# REPORT OF THE 19TH SESSION OF THE IOTC WORKING PARTY ON DATA COLLECTION AND STATISTICS

Mumbai, India – Hotel St. Regis / Online, 28 November – 2 December 2023

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# ACRONYMS

| | |
|---|---|
| ABNJ | Areas Beyond National Jurisdiction |
| AFAD | Anchored fish aggregating device |
| AIS | Automatic Identification System |
| ALDFG | Abandoned, Lost or otherwise Discarded Fishing Gear |
| ALB | Albacore |
| 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 |
| CMFRI | Central Marine Fisheries Research Institute (India) |
| 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 fish aggregating device |
| DFAR | Department of Fisheries and Aquatic Resources (Sri Lanka) |
| DFOB | Drifting floating object |
| DOI | Digital Object Identifier |
| EEZ | Exclusive Economic Zone |
| EM | Electronic Monitoring |
| EMS | Electronic Monitoring System |
| ERA | Ecological Risk Assessment |
| ERS | Electronic Reporting System |
| 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 |
| LOA | Length overall |
| 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 Electronic Monitoring 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 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 19th Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Data Collection and Statistics (WPDCS) was held in hybrid format in Mumbai (India) and online, from the 28th of November to the 2nd of December 2023. A total of 55 participants (117 in 2022, 94 in 2021, 76 in 2020, 41 in 2019) attended the Session, of which 19 attended in person and 36 attended remotely.

The following is a subset of the complete recommendations and decisions from the WPDCS19 to the Scientific Committee, which are provided at Appendix VI.

***Data reporting (to the Secretariat)***

**Rec. WPDCS19.02** (para 101):

> Following the discussions and endorsements on data-reporting aspects discussed so far, the WPDCS **RECOMMENDED** that the Scientific Committee: **a)** endorse the proposed updates to the IOTC data submission processes, and namely:
>
> - the introduction of Form 3-DA / 3-DA-multiple for the reporting of detailed activities on drifting FOBs
> - the introduction of Form 3-AA / 3-AA-mutiple for the reporting of detailed activities on AFADs
> - the decommissioning of the old, recommended forms 3-AR, 3-FA, 3-SU, and 1-RC-YFT
> - that the ad interim data reporting workflow and the accompanying electronic tools and formats (interactive validators, ad interim forms, etc.) become mandatory for the submission of statistical fisheries data to the IOTC starting with the 2024 reporting cycle (deadline of 30 June 2024)
> - that the study on the matrix approach for the characterisation of IOTC fisheries is further extended to cover all IOTC coastal nations and their fisheries, and that outputs of the study are presented to the next session of the meeting
> - that ROS data be exclusively submitted through the consolidated ROS Excel data reporting forms or as .ros files, for those CPCs using the ROS electronic data collection tools
>
> and **b)** further clarify the issues identified within Res. 12/02 and 19/07 that have an impact on the collection, reporting, and dissemination of IOTC datasets.

***Overview of data processing procedures and proposed revisions of historical data***

**Rec. WPDCS19.03** (para 220):

> The WPDCS **NOTED** the improvements made in the quality of the estimated data (e.g., reduction in volatility for some species such as bullet tuna and blue shark) and **ACKNOWLEDGED** that the updates of official catches better reflect the status of the catches in Indonesian fisheries as they provide an accurate separation of artisanal and industrial fisheries according to IOTC definitions.
>
> Nevertheless, the WPDCS **NOTED** that there are still issues in some of the species-specific reconstructed historical time-series of catches (2010-2021) that require further analysis: **i)** large inter-annual fluctuations, **ii)** discrepancies in scaling, and **iii)** potential errors in the input data used for some years (e.g., 2018).
>
> The WPDCS **ENCOURAGED** Indonesia to identify the root causes explaining the identified issues and seek support from the Secretariat to further progress on their resolution.
>
> The WPDCS **RECOMMENDED** that the SC provide general guidance on addressing the following points:
>
> - issues of continuity with the historical time series of catch (pre-2010) which might affect the stock assessments and would require some inter-calibration;
> - current differences between revised official national catch statistics and scientific best estimates used for supporting the IOTC science process and decision-making.

***Global fisheries information systems and data management best practices***

**Rec. WPDCS19.04** (para 243):

> **ACKNOWLEDGING** the potential benefits of a climate-ocean web portal for the SC and its Working Parties, the WPDCS **RECOMMENDED** a scoping study into how ocean-climate information (as shown through the initiative of the Seychelles Digital Ocean Atlas as well as the various indicators presented in paper IOTC–2018–WPDCS14–36) could be developed and made available by the IOTC and how this information would be presented to the SC and its working parties. The scoping study should also consider the resources needed to develop online ocean-climate indicators for the IOTC area of competence.

***Electronic Monitoring Systems in support of the IOTC ROS***

**Rec. WPDCS19.05** (para 284):

> The WPDCS **RECOMMENDED** that an intersessional working group is organised (by correspondence or through online meetings) to convey interested WPDCS and WGEMS participants and review:
>
> - the scientific need for each ROS data field proposed by the 2018 ROS expert WS;
> - ROS data fields collection and reporting status (e.g., mandatory/optional, etc.);
> - potential specific EMS fields to be added to ROS mandatory requirements; and
> - summarise the capabilities, and advantages and drawbacks to collect ROS data fields across gears by different alternative methods (e.g., EMS, human onboard observers, self-reporting, port sampling) and a combination of those.
>
> and further **REQUESTED** that this group report to the next sessions of the WGEMS and WPDCS.

# 1. Opening of the meeting

1. The 19th Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Data Collection and Statistics (WPDCS19) was held as a hybrid meeting from the 28th of November to the 2nd of December 2023, with in-person participants attending the Session at the St. Regis Hotel in Mumbai, India, and online participants connecting through the Zoom platform. A total of 55 participants (117 in 2022, 94 in 2021, 76 in 2020, 41 in 2019) attended the Session, of which 19 in person and 36 remotely. The list of participants is provided at Appendix I. The meeting was opened on 28th of November 2023 by the Chairperson, Dr. Julien Barde (EU,France), who welcomed participants to the meeting and proceeded with the arrangements for the session.

# 2. Adoption of the agenda and arrangements for the session

2. The WPDCS **ADOPTED** the Agenda provided at Appendix II. The documents presented to the WPDCS19 are listed in Appendix III.

# 3. The IOTC Process: outcomes, updates, and progress

## 3.1. Outcomes of the 25th Session of the Scientific Committee and of the 27th Session of the Commission

3. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-03 which outlined the main outcomes of the 25th Session of the Scientific Committee (SC25) specifically related to the work of the WPDCS.

4. The WPDCS **NOTED** that in 2022 the SC made several requests in relation to the WPDCS18 and other IOTC Working Parties' reports. Some of those requests and the associated responses from the WPDCS19 are provided below for reference.

***Report of the Secretariat – Activities in support of the IOTC science process in 2022***

- (*Para. 17) The SC **NOTED** the need to have a repository of information on data extrapolation procedures used by CPCs, further **NOTING** that while CPCs are required to submit this information in their national reports as per to paragraphs 4 and 5 of Res. 15/02, many CPCs have not provided this information.*

**Response**: At the 17th session of the WPDCS held in 2021, the Secretariat presented a framework template for describing the main characteristics of the sampling process used for each fishery in a simple and standard way (IOTC-2021-WPDCS17-27). In line with the revised definition of fisheries and following the updated version of the reporting guidelines, the Secretariat will propose this template as an additional reporting requirement for the submission of the fisheries data for the statistical year 2023.

***Report of the 12th Session of the Working Party on Neritic Tunas (WPNT12)***

- *(Para. 41) The SC **NOTED** with concern the stock status of Longtail tuna and Narrow-barred Spanish Mackerel. The SC further **NOTED** that the stock statuses for these species have been in the red for at least the past 5 years with a high probability and are showing no sign of recovery. As such, the SC **RECOMMENDED** that the Commission take measures to reduce the catches (to at least MSY levels) of these species and develop management measures that will facilitate the recovery of these stocks.*

**Response:** The WPDCS **NOTED** that total retained catches of longtail tuna were estimated at about 136,000 t during 2020-2022, i.e., close but above the most recent mean value of MSY estimated for the stock at 133,000 t. For narrow-barred Spanish mackerel, the best scientific estimates of retained catches indicate a steady increase from about 143,500 t in 2018 to 178,000 t in 2022, well above the mean value of MSY estimated at 161,000 t. The WPDCS further **RECALLED** that there are large uncertainties around the catch estimates of neritic species (see **IOTC-2023-WPDCS07_Rev1**).

***Report of the 19th Session of the Working Party on Billfish (WPB19)***

- *(Para. 44) The SC **REMINDED** that its previous recommendation on the inclusion of shortbill spearfish (Tetrapturus angustirostris) as an IOTC species has not yet been addressed by the Commission and **REQUESTED** the WPB to collate more data on the species to support this recommendation which would require a revision of the IOTC Agreement.*

**Response**: The WPDCS **NOTED** that some retained catch, geo-referenced catch, and size-frequency data are available for shortbill spearfish at the Secretariat, but that the variability in data collection and reporting is unknown due to the non-targeting of the species, resulting in major uncertainties on catch levels and trends for the species.

***Report of the 18th Session of the Working Party on Ecosystems and Bycatch (WPEB18)***

- *(Para. 61) The SC **NOTED** a recommendation from the WPEB to revise the list of sharks, rays and Endangered, Threatened and Protected (ETP) species included in Appendix II of Resolution 15/01 to ensure that all species under broad categories such as hammerhead sharks (Sphyrna spp.) are reported separately by species. The SC **NOTED** that this could help to provide an incentive to improve catches of these species which may have historically been reported aggregated.*

**Response**: The WPDCS **NOTED** the need to revise the Annex II of Res. 15/01 to improve the lists of gear-specific species for which reporting is mandatory or voluntary, **RECALLING** the recommendation made at the WPDCS18 to include silky shark (*Carcharhinus falciformis*) in the list of "other" species for gillnet fisheries.

- *(Para. 74) The SC **NOTED** that a better technical understanding of fishing gears and methods, used in fisheries harvesting highly migratory stocks in the IOTC area, is needed to inform the WPEB recommendations. This knowledge will also assist the SC and Commission in their understanding of fishery interactions with bycatch species and to better facilitate consideration of management options to mitigate interactions for bycatch species for which that is needed. The SC suggested that particular consideration of this could be built into the work of the WPEB, through CPC contributions (fishing gears/methods descriptions for all areas and vessel types/sizes) and data summaries developed by the IOTC Secretariat.*

**Response:** The WPDCS **NOTED** that the ongoing collaborative work on artisanal fisheries using the FAO fishery matrix constitutes a good approach to better describe the complexity and variety of fishing gears and configurations used in the IOTC area, including the interactions that artisanal fisheries may have with non-target and ETP species (see IOTC-2023-WPDCS19-23).

***Report of the 24th Session of the Working Party on Tropical Tunas (WPTT24)***

- *(Para. 82) The SC **RECALLED** that WPTT21 used a spatial-temporal re-estimation approach to revise the bigeye tuna catch reported by EU, Spain in 2018 (limited to their log-associated school component). The official reported catches were, however, kept in the IOTC database, and the revised catch was incorporated in the assessment as scientific estimates. The WPDCS15 further improved the re-estimation technique, and the WPTT24(DP) has agreed to utilize it in the current assessment*

**Response**: The WPDCS **NOTED** that EU,Spain did provide some information on the methodology now used to process the purse seine data since 2020 at the 25th session of the WPTT (document IOTC-2023-WPTT25-24).

5. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-04 which outlined the main outcomes of the 27th Session of the Commission (S27), 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 nine Conservation and Management Measures (CMMs) adopted at the 27th Session of the Commission (consisting of 8 Resolutions and 1 Recommendation) as listed below:

- Res. 23/03 On Establishing a Voluntary Fishing Closure in the Indian Ocean for the Conservation of Tropical Tunas
- Res. 23/04 On Establishing Catch Limits for Bigeye Tuna in the Area of IOTC Competence

- Res. 23/05 On Establishing a Programme for Transhipment by Large-scale Fishing Vessels
- Res. 23/06 On the Conservation of Cetaceans
- Res. 23/07 On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries
- Res. 23/08 On Electronic Monitoring Standards for IOTC Fisheries
- Res. 23/09 On a Fish Aggregating Devices (FADs) Working Group
- Res. 23/10 Terms of Reference for a Working Party on Socioeconomics
- Rec. 23/11 To Enhance Cooperation in the Indian Ocean Tuna Commission Decision Making Process.

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. Participants to WPDCS19 were **ENCOURAGED** to familiarise themselves with the adopted Resolutions, especially those most relevant to the WPDCS.

## 3.2. Review of Conservation and Management Measures (CMMs) relevant to the WPDCS

9. The WPDCS **NOTED** paper IOTC–2023–WPDCS19–05 which encouraged participants at the WPDCS19 to review some of the existing Conservation and Management Measures (CMM) relevant to the WPDCS, **RECALLING** that eight new CMMs were discussed during the 27th 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.

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

11. In particular, the WPDCS **ENCOURAGED** participants to review the texts of Res. 23/01 *On the management of anchored fish aggregating devices*, Res. 23/06 *On the conservation of cetaceans* which will supersede Res. 13/04 from the 1st of July 2024, and Res. 23/08 on Electronic Monitoring Standards for IOTC fisheries.

12. The WPDCS **RECALLED** that an overview of the current state-of-play regarding Res. 21/01 will be discussed later during this meeting (see document IOTC-2023-WPDCS19-11).

## 3.3. Progress on the recommendations of WPDCS18

13. The WPDCS **NOTED** paper IOTC–2023–WPDCS19–06 on Progress on the recommendations of WPDCS18, which provided information on the follow-up of recommendations made to the SC as well as potential responses and suggestions by the Commission and **AGREED** to provide alternative recommendations for the consideration and potential endorsement by participants as appropriate given any progress.

14. 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 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).

15. The WPDCS **NOTED** that most recommendations made during the WPDCS18 were endorsed and recommended by the SC to the Commission, which endorsed the list of recommendations from the SC (2022) as its own, including the proposed improvements in the data submission process of fisheries statistics, the delegation of the adoption of data standards and submission forms to the SC, the adoption of EM terms and definitions, EM program standards, and EM data standards, and the mandatory reporting of geo-referenced effort data as number of sets/operations for longline and surface fisheries.

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

## 4.1. Data recording (logbooks)

### 4.1.1. Res. 15/01 On the recording of catch and effort data by fishing vessels in the IOTC area of competence

16. The WPDCS **RECALLED** that current templates and samples of fishing logbooks in use by the CPCs are available from a dedicated IOTC webpage and that new versions should be submitted to the Secretariat when they are updated.

17. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-13 on alternative methods to improve data collection in IOTC coastal fisheries, and specifically focusing on progress, pitfalls, and priorities, with the following abstract provided by the authors:

> "*The Indian Ocean supports the second largest tuna fishery in the world, with over 1 million tonnes caught annually. Here, coastal fisheries (operated by vessels < 24 m LoA exclusively fishing in the EEZ of their flag state) are of significant economic, social, and cultural importance to many states and account for an estimated 50 % of all landings, while using only ~25 % of the fuel and sustaining 25 times the number of livelihoods compared with industrial vessels. However, a focus on advancements in data collection, science and policy for the industrial sector has largely overshadowed the impacts of coastal fisheries while the importance of developments in this sector is increasingly being realised. Coastal fisheries catches are often dominated by neritic tunas, however, data for these species is inaccurate, incomplete and not provided in timely fashion, resulting in large uncertainty over the status of many of these species and associated catches. There is no substitute for good data collection (Giron-Nava et al., 2020), and the lack of accurate catch and effort data has been identified as one of the greatest challenges facing the Indian Ocean Tuna Commission (IOTC) Scientific Committee. The IOTC requires that all fisheries are subject to an onboard data recording system (logbook), with specific data requirements outlined in Resolution 15/01. While coastal fisheries from developing CPCs were originally exempt from this measure, in recognition of the challenges faced, the Resolution states that data collection should "be implemented progressively from 1 July 2016". Yet this has still only been achieved by fraction of coastal states.*" (full abstract is provided with the paper)

18. The WPDCS **THANKED** and **CONGRATULATED** the author for the work which provides useful information on experiences of pilot projects using alternative data collection systems in the Indian Ocean and other fisheries over the world.

