

REVIEW OF CONSERVATION AND MANAGEMENT MEASURES RELATING TO DATA AND STATISTICS

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Purpose

To encourage participants at the 19th Working Party on Data Collection and Statistics (WPDCS19) to review the existing Conservation and Management Measures (CMM) relating to data collection and statistics; and as necessary to 1) provide recommendations to the Scientific Committee on whether modifications may be required; and 2) recommend whether other CMMs may be required.

Background

In addition to the CMMs outlined in document IOTC–2023–WPDCS19–04, IOTC fisheries are currently subject to a range of other data/statistical CMMs adopted by the Commission. To focus the efforts of the WPDCS, participants may wish to annually review several of the key CMMs which are clearly based on scientific advice, or which match current requests from the Commission. The following are a list of the key CMMs for the consideration of the WPDCS. At the next meeting, a range of other CMMs may be presented for discussion.

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

This resolution updates the requirements set forth by Resolution 10/02 (that it supersedes) in terms of frequency, structure, and overall completeness of the mandatory statistical data to be submitted by CPCs to the IOTC Secretariat. It recommends an increase in the recording frequency for total catches that is expected to be brought up to a quarterly basis when possible. Furthermore, given the urgent need of improving the quality of the assessments on the status of endangered marine species, it highlights the need to provide relevant data in accordance with past resolutions dealing with incidental bycatch reduction and conservation measures.

Additionally, it states the need to collect and share - with the due confidentiality policies applied by the Secretariat - all FAD-related data from purse seine fleets to increase the quality and completeness of the fishing efforts information ([Appendix I](#)).

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

This resolution proposes the creation of a pilot project aiming to enhance the implementation of the Resolution 11/04 on a Regional Observer Scheme (supersedes by Res. 22/04) and to raise the level of compliance to the implementation of Resolutions 15/01 and 15/02, respectively on the recording of catch and effort data by fishing vessels in the IOTC area of competence and on mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating non-Contracting parties (CPCs) ([Appendix II](#)).

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

This resolution proposes to address the long-standing issue of non-reporting of nominal catches (including lack of explicit reporting of zero-catches) by preventing involved CPCs from retaining concerned species for the year following the lack or incomplete reporting until data is received by the IOTC Secretariat. Also, to facilitate reporting of zero catches, this Resolution requests the inclusion of the dedicated form [1DR](#) to complement the already existing Form [1RC](#).

The form contains a matrix by IOTC species as well as by the most caught elasmobranch species, through which CPCs can indicate where they have had (positive) catches or no catches (zero landings + zero discards) for a particular species/gear combination. The Commission reserves the rights to expand the matrix to include additional species under the competence of IOTC as well as stock/gear combinations as appropriate ([Appendix III](#)).

[Resolution 19/01](#) *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC Area of competence*

This resolution updates the requirements set forth by Resolution 18/01 (that it supersedes except for India) by introducing means to manage the over-catch of annual limits, including the introduction of penalty mechanisms to be applied, at different levels, starting from 2020 to those fleets for which over-catch has occurred in the three consecutive years of 2017-2018-2019 and / or from 2020 onwards.

Also, the resolution further reduces the maximum number of supply vessels that can support at any point of time a purse seine vessel from the same flag state and introduces the additional requirement for CPCs to report (by March 2020¹) the number of FADs that were deployed in 2018 and 2019 by purse seine vessels and associated supply vessels, by 1x1 degrees grid.

Finally, without introducing further prejudice to the gradual phase-out of conventional gillnet fishing vessels, the resolution encourages flag states to increase the observer coverage on board of such vessels by 10%, also by using alternative data collection mechanisms (electronic or human) whose effectiveness will be ultimately verified by the IOTC Scientific Committee in 2023 ([Appendix IV](#)).

The resolution was superseded by Resolution 21/01 but remains binding on Indonesia, the Islamic Republic of Iran, Madagascar, Oman, and Somalia.

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

This resolution updates the requirements set forth by Resolution 18/08 (that it supersedes) by introducing a stricter limit in the maximum number of operational buoys followed by any purse seine vessel (now set to 300 at any one time) and also reducing to 500 the maximum number of instrumented buoys that may be acquired annually for each purse seine vessel, with the assumption that no purse seine vessel shall have more than 500 instrumented buoys (buoy in stock and operational buoy) at any time.

Furthermore, the resolution re-iterates that CPCs shall submit the data elements prescribed in Annex III and Annex IV to the Commission (consistent with the IOTC standards for the provision of catch and effort data, using form [3FA](#)) and introduces the additional requirement that, starting 1 January 2020, CPCs report, or require their vessels to report, daily information on all active FADs to the Secretariat and that such information shall contain the date, instrumented buoy ID, assigned vessel and daily position, to be compiled at monthly intervals and submitted with a time delay of at least 60 days (but no longer than 90 days), with the form [3BU](#) specifically designed to support these additional reporting requirements ([Appendix V](#)).

[Resolution 19/03](#) *On the conservation of mobulid species caught in association with fisheries in the IOTC area of competence*

This resolution has been implemented as a countermeasure to the recently noted decline of these species across the Indian Ocean: in response, the SC recommended several management actions (e.g., no-retention measures) as well as requesting CPCs to report the information and data on interactions (i.e., number of discards and releases) with mobulid rays by vessels through logbooks and / or through observer programs.

This resolution calls for such data to be provided to the IOTC Secretariat by 30 June of the following year, according to the timelines specified in Resolution 15/02, and explicitly requires CPCs to develop – with assistance from the IOTC Secretariat, where required – sampling plans for the monitoring of the mobulid rays catches by the subsistence and artisanal fisheries.

¹ Although the original text of the Resolution indicates March 2019, which is clearly a typo

The sampling plans, including their scientific and operational rationale, are to be reported in the national reports to the Scientific Committee starting in 2020 ([Appendix VI](#)).

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

This resolution updates the requirements set forth by Resolution 19/01 (that it supersedes, with the exception of objecting CPCs for which 19/01² or previous resolutions³ still apply) and in particular the means of calculating the baseline catch limits and the management of over-catch of annual limits, including the updates of penalty mechanisms to be applied (at different levels) starting from 2022 to those fleets for which over-catch has occurred from 2020 onwards.

The resolution calls for catch limits to be calculated and reductions to be applied to catches from all gears, regardless of their artisanal / industrial nature, and further reduces the maximum number of supply vessels that can support at any point of time a purse seine vessel from the same flag state.

Finally, without introducing further prejudice to Article 16 of the IOTC Agreement, CPCs are encouraged to phase out or convert their gillnet vessels to other gears, considering the huge ecological impact of these gears and fast-track the implementation of Resolution 17/07, recalling how large-scale driftnets are prohibited in the IOTC area of competence starting from 1st January 2022.

Furthermore, CPC are requested to set their gillnets at 2m depth from the surface by 2023 to mitigate the ecological impact of the gear and increase the observer coverage or field sampling of gillnet fisheries by 10% through alternative data collection methodologies verified by the IOTC Scientific Committee in 2023 ([Appendix VII](#)).

Resolution 22/04 *On a Regional Observer Scheme*

This resolution updates the requirements set forth by Resolution 11/04 indicating that observers deployed in purse seiner vessels shall monitor the catches at unloading to identify the species composition of targeted tuna species, instead only bigeye tuna catches composition. The resolution also set a 5% level of the coverage of the total levels of vessel activity for the artisanal fishing vessels for which landings shall be monitored at the landing place by field samplers.

The Resolution specify that once adopted by the IOTC Scientific Committee, observers shall use the IOTC ROS Minimum Standard Data Fields, the IOTC data collection forms, the IOTC Species identification cards, the IOTC Regional Observers Scheme (ROS) Observer Manual and the IOTC Observer Forms when carrying out their duty.

Finally, this Resolution recognizes modalities for the completion or substitution of the human observer coverage by an EMS once the standards are adopted by the Scientific Committee and the Commission. To ensure the minimum mandatory ROS data reporting standards are met, the EMS may be complemented by port sampling and/or other Commission approved data collection methods ([Appendix VIII](#)).

Resolution 23/01 *On the management of anchored fish aggregating devices (AFADs)*

This Resolution applies to all CPCs that deploy AFADs for the purpose of fishing for tuna and tuna-like species under the IOTC mandate except for recreational fisheries, and without prejudice or undermining the sovereign right of the coastal States and its existing national regulation.

The resolution calls for information about new AFADs deployed within the EEZ of the CPCs including date of deployment, GPS position and the UNI number. CPCs shall submit the data within 21 days of deployment of the AFADs to the IOTC Executive Secretary, consistent with the IOTC standards for the provision of catch and effort data, and this data shall be made available for analysis to the IOTC Scientific Committee on the aggregation level set by Resolution 15/01 and Resolution 15/02 and under the confidentiality rules set by Resolution 12/02.

² I.R. of Iran, Indonesia, Madagascar, Oman, Somalia

³ India, to which Res. 18/01 still applies

CPCs shall also maintain a register of deployed, lost, abandoned, and discarded AFADs and report this data to the IOTC Executive Secretary in their annual Implementation Report ([Appendix IX](#)).

[Resolution 23/06](#) On the Conservation of Cetaceans

This resolution updates the requirements set forth by Resolution 13/04 requiring that, in the event that a cetacean is unintentionally encircled in a purse seine net, or captured or entangled in the gillnets this interaction shall be reported including information about the species; the number of individuals; a short description of the interaction, the location of the encirclement or entanglement; the steps taken to ensure safe; and an assessment of the life status of the animal on release, including whether the cetacean was released alive but subsequently died.

The data could be collected through logbooks or through observer programs, but CPCs are also encouraged to use an Electronic Monitoring System (EMS) to enhance the data collection required in this Resolution ([Appendix X](#)).

[Resolution 23/08](#) On Electronic Monitoring Standards for IOTC fisheries

This Resolution sets the terms and definitions pertaining to the implementation of EMS by CPCs, consistent with this resolution and Resolution 22/04 and calls to the CPCs to share relevant information, approaches, and experiences, including those involving capacity building needs and any CPC-level knowledge exchange, with the Scientific Committee and Compliance Committee to support the implementation of the Regional Electronic Monitoring Program (REMP) ([Appendix XI](#)).

Discussion

As part of best practice, the WPDCS is obliged to review existing CMMs and consider whether their data/science-based components need to be updated. If this is the case, then the WPDCS should provide clear, science-based recommendations for the Scientific Committee's consideration.

Recommendation

That the WPDCS **NOTE** paper IOTC–2023–WPDCS19–05 which aimed to encourage the WPDCS to review the existing Conservation and Management Measures (CMMs) relating to data and statistics, and as necessary to 1) provide recommendations to the Scientific Committee on whether modifications may be required; and 2) recommend whether other CMMs may be required.

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Appendix I: Resolution 15/02

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

Keywords: Data reporting; total catch; catch and effort; size data; fish aggregating devices (FAD); surface fisheries; longline fisheries; coastal fisheries

The Indian Ocean Tuna Commission (IOTC)

GIVEN that the Agreement for the implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA) encourages coastal States and fishing States on the high seas to collect and share, in a timely manner, complete and accurate data concerning fishing activities on, inter alia, vessel position, catch of target and non-target species and fishing effort;

NOTING that the United Nations Food and Agricultural Organisation (FAO) Code of Conduct for Responsible Fishing provides that States should compile fishery-related and other supporting scientific data relating to fish stocks covered by subregional or regional fisheries management organisations and provide them in a timely manner to the organization;

RECALLING the commitment made by Contracting Parties under Article V of the IOTC Agreement to keep under review the conditions and trends of the stocks and to gather, analyse and disseminate scientific information, catch and effort statistics and other data relevant to the conservation and management of the stocks and to fisheries based on the stocks covered by the Agreement;

COGNISANT that the above commitment can only be achieved when Contracting Parties meet the requirements of Article XI of the IOTC Agreement i.e. to provide statistical and other data and information to minimum specifications and in a timely manner;

ACKNOWLEDGING that the IOTC Scientific Committee has repeatedly stressed the importance of the timeliness of data submissions;

GIVEN that the activities of support vessels and the use of Fish Aggregating Devices (FAD) are an integral part of the fishing effort exerted by the purse seine fleet;

CONSIDERING the provisions set forth in Resolution 15/02 on *mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)*, adopted by the Commission in 2015;

NOTING the Scientific Committee's concern that the lack of data from CPC fisheries under the mandate of the IOTC on the mortality of marine turtles and marine mammals undermines the ability to estimate levels of marine turtle and marine mammals bycatch and consequently the IOTC's capacity to respond and prevent adverse effects of fishing on these marine species;

FURTHER NOTING the Scientific Committee's concern about the impossibility to undertake assessments on the status of seabirds in the Indian Ocean, while acknowledging that some species are currently critically endangered, and that the lack of reporting of seabird interactions by CPCs seriously undermines the ability of IOTC to respond and prevent adverse effects of fishing on seabirds;

CONSIDERING the recommendations of the 17th Session of the IOTC Scientific Committee;

FURTHER CONSIDERING the call upon States, either individually, collectively or through regional fisheries management organisations and arrangements included in the United Nations General Assembly Resolution 67/79 on sustainable fisheries to collect the necessary data in order to evaluate and closely monitor the use of fish aggregating devices and their effects on tuna resources and tuna behaviour and associated and dependent species, to improve management procedures to monitor the number, type and use of such devices and to mitigate possible negative effects on the ecosystem, including on juveniles and the incidental bycatch of non-target species, particularly sharks and turtles;

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

1. Contracting Parties and Cooperating Non-Contracting Parties (CPCs) shall provide the following information to the IOTC Secretariat according to the timelines specified in paragraph 7:
2. **Total catch data:**

Estimates of the total catch by species and gear, if possible quarterly, that shall be submitted annually as referred in paragraph 7 (separated, whenever possible, by retained catches in live weight and by discards in live weight or numbers) for all species under the IOTC mandate as well as the most commonly caught elasmobranch species according to records of catches and incidents as established in Resolution 15/01 *on the recording of catch and effort data by fishing vessels in the IOTC area of competence* (or any subsequent superseding Resolution).
3. Concerning cetaceans, seabirds and marine turtles data should be provided as stated in Resolutions 13/04 *on Conservation of Cetaceans*, Resolution 12/06 *on reduction the incidental bycatch of seabirds in longline fisheries* and Resolution 12/04 *on the conservation of marine turtles* (or any subsequent superseding resolutions).
4. **Catch and effort data⁴:**
 - a) **For surface fisheries:** catch weight by species and fishing effort shall be provided by 1° grid area and month strata. Purse seine and pole and line fisheries data shall be stratified by fishing mode (e.g. free-swimming schools or schools in association with floating objects). The data shall be extrapolated to the total national monthly catches for each gear. Documents describing the extrapolation procedures (including raising factors corresponding to the logbook coverage) shall also be submitted routinely. Effort units reported should be consistent with those effort requirements of Resolution 15/01 (or any subsequent superseding revision).
 - b) **Longline fisheries:** catch by species, in numbers or weight, and effort as the number of hooks deployed shall be provided by 5° grid area and month strata. Documents describing the extrapolation procedures (including raising factors corresponding to the logbook coverage) shall also be submitted routinely. For the work of relevant working parties under the IOTC Scientific Committee, longline data should be of a resolution of 1° grid area and month or finer. These data would be for the exclusive use of IOTC Scientific Committee and its Working Parties, subject to the approval of the data owners and IOTC Resolution 12/02 *Data confidentiality policy and procedures*, and should be provided for scientific use only in a timely fashion. Effort units reported should be consistent with those effort requirements of Resolution 15/01 or any subsequent revision of such resolution.
 - c) **For coastal fisheries:** catches by species that shall be submitted annually as referred in paragraph 7, fishing gear and fishing effort shall be submitted frequently and may be provided using an alternative geographical area if it better represents the fishery concerned. Effort units reported should be consistent with those effort requirements of Resolution 15/01 (or any subsequent superseding revision).

Provisions on catch and effort data, applicable to tuna and tuna-like species, shall also be applicable to the most commonly caught elasmobranch species according to records of catches and incidents as established in Resolution 15/01 *on the recording of catch and effort by fishing vessels in the IOTC area of competence* (or any subsequent superseding Resolution).
5. **Size data:**

⁴ *Longline fisheries:* Fisheries undertaken by vessels in the IOTC Record of Authorized Vessels that use longline gear.

