



Report of the 3rd Session of the IOTC Ad-hoc Working Group on the Development of Electronic Monitoring Programme Standards (WGEMS)

Online, 15 - 16 March 2023

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ACRONYMS

ABNJ	Areas Beyond National Jurisdiction
AIS	Automatic Identification System
ALDFG	Abandoned, Lost or otherwise Discarded Fishing Gear
ALB	Albacore tuna
BET	Bigeye tuna
BLM	Black marlin
BLT	Bullet tuna
BUM	Blue marlin
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
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
DGCF	Directorate General of Capture Fisheries (Indonesia)
DFAD	Drifting FAD
DFAR	Department of Fisheries and Aquatic Resources (Sri Lanka)
DOI	Digital Object Identifier
EEZ	Exclusive Economic Zone
EM	Electronic Monitoring
EMS	Electronic Monitoring System
ERA	Ecological Risk Assessment
ETP	Endangered, Threatened, and Protected species
EU	European Union
FAD	Fish aggregating device
FAO	Food and Agriculture Organization of the UN
FIRMS	Fisheries and Resources Monitoring System
FOB	Floating Object
FRI	Frigate tuna
GEF	Global Environmental Facility
GUT	Indo-Pacific king mackerel
GTA	FIRMS Global Tuna Atlas
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IEO	Instituto Español de Oceanografía (EU,Spain)
IFREMER	Institut Francais de Recherche pour l'Exploitation de la Mer (EU,France)
IOC	Indian Ocean Commission
IOTC	Indian Ocean Tuna Commission
IRD	Institut de Recherche pour le Développement (EU,France)
I.R. Iran	Islamic Republic of Iran
ISSF	International Seafood Sustainability Foundation
KAW	Kawakawa
LOT	Longtail tuna
MLS	Striped marlin
MMAF	Ministry of Marine Affairs and Fisheries (Indonesia)
NARA	National Aquatic Resources Research and Development Agency (Sri Lanka)
OFCF	Overseas Fishery Cooperation Foundation (Japan)
OPAGAC	Organización de Productores de Atún Congelado (EU,Spain)
PET	Protected, Endangered and Threatened species
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
WCPFC	Western and Central Pacific Fisheries Commission
WWF	World Wide Fund for nature
YFT	Yellowfin tuna

STANDARDISATION OF IOTC WORKING PARTY AND SCIENTIFIC COMMITTEE REPORT TERMINOLOGY

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

HOW TO INTERPRET TERMINOLOGY CONTAINED IN THIS REPORT

Level 1: *From a subsidiary body of the Commission to the next level in the structure of the Commission:*

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

Level 2: *From a subsidiary body of the Commission to a CPC, the IOTC Secretariat, or other body (not the Commission) to carry out a specified task:*

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

Level 3: *General terms to be used for consistency:*

AGREED: Any point of discussion from a meeting which the IOTC body considers to be an agreed course of action covered by its mandate, which has not already been dealt with under Level 1 or level 2 above; a general point of agreement among delegations/participants of a meeting which does not need to be considered/adopted by the next level in the Commission's structure.

NOTED/NOTING: Any point of discussion from a meeting which the IOTC body considers to be important enough to record in a meeting report for future reference.

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

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EXECUTIVE SUMMARY

The 3rd Session of the Indian Ocean Tuna Commission's (IOTC) Ad hoc Working Group on the Development of Electronic Monitoring Programme Standards (WGEMS) was held online on Zoom from 15 - 16 March 2023. A total of 89 participants attended the Session (104 in 2022 and 79 in 2021). The list of participants is provided in [Appendix I](#). The meeting was opened by the Chairperson, Dr Hilario Murua (ISSF) who welcomed participants.

The following are the recommendations from the WGEMS03 to the Working Party on data Collection and Statistics, which are provided in [Appendix VI](#).

Updates to Annex 1 (Vessel Monitoring Plans)

WGEMS03.01: The WGEMS **RECOMMENDED** the adoption of Annex 1- Vessel Monitoring Plan as part of the EM System and Data Standards adopted by the Scientific Committee (Appendix 6c of the IOTC-2022-SC25-R) as a general guide and examples of existing EMS installations (Para. 33).

Updates to Annex 2 (EM capabilities to collect ROS data)

WGEMS03.02: Subsequently, to ensure that ROS minimum mandatory data requirements are met by CPCs implementing EM, as required by Res 22/04, the WGEMS **RECOMMENDED** that those CPCs include a table, alongside the VMPs submission, that details which minimum required data fields (listed in Annex 2) are to be collected by EM and which are to be collected by other approved methods (including specifying those methods for each field) (Para. 38).

Revision of the WG Program of Work (2024–2027)

WGEMS03.03: The WGEMS **RECOMMENDED** that the WPDCS consider and endorse the WGEMS Programme of Work (2024–2028), as provided in [Appendix V](#). (Para. 43).

Next meetings

WGEMS03.04: The WGEMS **RECOMMENDED** that the WGEMS meet again in 2024 to continue to advance EM standards for utilization by the IOTC members. (Para. 44).

1. OPENING OF THE MEETING

1. The 3rd Session of the Indian Ocean Tuna Commission's (IOTC) Ad-hoc Working Group on the Development of Electronic Monitoring Programme Standards (WGEMS) was held online on Zoom from 15 - 16 March 2023. A total of 89 participants attended the Session (104 in 2022 and 79 in 2021). The list of participants is provided in [Appendix I](#). The meeting was opened by the Chairperson, Dr Hilario Murua (ISSF) who welcomed participants.

2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

2. The WGEMS **ADOPTED** the Agenda provided at [Appendix II](#). The documents presented to the WGEMS are listed in [Appendix III](#).

3. BACKGROUND AND OBJECTIVES OF THE WORKING GROUP

3. The WGEMS **NOTED** a brief presentation provided by the chair on the background and objectives of the current Working Group. The presentation described the various requirements on IOTC Resolutions in relation to the implementation of Electronic Monitoring Systems in IOTC. In addition it provided a very short summary on the discussions held during the 2022 meeting of the IOTC Scientific Committee. These are detailed in section 4.2 below. The Chair noted that the Scientific Committee adopted the EM terms and definitions (Appendix 6a to the Scientific Committee report ([IOTC-2022-SC25-R](#))); b) the EM Program Standards (Appendix 6b), and; c) the EM System and Data Standards (Appendix 6c). The Chair underlined that the primary objective of the current meeting was to discuss Annexes 1 and 2 of the Electronic Monitoring System and Data Standards (Appendix 6c to the Scientific Committee report ([IOTC-2022-SC25-R](#))).

4. DECISIONS OF THE COMMISSION RELATED TO THE WORK OF THE WGEMS

4.1 Any Relevant Outcomes from the 6th Special Session of the Commission

4. The WGEMS **NOTED** that the 6th Special Session of the Commission focused exclusively on FAD related issues and therefore the WGEMS and its work was not discussed at that stage. The Secretariat reiterated that the Commission had discussed the WGEMS during its 26th Session in 2022 and adopted Resolution 22/04 on Regional Observer Scheme which, for the first time, formally recognised the potential use of EMS to achieve the ROS minimum mandatory data requirements; and that these discussions had been presented to the WGEMS02 meeting in June 2022.

4.2 Updates from the 25th Session of the Scientific Committee

5. The WGEMS **NOTED** the discussions held at the 2022 Session of the Scientific Committee and included in the SC25 report:

*(Para 148) The SC reviewed and **ENDORSED** a) the EM terms and definitions b) the EM Program standards, and c) the EM Data standards described in Appendices 6A, 6B and 6C (except Annex 1 and 2 to be adopted in March 15-16), respectively, and **RECOMMENDED** their adoption by the Commission.*

*(Para 149) Moreover, the SC **NOTED** that Annex 1 and 2 of the EM Data Standards (Appendix 6C) are general guides that should be tailored to each fishery and could vary from fleet to fleet, those annexes (VMS and EM capabilities to collect ROS minimum requirements) will be finalised during next IOTC WGEMS (15-16 March, 2023) before IOTC Commission Consideration.*

6. The WGEMS **NOTED** that the discussions arising from the Scientific Committee formed the basis for the current WGEMS meeting.

5. THE IOTC REGIONAL OBSERVER SCHEME AND REGIONAL OBSERVER PILOT PROJECT

7. The WGEMS **NOTED** that the ROS pilot project had now finished and that the final results from that project are being collated and will be presented to the relevant working parties throughout 2023.
8. The WGEMS **NOTED** that the most recent information regarding the status of the ROS, and particularly the summary of reported observer trip data by fishery and CPC, have been presented and discussed at the last WPDCS in December 2022, and that no major updates occurred since.

9. The WGEMS **ACKNOWLEDGED** that - in line with the requirements of IOTC Resolution 22/04 - the WPDCS and SC have endorsed standard electronic forms for the reporting of ROS data as one of the two formats accepted for future data submissions to the Secretariat (the other being the XML file format produced by the ROS electronic tools).
10. The WGEMS further **NOTED** the progress regarding the revision of the Regional Observer Scheme section of the IOTC website, which has been extended to include references to the material produced under the ROS Pilot Project including downloadable data collection forms in paper (PDF) and electronic (XLS) format.
11. Finally, the WGEMS **ACKNOWLEDGED** that the IOTC Secretariat is finalizing a comprehensive "reference data catalogue", which will disseminate details on all IOTC reference code lists including those of relevance to the ROS and EM systems.
12. The WGEMS was **INFORMED** that the EMS Pilot Project in Sri Lanka is being carried out with further delays due to the service provider closing down their EMS operations. The service provider had agreed to facilitate and support the installation of the final equipment onboard Sri Lankan vessels and the Secretariat was working with them to finalise this project.

5.1 Current projects related to Electronic Monitoring and Electronic Reporting

13. The WGEMS **NOTED** document [IOTC-2023-WGEMS03-04](#) which provided a remote electronic monitoring technology solution for small and large scale fisheries, including the following summary provided by the authors:

“Shellcatch has developed and applied its electronic monitoring system technology and functionality to 700+ small-scale fishing vessels in the Eastern and South Pacific and of Latin America, Eastern North Pacific, and the Arabian Sea. Recent hardware improvements combined with an optimized Artificial Intelligence algorithm and improved web platform have increased the detection rates and accuracy of various classes of bycatch (average score = ~85 – 90%) while reducing dependency on human observers at a 5-25% of its cost. Shellcatch is looking to build collaborative partnerships with the scientific community in different parts of the world to test the accuracy of its system and further develop system functionality”.

14. The WGEMS **NOTED** that this technology has been implemented in 16 countries worldwide and that pilot projects trialling this technology have been conducted in Pakistan and Mozambique. In Mozambique the vessels included in the trial were small-scale (between 6-8m LOA with an average of 2 crew members), while in Pakistan larger vessels are being included in the trial (up to 20m LOA with between 12-15 crew members). The WGEMS **NOTED** that Pakistan intends to scale this work up in the next year and will present the findings of these trials to IOTC WPDCS.
15. The WGEMS **NOTED** that these trials were used to validate the ability of this technology to share information easily with multiple stakeholders. It has also the potential to give complete ownership of data to regulating authorities or local governments in order to review and manage the fisheries concerned as well as share the data with stakeholders and RFMOs as required. The WGEMS **NOTED** that the next step in both of these trial countries is to bring the relevant ministries and management authorities onboard to help them to understand the utility of such a scheme and to create a basic structure that can be used by these authorities. The WGEMS **NOTED** that it will be critical to conduct training and capacity building activities in order to ensure that the fishery groups who will be utilising the technologies can do so effectively and independently of the technology provider.
16. The WGEMS **NOTED** that fisher buy-in is extremely important for the implementation of such systems as regulations alone will not lead to a scale-up in their adoption. The WGEMS **NOTED** that added value such as access to markets which would enable better livelihoods for fishers would be a valuable asset to leverage the use of such technologies.
17. The WGEMS **NOTED** that currently artificial intelligence (AI) software is being developed and tested for species identification and size estimation purposes in Sellcatch, which has an accuracy rate of around 85%. Further work is therefore required within each fishery with the help of video reviewers in order to improve the algorithms within the software to further improve this accuracy.
18. The WGEMS **ENCOURAGED** the participating CPCs to submit the data resulting from these trials to the Secretariat and **NOTED** that it is encouraging to see the rate of growth in technologies like this.

5.2 Update on CPCs EMS pilot projects and Programmes

19. The WGEMS **NOTED** document [IOTC-2023-WGEMS03-05_Rev1](#) which provided information for improving Kenya's Marine Fisheries Transparency Through Electronic Monitoring, including the following summary provided by the authors:

“The Government of Kenya aims at achieving 100% transparency in the EEZ industrial fishery, and supplement human observer programs with the implementation of electronic monitoring systems- the use of onboard video cameras, GPS, and sensors to automatically track activity on fishing vessels. Electronic monitoring will create transparency, provide confidence to consumers that the seafood products have been harvested legally, sustainably and without labor abuses. Effective monitoring will also contribute vital data, the current absence of which makes regulation of even the most vulnerable fisheries difficult. It will help ensure the sustainability of Kenya's EEZ fish stocks and the coastal communities they support.” ... see paper for full abstract

20. The WGEMS **NOTED** that initially EMS will be trialled on a total of 7 Kenyan flagged vessels (all 20m LOA and over and a variety of gear types including tuna longline, trawl and crab fishing) but it is hoped that the pilot will be rolled out to other fleet segments in the future, focussed on semi-industrial and industrial fisheries. The WGEMS **NOTED** that a large proportion of the Kenyan fleet consists of very small artisanal vessels including dugout canoes where the installation of EMS would not be practical.

21. The WGEMS further **NOTED** that as part of this EMS programme, Kenya also intends to trial the use of class B AIS onboard some artisanal vessels that have the capacity for this, more as a tool for monitoring control and surveillance (MCS) rather than for scientific purposes. The WGEMS **NOTED** that to date, the IOTC Compliance Committee has not supported the use of AIS as an alternative to VMS or as tools for MCS purposes but further **NOTED** that this was not the appropriate setting to discuss this topic.

22. The WGEMS **ENCOURAGED** Kenya to liaise with the IOTC Secretariat regarding the submission of data from these trials.

6. EMS PROGRAMME IN IOTC

6.1 EM Data Standards

23. The WGEMS **NOTED** paper [IOTC-2023-WGEMS03-06](#) on IOTC Electronic Monitoring System & Data Standards which presented the agreed IOTC EM System and Data Standards for the implementation of EMS for IOTC fisheries arising from intersessional work.

