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## REVIEW OF CURRENT CONSERVATION AND MANAGEMENT MEASURES RELATING TO ECOSYSTEMS AND BYCATCH

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PREPARED BY IOTC SECRETARIAT, AUGUST 2023

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### PURPOSE

To encourage participants at the Working Party on Ecosystems and Bycatch (WPEB19) to review the existing Conservation and Management Measures (CMM) relating to ecosystems and bycatch 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. At the 27<sup>th</sup> Session of the Commission (S27) held in May 2023, three new CMMs relevant to WPEB were adopted:

#### Resolution 23/06 *On the conservation of cetaceans:*

This Resolution supersedes Resolution 13/04 and applies to all vessels on the IOTC record of fishing vessels so does not apply to artisanal vessels operating exclusively in their respective EEZ. The Resolution aims to mitigate the interactions between cetaceans and purse seine and gillnet fishing gear; and gather additional information from CPCs on the interaction rates with other fishing gears, in particular gillnets and longlines. The Resolution also requests that the IOTC SC develop best practice guidelines for the safe release and handling of encircled cetaceans and submit these to the Commission meeting for endorsement by 2025 at the latest and review information on the status of cetaceans in the IOTC area and provide recommendations or advice to the Commission to identify measures that the Commission could take to mitigate negative effects of interactions with cetaceans by IOTC fisheries. Comparing this Resolution to 13/04, the updated Resolution adds in a clause saying that 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 are endorsed and another encouraging CPCs with national and state legislation for protecting these species to provide information to the SC.

#### Resolution 23/07 *On reducing the incidental bycatch of seabirds in longline fisheries:*

This Resolution supersedes Resolution 12/06. The Resolution applies specifically to longliners and the limit of the area in which longline vessels have to implement mitigation measures is south of 25°S to encompass the area of overlap between the distribution area of endangered species of seabirds and the longline fishing grounds. This Resolution builds on the previous Resolution which listed three mitigation measures (i.e., night setting with minimum deck lighting, bird scaring lines and line weighting) considered to be effective. The revised Resolution 23/07 differs from Resolution 12/06 in that CPCs may either use at least two of the three mitigation measure options previously mentioned or may use hook-shielding devices as a stand-alone measure. The Resolution also requires the SC to continue to review and make recommendations to the Commission on advancements and best practice in seabird bycatch mitigation including developing advice to the Commission on best practice branch line weighting by 2024.

#### Resolution 23/08 *On Electronic Monitoring Standards for IOTC fisheries.*

This Resolution sets out the minimum standards for electronic monitoring in IOTC fisheries and for implementing a Regional Electronic Monitoring Program (REMP). It sets out the rules for the implementation of national electronic monitoring programs by CPCs including the requirement to meet the EM program standard and EM system and data standards and submit Vessel Monitoring plans to the Secretariat and the SC on an annual basis. The Resolution requires the SC to review the ROS minimum data fields no later than 2024 to identify fields that are difficult for EM and/or human observers to collect; provide advice and recommendations to the Commission on the need and use of those identified fields for scientific purposes and provide advice to the Commission on the potential need to develop a separate EM ROS minimum data fields list. CPCs are encouraged to share relevant

information, approaches and experiences with the SC and Compliance Committee to support to the implementation of the REMP and the work of the SC.

## BACKGROUND

Ecosystems and bycatch in the Indian Ocean are currently subject to a range of other CMMs adopted by the Commission:

### **SHARKS AND RAYS:**

**Resolution 18/02:** *On management measures for the conservation of blue shark caught in association with IOTC fisheries.* This Resolution requires that CPCs firstly implement data collection programmes that ensure improved reporting of accurate blue shark catch, effort, size and discard data to IOTC in full accordance with the Resolution 15/02. In addition, CPCs are encouraged to undertake scientific research on blue shark that would provide information on key biological/ecological/behavioural characteristics, life-history, migrations, post-release survival and guidelines for safe release and identification of nursery grounds, as well as improving fishing practices. Lastly the Commission shall consider, at its 2021 meeting, the adoption of conservation and management measures, to be decided taking into account the most recent reported catch information or bycatch mitigation (Appendix A).

**Resolution 17/05:** *On the conservation of sharks caught in association with fisheries managed by IOTC.* This resolution includes minimum reporting requirements for sharks, calls for full utilisation of sharks, encourages the release of live sharks in non-targeted fisheries and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel (Appendix B).

**Resolution 13/06:** *On a scientific and management framework on the Conservation of sharks species caught in association with IOTC managed fisheries.* This Resolution prohibits, as an interim pilot measure, the retention onboard, transshipment, landing or storing any part or whole carcass of oceanic whitetip sharks (*Carcharhinus longimanus*) by all vessels on the IOTC record of authorized vessels or authorised to fish for tuna or tuna-like species, with the exception of observers who are permitted to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs) from oceanic whitetip sharks that are dead at haulback and artisanal fisheries for the purpose of local consumption, and will conduct a review and an evaluation of the interim measure in 2016. (Appendix C).

**Resolution 13/05:** *On the conservation of whale sharks (*Rhincodon typus*).* This Resolution aims to mitigate the interactions between whale sharks and purse seine fishing gear; gather additional information from CPCs on the interaction rates with other fishing gears, in particular gillnets and longlines; and requests that the IOTC SC develop best practice mitigation and handling guidelines for consideration by the Commission at its 18th Session in 2014, to mitigate the impacts of fishing on whale sharks in the IOTC area of competence (Appendix D).

**Resolution 12/09:** *On the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence.* This Resolution prohibits the retention onboard, transshipment, landing, storing, selling or offering for sale any part or whole carcass of the three species of Thresher sharks (family Alopiidae) by all vessels on the IOTC record of authorised vessels. Observers are permitted to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs) from thresher sharks that are dead at haulback (Appendix E).

**Resolution 19/03:** *On the conservation of mobulid rays caught in association with fisheries in the IOTC area of competence.* This Resolution aims to mitigate the interactions between mobulid rays and all fishing vessels flying the flag of a Contracting Party or Cooperating Non-Contracting Party. The Resolution prohibits the targeting of these rays and prohibits all vessels retaining onboard, transshipping, landing, storing, any part or whole carcass of mobulid rays caught in the IOTC Area of Competence apart from subsistence vessels. 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. (Appendix F).

**MARINE TURTLES:**

**Resolution 12/04:** *On the conservation of marine turtles.* This Resolution introduced amendments to Resolution 09/06 On Marine Turtles, by removing the term 'hard-shelled' to provide equal protection for all marine turtles in the IOTC area of competence and clarify the data reporting requirements for interactions with marine turtles (Appendix G).