Surface fisheries: All fisheries undertaken by vessels in the IOTC Record of Authorized Vessels other than longline fisheries; in particular: purse seine, pole-and-line, gillnet fisheries, handline, and trolling vessels.

Coastal fisheries: Fisheries other than longline or surface, as defined above, also called artisanal fisheries.

Size data shall be provided for all gears and for all species according to paragraph 4 and following the guidelines set out by the procedures described in the *Guidelines for the reporting of fisheries statistics to the IOTC*. Size sampling shall be run under strict and well described random sampling schemes which are necessary to provide unbiased figures of the sizes taken. Sampling coverage shall be set to at least one fish measured by ton caught, by species and type of fishery, with samples being representative of all the periods and areas fished. Alternatively, size data for longline fleets may be provided as part of the Regional Observer Scheme where such fleets have at least 5% observer coverage of all fishing operations. Length data by species, including the total number of fish measured, shall be submitted by a 5° grid area by month, by gear and fishing mode (e.g. free swimming schools or schools in association with floating objects for the purse seiners). Documents covering sampling and raising procedures shall also be provided, by species and type of fishery.

6. Given that the activities of purse seine supply vessels and the use of **Fish Aggregating Devices (FAD)** are an integral part of the fishing effort exerted by the purse seine fleet, the following data shall be provided by CPCs:
- a) The number and characteristics of purse seine supply vessels: (i) operating under their flag, (ii) assisting purse seine vessels operating under their flag, or (iii) licensed to operate in their exclusive economic zones, and that have been present in the IOTC area of competence;
 - b) Number of days at sea by purse seine and purse seine supply vessels by 1° grid area and month to be reported by the flag state of the supply vessel;
 - c) The total number set by the purse seine and purse seine supply vessels per quarter, as well as:
 - i. The positions, dates at the time of setting, FAD identifier and FAD type (i.e. drifting log or debris, drifting raft or fad with a net, drifting raft or FAD without a net, anchored FADs and other FADs e.g. Payao, dead animal etc.);
 - ii. The FAD design characteristics of each FAD (consistent with Annex 1 to Resolution 15/08 *Procedures on a fishing aggregating devices (FADs) management Plan, including a limitation on the number of FADS, more detailed specifications of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species*).

These data would be for the exclusive use of IOTC Scientific Committee and its Working Parties, subject to the approval of the data owners and in accordance with Resolution 12/02 *Data confidentiality policy and procedures*, and should be provided in a timely fashion.

7. **Timeliness of data submission to the IOTC Secretariat:**
- a) Longline fleets operating in the high seas shall provide provisional data for the previous year no later than 30 June. Final data shall be submitted no later than 30 December;
 - b) All other fleets (including supply vessels) shall submit their final data for the previous year no later than 30 June;
 - c) In case where the final statistics cannot be submitted by that date, at least preliminary statistics should be provided. Beyond a delay of two years, all revisions of historical data should be formally reported and duly justified. These reports should be made on forms provided by the IOTC Secretariat and reviewed by the IOTC Scientific Committee. The IOTC Scientific Committee will advise the IOTC Secretariat if revisions are then accepted for scientific use.
8. This Resolution supersedes Resolution 10/02 on *mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPCs)*.

Appendix II: Resolution 16/04

On the implementation of a pilot project in view of promoting the Regional Observer Scheme of IOTC

Keywords: Regional Observer Scheme;

The Indian Ocean Tuna Commission (IOTC),

TAKING INTO ACCOUNT the need to increase the scientific information, in particular to provide the IOTC Scientific Committee working material in order to improve the management of the tuna and tuna-like species fished in the Indian Ocean;

REITERATING the responsibilities of Flag States to ensure that their vessels conduct their fishing activities in a responsible manner, fully respecting IOTC Conservation and Management Measures;

CONSIDERING the need for action to ensure the effectiveness of the IOTC objectives;

CONSIDERING the obligation of all IOTC Contracting Parties and Cooperating Non-Contracting Parties (hereinafter CPCs) to fully comply with the IOTC Conservation and Management Measures;

AWARE of the necessity for sustained efforts by CPCs to ensure the enforcement of IOTC's Conservation and Management Measures, and the need to encourage Non-CPCs to abide by these measures;

UNDERLINING that the adoption of this measure is intended to promote the implementation of the Resolution 11/04 *on a Regional Observer Scheme*;

CONSIDERING the deliberations of the 18th Session of the IOTC Scientific Committee held in Bali, Indonesia from 23-27 November 2015, notably that CPCs should comply with IOTC data requirements as requested per Resolution 15/01 and 15/02, respectively *on the recording of catch and effort data by fishing vessels in the IOTC area of competence* and *on mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting parties (CPCs)*, given the gaps in available information in the IOTC database and the importance of basic fishery data in order to assess the status of stocks and for the provision of sound management advice.

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

1. Create a pilot project aiming to enhance the implementation of the Resolution 11/04 *on a Regional Observer Scheme* and to raise the level of compliance to the implementation of Resolutions 15/01 and 15/02, respectively *on the recording of catch and effort data by fishing vessels in the IOTC area of competence* and *on mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating non-Contracting parties (CPCs)*.
2. This pilot project will be funded through IOTC budget and/or from voluntary contributions. The pilot project will be prepared taking into account the following elements:
 - a) Identification and selection of voluntary participatory Contracting Parties or Cooperating Non-Contracting Parties (CPCs). Participatory CPCs should indicate their vessels that will participate in the project.
 - b) Terms of Reference (ToR) and selection of scientific observers, according to provisions of the Resolutions 11/04, 15/01 and 15/02.
 - c) Definition of an Action Plan for the observers work, including indicatively, a working calendar and an area of activity.
 - d) Mid-term review and a final term review, the latter should include recommendation on how to expand the experiences and results of the pilot project to all IOTC area of competence.
 - e) Cooperation coordination mechanism between CPCs participating in the project.
 - f) Complementarity with the Regional Observer Scheme actions already in place.
3. The IOTC Scientific Committee will draft guidelines regarding the ToR and work of observers, and an indicative budget for approval by the Commission in 2017. This project will focus on developing states,

with priority given to promote the implementation of the ROS to small island developing states (SIDS) and least developed countries (LDC).

4. Contracting Parties will provide their comments and suggestions within one month after the IOTC Executive Secretary transmission of the draft project, following the Scientific Committee.
5. The revised draft proposal, including a detailed budget, will be submitted to the Compliance Committee and to the Standing Committee on Administration and Finance for review, and submitted for consideration and approval at the annual meeting of the Commission in 2017.
6. The pilot project will explore the possibilities offered by electronic observation and observation in port.
7. The Scientific Committee will evaluate whether electronic observation or observation in port can be used to collect data matching IOTC standards. Scientific Committee will also propose minimum standards for the implementation of Electronic observation systems and how they can be used to increase levels of observer coverage for Indian Ocean fisheries.
8. The pilot project will not preclude any Regional Observer Scheme's actions already implemented by Contracting Parties or Cooperating non-Contracting Parties and respective fleets.

Annex I

Minimal requirements for observers

Scientific observers

1. Without prejudice to whatever specific training and qualifications are recommended by the Scientific Committee, the designated observers shall have the following qualifications to accomplish their tasks:
 - a) a satisfactory knowledge of the IOTC Conservation and Management Measures;
 - b) the ability to observe and record information accurately;
 - c) a satisfactory knowledge of the language of the flag of the vessel observed;
 - d) sufficient experience to identify species and fishing gear;
 - e) proven training in security and survival at sea.
2. Observers shall:
 - a) record and report upon the fishing activities carried out;
 - b) observe and estimate catches and check consistency with entries made in the logbook;
 - c) note the position of the vessel when engaged in catching activity;
 - d) carry out scientific work such as collecting of IOTC mandatory statistical information and fulfilment of logbooks;
 - e) report the results of these duties on the fishing vessel in the observers report to the flag state fishing authority,
 - f) submit the observer report to Flag State authorities within 30 days from the end of the period of observation;
 - g) treat as confidential all information with respect to the fishing and transshipment operations of the fishing vessels and accept this requirement in writing as a condition of appointment as an observer;
 - h) comply with requirements established in the laws and regulations of the flag State which exercises jurisdiction over the vessel to which the observer is assigned;
 - i) respect the hierarchy and general rules of behaviour which apply to all vessel personnel, provided such rules do not interfere with the duties of the observer under this program, and with the obligations of vessel personnel.

Obligations of the Master

3. The Master shall allow observers to:
- a) visit the fishing vessel, if weather conditions permit, and to have access to vessel staff and to the gear and equipment but not interfering with the equipment on-board;
 - b) have access to the equipment listed below, if present on the vessels to which they are assigned, in order to facilitate the carrying out of their duties. This shall be done on a request basis. The equipment concerns
 - i) satellite navigation equipment; (consultation only)
 - ii) radar display viewing screens when in use; (consultation only)
 - iii) electronic means of communication;
 - c) Observers shall be provided with accommodation, including lodging, food and adequate sanitary facilities, equal to those of officers;
 - d) Observers shall be provided with adequate space on the bridge or pilot house for clerical work, as well as space on deck adequate for carrying out observer duties;

Obligations of the Flag State

4. The Flag States shall ensure that masters, crew and vessel owners do not obstruct, intimidate, interfere with, influence, bribe or attempt to bribe an observer in the performance of his/her duties.
5. No later than two months upon completion of a fishing trip, observer reports will be sent to the IOTC secretariat, who shall manage and keep record of the mentioned observer's reports in a manner consistent with IOTC confidentiality requirements, and will submit copies of the observer reports to the Scientific Committee.
6. Data collected in any Coastal State EEZ will also be provided to the Coastal State authorities within the same delays and conditions of the previous paragraph.

Mutual recognition of observers

The observers selected to participate in this pilot project will be recognised by all CPCs participating in the project.

Appendix III: Resolution 18/07

On measures applicable in case of non-fulfilment of reporting obligations in the IOTC

Keywords: Reporting obligations; data submission; incomplete data; catch

The Indian Ocean Tuna Commission (IOTC),

GIVEN that following Article XI of the Agreement for the establishment of the IOTC, Contracting Parties agree to provide statistical and other data and information that the Commission may need for the purposes of this Agreement and that nominal catch data, Catch and effort data, size data and fish aggregating devices data should be submitted annually to the IOTC Secretariat by 30 June the year following the fishing activities;

RECALLING Resolutions by IOTC on the Deadlines, Procedures for Data Submission and Statistical Reporting Obligations, notably Resolutions [15/02](#), [15/01](#), [14/05](#), [12/04](#), 10/11 [superseded by [Resolution 16/11](#)], [11/04](#), [10/08](#) and [01/06](#);

RECOGNISING that funding is available from the Commission for developing CPCs to improve their data collection and submission capabilities;

TAKING INTO ACCOUNT that the Scientific Committee (IOTC-2015-SC18-R) noted with concern the lack of information submitted by CPCs on total catches, catch and effort and size data for various IOTC species, despite their mandatory reporting status, and requested that CPCs comply with IOTC data requirements, given the gaps in available information in the IOTC database and the importance of basic fishery data in order to assess the status of stocks and for the provision of sound management advice;

CONSIDERING that the Scientific Committee recommended that the Commission develop penalty mechanisms through the IOTC Compliance Committee to improve compliance by CPCs that do not currently comply with the submission of basic fishery data requirements as stated in Resolutions [15/01](#) and [15/02](#);

NOTING that incomplete reporting or no data reporting and that, despite the adoption of numerous measures intended to address the matter, lack of compliance with reporting obligations is still a problem for the Scientific Committee and for the Commission;

NOTING that several stocks remain not assessed and some others are assessed with substantial uncertainty, which lead to important risks of depletion of some IOTC species and negative impact in the ecosystem;

FURTHER NOTING that, in order that all IOTC fisheries should be managed in line with the principles of the precautionary approach, it is necessary to take measures aimed at eliminating or reducing non-reporting and misreporting;

ADOPTS in accordance with paragraph 1 of Article IX of the IOTC Agreement, that:

1. CPCs shall include information in their Annual Reports (*Report of Implementation*) on actions taken to implement their reporting obligations for all IOTC fisheries, including shark species caught in association with IOTC fisheries, in particular steps taken to improve their data collection for direct and incidental catches.
2. The IOTC Compliance Committee shall review Actions taken by CPCs, as described in paragraph 1, shall be reviewed annually by IOTC Compliance Committee.
3. Following the review carried out by the Compliance Committee, the Commission at its annual session, according to the guidelines attached (**Annex I**), and after having given due consideration to the relevant information provided by the concerned CPCs in these cases, may consider to prohibit CPCs that did not report nominal catch data (exclusively), including zero catches, for one or more species for a given year, in accordance with the [Resolution 15/02](#), paragraph 2 (or any subsequent revision), from retaining such species as of the year following the lack or incomplete reporting until such data have been received by the IOTC Secretariat. Priority shall be given to situations of repeated non-compliance. Any CPC unable to meet these reporting obligations owing to engagement in civil conflict shall be exempt from this measure. The CPC concerned will work with the IOTC Secretariat to identify and implement possible alternative methods for data collection, using established FAO data collection methods.

4. To facilitate the reporting of zero catches as required under paragraph 1 of Annex I of this Resolution, the following procedure shall apply:
 - a) as part of the IOTC 1RC electronic form used to report nominal catches, the Secretariat shall include a matrix by IOTC species as well as the most commonly caught elasmobranch species according to records of catches and incidents as established in Resolution 15/01 *on the recording of catch and effort data by fishing vessels in the IOTC area of competence (or any subsequent superseding Resolution)* and main IOTC gear groups on the basis of the format set out in Annex II of this Resolution
 - b) CPCs, as part of their total catch data reporting, shall complete the cells in the matrix with either a value of 'one' (1) to indicate where that CPC had catches (positive catch) for a particular species/gear combination or a value of 'zero' (0) to indicate where that CPC had no catches (zero landings + zero discards) for a particular species/gear combination.
 - c) The "Catch columns" section of the electronic Form 1RC shall only include reports of positive catches.
5. The Commission may consider expanding the matrix to include additional species under the competence of IOTC as well as stock/gear combinations as appropriate.
6. This Resolution supersedes Resolution 16/06 *On Measures Applicable in case of non-fulfilment of reporting Obligations in the IOTC*

Appendix IV: Resolution 19/01

On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC Area of competence

Keywords: Yellowfin tuna, Kobe Process, MSY, Precautionary Approach

The Indian Ocean Tuna Commission (IOTC),

CONSIDERING the objectives of the Commission to maintain stocks in perpetuity and with high probability, at levels not less than those capable of producing their maximum sustainable yield as qualified by relevant environmental and economic factors including the special requirements of developing States in the IOTC area of competence;

BEING MINDFUL of Article XVI of the IOTC Agreement regarding the rights of Coastal States and of Article 87 and 116 of the UN Convention of the Law of the Sea regarding the right to fish on the high seas;

RECOGNISING the special requirements of the developing States, particularly Small Island developing States in Article 24, of the Agreement for the Implementation of the Provisions of the United Nations Convention of the Law of the Sea of December 1982, relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA);

RECALLING that Article 5, of UNFSA entitles the conservation and management of highly migratory fish stocks are based on best scientific evidence available and with special reference to Resolution 15/10 for a stock where the assessed status places it within the red quadrant, and with an aim to end overfishing with a high probability and to rebuild the biomass of the stock in as short time as possible;

FURTHER RECALLING that Article 6, of UNFSA and IOTC Resolution 12/01 *On the implementation of the precautionary approach*, requires the States to be cautious during the application of precautionary approach when information is uncertain, unreliable or inadequate and this should not be a reason for postponing or failing to take conservation and management measures;

CONSIDERING the recommendations adopted by the KOBE II, held in San Sebastian, Spain, June 23 – July 3 2009; implementing where appropriate a freeze on fishing capacity on a fishery by fishery basis and such a freeze should not constrain the access to, development of, and benefit from sustainable tuna fisheries by developing coastal States;

FURTHER CONSIDERING the recommendations adopted by the KOBE III, held in La Jolla, California, 12- 14 July 2011; considering the status of the stocks, each RFMO should consider a scheme for reduction of overcapacity in a way that does not constrain the access to, development of, and benefit from sustainable tuna fisheries, including on the high seas, by developing coastal States, in particular Small Island Developing States, territories, and States with small and vulnerable economies; and Transfer of capacity from developed fishing members to developing coastal fishing members within its area of competence where appropriate;