24. The WGEMS **THANKED** the authors for the work and **NOTED** that the EM system and data standards include (i) the technical standards and specifications for vessel EM equipment, (ii) the logistical standards (e.g., EM record backup and retrieval), and (iii) the data analysis standards (e.g., EM record review).

25. The WGEMS **AGREED** that biological samples as well as some of the mandatory data elements of the ROS cannot currently be collected with EMS, depending on the fishing gear (see Annex 2 of the document and section 6.1.2 below). The WGEMS **NOTED** the concerns raised by some scientists that it is impossible for EM systems alone to collect all ROS data fields (e.g., related to depredation or mitigation devices in longline fisheries), and further **NOTED** the potential compliance issues that could arise from relying solely on EM. It was also further **NOTED** that some information is also logistically difficult to collect with onboard observer and, hence, it WAS **AGREED** to review the data that cannot be collected by EMS (and/or human observers) and their utilisation for scientific and management purposes.

26. However, the WGEMS **NOTED** that paragraph 5 of IOTC [Res. 22/04](#) explicitly states that EMS can be complemented by other collection methods to ensure that the minimum mandatory ROS data reporting standards are met, **RECALLING** that EM can complement or substitute human observed provided that EMS, in conjunction with other collection methods, are able to fulfil ROS mandatory data items.

27. The WGEMS **NOTED** the observations made by some scientists that the current ROS requirements may be too high and impractical to collect, **SUGGESTING** that some work could be conducted to review and where appropriate reduce them, in particular for coastal fisheries.

28. The WGEMS **RECALLED** that the current ROS minimum standards arose from a technical workshop held in 2018 that gathered several experienced scientists, observers, and data managers involved in observations at sea in different fisheries, and were followed by some final adjustments made during the implementation of the ROS pilot

project ([Res. 16/04](#)) and further meetings (see document [IOTC-2021-WPDCS17-10 Rev2](#)). The WGEMS also **NOTED** that the revision of the ROS minimum standards is beyond the scope of the WGEMS terms of reference and **SUGGESTED** the issue to be brought to the attention of the WPDCS and Scientific Committee.

29. The WGEMS **NOTED** that the development and implementation of an EM operational program would require a timeframe of several years in some coastal countries regarding the lack of human and technical resources available but **RECALLED** that implementation of EM is optional under Resolution 22/04 for those CPCs who are developing or who have implemented EMS as a data collection tool to meet the requirements of the IOTC Resolution 22/04 on Regional Observer Scheme as defined in the SC adopted EM Program Standards Scope (Appendix 6b of the [IOTC-2022-SC25-R](#)).

30. The WGEMS **NOTED** that most comments and feedback received on the previous version of the draft of IOTC Electronic Monitoring Programme standards, including Annexes 1 and 2 (see document [IOTC–2022–WPDCS18–34](#)) were only made by a limited number of scientists who focused on the development and implementation of EMS for longline fisheries. Therefore, the WGEMS **ENCOURAGED** 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, **RECALLING** that those annexes are a living document that is expected to change and improve over time and with the technological evolution of EMS.

6.1.1 Updates to Annex 1 (Vessel Monitoring Plans)

31. The WGEMS **NOTED** the Annex 1 of the document on Vessel Monitoring Plans (VMP), including the comments made on the potential issues of cable length related to the position of the camera covering the fishing deck and difficulty to assess the presence of tori lines and line weighting with one single camera at the stern of the boat. However, the WGEMS **NOTED** that camera configuration shown in Annex 1 should be considered as examples because the VMP should be customized to each particular fleet/CPC to collect ROS required data per EMS Data Standards.

32. The WGEMS **NOTED** that the minimum standards of the EM system for longline vessels should ensure to target the highest possible resolution for the identification of the species of seabirds incidentally caught in the fishery as recommended in IOTC [Res. 12/06](#).

33. The WGEMS **RECOMMENDED** the adoption of Annex 1- Vessel Monitoring Plan as part of the EM System and Data Standards adopted by the Scientific Committee (Appendix 6c of the [IOTC-2022-SC25-R](#)) as a general guide and examples of existing EMS installations. The final version is available in [Annex IV](#).

6.1.2 Updates to Annex 2 (EM capabilities to collect ROS data)

34. The WGEMS **NOTED** the Annex 2 of the document on IOTC ROS minimum data standards and the initial assessment of the ability of EMS to collect the ROS mandatory data based the categories developed by [Emery et al. \(2018\)](#).

35. The WGEMS **AGREED** that the assessment categories were too detailed and not easy to distinguish, and that some confusion was associated with the *R* (e.g., ready now but requires dedicated or additional work in the equipment) and *P* categories (i.e., P1 = possible with minor work and P2 = possible with major work). The WGEMS further **NOTED** that the assessment for gillnet vessels was not included in the document.

36. Therefore, the WGEMS **AGREED** to simplify the Annex 2 and only show the *mandatory* and *optional* data fields required to collect by the EMS to meet ROS data requirements, which would provide guidance to the CPCs. The final table is available in [Annex IV](#).

37. In addition, the WGEMS **ACKNOWLEDGED** the importance of CPCs (who are implementing EM) assessing the ability of EM in their fishery to collect ROS data fields, **NOTING** that firstly, EM alone cannot collect all ROS fields and secondly, EM installations and configurations will differ between fisheries and result in differences in EM data collection capability. Furthermore, the WGEMS **NOTED** that it would also be very useful to include in the assessment the complementary source of collection for each ROS item when EM cannot collect them (e.g., observers, skipper interview, sampling, etc.).

38. Subsequently, to ensure that ROS minimum mandatory data requirements are met by CPCs implementing EM, as required by Res 22/04, the WGEMS **RECOMMENDED** that those CPCs include a table, alongside the VMPs submission, that details which minimum required data fields (listed in Annex 2 of Appendix IV of this report) are to be collected by EM and which are to be collected by other approved methods (including specifying those methods for each field).

7. PLAN AND FUTURE MEETINGS

7.1 Future revisions and updates of EM data and program standards

39. The WGEMS **NOTED** that the Commission would discuss and consider for endorsement the EM Terms and Definitions (Appendix 6A), EM Program Standards (Appendix 6B) and EM Systems and Data Standards (Appendix 6C) adopted by the Scientific Committee ([IOTC-2022-SC25-R](#)).

40. The WGEMS **NOTED** that [Res. 22/04](#) states:

(Para. 4) The IOTC Scientific Committee, in collaboration with the Compliance Committee, shall develop and agree on minimum standards for the use of EMS for purse seine, longline, bait boat (pole and line), handline, and gillnet fleets by 2023 at the latest, including on modalities of the substitution of the human observer coverage by an EMS, taking into account factors such as, the principles and regulations regarding minimum safe manning requirements. The Commission may consider and adopt these standards by 2024 in a separate Resolution.

41. The WGEMS **NOTED** that a document on the EM Standards (as outlined in the aforementioned Appendices of the SC report) will be presented to the Compliance Committee in 2023 for their consideration and endorsement as stipulated in paragraph 4 of Res 22/04.

7.2 Revision of the WG Program of Work (2024–2027)

42. The WGEMS **NOTED** paper IOTC-2023-WGEMS03-03 on the WGEMS Program of Work (2024–2028).

43. The WGEMS **RECOMMENDED** that the WPDCS consider and endorse the WGEMS Programme of Work (2024–2028), as provided in [Appendix V](#).

7.3 Next Meetings

44. The WGEMS **RECOMMENDED** that the WGEMS meet again in 2024 to continue to advance EM standards for utilization by the IOTC members.

8. OTHER BUSINESS

8.1 Review of the draft, and adoption of the Report of the 2nd Session of the WGEMS

45. The report of the 3rd Session of the Ad-hoc Working Group on the Development of Electronic Monitoring Programme Standards (IOTC-2023-WGEMS03-R) was **ADOPTED** via correspondence.

APPENDIX I

LIST OF PARTICIPANTS

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APPENDIX II
MEETING AGENDA

Date: 15-16 March

Location: Online

Venue: Zoom

Time: 12:00 – 16:00 (Seychelles time) daily

Chairperson: Dr. Hilario Murua, **Vice-chair:** Dr. Don Bromhead

- 1. OPENING OF THE MEETING** (Chairperson)
- 2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION** (Chairperson)
- 3. BACKGROUND AND OBJECTIVES OF THE WORKSHOP** (Chairperson)
- 4. DECISIONS OF THE COMMISSION RELATED TO THE WORK OF THE WGEMS**
 - 4.1. Any Relevant Outcomes from the 6th Special Session of the Commission
 - 4.2. Updates from the 25th Session of the Scientific Committee
- 5. THE IOTC REGIONAL OBSERVER SCHEME AND REGIONAL OBSERVER PILOT PROJECT** (IOTC Secretariat)
 - 5.1. Current projects related to Electronic Monitoring and Electronic Reporting and possible ways to strength current IOTC fishery data collection (IOTC Secretariat)
 - 5.2. Update on CPCs EMS pilot projects and Programmes
- 6. EM PROGRAMME IN IOTC**
 - 6.1. EM Data Standards
 - 6.1.1. Updates to Annex 1 (Vessel Monitoring Plans)
 - 6.1.2. Updates to Annex 2 (EM capabilities to collect ROS data)
- 7. PLAN AND FUTURE MEETINGS** (Chairperson and Vice-chairperson)
 - 7.1. Future revisions and updates of EM data and program standards.
 - 7.2. Updated roadmap to implement EM Programme in IOTC.
 - 7.3. Revision of the WG Program of Work (2024–2028)
 - 7.4. Next meetings
- 8. OTHER BUSINESS**
 - 8.1. Review of the draft, and adoption of the Report of the 3rd Session of the WGEMS

APPENDIX III
LIST OF DOCUMENTS

Document	Title
IOTC–2023–WGEMS03–01a	Draft Agenda for the 3 rd Ad-Hoc Working Group on the Development of Electronic Monitoring Programme Standards (WGEMS)
IOTC–2023– WGEMS03–01b	Draft Annotated Agenda for the 3 rd Ad-Hoc Working Group on the Development of Electronic Monitoring Programme Standards (WGEMS)
IOTC–2023– WGEMS03–02	List of Documents for the 3 rd Ad-Hoc Working Group on the Development of Electronic Monitoring Programme Standards (WGEMS)
IOTC–2023– WGEMS03–03	WGEMS Programme of Work (2023 – 2027)
IOTC–2023– WGEMS03–04	Remote electronic monitoring technology solution for small and big and big scale fisheries (Sfeir A, Patiño D, Lozano D and Cornejo V)
IOTC–2023– WGEMS03–05	Improving Kenya’s Marine Fisheries Transparency Through Electronic Monitoring (Kiilu B)
IOTC–2023– WGEMS03–06	IOTC Electronic Monitoring System & Data Standards
Information papers	
IOTC–2023– WGEMS03–INF01	Developing techniques for mapping and characterization of artisanal fisheries in Oman (Oman)
IOTC–2023– WGEMS03–INF02	Improving data in artisanal IOTC fisheries using electronic monitoring tools (Wanless R, Kastern C, Pringle B, Raemaekers S)
IOTC–2023– WGEMS03–INF03	Report of the Sub-Group on Electronic Monitoring Systems: Proposal of Draft ICCAT Minimum Technical Standards for EMS in Pelagic Longliners (Anon)

APPENDIX IV
REVISED ANNEXES 1 AND 2 OF APPENDIX 6C IN THE SCIENTIFIC COMMITTEE REPORT

Annex 1 – Vessel Monitoring Plans

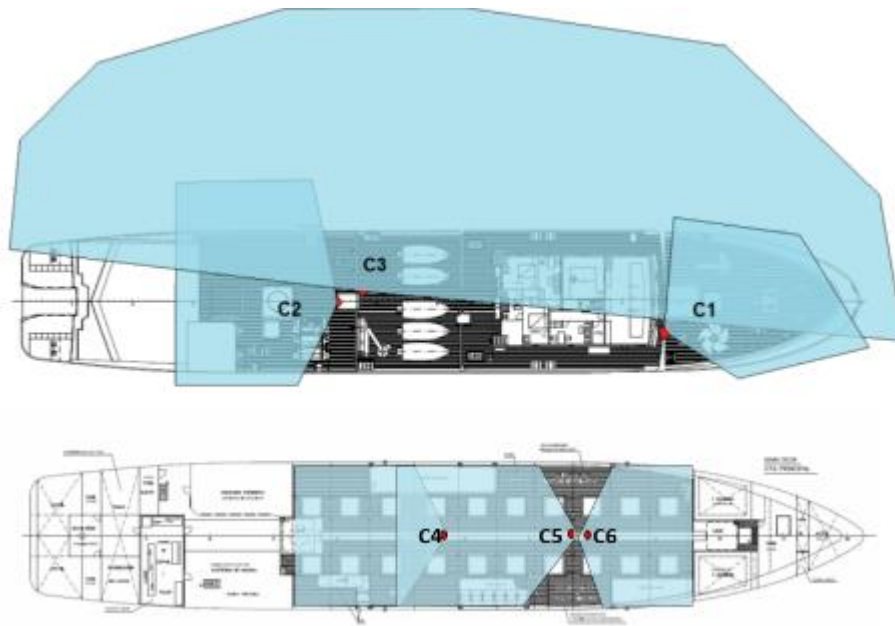
Each vessel should develop a “Vessel Monitoring Plan” so as to define how many and where cameras are located to collect the required ROS minimum data fields. Vessel Monitoring Plans should be reviewed by the CPCs fishery management agency and presented to the WGEMS/WPDCS to ensure it meets IOTC REMP Program and EM System and Data Standards.