**SEABIRDS:**

**Resolution 23/07:** *On reducing the incidental bycatch of seabirds in longline fisheries.* This Resolution supersedes Resolution 12/06. The Resolution applies specifically to longliners and the limit of the area in which longline vessels have to implement mitigation measures is south of 25°S to encompass the area of overlap between the distribution area of endangered species of seabirds and the longline fishing grounds. This Resolution builds on the previous Resolution which listed three mitigation measures (i.e., night setting with minimum deck lighting, bird scaring lines and line weighting) considered to be effective. The revised Resolution 23/07 differs from Resolution 12/06 in that CPCs may either use at least two of the three mitigation measure options previously mentioned or may use hook-shielding devices as a stand-alone measure. The Resolution also requires the SC to continue to review and make recommendations to the Commission on advancements and best practice in seabird bycatch mitigation including developing advice to the Commission on best practice branch line weighting by 2024 (Appendix H).

**CETACEANS:**

**Resolution 23/06:** *On the conservation of cetaceans.* This Resolution supersedes Resolution 13/04 and applies to all vessels on the IOTC record of fishing vessels so does not apply to artisanal vessels operating exclusively in their respective EEZ. The Resolution aims to mitigate the interactions between cetaceans and purse seine and gillnet fishing gear; and gather additional information from CPCs on the interaction rates with other fishing gears, in particular gillnets and longlines. The Resolution also requests that the IOTC SC develop best practice guidelines for the safe release and handling of encircled cetaceans and submit these to the Commission meeting for endorsement by 2025 at the latest and review information on the status of cetaceans in the IOTC area and provide recommendations or advice to the Commission to identify measures that the Commission could take to mitigate negative effects of interactions with cetaceans by IOTC fisheries. Comparing this Resolution to 13/04, the updated Resolution adds in a clause saying that 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 are endorsed and another encouraging CPCs with national and state legislation for protecting these species to provide information to the SC (Appendix I).

**REGIONAL OBSERVER SCHEME AND EMS:**

**Resolution 22/04** *On a Regional Observer Scheme.* This Resolution supersedes and is based on Resolution 11/04. This resolution puts in place a programme comprising national observer schemes to collect verified catch data and other scientific data related to the fisheries for tuna and tuna-like species in the IOTC area. CPCs are required to cover a minimum of 5% of their operations/sets per year on vessels over 24m in length or vessels of all lengths operating outside of their EEZ. This revision of the Resolution allows for the use of Electronic Monitoring Systems (EMS) to complement or substitute for human onboard observers once the EMS standards have been adopted (Appendix J)

**Resolution 16/04:** *On the implementation of a pilot project in view of promoting the regional observer scheme of IOTC.* This resolution creates a pilot project aiming to enhance the implementation of the Resolution 11/04 *on a Regional Observer Scheme* (Now Resolution 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 K)

**Resolution 23/08** *On Electronic Monitoring Standards for IOTC fisheries.* This Resolution sets out the minimum standards for electronic monitoring in IOTC fisheries and for implementing a Regional Electronic Monitoring Program (REMP). It sets out the rules for the implementation of national electronic monitoring programs by CPCs including the requirement to meet the EM program standard and EM system and data standards and submit Vessel Monitoring plans to the Secretariat and the SC on an annual basis. The Resolution requires the SC to review the Ros minimum data fields no later than 2024 to identify fields that are difficult for EM and/or human observers to collect; provide advice and recommendations to the Commission on the need and use of those identified fields for scientific purposes and provide advice to the Commission on the potential need to develop a separate EM ROS minimum data fields list. CPCs are encouraged to share relevant information, approaches and experiences with the SC and Compliance Committee to support to the implementation of the REMP and the work of the SC (Appendix L).

**OTHER:**

**Resolution 19/05:** *On a ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna and a recommendation for non-targeted species caught by purse seine vessels in the IOTC area of competence.* The Resolution bans the discard of three tropical tuna species, with the exception of fish unfit for human consumption or if no space available to accommodate all fish. This Resolution supersedes Resolution 17/04 (Appendix M).

**Resolution 12/12:** *To prohibit the use of large-scale driftnets on the high seas in the IOTC area.* This Resolution banned the use of large-scale driftnets (more than 2.5 km long) on the high seas within the IOTC area of competence. Paragraph 6 of this Resolution states that “The IOTC shall periodically assess whether additional measures should be adopted and implemented to ensure that large-scale driftnets are not used on the high seas in the Convention Area. The first such assessment shall take place in 2012.” (Appendix N).

**Resolution 18/04:** *On bioFAD experimental project.* This Resolution acknowledges and supports the Biodegradable FAD (BIOFAD) project with the objective of reducing the impact and the amount of synthetic marine debris of the use of non-biodegradable FAD in the ecosystem. The Project Consortium will make available to the IOTC Scientific Committee the results of the project at the latest two months in advance of its 2020 meeting. The Scientific Committee will analyse the outcomes of the project and provide scientific advice on possible additional FAD management options for consideration by the Commission in 2021. (Appendix O).

**Resolution 18/09:** *On a scoping study of socio-economic indicators of IOTC fisheries.* This Resolution specifies the terms of reference for a scoping study of socio-economic aspects of IOTC fisheries. Pursuant to Article XII.5 of the Agreement, the Commission shall review the results of the scoping study and determine if a permanent Working Party on the Socio-Economic Aspects of the Fisheries the IOTC Area of the Competence is needed, at its 23rd Session in 2019. (Appendix P).

**Resolution 19/02:** *Procedures on a Fish Aggregating Devices (FADs) Management Plan.* This Resolution sets a limit of 300 buoys to be set by any purse seine vessel at a time and the requirement for CPCs to submit information to the Secretariat on the number of operational buoys followed by vessels by type, 1x1 grid area and month strata. CPCs are also required to submit FAD management plans to the Commission for analysis by the Compliance Committee and these should include initiatives to investigate the minimise the capture of small bigeye and yellowfin tuna and non-target species associated with fishing on FADs as well as guidelines to prevent the loss or abandonment of FADs. The Resolution also states that vessels are required to use non-entangling FAD designs and

natural or biodegradable materials to construct them. (Appendix Q).

**Resolution 22/01** *On climate change as it relates to the Indian Ocean Tuna Commission.* This Resolution requires that the Commission shall take into account scientific information available from the Scientific Committee and other relevant international processes on the potential impacts of climate change on tuna stocks, bycatch and species belonging to the same ecosystem or dependent on or associated with tuna stocks. It also requires the Commission to support further scientific research into the relationship between climate change and species targeted and impacted by tuna fisheries including research which can inform potential measures to mitigate and/or adapt to climate change impacts (Appendix R)

## DISCUSSION

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

## RECOMMENDATION

That the WPEB **NOTE** paper IOTC–2023–WPEB19–05 which aimed to encourage the WPEB to review the existing Conservation and Management Measures (CMMs) relating to the WPEB, 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.

