennium. Dr. Julien Barde (IRD, EU) was nominated, seconded and elected as Chairperson of the WPDCS for the next biennium.

Vice-Chairperson

255. The WPDCS **NOTED** that the first term of the current Vice-Chairperson, Dr Julien Barde (EU) expired at the close of the WPDCS17 meeting. As per the IOTC Rules of Procedure (2014), participants are required to elect a new Vice-Chairperson of the WPDCS for the next biennium.

256. **NOTING** the Rules of Procedure (2014), the WPDCS **CALLED** for nominations for the positions of Vice-Chairperson of the IOTC WPDCS for the next biennium. Mr. Nuwan Gunawardane (DFAR, Sri Lanka) was nominated, seconded and elected as Vice-Chairperson of the WPDCS for the next biennium.

11.2 Date and place of the 18th and 19th Sessions of the WPDCS: 2022 & 2023

257. The WPDCS **NOTED** that the global CoViD-19 pandemic has resulted in international travel being almost impossible and with no clear end to the pandemic in sight, it was impossible to finalise arrangements for the meeting in 2022. The Secretariat will continue to liaise with CPCs to determine their interest in hosting these meetings in the future when this once again becomes feasible (**Table 4**).

258. It was also **AGREED** that the WPDCS should continue to be held back-to-back with the SC, as usual.

Table 4. Draft meeting schedule for the WPDCS (2022 and 2023)

Meeting	2022			2023		
	No.	Date	Location	No.	Date	Location
Working Party on **Data Collection and Statistics** (WPDCS)	18th	TBD	TBD	19th	TBD	TBD

11.3 Review of the draft, and adoption of the report of the 17th Session of the WPDCS

259. The WPDCS **NOTED** that the report would be adopted via correspondence, and that a set of draft recommendations will be presented at the SC24 for its endorsement.

260. The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS17, provided at Appendix VI.

Appendix I
List of participants

Title	First name	Last name	Organisation	E-mail	Affiliation
Chairpersons					
Mr.	Stephen	**Ndegwa**	Kenya Fisheries Service	ndegwafish@yahoo.com	Kenya (Chair)
Dr.	Julien	**Barde**	Institut de Recherche pour le Développement (IRD)	julien.barde@ird.fr	European Union (Vice-chair)
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Appendix II

Agenda for the 17th Working Party on Data Collection and Statistics

Date: 29th November – 3rd December 2021
Location: Online
Platform: Zoom
Time: 12:00 – 16:00 daily (Seychelles time, GMT+04:00)

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 23rd Session of the Scientific Committee and of the 25th Session of the Commission
   - 3.2 Review of Conservation and Management Measures relevant to the WPDCS
   - 3.3 Progress on the recommendations of WPDCS16
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
   - 4.3 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.
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 21/01 *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 Updates on the status of the ROS and its Pilot Project

7.2 Electronic Monitoring Systems in support of the IOTC ROS

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)