FURTHER CONSIDERING the report by International Council for the Exploration of Sea and FAO Working Group on Fishing Technology and Fish Behaviour (2006), Gillnets are considered to be one of the least catch controllable and least environmentally sustainable gears;

FURTHER CONSIDERING the recommendations of the 18th Scientific Committee held in Bali, Indonesia, 23 – 27 November 2015 and the 21st session of the Scientific Committee held in Seychelles, 3 – 7 December 2018, that the catches of yellowfin tuna have to be reduced by 20% of the 2017 levels to recover the stocks to levels above the interim target reference points with 50% probability by 2027 as specified in Kobe II Strategy Matrix;

FURTHER CONSIDERING the management advice of the 21st session of the Scientific Committee on the limitations and uncertainties in the stock assessment;

FURTHER CONSIDERING the concern of the 20th Session of the Working Party for Tropical Tuna held in Seychelles, 29 October – 3 November 2018, the change in strategy by increase of usage of FADs by the purse seine vessels to maintain catch level targets has led to a substantial increase of juvenile yellowfin tuna and bigeye tuna;

NOTING THAT supply vessels contribute to the increase in effort and capacity of purse seiners and that the number of supply vessels has increased significantly over the years;

FURTHER CONSIDERING the call by the United Nations General Assembly Resolution 70/75 upon the States to increase the reliance on scientific advice in developing, adopting and implementing conservation and management measures and to take into account the special requirements of developing States, including Small Island Developing States (SIDS) as highlighted in the SIDS Accelerated Modalities of Action (SAMOA) Pathway;

NOTING THAT Article V.2b of the Agreement for the Establishment of the Indian Ocean Tuna Commission give full recognition to the special interests and needs of Members in the region that are developing countries, in relation to the conservation and management and optimum utilization of stocks covered by this Agreement and encouraging development of fisheries based on such stocks;

FURTHER NOTING THAT Article V.2d requires the Commission to keep under review the economic and social aspects of the fisheries based on the stocks covered by this Agreement bearing in mind, in particular, the interests of developing coastal States. This includes ensuring that conservation and management measures adopted by it do not result in transferring, directly or indirectly, a disproportionate burden of conservation action onto developing States, especially Small Island Developing States;

RECOGNIZING FURTHER the interactions that occur between the fisheries for yellowfin, skipjack and bigeye tuna;

CONSIDERING paragraph 12 of Resolution 16/01 [superseded by Resolution 17/01, then by Resolution 18/01] that allows the Commission to review this Interim Plan before 2019;

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

Application

1. This resolution shall apply to all fishing vessels targeting tuna and tuna like species in the Indian Ocean of 24 meters overall length and over, and those under 24 meters if they fish outside the EEZ of their flag State, within the IOTC Area of Competence.
2. The measures contained within this Resolution shall be considered as interim measure and will be reviewed by the Commission no later than at its annual Session in 2020.
3. Notwithstanding paragraph 2, this Resolution shall be reviewed when a formal Management Procedure for the management of the yellowfin tuna stock is adopted by the Commission and in effect.
4. Nothing in this resolution shall pre-empt or prejudice future allocation of fishing opportunities.

Catch limits

5. **Purse seine:** CPCs whose purse seine catches of yellowfin reported for 2014 were above 5000 MT to reduce their purse seine catches of yellowfin by 15 % from the 2014 levels.
6. **Gillnet:** CPCs whose Gillnet catches of yellowfin reported for 2014 were above 2000 MT to reduce their Gillnet catches of yellowfin by 10 % from the 2014 levels.
7. **Longline:** CPCs whose Longline catches of yellowfin reported for 2014 were above 5000 MT to reduce their Longline catches of yellowfin by 10 % from the 2014 levels.
8. **CPCs' other gears:** CPCs whose catches of yellowfin from other gears reported for 2014 were above 5000 MT to reduce their other gear catches of yellowfin by 5 % from the 2014 levels.
9. In applying the catch reductions by gears in provisions in paragraph 5, 6, 7 and 8, Small Island Developing States and Least Developed Countries can either choose between catches of yellowfin tuna reported for either 2014 or 2015. For such CPCs Paragraph 13(a) is applicable over the accumulated catch in 2018 and 2019.
10. Exceptionally for 2019 and 2020, Small Island Developing States CPCs that contributed less than 4% of the total yellowfin catch of the Indian Ocean in 2017, shall reduce their purse seine catch by 7.5% of 2018 levels.
11. Any CPC to whom para 5-10 do not apply and whose catches exceeded the threshold limits in any subsequent year (from 2017), shall reduce their catches to the levels prescribed for that particular gear as mentioned in paragraphs 5, 6, 7 and 8.

12. Flag States will determine appropriate methods for achieving these catch reductions, which could include capacity reductions, effort limits, *etc.*, and will report to the IOTC Secretariat in their Implementation Report every year.

Over catch of annual limit

13. If over-catch of an annual limit for a given fleet of a CPC listed in paragraph 5 to 10 occurs, catch limits for that fleet shall be reduced as follows:

- a. If the accumulated catch in 2017, 2018 and 2019 exceeds the sum of the catch limit⁵ for 2017, 2018 and 2019 the excess (over-catch) shall be deducted from the 2021 catch limit.
- b. For 2020 and following years, 100% of that over-catch shall be deducted from the following two years limit; unless
- c. Over-catch for that fleet has occurred in two or more consecutive years, in which case 125% of the over-catch shall be deducted from the following two years limit.

14. CPCs shall inform the Commission via the IOTC Compliance Committee, any reductions in the following year because of over catch in paragraph 13 in their implementation Report.

15. The revised limits will apply in the following year and CPCs compliance shall be assessed against the revised limits reported to the IOTC Compliance Committee.

Supply Vessels

16. CPCs shall gradually reduce supply vessels⁶ by 31 December 2022 as specified below in (a), (b), and (c). Flag States shall submit the status of reducing the use of supply vessel as part of the report of Implementation to the Compliance Committee.

- a) From 1 January 2018 to 31 December 2019: 1 supply vessel in support of not less than 2 purse seiners, all of the same flag State⁷.
- b) From 1 January 2020 to 31 December 2020: 2 supply vessels in support of not less than 5 purse seiners, all of the same flag State³.
- c) No CPC is allowed to register any new or additional supply vessel on the IOTC Record of Authorized Vessels after 31 December 2017.

17. A single purse seine vessel shall not be supported by more than one single supply vessel of the same flag State at any point of time.

18. Complementary to Resolution 15/08 (superseded by Resolution 17/08, then by Resolution 18/08, then by Resolution 19/02) and to Resolution 15/02, CPC flag States shall report annually before the 1 January for the coming year of operations which Purse seiners are served by each supply vessel. This information will be published on IOTC website so as to be accessible to all CPCs and is mandatory.

19. CPCs shall report by 1 March 2019, the number of FADs that were deployed in 2018 and 2019 by purse seine vessels and associated supply vessels per 1°x1° grid.

Gillnet

20. Without prejudice to Article 16 of the IOTC Agreement, CPCs shall encourage phasing out or convert gillnet fishing vessels to other gears, considering the huge ecological impact of these gears and fast track the implementation of Resolution 17/07 *On the Prohibition to use large-scale driftnets in the IOTC*.

21. CPCs shall set their gillnets at 2m depth from the surface in gillnet fisheries by 2023 to mitigate ecological impacts of gillnets.

⁵ Catch of Indonesia is based on the national reports submitted to the Scientific Committee

⁶ For the purpose of this resolution, the term "supply vessel" includes "support vessel"

⁷ The subparagraphs (a) and (b) shall not apply to flag States which use only one supply vessel

22. CPCs are encouraged to increase their observer coverage or field sampling in gillnet fishing vessels by 10% using alternative data collection methodologies (electronic or human) verified by the IOTC Scientific Committee by 2023.
23. CPCs shall report the level of implementation of para 21 - 23 to the IOTC Commission via the Compliance Committee.

Administration

24. The IOTC Secretariat, under advice of the Scientific Committee, shall prepare and circulate a table of allocated catch limits disaggregated as per the conditions set out in paragraphs 5 – 10 for preceding year, in December of the current year.
25. CPCs shall monitor the yellowfin tuna catches from their vessels in conformity with Resolution 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence* and Resolution 15/02 *Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non Contracting Parties (CPCs)* and will provide a summary of most-recent yellowfin catches for the consideration of the IOTC Compliance Committee.
26. For the purposes of the implementation of this resolution, CPCs shall submit their catches of yellowfin disaggregated for vessel 24 m overall length and over, and those under 24 m if they fish outside the EEZ as per resolution 15/02.
27. Each year, the Compliance Committee shall evaluate the level of compliance with the reporting obligations and the catch limits deriving from this Resolution and shall make recommendations to the Commission accordingly.
28. The Scientific Committee via its Working Party on Tropical Tunas shall implement the “Workplan to improve current assessment of yellowfin tuna” and shall advise the Commission the financial and administrative requirements to further strengthen the work undertaken to minimize the issues and complexities regarding yellowfin tuna stock assessment.
29. The Scientific Committee via its Working Party on Tropical Tunas shall in 2019 undertake an evaluation of the effectiveness of the measures detailed in this Resolution, taking into account all sources of fishing mortality possible aiming at returning and maintaining biomass levels at the Commission’s target level.
30. This Resolution supersedes IOTC Resolution 18/01 *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock*.

Appendix V: Resolution 19/02

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

Keywords: FAD, active instrumented buoy.

The Indian Ocean Tuna Commission (IOTC),

BEARING IN MIND that the Agreement for the implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA) encourages coastal States and fishing States on the high seas to collect and share, in a timely manner, complete and accurate data concerning fishing activities on, inter alia, vessel position, catch of target and non-target species and fishing effort;

MINDFUL of the call upon States, either individually, collectively or through regional fisheries management organisations and arrangements in the United Nations General Assembly Resolution 67/79 on Sustainable fisheries to collect the necessary data in order to evaluate and closely monitor the use of large-scale fish aggregating devices and others, as appropriate, and their effects on tuna resources and tuna behaviour and associated and dependent species, to improve management procedures to monitor the number, type and use of such devices and to mitigate possible negative effects on the ecosystem, including on juveniles and the incidental bycatch of non-target species, particularly sharks and marine turtles;

NOTING that the United Nations Food and Agricultural Organization (FAO) Code of Conduct for Responsible Fishing provides that States should compile fishery-related and other supporting scientific data relating to fish stocks covered by sub-regional or regional fisheries management organisations and provide them in a timely manner to the organisation;

RECOGNISING that Fish Aggregating Devices under the competence of IOTC should be managed to ensure the sustainability of fishing operations;

GIVEN that the activities of supply vessels and the use of Fish Aggregating Devices (FAD) are an integral part of the fishing effort exerted by the purse seine fleet;

AWARE that the Commission is committed to adopt Conservation and Management Measures to reduce juvenile Bigeye tuna and Yellowfin tuna mortalities from fishing effort on Fish Aggregating Devices (FADs);

RECALLING that [Resolution 12/04](#) established that the Commission at its annual session in 2013 should consider the recommendations of the IOTC Scientific Committee as regards the development of improved FAD designs to reduce the incidence of entanglement of marine turtles, including the use of biodegradable materials, together with socio-economic considerations, with a view to adopting further measures to mitigate interactions with marine turtles in fisheries covered by the IOTC Agreement;

RECALLING that Resolution 13/08 [superseded by Resolution 15/08, by Resolution 17/08, then by [Resolution 18/08](#)] established procedures on a fish aggregating device (FAD) management plan, including more detailed specifications of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species;

NOTING that the IOTC Scientific Committee advised the Commission that only non-entangling FADs, both drifting and anchored, should be designed and deployed to prevent the entanglement of sharks, marine turtles and other species;

NOTING that the IOTC Scientific Committee advised the Commission to conduct an investigation of the feasibility and impacts of a temporary FAD closure as well as other measures in the context of Indian Ocean fisheries and stocks;

RECALLING that the objective of the IOTC Agreement is to ensure, through appropriate management, the conservation and optimum utilisation of stocks covered by the mentioned Agreement and encouraging sustainable development of fisheries based on such stocks and minimising the level of bycatch;

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

1. Definitions

For the purpose of this Resolution:

- a) Fish Aggregating Device (FAD) means a permanent, semi-permanent or temporary object, structure or device of any material, man-made or natural, which is deployed and/or tracked, for the purpose of aggregating target tuna species for consequent capture.
 - b) Drifting Fish Aggregating Devices (DFADs) means a FAD not tethered to the bottom of the ocean. A DFAD typically has a floating structure (such as a bamboo or metal raft with buoyancy provided by buoys, corks, etc.) and a submerged structure (made of old netting, canvass, ropes, etc.).
 - c) Anchored Fish Aggregating Devices (AFADs) means a FAD tethered to the bottom of the ocean. It usually consists of a very large buoy and anchored to the bottom of the ocean with a chain.
 - d) Instrumented buoy means a buoy with a clearly marked with a unique reference number allowing identification of its owner and equipped with a satellite tracking system to monitor its position.
 - e) Operational buoy means any instrumented buoy, previously activated, switched on and deployed at sea on a drifting FAD or log, which transmit position and any other available information such as eco-sounder estimates.
 - f) Activation of a buoy means the act of initializing satellite communication service, which is done by the buoy supplier company at the request of the vessel owner or manager.
 - g) Deactivation of a buoy means the act of cancelling satellite communications service, which is done by the buoy supplier company at the request of the vessel owner or manager.
 - h) Buoy owner means any legal or natural person, entity or branch, who is paying for the communication service for the buoy associated with a FAD, and/or who is authorized to receive information from the satellite buoy, as well as to request its activation and/or deactivation.
 - i) Reactivation: the act of re-enabling satellite communications services by the buoy supplier company at the request of the buoy owner or manager.
 - j) Buoy in stock means an instrumented buoy acquired by the owner which has not been made operational.
2. This Resolution shall apply to CPCs having purse seine vessels and fishing on Drifting Fish Aggregating Devices (DFADs), equipped with instrumented buoys for the purpose of aggregating target tuna species, in the IOTC area of competence. Only purse seiners and associated supply or support vessels are allowed to deploy DFADs in the IOTC Area of Competence.
 3. This resolution requires the use of instrumented buoy, as per the above definition, on all DFADs and prohibits the use of any other buoys, such as radio buoys, not meeting this definition.
 4. This Resolution sets the maximum number of operational buoys followed by any purse seine vessel at 300 at any one time. The number of instrumented buoys that may be acquired annually for each purse seine vessel is set at no more than 500. No purse seine vessel shall have more than 500 instrumented buoys (buoy in stock and operational buoy) at any time. An instrumented buoy shall be made operational only when physically present on board the purse-seine vessel to which it belongs or its associated supply or support vessel, and the event shall be recorded in the appropriate logbook, specifying the instrumented buoy unique identification number and the date, time and geographical coordinates of its deployment.
 5. A CPC may adopt a lower limit than the one set out in paragraph 4 for vessels flying its flag. Further, any CPC may adopt a lower limit for DFADs deployed in its EEZ than that stated in paragraph 4. The CPC shall review the adopted limit to ensure that such limit is not more than the limit fixed by the Commission.