19. The WPDCS **NOTED** that the scope of the study was the IOTC coastal fisheries, defined in the ToRs as vessels <24 m LOA exclusively fishing within their EEZ, but it was proposed that this is extended, consistent with the new vessel definitions, to include all vessels <24 m LOA even if they are fishing beyond the EEZ as they still experience the same issues as other small vessels, i.e., to include all *semi-industrial* vessels (see IOTC-2022-WPDCS18-07_Rev2). The proposal does not include vessels >24 m LOA as these are still classified as *industrial* vessels.

20. The WPDCS **NOTED** that the quality of data produced with EMS depends on the specific fishery, the objectives, the design of the data forms or camera configuration as well as several other factors, and that the wildly different results from different fishery trials highlight that each pilot needs to include validation as part of its trials (i.e., comparison with a separate data source) to ensure it is effective in achieving its aims before it is rolled out.

21. The WPDCS **NOTED** the potential benefits of combining different approaches to collect information on retained catch, geo-referenced catch and effort, and size-frequency data as well as digital pictures which can be used for

confirmation of species identification in the case of the self-reporting data collection system used in Pakistani gillnet fisheries.

22. The WPDCS further **AGREED** that such combination of approaches could address some of the issues encountered in data collection for several coastal fisheries, **ACKNOWLEDGING** this should be discussed later during the meeting for inclusion in the Workplan (see Section 10).

23. The WPDCS **NOTED** that the benefits of using alternative data collection methods would concern the semi-industrial and recreational fisheries (under the newly agreed IOTC definitions, I.e., vessels 15-24 m LOA fishing within the EEZ and <24 m LOA on the high seas) while for smaller vessels the review showed that the alternative methods proved to be difficult, so it is suggested that these remain confined to sampling at landing sites.

24. However, the WPDCS **NOTED** that electronic tools such as low-cost Global Navigation Satellite System (GNSS) may also be extremely useful to collect data on fishing grounds and effort (i.e., time at sea) for subsistence and small-scale fisheries, **AGREEING** that acquiring information on fishing effort in coastal fisheries should be a priority considering the paucity of such data available to the Secretariat.

25. Although considered negligible, the WPDCS further **NOTED** that almost no information is available on discards in coastal fisheries and that such data cannot be obtained through sampling at landing sites.

26. The WPDCS **NOTED** that the rationale for permitting a combination of alternative methods is that it allows verification among the different data sources, and because it provides the flexibility for managers to choose the most appropriate approach for the specific situation.

27. In absence of the consultant, the WPDCS **AGREED** to include the questions and responses in the report.

28. The WPDCS **QUERIED** whether there was any specific sampling scheme being used for selecting the sampling units and what was the sampling coverage. The author responded that this study was focused on alternative data collection methods and e-tools and that information about sampling strategies can be found in the previously published review on data collection systems in Indian Ocean artisanal fisheries (Feary et al. 2019).

29. The WPDCS **QUERIED** whether the study provided any simulation analysis on how a method or combination of alternate methods may aid in improving data quality of species identification for retained or discarded species at sea. The author responded that there were very few quantitative studies available in the literature on the subject and that EM data were found to have good accuracy for target species (i.e., billfish in La Reunion and sharks in Peru) and total captures but that EM did not perform so well for discards (i.e., sharks in Reunion and turtles in Peru).

30. The WPDCS **ACKNOWLEDGED** how a camera trial specifically established in Danish gillnet fisheries to monitor bird bycatch was found to perform very well for bycatch, showing the interest of the approach when specific objectives are included in the programmes.

31. The WPDCS **QUERIED** what are the enabling conditions for the alternate methods based on the challenges faced for small-scale fisheries (e.g., consideration of power issues for EMS). The author indicated that, from the case studies and interviews, technical issues did not emerge as the biggest challenge currently being faced. While all pilots were experiencing some kind of technical issue, these were very varied (power, lighting, connectivity, communications) but none were insurmountable and solutions for all issues had already been identified. The key limitations were the resources and time needed to be able to resolve them – most projects underestimated the length of time needed and were underfunded, leading to many being put on hold.

32. The WPDCS **NOTED** that the strongest enabling condition for success is using a transdisciplinary approach whereby fishers and governments are both involved in mutually designing, developing, and trialling the data collection system to improve transparency and fisher buy-in from the outset.

33. The WPDCS **QUERIED** whether it would be useful for CPCs to provide a plan for implementation of alternative data collection methods. The author responded that this could be valuable as it would enable to receive feedback from the IOTC community at an early stage in planning so that CPCs having trialled similar approaches

could provide advice, guidance, lessons learned, data collection templates to share and hopefully prevent the same mistakes being made and save everyone time and resources. This would also keep the Secretariat up to date with progress so they would be able to provide timely advice and guidance.

34. The WPDCS **ACKNOWLEDGED** that the EMS pilot project initiated in Sri Lanka in in 2018 will be finalized in 2024 with two more sets of EM systems to be installed onboard, further **NOTING** that the supplier Marine Instruments has now ceased its EM-related activities but agreed to provide technical support until the end of the project.

35. The WPDCS further **NOTED** that there are some major remaining issues in the scaling up of an EMS programme in Sri Lanka that need to be addressed in the future, including the fact that the technology is not feasible for many of the smaller vessels, problems of interference of the EMS with the vessel power supply, and general costs of installation and review.

36. The WPDCS **NOTED** that there has been some progress made in Indonesia with the implementation of electronic systems such as e-logbooks and that fishers are learning more and more about using digital tools, but that a major issue is the coverage of the fisheries regarding the large numbers of fishing vessels in operation (~100,000 vessels that might operate in coastal areas).

37. The WPDCS further **NOTED** that the development and implementation of new electronic systems in Indonesia still requires time to complete and that changes in national regulations may affect the dynamics of data collection, further **NOTING** that more focus is now put on the quality of the data collected (i.e., through checks and validation).

## 4.2. Data reporting (to the Secretariat)

### 4.2.1. Res. 15/02 On mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)

38. The WPDCS **RECALLED** the recommendation made at SC25 that "*the Commission ENDORSE the mandatory reporting of fishing craft statistics and that this change is included in the next revision of Res. 15/02*", further **RECALLING** that the Commission endorsed the Scientific Committee's 2022 list of recommendations as its own.

39. Therefore, the WPDCS **REITERATED** the importance of this request and **NOTED** that it has not been addressed yet and therefore should be brought to the attention of the Commission again in 2024.

40. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-14 which describes further updates introduced in the IOTC forms for the reporting of fishery statistics to the IOTC.

41. The WPDCS **RECALLED** how the timely and accurate provision of mandatory fishery statistics is a key task for all IOTC CPCs, as these statistics are used to support the work of the SC and its subsidiary bodies, as well as assess the level of compliance and the annual contributions of each CPC.

42. For these reasons, the WPDCS **WELCOMED** the efforts made by the Secretariat to simplify and rationalize the structure of the data reporting forms in the recent past and **ACKNOWLEDGED** that the IOTC forms have now become mandatory for the provision of several statistical datasets to the IOTC.

43. The WPDCS further **ACKNOWLEDGED** the structure and rationale of the new IOTC forms for the submission of retained catches, discards, geo-referenced catch and effort, size-frequency, and buoy positions (among others).

44. The WPCS **NOTED** the new semantics and granularity of the annual submissions, **ACKNOWLEDGED** that two new forms (i.e., 3-DA and 3-AA for the provision of data for drifting floating objects and anchored fish-aggregating devices, respectively) will be discussed under dedicated agenda items, and **ENDORSED** the overall list of changes proposed by the Secretariat and listed in the paper, which include:

- Decommissioning of Form 1-RC-YFT
- Decommissioning of Form 3-AR
- Decommissioning of Form 3-SU

- Decommissioning of Form 3-FA
- Introduction of Form 3-DA
- Endorse the introduction of Form 3-AA
- Endorse the introduction of Form 1-IN

45. The WPDCS **NOTED** the feedback from CPCs that have already trialled the new IOTC forms for the preparation of statistical data submissions for the 2023 reporting cycle, **ACKNOWLEDGED** that the new forms are clear and easy to fill, and **RECALLED** how these can already be used to submit historical data that might still be missing for some CPCs.

46. Finally, the WPDCS **REQUESTED** that the Secretariat support the correct implementation of the new data reporting procedures, including the endorsed list of IOTC forms and their adoption at national level, through dedicated in-person workshops to be delivered in Q1 and Q2 2024 to all CPCs.

47. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-15 which presents the latest developments regarding a set of online (public) tools for the validation of fishery data submissions to the IOTC.

48. The WPDCS **NOTED** the general principles underpinning the data reporting process for mandatory fishery statistics, and how its current implementation relies on *recommended* (i.e., not voluntary) forms and is both asynchronous and manual, notwithstanding the roll-out of the e-MARIS platform.

49. The WPDCS **RECALLED** the issues that the current process has in terms of validation of the submissions and provision of feedback by the Secretariat to the CPCs, and **NOTED** the proposed *ad interim* process that leverages the new IOTC forms (see paper IOTC-2023-WPDCS19-14) and introduces online tools to let CPCs validate their data prior to the submissions to the Secretariat.

50. The WPDCS **NOTED** the general functioning principles of the new IOTC online validators, and how these are based on the IOTC reference data catalogue and can help CPCs identify several types of issues, from warnings to regular and fatal errors, arising from their data submissions.

51. The WPDCS **ACKNOWLEDGED** that the presented IOTC online validators can mostly perform syntax checks on a single dataset, and that work is underway to develop comprehensive *semantic* checks that will analyse all distinct types of data submissions from a given CPC at the same time, to identify further inconsistencies across datasets.

52. The WPDCS also **NOTED** how the IOTC online validators clearly present the location (row / column) where issues are encountered in the original data submission and allow downloading the list of identified problems as a CSV file, which CPCs can analyse offline to verify and correct the issues.

53. The WPDCS **ACKNOWLEDGED** the positive feedback provided by the CPCs that had already trialled the IOTC online validators, including how these contributed to fixing bugs and improving the usability of the validators themselves, and **ENCOURAGED** all CPCs to trial the IOTC online validators as soon as possible, to familiarize with the proposed approach.

54. The WPDCS further **ACKNOWLEDGED** that data validation through the presented online tools is still a manual process, and that the next step would be the development of a fully automated procedure integrated within the e-MARIS platform.

55. For these reasons, the WPDCS **ENDORSED** the presented *ad interim* data reporting workflow and its adoption (including that of its required formats and provided tools) as the *de facto* standard for the provision of mandatory statistical information for the 2024 submission cycle (reference year 2023) with the deadline of 30 June 2024.

56. The WPDCS **AGREED** that the *ad interim* data reporting workflow as well as the use of the IOTC online validators be an integral part of the workshop to be delivered by the Secretariat to all CPCs in two sessions during Q1 and Q2 2024.

57. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-28 which presents a *draft* version of the new IOTC data reporting guidelines.

58. The WPDCS **NOTED** that the updated Data Reporting Guideline *draft* document connect the main Resolutions, requirements, datasets, and data elements to the new data reporting forms, which are to be used as mandatory format, as well the new tools developed by the Secretariat to support the CPCs data reporting process.

59. The WPDCS **NOTED** that the Data Reporting Guideline will be finalized and published by the Secretariat early next year and will be the reference document for the following reporting cycles as well the background document for the development of the proposed data workshop next year.

### *4.2.2.* Res. 19/02 *Procedures on a fish aggregating devices (FADs) management plan*

60. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-16 which describes the structure and semantics of the new IOTC form for the provision of detailed interactions between purse seine and supply vessels with drifting floating objects, including information on the floating object, instrumented buoy, and subsequent catches of IOTC and bycatch species (when applicable).

61. The WPDCS **NOTED** how the provision of data (including activities performed) on DFOBs is dictated by two main Resolutions, and namely Res. 15/02 and 19/02, with the latter requiring a level of resolution that includes reporting activities of a specific vessel on a specific DFOB at a given location and time, as well as the reporting of catches and releases at the level of each individual set.

62. The WPDCS **RECALLED** how the *recommended* Form 3-FA that was originally designed to report aggregated information on catch and effort on floating objects was deemed sub-optimal due to several reasons that include: a) use of non-standard classifications for FOB types, b) use of non-standard classifications for FOB activity types, c) lower spatio-temporal resolution, being stratified by grid and month, and d) lack of details on activities performed on buoys, as well as absence of provisions to report buoy identifiers.

63. The WPDCS **ACKNOWLEDGED** that the IOTC ad hoc Working Group on FADs (WGFAD) had discussed of the key data elements emerging from Res. 15/02 and 19/02 and specifically related to DFOBs, and presented a summary of these to the WPTT, which endorsed them and called the WPDCS to progress further.

64. For these reasons, the WPDCS **NOTED** the structure of the new Form 3-DA and **ACKNOWLEDGED** that this includes all the data elements identified by the WGFAD and can be therefore used by all those CPCs with purse seine and / or supply vessels operating on DFOBs to fulfil their mandatory reporting requirements.

65. The WPDCS **CALLED** data providers from such CPCs to confirm their ability to fill all mandatory data elements in Form 3-DA and **ACKNOWLEDGED** the positive answer in this regard by participating scientists from all concerned CPCs.

66. The WPDCS also **NOTED** that Form 3-DA allows the reporting of catches at set level, which has a higher level of resolution compared to what originally required by Res. 19/02, and in agreement with CPCs **ACKNOWLEDGED** this as a necessary trade-off to minimize the number of distinct forms to be submitted to fulfil the mandatory reporting requirements.

67. While **ACKNOWLEGING** that there is partial redundancy in the data on the geo-referenced catch and effort on DFOBs submitted through Forms 3-CE and 3-DA the WPDCS **AGREED** that the information on DFOB types and higher spatial resolution of the data reported through Form 3-DA may be critical for some scientific analyses.

68. The WPDCS further **NOTED** that information provided through Form 3-DA cannot be publicly shared *as is*, as this will go against the requirements of Res. 12/02 *Data confidentiality policy and procedure* by disclosing the activities of distinct vessels.

69. Eventually, the WPDCS **ENDORSED** the use of Form 3-DA from the next data reporting cycle, **REQUESTED** that the SC defines procedures for scientist to get access to more fine-grained data extracted from its submissions, and **AGREED** on publicly disseminating information duly aggregated by grid and month in the meantime.

70. Finally, the WPDCS **REQUESTED** that CPCs with fisheries on DFOBs also report to the Secretariat their historical data through both Form 3-CE (when not done already) and 3-DA.

### *4.2.3.* Res. 19/07 *On vessels chartering in the IOTC area of competence*

71. The WPDCS **NOTED** a presentation from the Secretariat regarding data-related considerations on Res. 19/07 *On vessels chartering in the IOTC area of competence* and **RECALLED** how the metadata fields *Flag country* and *Reporting entity* included in the new IOTC forms already account for the possibility of providing information on both the flag CPC and the chartering CPC, respectively.

72. The WPDCS **RECALLED** para. 3.5 of Res. 19/07 which requires that "*(...) the chartered vessels shall report (...) catch data to both the CPs (chartering and flag) and to the Secretariat*" and **NOTED** how, as of November 2023, only one chartered vessel has been fulfilling this requirement by providing a daily report including information on the location of the vessel, the number of fishing sets, as well as the composition of the catch.

73. The WPDCS **ACKNOWLEDGED** that there is currently no established format to report these data, and besides **QUESTIONED** whether the intention of the original proponents was to let chartering CPs share this detailed information with the Secretariat, **NOTING** that it is a requirement of the chartering CPC to provide aggregated retained catches as well as detailed catch and effort data to the IOTC as well as to the flag CP.

74. Furthermore, the WPDCS **NOTED** how para.8 of Res. 19/07 establishes that the information on catches from chartered vessels be submitted to the IOTC by 28 February each year, and that this contrasts with the default data reporting deadline of 30 June.

75. For these reasons, the WPDCS **REQUESTED** that the SC clarifies the aspects of Res. 19/07 that deal with the submission of catch statistics to the IOTC, to effectively manage these submissions and assess the compliance level of chartering and flag CPCs in the future.

### *4.2.4.* Res. 21/01 *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC area of competence*

76. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-11_Rev1 on updated calculations supporting the identification of yellowfin tuna catch limits for 2022 and 2023 in agreement with Res. 19/01 and 21/01.