On purse seine vessels, the minimum areas that cameras are recommended to cover:

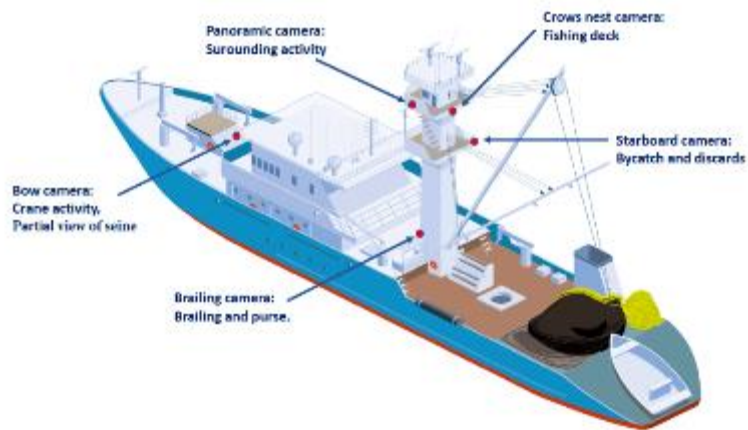
- the working deck (both port and starboard sides),
- the net sack and the brailer,
- the foredeck or amidships (e.g., FAD activity),
- and the well deck and conveyor belt (Murua et al., 2022; Restrepo et al., 2018): for the conveyor belt, in more than one place (e.g. at the beginning and at the end of the conveyour belt as a minimum). If a discard conveyor belt exists, it should also be covered.
- Cameras must cover the following actions: fishing set, brailing, net hauling, FAD activities, total catch, catch well sorting (process of putting the catch in the hold or wells), bycatch handling and release, and tuna discards (**Figure 1 and Table 1**).
- In large purse seines, at least 6 cameras are needed to cover fishing and fish-handling operations; however, less fewer cameras (e.g. 4 cameras) could cover the activity to collect the data required of smaller purse seines (e.g. 300-400 tonnes capacity).

The preferred EM equipment configuration would be the one that allows a greater number of images (frames) of higher quality/resolution. Digital video is generally preferred, but still images can also be a viable option to capture information during the various phases of the vessel activity. However, considering that storage capacity is limited, an optimal configuration may have video on certain areas/cameras/moments, while still photos on others. In the case of photographs, the minimum requirement should be that a picture is taken by the camera with viewing angle fully covering the fish management areas at least every 2 seconds when fishing action occurs (Restrepo et al., 2018). Image quality should also be adequate enough to allow accurate collection of all required data field, such as species ID, FAD materials and design, or bait used and, hence, achieve the monitoring objectives.

A



B



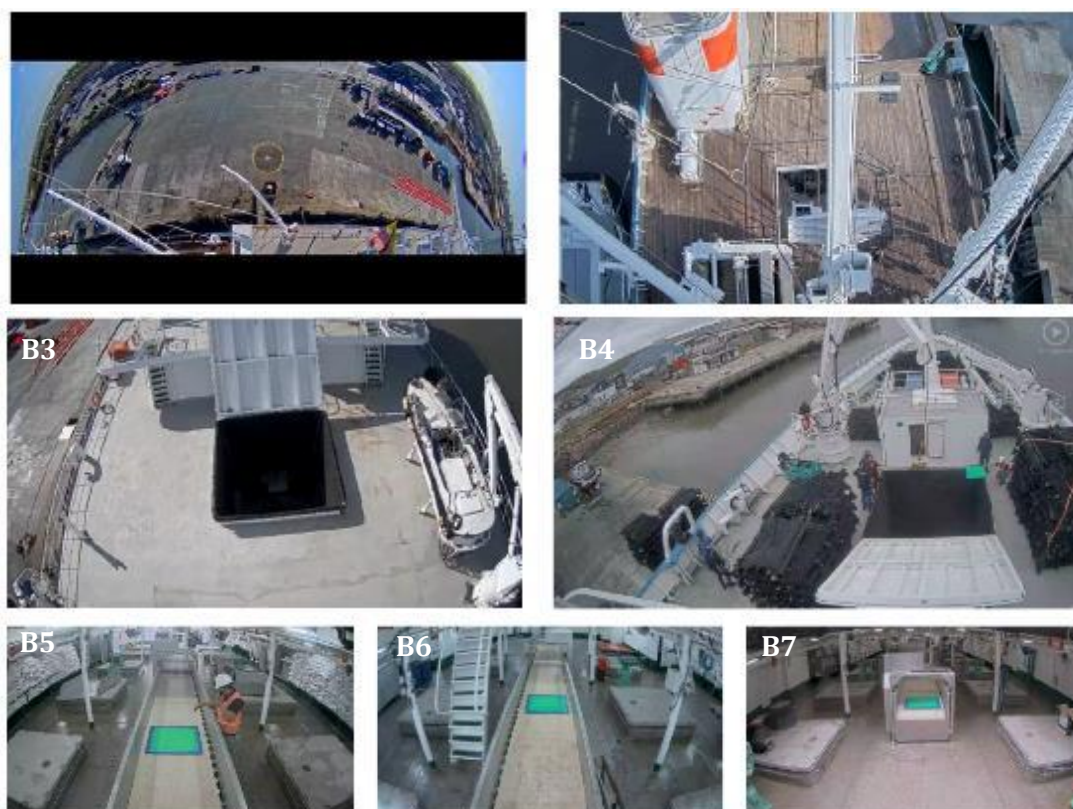


Figure 1. (A) An example of a 6-cameras EM system installed in a purse seine covering main areas of fishing and fish handling operations (from Murua et al., 2020b) and (B) 7-cameras EM system (4 in the upper deck and 3 in the well deck) installed in a purse seine covering main areas of fishing and fishing handling operations including 1 more camera in the conveyor belt: (B1) 360° Panoramic view camera (e.g port side view), (B2) Crows nest stern view camera, (B3) Working deck crane camera view, (B4) Foredeck view camera, (B5) Conveyor belt stern camera view, (B6) Conveyor belt middle camera, and (B7) Conveyor belt bow camera (source: Digital Observer Services).

Table 1. Minimum areas and actions that should be monitored (adapted from Murua et al., 2022; Ruiz et al., 2017).

Area covered	Action covered	Purpose	Minimum data requirements to be monitored
Work deck (port side)	Brailing	Total catch by set Species composition	Number of brails & fullness by brail. Weight, size and species of retained tuna
	Tuna discards	Total tuna discards by set	Weight, size and species of discarded tuna
	Bycatch handling	Bycatch estimation	number of individuals handling mode Species ID
Work deck (starboard side)	Bycatch handling	Bycatch estimation	Handling mode
	Bycatch release	Total bycatch by	Number of individuals and species ID
In-water purse seine area	Brailing	Total catch by set	Number of brails & fullness by brail
	Bycatch handling and safe-release of individual animals (whale sharks, manta rays...)	Total bycatch by set . Application of handling and safe-release best practices	Handling mode
	Bycatch release of big species (whale sharks, manta rays...)	Total bycatch by set Application of handling and safe-release best practices.	Number of individuals and species ID

Foredeck or amidships	FAD activity (deploying, replacement, reparation...)	Total number of FAD deployments, FAD design and FAD activities by trip	Number, material (natural or artificial), and FAD characteristics (entangling or no entangling)
Well deck and conveyor belt	Catch well sorting	Species composition	Weight, size and species of retained tuna.
	Bycatch handling	Best practices	Handling mode
	Estimation of bycatch discards, releases or retention	Total bycatch by set Species composition Application of handling and safe-release best practices.	Number, size or weight of individuals, species ID and fate

On longline vessels, the minimum areas and activities that cameras are recommended to cover (**Table 2, Figure 2**):

- The area of setting the longline (usually vessel stern site camera),
- the area of hauling the longline,
- the working deck where catch is handled,
- and the surrounding water area for those discarded species not brought onboard
- Cameras must cover the following actions: setting of the longline, bait type information, whether mitigation techniques are being used (e.g. tori lines for seabirds), hauling of the longline, all hooked species (both retained and discarded), the fate of the catch, and the size of the specimens.
- On most tuna longlines, at least 3 cameras are needed to cover fishing activities and fish handling operations: one capturing images when setting the longline, one to record the hauling and boarding of the catch, and other mounted over the processing deck to record species, size of specimens and fate (Murua et al., 2020a). And additional camera to cover the surrounding water area for those discarded species not brought onboard is also recommended.



Figure 2. An example of a 3-camera EM equipment installed on a longline covering main areas of fishing and fish handling operations. View of the 3 cameras: (left panel) Stern camera - setting longline providing information on hooks, floats, mitigation techniques and bait; (middle panel) Fishing deck 1 - hauling information, captures and discards, species ID, size and fate; and (right panel) Fishing deck 2 - fate of the species, size, species ID (source: Digital Observer Services).

Table 2 – General configuration and areas/activities covered by the EM system onboard tropical tuna longline vessels

Area covered	Action covered	Minimum data requirements to be monitored
Stern camera of the boat	Start and end setting operation	Position, date, and time
		Total number of hooks set and between floats
		Total number of floats set
		Bait type
		Bait species
		Bait ratio (%)
		Mitigation measures/marine pollution
Work deck	Catch onboard	Length and weight ¹ by capture
		Condition
		Fate
		Predator observed
	Bycatch discarded, released, or	Total bycatch by set and species composition
Processing area	Catch	Total catch by set
		Length and weight ¹ by capture
		Sex
		Fate
Surrounding water area	Start and end hauling operation	Position, time and date

¹ Estimated through length-weight relationships.

	Estimation of bycatch discards, releases or retention	Total bycatch by set and species composition
		Species condition and fate

On pole and line vessels, the minimum areas that cameras are recommended to cover are the area of bait fishing activity, the area of the fishing set and pole and line fishing activity (vessel stern site camera) and the working deck where catch is handled. On a typical Indian Ocean pole and line vessels, this will require at least 2 or 3 cameras to cover main fishing activity areas, fish handling operations and bait fishing (**Figure 3**).

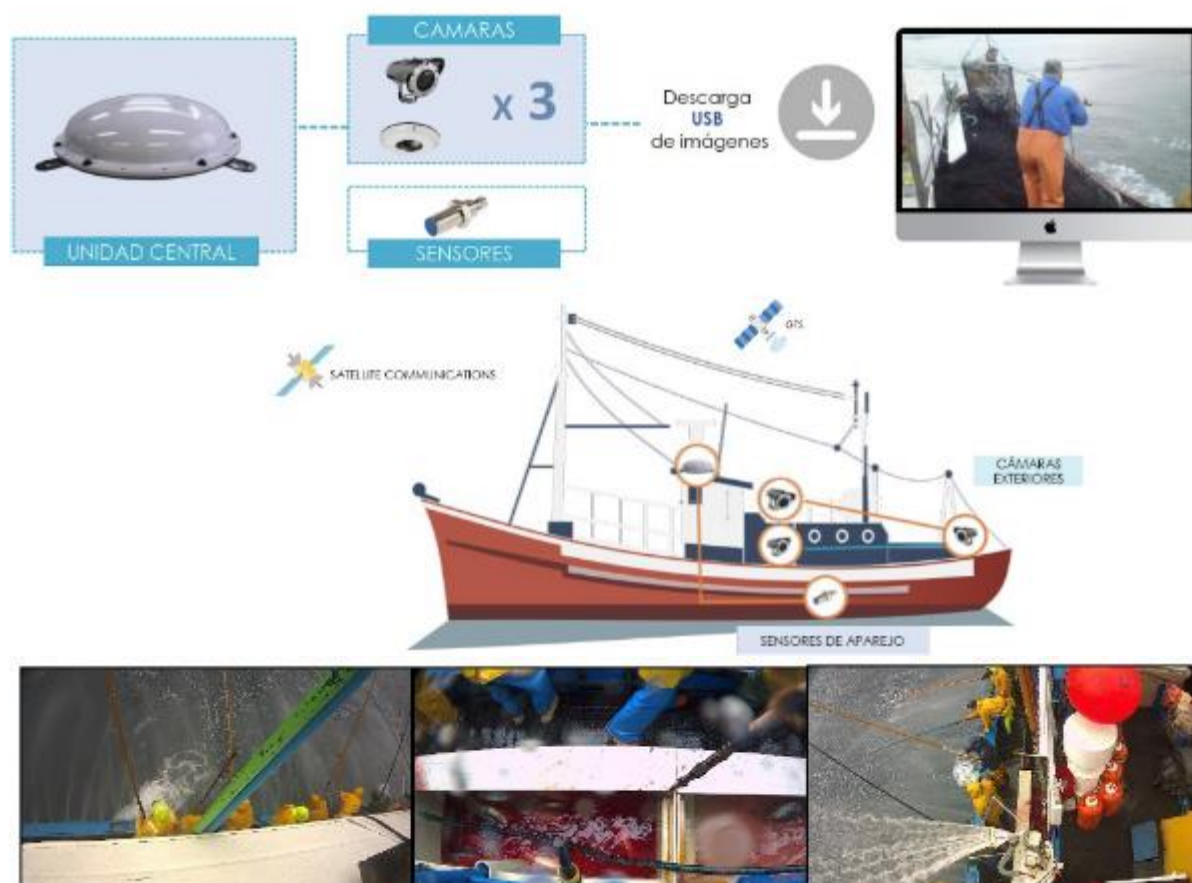


Figure 3. An example of a 3-camera EM equipment installed on a Bay of Biscay (Atlantic Ocean) pole and line vessel covering main areas of fishing activity and fish handling operations. View of the 3 cameras: (left panel) Vessel bridge camera stern view – pole and line activity; (middle panel) Fish handling - catch storage; (right panel) Vessel bridge camera bow view - bait and pole and line fishing activity (source: Marine Instrument).

Annex 2 – IOTC Regional Observer Scheme Minimum Standard Data Fields

The IOTC ROS minimum standard data fields for all fisheries. Some of the items such as vessel capacity and equipment, gear dimensions and configuration, which EM cannot record, should be collected before EM installation. MR: *Mandatory for Reporting* to be mandatorily collected and reported to the IOTC Secretariat; OR: *Optional for Reporting* to be reported to the IOTC Secretariat when the collection is feasible/practical. “---”: *Suggested for Collection*, to be collected by national Programs, based on best practice as agreed by the IOTC, but not mandatory to be reported to the IOTC Secretariat.