6. CPCs shall ensure that as from the effective date of this Resolution, each of its purse seiners already in operation does not exceed the maximum number of operational and instrumented buoys at any one time as set out in paragraph 4.
7. All purse seine vessel, supply or support vessel shall declare to its respective CPC, the number of instrumented buoys onboard, including each unique identifier of the instrumented buoy before and after each fishing trip.
8. Reactivation of an instrumented buoy shall only be possible once it has been brought back to port, either by the vessel tracking the buoy/ associated supply or support vessel or by another vessel and has been authorized by the CPC.
9. Notwithstanding the completion of any study undertaken at the request of the Commission including the study to be undertaken by the Working Group adopted at Resolution 15/09 in relation to FADs, the Commission may review the maximum number of instrumented buoys set out in paragraph 4.
10. CPCs shall require vessels flying their flag and fishing on DFADs to annually submit the number of operational buoys followed by vessel, lost and transferred (total number of DFADs tagged at sea, by deploying an instrumented buoy on a log or another vessel DFAD already in the water) by 1° by 1° grid area and month strata and DFAD type under the confidentiality rules set by Resolution 12/02 (or any subsequent superseding Resolution).
11. All CPCs shall ensure that all fishing vessels as referred to in paragraph 2 shall record fishing activities in association with FADs using the specific data elements found in Annex III (DFAD) and Annex IV (AFAD) in the section of the “FAD-logbook”.
12. CPCs having vessels flying their flag and fishing on FADs shall submit, to the Commission, on an annual basis, Management Plans for the use of FADs. Due to their specificity in terms of users, type of boat/vessel involved, fishing method and gear used and materials used in their construction, the Management Plans and Reporting Requirements for Drifting FADs (DFAD) and Anchored FADs (AFAD) shall be addressed separately for the purposes of this Resolution. The Plans shall at a minimum follow the Guidelines for Preparation for FAD Management Plans by each CPC as provided for DFADs in Annex I and AFADs in Annex II.
13. The Management Plans shall be analysed by the IOTC Compliance Committee.
14. The Management Plans shall include initiatives or surveys to investigate, and to the extent possible minimise the capture of small bigeye tuna and yellowfin tuna and non-target species associated with fishing on FADs. Management Plans shall also include guidelines to prevent, to the extent possible, the loss or abandonment of FADs.
15. In addition to the Management Plans, all CPCs shall ensure that all fishing vessels flying their flag and fishing on FADs, including supply vessels, shall record fishing activities in association with FADs using the specific data elements found in Annex III (DFAD) and Annex IV (AFAD).
16. CPCs shall submit to the Commission, 60 days before the Annual Meeting, a report on the progress of the management plans of FADs, including, if necessary, reviews of the initially submitted Management Plans, and including reviews of the application of the principles set out in Annex III.

Non-entangling and biodegradable FADs

17. To reduce the entanglement of sharks, marine turtles or any other species, CPCs shall require their flagged vessels to use non-entangling designs and materials in the construction of FADs as outlined in Annex V.
18. To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials in FAD construction should be promoted. CPCs shall encourage their flag vessels to use biodegradable FADs in accordance with the guidelines at Annex V with a view to transitioning to the use of biodegradable FADs, with the exception of materials used for the instrumented buoys, by their flag vessel from 1 January 2022. CPCs shall, from 1 January 2022, encourage their flag vessels to remove from the water, retain onboard and only dispose of in port, all traditional FADs encountered (e.g. those made of entangling materials or

designs). The reference year prescribed above shall be reviewed in light of the Scientific Committee's recommendation pursuant to Resolution 18/04 *On BioFAD experimental project*.

19. CPCs are encouraged to conduct trials using biodegradable materials to facilitate the transition to the use of only biodegradable material for DFADS construction by their flagged vessels. The results of such trials shall be presented to the Scientific Committee who shall continue to review research results on the use of biodegradable material on FADs and shall provide specific recommendations to the Commission as appropriate.

FAD Marking

20. A new marking scheme shall be developed by the ad-hoc FAD working group and shall be considered by the Commission at its regular annual session in 2020.
21. Until the marking scheme referred to in paragraph 20 is adopted, CPCs shall ensure that the instrumented buoy attached to the DFAD contain a physical, unique reference number marking (ID provided by the manufacturer of the instrumented buoy) and the vessel unique IOTC registration number clearly visible.

Data reporting and analysis

22. CPCs shall submit the data elements prescribed in Annex III and Annex IV to the Commission, consistent with the IOTC standards for the provision of catch and effort data, and these data shall be made available for analysis to the IOTC Scientific Committee on the aggregation level set by Resolution 15/02 (or any subsequent superseding Resolution), and under the confidentiality rules set by Resolution 12/02 (or any subsequent superseding Resolution).
23. The IOTC Scientific Committee will analyse the information, when available, and provide scientific advice on additional FAD management options for consideration by the Commission, including recommendations on the number of FADs to be operated, the use of biodegradable materials in new and improved FADs design. When assessing the impact of FADs on the dynamic and distribution of targeted fish stocks and associated species and on the ecosystem, the IOTC Scientific Committee will, where relevant, use all available data on abandoned FADs (i.e. FADs without a beacon or which have drifted outside the fishing zone).

FAD Tracking and Recovery Procedures

24. In order to support the monitoring of compliance with the limitation established in Paragraph 4, while protecting business confidential data, the instrumented buoy supplier company or the CPCs shall, starting 1 January 2020, report, or require their vessels to report, daily information on all active FADs to the Secretariat. Such information shall contain, date, instrumented buoy ID, assigned vessel and daily position, which shall be compiled at monthly intervals, to be submitted with a time delay of at least 60 days, but no longer than 90 days.
25. The Commission shall establish a DFAD tracking and recovery policy at its annual session in 2021, on the basis of recommendations from the ad-hoc FAD working group. The policy shall define DFAD tracking, reporting of lost DFADs, arrangements to alert coastal States of derelict/lost DFADs at risk of beaching in near real-time, how and who recovers the DFADs, how the recovery costs are collected and shared.
26. The IOTC Secretariat shall submit a report, on an annual basis, to the IOTC Compliance Committee on the level of compliance of each CPC with operational buoy limits, annual limits of instrumented buoys purchased.
27. This resolution shall be reviewed by the Commission, at the latest, at its session in 2022, based on recommendations from the Scientific Committee.
28. This resolution shall enter into force on 1 January 2020.
29. Resolution 18/08 *Procedures on a fish aggregating devices (FADs) management plan, including more detailed specification of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species* is superseded by this Resolution.

Annex I

Guidelines For Preparation Of Drifting Fish Aggregating Device (DFAD) Management Plans

To support obligations in respect of the DFAD Management Plan (DFAD–MP) to be submitted to the IOTC Secretariat by CPCs with fleets fishing in the IOTC area of competence, associated to DFADs, DFAD–MP should include:

1. An objective
2. Scope

Description of its application with respect to:

- vessel-types and support and tender vessels
 - DFAD numbers and DFADs beacon numbers to be deployed
 - reporting procedures for DFAD deployment
 - incidental bycatch reduction and utilisation policy
 - consideration of interaction with other gear types
 - plans for monitoring and retrieval of lost DFADs
 - statement or policy on “DFAD ownership”
3. Institutional arrangements for management of the DFAD Management Plans:
 - institutional responsibilities
 - application processes for DFAD and /or DFAD beacons deployment approval
 - obligations of vessel owners and masters in respect of DFAD and /or DFAD beacons deployment and use
 - DFAD and/or DFADs beacons replacement policy
 - reporting obligations
 4. DFAD construction specifications and requirements:
 - DFAD design characteristics (a description)
 - DFAD markings and identifiers, including DFADs beacons
 - lighting requirements
 - radar reflectors
 - visible distance
 - radio buoys (requirement for serial numbers)
 - satellite transceivers (requirement for serial numbers)
 5. Applicable areas:
 - Details of any closed areas or periods e.g. territorial waters, shipping lanes, proximity to artisanal fisheries, etc.
 6. Applicable period for the DFAD–MP.
 7. Means for monitoring and reviewing implementation of the DFAD–MP.
 8. DFAD logbook template (data to be collected specified in Annex III).

Annex II

Guidelines For Preparation Of Anchored Fish Aggregating Device (AFAD) Management Plans

To support obligations in respect of the AFAD Management Plan (AFAD–MP) to be submitted to the IOTC Secretariat by CPCs with fleets fishing in the IOTC area of competence, associated to AFADs, AFAD– MP should include:

1. An objective
2. Scope:

Description of its application with respect to:

 - a) vessel types
 - b) AFAD numbers and/or AFADs beacons numbers to be deployed (per AFAD type)
 - c) reporting procedures for AFAD deployment
 - d) distances between AFADs
 - e) incidental bycatch reduction and utilisation policy
 - f) consideration of interaction with other gear types
 - g) the establishment of inventories of the AFADs deployed, detailing AFAD identifiers, characteristics and equipment of each AFAD as laid down in point 4 of the present Annex, coordinates of the AFAD's mooring sites, date of set, lost and reset
 - h) plans for monitoring and retrieval of lost AFADs
 - i) statement or policy on "AFAD ownership"
3. Institutional arrangements for management of the AFAD Management Plans:
 - a) institutional responsibilities
 - b) regulations applicable to the setting and use of AFADs
 - c) AFAD repairs, maintenance rules and replacement policy
 - d) data collection system
 - e) reporting obligations
4. AFAD construction specifications and requirements:
 - a) AFAD design characteristics (a description of both the floating structure and the underwater structure, with special emphasis on any netting materials used)
 - b) anchorage used for mooring
 - c) AFAD markings and identifiers, including AFAD beacons if any
 - d) lighting requirements if any
 - e) radar reflectors
 - f) visible distance
 - g) radio buoys if any (requirement for serial numbers)
 - h) satellite transceivers (requirement for serial numbers)
 - i) echo sounder
5. Applicable areas:
 - a) coordinates of mooring sites, if applicable
 - b) details of any closed areas e.g., shipping lanes, Marine Protected Areas, reserves etc.
6. Means for monitoring and reviewing implementation of the AFAD–MP.

7. AFAD logbook template (data to be collected specified in Annex IV).

**Annex III
Data collection for DFADs**

- a) For each activity on a DFAD, whether followed by a set or not, each fishing, support and supply vessel to report the following information:
- i. Vessel (name and registration number of the fishing, support or supply vessel)
 - ii. Position (as the geographic location of the event (Latitude and Longitude) in degrees and minutes)
 - iii. Date (as DD/MM/YYYY, day/month/year)
 - iv. DFAD identifier (DFAD or beacon ID)
 - v. DFAD type (drifting natural FAD, drifting artificial FAD),
 - vi. DFAD design characteristics
 - Dimension and material of the floating part and of the underwater hanging structure
 - vii. Type of the activity, (visit deployment, hauling, retrieving, loss, intervention to service electronic equipment).

If the visit is followed by a set, the results of the set in terms of catch and bycatch, whether retained or discarded dead or alive. CPCs to report this data aggregated per vessel at 1*1 degree (where applicable) and monthly to the Secretariat

**Annex IV
Data Collection for AFADs**

- a) Any activity around an AFAD.
- b) For each activity on an AFAD (repair, intervention consolidation, etc.), whether followed or not by a set or other fishing activities, the,
- i. Position (as the geographic location of the event (Latitude and Longitude) in degrees and minutes)
 - ii. Date (as DD/MM/YYYY, day/month/year)
 - iii. AFAD identifier (i.e. AFAD Marking or beacon ID or any information allowing to identify the owner).
- c) If the visit is followed by a set or other fishing activities, the results of the set in terms of catch and bycatch, whether retained or discarded dead or alive.

Appendix VI: Resolution 19/03

On the conservation of mobulid species caught in association with fisheries in the IOTC area of competence

Keywords: Mobula Rays, Manta Rays, Conservation,

The Indian Ocean Tuna Commission (IOTC),

RECOGNISING Resolution 12/01 On the implementation of the Precautionary Approach calls on IOTC Contracting Parties and Cooperating Non-Contracting Parties to apply the precautionary approach when managing tuna and tuna-like species in accordance with Article 5 of the United Nations Fish Stocks Agreement and that, for sound fisheries management, such an approach applies also within areas under national jurisdiction;

RECALLING IOTC Resolution 05/05 *Concerning the conservation of sharks caught in association with fisheries managed by IOTC* [superseded by Resolution 17/05];

CONSIDERING that the species of the family Mobulidae, which includes manta rays and mobula rays (hereinafter mobulid rays), are extremely vulnerable to overfishing as they are slow-growing, late sexual maturity, have long gestation periods, and often give birth to only a few pups;

RECOGNISING the ecological and cultural significance of mobulid rays in the Indian Ocean;

CONCERNED about the possible impacts on these species by the different fisheries occurring from coastal areas to the high seas;

CONSIDERING that the United Nations Food and Agriculture Organization (FAO) International Plan of Action for Sharks calls on States to cooperate through regional fisheries management organizations to ensure the sustainability of shark stocks;

CONCERNED by the lack of complete and accurate data reporting concerning fishing activities on non-targeted species;

RECOGNIZING the need to improve the collection of species-specific data on catch, catch rates, release, discards, and trade as a basis for improving the conservation and management of mobulid rays stocks;

NOTING that the mobulid rays are listed in Appendix I and Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the range States to a migratory species shall endeavour to strictly protect them;

FURTHER NOTING that the mobulid rays are also listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) for which trade shall be closely controlled under specific conditions including, inter alia, that trade will not be detrimental to the survival of the species in the wild;

ACKNOWLEDGING that the Scientific Committee (SC21) recently noted the declines of these species across the Indian Ocean and RECOMMEND that management actions, such as no-retention measures amongst other, are required and must be immediately adopted;

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

This Resolution shall apply to all fishing vessels flying the flag of a Contracting Party or Cooperating Non-Contracting Party (hereinafter referred to collectively as CPCs), and on the IOTC record of fishing vessels or authorized to fish for tuna and tuna like species managed by the IOTC.

1. CPCs shall prohibit all vessels from intentionally setting any gear type for targeted fishing of mobulid rays in the IOTC Area of Competence, if the animal is sighted prior to commencement of the set.
2. CPCs shall prohibit all vessels retaining onboard, transshipping, landing, storing, any part or whole carcass of mobulid rays caught in the IOTC Area of Competence.

3. Provisions of paragraphs 2 and 3 above do not apply to fishing vessels carrying out subsistence fishery⁸ that, anyhow, shall not be selling or offering for sale any part or whole carcass of mobulid rays.
4. CPCs shall require all their fishing vessels, other than those carrying out subsistence fishery, to promptly release alive and unharmed, to the extent practicable, mobulid rays as soon as they are seen in the net, on the hook, or on the deck, and do it in a manner that will result in the least possible harm to the individuals captured. The handling procedures detailed in Annex I, while taking into consideration the safety of the crew shall be implemented and followed.
5. Notwithstanding paragraph 3, in the case of mobulid rays that are unintentionally caught by and frozen as part of a purse seine vessel's operation, the vessel must surrender the whole mobulid ray to the responsible governmental authorities, or other competent authority, or discard them at the point of landing. Mobulid rays surrendered in this manner may not be sold or bartered but may be donated for purposes of domestic human consumption.
6. Notwithstanding paragraph 3, in the case of mobulid rays that are unintentionally caught by artisanal fishing⁹, the vessel should report the information on the accidental catch to the responsible governmental authorities, or other competent authority, at the point of landing. Mobulid rays unintentionally caught may only be used for purposes of local consumption. This derogation will expire in 1 January 2022.
7. CPCs shall report the information and data collected on interactions (i.e. number of discards and releases) with mobulid rays by vessels through logbooks and/or through observer programs. The data shall be provided to the IOTC Secretariat by 30 June of the following year, and according to the timelines specified in Resolution 15/02 (or any subsequent revision).
8. CPCs shall ensure that fishermen are aware of and use proper mitigation, identification, handling and releasing techniques and keep on board all necessary equipment for the release of mobulid rays in accordance with the handling guidelines of Annex 1.
9. Recreational and sport fishing shall release alive all caught mobulid rays and shall not be entitled to retaining onboard, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of mobulid rays.
10. CPCs, unless clearly demonstrate that intentional and/or incidental catches of mobulids do not occur in their fisheries, shall develop, with the assistance from the IOTC Secretariat where required, sampling plans for the monitoring of the mobulid rays catches by the subsistence and artisanal fisheries. The sampling plans, including their scientific and operational rationale, shall be reported in the national scientific reports to the Scientific Committee, starting in 2020, which will provide its advice on their soundness by 2021 at the latest. The sampling plans, where required, will be implemented by the CPCs from 2022 onward taking into account the Scientific Committee advice.
11. CPCs are encouraged to investigate at-vessel and post-release mortality in mobulids including, but not exclusively, the application of satellite tagging programs that may be provisioned primarily through the national support complementing possible funds allocation from the IOTC to investigate the effectiveness of this measure.
12. The IOTC Scientific Committee shall review the status of *Mobula spp.* in the IOTC Area of Competence and provide management advice to the Commission in 2023 also to identify possible hot-spots for conservation and management of mobulids within and beyond EEZs. Moreover, the IOTC Scientific Committee is requested to provide, whenever considered adequate on the basis of evolving knowledge and scientific advice, further improvements to the handling procedures detailed in Annex 1.

⁸ A subsistence fishery is a fishery where the fish caught are consumed directly by the families of the fishers rather than being bought by middle-(wo)men and sold at the next larger market, per the FAO Guidelines for the routine collection of capture fishery data. FAO Fisheries Technical Paper. No. 382. Rome, FAO. 1999. 113p.