## APPENDICES

- [Appendix A:](#) Resolution 18/02: *On management measures for the conservation of blue shark caught in association with IOTC fisheries*
- [Appendix B:](#) Resolution 17/05: *On the conservation of sharks caught in association with fisheries managed by IOTC*
- [Appendix C:](#) Resolution 13/06: *On a scientific and management framework on the Conservation of shark species caught in association with IOTC managed fisheries*
- [Appendix D:](#) Resolution 13/05: *On the conservation of whale sharks (Rhincodon typus).*
- [Appendix E:](#) Resolution 12/09: *On the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence*
- [Appendix F:](#) Resolution 19/03: *On the conservation of mobulid rays caught in association with fisheries in the IOTC area of competence*
- [Appendix G:](#) Resolution 12/04: *On the conservation of marine turtles*
- [Appendix H:](#) Resolution 23/07: *On reducing the incidental bycatch of seabirds in longline fisheries*
- [Appendix I:](#) Resolution 23/06: *On the conservation of cetaceans.*
- [Appendix J:](#) Resolution 22/04: *On a regional observer scheme*
- [Appendix K:](#) Resolution 16/04: *On the implementation of a pilot project in view of promoting the regional observer scheme of IOTC*
- [Appendix L:](#) Resolution 23/08: *On Electronic Monitoring Standards for IOTC fisheries*
- [Appendix M:](#) Resolution 19/05: *On a ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna and a recommendation for non-targeted species caught by purse seine vessels in the IOTC area of competence*
- [Appendix N:](#) Resolution 12/12: *To prohibit the use of large-scale driftnets on the high seas in*

*the IOTC area.*

[Appendix O](#): Resolution 18/04: *On bioFAD experimental project*

[Appendix P](#): Resolution 18/09: *On a scoping study of socio-economic indicators of IOTC fisheries*

[Appendix Q](#): Resolution 19/02: *Procedures on a Fish Aggregating Devices (FADs) Management Plan*

[Appendix R](#): Resolution 22/01: *On climate change as it relates to the Indian Ocean Tuna Commission*

## APPENDIX A

### RESOLUTION 18/02

#### ON MANAGEMENT MEASURES FOR THE CONSERVATION OF BLUE SHARK CAUGHT IN ASSOCIATION WITH IOTC FISHERIES

**Keywords:** Blue shark, Catch limits, scientific research, reference points, data collection, catch reporting

#### **The Indian Ocean Tuna Commission (IOTC),**

RECALLING the Resolution 17/05 on the conservation of sharks caught in association with fisheries managed by IOTC aims the sustainability of shark fisheries and the protection of sharks;

RECALLING the Resolution 12/01 on the implementation of the precautionary approach calls on IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs) to apply the precautionary approach in accordance with Articles 5 and 6 of the United Nations Fish Stocks Agreement;

RECALLING the Resolution 15/01 on the recording of catch and effort data by fishing vessels in the IOTC area of competence fixes the IOTC data record system;

RECALLING the Resolution 15/02 on the Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs) defines the catch and catch related information to be provided by CPCs to the IOTC secretariat;

RECALLING that United Nations General Assembly Resolution on Sustainable Fisheries, adopted annually by consensus, since 2007 (62/177, 63/112, 64/72, 65/38, 66/68, 67/79, 68/71, 69/109, 70/75 and 71/123) calls upon States to take immediate and concerted action to improve the implementation of and compliance with existing regional fisheries management organisation or arrangement measures that regulate shark fisheries and incidental catch of sharks, in particular those measures which prohibit or restrict fisheries conducted solely for the purpose of harvesting shark fins, and, where necessary, to consider taking other measures, as appropriate, such as requiring that all sharks be landed with fins naturally attached;

CONSIDERING that pending the results of the new stock assessment, it is advisable to avoid an increase in levels of catches of blue shark while simultaneously adopt measures to improve data collection and monitoring of catches;

CONSIDERING that the average estimated catches of blue shark are much higher than the reported catches;

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

1. To ensure the conservation of the blue shark (*Prionace glauca*) stock in the Indian Ocean, Contracting Parties and Cooperating non-Contracting Parties, (CPCs) whose vessels catch blue shark in the IOTC Convention Area shall ensure that effective management measures are in place to support the sustainable exploitation of this stock in line with IOTC's Convention objective by undertaking the following management measures:

***Recording, Reporting, and Use of the Catch Information***

2. In order to curb the level of unreported catches, each CPC shall ensure that its vessels catching blue shark in association with IOTC fisheries in the Agreement area record their catch in accordance with the requirements set out in the Resolution 15/01 on the recording of catch and effort data by fishing vessels in the IOTC area of competence or any Resolution superseding it.
3. CPCs shall implement data collection programmes that ensure improved reporting of accurate blue shark catch, effort, size and discard data to IOTC in full accordance with the Resolution 15/02 on the Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs), or any Resolution superseding it.
4. CPCs shall include in their national Annual Reports to the Scientific Committee information on the actions they have taken domestically to monitor catches.

***Scientific Research***

5. CPCs are encouraged to undertake scientific research on blue shark that would provide information on key biological/ecological/behavioural characteristics, life-history, migrations, post-release survival and guidelines for safe release and identification of nursery grounds, as well as improving fishing practices. Such information shall be made available to the Working Party on Ecosystem and Bycatch and Scientific Committee through working documents and the national Annual Reports.
6. In light of the results of the next stock assessment of blue shark in 2021, the Scientific Committee shall provide advice, if possible, on options for candidate limit, threshold and target reference points for the conservation and management of this species in the IOTC Convention area.
7. The Scientific Committee shall also provide advice, at the latest by 2021, on potential management options for ensuring long-term sustainability of the stock, such as mitigation measures to reduce the mortality of blue shark, improving selectivity of fishing gears, spatial/temporal closures or minimum conservation sizes.

***Final Provisions***

Based on the review and the results of the next stock assessment, updated reported catch information by each CPC and taking into account the Scientific Committee's advice, the Commission shall consider, at its 2021 meeting, the adoption of conservation and management measures, which could include the catch limit for each CPC to be decided taking into account the most recent reported catch information or bycatch mitigation such as a ban on wire trace/shark line for blue shark as appropriate.