GENERAL VESSEL AND TRIP INFORMATION FOR ALL VESSEL TYPES

Data field name	Data field description	Reporting
Observed trip number	Record trip unique identifier. This is the observed trip unique identifier. This should begin with trip’s start date (YYYY-MM-DD), followed by IOTC observer number, and vessel main gear code as per IOTC classification (E.g. 2018/01/23-IOTCFRA001-PS).	MR
OBSERVER IDENTIFICATION		
Observer IOTC registration number	Record observer registration number allocated by the IOTC Secretariat to be used on all observer data submissions.	MR
Observer name	Record the name of the scientific observer(s) that collected the data on-board the fishing vessel. Note: print in full. First name First - Last name Last (do not use initials).	---
Observer nationality	Record the nationality of the scientific observer as it appears in passport (Table 9).	---
OBSERVER TRIP DETAILS		
Location of embarkation	Record the name and/or geographical coordinates of the port where the observer boarded the vessel – also include the country. If the observer embarked via a port launch within port limits, this is still recorded as a port embarkation. If the observer embarked at sea outside port limits via a vessel transfer, record “at sea” and record the position in Latitude and Longitude. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	---
Date / time embarkation	Record the date and time that the observer boarded the vessel. Note: specify units (preferably hh:mm and YYYY/MM/DD).	---
Location of disembarkation	Record the name and/or geographical coordinates of the port where the observer disembarked– also include the country. If the observer disembarked via a port launch within port limits then this is still recorded as a port of disembarkation. If the observer disembarked at sea outside port limits via a vessel transfer, record “at sea” and record the position in Latitude and Longitude. Note: Latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	---
Date / time disembarkation	Record the date and time that the observer disembarked from the vessel. Note: specify units (preferably hh:mm and YYYY/MM/DD).	---
VESSEL IDENTIFICATION		
Name of the vessel	Record the vessel full name as recorded on vessel official documentation and crosschecked with the name recorded on the vessel itself (any discrepancies are to be reported to the IOTC Secretariat). Note: care should be taken to record the correct spelling of the vessel’s name including any corresponding numbers. i.e. “Agnes 83”.	MR
Vessel flag state (or where chartering occurs, chartering state) ²	Record the name of country in which vessel is registered as shown on its registration documents (Table 9). Where chartering occurs, record name of the chartering country. Note: vessel flag state (or chartering state when chartering occurs) may not be the same as the nationality from which the vessel originates.	MR

² IOTC Res. 18/10

Vessel IOTC number	Vessel IOTC number as per the IOTC Record of Authorized Vessels ³ and crosschecked with the number recorded on vessel certificates. Note: any discrepancies are to be reported to the IOTC Secretariat.	MR
Vessel IMO or Lloyd's number	Record vessel IMO number. This is the number allocated to the vessel when registered to the International Maritime Organization of the United Nations (e.g.: IMO8814275).	OR
International radio call sign (IRCS)	Record vessel radio call sign if available. This is the number displayed prominently on the vessel's side or superstructure.	---
Vessel port of registration	Record the name of vessel's port of registry (also called home port) shown on its registration documents and lettered on the stern of the ship's hull – also include the country.	MR
Vessel registration number	Record the number issued by country in which the vessel is registered, shown on its registration documents and written on the hull of the vessel. This may be a combination of characters and numbers; record them all (e.g.: CBG303).	---
Vessel phone, fax and email	When available, record vessel contact details, taking note of the ocean region code. A vessel may have several contact numbers and email addresses depending on the satellite communications systems installed onboard; record them all.	---
Licensed target species	Record licensed target species (FAO spp. 3-alpha code) as specified in vessel licences or permit conditions (Table 1, Table 2, Table 3, Table 4, Table 8). Vessels will generally target a narrow range or aggregation of species, however one or more might not be an IOTC species; record them all.	OR
Main fishing gear	Record vessel main fishing gear (Table 10).	---
VESSEL OWNER AND PERSONNEL		
Registered owner	Record the owner's name, nationality (Table 9) and contact details in full. These can be obtained or cross-checked on the vessel registration forms.	---
Charterer / operator	Where the vessel has been chartered and is operated and managed by a company other than the owner, record operator's full name (company or individual as appropriate), nationality (Table 9) and contact details.	---
Fishing Master	Record the fishing master name and nationality in full (Table 9).	---
Skipper	Record skipper name and nationality in full (Table 9). Note: in some instances the fishing master and skipper may be the same person. In such cases record here "N/A" for not applicable.	---
Crew number	Record the number of crew. This should be cross checked against the vessel's crew list.	---
VESSEL TRIP DETAILS		
Port of departure	Record the name and/or geographical coordinates of the port from where the vessel sailed – also include the country. If the vessel started a new trip at sea following transshipment record 'at-sea' plus the geographical coordinates corresponding to the location the trip started. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	---
Date / time vessel sailed	Record the date and time the vessel departed from port or from a transshipment location. Note: specify units (preferably YYYY/MM/DD and hh:mm).	---
Port of return	Record the name and/or geographical coordinates of the port where the vessel returned – also include the country. If the vessel arrived at a transshipment location record 'at-sea' plus the geographical coordinates corresponding to the location the transshipment started. If the observer disembarked before the vessel returned then record expected port of return as provided by the vessel. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	---

³ <http://www.iotc.org/vessels/current>

Date / time vessel returned to port	Record the date and time the fishing vessel finishes its fishing campaign. i.e. returns to port or to a transshipment location for unloading. If the observer disembarks before the vessel returns then record expected date and time of arrival (ETA) as provided by the vessel. Note: specify units (preferably YYYY/MM/DD and hh:mm).	---
VESSEL ATTRIBUTES		
Tonnage	The vessel tonnage as specified in vessel registration papers. Note: specify units, i.e. if the vessel is registered using Gross Tonnage (GT) or Gross Registered Tonnage (GRT).	MR
Length overall	The vessel overall length (LOA) as specified in vessel registration papers. Note: specify units (preferably metres).	MR
Hull material	Record the vessel hull material (s) (steel, wood, aluminium, fibre glass, etc.) (Table 11).	MR
Main engines (make and power)	The make (brand) and power of the main engines. Note: specify units (HP, Kilowatt or BHP).	MR
Fish storage capacity	The vessel total maximum capacity to store catches. This should include blast freezer(s) capacity. Note: specify units (metric Tons (mT.) or cubic metres (m ³)).	MR
Fish preservation methods	Fish preservation methods: Record the method(s) used by the vessel to preserve the catch (Table 12).	---
Fish storage type	Record the type of structure(s) present on-board used by the vessel to store the catch (Table 13).	---
Vessel autonomy / range	Record vessel autonomy, expressed by the time (days) a vessel can spend at sea without refuelling. If this information is not available then record vessel range expressed in cruising distance (nautical miles). If a figure for the range cannot be obtained, the observer should calculate vessel range as follows. <Vessel range (nm)> = <Vessel average cruising distance per metric ton (nm/mT)> : <Tonnage of fuel carried (mT)> Note: specify units(days or nautical miles)	---
VESSEL ELECTRONICS		
Global Positioning System (GPS)	Indicate Yes if on board No if not sighted. Note: a GPS may be an independent unit or linked or incorporated into track plotters and acoustic systems.	MR
Vessel Monitoring Systems (VMS)	Indicate Yes if on board No if not sighted	MR
Radars	Indicate Yes if on board No if not sighted. Note: include high frequency radars used by the vessel to search for seabird activity or activity on the sea surface.	MR
Track Plotter	Indicate Yes if on board No if not sighted	MR
Depth Sounder	Indicate Yes if on board No if not sighted	MR
Sonar	Indicate Yes if on board No if not sighted	MR
Doppler Current Meter	Indicate Yes if on board No if not sighted Note: acoustic doppler current meter is used to ascertain current speed.	MR
Expendable bathythermographs (XBT)	Indicate Yes if on board No if not sighted. XTBs are usually mounted on the bridge wings. Note: XTBs are periodically used to determine the depth of the thermocline.	MR
VHF radios	Indicate Yes if on board No if not sighted	---
HF radios	Indicate Yes if on board No if not sighted	---
Satellite communication systems	Indicate Yes if on board No if not sighted.	---
Sea Surface Temperature (SST) gauge	Indicate Yes if on board No if not sighted. SST gauge is usually mounted on the bridge.	---

	Note: the vessel may also have access to SST charts received from Fisheries Information Services systems.	
Weather facsimile	Indicate Yes if on board No if not sighted. Note: weather information may also be received from Fisheries Information Services systems.	---
Fisheries information services	Indicate Yes or No if the vessel has access to a Fisheries information service. Note: Vessels may access fishery information services for instant information on weather and oceanographic features (SST, phytoplankton densities or sea height).	---
WASTE MANAGEMENT (MARPOL Agreement Annex 5)		
Waste category	Record the category of the waste produced by the vessel (Table 14).	OR
Storage/Disposal method	Record how the waste was disposed of (Table 15). For example, incinerated, stored in sacks or disposed of overboard.	OR
OBSERVED TRIP SUMMARY		
Number of fishing events/sets conducted by the vessel while the observer was on-board.	Record the total number of fishing events/sets conducted by the vessel while the observer was on-board, independently of their success and of being sampled or not by the observer. Note: this should not include pole and line bait fishing events/sets.	MR
Number of fishing events/sets observed	Record the total number of fishing sets/events monitored by the an observer. Note: this should not include pole and line bait fishing events/sets.	MR
Number of days searching	Record the total number of days that the vessel was engaged in actively searching for fish (this includes active fishing days).	MR
Number active fishing days	Record the total number of days that the vessel actually fished (i.e. when the vessel had gear in the water). Note: for some fishing events this may be for only a few hours of the day. Alternatively a single fishing event/set may span part of two days."	MR
Number of days lost	Record the total number of days where a vessel was unable to fish due to factors such as adverse weather conditions, mechanical failure or other unforeseen events.	MR
Reason(s) for days lost	Record the reason(s) a vessel was unable to fish: (i) adverse weather conditions, (ii) mechanical breakdown or inoperative gear or (iii) unforeseen events (specify).	OR
Number of days in the fishing area	Record the number of days the vessel spent in the fishing area while the observer was onboard. This does not include transit time even if the area being transited is within the fishing area.	---
Number of days transiting	Record the number of days the vessel spent steaming or transiting to/between/from fishing areas while the observer was onboard.	---

LONGLINE INFORMATION**Gear specifications**⁴

Data field name	Data field description	Reporting
SPECIAL EQUIPMENT OR MACHINERY		
Line setter	Indicate Yes if on board No if not sighted. Many long line vessels will be fitted with equipment or machinery that regulates line setting speed allowing the line to be set at uniform depth.	MR
Line hauler	Indicate Yes if on board No if not sighted. Most long line vessel will be fitted with equipment or machinery that hauls the line in after it has been set.	MR
Bait casting machine	Indicate Yes if on board No if not sighted. Most vessels manually deploy branch lines with the bait. However there are a number of vessels that use automatic bait casting machines.	MR
GENERAL GEAR ATTRIBUTES		
Mainline material	Record the material the mainline is made out of, e.g. kevlar, nylon, nylon multifilament (Table 16).	MR
Mainline length	Record the total length of the mainline (i.e. mainline maximum length). This information can be obtained from the Captain or Fishing Master. Note: specify units (preferably 'Kilometres')	MR
Mainline diameter	Record the diameter of the mainline. This information can be obtained from the Captain or crew and crosschecked by measuring mainline diameter with callipers. Note: specify units (preferably 'millimetres')	---
Branchline configuration number	Unique number for a specific branchline specification as detailed based on the fields below.	MR
Branchline material	Record the branchline material for each of the four sections where section 1 is that closest to the mainline and section 4 is the leader; note that wire trace may be sheathed by a plastic or nylon coating (Table 16).	---
Branchline length	Record the length of the branchline for each of the four sections where section 1 is that closest to the mainline and section 4 is the leader. Note: specify units (preferably 'metres')	MR
Branchline diameter	Record the diameter of the branchline for each of the four sections where section 1 is that closest to the mainline and section 4 is the leader. Note: specify units (preferably 'millimetres')	MR
Branch line storage	Record if the branch lines are coiled up and packed into baskets (BSK), or layered out in tubs (TBS), or coiled up onto reels (RLS).	---
MITIGATION DEVICES		
DMDs used	Record depredation mitigation device/s DMDs used by the vessel (if any) (Table 38).	---

⁴ Information designed to capture detailed specifications of the different components of the longline gear used by the vessel.

TORI LINE DETAILS	If the vessel was equipped with a tori line provide tori line details below. If no tori line was present on-board fill in NA for not applicable.	
Tori line length	Record the total length of the tori line (not including streamers). Note: specify units (preferably metres)	MR
Streamer type	Indicate the type of streamers which are used with the tori line (e.g. paired or single)	MR
Streamer line length	Record length of individual streamer lines (minimum and maximum where lengths vary). Record only one length if they do not vary. Note: specify units (preferably metres)	MR
No. streamers per line	Record the number of streamers that are attached to a single tori line	MR
Distance between streamers	Record the distance between streamers. Note: specify units (preferably metres)	---
Attached height	Record the height hat the tori line is attached above the water level. Note: specify units (preferably metres)	MR
Streamers reach surface	Indicate Yes if the streamers are long enough to touch the surface of the water in calm conditions and No if they are not.	---
Towed objects	Record the total number and type of towed objects used to maintain tori line tension and achieve aerial extent when deployed.	---
Diagram	Sketch/complete a diagram containing Tori line key features (e.g. Fig. 1 of IOTC Resolution 12/06).	---

Fishing event⁵

Data field name	Data field description	Reporting
Set number	Record set number. This should be a four digit numerical code beginning 0001. Set numbers should be consecutive from the start of the first line set to the last line set of the observed trip. A unique number is to be allocated to each individual set.	MR
SETTING OPERATIONS		
Start setting date and time	Record the date and the time the first dhan buoy and / or radio buoy is deployed to start the setting of the line. Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR
Start setting position	Record the position in latitude and longitude for the start of the setting operation Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	MR
End setting date and time	Record the date and the time that the last dhan buoy and / or radio buoy is deployed. Longline vessels often set lines at the night and the setting operation may continue beyond midnight and into the following day.	MR

⁵ Information required for every set/operation.