10. WPDCS PROGRAM OF WORK (Chair & IOTC Secretariat)

10.1 Revision of the WPDCS Program of Work 2022–2026

11. OTHER BUSINESS

11.1 Election of a Chairperson and a Vice-Chairperson of the WPDCS for the next biennium (Secretariat)

11.2 Date and place of the 18th and 19th Sessions of the WPDCS: 2022 & 2023 (Chair)

11.3 Review of the draft, and adoption of the report of the 17th Session of the WPDCS (Chair)

Appendix III
List of documents

Document	Title
IOTC-2021-WPDCS17-01a	Agenda of the 17th Working Party on Data Collection and Statistics
IOTC-2021-WPDCS17-01b_Rev3	Annotated agenda of the 17th Working Party on Data Collection and Statistics
IOTC-2021-WPDCS17-02_Rev3	List of documents of the 17th Working Party on Data Collection and Statistics
IOTC-2021-WPDCS17-03	Outcomes of the 23rd Session of the Scientific Committee (IOTC Secretariat)
IOTC-2021-WPDCS17-04	Outcomes of the 25th Session of the Commission (IOTC Secretariat)
IOTC-2021-WPDCS17-05	Review of current Conservation and Management Measures relating to the WPDCS (IOTC Secretariat)
IOTC-2021-WPDCS17-06	Progress on the recommendations of WPDCS16 (IOTC Secretariat)
IOTC-2021-WPDCS17-07	Report on IOTC Data Collection and Statistics (IOTC Secretariat)
IOTC-2021-WPDCS17-08	IOTC capacity building activities in support of developing coastal IOTC CPCs (IOTC Secretariat)
IOTC-2021-WPDCS17-09	Revision of the WPDCS Program of Work (2022-2026) (IOTC Secretariat, Chairperson & Vice-Chairperson)
IOTC-2021-WPDCS17-10_Rev2	Updates on the implementation of the IOTC Regional Observer Scheme and its pilot project (IOTC Secretariat)
IOTC-2021-WPDCS17-11	Update from the consultancy on the development and Implementation of an Observer Training Programme to support the IOTC Regional Observer Scheme (Norman S, Athayde T)
IOTC-2021-WPDCS17-12	Revised electronic templates for the submission of IOTC ROS data (IOTC Secretariat)
IOTC-2021-WPDCS17-13	Outcomes of the 1st ad hoc IOTC Working Group on Electronic Monitoring Systems (WGEMS chairs)
IOTC-2021-WPDCS17-14	Pilot Project on Electronic Monitoring System (EMS) for small fishing vessels (24m>) operating in Sri Lanka (2018-2021) (Department of Fisheries and Aquatic Resources Sri Lanka)
IOTC-2021-WPDCS17-15	ACAP Guidelines on Fisheries Electronic Monitoring Systems (ACAP)
IOTC-2021-WPDCS17-16_Rev1	An android based application to collect catch and effort data from the coastal fisheries of Sri Lanka to minimize the gap of data availability (Gunawardane N)
IOTC-2021-WPDCS17-17	Improving data in artisanal IOTC fisheries using electronic monitoring tools (Wanless R, Kastern C, Calothi N, Pringle B, Raemaekers S)
IOTC-2021-WPDCS17-18	Observer Programme for Small Scale Tuna Fisheries: Is Crew Based Observer Programme an implementable option (Moazzam M, Shahid U)
IOTC-2021-WPDCS17-19	Extraction of UK catch data from historic EU catch data (Wicker C, Owen M)
IOTC-2021-WPDCS17-20	Draft report on the review of re-estimation methodology of Indonesia's annual tuna catch data in IOTC for 2017-2019 (Ministry of Marine Affairs and Fisheries, Indonesia)
IOTC-2021-WPDCS17-21	Statistics of the French purse seine fishing fleet targeting tropical tuna in the Indian Ocean (1981-2020) (Floch L, Marsac F, Fily T, Depetris M, Duparc A, Kaplan D, Lebranchu J)