⁹ Artisanal fishing: fisheries other than longline or surface fisheries (i.e. purse seines, pole & line, gillnet fisheries, hand-line and trolling vessels), registered in the IOTC Record of Authorized Vessels (DEFINITION in footnote 1 of Res. 15/02).

13. Scientific observers shall be allowed to collect biological samples of mobulid rays caught in the IOTC Area of Competence that are dead at haul-back, provided that the samples are a part of a research project approved by the IOTC Scientific Committee. In order to obtain the approval, a detailed document outlining the purpose of the work, number of samples intended to be collected and the spatio-temporal distribution of the sampling effort must be included in the proposal. Annual progress of the work and a final report on completion shall be presented to the SC.

ANNEX 1

Live release handling procedures

1. Prohibit the gaffing of rays.
2. Prohibit the lifting of rays by the gill slits or spiracles.
3. Prohibit the punching of holes through the bodies of rays (e.g. to pass a cable through for lifting the ray).
4. Rays too large to be lifted safely by hand shall be, to the extent possible, brailed out of the net using best available method such as those recommended in document IOTC-2012-WPEB08-INF07.

Large rays that cannot be released safely before being landed on deck, shall be returned to the water as soon as possible, preferably utilizing a ramp from the deck connecting to an opening on the side of the boat, or if no such ramp is available, lowered with a sling or net.

Appendix VII: Resolution 21/01

On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock in the IOTC area of competence

Keywords: Yellowfin tuna, Kobe Process, MSY, Precautionary Approach

The Indian Ocean Tuna Commission (IOTC),

CONSIDERING the objectives of the Commission to maintain stocks in perpetuity and with high probability, at levels not less than those capable of producing their maximum sustainable yield as qualified by relevant environmental and economic factors including the special requirements of developing States in the IOTC area of competence;

BEING MINDFUL of Article XVI of the IOTC Agreement regarding the rights of Coastal States and of Article 87 and 116 of the UN Convention of the Law of the Sea regarding the right to fish on the high seas;

RECOGNISING the special requirements of the developing States, particularly Small Island developing States in Article 24(b), of the Agreement for the Implementation of the Provisions of the United Nations Convention of the Law of the Sea of December 1982, relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA);

FURTHER RECOGNISING the need to ensure that conservation and management measures do not result in transferring, directly or indirectly, a disproportionate burden of conservation action onto developing States, Article 24(c) of UNFSA;

RECALLING that Article 5, of UNFSA entitles the conservation and management of highly migratory fish stocks are based on best scientific evidence available and with special reference to IOTC Resolution 15/10 for a stock where the assessed status places it within the red quadrant, and with an aim to end overfishing with a high probability and to rebuild the biomass of the stock in as short time as possible;

FURTHER RECALLING that Article 6, of UNFSA and IOTC Resolution 12/01 *“On the implementation of the precautionary approach”*, requires the States to be cautious during the application of precautionary approach when information is uncertain, unreliable or inadequate and this should not be a reason for postponing or failing to take conservation and management measures;

CONSIDERING the recommendations adopted by the KOBE II, held in San Sebastian, Spain, June 23 – July 3 2009; implementing where appropriate a freeze on fishing capacity on a fishery by fishery basis and such a freeze should not constrain the access to, development of, and benefit from sustainable tuna fisheries by developing coastal States;

FURTHER CONSIDERING the recommendations adopted by the KOBE III, held in La Jolla, California, 12- 14 July 2011; considering the status of the stocks, each RFMO should consider a scheme for reduction of overcapacity in a way that does not constrain the access to, development of, and benefit from sustainable tuna fisheries, including on the high seas, by developing coastal States, in particular Small Island Developing States, territories, and States with small and vulnerable economies; and Transfer of capacity from developed fishing members to developing coastal fishing members within its area of competence where appropriate;

FURTHER CONSIDERING the concern of the 20th Session of the Working Party for Tropical Tuna held in Seychelles, 29 October – 3 November 2018, the change in strategy by increase of usage of FADs by the purse seine vessels to maintain catch level targets has led to a substantial increase of juvenile yellowfin tuna and bigeye tuna;

NOTING THAT supply vessels contribute to the increase in effort and capacity of purse seiners and that the number of supply vessels has increased significantly over the years;

FURTHER CONSIDERING the call by the United Nations General Assembly Resolution 70/75 upon the States to increase the reliance on scientific advice in developing, adopting and implementing conservation and management measures and to take into account the special requirements of developing States, including Small Island Developing States (SIDS) as highlighted in the SIDS Accelerated Modalities of Action (SAMOA) Pathway;

NOTING THAT Article V.2b of the Agreement for the Establishment of the Indian Ocean Tuna Commission give full recognition to the special interests and needs of Members in the region that are developing countries, in relation to the conservation and management and optimum utilization of stocks covered by this Agreement and encouraging

development of fisheries based on such stocks;

FURTHER NOTING THAT Article V.2d requires the Commission to keep under review the economic and social aspects of the fisheries based on the stocks covered by this Agreement bearing in mind, in particular, the interests of developing coastal States. This includes ensuring that conservation and management measures adopted by it do not result in transferring, directly or indirectly, a disproportionate burden of conservation action onto developing States, especially Small Island Developing States;

RECOGNIZING FURTHER the interactions that occur between the fisheries for yellowfin, skipjack and bigeye tuna;

FURTHER CONSIDERING the management advice of the 23rd session of the Scientific Committee, that given the limitations and uncertainties in the stock assessment and the inability to use K2SM derived from the 2018 yellowfin tuna stock assessment, the catches to be reduced to a level at least below the C_{MSY} estimate (403, 000MT) and the need to decrease the fishing mortality from the 2017 level in order to remove overfishing on the stock;

FURTHER CONSIDERING the issues raised in the 23rd session of the Scientific Committee regarding the estimated K2SM probabilities derived from the 2018 stock assessment, and that due to critical errors in projections and estimations in computing probabilities in the K2SM developed in 2018, the K2SM is not suitable to provide management advice;

FURTHER CONSIDERING the SC 2020 advice that Commission should ensure that CPCs take all necessary action to achieve the catch reductions in their fleets as per Resolution 19/01.

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

Application

1. This resolution shall apply to all CPCs within the IOTC area of competence.
2. This resolution will be effective from 1 January 2022. The measures contained within this Resolution shall be considered as interim measure and will be reviewed by the Commission no later than at its annual Session in 2022.
3. Notwithstanding paragraph 2, this Resolution shall be reviewed when a formal Management Procedure for the management of the yellowfin tuna stock is adopted by the Commission and in effect.
4. Nothing in this resolution shall pre-empt or prejudice future allocation of fishing opportunities.

Catch limits

5. CPCs whose reported catches of yellowfin tuna for 2014 were above 5000t shall reduce their catches of yellowfin tuna by 21% compared to 2014 yellowfin tuna catch, except:
 - a. If those CPCs are Coastal Developing States, they shall reduce their catches of yellowfin tuna by 12% compared to 2014 yellowfin tuna catch;
 - b. If those CPCs are Small Island Developing States or Least Developed States, they shall reduce their catches of yellowfin tuna by 10% compared to 2014 yellowfin tuna catch.
6. CPCs whose reported catches of yellowfin tuna for 2014 were below 5000t and their average catches of yellowfin tuna for the period from 2017 to 2019 inclusive, were above 5000t, shall reduce their catches of yellowfin tuna by 21% compared to 2014 yellowfin tuna catch, except;
 - a. If those CPCs are Coastal Developing States, they shall reduce their catches of yellowfin tuna by 12% compared to average of 2017 – 2019 yellowfin tuna catch;
 - b. If those CPCs are Small Island Developing States or Least Developed States, they shall reduce their catches of yellowfin tuna by 10% compared to average of 2017 – 2019 or 2018 yellowfin tuna catch, whichever is higher.
7. CPCs whose reported catches of yellowfin tuna for 2014 were below 5000t and their average catches of yellowfin tuna for the period from 2017 to 2019 inclusive were between 2000t to 5000t, shall not exceed their maximum reported yellowfin tuna catches between 2017 to 2019.
8. CPCs whose reported catches of yellowfin tuna for 2014 were below 5000t and their average catches of

yellowfin tuna for the period from 2017 to 2019 inclusive were below 2000t, shall not exceed their catches above 2000t

9. In respect of paragraph 8, and recalling paragraph 4, for conservation purposes three CPCs have agreed exceptionally for 2022 (or 1 year) not to exceed yellowfin tuna catches at different levels¹⁰
10. In applying the catch reductions in paragraph 5, Small Island Developing State CPCs and Least Developed State CPCs can either choose between catches of yellowfin tuna reported for either 2014, or 2015 or their average catches for the period from 2017 to 2019.
11. In applying the catch reductions in paragraph 5 for Distant Water Fishing CPCs, if the average yellowfin tuna catches between 2017 – 2019 were below 10,000t, CPCs shall reduce their yellowfin catch by 13% compared to 2014 levels.
12. CPCs will determine appropriate methods for achieving these catch reductions, which could include capacity reductions, effort limits, etc., and will report to the IOTC Secretariat in their Implementation Report every year.
13. Any CPC who submits updated catch histories of yellowfin tuna in accordance with IOTC resolution 15/01 and verified by the secretariat and the IOTC Scientific Committee, shall have a right to access yellowfin tuna in accordance with the limits prescribed in the Resolution.

Over catch of annual limit

14. If over catch of an annual limit for a given CPC listed in paragraphs 5 to 11 occurs, catch limits for that CPC shall be reduced as follows:
 - a. for over-catch of limits set forth in Resolution 19/01, in 2020 and/or 2021, 100% of that over-catch shall be deducted from following two years limit, and;
 - b. over-catch in 2022 and following years, 100% of that over-catch shall be deducted from the following two years' limit, unless;
 - c. over-catch for that CPC has occurred in two or more consecutive years, in which case 125% of the over-catch shall be deducted from the following two years limit.
15. CPCs that are subject to catch reductions due to over-catch shall inform the Commission via the IOTC Compliance Committee, corrective actions taken by the CPC to adhere to the prescribed catch levels, in their implementation Report.
16. The revised limits from paragraph 14 will apply in the following year and CPCs compliance shall be assessed against the revised limits reported to the IOTC Compliance Committee.
17. The tropical tuna data submitted by CPCs in accordance with Resolution 15/01 "*On the recording of catch and effort data by fishing vessels in the IOTC area of competence*" and Resolution 15/02 "*Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)*" shall be reviewed by the Secretariat and discussed by the Scientific Committee for possible inconsistencies. In such cases, the Scientific Committee shall provide the rationale of the detected inconsistencies and justify the choice of the best solution available with regard the scientific analysis to be carried out. Data used for catch limit calculations shall be based on the data reviewed, including possible estimates, by the Secretariat.

Supply Vessels

18. CPCs shall gradually reduce supply vessels¹¹ in purse seine operations targeting tropical tuna, by 31 December 2022 as specified below in (a) and (b). Flag States shall submit the status of reducing the use of supply vessel as part of the report of Implementation to the Compliance Committee.
 - a. From 1 January 2022 to 31 December 2024: 3 supply vessels in support of not less than 10 purse seiners, all of the same flag State¹².
 - b. No CPC is allowed to register any new or additional supply vessel on the IOTC Record of Authorized

¹⁰ France (OT) 500t; Philippines 700t; and the United Kingdom 500t.

¹¹ For the purpose of this resolution, the term "supply vessel" includes "support vessel"

¹² The subparagraph (a) shall not apply to CPCs which use only one supply vessel

Vessels-

19. A single purse seine vessel shall not be supported by more than one single supply vessel of the same flag State at any point of time.
20. Complementary to Resolution 15/08 and to Resolution 15/02, CPC/flag States shall report annually before the 1st of January for the coming year of operations which Purse seiners are served by each supply vessel. This information will be published on IOTC website so as to be accessible to all CPCs and is mandatory.

Gillnet

21. Without prejudice to Article 16 of the IOTC Agreement, CPCs shall encourage phasing out or convert gillnet fishing vessels to other gears, considering the huge ecological impact of these gears and fast track the implementation of Resolution 17/07 *“On the Prohibition to use large-scale driftnets in the IOTC”*, noting that large-scale driftnets are prohibited in the IOTC Area of Competence from 1 January 2022.
22. CPCs shall set their gillnets at 2m depth from the surface in gillnet fisheries by 2023 to mitigate ecological impacts of gillnets.
23. CPCs are encouraged to increase their observer coverage or field sampling in gillnet fishing vessels by 10% using alternative data collection methodologies (electronic or human) verified by the IOTC Scientific Committee by 2023.
24. CPCs shall report the level of implementation of paragraphs 21-23 to the Commission via the Compliance Committee.

Administration

25. The IOTC Secretariat under advice of the Scientific Committee shall prepare and a table of allocated catch limits disaggregated as per the conditions set out in paragraphs 5-11 for following year, in December of the current year.
26. For the purposes of the implementation of this resolution, each CPC shall, by 15 February of the following year, notify to the Executive Secretary the list of vessels, which have fished for yellowfin tuna in the IOTC area of competence for the preceding year.
27. The IOTC Secretariat shall report each year these lists of active vessels to the IOTC Compliance Committee and to the IOTC Scientific Committee in the form of aggregated statistics concerning fishing fleets capacity metrics.
28. CPCs shall monitor the yellowfin tuna catches from their vessels in conformity with Resolution 15/01 *“On the recording of catch and effort data by fishing vessels in the IOTC area of competence”* and Resolution 15/02 *“Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non Contracting Parties (CPCs)”* and will provide a summary of most-recent yellowfin catches for the consideration of the IOTC Compliance Committee.
29. Each year, the IOTC Compliance Committee shall evaluate the level of compliance with the reporting obligations and the catch limits deriving from this Resolution and shall make recommendations to the Commission accordingly.
30. The IOTC Scientific Committee via its Working Party on Tropical Tunas shall implement the *“Workplan to improve current assessment of yellowfin tuna”* and shall advice the Commission the financial and administrative requirements to further strengthen the work undertaken to minimize the issues and complexities regarding yellowfin tuna stock assessment.
31. The IOTC Scientific Committee and its Working Parties shall prioritise the work on the yellowfin tuna management procedure and to provide advice to the Technical Committee on Management Procedures and to enable the Commission to adopt the yellowfin tuna management procedure at the earliest opportunity.
32. The Scientific Committee via its Working Party on Tropical Tunas shall undertake evaluation of the effectiveness of the measures detailed in this Resolution, taking into account all sources of fishing mortality possible aiming at returning and maintaining biomass levels at the Commission’s target level.
33. This Resolution supersedes IOTC Resolution 19/01 *On an interim plan for rebuilding the Indian Ocean yellowfin tuna stock*.

Appendix VIII: Resolution 22/04 On a Regional Observer Scheme

Keywords: *Regional Observer Scheme, Scientific Observer, Electronic Monitoring System*

The Indian Ocean Tuna Commission (IOTC),

TAKING INTO ACCOUNT the need to increase the scientific information, in particular to provide the IOTC Scientific Committee (SC) working material in order to improve the management of the tuna and tuna-like species fished in the Indian Ocean;

REITERATING the responsibilities of flag States to ensure that their vessels conduct their fishing activities in a responsible manner, fully respecting IOTC Conservation and Management Measures;

CONSIDERING the need for action to ensure the effectiveness of the IOTC objectives;

CONSIDERING the obligation of all IOTC Contracting Parties and Cooperating Non-Contracting Parties (hereinafter CPCs) to fully comply with the IOTC Conservation and Management Measures;

AWARE of the necessity for sustained efforts by CPCs to ensure the enforcement of IOTC's Conservation and Management Measures, and the need to encourage Non-Contracting Parties (NCPs) to abide by these measures;

UNDERLINING that the adoption of this measure is intended to help support the implementation of Conservation and Management Measures as well as scientific research for tuna and tuna-like species;

CONSIDERING the provisions set forth in Resolution 11/04 [superseded by Resolution 22/04] *On A Regional Observer Scheme*, adopted by the Commission;

CONSIDERING Resolution 16/04 *On the implementation of a pilot project in view of promoting the regional observer scheme of IOTC*;

FURTHER CONSIDERING the deliberation of the 21st Session of the IOTC Scientific Committee held in Seychelles, from 3 to 7 December 2018;

RECALLING the discussion of the 23rd session of the IOTC held in Hyderabad, India, from 17 to 21 June 2019;

FURTHER RECALLING that the 23rd session of the IOTC Scientific Committee expressed the concern on the low observer coverage level at 2.15% and on the fact that there is no coverage of the artisanal fleet, which comprise a large portion of catches taken in the Indian Ocean;

CONSIDERING the recurrent non-compliance of multiple fleets to the minimum observer coverage since the adoption of Resolution 11/04;

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

Definition

1. In this Resolution:

“field sampler” means a person who collects information on land during the unloading of fishing vessels and field sampling programs can be used *inter alia* for quantifying catch, retained bycatch and collecting tag returns; and

“observer” means a person who collects information on board fishing vessels, in the framework of observer programs, can be used *inter alia* for monitoring fishing activities, quantifying species composition of target species and bycatch, whether they are retained or discarded and deploying or collecting tags.