	Note: specify units (preferably hh:mm and YYYY/MM/DD).	
End Setting Position	Record the position in latitude and longitude for the end of the setting operation Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably \pm (d)dd.dddd°).	---
Vessel speed	Record the vessel's average speed during setting (knots). Note: Collect vessel speed from the GPS several times during the operation and take the average.	---
Line setter speed	Record the speed setting of the line setter (metres/second).	---
Length of mainline set	Record mainline total set length (i.e. the total deployed length of the mainline for the specific set). Usually calculated by multiplying the total time to set the line and the average line setter speed, taking into account any interruption times. This information can be obtained from the Fishing Master and cross checked against observer calculations. Note: specify units (preferably in Kilometres).	MR
Branchline clip on time	Record the average time interval in seconds between the "beeps" that indicate to the crew to clip on a branch line. Note: the timing of this is usually controlled by the Fishing Master.	---
Buoys clip on time	Record the average time interval in seconds between the "beeps" that indicate to the crew to clip on a buoy. Note: the timing of this is usually controlled by the Fishing Master.	---
Total number of hooks set	Record the total number of hooks deployed for the set. Usually calculated by multiplying number of baskets by the average number of hooks between the baskets. This information can be obtained from the Fishing Master and cross checked against observer calculations. Note: total length of line set and spacing between branch lines can also be used to determine the number of hooks set.	MR
Total number of floats set	Record the total number of floats deployed during the set (this should not include the radio/dhan buoys). Usually calculated by subtracting the number of buoys in their holders before setting by the number of buoys in their holders after setting. This information can be obtained from the Fishing Master and cross checked against observer calculations.	---
N° of hooks set between floats	Record the number of hooks set between floats. This will correspond to the number of hooks stored in each basket/tub, or on a reel and will be equivalent to the number of branch lines set.	---
Distance between branchlines	Record the distance between branch lines (i.e. the interval at which they were set along the mainline) in metres. Usually calculated by multiplying 'Branch line clip on time (s)' by the 'line setter speed' (m/s).	---
Floatline lengths (1, 2 and 3)	Record the different lengths of the floatlines used (1, 2 and 3). Note: specify units (preferably metres).	---
Total radio/dhan buoys set	Record the total number of radio and /or dhan buoys deployed.	---

Attached lights	Record number of lights attached to the branchlines per type (Table 22) and colour (Table 23).”	---
Shark lines set	Indicate Y or No if shark lines were set during the operation. Note: shark lines are branch lines running directly off the longline floats or drop lines, specifically for targeting sharks.	MR
N° of shark lines set	Record the number of shark lines set during the operation. If no shark lines are set then record zero (0).	---
Target species	Record the target species for the set (FAO spp. 3-alpha code), (Table 1, Table 2, Table 3 and Table 4).	MR
VMS on	Indicate Y or No to sign if the VMS was on or not while setting and hauling.	OR
Mitigation measures		
Number of Tori lines deployed	The total number of tori lines deployed during the setting operation. Record zero if none were deployed.	MR
Low light night setting	Indicate Y or No for whether minimum deck lighting is used during night setting (as defined in Table 1. Mitigation measures of IOTC Res 12/06). Note: night setting is binary. i.e. if all hooks are set between dusk and dawn, then night setting was used. If some hooks are set outside of nautical darkness, then night setting was not used. [Consistent with IOTC Res 12/06]	MR
Branchline weighted	Indicate Yes or No if the branch line is weighted. [Consistent with IOTC Res 12/06]	MR
Sinker average weight	Record the average weight of weights or sinkers attached to the branchlines (weights deployed on the snood prior to setting). Note: specify units (preferably grams (g)). [Consistent with IOTC Res 12/06]	MR
% branchlines weighted	Record the proportion of branchlines weighted (%). If all weighted, record 100%.	MR
Hook-sinker distance	The distance of the weights/sinkers from the eye of the hook. Note: specify units (preferably centimetres (cm)).	MR
Underwater setting	Indicate Yes or No if the bait is protected on the branchlines until they are a certain depth below the surface.	---
Other mitigation measures used	Record any other mitigation measures observed (Table 38).	---
N° of branchlines set by type	Record the number of branchlines set by type (branchline configuration number. Branchline types must be in accordance to types previously defined under the “Gear specifications” section.	---
Hook type	Record the type of hooks used (Table 17).	MR
% hooks set by type	Record the percentage (%) of hooks set by type. [As per SC20.23 recommendations]	MR

Variations in hook type ⁶	Where possible indicate any variations in hook type, hook material and presence/absence of hook ring (Table 17).	---
Bait type	Record bait type/condition used (Table 25).	MR
Bait species	Record the species of bait used (FAO spp. 3-alpha code) (Table 8).	MR
Bait ratio (%)	Record the approximate proportion of bait species and condition used across all hooks in the set (%).	MR
Bait dye colour	Record the colour or colours that the different baits are dyed (e.g. blue to avoid bird bycatch). If none, write NONE.	---
HAULING OPERATIONS		
Start hauling date and time	Record the date and the time when the first dhan buoy and / or radio buoy is hauled back on-board to start hauling the line. Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR
Start hauling position	Record the position in latitude and longitude for the start of the hauling operation. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably ±(d)dd.dddd°).	MR
End hauling date and time	Record the date and the time when the when the last component of the longline gear (dhan buoy and / or radio buoy) is hauled back on-board. Note: specify units (preferably hh:mm and YYYY/MM/DD).	---
End hauling position	Record the position in latitude and longitude for the end of the hauling operation. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably ±(d)dd.dddd°).	---
Offal management	Record fate given to the offal (fish heads, guts, etc.) and bait produced during the observed set. Indicate if these are retained for batch disposal (BD) at a later stage and/or disposed of ad hoc (AH) as they accumulate.	---
Position of offal disposal	Record the position where offal and used bait was disposed. Indicate if these are disposed at port side (BB), starboard (SB) or aft (AF).	---
Method/s to stun fish	Record the method/s used to stun fish during hauling (Table 24).	---
Bird scaring device at hauler	Indicate Yes if a bird scaring device was deployed during hauling operations and No if not. Note: report on the construction and effectiveness of all devices used in the comments section and trip report.	---
Number of bite-offs (by branchline type)	Record for each type of branchline set up previously identified how many have had the hook bitten off. This only includes bite-offs observed while the observer was in a position to observe and record the hooks coming directly out of the water.	---

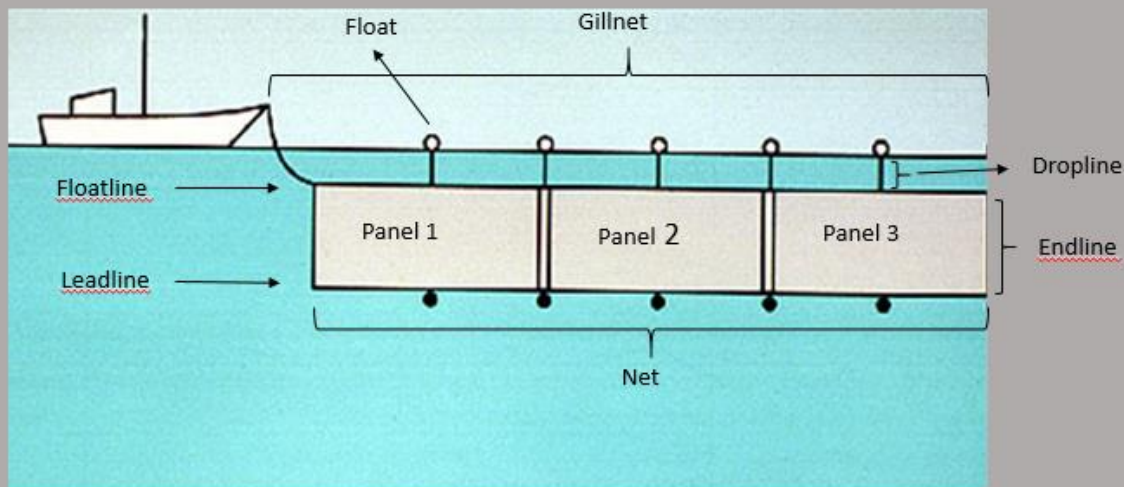
⁶ Hooks used in pelagic fisheries are correctly identified and characterised based on type, type variations, material and presence/absence of hook ring. Standardization of hook types and characteristics is therefore very important for data recording and analysis and for scientific studies on their effects on catch rates and post-capture survival.

Number of retrieved hooks observed	Record the number of hooks observed.	MR
Sampling protocol	Indicate sampling protocol followed by the observer (Table 39).	MR
CATCH DETAILS		
Set number	Unique within a specific trip	MR
Catch detail number	Unique within a specific set	MR
Species	Record the species code for each specimen observed using FAO three figure alpha codes (Table 1, Table 2, Table 3, Table 4, Table 5, Table 6 and Table 7). If species FAO code is not available, record the species scientific name. Note: Record “unknown” for species that cannot be positively identified and give it a reference number. Use the same reference number throughout the trip for that species. Retain a sample and / or take a photograph of the unidentified organism for latter identification.	MR
Fate	Specify the fate which includes whether it was retained or discarded and the reason, e.g. “Discarded – too small” (Table 41).	MR
Sampling methods for obtaining total catch estimates per species	Indicate the sampling method used to obtain total catch estimates per species for the catch detail (Table 40).	MR
Number	Record the number of individuals per species for each specified fate. If weight is recorded, insert NA here (for large fish, record number of individuals).	MR
Weight	Record the weight corresponding to the specified species and fate category. If number of individuals is recorded, insert NA here (for small fish, record weight). Note: specify units (preferably tons).	MR
Weight estimation method	Indicate the weight estimation method used to collect weight (Table 43). Note: If number of individuals is recorded, insert NA here.	MR
Weight code	The code corresponding to the type of processing the specimen underwent prior to weighing (Table 44). If the fish has not been processed, record code for unprocessed (or round, whole, live) weight (i.e. RD). Note: If number of individuals is recorded, insert NA here.	MR
SPECIMEN INFORMATION		
Set number	Unique within a specific trip	MR
Catch detail number	Unique within a specific set	MR
Specimen number	Unique within a specific catch detail	MR
Depredation details	[In agreement with SC18.16 (para. 53)]	
Depredation source	For depredated specimens, record the depredation source based on depredation scar characteristics (Table 45). For non-depredated specimens record NA.	MR

Predator Observed	For depredated specimens, record the predator species directly observed and identified (FAO spp. 3-alpha code). If the predator was not observed record UNK (unknown). For non-depredated specimens record NA. Note: species observed in the area may not necessarily be associated with depredation unless directly observed. Similarly for shark and squid damage the species may be difficult to determine.	MR
Additional details on non-target species	Catch details on non-target species to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Condition at capture	State the condition of the specimen at capture (Table 46).	OR
Condition at release	State the condition of the specimen at the time of release (Table 46).	OR
Additional catch details on SSIs	Additional catch details on Species of Special Interest (Table 47) to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Gear interaction	For SSI only, specify the type of interaction of the specimen with the fishing gear (Table 48).	OR
Hook type	For SSI only, record the type of hook the individual was hauled on (Table 17) [Consistent with IOTC Res 12-04]	OR
Bait type	For SSI only, record the type/condition of bait the individual was hauled on (Table 25). [Consistent with IOTC Res 12-04]	OR
Leader material	For SSI only, record the leader material the individual was hauled on (Table 16). [Consistent with IOTC Res 12-04 and IOTC Res. 17/05]	OR
Leader thickness	For SSI only, record the thickness of the leader the individual was hauled on. Note: precise units (preferably millimetres (mm)). [Consistent with IOTC Res 12-04 and IOTC Res. 17/05]	OR
De-hooker/line cutter	Specify de-hooking or line cutting device used to extract the hook (Table 50). [Consistent with IOTC Res 12-04]	OR
Brought on board	Indicate Yes or No, if the specimen was brought on board. [Consistent with IOTC Resolutions 13/04; 13/05; 12/04; 12/06; 12/09]	OR
Hauling method	Detail how the specimen was brought on-board (Table 49). [Consistent with IOTC Res 12-04]	OR
Resuscitation (for turtles only)	For turtles indicate Yes if the release took place with resuscitation and No if not.	---
Photo ID	If a photo is taken, record photo number/code so that it can be linked back to the specimen for onshore examination.	---
BIOMETRIC INFORMATION		
Details concerning any extra biometric measurements, sex, maturity and the collection of biological samples.		
Sampling methods for the collection of biological information	Indicate the sampling method used for the collection of biological sub-sample (Table 42).	MR
Length code 1	Specify the length code used for the measurement (Table 53).	MR

Length 1	Record the length corresponding to the length type taken rounded to the lower centimetre.	MR
Length code 2	When an additional length measurement is taken, the corresponding length code should be recorded (Table 53).	OR
Length 2	When an additional length measurement is taken, the corresponding length should be recorded rounded to the lower centimetre.	OR
Weight code	Record the code corresponding to the type of processing the specimen underwent prior to weighing (Table 44).	OR
Weight	Record the specimen's weight (in kilograms) corresponding to the specified product type recorded in 'weight code'. If the fish has not been processed, record the unprocessed (or round, whole, live) weight (i.e. RD).	OR
Weight estimation method	Specify the weight estimation method used to obtain the weight (Table 43).	OR
Sex	Record the sex of the sampled fish specimen (Table 51). If unknown record UNK.	OR
Maturity stage ⁷	Record the stage of maturity of the sampled fish specimen according to standard maturity scales approved by the IOTC. If unknown record UNK.	OR
Sample collected	Record the following details on the collection of samples: a) type (e.g. otoliths, spine clippings, and genetic samples) b) preservation method (e.g. alcohol, frozen, etc.) c) destination (i.e. location to be sent/stored)	OR
TAG DETAILS		
Note that all tagged specimens are to be identified to species level and to be sampled for length. Elasmobranchs and turtles are also to be sexed and ascertained for maturity.		
Tag release	Indicate Yes or No, whether this individual was re-released with a tag attached.	MR
Tag recovery	Indicate Yes or No, whether a tag was recovered from this individual.	MR
Tag number	Provide the tag number. If a turtle, provide both tag numbers (right and left flipper).	MR
Tag type	Record the type of tag used (Table 52).	MR
Tag finder	Record the name and contact details of the person who recovered the tag.	MR

⁷ Until a standard maturity stage has been approved by the Scientific Committee, record both stage and scale used.

GILLNET INFORMATION⁸

Gillnet: A vertical panel(s) of netting suspended in the water column which may be attached to free floating buoys and/or a high flier at one end, and tied off to the vessel at the other end. Large mesh netting is stretched between a floatline at the top and a leadline at the bottom, and supported by vertical endlines, or up and down lines on each end. Panels of netting may be separated by a space or escape panel.

Net: A string of panels sewn together. The entire string may be referred to as "the net".

Panel: A section of continuous netting of exactly the same characteristics between two endlines (up and down lines).