IOTC-2021-WPDCS17-22	Development of an online ocean digital atlas for the Seychelles EEZ and neighbouring ocean regions (Marsac F, Noel E)
IOTC-2021-WPDCS17-23	Towards a Statistical Definition of Small-Scale Fisheries (Geehan J, Funge-Smith S)
IOTC-2021-WPDCS17-24	A proposal for an IOTC interactive statistical data browser (IOTC Secretariat)
IOTC-2021-WPDCS17-25	Fostering the work of the IOTC with socio-economic data sets sourced from FAO-GLOBEFISH and the Pacific Islands Forum Fisheries Agency (FFA) (IOTC Secretariat)
IOTC-2021-WPDCS17-26	Harnessing the information available on morphometric traits to build robust relationships and conversion factors for the IOTC (IOTC Secretariat)
IOTC-2021-WPDCS17-27	A proposal of guidelines for describing sampling design, sampling performance, and statistical inference for IOTC fisheries data sets (IOTC Secretariat)
IOTC-2021-WPDCS17-28_Rev1	Updates on yellowfin tuna catch limits according to IOTC Resolution 21/01 (IOTC Secretariat)
IOTC-2021-WPDCS17-29_Rev1	Request for Approval on Signing of Memorandum of Understanding Concerning the Continuation of the IOTC-OFCF Project from 2022 between the OFCF and the FAO under which the IOTC falls (OFCF)
Information papers	
Document	**Title**
IOTC-2021-WPDCS17-INF01	Species composition of the unintentional catch from wells in tropical tuna purse seine fisheries (Pérez San Juan A, Sierra V, Ramos Alonso M-L, Rojo V, Báez J-C)
IOTC-2021-WPDCS17-INF02	ROS training programme: Observer Logistic Coordination (OLC) workshop objectives, structure and programme (final) (CapMarine)
IOTC-2021-WPDCS17-INF03	ROS training programme: Observer Logistic Coordination (OLC) guide: observer programme development, observer deployment and coordination (final) (CapMarine)
IOTC-2021-WPDCS17-INF04	ROS training programme: Scientific Field Observer (SFO) training course objectives, structure and programme (CapMarine)
IOTC-2021-WPDCS17-INF05	ROS training programme: Scientific Field Observer (SFO) training manual (CapMarine)
IOTC-2021-WPDCS17-INF06	ROS training programme: Guidelines for Observers on Pelagic Longliners (CapMarine)
IOTC-2021-WPDCS17-INF07	ROS training programme: Guidelines for Observers on Tuna Purse-seiners (CapMarine)
IOTC-2021-WPDCS17-INF08	ROS training programme: Guidelines for Observers on Pelagic Drift Gill-netters (CapMarine)
IOTC-2021-WPDCS17-INF09	ROS training programme: Draft data collection templates for PS / LL / GIL (CapMarine)
IOTC-2021-WPDCS17-INF10	ROS data fields and reference codes (IOTC Secretariat)
IOTC-2021-WPDCS17-INF11	ROS data fields structure (IOTC Secretariat)
IOTC-2021-WPDCS17-INF12	ROS data reporting templates (IOTC Secretariat)
IOTC-2021-WPDCS17-INF13	Improving Data Collection Mechanism and Identification of Marine Wildlife CITES-Listed Bycatch Species Though E-log and Artificial Technologies in Pakistan (Razzaque S-A, Shaikh A, Shaikh N, Shahid U, Rasheed T, Cornish A, Khan F)

Appendix IV

Main data issues identified by the WPDCS and actions proposed to address them

Table A1. Main issues identified for the nominal catch (NC) data, including the CPCs and fisheries concerned, and the actions proposed

Dataset	CPCs	Fisheries	Main issues	Proposed actions
NC	**India**	**Coastal fisheries**	Partial data reported in 2018 and 2019; almost no shark catch reported for 2018	India has indicated that the IOTC shall use official figures, communicated by national authorities. Increase engagement with national scientists and stakeholders to increase the compatibility of the national data collection and reporting systems with the IOTC reporting formats
	Indonesia		Interannual variability in official estimates of total catch and species composition, multiple data submissions every year	Continue ad hoc collaboration with institutes involved in fisheries monitoring and reporting and support for sampling of artisanal fisheries (e.g., species identification) and data management
	I. R. Iran, Pakistan	**Drifting gillnet fisheries**	Possible double-counting of catch due to vessels that may be registered in Pakistan and I. R. Iran	Liaise with fisheries administrations from Pakistan and I. R. Iran to understand and address the issue
	Pakistan	**Drifting gillnet fishery**	Additional validation of latest revised catch series	Liaise with Pakistan in terms of support for appraisal of the data
	Madagascar	**Coastal fisheries, longline fisheries**	Issues with data collection, including catch and effort and size data	Provide assistance in the sampling of artisanal fisheries upon request (dependent on staff / funds available). Liaise with FAO to assess possible options for combined interventions in the country
	Somalia	**Coastal fisheries**	Lack of national data collection systems, including catch and effort and size data	Support to national initiatives (e.g., Fisheries Data Collection Working Group) for the validation of databases and data collection programmes
	Yemen	**Handline fishery**	Nominal catches from FAO used since 2007 and repeated since 2017	Liaise with FAO regional office and Statistics team of the Fisheries Division