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**APPENDIX B****RESOLUTION 17/05****ON THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC****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 (CPCs) to apply the precautionary approach in accordance with Article V of the United Nations Fish Stocks Agreement;

CONCERNED by the continued failure of IOTC CPCs to submit complete, accurate and timely catch records for sharks in accordance with existing IOTC Resolutions;

RECOGNISING the need to improve the collection of species specific data on catch, discards and trade as a basis for improving the conservation and management of shark stocks and aware that identifying sharks by species is rarely possible when fins have been removed from the carcass;

RECALLING that United Nations General Assembly Resolution on Sustainable Fisheries, adopted annually by consensus, since 2007 (62/177, 63/112, 64/72, 65/38, 66/68, 67/79, 68/71, 69/109, 70/75 and A/RES/71/123) calls upon States to take immediate and concerted action to improve the implementation of and compliance with existing regional fisheries management organisation or arrangement measures that regulate shark fisheries and incidental catch of sharks, in particular those measures which prohibit or restrict fisheries conducted solely for the purpose of harvesting shark fins, and, where necessary, to consider taking other measures, as appropriate, such as requiring that all sharks be landed with fins naturally attached;

FURTHER RECALLING that the FAO International Plan of Action for Sharks calls on States to encourage full use of dead sharks, to facilitate improved species-specific catch and landings data and monitoring of shark catches and the identification and reporting of species-specific biological and trade data;

AWARE that despite regional agreements on the prohibition of shark finning, shark fins continue to be removed on board and the rest of the shark carcass discarded into the sea;

EMPHASISING the recent recommendations of IOTC and WCPFC Scientific Committees that the use of fin-to-carcass weight ratios is not a verifiable means of ensuring the eradication of shark finning and that it has proven ineffective in terms of implementation, enforcement and monitoring;

NOTING the adoption of Recommendation 10:2015 *on Conservation of Sharks Caught in Association with Fisheries Managed by the North-East Atlantic Fisheries Commission (NEAFC)* and Article 12 of the North-West Atlantic Fisheries Organisation (NAFO), which establish the fins attached policy as exclusive option for ensuring the shark finning ban in the NEAFC and NAFO fisheries;

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 Contracting Party or Cooperating Non-Contracting Party (CPC) and on the IOTC Record of Authorised Vessels, or authorised to fish for tuna or tuna-like species managed by the IOTC.
2. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks, with the exception of species prohibited by the IOTC. Full utilisation is

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defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.

3. 

a) Sharks landed fresh: CPCs shall prohibit the removal of shark fins on board vessels. CPCs shall prohibit the landing, retention on-board, transshipment and carrying of shark fins which are not naturally attached to the shark carcass until the first point of landing.

b) Sharks landed frozen: CPCs that do not apply sub-paragraph 3 a) for all sharks shall require their vessels to not have on board fins that total more than 5% of the weight of sharks on board, up to the first point of landing. CPCs that currently do not require fins and carcasses to be offloaded together at the point of first landing shall take the necessary measures to ensure compliance with the 5 % ratio through certification, monitoring by an observer, or other appropriate measures.

c) CPCs are encouraged to consider to progressively implement the measures described in sub-paragraph 3 a) to all shark landings. Paragraph 3 will be revisited by the Commission in its 2019 Annual Meeting in light of recommendations from the Scientific Committee, using the best available science and case studies from other CPCs already prohibiting the removal of shark fins on board vessels.
4. In fisheries in which sharks are unwanted species, CPCs shall, to the extent possible, encourage the release of live sharks, especially juveniles and pregnant sharks that are caught incidentally and are not used for food and/or subsistence. CPCs shall require that fishers are aware of and use identification guides (e.g. *IOTC Shark and Ray Identification in Indian Ocean Fisheries*) and handling practices.
5. Without prejudice to paragraph 3, in order to facilitate on-board storage, shark fins may be partially sliced through and folded against the shark carcass, but shall not be removed from the carcass until the first point of landing.
6. CPCs shall report data for catches of sharks no later than 30 June of the following year, in accordance with IOTC data reporting requirements and procedures in [Resolution 15/02 mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties \(CPC's\)](#) (or any subsequent superseding resolution), including all available historical data, estimates and life status of discards (dead or alive) and size frequencies.
7. CPCs shall prohibit the purchase, offer for sale and sale of shark fins which have been removed on-board, retained on-board, transhipped or landed, in contravention to this Resolution.
8. The Commission shall develop and consider for adoption at its regular annual session in 2017 mechanisms to encourage CPCs to comply with their reporting requirement on sharks, notably on the most vulnerable shark species identified by the IOTC Scientific Committee.
9. The IOTC Scientific Committee shall request that the IOTC Working Party on Ecosystems and Bycatch continue its work on identifying and monitoring the status of sharks until such time as comprehensive assessments are possible for all relevant shark species/groups. In particular, the IOTC Working Party on Ecosystems and Bycatch will establish the Terms of Reference for the Commission to establish a long term-project on sharks in IOTC, with the aim to ensure the collection of data required for performing reliable stock assessments for key shark species. The project will include:

- a) the identification of data gaps for key shark species in IOTC;
- b) the collection of relevant data, including through direct contacts with CPC national administrations, research institutes and stakeholders;
- c) any other activity that could contribute to improving the collection of data required for performing stock assessments of key shark species in IOTC.

The IOTC Scientific Committee will incorporate results of the project in its reports on sharks and based on progress achieved will propose a timeframe for performing stock assessment of key sharks species. CPCs are encouraged to contribute financially to the implementation of the project.

- 10. The IOTC Scientific Committee shall review annually the information reported by CPCs pursuant to this Resolution and, as necessary, provide recommendations to the Commission on ways to strengthen the conservation and management of sharks within IOTC fisheries.
- 11. CPCs shall undertake research to:
  - a) identify ways to make fishing gears more selective, where appropriate, including research into the effectiveness of prohibiting wire leaders;
  - b) improve knowledge on key biological/ecological parameters, life-history and behavioural traits, migration patterns of key shark species;
  - c) identify key shark mating, pupping and nursery areas; and
  - d) improve handling practices for live sharks to maximise post-release survival.
- 12. The Commission shall consider appropriate assistance to developing CPCs for the identification of shark species/ groups and the collection of data on their shark catches.
- 13. This Resolution supersedes Resolution 05/05 *concerning the conservation of sharks caught in association with fisheries managed by the IOTC*.