Source: *Scott.Fish.Inf.Pamp. Fig.30, p.40*

Gear specifications

Data field name	Data field description	Rep. Req.
SPECIAL EQUIPMENT OR MACHINERY		
Net drum/hauler	Indicate Yes if on board No if not sighted. Vessels are normally equipped with a hydraulic net hauler; However they can also use net drums to both haul and store the net.	MR
GILLNET ATTRIBUTES Detail the specifications of each gillnet present on-board during the observed trip.		
Gillnet sequential number	Specify gillnet sequential number. Note: a unique sequential number is allocated to link each gillnet to its specifications. Any changes to individual gillnet specifications are to be considered a change of gillnet and the "new" gillnet will need to be characterised accordingly.	MR
Total number of panels	Record the number of panels making up the net.	MR
Panels stacked	Indicate Yes or No if there are any panels stacked.	MR

⁸ To be completed as soon as EM pilots from Regional Observer Project are available

	Note: stacked panels is defined as two or more panels of netting sewn together vertically, one on top of the other, to intentionally fish “double deep”.	
Net length	Record the net string length. Usually calculated by multiplying the panel average length by the number of panels used in the net. Note: specify units (preferably kilometres)	MR
Net depth	Record the vertical height of the net (depth). Usually obtained by measuring the length of the end-line, or up and down line, on the end of a net where the meshes are attached. This information may be used to cross check information provided by the crew. Note: specify units (preferably metres)	---
Net material	Record the material of the net webbing (Table 18).	---
Stretched mesh size(s)	Record the mesh average stretched lengths (knot to knot) and range. Usually calculated by measuring at least 10 meshes from 5 panels in different areas of the net. Note: specify units (preferably millimetres)	MR
Mesh count, vertical	Record the number of vertical meshes of a net in this gear. Usually obtained by counting the number of meshes of the end-line, or up and down line, on the end of a net where the meshes are attached. This information may be used to cross check information provided by the crew.	---
Hanging ratio (%)	Record the ratio between the length of the float line and the length of the stretched mesh hanging on the float line. Usually obtained by the following process: 1) counting 10 or 12 meshes horizontally, 2) multiplying the number of counted meshes by average stretched mesh length; 3) measuring the length of the floatline they are attached to, 3) dividing the length of the floatline the meshes are attached to by the length of the stretched meshes counted (see e.g. below). <div style="text-align: center;"> <p>Hanging ratio</p> <p>If a stretched mesh of: 10 cm...</p> <p>...is hung in the line at:</p> <p>6.7 cm 5 cm 3 cm</p> <p>Hanging ratio = 0.67 Hanging ratio = 0.5 Hanging ratio = 0.3</p> <p>(6.7 : 10 = 0.67) (5 : 10 = 0.5) (3 : 10 = 0.3)</p> </div>	MR
Net web colour	The colour(s) of the net webbing (Table 19). Note: Different net colours can have an impact on cetacean and turtle bycatch as some colours are more visible than others. [Consistent with SC16.24 (para. 53)].	MR
Float type	Record the type of buoyancy aid that is attached to the head-rope (Table 20).	---
Float number	Record an approximate total number of floats used on this gillnet. This number must include the number of floats across a space that may occur at the bridle at the end of a net. This information may be obtained from the crew.	---
Distance between floats	Record the average distance (measured along the head-rope) between the floats used on this gillnet.	---

	Note: specify units (preferably metres).	
Droplines used	Indicate Yes if droplines are used in this gillnet and No if not.	---
Droplines length	If droplines are used in this gillnet, record the length of the droplines. Usually obtained by measuring the distance from the floats (at the water's surface) to the float-line. This information may be used to cross check information provided by the crew. Note: specify units (preferably metres).	---
Sinker type	Record the sinker type (defined accordingly to the material they are made of) attached to the footrope (Table 21).	---
Sinker Number	Record an approximate total number of sinkers attached to footrope. If more than one type of sinker is used, record approximate total number of sinkers/weights per sinker type. This information may be obtained from the crew.	---
Sinker average weight	Record sinker average weight. If more than one type of sinker is used, record sinker average weight per sinker type. Note: specify units (preferably kilograms).	---

Fishing event

Data field name	Data field description	Rep. Req.
Set number	Record set number. This should be a four digit numerical code beginning 0001. Set numbers should be consecutive from the start of the first line set to the last line set of the observed trip. A unique number is to be allocated to each individual set.	MR
Gillnet sequential number	Specify gillnet used on this set by recording its sequential number. Note: a unique sequential number is allocated to link each gillnets to its specifications.	MR
SETTING OPERATIONS		
Start setting date and time	Record the date and the time that first panel enters the water (i.e. start of the setting of the net). Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR
Start setting position	Record the position in latitude and longitude for the start of the setting operation. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	MR
End setting date and time	Record the date and the time the gillnet is secured to the vessel, to an anchoring device, or completely deployed (i.e. end of net setting). Gillnet vessels often set dusk and the setting operation may continue beyond midnight and into the following day. Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR
End setting position	Record the position in latitude and longitude for the end of the setting operation Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	---
Vessel speed	Record the vessel's average speed in knots during setting.	---

	Note: Collect vessel speed from the GPS several times during the operation and take the average.	
Vertical set	Indicate the level the gillnet is set at vertically in the water column, i.e., if the net is set at the surface or sub-surface (Table 27).	MR
Setting strategy	Indicate how the gillnet was set (Table 29).	MR
Setting shape	Indicate the spatial configuration in which the gillnet was set (Table 28). Note: gillnets can be set in a range of configurations such as pulled straight, in a semi-circle or v-shape as well as many others.	---
Mitigation measures		
Mitigation measures	Indicate Yes or No if any bycatch mitigation devices were used during the set.	MR
Mitigation devices	Record any mitigation device(s) used during the set (Table 38).	---
HAULING OPERATIONS		
Start hauling date and time	Record the date and time at the start of net hauling. This is the time when the hauling equipment is put into gear or when the net starts being hauled. Vessels often haul nets in the early morning after a night soak period. Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR
Start hauling position	Record the position in latitude and longitude for the start of the hauling operation. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.ddd^\circ$).	MR
End hauling date and time	Record the date and time at the end of net hauling. This is the time when the gillnet is completely retrieved and onboard the vessel. Note: specify units (preferably hh:mm and YYYY/MM/DD).	---
End hauling position	Record the position in latitude and longitude for the end of the hauling operation. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.ddd^\circ$).	---
Net condition	Indicate the condition of the net at haul-back, even if the condition was the same at setting (Table 26).	MR
Number of net panels retrieved	Record the total number of net panels retrieved at haul.	MR
Number of net panels observed	Record the total number of hauled net panels that are observed.	MR
Sampling protocol	Indicate sampling protocol followed by the observer to select which net panels to observe (Table 39).	MR
CATCH DETAILS		
Set number	Unique within a specific trip	MR
Catch detail number	Unique within a specific set	MR

Species	Record the species code for each specimen observed using FAO three figure alpha codes (Table 1, Table 2, Table 3, Table 4, Table 5, Table 6 and Table 7). If species FAO code is not available, the species scientific name. Note: Record “unknown” for species that cannot be positively identified and give it a reference number. Use the same reference number throughout the trip for that species. Retain a sample and / or take a photograph of the unidentified organism for latter identification.	MR
Fate	Specify the fate which includes whether it was retained or discarded and the reason, e.g. “Discarded – too small” (Table 41).	MR
Sampling methods for obtaining total catch estimates per species	Indicate the sampling method used to obtain total catch estimates per species (Table 40).	MR
Number	Record the number of individuals per species for each specified fate. If weight is recorded, insert NA here (for large fish, record number of individuals).	MR
Weight	Record the weight corresponding to the specified species and fate category. If number of individuals is recorded, insert NA here (for small fish, record weight). Note: specify units (preferably tons).	MR
Weight estimation method	Indicate the weight estimation method used to collect weight (Table 43). Note: If number of individuals is recorded, insert NA here.	MR
Weight code	Record the type of processing the species underwent prior to weighing (Table 44). If the species has not been processed, record the code for unprocessed (or round, whole, live) weight (i.e. RD). Note: If number of individuals is recorded, insert NA here.	MR
Depredation details		
Depredation source	For depredated specimens, indicate the depredation source based on depredation scar characteristics (Table 45). For non-depredated specimens record NA.	MR
Predator Observed	For depredated specimens, record the predator species directly observed and identified (FAO spp. 3-alpha code). If the predator was not observed record UNK (unknown). For non-depredated specimens record NA. Note: species observed in the area may not necessary be associated with depredation unless directly observed. Similarly for shark and squid damage the species may be difficult to determine.	MR
SPECIMEN INFORMATION		
Set number	Unique within a specific trip	MR
Catch detail number	Unique within a specific set	MR
Specimen number	Unique within a specific catch detail	MR

Additional details on non-target spp.	Catch details on non-target species to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Condition at capture	State the condition of the specimen at capture (Table 46).	OR
Condition at release	State the condition of the specimen at the time of release (Table 46).	OR
Additional catch details on SSIs	Additional catch details on Species of Special Interest (Table 47) to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Gear interaction	For SSI only, specify the interaction of the specimen with the fishing gear (Table 48).	OR
Brought on board	Indicate Yes or No, if the specimen was brought on board. [Consistent with IOTC Resolutions 13/04; 13/05; 12/04; 12/06; 12/09]	OR
Hauling method	Specify how the specimen was brought on-board (Table 49). [Consistent with IOTC Res 12-04]	OR
Resuscitation (for turtles only)	For turtles indicate Yes if the release took place with resuscitation and No if not.	---
Photo ID	If a photo is taken, record photo number/code so that it can be linked back to the specimen for onshore examination.	---
BIOMETRIC INFORMATION		
Details concerning any extra biometric measurements, sex, maturity and the collection of samples.		
Sampling methods for the collection of biological information	Indicate the sampling method used for the collection of biological sub-sample (Table 42).	MR
Length code 1	Specify the length code used for the measurement (Table 53).	MR
Length 1	Record the length corresponding to the length type taken rounded to the lower centimetre.	MR
Length code 2	When an additional length measurement is taken, the corresponding length code should be recorded (Table 53).	OR
Length 2	When an additional length measurement is taken, the corresponding length should be recorded rounded to the lower centimetre.	OR
Weight	Record the weight corresponding to the specified species and fate category. If number of individuals is recorded, insert NA here (for small fish, record weight). Note: specify units (preferably tons).	OR
Weight estimation method	Indicate the weight estimation method used to collect weight (Table 43). Note: If number of individuals is recorded, insert NA here.	OR
Weight code	Record the type of processing the species underwent prior to weighing (Table 44). If the species has not been processed, record the code for unprocessed (or round, whole, live) weight (i.e. RD). Note: If number of individuals is recorded, insert NA here.	OR

Sex	Record the sex of the sampled fish specimen (Table 51).	OR
Maturity stage ⁹	Record the stage of maturity of the sampled fish specimen according to standard maturity scales approved by the IOTC. If unknown record UNK.	OR
Sample collected	Record the following details on the collection of samples: <i>d)</i> type (e.g. otoliths, spine clippings, and genetic samples) <i>e)</i> preservation method (e.g. alcohol, frozen, etc.) <i>f)</i> destination (i.e. location to be sent/stored)	OR
TAG DETAILS		
Note that all tagged specimens are to be identified to species level and to be sampled for length. Elasmobranchs and turtles are also to be sexed and ascertained for maturity.		
Tag release	Indicate Yes or No, whether this individual was re-released with a tag attached.	MR
Tag recovery	Indicate Yes or No, whether a tag was recovered from this individual.	MR
Tag number	Provide the tag number. If a turtle, provide both tag numbers (right and left flipper).	MR
Tag type	Record the type of tag used (Table 52).	MR
Tag finder	Record the name and contact details of the person who recovered the tag.	MR

PURSE-SEINE INFORMATION

Gear specifications

Data field name	Data field description	Reporting
SPECIAL EQUIPMENT OR MACHINERY		
Power block	Indicate Yes if on board No if not sighted.	MR
Purse winch	Indicate Yes if on board No if not sighted.	MR
GENERAL GEAR ATTRIBUTES		
Maximum length of the net	Record the maximum length of the net according to the net specifications. This corresponds to the length of the topline. Note: specify units (preferably metres)	MR
Maximum depth of the net	Record the maximum fishing depth according to the net specifications. Note: specify units (preferably metres)	MR
Bag stretched mesh size	Record the mesh average stretched lengths (knot to knot) of the bag of the net. Usually calculated by measuring 3 stretched mesh lengths and calculating the average. Note: specify units (preferably centimetres)	MR

⁹ Until a standard maturity stage has been approved by the Scientific Committee, record both stage and scale used.

Mid-net stretched mesh size	Record the mesh average stretched lengths (knot to knot) of the mid-net. Usually calculated by measuring 3 stretched mesh lengths and calculating the average. Note: specify units (preferably centimetres)	MR
Maximum Brail Capacity	Record the maximum weight capacity of a full brail in metric tonnes (Mt).	MR
Skiff Power	Record the skiff engine power. Note: specify units (HP, KW).	---

Fishing event

Data field name	Data field description	Reporting
Set number	Record set number. This should be a four digit numerical code beginning 0001. Set numbers should be consecutive from the start of the first line set to the last line set of the observed trip. A unique number is to be allocated to each individual set.	MR
OPERATIONS		
Set type ¹⁰	Free school set, FAD set, etc. (table 34)	MR
Start setting date and time	Record the date and time the skiff is launched to start the setting operation. Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR
Start setting position	Record the position in latitude and longitude for the start of the setting operation. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	MR
Beaufort	Record the force of the wind according to the Beaufort scale (Table 37).	---
School sighting cue and school type	Report up to the first three cues which lead the vessel to detect the presence of the tuna school and specify the type of tuna school detected (Table 35).	MR
First detection method	Record how the vessel first detects the tuna school, floating object or birds (Table 30). If more than one method is used record only what first made the vessel change course.	---
School size	Provide an estimation of the size of the tuna school being targeted (in tonnes). This information can be requested from the bridge officers.	---
Time net pursed	Record the time (hh:mm) when the net is fully pursed. All rings are up.	MR

¹⁰ This is included in the ROS Minimum Data Requirements collectively with “school sighting cue” (see below) data field name but it would be better to identify the school type separately from the “school sighting cue”.