Table A2. Main issues identified for the catch and effort (CE) data, including the CPCs and fisheries concerned, and the actions proposed

Dataset	CPCs	Fisheries	Main issues	Proposed actions
CE	**All**	**Most fisheries**	Data either not submitted, or falls short of the IOTC data reporting requirements	Implement minimum data requirements for sharks (noting that those for India are different as it has objected to the logbook Resolution)
		Coastal fisheries	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).
	Oman	**Longline fisheries**	Data either not submitted, or falls short of the IOTC data reporting requirements	As part of the IOTC Data Compliance and Support missions, provide assistance to CPCs to understand the IOTC data requirements and processing of information and urge them to implement requirements and report data to the IOTC; for Pakistan gillnetters, appraisal of the capacity of the local crew-based data collection database to provide reliable catch and effort (as well as size-frequency) data to the Secretariat
	Indonesia	**Industrial longline fisheries**	Inconsistency between logbook and VMS	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)
	Oman	**Handline and gillnet fisheries**	Lack of reporting due to data management	Follow-up to 2019-09 mission to finalize proper standardization of the statistical information available for handlines and gillnets, and eventually submission of catch and effort data according to Res. 15/02
	Pakistan	**Drifting gillnet fishery**	Data either not submitted, or falls short of the IOTC data reporting requirements	As part of the IOTC Data Compliance and Support missions, provide assistance to CPCs to understand the IOTC data requirements and processing of information and urge them to implement requirements and report data to the IOTC; for Pakistan gillnetters, appraisal of the capacity of the local crew-based data collection database to provide reliable catch and effort (as well as size-frequency) data to the Secretariat

Table A3: Main issues identified for the size-frequency (SF) data, including the CPCs and fisheries concerned, and the actions proposed

Dataset	CPCs	Fisheries	Main issues	Proposed actions
SF	**India, Indonesia, Malaysia, Oman, Yemen**	**Coastal fisheries**	No or very few size-frequency data reported	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
	I. R. Iran	**Drifting gillnet fishery**	Data not by IOTC standards	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)
	Japan, Taiwan,China	**Longline fisheries**	Catch and effort and size data conflicting over the time series	Follow-up of recommendations resulting from the consultancy conducted in 2020-2021
	Pakistan	**Drifting gillnet fishery**	No or very few size-frequency data reported	IOTC Secretariat liaising with Pakistan in terms of possible assistance for data entry, processing and submission of data via the Pakistan government

Table 4: Main issues identified for the Regional Observer Scheme (ROS) data, including the CPCs and fisheries concerned, and the actions proposed

Dataset	CPCs	Fisheries	Main issues	Proposed actions
ROS	**All**	**Longline and surface fisheries**	Low levels of implementation and reporting	Organize ROS training and workshops to assist CPCs with implementation of the ROS data collection and reporting requirements, also under the activities of the ROS Pilot Project (training programme).
			Information reported in formats not suitable for data extraction	Explore ways of facilitating reporting of data using the IOTC ROS electronic tools and data reporting forms
		Coastal fisheries	Low levels of implementation and reporting	Extension of EMS pilot project to other countries besides Sri Lanka
				Strengthen data collection mechanisms at landing sites (in-port observers, alternative data collection mechanisms)
	Sri Lanka	**Coastal and offshore fisheries**	Partial implementation of ROS requirements	IOTC Secretariat to continue supporting the adoption of the ROS standards and tools; possible follow-up on EMS trial projects dependent on funding. Follow-up on the pilot study of EMS in Sri Lanka for coastal fisheries for which there are difficulties placing on-board observers

Table A5: Main issues identified for the socio-economic (SE) data, including the CPCs and fisheries concerned, and the actions proposed