**APPENDIX C****RESOLUTION 13/06****On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries**

**(Objection [India]: Not binding on India)**

**The Indian Ocean Tuna Commission (IOTC),**

RECALLING IOTC [Resolution 05/05](#) concerning the conservation of sharks caught in association with fisheries managed by IOTC;

NOTING that the IOTC Working Party on Ecosystems and Bycatch (WPEB) recognised that full stock assessments on sharks may not be possible because of data limitations and that it is essential that some stock assessment evaluation should be carried out;

NOTING that the IOTC Scientific Committee advises that maintaining or increasing fishing efforts for certain shark species will probably result in further declines in biomass, productivity and CPUE;

NOTING that the ecological risk assessment (ERA) by fishing gears made by the IOTC Scientific Committee recognises the oceanic whitetip sharks (*Carcharhinus longimanus*) as vulnerable species in IOTC fisheries;

CONSIDERING that, sharks are caught as either main target or bycatch in the IOTC area of competence and valuable fishery resources for local communities in IOTC area;

CONSIDERING that the number of fishing vessels such as longliners and purse seiners and their fishing effort are gradually getting to reduce in the IOTC area of competence recently;

RECOGNISING the need for further improvement of the level of sharks data/information submitted by Contracting Parties and Cooperating Non-Contracting Parties (hereafter referred to as CPCs) to IOTC;

RECOGNISING the significant impact of IOTC Conservation and Management Measures regarding sharks on fishing operations and sharks data/information collected and reported by CPCs;

FURTHER RECOGNISING the need to establish a scientific framework for the conservation and management of shark species in IOTC;

BEARING IN MIND that oceanic whitetip sharks can be easily distinguished from other shark species and can therefore be released before they are taken on board of the vessel;

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

1. The Commission shall determine the shark species that are subjected to IOTC Conservation and Management Measures, including prohibition to retain on board, tranship, land or store any part or whole carcass according to the IOTC Scientific Committee's (SC) recommendation or advice.
2. The SC recommendation or advice shall be conducted taking account of:
  - a) full stock assessments on sharks, stock assessment and Ecological Risk Assessments (ERAs) by fishing gears, using available best scientific data/information;

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- b) trend of fishing effort by fishing gear on each shark species;
  - c) effective IOTC Conservation and Management Measures for certain fishing gears with high risk by shark species;
  - d) priority in shark species with high risk;
  - e) review of practical implementation of prohibition to retain on board of shark species;
  - f) feasibility of implementation of prohibition to retain on board including identification of shark species;
  - g) impact and bias of IOTC Conservation and Management Measures of sharks on fishing operations and sharks data/information collected and reported by CPCs;
  - h) further improvement of level for sharks data/information submitted by CPCs, particularly developing CPCs.
3. Notwithstanding paragraphs 1 and 2, CPCs shall prohibit, as an interim pilot measure, all fishing vessels flying their flag and on the IOTC Record of Authorised Vessels, or authorised to fish for tuna or tuna-like species managed by the IOTC on the high seas to retain onboard, tranship, land or store any part or whole carcass of oceanic whitetip sharks with the exception of paragraph 7. The provisions of this measure do not apply to artisanal fisheries operating exclusively in their respective Exclusive Economic Zone (EEZ) for the purpose of local consumption.
  4. CPCs shall require fishing vessels flying their flag and on the IOTC Record of Authorised Vessels or authorised to fish for tuna and tuna-like species managed by the IOTC on the high seas to promptly release unharmed, to the extent practicable, of oceanic whitetip sharks when brought alongside for taking onboard the vessel. However, CPCs should encourage their fishers to release this species if recognised on the line before bringing them onboard the vessels.
  5. CPCs shall encourage their fishers to record incidental catches as well as live releases of oceanic whitetip sharks. These data shall be kept at the IOTC Secretariat.
  6. CPCs shall, where possible, implement research on oceanic whitetip sharks taken in the IOTC area of competence, in order to identify potential nursery areas. Based on this research, CPCs shall consider other measures, as appropriate.
  7. Scientific observers shall be allowed to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs, skin samples, spiral valves, jaws, whole and skeletonised specimens for taxonomic works and museum collections) from oceanic whitetip sharks taken in the IOTC area of competence that are dead at haulback, provided that the samples are a part of a research project approved by the IOTC Scientific Committee (SC)/the IOTC Working Party on Ecosystems and Bycatch (WPEB). 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/WPEB.
  8. The CPCs, especially those targeting sharks, shall submit data for sharks, as required by IOTC data reporting procedures.

9. The provisional measures stipulated in this Resolution shall be evaluated in 2016 by the IOTC Scientific Committee to deliver more appropriate advice on the conservation and management of the stocks for the consideration of the Commission.

**APPENDIX D**  
**RESOLUTION 13/05**  
**ON THE CONSERVATION OF WHALE SHARKS (*RHINCODON TYPUS*)**

**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 V of the United Nations Fish Stocks Agreement;

RECOGNISING the ecological and cultural significance of whale sharks in the Indian Ocean;

MINDFUL that whale sharks are particularly vulnerable to exploitation including from fishing;

CONCERNED about the possible impacts of purse seine fishing operations on the sustainability of whale sharks;

ACKNOWLEDGING that under [Resolution 10/02](#) *Mandatory Statistical Requirements for IOTC Members and Cooperating Non-Contracting Parties (CPC's)*, paragraph 3: 'the provisions, applicable to tuna and tuna-like species, shall also be applicable to the most commonly caught shark species and, where possible, to the less common shark species';

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

NOTING that the IOTC Working Party on Ecosystems and Bycatch (WPEB) noted paper IOTC–2011–WPEB07–08 that reviewed the status of the information available on non-target species associated with IOTC fisheries; recommended that [Resolution 10/02](#) be revised to include whale sharks in a list of the most commonly caught elasmobranch species for which nominal catch data shall be reported as part of the statistical requirements for IOTC CPCs;

FURTHER NOTING that the WPEB noted paper IOTC–2011–WPEB07–08, paragraph 163: 'recommended that the recommendations from the KOBE bycatch technical working group are considered to encourage research and development of best practice with regard to setting nets on whale sharks to determine the impacts of the practice' and that the WPEB also recommended developing best practice methods for extraction of whale sharks from purse seine nets through direct collaboration with the Western and Central Pacific Fisheries Commission;

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 for tuna and tuna-like species managed by the IOTC on the high seas. The provisions of this measure do not apply to artisanal fisheries operating exclusively in their respective EEZ.
2. Contracting Parties and Cooperating Non-Contracting Parties (collectively, CPCs) shall prohibit their flagged vessels from intentionally setting a purse seine net around a whale shark in the IOTC area of competence, if it is sighted prior to the commencement of the set.