Time start brailing	Record the time that brailing starts (hh:mm).	---
Time end brailing	Record the time that brailing ends (hh:mm).	---
Time skiff onboard	Record the time when the skiff comes on board and the set is over (hh:mm).	---
Maximum closing net depth (m)	Record the real, measured, closed net depth (m). To be recorded only if depth gauge is used. Use information from middle gauge if more than one gauge is present.	---
Object Details	For sets conducted on FADs (natural or artificial), the following detailed information should be collected where possible and reported to the IOTC Secretariat.	
Buoy ID	For every activity involving artificial or a natural FADs equipped with a buoy report BUOY ID (i.e. Buoy marking or any information allowing identifying the owner). [Consistent with IOTC Res 18/08]	OR
Buoy equipped with artificial lights	Report if devices equipped with artificial lights are deployed and/or recovered. [Consistent with IOTC Res 16/07]	OR
Artificial FAD design	Characterize artificial FAD design using codes provided to describe raft (floating part) and tail (underwater hanging structure) materials (Table 36). [Consistent with IOTC Res. 12/04 and Res 18/08]	OR
Cetaceans and whale sharks sightings during setting	Details on cetaceans and whale sharks sightings during purse-seine setting are to be collected where possible and reported to the IOTC Secretariat. [Consistent with IOTC Res 13/04 and 13/05]	
Sighting occurred before setting	Indicate YES if the sighting occurred before setting or NO if it occurred after.	OR
Species	The species code for the sighted specimen/s (FAO spp. 3-alpha code). If species FAO code is not available, the species scientific name.	OR
N° sighted	The number of individuals sighted per species.	OR
Caught inside the net	Indicate YES or NO whether sighted specimen/s was/were caught inside the net once the purse line was closed.	OR
Support vessel details	Details on support vessel/s present/participating to the observed fishing set.	
Support vessel presence	Record if a supply vessel is present during the observed set.	---
Support vessel name	Record the name of the support vessel present during the observed set.	---
Support vessel participation	Support vessel participation: Record if the Supply Vessel takes part in the setting operation (YES/NO). If YES, describe it (e.g. acting as floating objet, etc.).	---

Details on the current	Details on sea current that might influence set performance.	
Current direction	Record current direction using cardinal points (E, W, SW, SSW, etc.). This information is to be requested from bridge officers.	---
Current speed	Record current speed in knots. This information is to be requested from bridge officers.	---
Current depth	Record current depth in metres. This information is to be requested from bridge officers.	---
CATCH DETAILS		
Set number	Unique within a specific set	MR
Catch detail number	Unique within a specific catch detail	MR
Species	Record the species code for each specimen observed using FAO three figure alpha codes (Table 1, Table 2, Table 3, Table 4, Table 5, Table 6 and Table 7). If species FAO code is not available, the species scientific name. Note: Record “unknown” for species that cannot be positively identified and give it a reference number. Use the same reference number throughout the trip for that species. Retain a sample and / or take a photograph of the unidentified organism for latter identification.	MR
Fate	Specify the species fate which includes whether it was retained or discarded and the reason, e.g. “Discarded – too small” (Table 41).	MR
Sampling methods for obtaining total catch estimates per species	Indicate the sampling method used to obtain total catch estimates per species for the catch detail (Table 40).	MR
Number	Record the number of individuals per species for each specified fate. If weight is recorded, insert NA here (for large fish, record number of individuals).	MR
Weight	Record the weight corresponding to the specified species and fate category. If number of individuals is recorded, insert NA here (for small fish, record weight). Note: specify units (preferably tons).	MR
Weight estimation method	Indicate the weight estimation method used to collect weight (Table 43). Note: If number of individuals is recorded, insert NA here.	MR
Weight code	The code corresponding to the type of processing the specimen underwent prior to weighing (Table 44). If the fish has not been processed, record code for unprocessed (or round, whole, live) weight (i.e. RD). Note: If number of individuals is recorded, insert NA here.	MR

Additional details on non-target spp.	Catch details on non-target species to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Condition at capture	State the condition of the specimens at capture (Table 46).	OR
Condition at release	State the condition of the specimens at the time of release (Table 46).	OR
SPECIMEN INFORMATION		
Set number	Unique within a specific trip	MR
Catch detail number	Unique within a specific set	MR
Specimen number	Unique within a specific catch detail	MR
Additional details on non-target spp.	Catch details on non-target species to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Condition at capture	State the condition of the specimen at capture (Table 46).	OR
Condition at release	State the condition of the specimen at the time of release (Table 46).	OR
Additional catch details on SSIs	Additional catch details on Species of Special Interest (Table 47) to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Gear interaction	For SSI only, specify the interaction of the specimen with the fishing gear (Table 48).	OR
Brought on board	Indicate Yes or No, if the specimen was brought on board. [Consistent with IOTC Resolutions 13/04; 13/05; 12/04; 12/06; 12/09]	OR
Hauling method	Specify how the specimen was brought on-board (Table 49). [Consistent with IOTC Res 12-04]	OR
Resuscitation (for turtles only)	For turtles indicate Yes if the release took place with resuscitation and No if not.	---
Photo ID	If a photo is taken, record photo number/code so that it can be linked back to the specimen for onshore examination.	---
BIOMETRIC INFORMATION Details concerning any extra biometric measurements, sex, maturity and the collection of samples.		
Sampling methods for the collection of biological information	Indicate the sampling method used for the collection of biological sub-sample (Table 42).	MR

Length code 1	Specify the length code used for the measurement (Table 53).	MR
Length 1	Record the length corresponding to the length type taken rounded to the lower centimetre.	MR
Length code 2	When an additional length measurement is taken, the corresponding length code should be recorded (Table 53).	OR
Length 2	When an additional length measurement is taken, the corresponding length should be recorded rounded to the lower centimetre.	OR
Weight code	Record the code corresponding to the type of processing the specimen underwent prior to weighing (Table 44).	OR
Weight	Record the specimen's weight (in kilograms) corresponding to the specified product type recorded in 'weight code'. If the fish has not been processed, record the unprocessed (or round, whole, live) weight (i.e. RD).	OR
Weight estimation method	Specify the weight estimation method used to obtain the weight (Table 43).	OR
Sex	Record the sex of the sampled fish specimen (Table 51).	OR
Maturity stage	Record the stage of maturity of the sampled fish specimen according to standard maturity scales approved by the IOTC. If unknown record UNK.	OR
Sample collected	Record the following details on the collection of samples: <i>g)</i> type (e.g. otoliths, spine clippings, and genetic samples) <i>h)</i> preservation method (e.g. alcohol, frozen, etc.) <i>i)</i> destination (i.e. location to be sent/stored)	OR
TAG DETAILS		
Note that all tagged specimens are to be identified to species level and to be sampled for length. Elasmobranchs and turtles are also to be sexed and ascertained for maturity.		
Tag release	Indicate Yes or No, whether this individual was re-released with a tag attached.	MR
Tag recovery	Indicate Yes or No, whether a tag was recovered from this individual.	MR
Tag number	Provide the tag number. If a turtle make sure to provide both tag numbers (right and left flipper).	MR
Tag type	Record the type of tag used (Table 52).	MR
Tag finder	Record the name and contact details of the person who recovered the tag.	MR
Well	The well number from which the tagged fish has been recovered, if the fish is recovered during shifting, transshipping or unloading. (Note: this information will allow tracing back tagged fish to the location where it was caught).	MR

Purse-seine vessel daily activity information

The following information is to be collected on a daily basis for every fishing set and at every 2 hours (from sunrise to sunset) to allow to reconstruct vessel route and for every fishing set.

Data field name	Data field description	Reporting
Date	Record the date. Note: specify units (preferably YYYY/MM/DD).	---
Time	Record time at the start of every fishing activity and every two hours from sunrise to sunset. Note: specify units (preferably hh:mm).	---
Position	Record vessel position at the start of every fishing activity and every two hours from sunrise to sunset. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	---
Activity	Record vessel activity at the start of every fishing activity and every two hours from sunrise to sunset (Table 33).	---
Comments	Record short commentaries on exceptional events that could not be described by the previous data fields.	---

Purse-seine FAD activities

The following information is not included in the ROS Minimum Data Requirements but are requested under FAD related IOTC Data Requirements (Resolution 15/02, 19/01 and 19/02). ROS Minimum Data Requirements could also be updated to request observer to collect these data, whenever possible.

Data field name	Data field description	Reporting
Set number	As above	MR
Type	Type of floating object (flotsam, natural object, FAD)	---
Floating structure: dimensions	Length, width and height of the floating structure	
Submerged structure: shape		
Submerged structure: depth		
Components when encountered	Components of floating and submerged structures when encountered	
Components when left	Components of floating and submerged structures when left	
Object encounter	Date, time, position	
FAD activity: deployment	Date, time, position	
FAD activity: visit	Date, time, position	

FAD activity: hauling	Date, time, position	
FAD activity: retrieving/removed	Date, time, position	
FAD ID	If FAD is marked	
Buoy ID	Serial number of satellite buoy	
Origin	Origin of object (e.g. FAD ownership)	
Operational buoys followed by vessel		
Operational buoy lost by vessel		

POLE AND LINE INFORMATION¹¹

Gear specifications

Data field name	Data field description	Reporting
SPECIAL EQUIPMENT OR MACHINERY		
Live bait tanks capacity	Record the total volume of the tanks used to keep the live bait, in cubic metres (m3).	MR
Number of automatic poles	Record the total number of automatic poles that are fixed on a vessel.	MR
GENERAL GEAR ATTRIBUTES		
Number of anglers	Record the maximum number of anglers observed during the trip.	MR
Pole material	Specify the material the pole is made of: bamboo, fibre glass or carbon. If made of another material, describe it.	MR
Hook type	Indicate the type of hooks used for the observed trip (Table 17).	MR
Type of lures used	Record Yes if the vessel uses lures or jiggers during the observed trip and No if it doesn't. If Yes, record lures or jiggers type, make (brand) and hook type (Table 17).	---

Fishing event

Tuna fishing event

Data field name	Data field description	Reporting
Event number	Record event number. This should be a four digit numerical code beginning 0001. Event numbers should be consecutive from the start to the end of the observed trip.	MR

¹¹ To be completed as soon as EM pilots from Regional Observer Project are available

	Note: Each time the vessel activates its sprayers, starts chumming and/or actively catching fish, the observer should record this as event even if no fish is caught.	
TUNA FISHING OPERATIONS		
Event date and time	Record the data and time that the first line enters the water. Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR
Event start position	Record the position in latitude and longitude at the start of the fishing event. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	MR
Beaufort	Record the force of the wind according to the Beaufort scale (Table 37).	---
Event end time	The time when the last line comes out of the water. Note: If the vessel stops fishing for a period of at least 10 minutes then it should be considered that the fishing event ended, even if fishing is to restart shortly afterwards on the same school.	MR
School sighting cue and school type	Record up to the first three cues which leads the vessel to detect the presence of a tuna school and the type of school detected (Table 30).	MR
Target Species	Record the species in the school being targeted using FAO three figure alpha codes (Table 1).	---
Maximum lines fishing at the same time	Record maximum number of lines fishing at the same time. These should include lines deployed from manual and automatic poles. Specify if other lines are deployed and include them in the total count. Note: This should be one count taken when the fishing activity is well established (not right at the beginning or right at the end).	MR
Bait used	Indicate Yes or No regarding whether any bait was used during the fishing event.	MR
Bait type	Specify the bait type/condition used during the fishing event (Table 25).	MR
Bait species	Record the species of bait used during the fishing event using FAO three figure alpha codes (Table 8).	MR
Number of hooks lost	Record the total number of hooks lost during the poling operation.	MR
Weight of bait used	Record the estimated quantity of bait used in the poling operation (in kg). If no bait was used record zero (0). Note: Request this information from the fishers in charge of live bait.	---
Object ID	For every activity involving artificial FAD (DFAD/AFAD) report FAD identifier (i.e. FAD marking or beacon ID or any information allowing identifying the owner).	OR

Buoys equipped with artificial lights	For every activity involving FADs (natural and/or artificial) report if device is equipped with artificial lights.	OR
Sampling protocol	Indicate sampling protocol followed by the observer to select which lines to observe (Table 39).	MR
CATCH DETAILS		
Event number	Unique within a specific observed trip	MR
Catch detail number	Unique within a specific event	MR
Species	Record the species code for each specimen observed using FAO three figure alpha codes (Table 1, Table 2, Table 3, Table 4, Table 5, Table 6 and Table 7). If species FAO code is not available, the species scientific name. Note: Record “unknown” for species that cannot be positively identified and give it a reference number. Use the same reference number throughout the trip for that species. Retain a sample and / or take a photograph of the unidentified organism for latter identification.	MR
Fate	Specify the fate which includes whether it was retained or discarded and the reason, e.g. “Discarded – too small” (Table 41).	MR
Sampling methods for obtaining total catch estimates per species	Indicate the sampling method used to obtain total catch estimates per species for the observed set (Table 40).	MR
Number	Record the number of individuals per species for each specified fate. If weight is recorded, insert NA here (for large fish, record number of individuals).	MR
Weight	Record the weight corresponding to the specified species and fate category. If number of individuals is recorded, insert NA here (for small fish, record weight). Note: specify units (preferably tons).	MR
Weight estimation method	Indicate the method used to estimate weight (Table 43). Note: If number of individuals is recorded, insert NA here.	MR
Weight code	The code corresponding to the type of processing the specimen underwent prior to weighing (Table 44). If the fish has not been processed, record code for unprocessed (or round, whole, live) weight (i.e. RD). Note: If number of individuals is recorded, insert NA here.	MR
Depredation details	[In agreement with SC18.16 (para. 53)]	
Depredation source	For depredated specimens, indicate the depredation source based on depredation scar characteristics (Table 45). For non-depredated specimens record NA.	MR

Predator Observed	For depredated specimens, record the predator species directly observed and identified (FAO spp. 3-alpha code). If the predator was not observed record UNK (unknown). For non-depredated specimens record NA. Note: species observed in the area may not necessary be associated with depredation unless directly observed. Similarly for shark and squid damage the species may be difficult to determine.	MR
SPECIMEN INFORMATION		
Additional details on non-target spp.	Catch details on non-target species to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Condition at capture	State the condition of the specimen at capture (Table 46).	OR
Condition at release	State the condition of the specimen at the time of release (Table 46).	OR
Additional catch details on SSIs	Additional catch details on Species of Special Interest (Table 47) to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Gear interaction	For SSI only, specify the interaction of the specimen with the fishing gear (Table 48).	OR
Brought on board	Indicate Yes or No, if the specimen was brought on board. [Consistent with IOTC Resolutions 13/04; 13/05; 12/04; 12/06; 12/09]	OR
Hauling method	Specify how the specimen was brought on-board (Table 49). [Consistent with IOTC Res 12-04]	OR
Resuscitation (for turtles only)	For turtles indicate Yes if the release took place with resuscitation and No if not.	---
Photo ID	If a photo is taken, record photo number/code so that it can be linked back to the specimen for onshore examination.	---
BIOMETRIC INFORMATION		
Details concerning possible extra biometric measurements, sex, maturity and the collection of samples.		
Sampling methods for the collection of biological information	Indicate the sampling method used for the collection of biological sub-sample (Table 42).	MR
Length code 1	Specify the length code used for the measurement (Table 53).	MR
Length 1	Record the length corresponding to the length type taken rounded to the lower centimetre.	MR
Length code 2	When an additional length measurement is taken, the corresponding length code should be recorded (Table 53).	OR

Length 2	When an additional length measurement is taken, the corresponding length should be recorded rounded to the lower centimetre.	OR
Weight code	Record the code corresponding to the type of processing the specimen underwent prior to weighing (Table 44).	OR
Weight	Record the specimen's weight (in kilograms) corresponding to the specified product type recorded in 'weight code'. If the fish has not been processed, record the unprocessed (or round, whole, live) weight (i.e. RD).	OR
Weight estimation method	Specify the weight estimation method used to obtain the weight (Table 43).	OR
Sex	Record the sex of the sampled fish specimen (Table 51).	OR
Maturity stage ¹²	Record the stage of maturity of the sampled fish specimen according to standard maturity scales approved by the IOTC. If unknown record UNK.	OR
Sample collected	Record the following details on the collection of samples: <i>j)</i> type (e.g. otoliths, spine clippings, and genetic samples) <i>k)</i> preservation method (e.g. alcohol, frozen, etc.) <i>l)</i> destination (i.e. location to be sent/stored)	OR
TAG DETAILS		
Note that all tagged specimens are to be identified to species level and to be sampled for length. Elasmobranchs and turtles are also to be sexed and ascertained for maturity.		
Tag release	Indicate Yes or No, whether this individual was re-released with a tag attached.	MR
Tag recovery	Indicate Yes or No, whether a tag was recovered from this individual.	MR
Tag number	Provide the tag number. If a turtle make sure to provide both tag numbers (right and left flipper).	MR
Tag type	Record the type of tag used (Table 52).	MR
Tag finder	Record the name and contact details of the person who recovered the tag.	MR

Bait fishing event

Data field name	Data field description	Reporting
Event number	Record event number. This should be a four digit numerical code beginning 0001. Event numbers should be consecutive from the start to the end of the observed trip.	MR
Event start date and time	Record the data and time when chumming for bait starts. Note: specify units (preferably hh:mm and YYYY/MM/DD).	MR

¹² Until a standard maturity stage has been approved by the Scientific Committee, record both stage and scale used.