Dataset	CPCs	Fisheries	Main issues	Proposed actions
Socio-Economic	**All**	**All**	Limited data available, and collated within the IOTC database	Liaise with FAO Trade and Statistics Division and economic institutions to access open repositories of fish sale price, import and export data, and national indicators (e.g., Gross Domestic Product)

Appendix V

Working Party on Data Collection and Statistics program of work (2022–2026)

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				
			2022	2023	2024	2025	2026
1. Artisanal fisheries data collection	**1.1.** Implement a region-wide study focusing on the application of FAO methodology for the characterization of artisanal fisheries (Secretariat, CPCs)						
	1.2. Assist the implementation of data collection and sampling activities for artisanal fisheries in countries/fisheries insufficiently sampled in the past; priority to be given to the following fisheries:	**1**					
	· Coastal fisheries of Indonesia						
	· Coastal fisheries of India						

· Coastal fisheries of Bangladesh						
· Coastal fisheries of Pakistan						
· Coastal fisheries of I.R. Iran						
· Coastal fisheries of Kenya						
· Coastal fisheries of Somalia						
· Coastal fisheries of Sri Lanka						
1.3 Enhance the use of electronic tools to support data collection in artisanal fisheries	**2**					
1.3.1. Define minimum standards for artisanal fisheries data collection						
1.3.2. Encourage and support sharing of experience and initiatives already implemented by IOTC CPCs in this regard						

2. Evaluation of catch data uncertainties	**2.1** Review of historical catch data for all stocks being assessed in the following year to determine the level of uncertainty to be used for stock assessment and management procedures[1]	**2**					
3. Compliance with IOTC data reporting requirements	**3.1.** Data support missions						
	3.1.1. Drafting of indicators to assess performance of IOTC CPCs against IOTC Data Requirements; evaluation of performance of IOTC CPCs with those Requirements; development of plans of action to address the issues identified, including timeframe of implementation and follow-up activities required. Priority to be given to the following CPCs / fisheries:						
	· Indonesia						
	· India						
	· Pakistan						

[1] Secretariat / WPTT / WPM / national scientists / external experts

	· Oman						
	· Sri Lanka						
	· Somalia						
	3.2. Workshops to clarify data reporting requirements[2]						
	3.3. Support the documentation of sampling protocols and processing[3]						
	3.4. Strengthen collaboration with the WGFAD to propose new terminology for FAD activities and types						
4. Data access	**4.1.** Improve discoverability of IOTC scientific assets through standard metadata and DOIs[4]						
	5.1. ROS e-tools						

[2] Recommended by the CoC
[3] Secretariat to finalize the template, CPC to provide information
[4] Secretariat in collaboration with INTERREG project

5. ROS – Support for the implementation of the IOTC Regional Observer Scheme	**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, 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 possibly by providing support through remote meetings until travel bans are lifted[5]						

[5] Sri Lanka EMS, training + data exchange

5.3.2. Ad hoc Working Group on EMS programme standards, including workshops (in person / virtual, depending on the case)	**3**					
5.4. Evaluate the combination of alternative data collection systems and protocols for the collection of scientific observer data for artisanal and coastal fisheries, with an initial expert to develop protocols and guidelines for minimum data collection requirements in small-scale, artisanal, and coastal fisheries, including through EMS systems.						
5.5. Supporting intersessional work to finalize the outputs from the ROS Pilot Project training programme[6]						

[6] Secretariat / service provider / international experts / peer-reviewers

Appendix VI

Consolidated recommendations of the 17th Session of the Working Party on Data Collection and Statistics

Note: Appendix references refer to the Report of the 17th Session of the Working Party on Data Collection and Statistics (IOTC-2021-WPDCS17-R)

Extraction of UK catch data from historic EU catch data

WPDCS17.01 (para. 82): The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the process outlined in document IOTC-2021-WPDCS17-19 regarding the re-labelling of historical EU,GBR statistical data assets held and disseminated by the IOTC Secretariat.