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3. CPCs shall require that, in the event that a whale shark is unintentionally encircled in the purse seine net, the master of the vessel shall:
    - a) take all reasonable steps to ensure its safe release, while taking into consideration the safety of the crew. These steps shall follow the best practice guidelines for the safe release and handling of whale sharks developed by the IOTC Scientific Committee;
    - b) report the incident to the relevant authority of the flag State, with the following information:
      - i. the number of individuals;
      - ii. a short description of the interaction, including details of how and why the interaction occurred, if possible;
      - iii. the location of the encirclement;
      - iv. the steps taken to ensure safe release;
      - v. an assessment of the life status of the animal on release, including whether the whale shark was released alive but subsequently died.
  4. CPCs using other gear types fishing for tuna and tuna-like species associated with a whale shark shall report all interactions with whale sharks to the relevant authority of the flag State and include all the information outlined in paragraph 3b(i–v).
  5. CPCs shall adopt Fish Aggregating Device designs that reduce the incidence of entanglement, according to **Annex III** of [Resolution 13/08](#) (or any subsequent revision).
  6. The Commission requests that the IOTC Scientific Committee develop best practice guidelines for the safe release and handling of encircled whale sharks, taking into account those developed in other regional fisheries management organisations including the Western and Central Pacific Fisheries Commission, and that these guidelines be submitted to the 2014 Commission meeting for endorsement.
  7. 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 10/02](#) (or any subsequent revision).
  8. CPCs shall report, in accordance with Article X of the IOTC Agreement, any instances in which whale sharks have been encircled by the purse seine nets of their flagged vessels.
  9. For CPCs having national and state legislation for protecting the species shall be exempt from reporting to IOTC, but are encouraged to provide data for the IOTC Scientific Committee consideration. The IOTC Scientific Committee will analyse the situation concerning the availability of data and will advise the Commission to undertake support measures to developing CPCs to overcome this situation.



**APPENDIX E****RESOLUTION 12/09****ON THE CONSERVATION OF THRESHER SHARKS (FAMILY ALOPIIDAE) CAUGHT IN ASSOCIATION WITH FISHERIES IN THE IOTC AREA OF COMPETENCE****The Indian Ocean Tuna Commission (IOTC),**

RECALLING that the IOTC [Resolution 05/05](#) concerning the conservation of sharks caught in association with fisheries managed by IOTC;

CONSIDERING that thresher sharks of the family Alopiidae are caught as bycatch in the IOTC area of competence;

NOTING that at its 2009 meeting, the IOTC Working Party on Ecosystems and Bycatch recognised that full stock assessments on sharks may not be possible because of data limitations and that it is essential that some stock assessment evaluation should be carried out;

NOTING that the international scientific community points out that the bigeye thresher shark (*Alopias superciliosus*) is particularly endangered and vulnerable;

CONSIDERING that it is difficult to differentiate between the various species of thresher sharks without taking them onboard and that such action might jeopardise the survival of the captured individuals;

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

1. This measure shall apply to all fishing vessels on the IOTC Record of Authorised Vessels.
2. Fishing Vessels flying the flag of an IOTC Member or Cooperating Non-Contracting Party (CPCs) are prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae, with the exception of paragraph 7.
3. CPCs shall require vessels flying their flag to promptly release unharmed, to the extent practicable, thresher sharks when brought along side for taking on board the vessel.
4. CPCs shall encourage their fishers to record and report incidental catches as well as live releases. These data will be then kept at the IOTC Secretariat.
5. Recreational and sport fishing shall release alive all caught animals of thresher sharks of all the species of the family Alopiidae. In no circumstances specimen shall be retained on board, transhipped, landed, stored, sold or offered for sale. The CPCs shall ensure that both recreational and sport fishermen carrying out fishing with high risk of catching thresher sharks are equipped with instruments suitable to release alive the animals.
6. CPCs shall, where possible, implement research on sharks of the species *Alopias* spp, in the Convention area in order to identify potential nursery areas. Based on this research, CPCs shall consider additional management measures, as appropriate.
7. Scientific observers shall be allowed to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs, skin samples, spiral valves, jaws, whole and skeletonised

specimens for taxonomic works and museum collections) from thresher sharks that are dead at haulback, provided that the samples are part of the research project approved by the IOTC Scientific Committee (or IOTC Working Party on Ecosystems and Bycatch (WPEB)). In order to obtain the approval, a detailed document outlining the purpose of the work, number and type of samples intended to be collected and the spatio-temporal distribution of the sampling work must be included in the proposal. Annual progress of the work and a final report on completion of the project shall be presented to the IOTC WPEB and the IOTC Scientific Committee.

8. The Contracting Parties, Cooperating Non-Contracting Parties, especially those directing fishing activities for sharks, shall submit data for sharks, as required by IOTC data reporting procedures.
9. This Resolution supersedes Resolution 10/12 *On the Conservation of Thresher Sharks (Family Alopiidae) Caught in Association with Fisheries in the IOTC Area of Competence*.

**APPENDIX F**  
**RESOLUTION 19/03**  
**ON THE CONSERVATION OF MOBULID RAYS 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 fishery<sup>1</sup> 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 fishing<sup>2</sup>, 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).

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<sup>1</sup> 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.

<sup>2</sup> 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).

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.
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 effect 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 G**  
**RESOLUTION 12/04**  
**ON THE CONSERVATION OF MARINE TURTLES**

**The Indian Ocean Tuna Commission (IOTC),**

RECALLING Recommendation 05/08 *On Sea Turtles* and Resolution 09/06 [superseded by [Resolution 12/04](#)] *On Marine Turtles*;

FURTHER RECALLING that marine turtles, including all species in the family Cheloniidae and *Dermochelys coriacea* (leatherback turtles) are listed in Appendix I of the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES) and that all species of marine turtles are listed on Appendix I or II of *Convention on the Conservation of Migratory Species of Wild Animals*;

AWARE that the populations of the six species of marine turtles under the *Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia* (IOSEA MoU) are listed as Vulnerable, Endangered or Critically endangered on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species;

RECOGNISING that the 26<sup>th</sup> FAO–COFI Session in March 2005 adopted the *Guidelines to Reduce Sea Turtle Mortality in Fishing Operations* (hereinafter referred to as “the FAO Guidelines”) and recommended their implementation by regional fisheries bodies and management organisations;

RECOGNISING that some fishing operations carried out in the Indian Ocean can adversely impact marine turtles and the need to implement measures to manage the adverse effects of fishing in the Indian Ocean on marine turtles;

ACKNOWLEDGING the activities undertaken to conserve marine turtles and the habitats on which they depend within the framework of the IOSEA MoU in particular its *Resolution to Promote the Use of Marine Turtle Bycatch Reduction Measures by IOSEA Signatory States* adopted by the Fifth Meeting of the Signatory States;