“Electronic Monitoring System” (EMS) means an integrated system of hardware and software that supports acquisition of video footages of fishing activity, positional data and/or sensor, that allows the analysis and reporting of EM records.

“Pool of observers” means a list of IOTC recognised observers that have been allocated an IOTC registration number and trained according to IOTC standards who may be called upon by other flag States.

Objective

2. The objective of the IOTC Regional Observer Scheme (ROS) shall be to collect verified catch data and other scientific data related to the fisheries for tuna and tuna-like species in the IOTC area of competence.

Observer Scheme

3. In order to improve the collection of scientific data, each CPC shall ensure that all fishing vessels of 24 meters length overall and above and under 24 meters, if they operate outside the exclusive economic zone (EEZ) of the flag CPC and in the IOTC area of competence, comply with the minimum observer coverage of 5% as defined by the number of operations/sets.
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.
5. Once the EMS standards are adopted and providing CPCs meet the minimum mandatory ROS data reporting standards, the minimum human observer coverage provided for in paragraph 3 may be complemented or substituted by means of an EMS. To ensure the minimum mandatory ROS data reporting standards are met, the EMS may be complemented by port sampling and/or other Commission approved data collection methods. CPCs are encouraged to use an EMS to improve the collection of scientific data before the standards mentioned in paragraph 4 are adopted.
6. CPCs shall endeavor to provide a list of observers to the IOTC Secretariat constituting the basis for the development of a regional pool of observers. The regional pool of observers shall be composed of observers registered through authorised observer providers according to the IOTC ROS standards. Each observer shall be allocated an IOTC registration number that must be included on reported data.
7. When purse seiners are carrying an observer in accordance with paragraph 3, this observer shall also monitor the catches at unloading to identify the species composition of targeted tuna species. The requirement for the observer to monitor catches at unloading is not applicable to CPCs already having a sampling scheme, with at least the coverage set out in paragraph 3.
8. Landings from artisanal fishing vessels shall also be monitored at the landing place by field samplers. The indicative level of the coverage of the artisanal fishing vessels shall be 5% of the total levels of vessel activity (i.e. total number of vessel trips or total number of active vessels).
9. Field samplers shall monitor catches at the landing place with a view to estimating catch-at-size by type of boat, gear and species, or carry out such scientific work as may be requested by the IOTC Scientific Committee.
10. CPCs shall:
 - a. have the primary responsibility to obtain qualified observers and each CPC may choose to use either deployed national or non-national of the flag State of the vessel on which they are deployed;
 - b. ensure that the minimum level of coverage is met;
 - c. take all necessary measures to ensure that observers are able to carry out their duties in a competent and safe manner;
 - d. endeavour to ensure that the observers alternate vessels between their assignments;
 - e. ensure that observers perform duties described in paragraphs 7, 15 and 16. If observers are entrusted with complementary tasks by the relevant CPC fisheries research institutes, this shall in no way affect their performance on the above-mentioned duties;

- f. ensure that the vessel on which an observer is placed shall provide suitable food and lodging during the observer's deployment at the same level as the officers, where possible; and
 - g. require vessel masters to ensure that all necessary cooperation is extended to observers in order for them to carry out their duties safely including providing access, as required, to the retained catch, and catch which is intended to be discarded.
 - h. record and report fishing activities, verify positions of the vessel;
 - i. observe and estimate catches as far as possible with a view to identifying catch composition and bycatch and to monitoring discards including their fate (e.g. released alive) and size frequency;
 - j. record the gear type, mesh size and attachments employed by the master;
 - k. collect information to enable the cross-checking of entries made to the logbooks (species composition and quantities, live and processed weight and location, where available); and
 - l. carry out such scientific work (e.g. collecting samples), as requested by the IOTC Scientific Committee.
11. If the coverage referred in paragraphs 3 is not met by a CPC, any other CPC may, subject to the consent of the CPC who has not met its coverage, place an observer to fulfil the tasks defined in the paragraphs 7, 15, 16 and 17 until that CPC provides a replacement or the target coverage level is met.
 12. CPCs shall provide to the IOTC Secretariat and the IOTC Scientific Committee, annually in their national scientific reports, a description of the protocols supporting their observer programs and sampling schemes mentioned in paragraphs 3, 5, 7 and 8, the number of fishing vessels and of fishing effort sampled, as well as the coverage achieved by gear type in accordance with the provisions of this Resolution.
 13. Observers shall:
 - a. record and report fishing activities, verify positions of the vessel;
 - b. observe and estimate catches as far as possible with a view to identifying catch composition and bycatch and to monitoring discards including their fate (e.g. released alive) and size frequency;
 - c. record the gear type, mesh size and attachments employed by the master;
 - d. collect information to enable the cross-checking of entries made to the logbooks (species composition and quantities, live and processed weight and location, where available); and
 - e. carry out such scientific work (e.g. collecting samples), as requested by the IOTC Scientific Committee.
 14. The IOTC Scientific Committee shall adopt by 2023 the IOTC ROS Observer Manual and the IOTC Observer Forms used for reporting (including minimum data fields) and provide advice on a training program.
 15. Once adopted by the IOTC Scientific Committee, observers shall use the IOTC ROS *Minimum Standard Data Fields*, the IOTC data collection forms, the IOTC Species identification cards, the IOTC Regional Observers Scheme (ROS) Observer Manual and the IOTC Observer Forms when carrying out their duty. The Secretariat shall publish this information in a dedicated area of the IOTC website.
 16. Each observer shall provide, within 30 days of completion of each trip, a report to the flag CPC of the vessel. If the vessel was fishing in the EEZ of a coastal State, the part of the observer report covering fishing activities in the EEZ shall be also submitted to that coastal State.
 17. Each CPC shall provide, to the IOTC Secretariat within 150 days the latest, each report and observer data, following IOTC observer reporting templates and standards. The Executive Secretary shall make the information available to the IOTC Scientific Committee.
 18. The data referenced in paragraph 17 shall be provided by 1°x1° square and month. CPC shall endeavor to send these data in an electronic format suitable for automated data extraction.
 19. The confidentiality rules set out in [Resolution 12/02 Data confidentiality policy and procedures for fine-scale data](#) shall apply.
 20. The funds available from the IOTC balance of funds may be used to support the implementation of this program in developing coastal CPCs, notably the training of observers and field samplers.
 21. The elements of the Observer Scheme, notably those regarding its coverage and the adoption of EMS standards, are subject to review and revision, as appropriate, for application in 2023 and subsequent years.

22. All provisions in this resolution related to the deployment of observers onboard fishing vessels, shall apply *mutatis mutandis* to the use of EMS, as applicable.
23. This Resolution supersedes Resolution 11/04 *On A Regional Observer Scheme*.

Appendix IX: Resolution 23/01
On the management of anchored fish aggregating devices (AFADs)

Keywords: Precautionary Approach, anchored FADs

The Indian Ocean Tuna Commission (IOTC),

BEARING IN MIND that Article 5 of the Agreement for the implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA) requires coastal States and States fishing on the high seas to collect and share, in a timely manner, complete and accurate data concerning fishing activities on, inter alia, vessel position, catch of target and non-target species and fishing effort, as well as information from national and international research programmes;

NOTING that the United Nations Food and Agricultural Organization (FAO) Code of Conduct for Responsible Fisheries provides that States should compile fishery-related and other supporting scientific data relating to fish stocks covered by sub-regional or regional fisheries management organisations and provide them in a timely manner to the organisation;

RECALLING that the objective of the IOTC Agreement is to ensure, through appropriate management, the conservation and optimum utilisation of stocks covered by the IOTC Agreement and encouraging sustainable development of fisheries based on such stocks while minimising the level of bycatch;

COGNIZANT that the operational aspects of anchored FADS and drifting FADS are very different and therefore that the requirements of drifting FAD management, such as those relating to the materials used in FAD construction, monitoring frequency and reporting, would be incompatible with the normal operation of anchored FADS.

ADOPTS, in accordance with Article IX, paragraph 1 of the IOTC Agreement, the following:

Definitions

1. For the purpose of this Resolution:

- a. Fish Aggregating Device (FAD) means a permanent, semi-permanent or temporary object, structure or device of any material, man-made or natural, which is deployed and/or tracked, for the purpose of aggregating target tuna and tuna like species for consequent capture.
- b. Anchored Fish Aggregating Devices (AFADs) means a FAD tethered to the bottom of the ocean, usually consisting of a buoy, and is anchored to the bottom of the ocean.

Applications

2. This Resolution applies to all CPCs that deploy AFADs for the purpose of fishing for tuna and tuna like species under the IOTC mandate with the exception of recreational fisheries, and without prejudice or undermining the sovereign right of the coastal States and its existing national regulation.
3. This resolution shall enter into force on 1 January 2024.

AFAD management

4. CPCs shall develop an AFAD Management Plan in accordance with the Guidelines in Annex I and shall submit this AFAD Management Plan to the IOTC Executive Secretary by 1 January 2024.
5. AFAD Management Plans shall be reviewed against the Guidelines in Annex I, by the IOTC Compliance Committee and by the IOTC Scientific Committee each in their respective role with the objective to provide advice to CPCs on areas of improvement.

6. CPCs shall submit to the Commission, through the Annual Report of Implementation their progress of their AFAD management plans, including, if necessary, reviews of the previously submitted management plans.
7. Until a scheme to operationalise the FAO Voluntary Guidelines on the Marking of Fishing Gear (VGMFG) is developed, CPCs shall ensure that their vessels only use AFADs that are permanently marked with a Unique National Identification (UNI) number that identifies either the CPC or the vessel(s) that the AFAD belongs to (which ever applicable). The UNI number shall be clearly and permanently marked on the buoy of the AFAD.
8. The details of the new AFADs deployed within the EEZ of the CPCs (date of deployment, GPS position and the UNI number) shall be reported to the IOTC within 21 days of deployment of the AFADs, and its data confidentiality shall be maintained by the Secretariat. CPCs shall also maintain a register of deployed, lost, abandoned, and discarded AFADs and report this data to the IOTC Executive Secretary in their annual Implementation Report.
9. CPCs shall conduct inspections at sea to ensure that the AFADs are clearly and permanently marked with UNI number. CPCs with limited capacity to undertake at sea inspections may implement port inspections to ensure that the AFADs deployed are constructed and marked as per the requirements specified in this Resolution. CPCs shall communicate the number and outcome of inspections (at sea or in port) in their Annual Implementation Report.
10. The AFAD location data provided by the CPCs as required by paragraph 8 of this Resolution shall only be used for the purposes of the Scientific Committee and relevant Working Parties and should not be publicly shared or circulated for any other purpose.
11. CPCs shall submit the data elements provided in Annex II to the IOTC Executive Secretary, consistent with the IOTC standards for the provision of catch and effort data, and this data shall be made available for analysis to the IOTC Scientific Committee on the aggregation level set by Resolution 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence* and Resolution 15/02 *Mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPC's)* (or any subsequent superseding Resolutions), and under the confidentiality rules set by Resolution 12/02 *Data Confidentiality Policy and Procedures* (or any subsequent superseding Resolution).

Site selection and construction of AFADs

12. CPCs shall require that their flag vessels deploying new AFADs or replacing existing ones, take into account the nature and profile of the sea bottom when choosing a site and, where possible, avoid sites with steep slopes to minimise the risk of AFAD loss.
13. CPCs shall ensure that the upper floatation of AFADs is suitable for offshore, high current deployments by using designs which are streamlined to reduce drag and resistance to currents and waves.
 14. CPCs shall ensure that only non-entangling and non-mesh materials are used in the sub-surface aggregates of AFADs.
 15. CPCs shall encourage to construct AFADs from materials that will ensure increased longevity so that they continue to retain their integrity for the longest lifespan possible. Where sub-surface aggregators are attached to the mooring line of AFADs, CPCs should ensure that these aggregators are constructed from bio-degradable materials.
 16. The IOTC Executive Secretary in consultation with the Scientific Committee shall develop a best practice guideline for construction of AFADs and submit it to the Commission for adoption no later than the 29th Annual Session of the IOTC.
 17. The IOTC Scientific Committee shall analyse further information, when available, and provide advice on existing, additional or alternative AFAD management options for sustainable fisheries.
 18. The IOTC Scientific Committee shall, no later than at its annual session in 2025, provide a set of relevant indicators that would allow monitoring the effects of AFAD fisheries and assessing the efficiency of existing/additional/alternative AFAD management options.
 19. The IOTC Scientific Committee shall provide scientific advice by assessing the impact of fishing using AFADs on juvenile tuna mortality and provide advice to the Commission.

ANNEX 1: AFAD Management Plans

AFAD Management Plans shall include:

1. An objective

2. Scope:

Description of its application with respect to:

- a) Vessel types
 - b) AFAD numbers and/or AFAD beacon numbers to be deployed (per AFAD type)
 - c) reporting and/or recording procedures for AFAD deployments
 - d) plans for monitoring and retrieval of lost AFADs
 - e) statement or policy on "AFAD ownership"
3. Institutional arrangements for management of the AFAD Management Plans:
- a) institutional responsibilities
 - b) regulations applicable to the setting and use of AFADs
 - c) At-sea AFAD repairs, maintenance rules and replacement policy
 - d) data collection system
 - e) reporting obligations
4. AFAD construction specifications and requirements:
- a) AFAD design characteristics (a description)
 - b) AFAD markings and identifiers, including AFAD beacons, if any
 - c) lighting requirements, if any
 - d) radar reflectors, if any
 - e) radio buoys, if any (requirement for serial numbers)
 - f) satellite transceivers, if any (requirement for serial numbers)
 - g) echo sounder, if any
5. Applicable areas:
- a) details of any closed areas e.g., shipping lanes, Marine Protected Areas, reserves etc.
6. Means for monitoring and reviewing implementation of the AFAD–MP.
7. Methodologies for recording and reporting data specified in Annex II

Annex II: DATA COLLECTION FOR AFADS

- a) Any fishing activity around an AFAD including catch and bycatch, whether retained or discarded dead or alive.
- b) For each activity on an AFAD (including repair, intervention consolidation, etc.), whether followed or not by a set or other fishing activities, the,
 - i. Position (as the geographic location of the event (Latitude and Longitude) in degrees and minutes)
 - ii. Date (as DD/MM/YYYY, day/month/year)
 - iii. AFAD identifier (i.e. AFAD national identification number, beacon ID or any information allowing to identify the owner).