77. The WPDCS **RECALLED** that six CPCs objected to Res. 21/01, while one CPC objected to Res. 19/01 and that therefore Res. 19/01 remains binding for Indonesia, I.R. Iran, Madagascar, Oman, and Somalia while Res. 18/01 remains binding for India.

78. The WPDCS also **RECALLED** that all presented catch limits for 2023 have been effectively *calculated* based on the information (historical catches) available to the Secretariat for all concerned CPCs, whereas all presented catch limits for 2024 are estimated with the assumption that CPCs will not exceed their calculated catch limit in 2023.

79. The WPDCS **NOTED** Table 1 and Table 2 of the document, which present the catch limits by CPC for 2023-2024 and by CPC and industrial gear for 2020-2024 according to Res. 21/01 and 19/01, respectively, and **ACKNOWLEDGED** that these tables will be presented to the forthcoming SC for their its endorsement.

80. The WPDCS also **NOTED** the tables contained in Appendices 1-4 of the document, which outline the historical catches, over-catches, and calculated base limits for all CPCs according to the Resolutions they are bound to.

81. Furthermore, the WPDCS **INVITED** concerned CPCs to verify the information contained within these table and confirm: 1) the accuracy of historical catches used by the Secretariat to determine catch limits and over-catches, and 2) the results of the catch limit calculations, taking into account the interconnections between Res. 19/01 and 21/01 in terms of over-catches from the former affecting catch limits for the latter, and penalty mechanisms for repeated over-catches across two or more consecutive years.

82. The WPDCS **NOTED** the recent improvements in the breakdown of Indonesian longline and purse seine catches between their *coastal* and *industrial* components, **RECALLED** that Indonesia submitted revised historical catches

to the Secretariat in July 2023 accordingly, and **ACKNOWLEDGED** that these revisions led to the industrial longline fishery of Indonesia not being subject to yellowfin tuna catch reductions anymore, as their baseline catch levels in 2014 are now estimated to be less than 2,000 t.

83. The WPDCS **NOTED** the concerns raised by some CPCs about their estimated yellowfin tuna catch limit, further **NOTING** that the limits are estimated prior to the reporting of the actual 2023 catch, which therefore impacts on how over-catches are deducted from the initial baseline limit.

84. Nevertheless, the WPDCS **EXPLAINED** how due to the officially reported time series of historical catches from the fraction of gillnet vessels from I.R. Iran subject to Res. 19/01, the calculated (2023) and estimated (2024) catch limits for this segment of the Iranian fleets are negative, and that therefore I.R. Iran is expected to reduce the catches of yellowfin tuna to zero for this specific fishery.

85. The WPDCS **RECALLED** how the calculated and estimated catch limits for yellowfin tuna are provided on a CPC-by-CPC basis, as this is the requirement of the original resolutions, notwithstanding the frequent practice in the IOTC to separate data by flag / fleet when disseminating other types of public information.

### *4.2.5.* Res. 23/01 *On the management of anchored fish aggregating devices (AFADs)*

86. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-17 which presents the proposed structure and semantics for a new electronic form for the provision of detailed data on the interactions between IOTC fisheries and AFADs.

87. The WPDCS **NOTED** how the provision of data (including activities performed) on AFADs is dictated by two main Resolutions, namely Res. 15/02 and 23/01, with the latter requiring a level of resolution that includes reporting activities of a vessel on a specific AFAD at a given location and time, as well as the reporting of catches and releases at the level of each individual set.

88. The WPDCS **RECALLED** how the *recommended* Form 3-FA that was originally designed to report aggregated information on catch and effort on FOBs (including anchored ones) was deemed sub-optimal due to several reasons that include: a) use of non-standard classifications for FOB types, b) use of non-standard classifications for FOB activity types, and c) lower spatio-temporal resolution, being stratified by grid and month.

89. Furthermore, the WPDCS **NOTED** how no information regarding fisheries on AFADs was ever reported to the IOTC through Form 3-FA, and that the only limited data on these fisheries is available through the information on school associations embedded within the fishery codes in the old, recommended forms 3-CE and 4-SF.

90. For these reasons, and to implement the new data reporting requirements emerging from Res. 23/01, the WPDCS **NOTED** the structure of the new Form 3-AA, **ACKNOWLEDGED** that this includes all the data elements requested by Res. 15/02 and 23/01 and can in principle be used by all those CPCs with vessels fishing on AFADs to fulfil their mandatory reporting requirements to the level of spatio-temporal resolution expressed by the latter.

91. The WPDCS **NOTED** the structure of the new Form 3-AA and how this:

- combines details on AFAD activities and catches / releases
- references standard classifications based on the extended CECOFAD ones
- maintains the required spatio-temporal resolution
- implement the same design principles as all other new IOTC forms.

92. The WPDCS **ACKNOWLEDGED** that compared to Form 3-DA (for the reporting of activities on drifting floating objects) the requirements underpinning Form 3-AA exclude the *vessel* dimension, notwithstanding the fact that interactions with AFADs should be reported by exact location and point in time.

93. For this reason, the WPDCS **REQUESTED** the SC to confirm that vessel information should not be included in the data elements captured by Form 3-AA and **ACKNOWLEDGED** how in lack of this information, all data received through Form 3-AA could be publicly disseminated as they are, as they would not include any detail that could

lead to the identification of a specific fishing boat and its activities, in agreement with the requirements of Res. 12/02.

94. The WPDCS **REQUESTED** all CPCs with fisheries on AFADs to confirm if they can collect (and report) all required data elements, as well as to confirm that the proposed AFAD type and AFAD activity type classifications are fit for the purpose.

95. **ACKNOWLEDGING** that not all CPCs can fulfil these requirements, as their vessels on AFADs are often of *artisanal* nature and lack proper onboard data collection mechanisms, the WPDCS **ENDORSED** anyway the proposed Form 3-AA for the reporting of detailed interaction with AFADs and **REQUESTED** that those CPCs that can, also report to the Secretariat historical data for their AFAD fisheries through both Form 3-CE and 3-AA.

96. Additionally, the WPDCS **NOTED** how the current extended CECOFAD classification for activities on AFADs does not contain a code modelling the loss of an AFAD, and that Res. 23/01 does not explicitly require to report information on the structure of the AFADs vessels interact with.

97. However, the WPDCS **ACKNOWLEDGED** that the loss of an AFAD is a rare event and that it cannot be considered as an activity performed by a vessel on the AFAD itself, and **NOTED** that the reporting of the characteristics of an AFAD structure are captured by other requirements of Res. 23/01 for which there already exists a template to report detailed information on AFAD deployments (available through the e-Maris platform), mainly for compliance purposes.

98. The WPDCS **NOTED** that the AFADs used in Thailand are made of coconut leaves and mostly deployed in very coastal areas, where depth is less than 100 m, to aggregate small pelagic species (i.e., mackerels, scads, and sardines) while seerfish comprise a small part of the catch, i.e., generally less than 5%.

99. As such, the WPDCS **ACKNOWLEDGED** that collecting and reporting the information on these AFADs might not be required for the Thai fishery of small-scale purse seiners.

100. Nevertheless, the WPDCS **NOTED** that about 25% of the total catch of the Thai small-purse seine fishery may come from AFADs when the rest is taken on free-swimming schools and **REQUESTED** Thailand to consider those as two distinct fisheries in future submissions of catch and effort to the Secretariat, splitting the historical data accordingly where possible.

***Overarching recommendations***

101. Following the discussions and endorsements on data-reporting aspects discussed so far, the WPDCS **RECOMMENDED** that the Scientific Committee: a) endorse the proposed updates to the IOTC data submission processes, and namely:

- the introduction of Form 3-DA / 3-DA-multiple for the reporting of detailed activities on drifting FOBs
- the introduction of Form 3-AA / 3-AA-mutiple for the reporting of detailed activities on AFADs
- the decommissioning of the old, *recommended* forms 3-AR, 3-FA, 3-SU, and 1-RC-YFT
- that the *ad interim* data reporting workflow and the accompanying electronic tools and formats (interactive validators, ad interim forms, etc.) become *mandatory* for the submission of statistical fisheries data to the IOTC starting with the 2024 reporting cycle (deadline of 30 June 2024)
- that the study on the matrix approach for the characterisation of IOTC fisheries is further extended to cover all IOTC coastal nations and their fisheries, and that outputs of the study are presented to the next session of the meeting
- that ROS data be exclusively submitted through the consolidated ROS Excel data reporting forms or as .ros files, for those CPCs using the ROS electronic data collection tools

and b) further clarify the issues identified within Res. 12/02 and 19/07 that have an impact on the collection, reporting, and dissemination of IOTC datasets.

# 5. Progress report of the Secretariat on data-related issues

## 5.1. Secretariat report

102. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-07_Rev1 on the report on IOTC Data Collection and Statistics, which provides an overview of the multiple datasets managed at the Secretariat, including information on their coverage, timeliness of the submissions by the CPCs, assessment of reporting quality, and a list of the main issues affecting the IOTC data together with proposals to address them.

103. The WPDCS **NOTED** the specific terminology used by the IOTC, including the definitions of *bycatch*, fishery *category* (as defined in Res. 15/02), fishery *type* (which are based on a combination of information on fishery purpose, area of operation, and vessel size), and *fishery* itself (IOTC-2022-WPDCS18-13_Rev3).

104. The WPDCS **NOTED** that *artisanal* is equivalent to *coastal* in the IOTC terminology, and that work led by the Secretariat in collaboration with several CPCs is ongoing to better characterize the complexity of IOTC artisanal fisheries using the FAO fishery matrix approach (IOTC-2022-WPDCS18-16 and IOTC-2023-WPDCS19-23).

105. The WPDCS **NOTED** the range of datasets managed by the Secretariat which has expanded over time to improve the monitoring of fishing activities and address the increasing scientific needs to analyse and understand the dynamics of tuna and tuna-like populations and the effects of fishing on marine ecosystems.

106. The WPDCS **NOTED** the ongoing work of the Secretariat aimed at streamlining the general data flow from the CPCs to the IOTC, including the simplification and harmonization of reporting forms (IOTC-2023-WPDCS19-14), the development of new forms (IOTC-2023-WPDCS19-16 and IOTC-2023-WPDCS19-17), the online validation tool (IOTC-2023-WPDCS19-15), and the development of new reporting guidelines (IOTC-2023-WPDCS19-28).

107. The WPDCS **NOTED** with concern that the availability of the three main fisheries data sets (i.e., retained catches, geo-referenced catch and effort, and size-frequency data) has decreased in 2023, and that a substantial amount of data was reported after the deadline for tropical tunas, billfish, neritic tunas, and seerfish.

108. The WPDCS **NOTED** that the delays in data submission resulted in several additional updates of the datasets of tropical tunas prepared for the WGFAD05 and WPTT25, **ACKNOWLEDGING** that this resulted in an increased workload for the Secretariat (to re-process all datasets and produce raised georeferenced catches) and contributing scientists (to re-analyses the information following each data update).

109. The WPDCS **NOTED** that about 12% of the total retained catches of the 16 IOTC species was not reported to the Secretariat for the statistical year 2022, with major fishing nations such as India and Pakistan having not reported any data for that year and **ACKNOWLEDGED** that this resulted in catch data for India being collated from online CMFRI reports, and total retained catches for Eritrea, Madagascar, Pakistan, Sudan, and Yemen repeated from the year 2021.

110. The WPDCS further **NOTED** that total retained catches for 2022 for all non-members of the IOTC (i.e., Bahrain, Djibouti, Egypt, Jordan, Kuwait, Myanmar, Saudi Arabia, and Timor Leste) were not made available to the Secretariat except for UAE and were inferred from the FAO global capture production database, assuming the fishery composition of each of these countries, which is originally missing from the FAO data.

111. The WPDCS **RECALLED** the paucity of size-frequency data available at the Secretariat, for most coastal fisheries, and for billfish and neritic species in particular, and **URGED** all concerned CPCs to develop and implement sampling and reporting systems to acquire more information on the size composition of the catch of their coastal fisheries.

112. The WPDCS also **RECALLED** that the collection of size-frequency samples is mandatory for the main pelagic sharks listed in Annex II of Res. 15/01, as stated in Res. 17/05, and that little data are available on the size composition of sharks caught in IOTC fisheries.

113. The WPDCS **NOTED** that very few estimates of discarded fish and ETP species have been reported to the Secretariat for the year 2022, and that most of the submissions were not by the IOTC reporting standards.

114. The WPDCS **NOTED** that the Secretariat has been collating a large dataset of information derived from about 200 satellite tags deployed on several species of billfish, tunas, and sharks in the Indian Ocean, through a collaboration with CPCs, Universities, and NGOs, and that work is ongoing to describe the data and make them available through a repository under specific use conditions set by the data owners.

115. The WPDCS **NOTED** that the Secretariat has designed a database structure and defined a draft of exchange format for biological data but that the work is behind schedule and will be a priority in the first quarter of 2024.

116. In the context of the development of the Working Party on Socio-Economics (WPSE; Res. 23/10), the WPDCS **RECALLED** that IOTC data requirements related to socio-economics are currently voluntary and that the Secretariat has only extremely limited data on fish price reported from a few CPCs.

117. However, the WPDCS **NOTED** that a recent collaboration with the Pacific Islands Forum Fisheries Agency (FFA) enabled the collation of long time series of import prices of tuna and crude oil prices which are now made available through the IOTC website.

118. The WPDCS **ACKNOWLEDGED** that several datasets on socio-economics are available from online open repositories managed by institutions such as the World Bank (e.g., development indicators, population), the FAO Fisheries Division (e.g., imports, exports), and others (e.g., Commonwealth), and **NOTED** that the Secretariat will follow the recommendations emanating from the WPSE to collate and make available these data to support the IOTC process.

## 5.2. Updates on data-related requests from other Working Parties

119. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-12 on summary of updates on data-related requests made by the Scientific Committee and the other Working Parties and Working Groups, including:

- A request by the SC that the WGFAD further discuss the FAD definition and report to the WPEB and WPDCS in 2023.
  - *The WPDCS **NOTED** that this request should be addressed at the next session of the WGFAD*
- With concerned on paucity if size-frequency data available at the Secretariat for neritic tuna, the WPNT requested all CPCs to work to find and report historical data that may not have been reported and to develop and implement procedures for the collection of size data when necessary
  - *The WPDCS **NOTED** that no historical size-frequency data have been recovered and submitted to the Secretariat since the last session of the WPDCS and that little new size data were reported for the year 2023 (IOTC-2023-WPDCS19-07_Rev1)*
- A request from the WPNT for Indonesia to share the data collected from the study of catch composition and size distribution of neritic tunas (IOTC-2023-WPNT13-13) with the Secretariat so that they can be included in the morphological database that is under development for all species managed by the IOTC
  - *The WPDCS **NOTED** that no size data were reported by Indonesia despite the WPNT request*
- A request from WGEMS that scientists involved in purse seine, gillnet fisheries, and coastal fisheries to carefully review the annexes 1 and 2 of the document IOTC-2023-WGEMS03-06 and provide feedback to the group at the next sessions of the WPDCS and WGEMS
  - *Some feedback on the document is provided in IOTC-2023-WPDCS19-25_Rev1 and IOTC-2023-WPDCS19-26*
- A request from WGEMS recommending that the WPDCS consider and endorse the WGEMS Programme of Work (PoW) (2024–2028), as provided in Appendix V

- *The WPDCS **ENDORSED** the WGEM PoW and included it into the WPDCS PoW*

- A request from the WPB for the Secretariat to present the progress made on developing an electronic exchange format, a biological database, and a summary of the status of all biological data available at the Secretariat at the next session of the WPDCS
  - *The progress made by the Secretariat was presented in paper IOTC-2023-WPDCS19-07_Rev1*
- A request from WPEB that the WGEMS is currently working on the identification of all ROS data elements that could be collected through Electronic Monitoring Systems (EMS) and will report back any findings to the WPDCS.
  - *The WGEMS REQUESTED the SC to review, no later than 2024, the ROS minimum required data fields to* identify any fields that are logistically difficult for EM and/or human observers to collect, respectively.
  - *The WPDCS at this session **AGREED** to organise an intersessional working group that will review and summarise the capabilities and advantages and drawbacks to collect ROS data fields across gears by different alternative methods, including EMS.*
- A request from WPTT which discussed the possibility of imposing a unit of effort for the different fishing gears to accurately standardize CPUE. The WPTT QUERIED whether the information on the number of crew or days at sea has been collected to calculate appropriate effort indices. The WPTT NOTED that logbooks contain some information on the number of hooks or crew that could be used to correct for this. The WPTT further NOTED that logbook data also include the number of poles. The WPTT AGREED that consistent reporting of pole and line effort for a long time and the issue of effort units should be further discussed at the WPDCS.
  - While there was no progress on this specific aspect, the WPDCS **RECALLED** how the standardization of effort unit is one of the topics currently discussed by the FAO Coordinating Working Party on fishery statistics (FAO-CWP) and **AGREED** on seeking advice from the FAO-CWP on how to best proceed on this matter.