Event start position	Record the position in latitude and longitude at the start of the fishing event. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	MR
Event end date and time	Record the data and time at the end of the bait fishing event, when the last bait is scooped from the net. Note: specify units (preferably hh:mm and YYYY/MM/DD).	---
Event depth	Record the depth of the place where the net is being deployed. Note: specify units (preferably metres).	MR
Distance from the coast	Record the distance from the coast to which the bait fishing is being carried out. Note: specify units (preferably nautical miles).	---
Beaufort	Record the force of the wind according to the Beaufort scale (Table 37).	---
School sighting cue and school type	Record up to the first three cues which leads the vessel to detect the presence of a tuna school and type of school detected (Table 30).	MR
Detection method	Select the detection method/s used to detect bait fish school (Table 31).	---
Fishing method	Indicate the fishing method during the specific bait fishing event (Table 32).	---
N° of fishers	Number of fishers that participate to the bait fishing event.	---
Object ID	For every activity involving artificial FAD (DFAD/AFAD) report FAD identifier (i.e. FAD marking or beacon ID or any information allowing identifying the owner).	OR
Buoys equipped with artificial lights	For every activity involving FADs (natural and/or artificial) report if device is equipped with artificial lights.	OR
Sampling protocol	Indicate sampling protocol followed by the observer to select which lines to observe (Table 39).	MR
CATCH DETAILS		
Event number	Unique within a specified trip	MR
Catch detail number	Unique within a specified event	MR
Species	Record the species code for each specimen observed using FAO three figure alpha codes (Table 1, Table 2, Table 3, Table 4, Table 5, Table 6, Table 7 and Table 8). If species FAO code is not available, the species scientific name. Note: Record “unknown” for species that cannot be positively identified and give it a reference number. Use the same reference number throughout the trip for that species. Retain a sample and /	MR

	or take a photograph of the unidentified organism for latter identification.	
Fate	Specify the species fate which includes whether it was retained or discarded and the reason, e.g. “Discarded – too small” (Table 41).	MR
Sampling methods for obtaining total catch estimates per species	Indicate the sampling method used to obtain total catch estimates per species for the observed set (Table 40).	MR
Number	Record the number of individuals per species for each specified fate. If weight is recorded, insert NA here (for large individuals, record numbers).	MR
Weight	Record the weight corresponding to the specified species and fate category. If number of individuals is recorded, insert NA here (for small fish, record weight). Note: specify units.	MR
Weight estimation method	Indicate the method used to estimate weight (Table 43). Note: If number of individuals is recorded, insert NA here.	MR
SPECIMEN INFORMATION		
Event number	Unique within a specified trip	MR
Catch detail number	Unique within a specified event	MR
Specimen number	Unique within a specified catch detail	MR
Additional details on non-target spp.	Catch details on non-target species to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Condition at capture	State the condition of the specimen at capture (Table 46).	OR
Condition at release	State the condition of the specimen at the time of release (Table 46).	OR
Additional catch details on SSIs	Additional catch details on Species of Special Interest (Table 47) to be collected where possible and reported to the IOTC Secretariat as recommended by the Scientific Committee.	
Gear interaction	For SSI only, specify the interaction of the specimen with the fishing gear (Table 48).	OR
Brought on board	Indicate Yes or No, if the specimen was brought on board. [Consistent with IOTC Resolutions 13/04; 13/05; 12/04; 12/06; 12/09]	OR
Hauling method	Specify how the specimen was brought on-board (Table 49). [Consistent with IOTC Res 12-04]	OR

Resuscitation (for turtles only)	For turtles indicate Yes if the release took place with resuscitation and No if not.	---
Photo ID	If a photo is taken, record photo number/code so that it can be linked back to the specimen for onshore examination.	---
BIOMETRIC INFORMATION		
Details concerning any extra biometric measurements, sex, maturity and the collection of samples.		
Sampling methods for the collection of biological information	Indicate the sampling method used for the collection of biological sub-sample (Table 42).	OR
Length code 1	Specify the length code used for the measurement (Table 53).	OR
Length 1	Record the length corresponding to the length type taken rounded to the lower centimetre.	OR
Length code 2	When an additional length measurement is taken, the corresponding length code should be recorded (Table 53).	OR
Length 2	When an additional length measurement is taken, the corresponding length should be recorded rounded to the lower centimetre.	OR
Weight code	Record the code corresponding to the type of processing the specimen underwent prior to weighing (Table 44).	OR
Weight	Record the specimen's weight (in kilograms) corresponding to the specified product type recorded in 'weight code'. If the fish has not been processed, record the unprocessed (or round, whole, live) weight (i.e. RD).	OR
Weight estimation method	Specify the weight estimation method used to obtain the weight (Table 43).	OR
Sex	Record the sex of the sampled fish specimen (Table 51).	OR
Maturity stage	Record the stage of maturity of the sampled fish specimen according to standard maturity scales approved by the IOTC. If unknown record UNK.	OR
Sample collected	Record the following details on the collection of samples: <i>m</i>) type (e.g. otoliths, spine clippings, and genetic samples) <i>n</i>) preservation method (e.g. alcohol, frozen, etc.) <i>o</i>) destination (i.e. location to be sent/stored)	OR
TAG DETAILS		
Note that all tagged specimens are to be identified to species level and to be sampled for length. Elasmobranches and turtles are also to be sexed.		
Tag release	Indicate Yes or No, whether this individual was re-released with a tag attached.	OR
Tag recovery	Indicate Yes or No, whether a tag was recovered from this individual.	OR
Tag number	Provide the tag number. If a turtle make sure to provide both tag numbers (right and left flipper).	OR

Tag type	Record the type of tag used (Table 52).	OR
Tag finder	Record the name and contact details of the person who recovered the tag.	OR

Pole and line vessel daily activity information

The following information is to be collected on a daily basis for every fishing event and every 2 hours (from sunrise to sunset)

Data field name	Data field description	Reporting
Date	Record the date. Note: specify units (preferably YYYY/MM/DD).	MR
Time	Record the time every two hours (from sunrise to sunset) and at the start of every fishing activity. Note: specify units (preferably hh:mm).	MR
Position	Record vessel position every two hours (from sunrise to sunset) and at the start of every fishing activity. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	MR
Activity	Record vessel activity every two hours (from sunrise to sunset) and at the start of every fishing activity (Table 33).	MR
Comments	Record short commentaries on exceptional events that could not be described by the previous data fields.	---

VESSEL TRANSHIPMENT INFORMATION¹³

Information on all transhipments that take place during the trip should be collected. Most commonly this will entail transhipping processed catch to a carrier vessel or another fishing vessel. If fish or fish products are move to or from another vessel (carrier or fishing vessel), observers must record details of the transhipment.

Bear in mind that the collecting this information is not necessary if an observer is present on a carrier vessel monitoring the transhipment for the IOTC Regional Observer Program (ROP)¹⁴.

Data field name	Data field description	Reporti ng
Date	Record the date the transhipment takes place. Note: specify units (preferably YYYY/MM/DD).	---
Start time	Record the time the transhipment of fish starts. Note: specify units (preferably hh:mm).	---
End time	Record the time the transhipment of fish ends. Stores, bait or fuel may also be transhipped. The time and details of this must not be confused with the time that fish or fish products are being transhipped. Note: specify units (preferably hh:mm).	---
Position	Record the position of your vessel, during transhipment. Note: latitude and longitude to be recorded mentioning if collected South or North of the equator and specifying units (preferably $\pm(d)dd.dddd^\circ$).	---
Category	Record if your vessel is transhipping to or from, (i.e. receiving fish from) another vessel (carrier/fishing vessel) or if loading or allowing to load fish from the net (this may occur if a purse seiner has pursed more fish than its present loading capacity).	---
Product transhipped	Observers deployed on-board a purse-seine, pole and line or gillnet vessel are to record the quantity of fish products transhipped (per species) using FAO spp.3-Alpha and IOTC "Product" categories (Table 44). Observers deployed on-board longline vessels are only to request to their vessel Captain a copy of the signed declaration form, which will have all the required information. Note: specify units (preferably tonnes).	---
Name of carrier/fishing vessel	Observers deployed on-board a purse-seine, pole and line or gillnet vessel are to record the name and registration details of the carrier/fishing vessel they are transhipping to/from (i.e. name, national registration number, port of registry, flag and call sign). Observers deployed on-board longline vessels are only to request to their vessel Captain a copy of the signed declaration form, which will have all the required Information.	---

¹³ Information designed to capture information on all transhipments that take place during the trip.

¹⁴ As per SC14 (para. 104)

APPENDIX V

PROGRAMME OF WORK FOR THE AD HOC WORKING GROUP ON THE DEVELOPMENT OF ELECTRONIC MONITORING PROGRAMME STANDARDS (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 of its Working Parties:

Table 1. Priority topics for obtaining the information necessary to deliver the necessary advice to the Commission. Resolution 11/04 and 16/04 elements have been incorporated as required by the Commission.

Topic	Sub-topic and project	Timing				
		2024	2025	2026	2027	2028
Items considered to be of high priority						
1. EMS data fields	Review of the fields that are required under the ROS but are logistically difficult to collect for EMS (and /or human observers) and their utilisation for scientific and management purposes.					
2. Capacity building	Capacity building to develop and implement National EMS Programs.					
3. EMS Pilot Projects	Facilitation of EMS pilot projects in IOTC fisheries (LL, PS, PL, GN, and others) to ensure that ROP minimum data requirements are collected by EMS Cross validation of EM information with other data sources Identify needs and encourage pilots for new electronic tools and systems. Provide guide for the capabilities of EMS to collect ROS data requirements and how they may be collected in the future (include examples as to how annex II of EM System and Data Standards can be improved).					
Items considered to be of medium to low priority						
4. Review EM Minimum data Standards	Agree on or revise: <ul style="list-style-type: none"> • Definitions • Minimum technical specifications and equipment • Data collection (including EM capabilities to collect ROP minimum data requirements) and storage • Data transfer and logistical specifications • Data analysis specification and data submission • EM maintenance and functioning, 					

	<ul style="list-style-type: none"> • EM data analysis, validation and quality control specifications • Roles of EM users 					
5. Review of EM Programme Standards	<p>Agree on or revise:</p> <ul style="list-style-type: none"> • Objectives and Scope of the Programme • Institutional structure and management • EMS coverage and data review coverage • Roles and responsibilities • Specifications and Procedures • Timeframe for EMS implementation • Accreditation of EMS Systems/vendors • Data confidentiality, access and use • EMS Program cost 					
6. Compatibility and Interoperability	<p>Compatibility of IOTC databases and other collection platforms (e.g. VMS) Interoperability among different vendor's EMSs</p>					
7. Development of tools and innovative strategies	<p>Innovative collection of data which may include Artificial Intelligence and Machine learning for EMS data analysis as well as other methods that are identified by the WG.</p>					

APPENDIX VI
**CONSOLIDATED RECOMMENDATIONS OF THE 3RD SESSION OF THE AD-HOC WORKING GROUP ON THE
DEVELOPMENT OF ELECTRONIC MONITORING PROGRAMME STANDARDS**

Note: Appendix references refer to the Report of the 3rd Session of the Ad-hoc Working Group on the Development of Electronic Monitoring Programme Standards (IOTC-2023-WGEMS03-R)

Updates to Annex 1 (Vessel Monitoring Plans)

WGEMS03.01: The WGEMS **RECOMMENDED** the adoption of Annex 1- Vessel Monitoring Plan as part of the EM System and Data Standards adopted by the Scientific Committee (Appendix 6c of the IOTC-2022-SC25-R) as a general guide and examples of existing EMS installations (Para. 33).

Updates to Annex 2 (EM capabilities to collect ROS data)

WGEMS03.02: Subsequently, to ensure that ROS minimum mandatory data requirements are met by CPCs implementing EM, as required by Res 22/04, the WGEMS **RECOMMENDED** that those CPCs include a table, alongside the VMPs submission, that details which minimum required data fields (listed in Annex 2) are to be collected by EM and which are to be collected by other approved methods (including specifying those methods for each field) (Para. 38).

Revision of the WG Program of Work (2024–2027)

WGEMS03.03: The WGEMS **RECOMMENDED** that the WPDCS consider and endorse the WGEMS Programme of Work (2024–2028), as provided in [Appendix V](#). (Para. 43).

Next meetings

WGEMS03.04: The WGEMS **RECOMMENDED** that the WGEMS meet again in 2024 to continue to advance EM standards for utilization by the IOTC members. (Para. 44).