Appendix X: Resolution 23/06
On the Conservation of Cetaceans

The Indian Ocean Tuna Commission (IOTC),

RECOGNIZING Resolution 12/01 *On the Implementation of the Precautionary Approach* calls on IOTC Contracting Parties and Cooperating Non-Contracting Parties (hereinafter CPCs) to apply the precautionary approach when managing tuna and tuna-like species in accordance with Article V of the United Nations Fish Stocks Agreement;

RECOGNIZING the ecological and cultural significance of cetaceans in the Indian Ocean;
 MINDFUL that cetaceans are particularly vulnerable to exploitation including from fishing;

CONCERNED about the potential impacts of fishing operations targeting tuna and tuna-like species on the sustainability of cetaceans;

NOTING that under Resolution 15/02 *On mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPC's)*, paragraph 3: 'CPCs are also encouraged to record and provide data on species other than sharks and tunas taken as bycatch';

CONCERNED by the lack of accurate and complete data collection and reporting to the IOTC Secretariat concerning interactions and mortalities of non-target species with fishing vessels in the IOTC area of competence;

FURTHER NOTING that the IOTC Working Party on Ecosystems and Bycatch (WPEB) noted paper IOTC-2011-WPEB07-08 which reviewed the status of the information available on non-target species associated with IOTC fisheries; recommended that data on marine mammal interactions with IOTC fisheries are collected and reported by CPCs to the IOTC Secretariat;

FURTHER NOTING that the IOTC Working Party on Ecosystem and Bycatch (WPEB) noted the paper IOTC-2020-WPEB16-22 that cetacean populations in the Indian Ocean may have been reduced to a low level, perhaps <20%, of their original levels but that the use of an aggregated approach was problematic, and that it is not possible to fully evaluate the change of population abundance without a species specific analysis; recalled the importance of cetacean bycatch monitoring and the collection of species-specific bycatch data;

RECOGNIZING that Recommendation 12/15 *On the Best Available Science* recommends CPCs take all measures to improve the collection and submission of data to the IOTC Secretariat, including on bycatch;

RECALLING that IOTC in 2022 noted document IOTC-2022-S26-09 which was produced concerning lack of data available on cetaceans at the IOTC, and therefore, to improve the information available to the Scientific Committee, also recognizing the common will of FAO and the International Whaling Commission (IWC) is to strengthen the monitoring and assessment of cetacean bycatch and the implementation of proper and effective conservation and management measures to reduce it;

NOTING that the 19th Regular Session of the Western and Central Pacific Fisheries Commission in 2022 adopted the Graphics for Best Practices for the Safe Handling and Release of Cetaceans;

RECOGNIZING that the 25th Session of the IOTC Scientific Committee in 2022 recommended that the Commission note the management advice developed for cetaceans noting the number of fisheries interactions involving cetaceans is highly uncertain and should be addressed as a matter of priority and available evidence indicates considerable risk to cetaceans in the Indian Ocean, particularly from tuna drift gillnets;

ADOPTS in accordance with paragraph 1 of Article IX of the IOTC Agreement, that:

1. This measure shall apply to all fishing vessels flying the flag of a CPC and on the IOTC Record of Fishing Vessels or authorised to fish tuna and tuna-like species managed in the IOTC area of competence. The provisions of this measure do not apply to artisanal fisheries operating exclusively in their respective EEZ.
2. CPCs shall prohibit their flagged vessels from intentionally setting a purse seine net around a cetacean in the IOTC area of competence, if the animal is sighted prior to the commencement of the set.

3. CPCs shall require that, in the event that a cetacean is unintentionally encircled in a purse seine net, or captured or entangled in the gillnets the master of the vessels shall:
 - a. take all reasonable steps to ensure the safe release of the cetacean, while taking into consideration the safety of the crew. These steps shall include following the best practice guidelines for the safe release and handling of cetaceans developed by the IOTC Scientific Committee;
 - b. report the incident to the relevant authority of the flag State, with the following information:
 - I. the species (if known);
 - II. the number of individuals;
 - III. a short description of the interaction, including details of how and why the interaction occurred and the gear type;
 - IV. the location of the encirclement or entanglement (if occurred);
 - V. the steps taken to ensure safe release (if encirclement or entanglement occurred);
 - VI. an assessment of the life status of the animal on release, including whether the cetacean was released alive but subsequently died.
4. CPCs using other gear types fishing for tuna and tuna-like species associated with cetaceans shall report all interactions with cetaceans to the relevant authority of the flag State and include all the information outlined in paragraph 3b(i–vi).
5. Notwithstanding paragraph 1, in the event of any interactions with cetaceans occurred in artisanal fishing, the CPCs shall encourage their vessels immediately release the animal to the extent possible and report the information to relevant authority of the flag State as outlined in paragraph 3b) or in accordance with Resolution 15/01 and 15/02 (or any subsequent revisions).
6. CPCs shall ensure that only non-entangling material and designs shall be used for drifting Fish Aggregating Devices (DFADs) to reduce the incidence of entanglement.
7. The Commission requests that the IOTC Scientific Committee develop best practice guidelines for the safe release and handling of encircled cetaceans, taking into account those developed in other Regional Fisheries guidelines be submitted to the Commission meeting for endorsement by 2025 at the latest.
8. CPCs shall endeavour to ensure that fishermen are aware of and use proper mitigation, identification, handling and releasing techniques and keep on board all necessary equipment for the safe release of cetaceans before the guidelines mentioned in paragraph 6 are endorsed.
9. CPCs shall report the information and data collected under paragraph 3(b) and paragraph 4, through logbooks, or when an observer is onboard through observer programs, and provide to the IOTC Secretariat by 30 June of the following year and according to the timelines specified in Resolution 15/02 (or any subsequent revision). CPCs are encouraged to use an Electronic Monitoring System (EMS) to enhance the data collection required in this Resolution.
10. CPCs shall report, in accordance with Article X of the IOTC Agreement, any instances in which cetaceans have been encircled or caught by the purse seine nets or entangled in gillnets or in Fish Aggregating Devices of their flagged vessels.
11. For CPCs having national and state legislation for protecting these species are encouraged to provide the information for the IOTC Scientific Committee, Compliance Committee and Working Party on the Implementation of Conservation and Management Measures consideration.
12. The IOTC Scientific Committee shall review information on the status of cetaceans in the IOTC area of competence and provide recommendation or advice to the Commission no later than 2025 to identify appropriate measures that Commission shall take to mitigate negative effects of the interactions with cetaceans by the IOTC fisheries.
13. Resolution 13/04 *On the conservation of cetaceans* is superseded by this Resolution.

Appendix XI: Resolution 23/08
On Electronic Monitoring Standards for IOTC fisheries

Keywords: Electronic Monitoring, Regional observer scheme, Minimum data requirements

The Indian Ocean Tuna Commission (IOTC):

RECALLING the IOTC's responsibility to conserve and manage tuna and tuna-like species in the Indian Ocean. EMPHASISING the importance of collecting sufficient verified catch data and effort and other scientific data related to the fisheries for tuna and tuna-like species in the IOTC area of competence to enable the Scientific Committee (SC) to provide the Commission with scientific assessments, advice and recommendations.

RECALLING the first Resolution (11/04) on a Regional Observer Scheme (ROS) that mandated at least a 5% observer coverage for fleets for vessels equal to or greater than 24 meters length, and under 24 meters if they fish outside their Exclusive Economic Zone (EEZ).

NOTING the significant difficulties and challenges some CPC fisheries face in achieving IOTC mandated observer coverage rates, and the need to increase their observer coverage rates to improve data collection to allow estimates of total and species level bycatch.

FURTHER RECALLING that the 23rd session of the IOTC Scientific Committee expressed the concern at the low observer coverage level at 2.15% and that there is no coverage of the artisanal fleet, which comprise a large portion of catches taken in the Indian Ocean;

RECALLING Resolution 16/04 (on the implementation of a pilot project in view of promoting the regional observer scheme of IOTC) that required exploration of the potential for electronic observation to collect data required by the IOTC, and for the Scientific Committee to develop and propose minimum standards for the implementation of electronic observation (monitoring) systems.

RECALLING that the Commission endorsed, in principle, the Regional Observer Scheme Program Standards, including Minimum Standards Data Fields in 2019.

CONSIDERING Resolution 22/04 on Regional Observer Scheme (updating and replacing Resolution 11/04) which formally recognised the role of electronic monitoring systems (EMS) to contribute to and improve observer coverage and meet the ROS minimum mandatory data requirements. Resolution 22/04 requests that the IOTC SC (in collaboration with the Compliance Committee) develops and agrees electronic monitoring (EM) minimum standards for IOTC Fisheries (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.

NOTING the 2022 SC endorsed and recommended Commission adoption of: a) the EM terms and definitions; b) the EM Program Standards, and; c) the EM Data Standards. (IOTC-2022-SC25-R[E])

ADOPTS, in accordance with paragraph 1 of Article IX of the IOTC Agreement:

Electronic Monitoring terms and definitions

1. Terms and definitions pertaining to the implementation of EMS by CPCs, consistent with this resolution and resolution 22/04, are defined in Annex 1.

Electronic Monitoring Standards

2. The Commission shall:

a) implement a Regional Electronic Monitoring Program (REMP) as per the objectives, purpose and roles and responsibilities described in the IOTC EM Program Standard (Annex 1) by [1 July 2024].

b) upon the advice of the Scientific Committee and Compliance Committee, review the REMP, the EM Program Standard (Annex 1) and the EM System and Data Standards (Annex 2) after a period of 1 year from REMP implementation.

3. CPCs, who fish for species under the competence of the IOTC, and who choose to implement EMS in the IOTC area of competence to partially or fully meet the minimum ROS data requirements under Resolution 22/04 (or any subsequent revision), shall:

a) ensure that the implementation of their National EM Programs (NEMPs) and EM systems on their flagged vessels meets the requirements of the EM Program Standard (Annex 1) and EM System and Data Standards (Annex 2).

b) submit to the IOTC Secretariat by 1 July each year, a Vessel Monitoring Plan, that covers each vessel in their IOTC fishery utilizing EMS, outlining the EMS setup on each vessel, consistent with the requirements in the EM Program Standard (Annex 1) and making use of guidance in Annex 3 (Vessel Management Plan Guide).

- c) submit to the IOTC Scientific Committee, as an annex to CPC National Reports to the SC, a fleet level summary of the Vessel Monitoring Plans (described in 3b) that specifies at a minimum:
- i. The number of CPC flagged vessels implementing EM by gear/fishery type.
 - ii. The range of EMS configurations implemented within the fleet (including the numbers and placements of cameras for each configuration).
 - iii. A general description of EMS requirements placed upon vessel skippers/crews by the CPC government.
- d) submit to the IOTC Secretariat by 1 July each year, a fleet level ROS data collection table, clearly specifying for each ROS minimum required data field as specified:
- i. The data field name and description
 - ii. The data field reporting requirement level (i.e., mandatory collection and reporting, mandatory reporting if collected, not mandatory etc)
 - iii. the data collection method used to collect data for that field⁵,
 - iv. a brief description of the data collection method.
4. The IOTC Secretariat shall:
- a) assist the Commission to establish and implement a REMP.
 - b) undertake roles as per EM Program Standard (Annex 1).
5. The Scientific Committee shall, no later than 2024, review the ROS minimum required data fields to
- a) identify any fields that are logistically difficult for EM and/or human observers to collect, respectively; and
 - b) provide advice and recommendations to the Commission on the need and use of those identified fields for scientific purposes, and their collection and reporting status (i.e. mandatory, non-mandatory etc.).
- c) Discuss and provide advice to the Commission on the potential need to develop a separate EM ROS minimum data fields list.
6. To support the implementation of the REMP and the work of the Scientific Committee referred to in paragraph 5, CPCs are encouraged to share relevant information, approaches and experiences, including those involving capacity building needs and any CPC-level knowledge exchange, with the Scientific Committee and Compliance Committee.

ANNEX 1

IOTC ELECTRONIC MONITORING PROGRAM STANDARDS

General

National/Regional data collection Programs using Electronic Monitoring Systems (EMS) that are certified as meeting the minimum standards of the Electronic Monitoring Program (EMP) as adopted by IOTC may be included within IOTC Regional Electronic Monitoring Program (REMP).

IOTC REMP shall be coordinated by the IOTC Secretariat.

Objectives

The objective of the IOTC REMP is to collect, via EMS, verified catch data and other scientific data related to the fisheries for tuna and tuna-like species in the IOTC area of competence and achieve the EM observer/review coverage to meet the requirements of IOTC Observer Resolution on Regional Observer Scheme.

Purpose:

The purpose of IOTC REMP is to allow CPCs to utilise EMS to collect data to assist CPCs in meeting the requirements of IOTC Observer Resolution on Regional Observer Scheme, including in situations where onboard observer coverage is low or non-existent.

The REMP aims to improve the quantity and quality of fishery data and the monitoring of IOTC fisheries and address gaps in the collection and verification of fishery data. The REMP may also in the future help CPCs meet the requirements of other IOTC Resolutions.

Scope:

The IOTC's REMP and associated minimum EM Program and EMS Data Standards (including this standard) apply only to IOTC CPCs who are developing or who have implemented EMS as a data collection tool to help meet, to the extent logistically possible, the requirements of the IOTC Observer Resolution on Regional Observer Scheme. IOTC's REMP provides a framework for the development of EMS in the following IOTC fisheries:

IOTC's REMP or any National EMP, under IOTC's REMP, shall ensure that the data collected through EMS are documented and that all ROS minimum data standard requirements (e.g., "Mandatory Reporting"), if necessary complemented with any additional monitoring program (e.g., port sampling, biological sampling, etc.), are collected by EMS.

Definitions:

Electronic Technologies (ET): any electronic tool that is used to support fisheries-dependent data collection, both on shore and at sea, including electronic reporting (ER) and electronic monitoring (EM).

Electronic Reporting (ER): the use of electronic systems (application, software, form or file) to record, store, receive and transmit fisheries data.

Monitoring: the requirement for the continuous collection of fishery-related data.

Electronic Monitoring (EM): the use of electronic devices to record fishing vessel's activities using video technology linked to a Global Position System (GPS), which may include sensors.

Electronic Monitoring System (EMS): the system comprising the vessel and shore-based components for collecting, transmitting and reviewing EM records, reporting of EM data and implementing an EM Program.

EM Program: a process administered by a national or regional administration that regulates the use of EMS on vessels to collect and verify fisheries data and information responsible through an implementation of an EMS in a defined area and/or fishery.

EM Program standards: the agreed standards, specifications and procedures (SSP) governing the establishment and operation of an EM Program, applicable to all components of the EMS.

EM data standards: the agreed subset of data requirements by the IOTC Regional Observer Scheme (ROS) that could be collected by the EMS.

EM records: Imagery, and possibly sensor, raw data linked to positional data collected by an EM equipment that can be reviewed to produce EM data.

EM data: processed/analysed data produced through review of EM records that conforms with the EM data standards.

EM equipment: a network of electronic cameras, sensors and data storage devices installed on a vessel and used to record the vessel's activities.

Vessel Monitoring Plan (VMP): The vessel's EM equipment characteristics and how the vessel's EM equipment is installed and configured to monitor fishing activities and meet the EM Program and EM Data Standards as required by the IOTC Regional Electronic Monitoring Program.

EM review: the review of EM records by EM observers/reviewers to produce EM data.

EM observer/reviewer: a person qualified to review EM records, store and produce EM data in accordance with the EM Data standards and analysis procedure.

EM review system: application software used by the EM observer to review the EM records and produce the processed EM data as per the EM data standards.

EM review center: local, national, or regional office facility where EM records are received and reviewed to produce and store EM data.

EM review provider: a third-party provider of EM review services to review EM records to produce EM data. The same third-party organization can provide both the EM equipment and EM review services but they can also be supplied by different providers.

EM installation coverage: the proportion of vessels by fleet that has EM equipment installed that is operational.

EM record coverage: the proportion of fishing effort for which EM records are collected by installed EM equipment.

EM observer/review coverage: the proportion of fishing effort for which EM records are reviewed to produce EM data and submitted to the IOTC.

EM service provider: a third-party provider of EM equipment (and/or system), technical and logistical services to maintain the EM equipment and monitor its proper functioning.

EM Systems

EMS should be approved and accredited by an appropriate IOTC body (e.g., IOTC WGEMS/WPDCS) or CPCs to ensure that the minimum standards of the REMP (and ROS) are met, including EM equipment installation (through an EM Vessel Monitoring Plan), collection of data consistent with ROS minimum data standards, EM records reviewed by accredited companies/organizations and independence of EMS are maintained. In case that CPCs approved the EMS the CPC shall submit to the IOTC Secretariat copies of each vessel's VMP and present to the Scientific Committee, as an annex to CPC National Reports to the Scientific Committee, a fleet level overview of the CPCs VMPs.

Data:

EM data submitted by Regional or National EMPs are subject to Resolution 12/02 *On data confidentiality policy and procedures* concerning the requirements for sharing data in the public domain (e.g., the level of stratification

to apply in order to prevent activity from a single vessel to be clearly identified from the published data) and the procedures for the safeguard of records.

EM data collected via EM should be provided in compliance with the requirements established by the Commission in Resolution 15/01 *On the recording of catch and effort data by fishing vessels in the IOTC area of competence*, Resolution 15/02 *On mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)* and IOTC Observer Resolution on Regional Observer Scheme.