## 5.3. Dissemination of IOTC reference data, datasets, and documents

120. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-18_Rev1 which describes the benefits of assigning Digital Object Identifiers (DOIs) to IOTC documents and datasets, with the following abstract provided by the authors:

> *"Only few organizations worldwide can ensure the long term storage and access for their numeric resources. Indeed this requires a replication of data in multiple sites within secured data centers. Consequently, even in scientific organizations, the rate of data loss is important and this situation is no longer accepted by funding agencies which are requiring research projects to implement data management plans to ensure that the funded data and resulting information and knowledge will not be lost. In addition, beyond economical considerations and for obvious ethical reasons, data have to be made accessible along with publications to enable the review and the reproducibility of the scientific work. To be found once published, resources also have to be described with standardized discovery metadata which foster interoperability on the Web. Since years, multiple data repositories offer free services for the long term storage of any kind of numerical resource. These repositories also assign unique identifiers (Digital Object Identifier, DOI) which foster their reuse and citation worldwide by complying with standardized metadata. In practice, scientists are already used to getting DOIs assigned to their articles by scientific journals but still few of them are assigning DOIs to other products like their data, code or reports. In 2019, a first work has been driven in collaboration with IOTC to start assigning DOIs to a selection of IOTC reports. In this paper we present a summary of the past work results and make some recommendations to update it by assigning new DOIs to other kinds of IOTC resources (eg datasets, working papers)."*

121. The WPDCS **THANKED** the authors for the presentation and **AGREED** on the interest of DOIs for improving the management and discoverability of the different resources available at the Secretariat (i.e., datasets, meeting documents and reports, etc.), further **NOTING** that DOIs associated with datasets may be required by some peer-reviewed journals for publication.

122. The WPDCS **NOTED** that *versioned* DOIs enable tracking the different versions of a resource that changes over time (e.g., due to improvements, additional data, etc.), and that this would be adapted to most IOTC fisheries datasets which are constantly improved and augmented on an annual basis.

123. The WPDCS **NOTED** how, in the context of good practices for data management based on the *FAIR* principle (*Findable*, *Accessible*, *Interoperable,* and *Reusable*), assigning a DOI is enough for the data to be FAIR-compliant.

124. However, the WPDCS **NOTED** how IOTC resources are not fully FAIR-compliant due to the current IOTC dissemination process as well as to poor and inefficient references and **RECALLED** that the resources produced by the Secretariat, which are already in the public domain, do not have restriction to get DOIs assigned.

125. The WPDCS **NOTED** the lack of visibility of the IOTC resources, with limited metadata describing the information, and **ENCOURAGED** the Secretariat to use online data repositories and DOIs to improve the quality and presentation of its data assets as well as all documents.

126. The WPDCS also **NOTED** that a first exercise was performed in 2019 to implement the use of DOIs for a large set of IOTC reports and meeting documents using Zenodo, which further facilitates incorporating any of these documents' metadata to generate bibliographical references with most reference management tools (e.g., Zotero).

127. The WPDCS further **NOTED** that Zenodo is a research data repository hosted by the CERN data centre, and that it offers the advantage of storing resources for at least 25 years and record activities (updates, viewers etc.) related to the data.

128. However, the WPDCS **QUERIED** on where priorities should be set to process the multiple IOTC resources, **NOTING** the limited time available to the Secretariat to implement the project with regards to the other priorities set by the Commission.

129. The WPDCS **NOTED** the request for CPCs and the Secretariat to implement a FAIR data management plan (DMP) and strategies by assigning DOIs to public domain and open data for both past and future resources, **ACKNOWLEDGING** that it might be necessary to seek approval from the SC for the implementation of a DMP.

130. The WPDCS **NOTED** that the lack of DOIs hinders the ability to crosscheck a document with other tRFMOs, even when these are free-access and openly accessible.

131. The WPDCS **AGREED** that the DOI approach would be valuable to the resources available from all tuna RFMOs, **NOTING** that the consolidated datasets of the FIRM Global Tuna Atlas which combine catches of tuna, tuna-like, and pelagic shark species across the five tRFMOs are available from Zenodo (e.g., https://zenodo.org/records/5999286).

132. The WPDCS **ACKNOWLEDGED** that the Secretariat is committed to improve the ways in which its data assets are disseminated, **NOTING** that without proper DOI-enabled online repositories the evolution of these assets will not fully available to end users (e.g., increasing size of satellite tagging datasets).

133. The WPDCS **NOTED** that although several online repositories are completely open, authors may choose to restrict access to their documents by placing them under embargo and **ACKNOWLEDGED** that this should be taken in consideration when requesting participants to IOTC scientific meetings to have a DOI assigned to their papers.

134. The WPDCS further **AGREED** on seeking advice from the SC on how to implement this process and guarantee that existing data policies are not violated, while ensuring the highest level of dissemination of all assets available to (or produced by) the Secretariat.

### *5.3.1.* Res. 12/02 Data confidentiality policy and procedures

135. The WPDCS **NOTED** a presentation from the Secretariat regarding data-related considerations on Res. 12/02 *Data confidentiality policy and procedures*, which shares concerns on the necessity of better handling aggregated data originating from fleets composed of a single vessel.

136. The WPDCS **RECALLED** the definition of standard stratification included in para. 2 of Res. 12/02, which confirms that duly aggregated data by grid and month remain in the public domain provided that "*the catch of no individual vessel can be identified within a time / area stratum*", in which case the information must be aggregated in time / area / flag before its public release.

137. The WPDCS **NOTED** how, based on the data included in the IOTC Active Vessels List (AVL) as of November 2023, no CPC with a single vessel of a given type actively operating in the IOTC area (i.e., EU,Italy, Indonesia, Republic of Korea, Mauritius, Oman, and South Africa) has either a proper fishing vessel (i.e., it might list a *supply vessel* instead), or is providing georeferenced catch and effort for it.

138. Nevertheless, the WPDCS **ACKNOWLEDGED** that this situation might change in the future and therefore **DISCUSSED** on whether it would be agreeable for CPCs with a single fishing vessel listed in the AVL at any given time to agree on publicly sharing the georeferenced catch and effort information to the level of resolution it was originally provided to the IOTC, regardless of the requirements expressed in Res. 12/02.

139. Furthermore, the WPDCS **NOTED** that mandatory statistical data are reported to the Secretariat with a delay of at least six months (in the best-case scenario) which further reduces the potential damages of disclosing information of (recent) commercial interest.

140. Considering the above, the SC **REQUESTED** that the SC clarify these open points and provide advice on how to progress further in the best interest of the CPCs and the IOTC scientific community.

# 6. Updates on national statistical systems

## 6.1. Updates on the status of national data collection systems

141. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-19_Rev1 on the measures taken by I.R. Iran to improve the reporting of catch and effort data to the IOTC from the year 2022, with the following abstract provided by the authors:

> *"This document presents summary information about fisheries statistical data in Iran, according to IOTC resolutions and recommendations concerning mandatory minimum data submit to IOTC and basic actions to improving Data collection system with approvals and recommendations of the Scientific Committee and WPDCS. (…)*" (full abstract is provided with the paper)

142. The WPDCS **NOTED** that electronic reporting means are currently being developed in I.R. Iran since 2018 but progress is slow due to lack of funding and technical issues, including difficulties in sourcing the equipment due to the embargo.

143. The WPDCS **NOTED** that, in I.R. Iran, size data can only be provided reliably for tuna and tuna-like species, as the length of billfishes is not measured due to the fish being processed onboard (with fins and bill removed) while the length of sharks is not measured due to the species not observable during sampling operations.

144. The WPDCS further **NOTED** that similar issues occur for other fisheries in the region, such as in Sri Lanka and India, and **ACKNOWLEDGED** that this problem was also raised in the WPB, **NOTING** that the Secretariat is aiming to complement the new reporting guidelines with some technical guidelines focusing on the sampling description of the different measurement types that can be taken from dressed billfish in addition to improving the length-length conversion keys available to the CPCs.

145. The WPDCS **NOTED** that the overall catches of I.R. Iran have significantly increased from approximately 200,000 t to 600,000 t during the past 20 years, although most of the catch was composed of small pelagic fishes which accounted for approximately 140,000 t in recent years.

146. The WPDCS further **NOTED** that there were several factors influencing the increase in overall catch, including illegal catches which were unreported in the past, improved fishing technology, modification of fishing vessels resulting in increased fishing power, and increased time-at-sea.

147. The WPDCS **NOTED** that fishers and port samplers experience issues of species identification for some billfish species, which remain satisfying for Indo-Pacific sailfish, black marlin, and swordfish while catches of other billfish species are often reported as aggregated.

148. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-20 on the redesign of the French purse seiners logbooks to support the increased complexity of IOTC data reporting requirements, with the following abstract provided by the authors:

> *"Logbooks are one of the key tools to monitor a fishery and are required for multiple needs and by multiple end users. In the case of the French and Italian tropical tuna purse seiners (PS) operating in the Atlantic and Indian Oceans, logbooks have been used since the start of the fishery, respectively during the 1960s and the 1980s. Overall, despite increasingly complex data reporting requirements, their structure has not changed much over time. Here, we present the structure of a fully redesigned logbook, with an in-depth revision aiming at making the logbooks more user friendly for captains, using data entry forms. This structural change also allows designing a database-like logbook, with a healthier data structure, separating data entry tasks from analysis and reporting needs. Future steps, including the validation of the current format and training of captains to this new reporting tool are also presented."*

149. The WPDCS **NOTED** that the redesigned logbook currently does not allow reporting on tag recovery and **ACKNOWLEDGED** that due to the amount of information already required in the logbook, tag recovery will not be included in the near future, and that the responsibility of handling this information will be delegated to onboard observers when present.

150. The WPDCS also **NOTED** that the well plan (i.e., link between the fishing sets and freezing wells where the tuna is stored) is not part of the new logbook version.

151. The WPDCS **ACKNOWLEDGED** that discard data are collected by onboard observers, when present, operating on French and Italian purse seiners and **NOTED** that skippers will be instructed to improve the reporting of retained bycatch and discards in the revised logbooks, using either the estimates of onboard observers or their own estimates for vessels monitored using EM.

152. The WPDCS **NOTED** that estimates of bycatch being provided in numbers by onboard observers, an automatic conversion to weight will be implemented using the mean weight relationship of IRD's ObServe database.

153. The WPDCS **NOTED** the data structure implemented in the redesigned logbook of French purse seiners to report information on drifting Fish Aggregating Devices (DFADs) and other Floating OBjects (FOBs), with DFADs defined as a combination of rafts, cages, and tails.

154. The WPDCS further **NOTED** that this structure has been implemented to facilitate data reporting by skippers but that no change will be required in the structure of IOTC Form 3-DA to report on FOB and buoy activities to adapt to the format proposed in the French logbook.

155. The WPDCS **NOTED** that a test phase involving a selection of skippers will take place soon to ensure the redesigned logbook is fully functional before its deployment on all French and Italian purse seiners, as well as support vessels in the Indian and Atlantic oceans.

156. To avoid triple reporting for the skippers involved in the trial phase (i.e., ERS, current logbook, and new logbook in test), the WPDCS **NOTED** that some support will be provided to fill the current versions of the logbooks by staff on the ground.

157. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-30 on the gill-oxygen limitation theory as an explaining factor of fishers' perceptions over current trends in Sri Lanka pelagic catches in the Indian Ocean, with the following abstract provided by the authors:

> *"In Sri Lanka, multi-day fishing operations are carried out by inboard multiday boats (IMUL). These boats usually target pelagic tuna and tuna-like species using drift gillnets, longlines and a small-scale surrounding net called ring nets. that although there was an increase in pelagic fish catches until around 2010, particularly yellowfin and skipjack tuna, catches of almost all pelagic fish species had a spectacular decrease over the years according to the IOTC data. Fishermen also complaining on the same aspect claiming that there have been declining trends in the catch composition of target pelagic species. Results of a questionnaire survey indicated 64.7% of the skippers were of the view that the shifting of productive fishing locations of pelagic species was possibly due to changes in oceanic characteristics. An attempt was made to explain the trends of and fishers' attitudes about changes in pelagic catches in the Indian Ocean via GOLT theory. Results of GOLT analysis indicated that, pelagic fish species in the Indian Ocean off Sri Lanka can be considered to be susceptible to deoxygenation due to elevated sea temperature. It is therefore imperative that the regional fisheries management organizations such as IOTC consider, when defining data collection and analysis process and regional fisheries management plans, the possible shifting of pelagic fish stocks due to deoxygenation associated with increased sea surface and sub-surface temperature as an area of concern in addition to control of the amount of fishing."*

158. The WPDCS **CONGRATULATED** the authors for the original study which involves fishers through online questionnaires to assess their perceptions on the reasons for changes in catches of pelagic species over time and space.

159. The WPDCS **NOTED** that survey results showed that Sri Lankan fishers mostly considered that catch reductions were related to changes in water conditions and movements of the fish southward or in deeper, cooler waters, while overfishing was only considered a reason for change in less than 6% of the responses.

160. The WPDCS **NOTED** the theoretical nature of the Gill Oxygen Theory (GOLT) and its interest, further **NOTING** that alternative or complementary theories could be also explored (e.g., range-abundance relationship; Worm and Tittensor 2011).

161. The WPDCS **NOTED** that the life history traits of the 18 main pelagic species (including 14 IOTC species) caught in the multi-day Sri Lankan fisheries conform well with the GOLT, i.e., these species appear to be sensitive to oxygen limitation which might force them to make poleward migrations and/or move to deeper waters in response to reduction in oxygen concentration.

162. The WPDCS **QUERIED** whether environmental data available from open repositories (e.g., Copernicus) were used to confirm some reduction in oxygen concentration in the waters of the Indian Ocean as suggested by the GOLT, **NOTING** that such trend has been observed in the surface and sub-surface layers of the world oceans.

163. **NOTING** that the authors did not yet look at oceanographic data, the WPDCS **ENCOURAGED** the authors to continue the study using environmental indicators from diverse sources (i.e., derived from models, satellites, and *in-situ* observations) to assess the existence and extent of oxygen reduction in the Indian Ocean.

164. The WPDCS further **REQUESTED** the authors to present their findings at the next sessions of the WPEB and/or WPTT to advance on how to better account for changes in environmental conditions on population dynamics, further **NOTING** that recent papers presented at the 25th session of the WPTT suggested some strong effects of the environment on the recruitment dynamics of yellowfin tuna (IOTC-2023-WPTT25-12) and skipjack tuna (IOTC-2023-WPTT25-22).

165. The WPDCS further **NOTED** that the extent of the fishing grounds described by the data available to the study appeared to be wider than those available from the Secretariat and **ACKNOWLEDGED** that this could be partly explained by the range of years as no geo-referenced data are available at the Secretariat for industrial Sri Lankan fisheries prior to 2014 while one of the charts included in the presentation covers the period 1978-2010.

166. For the recent map (i.e., 2022), the WPDCS **REQUESTED** the Secretariat to liaise with Sri Lanka to cross-check the consistency of the fishing grounds with the catch and effort data reported by Sri Lanka for that year.

167. The WPDCS **NOTED** that paper IOTC-2023-WPDCS19-31 on the methodologies for data collection and estimation for small-scale fisheries implemented in Madagascar through the OPENARTFISH platform was not presented at the meeting in absence of the authors.

168. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-32 on the key findings of the catch assessment survey (CAS) and monitoring of small-scale fisheries catch log-sheets conducted by Kenya in 2022, with the following abstract provided by the authors:

> *"This paper looks at data collection approach adopted towards improving data collection and reporting and the status to date. The use of catch assessment survey (CAS) was piloted from 2016-2023 with aim to strengthen the monitoring plans for tuna species and improve Small Scale tuna data collection. Catch Assessment Survey was adopted as an approach to support improvement of data collection and monitoring and to strengthen co-management of nearshore fisheries. In 2022 CAS was conducted in thirty-three (36) landing sites by trained of data enumerators from different institutions and Beach Management Units (BMU). The CAS was implemented following the harmonized Standard Operating Procedures (SOPs) and CAS manual."* (full abstract is provided with the paper)

169. The WPDCS **NOTED** the key steps that Kenya took since 2013 to improve their data collection systems, starting with the inclusion of manual data collection, sampling operations, and trial of various Apps, and eventually using the e-CAS mobile system which is based on a Catch Assessment Survey (CAS) since 2022.

170. The WPDCS **NOTED** that the new system involves managers, fishers, and scientists, and that the estimation method used to produce catches for 2022 includes a combination of data sources, such as CAS, daily catch data, and frame survey reports.

171. The WPDCS further **NOTED** that Kenya intends to use a combination of the latest e-CAS output and logbooks to perform the reconstruction of their historical catches.

172. The WPDCS **NOTED** that the CAS is based on a 2-stage sampling design: (i) a sample of landing sites considered as Primary Sampling Units (PSU) within each county administrative unit and (ii) for each PSU, a sample of fishing gears based on the total number of fishing crafts per landing site and the spatial distribution along the coastline following the results of the frame surveys, combined with a sampling effort of 10 days every month.

173. The WPDCS **NOTED** the seasonal variations in catch magnitude from various Kenyan fisheries and **ACKNOWLEDGED** that this might be partially due to small-scale fisheries targeting varied species groups over the year.

174. The WPDCS **NOTED** that the length measurements usually reported by Kenya for tuna and tuna-like species are taken as total length and therefore **ENCOURAGED** Kenya to adopt upper-jaw fork length and lower-jaw fork length as the recommended measurement for all IOTC species, as defined in the IOTC reporting guidelines.

175. The WPDCS **ACKNOWLEDGED** the needs of Kenya to continuously improve their data collection systems. **NOTING** that assistance through capacity building on sampling and species identification and additionally, better characterisation of the artisanal fisheries would be of help to further develop their fisheries management system.

176. The WPDCS **NOTED** the discrepancy between data presented during the WPDCS and provided by Kenya to the Secretariat over the years, **NOTING** that the different data collection systems used over time lead to fluctuations in the catch series, and with the help of the CALIPSEO from FAO (recently adopted in Kenya) the quality of the data could improve.

177. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-34_Rev1 that provides details on the status of data collection and fishery statistics systems of the Sultanate of Oman, as well as additional background on the recent sharp increases in catches reported to IOTC and FAO (no abstract provided).

178. The WPDCS **THANKED** Oman for the overview describing the status of the national fisheries data collection procedures, **NOTING** that Oman has undertaken in recent years a deep review of their statistical processes, following an increase of internal resources allocated to these tasks, and the workshops and training sessions provided by different experts, including the workshop on IOTC Data Reporting Requirements delivered by FAO and IOTC experts in September 2019.

179. The WPDCS **ACKNOWLEDGED** that the introduction by Oman of new and improved data collection schemes for fishing effort is considered to have significantly enhanced the accuracy and reliability of the system and that these schemes have contributed to eliminate ambiguities related to site types, resulting in more dependable Probability of Boat Activity (PBA) estimates.

180. The WPDCS **NOTED** that additional measures have been implemented, i.e., separation of landings and effort surveys, adoption of new electronic templates, enhancements of internal databases, increased flexibility for small and large vessels to adopt digital-based data collection systems, improved accuracy and bias reduction, and efficiency gains for data collectors.

181. The WPDCS **NOTED** that the Omani industrial fishing vessels are equipped with VMS and e-logbooks following the IOTC regulations and are able as such to collect reliable data on fishing activities.

182. However, the WPDCS **NOTED** that no geo-referenced catch and effort data have been reported to the Secretariat for the industrial fisheries of Oman since 2009, and therefore **URGED** Oman to make the necessary arrangements to submit catch and effort data to the IOTC for both artisanal and industrial fisheries, including historical time series where possible.

183. In parallel, the WPDCS **ACKNOWLEDGED** the generalized increases in catches for several species, **NOTING** how for those of relevance to the IOTC and with non-negligible catches in 2014, the difference with catches reported for 2021 are particularly marked for yellowfin tuna (+842%), Indo-Pacific sailfish (+155%), longtail tuna (+152%), and kawakawa (+82%).

184. The WPDCS further **NOTED** that the increase in catches includes not only tuna and tuna-like species, but also catches of small pelagics, including Indian oil fish and *Jacks and trevallies nei* (*Caranx spp*), increasing Oman's total marine water catches by 165% from 348,000 t in 2017 to 922,000 t in 2021.

185. The WPDCS **NOTED** that the recent increases in catches highlighted by the Secretariat and FAO were not linked to changes in the structure of the fleet and might be explained by several factors that include the aforementioned improvements in the data collection and statistical systems (implemented from 2017 onwards) combined with the collection of auxiliary data related to purchases made by fish factories and companies from local fishers, allowing Oman to improve the monitoring of catches from small and large pelagics, including tuna species.

186. In addition, the WPDCS **NOTED** that production levels have increased due to several developments in Oman's fisheries in the Arabian Sea, including vessels targeting tuna and small pelagic species (notably, sardines) and specifically:

- the development of markets for fish meal and oil factors established since 2016, resulting in catches of Indian oil sardines (*Sardinella longiceps*) increasing from 94,000 t in 2016 to over 440,000 t in 2021 (Source, FAO)
- changes in targeting by fishing communities in Al Wusta Governorate, again due to the emergence of new commercial markets
- increased fishing activity (and associated higher catches) by coastal fleets operating within the Arabian Sea, due to the slowdown in fishing pressure in the Yemeni waters.

187. The WPDCS further **NOTED** that the increased catches reported by Oman for yellowfin tuna caught with handlines might be the result of natural fluctuations in the commercial catch rates due to the migratory nature of the species, although trends in standardized longline CPUEs at the larger scale of the northwestern Indian Ocean do not support changes of the same magnitude (IOTC-2021-WPTT23(DP)-14).

188. **NOTING** that the increase in Oman's official catches – particularly since 2017 – are partly an artifact of improvements in the data collection and monitoring of landings, rather than entirely due to an actual increase in production, the WPDCS **REQUESTED** that Oman consider revising the historical catches not only for yellowfin tuna, but also for all other key tuna and non-tuna species (e.g., longtail tuna, Indian oil sardines, *jacks and trevallies*, etc.) which account for a significant proportion of total catches, further **REQUESTING** that an update be provided at the next WPDCS meeting.

189. The WPDCS **RECALLED** how the Secretariat is instructed by the IOTC WPs, SC, and Commission on what to investigate and when to seek clarifications from CPCs on major catch fluctuations (including both increases or decreases) as well as revisions to historical catches submitted by CPCs.

190. The WPDCS **ACKNOWLEDGED** that this is true for all species and not only extremely sensitive ones (such as yellowfin tuna), to ensure the integrity of the publicly disseminated IOTC best scientific estimates of retained catches and and guarantee the scientific rigour of stock assessments that are driven by the trend in catches.

191. The WPDCS also **NOTED** that Oman stills needs to provide further information on the implementation measures recommended by the compliance and support mission on IOTC Data Reporting Requirements that was delivered by FAO and IOTC experts in September 2019, and that Oman is committed on continuing to improve their data collection and statistics system with the assistance of experts and eventually to report the results to the FAO and IOTC at the next WPDCS.

192. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-INF04 that provides an overview of the development of Fisheries Information Platforms (FiPs) to further improve fisheries data management and statistics for Tanzania (no abstract provided by the authors).

193. The WPDCS **CONGRATULATED** Tanzania for the new initiative implemented by the Deep-Sea Fishing Authority to centralize all data reporting and how this will increase the efficiency in reporting quality information, **ACKNOWLEDGING** the progress made to improve the data collection, which will affect not only the reporting for coastal fisheries, but also from their developing industrial fisheries.

194. The WPDCS **NOTED** the different management systems and acts governing the fisheries in the EEZ of Tanzania, **ACKNOWLEDGING** how the lack of coordination between departments in mainland Tanzania and Zanzibar has impacted the effective management of the Tanzanian fisheries.

195. The WPDCS **NOTED** the complexity of Tanzania's conventional data collection system, which requires more paperwork and manual input than the new system, and how this was extremely time-consuming, considering the diverse types of small-scale fisheries and the varied sizes of the Tanzanian landing sites.

196. The WPDCS **ACKNOWLEDGED** the new electronic data collection system, whose implementation started in 2017, and how this supports data collection through mobile phones with information directly sent into a cloud platform, **NOTING** that this provides more flexibility and helps generating the various reports required by the stakeholders Tanzania is engaged with, including the IOTC.

197. The WPDCS **NOTED** that over 200 data collectors use the new FIP, collecting data from the coast of Tanzania as well as from the lakes.

198. The WPDCS **ACKNOWLEDGED** that the Secretariat will continue to work with Tanzania, especially to re-estimate their historical catches which have been repeated in the IOTC database for several years and are misaligned with the new estimates.

199. In this regard, the WPDCS **NOTED** that a data compliance and support mission to Tanzania is planned for early 2024 as a follow up to the mission delivered in July 2023.

200. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-INF05 that provides an overview of the data collection, monitoring, and assessment of India's marine fishery resource (no abstract provided by the authors).

201. The WPDCS **CONGRATULATED** India for the detailed presentation of their comprehensive data collection systems currently in place for the monitoring of fisheries while **NOTING**, however, long-standing issues with the reporting of India's data to the FAO and the Secretariat, and that in the case of IOTC, no data have been submitted for 2022, while data for previous years were not fully reported according to IOTC standards in terms of geo-referenced catches and fishing effort by gear type and fishing area.

202. The WPDCS **NOTED** that the sampling strategy implemented by India is based on geographical areas referred to as *fishing zones*, and by landing sites, and that geo-referenced catch and effort data of Indian artisanal fisheries could then be reported to the IOTC with a higher spatial resolution than historically reported.

203. Consequently, the WPDCS **ENCOURAGED** India to report their future (and historical) georeferenced fisheries data using the geographical areas that best represent the fisheries concerned, in line with Res. 15/02 (para. 4c) and liaise with the Secretariat to provide the boundaries of these areas.

204. The WPDCS further **NOTED** that India has not submitted data to FAO for the last ten years, despite the repeated requests by FAO on this matter.

205. Given the importance of India in terms of the contribution to global catches of tuna and tuna-like species – ranking as the third largest capture producer in the Indian Ocean – and on-going issues with the regular reporting of data, the WPDCS **URGED** India to ensure that data are submitted to FAO and IOTC as a matter of priority.

206. The WPDCS also **NOTED** inconsistencies in the official catches of tunas disseminated in CMFRI's publication "*Marine Fish Landings in India"* and the official catches submitted by India to the Secretariat, and **ACKNOWLEDGED** this might be due to the process by which IOTC catches are compiled by CMFRI in collaboration with the Fisheries Department of State Government/Union Territories.

207. However, the WDPDCS **NOTED** that this can potentially lead to confusion and inconsistencies perceived by some users, including organizations such as FAO that extract information from CMFRI's publication in the absence of formal data submission by India.

208. The WPDCS **NOTED** the multiple languages used to identify species in the application tool from India, further **NOTING** that the field observers are experts in identifying species and provide the taxonomy and photo for further confirmation if unsure of species identity.

209. **NOTING** that the official estimation of catches for Indian artisanal fisheries appears to rely on a solid statistical foundation, the WPDCS **ACKNOWLEDGED** that the re-estimation of the composition of the catch by gear performed since the 2000s by the Secretariat to account for some historical inconsistencies in the data (IOTC–2012–SC15–38) may need to be revisited, **ENCOURAGING** India to closely work with the Secretariat to review the current methodology in use.

210. The WPDCS **NOTED** the large fluctuations in retained catches of yellowfin tuna in Indian artisanal fisheries as available for the period 2015-2020, which could be due to the complexity of the fisheries that are composed of thousands of boats and to the highly migratory nature of this species.

## 6.2. Overview of data processing procedures and proposed revisions of historical data

211. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-21 on a third draft report describing a proposal for a new re-estimation methodology of Indonesia's annual tuna catch data in the IOTC for 2010-2020, with the following abstract provided by the authors:

> *"Catch data is essential in building a robust fisheries management strategy. However, in some Regional Fisheries Management Organization (RFMO) e.g., Indian Ocean Tuna Commission (IOTC), such data needs to be tailored due to several reasons, for example, inter-annual variation in reported catches by species,*

*gear and fleets. However, such method often creates a distinguishable discrepancy between national catch data presented in the country's national report and those presented in the IOTC datasets. Similar to what happened in Indonesia, in particular affecting the yellowfin tuna catch. The re-estimation process by Secretariat produced 40% less catch than what Indonesia's initially reported and currently under scrutiny. Since the yellowfin tuna stock in IOTC was under pressure in the last five years, catch reduction was an inevitable solution for guiding it back into recovery. Nevertheless, if the new re-estimated data were to be used as the basis for catch reductions this would not reflect the real situation bearing in mind that the Indonesia waters is the largest ocean area and fishing capacity among IOTC members. Indonesia appreciates the effort taken by Secretariat to work with Indonesia on developing a new methodology based on the best data available from the robust logbook to produce data catch for the period of 2010-2021. Both parties agreed that the current re-estimation methodology was somewhat confusing and based on obsolete study, thus an updated version with more recent and robust datasets is imminent. Seven-sessions assistance meeting (virtual and physical) with the IOTC staffs were held during 2021-2023 to follow up the WPDCS recommendation and the SC. This report provided an in-depth study on how to conduct recalculation on the Indonesian tuna datasets with emphasizing on using a reliable data source and minimizing the uncertainties. In the wake that this approach will be approved as the foundation for estimating Indonesian catches for the 2010–2021 periods."*

212. The WPDCS **NOTED** the diagram explaining the process to estimate catches by gear and species for the three different components of Indonesian fisheries, i.e., 1) vessels less than 5 GT (for which logbook are unavailable), 2) vessels above 5 GT, less than 24 m in length overall and exclusively operating in areas under national jurisdiction, and 3) all other vessels (i.e., above 5 GT, and over 24 m in length overall or operating in areas beyond national jurisdiction).

213. The WPDCS **ACKNOWLEDGED** the different sources of information used to estimate the gear / species composition for the three components above, and **NOTED** how to estimate the species composition of the first component, the information used is the same producing the *official* data reported by Indonesia through form 1-RC (i.e., data collected by the statistical teams operating at provincial / regional / national level) whose accuracy was originally questioned by the IOTC Scientific Committee in the past.

214. The WPDCS also **ACKNOWLEDGED** that data from the landing sites collected by PIPP are used to estimate the species composition of only a fraction of the fisheries, i.e., those employing vessels between 5 and 30 GT.

215. The WPDCS **RECALLED** the advice from the Secretariat to assess the quality and comprehensiveness of the species composition emerging from the logbook data by cross verifying this information with the PIPP data for the same vessel and trip and **SUGGESTED** that Indonesia further consider this approach (and the derived results) in their estimations.

216. The WPDCS also **NOTED** some inconsistencies in the re-estimated catches of several species for the year 2018, which present marked spikes in catches (either positive or negative) compared to the rest of the time series, and **QUERIED** Indonesia for an explanation of this behaviour, **ACKNOWLEDGING** that this is due to an error in the input data / estimation procedure.

217. Furthermore, the WPDCS **NOTED** that the re-estimation performed by Indonesia reduces sensibly the annual catches of the 16 IOTC species compared to what originally provided, to the point that catches of '*Other species*' (not elsewhere qualified) now reach annual amounts of several tens of thousands of metric tonnes.

218. The WPDCS **RECALLED** that catches from '*Other species*' were generally negligible in the official catches submitted by Indonesia to the IOTC through form 1-RC and **SUGGESTED** that Indonesia further investigates this issue which could be caused by potential bias in the species composition emerging from the logbooks, especially in years were these had poor coverage.

219. Overall, the WPDCS **ACKNOWLEDGED** the progress accomplished by Indonesia and **ENDORSED** the general methodology proposed.