Draft report on the review of re-estimation methodology of Indonesia's annual tuna catch data in IOTC for 2017-2019

WPDCS17.02 (para. 101): Therefore **NOTING** the unusual variabilities in some of Indonesia's official catch statistics prior to the implementation of One Data in 2017, particularly in the case of neritic and tropical tuna species, the WPDCS **REQUESTED** that Indonesia undertake work – in collaboration with the IOTC Secretariat – to reassess their official catches (for the period 2010-2016) to ensure consistency and coherence in the longer-term catch series available for management and stock assessment purposes and **RECOMMENDED** that the Scientific Committee endorse this process.

Data reporting (to the Secretariat)

WPDCS17.03 (para. 116): The WPDCS therefore **RECOMMENDED** that work is undertaken to test an alternative, more flexible, matrix-based approach developed by FAO, to help refine the characterization of fisheries in IOTC at the national and regional level, and **NOTED** that a number of CPCs (including Indonesia, Kenya, Maldives, Pakistan and Sri Lanka) expressed their interest in participating in these studies.

Resolution 15/02 On mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)

WPDCS17.04 (para. 118): **NOTING** the difficulty for some CPCs to fulfil the mandatory requirement of sampling at least 1 fish per metric ton of catch (by species and gear), particularly in the case of bycatch species that are brought onboard alive and whose handling might put the safety of crew members at risk (e.g., sharks), the WPDCS **RECOMMENDED** the Scientific Committee to further discuss this issue to ensure that CPCs are not penalized from a compliance perspective when the above circumstances arise in their fisheries.

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

WPDCS17.05 (para. 145): The WPDCS **NOTED** that silky shark (Carcharhinus falciformis) is a bycatch species frequently interacted with by the gillnet fisheries operating in the Indian Ocean and therefore **RECOMMENDED** that the Scientific Committee discuss its inclusion in the list of 'other' species for which information should be recorded by gillnet fisheries (paragraph 2.3 of Resolution 15/01).

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

WPDCS17.06 (para. 175): For this reason, the WPDCS **RECOMMENDED** the Scientific Committee to finalize the work required to improve current definitions of FAD and FAD activities used by the IOTC, in collaboration with the WPTT and WGFAD.

Update from the consultancy on the development and Implementation of an Observer Training Programme to support the IOTC Regional Observer Scheme

WPDCS17.07 (para. 203): Finally, in order to overcome the practical issues and delays introduced by the onset of the CoViD-19 pandemic and to further guarantee that OTP materials and standards be fully developed, the WPDCS **RECOMMENDED** that the Scientific Committee endorse the proposed process for their revision and finalization, that calls the IOTC Secretariat, the service provider, external peer-reviewers and international experts to contribute to the consolidation of the final outputs in the intersessional period.

Outcomes of the 1st ad hoc IOTC WGEMS - Working Group on Electronic Monitoring Systems

WPDCS17.08 (para. 217): For the reasons above, the WPDCS **RECOMMENDED** that the Scientific Committee continue discussing the terms of references of the group and its continuation in the future, while **CONSIDERING** the possibility of moving the WGEMS under the direct responsibility of the Scientific Committee.

IOTC-OFCF Project

WPDCS17.09 (para. 238): Therefore The WPDCS **RECOMMENDED** the Scientific Committee to endorse the signing of the agreement between FAO / IOTC and OFCF concerning the continuation of the IOTC-OFCF project in 2022.

Revision of the WPDCS program of work 2022-2026

WPDCS17.10 (para. 250): The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2022-2026), as provided at Appendix V.

WPDCS17.11 (para. 252): In light of the above, and **NOTING** also how the number of new working groups and working parties (now including data preparatory sessions) has increased markedly the workload of the Data Section of the Secretariat in recent years, the WPDCS **RECOMMENDED** that the Scientific Committee discuss this resourcing issue and seek a solution from the Commission to address it.

Review of the draft, and adoption of the report of the 17th Session of the WPDCS

WPDCS17.12 (para. 260): The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS17, provided at Appendix VI.