NOTING the IOTC Scientific Committee’s concern that the lack of data from Contracting Parties and Cooperating Non-Contracting Parties (CPCs) on the interactions and mortality of marine turtles from fisheries under the mandate of the IOTC undermines the ability to estimate levels of marine turtle bycatch and consequently IOTC’s capacity to respond and manage adverse effects of fishing on marine turtles;

FURTHER NOTING the IOTC Scientific Committee’s concern that the expansion of gillnet fishing from traditional fishing grounds into high seas might increase the interaction with marine turtles and lead to increased mortality;

CONVINCED of the need to strengthen Resolution 09/06 [superseded by [Resolution 12/04](#)] *On Marine Turtles* to ensure that the Resolution applies equally to all marine turtle species and that CPCs annually report all interactions and mortalities of marine turtles in fisheries under the mandate of the IOTC;

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

1. This Resolution shall apply to all fishing vessels on the IOTC Record of Fishing Vessels.

2. Contracting Parties and Cooperating Non-Contracting Parties (hereinafter referred to as “CPCs”) will implement, as appropriate, the FAO Guidelines.
3. CPCs shall collect (including through logbooks and observer programs) and provide to the IOTC Secretariat no later than 30 June of the following year in accordance with [Resolution 10/02](#) (or any subsequent revision), all data on their vessels’ interactions with marine turtles. The data shall include the level of logbook or observer coverage and an estimation of total mortality of marine turtles incidentally caught in their fisheries.
4. CPCs shall report to the IOTC Scientific Committee information on successful mitigation measures and other impacts on marine turtles in the IOTC area, such as the deterioration of nesting sites and swallowing of marine debris.
5. CPCs shall report to the Commission in the annual implementation report, in accordance with Article X of the IOTC Agreement, their progress of implementation of the FAO Guidelines and this Resolution.
6. CPCs shall require fishermen on vessels targeting species covered by the IOTC Agreement to bring aboard, if practicable, any captured marine turtle that is comatose or inactive as soon as possible and foster its recovery, including aiding in its resuscitation, before safely returning it to the water. CPCs shall ensure that fishermen are aware of and use proper mitigation, identification, handling and de-hooking techniques and keep on board all necessary equipment for the release of marine turtles, in accordance with handling guidelines in the IOTC Marine Turtle Identification Cards.
7. CPCs with gillnet vessels that fish for species covered by the IOTC Agreement shall:
  - a) Require that operators of such vessels record all incidents involving marine turtles during fishing operations in their logbooks<sup>3</sup> and report such incidents to the appropriate authorities of the CPC.
8. CPCs with longline vessels that fish for species covered by the IOTC Agreement shall:
  - a) Ensure that the operators of all longline vessels carry line cutters and de-hookers in order to facilitate the appropriate handling and prompt release of marine turtles caught or entangled, and that they do so in accordance with IOTC Guidelines. CPCs shall also ensure that operators of such vessels follow the handling guidelines in the IOTC Marine Turtle Identification Cards;
  - b) Where appropriate, encourage the use of whole finfish bait;
  - c) Require that operators of such vessels record all incidents involving marine turtles during fishing operations in their logbooks<sup>4</sup> and report such incidents to the appropriate authorities of the CPC.
9. CPCs with purse seine vessels that fish for species covered by the IOTC Agreement shall:
  - a) Ensure that operators of such vessels, while fishing in the IOTC area:

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<sup>3</sup> This information should include, where possible, details on species, location of capture, conditions, actions taken on board and location of release.

<sup>4</sup> This information should include, where possible, details on species, location of capture, conditions, actions taken on board and location of release



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- i. To the extent practicable, avoid encirclement of marine turtles, and if a marine turtle is encircled or entangled, take practicable measures to safely release the turtle in accordance with the handling guidelines in the IOTC Marine Turtle Identification Cards;
    - ii. To the extent practicable, release all marine turtles observed entangled in fish aggregating devices (FADs) or other fishing gear;
    - iii. If a marine turtle is entangled in the net, stop net roll as soon as the turtle comes out of the water; disentangle the turtle without injuring it before resuming the net roll; and to the extent practicable, assist the recovery of the turtle before returning it to the water;
    - iv. Carry and employ dip nets, when appropriate, to handle marine turtles.
  - b) Encourage such vessels to adopt FAD designs that reduce the incidence of entanglement of marine turtles according to international standards;
  - c) Require that operators of such vessels record all incidents involving marine turtles during fishing operations in their logbooks<sup>5</sup> and report such incidents to the appropriate authorities of the CPC.
10. All CPCs are requested to:
- a) Where appropriate undertake research trials of circle hooks, use of whole finfish for bait, alternative FAD designs, alternative handling techniques, gillnet design and fishing practices and other mitigation methods which may improve the mitigation of adverse effects on marine turtles;
  - b) Report the results of these trials to the IOTC Scientific Committee, at least 30 days in advance of the annual meetings of the Scientific Committee.
11. The IOTC Scientific Committee shall request the IOTC Working Party on Ecosystems and Bycatch to:
- a) Develop recommendations on appropriate mitigation measures for gillnet, longline and purse seine fisheries in the IOTC area;
  - b) Develop regional standards covering data collection, data exchange and training;
  - c) Develop improved FAD designs to reduce the incidence of entanglement of marine turtles, including the use of biodegradable materials.

The recommendations of the IOTC Working Party on Ecosystems and Bycatch shall be provided to the IOTC Scientific Committee for consideration at its annual session in 2012. In developing its recommendations, the IOTC Working Party on Ecosystems and Bycatch shall examine and take into account the information provided by CPCs in accordance with paragraph 10 of this measure, other research available on the effectiveness of various mitigation methods in the IOTC area, mitigation measures and guidelines adopted by other relevant organizations and, in particular, those of the Western and Central Pacific Fisheries Commission. The IOTC Working Party on Ecosystems and Bycatch will specifically consider the

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<sup>5</sup> This information should include, where possible, details on species, location of capture, conditions, actions taken on board and location of release

effects of circle hooks on target species catch rates, marine turtle mortalities and other bycatch species.

12. At its annual session in 2013 the Commission shall consider the recommendations of the IOTC Scientific Committee, 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.
13. In researching new mitigation methods, consideration should be given to ensuring that methods do not cause greater harm than they prevent and do not adversely impact other species (particularly threatened species) and/or the environment.
14. CPCs are encouraged to collaborate with the IOSEA and take into account the IOSEA MoU including the provisions of the Conservation and Management Plan in the implementation of bycatch mitigation measures for marine turtles.
15. The IOTC and IOSEA secretariats are encouraged to intensify their collaboration and exchange of information on marine turtle issues in accordance with the protocols agreed by the Commission.
16. CPCs are encouraged to support developing countries in their implementation of the FAO Guidelines and this Resolution.
17. The IOTC Scientific Committee shall annually review the information reported by CPCs pursuant to this measure and, as necessary, provide recommendations to the Commission on ways to strengthen efforts to reduce marine turtle interactions with IOTC fisheries.
18. This Resolution supersedes Recommendation 05/08 *On Sea Turtles* and Resolution 09/06 *On Marine Turtles*.