220. The WPDCS **NOTED** the improvements made in the quality of the estimated data (e.g., reduction in volatility for some species such as bullet tuna and blue shark) and **ACKNOWLEDGED** that the updates of official catches better reflect the status of the catches in Indonesian fisheries as they provide an accurate separation of artisanal and industrial fisheries according to IOTC definitions.
221. Nevertheless, the WPDCS **NOTED** that there are still issues in some of the species-specific reconstructed historical time-series of catches (2010-2021) that require further analysis, and in particular: i) large inter-annual fluctuations, ii) discrepancies in scaling, and iii) potential errors in the input data used for some years (e.g., 2018) (**Fig. 1**).


**Figure 1**: Differences in total annual retained catches (metric tonnes; t) by species between the re-estimation produced by Indonesia (ESTIMATIONS) and the IOTC best scientific estimates (IOTC) for the 16 IOTC species

222. The WPDCS **ENCOURAGED** Indonesia to identify the root causes explaining the identified issues and seek support from the Secretariat to further progress on their resolution.
223. The WPDCS **RECOMMENDED** that the SC provide general guidance on addressing the following points:
    - issues of continuity with the historical time series of catch (pre-2010) which might affect the stock assessments and would require some inter-calibration;
    - current differences between revised official national catch statistics and scientific best estimates used for supporting the IOTC science process and decision-making.
224. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-22 on the attempt at reconstructing the species composition of neritic and seerfish species caught by Thai purse seiners in the Andaman Sea, with the following abstract provided by the authors:

    *"Neritic tunas and seerfishes in the Andaman Sea of Thailand are caught by small-scale purse seiners. There are four species of neritic tunas, i.e., longtail tuna (Thunnus tonggol), Kawakawa (Euthynnus affinis), frigate tuna (Auxis thazard) and bullet tuna (A. rochei), and two species of seerfish, i.e., Indo-Pacific king mackerel (Scomberomorus guttatus) and narrow-barred Spanish mackerel (S. commerson) caught by the*

*purse seiners. The neritic tuna and seerfish catch data are annually submitted to the Secretariat. However, there are some major discrepancies between the species composition of the annual retained catches (reported through form 1RC) and the geo-referenced catches (reported through form 3AR). In addition, there are some species aggregates that were reported in the geo-referenced catches, e.g., species code AG06, standing for a mix of Kawakawa, frigate, and bullet tuna and a mix of Indo-Pacific king mackerel and narrow-barred Spanish mackerel. This paper aims to reconstruct the species composition of neritic tuna and seerfish by using monthly port sampling information. The mixed neritic tuna and seerfish catches were disaggregated back to 2006 by month while the total catches remained the same as previously reported. The form 1RC and form 3AR were corrected and will be submitted to the IOTC secretary."*

225. The WPDCS **CONGRATULATED** Thailand for the effort to reconstruct the neritic species composition caught by small-scale purse seine fisheries in the Andaman Sea for the period 2006 to 2017, **NOTING** that in past only two small tunas and one seerfish species were reported, while the small-scale purse seine fisheries are catching all six neritic species.

226. The WPDCS **ACKNOWLEDGED** Thailand's effort to respond to the WPNT13 requests for reconstructing and improving the individual species reported in the past data promptly.

227. The WPDCS **NOTED** that the past Thai statistical system only recorded major species, and merged the data for other species, **NOTING** that with the current system the total number of species from Thailand fisheries statistics books increased from 66 (before 2016) to 71 species.

228. The WPDCS **ACKNOWLEDGED** that the small-scale purse seine fisheries of Thailand only operate close to shore, and that AFADs are sometimes used by these vessels, further **NOTING** that Thailand vessels used the same net for catching small and large tunas either on free-schools or on schools associated with AFADs.

229. The WPDCS also **NOTED** that although most of the vessels operate in a free-swimming school, Thailand can track the fishing modes of the small-scale purse seine fisheries to split the catches accordingly.

230. The WPDCS **ENCOURAGED** Thailand to review the catches of other species, particularly Indo-Pacific sailfish, which are sampled from its purse seine fisheries, however, no retained catch was reported.

### 6.3. Main challenges encountered in reporting mandatory statistics to the Secretariat

231. The WPDCS **NOTED** that issues still persist for several CPCs in reporting fishery statistics data to the Secretariat in agreement with the format and requirements set forth by the IOTC Resolutions and **RECALLED** that a regional workshop specifically dealing with this topic will be delivered during Q1 and Q2 2024.

## 7. Global fisheries information systems and data management best practices

232. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-23 on updated results on the implementation of the FAO matrix approach for the characterization of selected IOTC fisheries.

233. The WPDCS **NOTED** the ongoing effort to test the implementation of the matrix, which has been initiated in 2021 with 6 volunteering CPCs, resulting in 47 fishing units identified.

234. The WPDC **NOTED** that two online workshop sessions were organised by the Secretariat with participants from eight CPCs to discuss the methodology of the matrix and trial its adoption to describe national fisheries.

235. The WPDC **NOTED** that although the number of fishing units included as of today in this study is insufficient to represent the complexity and diversity of active IOTC fisheries, this exercise enabled the characterisation of several fishing units for which no information on fishing crafts had been previously reported.

236. The WPDC **NOTED** that the reporting of fishing crafts statistics remains voluntary, but according to the available information presented by various CPCs in relation to their national data collection systems strongly ENCOURAGED CPCs to provide this information to the Secretariat until Res. 15/02 is revised accordingly.

237. The WPDCS **ENCOURAGED** the implementation of the matrix approach to be further extended to cover all CPCs, with the objective of an optimal separation between small-scale, coastal, and industrial fleets, which will enhance the quality of reported catch data.

238. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-33 on the status of the Seychelles Digital Ocean Atlas (SDOA) in 2023, with the following abstract provided by the authors:

> *A broad range of oceanographic and environmental conditions and processes influence marine ecosystems and fisheries. The Seychelles Digital Ocean Atlas (SDOA) is designed to provide to an easy access to information on the marine environment. The datasets associated to this first version include ocean numerical models (since 1993) and satellite sea colour (since 1997). An interactive web interface allows the user to generate maps, time series, transects, space-time and vertical plots of thirteen variables (seven physical and 5 biogeochemical variables, and the GEBCO seafloor topography) that are included in this version. The SDOA area stretches over an area of 5.2 million km² including the Seychelles Exclusive Economic Zone and neighbouring regions (5°N to 13°S, 41°E to 70°E). The SDOA system is flexible as it can easily include new variables (gridded or discrete) without huge development effort. The SDOA is also fully expandable to other regions, as the code and users interface can be applied to other NetCDF datasets generated specifically for other study areas. Eventually, the SDOA can provide useful information in a blue economy context.*

239. The WPDCS **NOTED** the progress achieved through a live demo from the SDOA web site during the presentation.

240. The WPDCS **NOTED** that the R scripts developed for the atlas would be shared in open access, and that the source of the datasets, prior to resizing to the study area, remains the European Copernicus Marine Service that offers free access to ocean models products and satellite observations, all being fully validated products.

241. The WPDCS **EMPHASIZED** the relevance of an ocean atlas for the IOTC in the context of Res. 22/01, further stressing the importance of considering the potential impacts of climate change and trends on tuna stocks and fisheries.

242. The WPDCS **ACKNOWLEDGED** that the SDOA is a generic platform, currently applied to the Seychelles EEZ and neighbouring waters, that can be easily extended to other/wider regions, **NOTING** however that this will require resources to maintain, manage and update the underlying datasets.

243. **ACKNOWLEDGING** the potential benefits of a climate-ocean web portal for the SC and its Working Parties, the WPDCS **RECOMMENDED** a scoping study into how ocean-climate information (as shown through the initiative of the Seychelles Digital Ocean Atlas and through the various indicators presented in paper IOTC–2018–WPDCS14–36) could be developed and made available by the IOTC, including how this information would be presented to the SC and its working parties.

244. The WPDCS also **NOTED** that this scoping study should also consider the resources needed to develop online ocean-climate indicators for the IOTC area of competence.

245. The WPDCS **NOTED** that the project is collecting data from 1993, which shows the variation in the distribution patterns of the temperature as partly driven by the Indian Ocean dipole and the El Nino Southern Oscillation (ENSO) and **ACKNOWLEDGED** that this information would be useful, particularly for tropical tuna stock assessment, and the Secretariat is analysing the possibility of incorporating the information in the assessment.

246. The WPDCS **NOTED** that there should be a page on the website dedicated to climate data with the increased information collected, **ACKNOWLEDGING** that the data could be integrated with the atlas and are fully calibrated.

# 8. Regional Observer Scheme

## 8.1. Updates on the status of the ROS and its Pilot Project

247. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-10 regarding updates on the implementation of the IOTC Regional Observer Scheme and its Pilot Project.

248. The WPDCS **RECALLED** the new Res. 22/04 *On a Regional Observer Scheme* which was adopted by the Commission in 2022 and which supersedes Res. 11/04.

249. The WPDCS **NOTED** an overview of the data that have been submitted as part of the ROS, further **ACKNOWLEDGING** that more information has been submitted than what has been currently included in the ROS database, due to some CPCs reporting data through non-standardised formats which cannot easily be extracted and processed.

250. The WPDCS **NOTED** the summaries of the provision of ROS data by fishing method and CPC highlighting that many CPCs have never provided ROS data or have extremely low coverage.

251. The WPDCS **ACKNOWLEDGED** that some CPCs are submitting observer data collected by EMS and considering the adoption of Res. 23/08 *On Electronic Monitoring Standards for IOTC fisheries* **AGREED** it would be useful to indicate the observer coverage by different observation methods (i.e., EMS vs human onboard observers) in the observer coverage table.

252. The WPDCS also **NOTED** that it might be useful to break down the coverage statistics such that they indicate also if all mandatory ROS data fields have been provided.

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

254. In general, and with few exceptions, the WPDCS **NOTED** with concern that the estimated 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 ~60%, 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%).

255. The WPDCS **NOTED** that Res. 22/04 specifies that observer coverage should be estimated by comparing the number of observed operations/sets with the total reported operations/sets by each CPC.

256. However, the WPDCS **NOTED** that when estimating the level of observer coverage for certain CPCs it was necessary to use alternative units of effort such as fishing days or hooks deployed due to these being the default (or most common) units for the reporting of effort data to the Secretariat according to Res. 15/02.

257. The WPDCS **NOTED** that Res. 22/04 explicitly calls for CPCs to endeavour to send observer data in an electronic format that is suitable for automated data extraction.

258. The WPDCS **RECALLED** that suitable formats for the submission of ROS data to the Secretariat are:

- the ROS structured data reporting format, i.e., .**ros** files produced by the ROS e-collection tool and managed by the ROS national databases
- the ROS *tabular* data reporting format, i.e., **.xlsx** files comprising by a pre-agreed, gear-dependent set of MS Excel worksheets for those CPCs that already have proprietary ROS data management systems already in place.

259. The WPDCS **RECALLED** that the Secretariat had *temporarily* accommodated for the submission of ROS data through other proprietary formats such as the ICCAT ST09 forms or the JPN observer data format and

**ACKNOWLEDGED** that these will not be accepted anymore as they do not comply with the ROS minimum data requirements and necessitate of additional effort to be processed.

260. The WPDCS **ENCOURAGED** all CPCs that have implemented scientific observer programmes in their fisheries in years between 2018 and 2022 to verify that the summarised information accurately reflects their status of development, implementation, and reporting of the ROS.

261. The WPDCS also **NOTED** the overview provided of the outcomes of the ROS Pilot Project including:

- Observer training program and standards
- Observer database development and historical data collation
- Electronic monitoring system trials
- Observation in port and port sampling
- ROS data provision and observer coverage

262. With respect to the ROS Pilot Project, the WPDCS **NOTED** that the continuation of trials in developing coastal states will be dependent on Commission's priorities and funding.

263. The WPDCS further **NOTED** that the Sri Lanka trial encountered issues related to both the cost of equipment and skipper training and technical challenges including power supply and vessel vibrations impacting the recording of information and that however, trials are continuing and will be reported to WPDCS in the future.

## 8.2. Electronic Monitoring Systems in support of the IOTC ROS

264. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-24 presented by the Chair of the WGEMS, which summarises the main outcomes and outputs of the 3rd Session of the WGEMS (2023).

265. The WPDCS **NOTED** that following the recommendations from WGEMS and SC23, the Commission at its 28th meeting (May 2023) adopted Res. 23/08 *On Electronic Monitoring Standards for IOTC Fisheries*, including: i) the terms and definitions of EMS, ii) EM Program Standards, and iii) EM System and Data Standards as per IOTC SC recommendation, that allows CPCs to meet the minimum ROS data requirements under Res. 22/04 using EMS.

266. The WPDCS **NOTED** that Res. 23/08 also requests the SC to review, no later than 2024, the ROS minimum required data fields to:

- Identify any fields that are logistically difficult for EM and/or human observers to collect, respectively.
- Provide advice and recommendations to the Commission on the need and use of those identified fields for scientific purposes, and their collection and reporting status (i.e. mandatory, non-mandatory etc.)
- Discuss and provide advice to the Commission on the potential need to develop a separate EM ROS minimum data field list.

267. The WPDCS **NOTED** that some of the ROS data fields might be potentially outdated or no longer relevant to the Commission's scientific and management needs, or cannot be adapted to accommodate EMS, or are difficult to be collected by human observers.

268. Therefore, the WPDCS **AGREED** that a review of all the ROS fields is required to determine what fields are needed for scientific purposes (to inform management) including their collection/reporting nature (e.g., mandatory, or not).

269. The WPDCS **DISCUSSED** whether it is necessary to expand the requirement of Res. 23/08 for EMS to provide a fleet-level ROS data collection table, including the data collection method used to collect each ROS minimum required data field and **AGREED** to have this discussion intersessionally, during the required for the revision of the ROS data fields.

270. The WPDCS **NOTED** that the terminology used to describe observers onboard, which currently uses the term *human* observers, should be reviewed in the resolution, and updated to *onboard* observers instead.

271. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-25 which assesses the feasibility (and challenges) of collecting EMS data on French purse seiners in relation to the IOTC ROS minimum standards, with the following abstract provided by the authors:

*"During the last years, Electronic Monitoring Systems (EMS) have been progressively tested and implemented in tuna fisheries as a complementary tool for scientific observer programs. All tuna Regional Fisheries Management organizations (t-RFMOs) are now developing minimum standards that can be used as guidelines to fulfil specific fisheries management resolutions in each area of competence including Regional Observer Scheme (ROS) requirements. The first EM standards for Indian Ocean Tuna Commission (IOTC) were discussed in WGEMS meetings and were adopted this year based on previous RFMOs and countries experiences. Each tuna fishery willing to use EMS including purse seiners in the Indian Ocean is now invited to follow the minimum standards for data collection that were proposed in the new Resolution 23/08. However, with the diversity of fisheries, vessels configuration, programs advancement and the limits of the method itself, EM minimum standards monitoring goals (which are initially based on ROS onboard observation programs) are sometimes challenging to fulfil. The aim of the present document is to review the French purse seine EMS program and to discuss the feasibility and challenges to comply with the minimum standards for scientific data collection on tropical purse seine fleets of the Indian Ocean. This document reports on the shared experience of scientists, fleet managers, EM analysts and EM providers with the current EM installation covering the French tropical tuna purse seine fleet. Here, we review each ROS scientific fields against the ability of the vessel EM configuration to collect the information. This includes data collection on fishing activity, discards and handling and release of ETP species that is currently undertaken routinely and data collection on retained catches and FAD activities that is currently in test. Lessons learned from past experience are used to identify minimum standards that can be collected via EMS with sufficient data quality for IOTC data collection from those that might demand improvement or alternative data collection methods."*

272. The WPDCS **CONGRATULATED** the authors on the excellent and informative study and **DISCUSSED** the relative strengths and weaknesses of EMS versus onboard observers in purse seine fisheries concluding that both are complementary.

273. The WPDCS **NOTED** that a key advantage of EMS was its ability to collect data simultaneously on the lower and upper decks when onboard observers can cover only one of these, and the advantage of EMS to record discarding of bycatch including shark species.

274. The WPDCS **NOTED** how the study found that current EM systems could be used to monitor most of the ROS data fields while could not be well suited to collect other types of data (e.g., species composition of catch, biological sampling, etc.).

275. The WPDCS **ACKNOWLEDGED** that the activities of the observer were modified to meet the objectives of the EMS study and as such did not represent a typical observer trip.