National EM Programs EM data should be submitted to IOTC in accordance with the electronic data format specifications provided by the IOTC Secretariat and adopted by the IOTC Commission, in order for data to be incorporated in the IOTC Regional Observer Scheme database. The EM data should be properly marked in the database to be distinguished from data collected through onboard human observers.

Roles

IOTC Commission:

- To monitor and provide oversight of the implementation of the REMP, including those implemented through National EM Programs.
- To adopt and revise, when necessary, minimum standards for the EM Program, technical specifications, and associated data collection.
- To agree on overall EM observer/review coverage through IOTC Observer Resolution on Regional Observer Scheme.
- To develop and adopt a REMP implementation plan.
- When necessary, the Commission may contract Regional EM review centers to review EM records obtained in the frame of the REMP.
- To ensure sufficient financial resources to effectively administrate IOTC's REMP.
- To review IOTC's REMP after an initial period (e.g., 3 years) of IOTC's REMP implementation.

IOTC CPCs:

- In case they choose EMP to meet IOTC Observer Resolution on Regional Observer Scheme, to ensure that EM equipment installed on fishing vessels under its flag and the EMS implementation complies with the requirements established by the Commission for the purpose of IOTC's REMP.
- To require that a Vessel Monitoring Plan (see below) is developed for each vessel equipped with EM equipment and delivered to the CPC competent authorities.
- To ensure that EM equipment are installed in their vessels following a Vessel Monitoring Plan to collect the required data and to comply with the coverage objectives agreed by the Commission.
- To ensure that EMS implementation is consistent with IOTC's REMP and its minimum standards.
- To collaborate to ensure National EM Programs are compatible and harmonized where necessary.
- To document the roles and responsibilities of fisheries government authorities and vessel owner/crew with respect to inter alia installing and maintaining equipment, routine cleaning of cameras, sending storage devices, access to EM records and EM data, responses to mechanical or technical failure of EMS.
- The CPC shall provide the IOTC Secretariat with the contact details of their EM Program Coordinator(s).

IOTC Secretariat:

- To collaborate with the Commission and CPCs to ensure that National EM Programs are consistent and compatible with the REMP and meet IOTC's REMP monitoring minimum standards.
- To summarize and provide annual reports about the progress of the REMP, including National EM Programs, to the Commission and its Subsidiary Bodies.
- To recommend improvements and adjustments to the REMP to ensure that data and monitoring requirements of IOTC Commission are met.
- To coordinate activities regarding EM with other tuna RFMOs as required by the Commission.

Contact information: contact information for the vessel owner, vessel operator and EM service provider as long as the contract lasts.

General vessel information: basic information about the vessel and its fishing activities and operations (e.g., vessel name, registration number, target fishery, areas, fishing gear, LOA...).

Vessel layout: equipment of the vessel with detailed information, plan of the vessel disposition and different areas (decks, processing area, storage, etc.).

EM equipment setup: description of the settings of the EM equipment, such as time running, number of cameras and areas covered, time recording for each of the cameras, number and position of sensors (if any), software used, control box disposition, procedures for checking the proper functioning of the EM equipment installed onboard, etc.

A snapshot of each camera should be inserted in the VMP.

EM Vessel Monitoring Plan

The vessel's EM equipment characteristics and how the vessel's EM equipment is optimized to meet the EM System and Data Standards must be recorded on a Vessel Monitor Plan (VMP) for each vessel.

The VMP shall be developed in collaboration with the EM service provider, vessel owner and fishing authorities.

The Vessel Monitoring Plan will describe the numbers of cameras, position and settings, and key areas to be monitored for fishing activities, catch handling, species identification, fate and storage of the individuals.

The VMP should include information on:

The VMP should be signed off by the vessel owner and finally approved by the flag state competent authority.

Any physical changes on a vessel that will affect EMS should be reported to the flag state competent authorities.

The VMP should be updated and approved again by the competent authority as soon as possible.

Any change on the EM equipment (e.g., installation of a new generation of cameras) should be reported to the flag state competent authorities. The VMP should be updated and approved again by the competent authority as soon as possible.

Operationalising IOTC's REMP – Accreditation and Auditing of National EMPs

CPCs should apply to the IOTC Secretariat to have its own National EM Program recognized as part of IOTC's REMP so as to comply with ROS data minimum standards.

IOTC shall audit the National EM Programs against the EM minimum standards.

National EM Programs shall be reviewed and subject to regular and periodic audits as agreed by IOTC Commission.

IOTC could authorize National EM Programs approved by other tRFMOs.

ANNEX 2

IOTC ELECTRONIC MONITORING SYSTEM AND DATA STANDARDS

EM TECHNICAL MINIMUM STANDARDS

The Technical Minimum Standards shall describe the requirements of the EM. CPCs shall ensure all EM equipment installed in their national or subregional programs are consistent with these technical specifications.

Customized to vessel level: there is no standard configuration that will cover all vessels from fleets operating in the Indian Ocean region, therefore each EM equipment installation must be customized at the vessel level. An EM equipment to be installed on board of a fishing vessel should consist of a control system connecting a number of cameras, and optionally to a number of different sensors, to collect and record images to address the objectives of the EM Program. The number of cameras and sensors should be tailored to each vessel through a Vessel Monitoring Plan to meet overall objectives of the program rather than being too prescriptive and should include a sufficient number of cameras. Although it will depend on the configuration of each particular vessel, as a general setup, cameras shall capture the areas and activities provided in Table 1 and 2 and Figure 1 to 3 of Annex 36. Each vessel should develop a “Vessel Monitoring Plan” specifying how many and where the cameras are located, and their settings, to collect the required ROS minimum “mandatory” data fields. The collection of some of the required ROS minimum data standards may be complemented by port sampling and/or other data collection methods as described [here7]. Within a given EM program, a certain level of harmonisation among vessels may also be necessary (camera placement and settings).

6 Annex 3 should be taken as a general guide since they are examples of existing EMS installations. The EM configuration (number of cameras, position, and monitoring objectives for each) should then be tailored to each fishery/vessel through a Vessel Monitoring Plan.

7 EM capabilities to collect ROS minimum data requirement fields (<https://iotc.org/documents/ROS/DataStandards>) may vary from fleet to fleet if the catch handling and setting/hauling maneuvers differ among fleets. Therefore, these values should be taken as a general guide and subject to constant review.

Include sensor/automatic devices: since EM records require large storage capacities, most EMS are not recording vessel activities on a full-time basis. The recording of some cameras may be triggered by the detection of gear usage or fishing activity. EMS may therefore include sensors, and other procedures (Computer Vision, Artificial Intelligence), to detect when fishing or other activities of interest occur on board. This will ensure proper EM record acquisition (e.g. trigger video recording when fishing operation starts) and facilitate EM record reviewing.

Include Global Positioning System (GPS): to monitor vessel position, route, speed and provide information on date/time and location of fishing activities. Fishing vessel position and date/time stamps should be incorporated directly on images or in the metadata of images.

Compatibility: the EMS could ideally be capable of integrating with other Monitoring, Control and Surveillance (MCS) tools (e.g. Vessel Monitoring System).

Robust System: the EM equipment components installed outdoors (such as cameras/camera housing and sensors) should be capable to resist rough conditions at-sea and harsh environment on board the vessels.

Secure System: the EM equipment components and data need to be tamper-resistant and tamper-evident, ideally using encrypted data, such that attempts at unauthorized modifications are not possible.

Cameras: digital, high-resolution when possible, cameras covering all areas of interest on the vessel according to the vessel and fishing operations are recommended. Camera placement, settings and recording must assure the detection vessel activities, catch and bycatch species, and enable accurate species identification (at least for all species under the IOTC mandate). The system should be able to record activities in low and very bright natural light conditions (low and high contrasts). The cameras must be water resistant and in a self-contained, weather resistant box.

EM records: EM records shall contain the following information: EM record file name including, at a minimum, the vessel name and vessel ID, camera ID, trip ID, geolocation data (date, time (UTC), latitude and longitude), camera recording status, EM health status(when available), images, and sensor data when used.

Independence: the system needs to be self-governing with the exception of minimal maintenance by the crew (e.g., cleaning sensors and cameras). The system may include remote verification of its functionality in real time to collect all information. A designated person should ensure that the system is working properly before leaving port and at sea, and a protocol (checklist) should exist for that purpose.

No interference: EM equipment should not generate or cause radio frequency interference with other on-board vessel communication, navigation, safety, geolocation devices (e.g. VMS) or fishing equipment.

Autonomy: the EM equipment should have its own uninterruptible power supply or be connected to that of the vessel to ensure that it can work even in the event of a vessel power outage. The EM equipment should include separate, duplicate backup devices to ensure that data are not lost if a storage device fails.

EM Data storage autonomy: the EM equipment should have enough storage capacity to store all EM records for a certain period of time, which should be at minimum a complete trip. The duration will depend on the vessel's

operational characteristics that could range from 4 months (in the case of purse seiners) to 12 months or more (in the case of longliners).

Interoperability: EMS ideally should generate EM records that are interoperable between different EM service and review providers and, where possible, integrate with other data collection and monitoring tools.

Maintenance: a designated person on board (and/or on land) should be designated to maintain the equipment (e.g., clean of lenses, etc.) and report to the EM equipment provider and the competent authority (e.g., IOTC or flag state) when the system is malfunctioning at port or at sea so the system is fixed as soon as possible, and should record any failure of the EM equipment in a dedicated form.

EM LOGISTICAL MINIMUM STANDARDS

EM records retrieval: the EM records should be transmitted via mobile networks, Wi-Fi, or satellite, or storage device (i.e., SSD or HDD) exchange. For the latter, a protocol to recover and send the storage devices to the designated EM review center should also be implemented.

EM record storage: EM records should be stored by the vessel/company/EM service provider/EM review provider/EM program administrator for at least 1 year or for the period established in the national/regional EM programs.

EM records backup: if EM records are automatically transmitted electronically, operational procedures for their receipt and backup should be implemented taking into account any necessary chain of custody arrangements.

Storage device chain of custody: the EMS must ensure traceability of every storage device and EM records. The chain of custody of the EMS storage devices should be assured.

Frequency: EM programs should include requirements on the method and frequency (e.g. after each trip) of EM records transmission to EM review centers, that should be consistent with the minimum standards established by the CPC or IOTC.

EM DATA REVIEW MINIMUM STANDARDS

EM review software: EMS should include software to facilitate the review of EM records and to produce EM data that will allow compiling and reporting in an IOTC common output format for exchange/submission to IOTC. Ideally, EM review software can be used to review EM records collected from different EM equipment providers.

EM review and EM data reporting: EM records reviewing and EM data reporting should be done by institutions, organizations and independent companies with proven expertise and experience (e.g., work experience with onboard observers). These tasks can be centralized in a “regional EM review center” when implementing a regional program and/or can be carried out by national or independent organizations.

EM records and EM data quality check: the reviewing process of EM records should include quality controls through EM records quality check, EM data entry checks, possible automatic error identification in EM data (e.g. incorrect fishing set positions on land, etc), debriefing of EM observers. The produced EM data should be checked prior to reporting to the IOTC Secretariat.

EM data: EMS should allow collecting and reporting, at a minimum, the ROS Minimum Standard Data Fields. EM data will be submitted to the IOTC Secretariat using IOTC standard forms according to the time frame specified in Resolution 22/04, or any superseding Resolution. Data confidentiality requirements outlined in Resolution 12/02, Data Confidentiality Policy and Procedures, or any superseding Resolution, shall apply to all EM data submitted to the IOTC Secretariat.

EM observers’ training: EM observers must have specific qualifications related to EM record review which should be integrated into the regional or national EM program standards. The EM observer should participate in specialised training courses that should be updated upon modification of the EM review protocol to ensure EM data high-quality standards.

EM observer’s qualifications: EM observers must have the ability to review EM records and produce EM data according to IOTC requirements. EM observers should be familiar with fishing activities and be capable of identifying (i) IOTC species and species of special interest, (ii) IOTC fishing methods, and (iii) IOTC mitigation methods.

Compatibility with ongoing standardized data flow and databases: EM data should have compatible output format (including usage of standardized, well-established code lists) to exchange collected information with current IOTC data reporting format and standards, and should be consistent with IOTC data rules. EM data will be submitted in an approved electronic data reporting format to the IOTC Secretariat, using IOTC standard codes and units.

Data storage and retention: legal provisions on data protection, storage, and retention by IOTC should be developed and agreed upon whether it is a REMP or EM National Programs.

EM records ownership: EM records ownership is of the vessel owner/flag state but should provide IOTC with the EM data outputs to incorporate in the IOTC database for use, analysis, and disposal as required by the IOTC observers Resolution on Regional Observer Scheme.

Hardware/software ownership: irrespective of the scope of the EM program, it is recommended that hardware and software license ownership (and maintenance) is of the vessel owner/flag state.

ANNEX 3

VESSEL MONITORING PLANS (GUIDE)

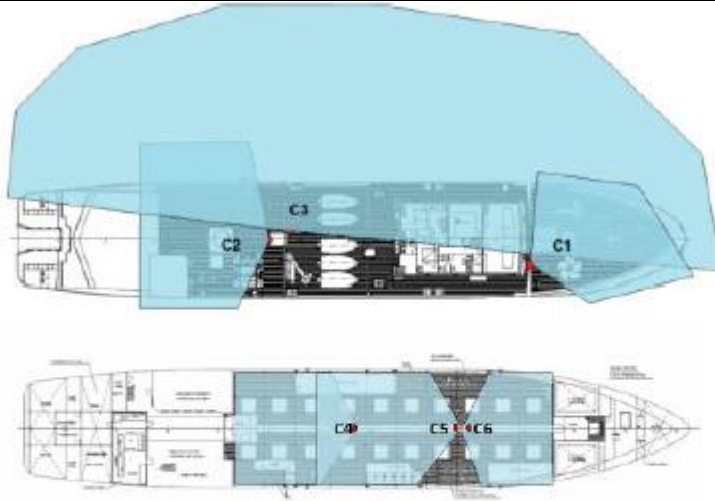
Each vessel should develop a “Vessel Monitoring Plan” so as to define how many and where cameras are located to collect the required ROS minimum data fields. Vessel Monitoring Plans should be reviewed by the CPCs fishery management agency and presented to the WGEMS/WPDCS to ensure it meets IOTC REMP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

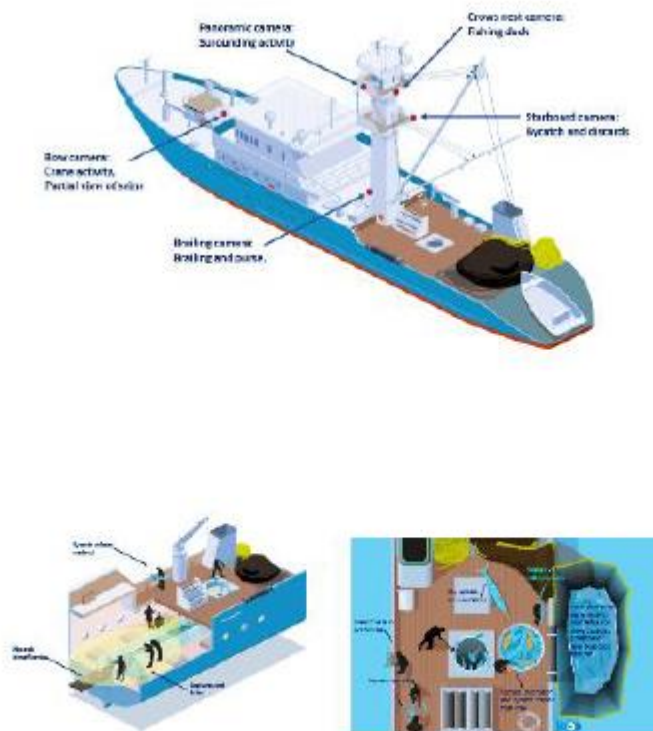




Figure 1. (A) An example of a 6-camera EM system installed in a purse seine covering main areas of fishing and fish handling operations (from Murua et al., 2020b) and (B) 7-camera EM system (4 in the upper deck and 3 in the well deck) installed in a purse seine covering main areas of fishing and fishing 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 set	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.



C1: Stern camera



C2: Fishing deck 1



C3: Fishing deck 2



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 (%)
Work deck	Catch onboard	Length and weight ⁸ by capture
		Condition
		Fate
	Bycatch discarded, released, or retained	Predator observed
		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
	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).