276. The WPDCS **AGREED** with the conclusion from the paper to maintain the IOTC WGEMS in the long-term as the implementation of an EM program, including the collection of the ROS minimum data standards, is a challenging process and will require continuous adaptation of the EMS in use.

277. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-26 which provides consideration on the correspondence between EMS and ROS standards, with the following abstract provided by the authors:

*"This document was prepared for partially respond the item 5 of the IOTC Resolution 23/08 on Electronic Monitoring Standards for IOTC Fisheries, requesting the Scientific Committee to review the ROS minimum required data fields a) to identify any fields that are logistically difficult for EM and/or human observers to collect, respectively, and b) provide advice and recommendations to the Commission on the need and*

*use of those identified fields for scientific purposes, and their collection and reporting status (i.e. mandatory, non-mandatory etc.) The comparative consideration between EMS and ROS was only made on monitoring/ observation of longline fishing events, with special focus on data and information needs for conducting scientific analysis on bycatch and ecosystem-related issues. The document reflects personal views as a scientist and does not represent and presume any formal position of the Government."* (full abstract is provided with the paper)

278. The WPDCS **NOTED** the advantage of EMS in allowing observation of longline vessels that are not suitable or safe for placement of onboard observers and the ability of EMS to gain excellent coverage of catch and effort information across a fleet.

279. The WPDCS **NOTED** that the ability of EMS to collect required data fields is likely to improve over time because of technical innovations, and that EMS can be made more effective through the implementation of EM-specific rules for the fishers.

280. For example, the WPDCS was **INFORMED** about an EM program in which, if a deceased protected species (e.g. seabird) is found, the crew is required to hold it in view of the camera to facilitate species identification otherwise EMS might not perform well to identify the seabirds at the species level.

281. The WPDCS also **NOTED** that the combination of tools used by CPCs to meet ROS mandatory data requirements (e.g., EMS, onboard observers, or port sampling) will vary between fleets and should be tailored to each type of fishery (coastal vs. industrial).

282. The WPDCS **NOTED** that coastal-based longline fleets with EMS doing relatively short trips might more easily utilise alternative sampling methods (e.g., post-trip port sampling) to collect biological, size measurements, and gear information, and **ACKNOWLEDGED** that the same might not be possible for larger vessels that are at sea for months at a time.

283. The WPDCS **NOTED** that EMS has significant potential for use for compliance purposes as well as scientific purposes.

284. Considering all the above, the WPDCS **RECOMMENDED** that an intersessional working group is organised (by correspondence or through online meetings) to convey interested WPDCS and WGEMS participants and review:

- the scientific need for each ROS data field proposed by the 2018 ROS expert WS report;
- ROS data fields collection and reporting status (e.g., mandatory/optional, etc.);
- potential specific EMS fields to be added to ROS mandatory requirements; and
- summarise the capabilities, and advantages and drawbacks to collect ROS data fields across gears by different alternative methods (e.g., EMS, human onboard observers, self-reporting, port sampling) and a combination of those.

and further **REQUESTED** that this group report to the next sessions of the WGEMS and WPDCS.

# 9. Capacity building activities: data collection and processing in coastal countries

285. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-08 on IOTC capacity building activities in support of developing coastal States.

286. The WPDCS **THANKED** the 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.

287. The WPDCS **NOTED** that the Secretariat delivered an in-person mission to Indonesia in March 2023, followed by several online workshops, and **ACKNOWLEDGED** that these were instrumental to further progress on improving catch re-estimation for Indonesian fisheries.

288. The WPDCS **NOTED** that the Secretariat delivered an in-person mission to Tanzania in July 2023 and that a further mission is planned to the first quarter of 2024 to continue supporting the improvement of data collection and reporting statistical data to the Secretariat.

289. The WPDCS **NOTED** that the Secretariat delivered online workshops on the characterization of IOTC fisheries using the FAO matrix approach, which have the participation of 10 CPCs, **THANKING** these CPCs for their presence and strongly **ENCOURAGING** them to follow-up in completing the matrix.

290. The WPDCS also **NOTED** the tentative list of data compliance and support missions drafted by the Secretariat for 2024, that includes Bangladesh, I.R. Iran, Oman, Kenya, Indonesia, and Pakistan among others, and **ACKNOWLEDGED** the rationale and objective of each activity **RECALLING** how their effective delivery will still depend on the possibility of safely travelling across the identified target countries.

291. The WPDCS **ACKNOWLEDGED** that funds from the IOTC-EU project, covering the biennium 2023-2024, OFCF, UK government and IOC (EcoFish) are available to support various capacity building activities such as:

- Conducting regional technical workshops on data reporting procedures, including the use of online validation tools, to improve the extent and quality data reported to the Secretariat
- Assessing and reviewing data collection systems of artisanal fisheries for some priority CPCs with consistent issues or lack of proper systems (e.g., Tanzania, Indonesia, India, and Somalia)
- Assisting CPCs with under-sampled fisheries to enhance sampling coverage and improve data collection (e.g., Bangladesh, Kenya, Madagascar)
- Improving data collection, reporting, and management of Regional Observer Scheme data
- Assessing the need and best methods for the reconstruction of historical time series of catch for CPCs with historical data quality issues (e.g., Pakistan, Tanzania, Comoros, Mozambique).

292. The WPDCS **THANKED** the EU for their continuous interest in supporting the work of the IOTC, and for contributing to the delivery of important capacity building activities beneficial to coastal states.

293. The WPDCS also **THANKED** OFCF, the UK government, and IOC for their support, which will aid delivering the activities of data section.

294. **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 prioritising those activities that focus on data collection and management of artisanal and small-scale fisheries.

295. The WPDCS **THANKED** the government of Oman for proposing to hold one of the regional technical workshops on data reporting processes, **NOTING** that the Secretariat will follow-up with Oman for confirmation.

296. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-27 which provided updates on the status of implementation of the IOTC-OFCF project during JFY2023 and on potential activities to be delivered during JFY2024.

297. The WPDCS **NOTED** that OFCF provided support to translate IOTC species ID guides in Bengali and Hindi, and that more translations are expected to be finalized during JFY2023, and **THANKED** OFCF for their continuous support on this important activity.

298. Furthermore, the WPDCS **ACKNOWLEDGED** the work done by OFCF on the scoping study on Electronic Data Collection Tools (EDCTs), providing an overview of various EDCTs applications in the region, **NOTING** that the study will provide knowledge of the EDCT applications adopted by coastal CPCs and, at the same time, identify CPCs in need of assistance for data collection.

299. The WPDCS **NOTED** that OFCF has been collaborating productively with the Secretariat for over 20 years and **ACKNOWLEDGED** 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.

300. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-29 which presents a proposal for a technical data workshop to support the reporting of fisheries statistics to the Secretariat.

301. The WPDCS **NOTED** that the aim of the workshop will be to provide guidance in using the new IOTC forms and successfully implement the *ad interim* data reporting workflow, as well as help CPCs familiarize with the IOTC reference data catalogue and fisheries identification wizard, which are tools developed by IOTC data section to improve data reporting for all fleet segments in accordance with the requirements of the IOTC CMMs.

302. The WPDCS **NOTED** that the workshop will be held in two sessions, one for the western and one for the eastern Indian Ocean, supported with funds from the UK and the IOTC-EU project for the biennium 2023-2024.

303. The WPDCS **NOTED** that the workshop sessions are planned for the first and second quarter of 2024, but dates and location are still pending of confirmation.

304. The WPDCS **NOTED** that the quality of reporting of fishery data continues to fundamentally affect the stock assessments and management of IOTC species and therefore, the WPDCS **AGREED** to hold data reporting workshops (either in person or remotely) every year before the mandatory statistical reporting deadline to ensure that CPCs can provide the best possible data for upcoming stock assessments.

# 10. WPDCS program of work

## 10.1. Revision of the WPDCS program of work 2024-2028

305. The WPDCS **NOTED** paper IOTC-2023-WPDCS19-09 which provides an opportunity to discuss and revise the WPDCS Program of Work (2024-2028), by considering the specific requests of the Commission, Scientific Committee, and the resources available to the Secretariat and CPCs.

306. 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)

307. The WPDCS **RECALLED** that the Chairperson and Vice-Chairperson of the WPDCS shall consult with the Secretariat to develop Terms of Reference (TOR) for each of the high priority projects that are yet to be funded, for circulation to potential funding sources.

308. The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2024-2028), as provided at Appendix V.

# 11. Other business

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

***Chairperson***

309. The WPDCS **NOTED** that the first term of the current Chairperson, Dr Julien Barde (EU,France) expired at the end of the WPDCS19 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.

310. **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 (EU,France) was nominated, seconded, and elected again as Chairperson of the WPDCS for the next biennium.

***Vice-Chairperson***

311. The WPDCS **NOTED** that the first term of the current Vice-Chairperson, Dr Nuwan Gunawardane (Sri Lanka) expired at the end of the WPDCS19 meeting and, as per the IOTC Rules of Procedure (2014), participants are required to elect a new Vice-Chairperson of the WPDCS for the next biennium.

312. **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 Nuwan Gunawardane (Sri Lanka) was nominated, seconded, and elected again as Vice-Chairperson of the WPDCS for the next biennium.

## 11.2. Date and place of the 20th and 21st Sessions of the WPDCS: 2024 & 2025

313. The WPDCS **NOTED** that its 19th session was held as a hybrid meeting (in-person / online) thanks to the almost complete lifting of the travel restrictions for most of the IOTC countries.

314. The WPDCS **AGREED** that the working party should continue to be held back-to-back with the SC, as usual, and therefore **ACKNOWLEDGED** that the exact dates and location of its 20th session will depend on whether CPCs will express their interest in hosting the next session.

**Table 4.** Draft meeting schedule for the WPDCS (2024 and 2025)

| Meeting | 2023 | | | 2024 | | |
|---|---|---|---|---|---|---|
| | No. | Date | Location | No. | Date | Location |
| Working Party on **Data Collection and Statistics** (WPDCS) | 20th | **TBD** | **TBD** | 21st | **TBD** | **TBD** |

# 12. Adoption of the report

## 12.1. Review of the draft, and adoption of the report of the 19th Session of the WPDCS

315. The WPDCS **NOTED** that the report would be adopted via correspondence, and that a set of draft recommendations will be presented at the SC26 for its endorsement.

316. The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS19, provided at Appendix VI.

# APPENDIX I

## LIST OF PARTICIPANTS

**Chairpersons**

| | Last name | First name | Organisation | Role | Country | e-mail | Part. |
|---|---|---|---|---|---|---|---|
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**Participants**

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| | | | | | | | |
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**Part(icipation)**: **P** – in person, **R** – remote

# APPENDIX II

# AGENDA FOR THE 19TH WORKING PARTY ON DATA COLLECTION AND STATISTICS

**Date:** 28th November – 2nd December 2023
**Location:** Mumbai, India / Hybrid
**Platform:** Zoom
**Time:** 9:00 – 17:00 (Mumbai time, GMT+05:30)

**Chair:** Dr Julien Barde (EU,France); **Vice-Chair:** Dr Nuwan Gunawardane (Sri Lanka)

1. **OPENING OF THE MEETING** (Chair)
2. **ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION** (Chairs)
3. **THE IOTC PROCESS: OUTCOMES, UPDATES AND PROGRESS** (Secretariat)
   - 3.1. Outcomes of the 25th Session of the Scientific Committee and of the 27th Session of the Commission
   - 3.2. Review of Conservation and Management Measures (*CMMs*) relevant to the WPDCS
   - 3.3. Progress on the recommendations of WPDCS18
4. **REVIEW OF DATA REQUIREMENTS IN CONSERVATION AND MANAGEMENT MEASURES RELEVANT TO THE WPDCS** (Secretariat)
   - 4.1. Data recording (logbooks)
     - 4.1.1. Res. 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence*
   - 4.2. Data reporting (to the Secretariat)
     - 4.2.1. Res. 15/02 *On mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)*
     - 4.2.2. Res. 19/02 *Procedures on a fish aggregating devices (FADs) management plan*
     - 4.2.3. Res. 19/07 *On vessels chartering in the IOTC area of competence*
     - 4.2.4. Res. 21/01 *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC area of competence*
     - 4.2.5. Res. 23/01 *On the management of Anchored Fish Aggregating Devices (AFADs)*
5. **PROGRESS REPORT OF THE SECRETARIAT ON DATA RELATED ISSUES** (Secretariat)
   - 5.1. Secretariat report
   - 5.2. Updates on data-related requests from other Working Parties (Secretariat)
   - 5.3. Dissemination of IOTC reference data, datasets, and documents
     - 5.3.1. Res. 12/02 *Data confidentiality policy and procedures*
6. **UPDATES ON NATIONAL STATISTICAL SYSTEMS** (CPCs)
   - 6.1. Updates on the status of national data collection systems
   - 6.2. Overview of data processing procedures and proposed revisions of historical data
   - 6.3. Main challenges encountered in reporting mandatory statistics to the Secretariat
7. **GLOBAL FISHERIES INFORMATION SYSTEMS AND DATA MANAGEMENT BEST PRACTICES** (Chairs & Secretariat)
8. **REGIONAL OBSERVER SCHEME** (Secretariat & CPCs)

8.1. Updates on the status of the ROS and its Pilot Project

8.2. Electronic Monitoring Systems in support of the IOTC ROS

9. **CAPACITY BUILDING ACTIVITIES: DATA COLLECTION AND PROCESSING IN COASTAL COUNTRIES** (Chairs & Secretariat)

10. **WPDCS PROGRAM OF WORK** (Chairs & Secretariat)

10.1. Revision of the WPDCS Program of Work 2024–2027

11. **OTHER BUSINESS**

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

11.2. Date and place of the 20th and 21st sessions of the WPDCS: 2024 & 2025 (Chairs)

12. **ADOPTION OF THE REPORT**

12.1. Review of the draft, and adoption of the report of the 19th session of the WPDCS (Chairs)

# APPENDIX III

## LIST OF DOCUMENTS

| Document | Title |
|---|---|
| **IOTC-2023-WPDCS19-01a** | Agenda of the 19th Working Party on Data Collection and Statistics (Secretariat) |
| **IOTC-2023-WPDCS19-01b** | Annotated agenda of the 19th Working Party on Data Collection and Statistics (Secretariat) |
| **IOTC-2023-WPDCS19-02** | List of documents of the 19th Working Party on Data Collection and Statistics (Secretariat) |
| **IOTC-2023-WPDCS19-03** | Outcomes of the 25th session of the Scientific Committee (Secretariat) |
| **IOTC-2023-WPDCS19-04** | Outcomes of the 27th session of the Commission (Secretariat) |
| **IOTC-2023-WPDCS19-05** | Review of current Conservation and Management Measures relating to the WPDCS (Secretariat) |
| **IOTC-2023-WPDCS19-06** | Progress made on the recommendations of WPDCS18 (Secretariat) |
| **IOTC-2023-WPDCS19-07** | Report on IOTC Data Collection and Statistics (Secretariat) |
| **IOTC-2023-WPDCS19-08** | IOTC capacity building activities in support of developing coastal CPCs (Secretariat) |
| **IOTC-2023-WPDCS19-09** | Revision of the WPDCS Program of Work 2024–2025 (Secretariat) |
| **IOTC-2023-WPDCS19-10** | Updates on the implementation of the IOTC Regional Observer Scheme and its pilot project (Secretariat) |
| **IOTC-2023-WPDCS19-11** | Updates on yellowfin tuna catch limits for 2023 and 2024 (Secretariat) |
| **IOTC-2023-WPDCS19-12** | Summary of updates on data-related requests from other Working Parties (Secretariat) |
| **IOTC-2023-WPDCS19-13** | Alternative methods to improve data collection in IOTC coastal fisheries: progress, pitfalls and priorities (Martin S, Secretariat) |
| **IOTC-2023-WPDCS19-14** | Further updates on the IOTC data reporting forms (Secretariat) |
| **IOTC-2023-WPDCS19-15** | Online tools for the validation of IOTC data submissions (Secretariat) |
| **IOTC-2023-WPDCS19-16** | Revised IOTC forms for the provision of detailed interactions with drifting floating objects (Secretariat) |
| **IOTC-2023-WPDCS19-17** | A proposal for new IOTC forms to report detailed interactions with anchored floating objects (Secretariat) |
| **IOTC-2023-WPDCS19-18** | Benefits of assigning DOIs to IOTC documents and data (Barde J, Secretariat) |
| **IOTC-2023-WPDCS19-19** | Iran's measures to improve catch and effort data in 2022 (Khorshidi S) |
| **IOTC-2023-WPDCS19-20** | Redesigning the logbook of French purse seiners to meet increasingly complex data reporting requirements (Maufroy et al.) |
| **IOTC-2023-WPDCS19-21** | Third draft report on the review of re-estimation methodology of Indonesia's annual tuna catch data in IOTC for 2010-2021 (DGCF, BRIN) |
| **IOTC-2023-WPDCS19-22** | Reconstructed species composition of neritic tuna and seerfish caught by purse seiners in the Andaman Sea of Thailand (Noranarttragoon et al.) |
| **IOTC-2023-WPDCS19-23** | Updated results on the implementation of the FAO matrix approach for the characterization of selected IOTC fisheries (Secretariat) |
| **IOTC-2023-WPDCS19-24** | Outcomes of the 3rd ad-hoc IOTC WGEMS - Working Group on Electronic Monitoring Systems (WGEMS chairs) |
| **IOTC-2023-WPDCS19-25** | The feasibility and challenges of collecting Electronic Monitoring Systems (EMS) data on French purse seiners in relation to IOTC minimum standards (Briand et al.) |
| **IOTC-2023-WPDCS19-26** | Consideration of the correspondence between the standard of the Electronic Monitoring System and the Regional Observer Scheme in IOTC (Tsuji S and Ochi D) |
| **IOTC-2023-WPDCS19-27** | Report on progress of IOTC-OFCF Project for JFY2023 activities and planned activities for JFY2024 (OFCF Japan) |
| **IOTC-2023-WPDCS19-28** | Updated guidelines for the reporting of fisheries statistics to the IOTC (Secretariat) |
| **IOTC-2023-WPDCS19-29** | Proposal for a technical data workshop to support the reporting of fisheries statistics to the IOTC (Secretariat) |
| **IOTC-2023-WPDCS19-30** | GOLT as a clarification to Fishers' perceptions over recent trends in the pelagic fish catches in the Indian Ocean by Sri Lanka: a preliminary analysis (Gunawardane N) |
| **IOTC-2023-WPDCS19-31** | Methodology of data collection (OPEN ARTFISH) and estimation of small-scale fisheries catches in Madagascar (Ralalasoa AJH et al.) |
| **IOTC-2023-WPDCS19-32** | Enhancing small-scale tuna fishery catch estimation and reporting in Kenya (Mueni E et al.) |
| **IOTC-2023-WPDCS19-33** | Status of the Seychelles Digital Ocean Atlas (SDOA) in 2023 (Marsac F and Noel E) |

| Information papers | |
|---|---|
| **Document** | **Title** |
| **IOTC-2023-WPDCS19-3AA** | Form 3-AA (standard) (Secretariat) |
| **IOTC-2023-WPDCS19-3AA-multiple** | Form 3-AA (multiple) (Secretariat) |
| **IOTC-2023-WPDCS19-3DA** | Form 3-DA (standard) (Secretariat) |
| **IOTC-2023-WPDCS19-3DA-multiple** | Form 3-DA (multiple) (Secretariat) |
| **IOTC-2023-WPDCS19-INF01** | Assessing progress in data reporting by tuna Regional Fisheries Management Organizations (Heidrich et al 2022) |
| **IOTC-2023-WPDCS19-INF02** | Reconstructing past fisheries catches for large pelagic species in the Indian Ocean (Heidrich et al 2023) |
| **IOTC-2023-WPDCS19-INF03** | Trends in Indian Ocean marine fisheries since 1950: synthesis of reconstructed catch and effort data (Zeller et al 2023) |
| **IOTC-2023-WPDCS19-INF04** | Improving Fisheries Information Platforms (FiPs) for Improved Fisheries Data Management and Statistics for Tanzania |
| **IOTC-2023-WPDCS19-INF05** | Methodology for the estimation of marine fishery resources in India |

# APPENDIX IV

# MAIN ISSUES IDENTIFIED BY THE WPDCS AND ACTIONS PROPOSED TO ADDRESS THEM

**Table A1**. Key issues identified for the retained catch (RC) data, including the CPCs and fisheries concerned, and the actions proposed

| Dataset | CPCs | Fisheries | Key issues | Proposed actions |
|---|---|---|---|---|
| **RC** | **India** | **Coastal fisheries** | Catches are reported for various regions by fisheries, rather than aggregated by main IOTC areas, as required for RC. Aggregated catches of shark species. No data reported for 2022 | 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, noting how I.R. Iran has confirmed that double-counting of catches is basically prevented from the implementation of the national fisheries management regulations whose control and monitoring processes minimize or eliminate the possibility of violations in this area. Therefore, In light of this, Pakistan should provide any evidence of double-counting for further investigation. |
| | **Kenya** | **Coastal fisheries, Industrial fisheries** | Lack of knowledge on industrial fisheries activities. Issues with data collection, including catch and effort and size data for coastal fisheries | Liaise with Kenya, with the assistance of Compliance expert to help Kenya to implement the requirement of resolutions 15/01 and 15/02 |
| | **Pakistan** | **Drifting gillnet fishery** | Additional validation of latest revised catch series. No data reported for 2022 | 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. Ending of the World Bank project in 2021 led to discontinuation of data collection, where no data reported for 2022 | Madagascar requested assistance to review and continuation of the sampling of artisanal fisheries (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** | Retained catches from FAO which have recently updated, which include changes in catches of some IOTC species | Liaise with FAO regional office and Statistics team of the Fisheries Division |

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

| Dataset | CPCs | Fisheries | Key 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/species? (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 |
| | **Indonesia** | **Industrial longline fisheries** | Inconsistency between logbook and VMS; Low logbook coverage, particularly for small scale fisheries. Irregularities in fisheries catch | 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 by the requirement standard due to data management | Follow-up to previous mission (2019-09) to support the standardization of statistical information available for handlines and gillnets, and establish proper submission of catch and effort data according to Res. 15/02 and identify the reasons for the recent remarkable increases in the catches of yellowfin tuna. Oman planned to work closely with IOTC Secretariat with the possibility of conduction a mission. |
| | **Pakistan** | **Drifting gillnet fishery** | Data not submitted | 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 |
| | **Madagascar** | **Coastal fisheries** | Issues with data collection, inconsistency and not fully covering all areas. Discontinuation of the world bank project, no data collected in 2022 | Madagascar requested assistance to review and continuation of the sampling of artisanal fisheries (dependent on staff / funds available?). Liaise with FAO to assess possible options for combined interventions in the country |

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

| Dataset | CPCs | Fisheries | Key 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 providing assistance to I.R. Iran to submit size data by fishing ground and fisheries (rather than landing site) based on port sampling as logbooks are currently being fully implemented 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 |
| | **Japan** | | No sampling since 2021 | Follow-up to see why the lack of size data collection |

| | | | | |
|---|---|---|---|---|
| | **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, as data could be collected by observers on board vessels |

**Table A4**: Key issues identified for the Regional Observer Scheme (ROS) data, including the CPCs and fisheries concerned, and the actions proposed

| Dataset | CPCs | Fisheries | Key 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**: Key issues identified for the socio-economic (SE) data, including the CPCs and fisheries concerned, and the actions proposed

| Dataset | CPCs | Fisheries | Key issues | Proposed actions |
|---|---|---|---|---|
| **Socio-Economic** | **All** | **All** | Limited data available, and collated within the IOTC database | Liaise with FAO and other institutes (e.g., FFA) to access open repositories of fish sale price, import and export data, and national indicators (e.g., Gross Domestic Product). Encourage CPCs to report information of fish prices (local sale, export, import prices). Through the resolution 23/10, with the implementation of the WPSE, more emphasis on the collection of socio-economic data |

# APPENDIX V

# WORKING PARTY ON DATA COLLECTION AND STATISTICS PROGRAM OF WORK (2024–2028)

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 its Working Parties:

**Table A6**. Priority topics for obtaining the information necessary to deliver the necessary advice to the Commission

| Topic in order of priority | | Sub-topic and project | | Timings | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2024 | 2025 | 2026 | 2027 | 2028 |
| 1 | **Coastal fisheries data collection** | 1.2 | Assist the implementation of data collection and sampling activities for fisheries insufficiently sampled. Recommended actions include: (regional) training on species identification, designing sampling guidelines for IOTC fisheries. Priority to be given to the following countries / fisheries: | | | | | |
| | | | • Indonesia | | | | | |
| | | | • India | | | | | |
| | | | • Bangladesh | | | | | |
| | | | • Pakistan | | | | | |
| | | | • I.R. Iran | | | | | |
| | | | • Kenya | | | | | |
| | | | • Somalia | | | | | |
| | | | • Sri Lanka | | | | | |
| 2 | **Evaluation of catch and effort data uncertainties** | 2.1 | Review of historical nominal catches and catch-and-effort data for all stocks being assessed in the following years to determine the level of uncertainty to be used for stock assessment and management procedures[1] | | | | | |
| 3 | **Compliance with IOTC data reporting requirements** | 3.2 | Workshops to clarify data reporting requirements[2] and support preparation of annual submissions | | | | | |

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

[2] Recommended by the CoC; Regular annual webinars / workshops to be held from 2025 onwards with each CPC (or group of CPCs) prior to the data reporting deadline

| | 2024 | 2025 | 2026 | 2027 | 2028 |
|---|---|---|---|---|---|

**Table A7**. All other topics of relevance to the WPDCS program of work (2024-2028)

| Topic | | Sub-topic and project | | Timings | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2024 | 2025 | 2026 | 2027 | 2028 |
| **1** | **Coastal fisheries data collection** | **1.1** | Implement a region-wide study focusing on the application of FAO methodology for the characterization of Indian Ocean fisheries (Secretariat, CPCs) | | | | | |
| **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 | | | | | |
| | | | • Oman | | | | | |
| | | | • Sri Lanka | | | | | |
| | | | • Somalia | | | | | |
| | | | • Tanzania | | | | | |
| | | | • Other (as required / determined) | | | | | |
| | | **3.3** | Support the documentation of sampling protocols and processing[3] | | | | | |
| **4** | **Data access** | **4.1** | Improve discoverability of IOTC scientific assets through standard metadata and DOI (e.g., remote workshops) | | | | | |

[3] Secretariat to finalize the template, CPC to provide information

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | **4.2** | Scoping study to develop indicators for ocean-climate status and trends through an online atlas linked by the IOTC website (including provision of educational resources) | | | | |
| **5** | **Support for the implementation of the IOTC Regional Observer Scheme (ROS)** | **5.1** | ROS e-tools | | | | |
| | | **5.1.1** | Support the adoption of the ROS e-Reporting and ROS national database tools by countries not having any existing observer data collection and management system in place | | | | |
| | | **5.2** | ROS Regional Database | | | | |
| | | **5.2.1** | Incorporate all historical observer data currently available in other proprietary data formats (e.g., ObServe, ICCAT ST09 and other custom observer forms) | | | | |
| | | **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 / in-person meetings[4] | | | | |
| | | **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 coastal fisheries, including through EMS systems. | | | | |
| | | **5.5** | Revision of ROS data fields through intersessional activity / workshops coordinated by the WPDCS | | | | |
| | | | | **2024** | **2025** | **2026** | **2027** | **2028** |

[4] Sri Lanka EMS, training and setup of data exchange

# APPENDIX VI

# CONSOLIDATED RECOMMENDATIONS OF THE 19TH SESSION OF THE WORKING PARTY ON DATA COLLECTION AND STATISTICS

*Note: Appendix references refer to the Report of the 19th Session of the Working Party on Data Collection and Statistics (IOTC-2023-WPDCS19-R)*

### *Data reporting (to the Secretariat)*

**Rec. WPDCS19.01** (para 38): The WPDCS **RECALLED** the RECOMMENDATION made at SC25 that "*the Commission ENDORSE the mandatory reporting of fishing craft statistics and that this change is included in the next revision of Res. 15/02*", further **RECALLING** that the Commission ENDORSED the Scientific Committee's 2022 list of recommendations as its own.

Therefore, the WPDCS **REITERATED** the importance of this issue and **NOTED** that it has not yet been addressed and therefore should be brought to the attention of the Commission again in 2024.

**Rec. WPDCS19.02** (para 101): Following the discussions and endorsements on data-reporting aspects discussed so far, the WPDCS **RECOMMENDED** that the Scientific Committee: **a)** endorse the proposed updates to the IOTC data submission processes, and namely:

- the introduction of Form 3-DA / 3-DA-multiple for the reporting of detailed activities on drifting FOBs
- the introduction of Form 3-AA / 3-AA-mutiple for the reporting of detailed activities on AFADs
- the decommissioning of the old, recommended forms 3-AR, 3-FA, 3-SU, and 1-RC-YFT
- that the ad interim data reporting workflow and the accompanying electronic tools and formats (interactive validators, ad interim forms, etc.) become mandatory for the submission of statistical fisheries data to the IOTC starting with the 2024 reporting cycle (deadline of 30 June 2024)
- that the study on the matrix approach for the characterisation of IOTC fisheries is further extended to cover all IOTC coastal nations and their fisheries, and that outputs of the study are presented to the next session of the meeting
- that ROS data be exclusively submitted through the consolidated ROS Excel data reporting forms or as .ros files, for those CPCs using the ROS electronic data collection tools

and **b)** further clarify the issues identified within Res. 12/02 and 19/07 that have an impact on the collection, reporting, and dissemination of IOTC datasets.

### *Overview of data processing procedures and proposed revisions of historical data*

**Rec. WPDCS19.03** (para 220): The WPDCS **NOTED** the improvements made in the quality of the estimated data (e.g., reduction in volatility for some species such as bullet tuna and blue shark) and **ACKNOWLEDGED** that the updates of official catches better reflect the status of the catches in Indonesian fisheries as they provide an accurate separation of artisanal and industrial fisheries according to IOTC definitions.

Nevertheless, the WPDCS **NOTED** that there are still issues in some of the species-specific reconstructed historical time-series of catches (2010-2021) that require further analysis:

**i)** large inter-annual fluctuations, **ii)** discrepancies in scaling, and **iii)** potential errors in the input data used for some years (e.g., 2018).

The WPDCS **ENCOURAGED** Indonesia to identify the root causes explaining the identified issues and seek support from the Secretariat to further progress on their resolution.

The WPDCS **RECOMMENDED** that the SC provide general guidance on addressing the following points:

- issues of continuity with the historical time series of catch (pre-2010) which might affect the stock assessments and would require some inter-calibration;
- current differences between revised official national catch statistics and scientific best estimates used for supporting the IOTC science process and decision-making.

### *Global fisheries information systems and data management best practices*

**Rec. WPDCS19.04** (para 243): **ACKNOWLEDGING** the potential benefits of a climate-ocean web portal for the SC and its Working Parties, the WPDCS **RECOMMENDED** a scoping study into how ocean-climate information (as shown through the initiative of the Seychelles Digital Ocean Atlas as well as the various indicators presented in paper IOTC–2018–WPDCS14–36) could be developed and made available by the IOTC and how this information would be presented to the SC and its working parties. The scoping study should also consider the resources needed to develop online ocean-climate indicators for the IOTC area of competence.

### *Electronic Monitoring Systems in support of the IOTC ROS*

**Rec. WPDCS19.05** (para 284): The WPDCS **RECOMMENDED** that an intersessional working group is organised (by correspondence or through online meetings) to convey interested WPDCS and WGEMS participants and review:

- the scientific need for each ROS data field proposed by the 2018 ROS expert WS;
- ROS data fields collection and reporting status (e.g., mandatory/optional, etc.);
- potential specific EMS fields to be added to ROS mandatory requirements; and
- summarise the capabilities, and advantages and drawbacks to collect ROS data fields across gears by different alternative methods (e.g., EMS, human onboard observers, self-reporting, port sampling) and a combination of those.

and further **REQUESTED** that this group report to the next sessions of the WGEMS and WPDCS.

### *WPDCS program of work*

**Rec. WPDCS19.06** (para 308): The WPDCS **RECOMMENDED** that the Scientific Committee consider and endorse the WPDCS Program of Work (2024–2028)

### *Review of the draft, and adoption of the report of the 19th Session of the WPDCS*

**Rec. WPDCS19.07**(para 316): The WPDCS **RECOMMENDED** that the Scientific Committee consider the consolidated set of recommendations arising from WPDCS19, provided at Appendix VI.