**APPENDIX H**  
**RESOLUTION 23/07**  
**ON REDUCING THE INCIDENTAL BYCATCH OF SEABIRDS IN LONGLINE FISHERIES**

**The Indian Ocean Tuna Commission (IOTC),**

RECALLING Resolution 12/06 *On reducing incidental bycatch of seabirds in longline fisheries*;

RECOGNIZING the need to strengthen mechanisms to protect seabirds in the Indian Ocean and to harmonise such mechanisms across tuna RFMOs;

NOTING the adoption of optional hook-shielding measures by the WCPFC in 2018;

TAKING INTO ACCOUNT the United Nations Food and Agriculture Organization (FAO) International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds);

NOTING the previous recommendations of the IOTC Scientific Committee, in agreement with the IOTC Working Party on Ecosystems and Bycatch (WPEB) on measures to mitigate seabird interactions as outlined in their 2007, 2009, 2011, 2016 and 2022 Reports;

RECOGNIZING that in 2022 the Scientific Committee recommended that the Commission consider including hook-shielding devices as an additional option for seabird bycatch mitigation measures in Resolution 12/06;

ACKNOWLEDGING that to date some IOTC Contracting Parties and Cooperating Non-Contracting Parties (hereinafter referred to as "CPCs") have identified the need for, and have either completed or are near finalising, their National Plan of Action on Seabirds;

RECOGNIZING the global concern that some species of seabirds, notably albatrosses and petrels, are threatened with extinction;

NOTING that the Agreement on the Conservation of Albatrosses and Petrels, which opened for signatures at Canberra on 19 June 2001, has entered into force and continues to update best-practice mitigation advice;

NOTING that the ultimate aim of the IOTC and CPCs is to achieve a zero bycatch of seabirds for fisheries under the purview of the IOTC, especially threatened albatrosses and petrel species in longline fisheries;

BEARING in mind studies undertaken in other longline tuna fisheries, demonstrating the economic benefit of measures to mitigate incidental bycatch of seabirds, by significantly increasing catches of targeted species;

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

1. CPCs shall record data on seabird incidental bycatch by species, notably through scientific observers in accordance with Resolution 22/04 and report these annually. Observers shall to the extent possible take photographs of seabirds caught by fishing vessels and transmit them to national seabird experts or to the IOTC Secretariat, for confirmation of identification.

2. CPCs that have not fully implemented the provisions of the IOTC Regional Observer Scheme outlined in paragraph 3 of Resolution 22/04 shall report seabird incidental bycatch through logbooks, including details of species, if possible.
3. CPCs shall provide to the Commission as part of their annual reports, information on how they are implementing this measure.
4. CPCs shall seek to achieve reductions in levels of seabird bycatch across all fishing areas, seasons, and fisheries through the use of effective mitigation measures, while giving due consideration to the safety of crew members and the practicability of mitigation measures.
5. In the area south of 25 degrees South latitude, CPCs shall ensure that all longline vessels use at least two of the three mitigation measures in Table 1 or, alternatively, use hook-shielding devices (as described in Table 2) as a stand-alone measure. These measures should also be considered for implementation in other areas, as appropriate, consistent with scientific advice.
6. Mitigation measures used pursuant to paragraph 5 shall conform to the minimum technical standards for these measures, as shown in Table 1 and Table 2.
7. The design and deployment for bird scaring lines should also meet the additional specifications provided in Annex I.
8. The Scientific Committee will continue to review and make recommendations to the Commission on advancements and best practice in seabird bycatch mitigation as they become available. This will include, by 2024 at the latest, developing advice to the Commission on best practice branch line weighting.
9. CPCs who elect to use hook-shielding devices as a mitigation method are encouraged to share their experience with other CPCs, as appropriate, through the Working Party on Ecosystems and Bycatch.
10. The use of hook-shielding devices must be consistent with all other IOTC Resolutions.
11. This Resolution shall enter into force on 1 July 2024.
12. As of 1 July 2024, the Resolution 12/06 *On reducing incidental bycatch of seabirds in longline fisheries* is superseded by this Resolution.

**Table 1.** Mitigation measures

Mitigation	Description	Specification
Night setting with minimum deck lighting	<p>No setting between nautical dawn and before nautical dusk.</p> <p>Deck lighting to be kept to a minimum.</p>	<p>Nautical dusk and nautical dawn are defined as set out in the Nautical Almanac tables for relevant latitude, local time and date.</p> <p>Minimum deck lighting should not breach minimum standards for safety and navigation.</p>
Bird-scaring lines (Tori lines)	<p>Bird-scaring lines shall be deployed during the entire longline setting to deter birds from approaching the branch line.</p>	<p>For vessels greater than or equal to 35 m:</p> <ul style="list-style-type: none"> <li>• Deploy at least 1 bird-scaring line. Where practical, vessels are encouraged to use a second tori pole and bird scaring line at times of high bird abundance or activity; both tori lines should be deployed simultaneously, one on each side of the line being set.</li> <li>• Aerial extent of bird-scaring lines must be greater than or equal to 100 m.</li> <li>• Long streamers of sufficient length to reach the sea surface in calm conditions must be used.</li> <li>• Long streamers must be at intervals of no more than 5m.</li> </ul> <p>For vessels less than 35 m:</p> <ul style="list-style-type: none"> <li>• Deploy at least 1 bird-scaring line.</li> <li>• Aerial extent must be greater than or equal to 75 m.</li> <li>• Long and/or short (but greater than 1 m in length) streamers must be used and placed at intervals as follows: <ul style="list-style-type: none"> <li>○ Short: intervals of no more than 2 m.</li> <li>○ Long: intervals of no more than 5 m for the first 55 m of bird scaring line.</li> </ul> </li> </ul> <p>Additional design and deployment guidelines for bird-scaring lines are provided in Annex I of this Resolution.</p>

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Line weighting	Line weights to be deployed on the snood prior to setting.	Greater than a total of 45 g attached within 1 m of the hook or; Greater than a total of 60 g attached within 3.5 m of the hook or; Greater than a total of 98 g weight attached within 4 m of the hook.
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**Table 2.** Hook-shielding devices

Mitigation	Description	Specification
Hook-shielding devices <sup>6</sup>	Hook-shielding devices, listed by the Parties to the Agreement on the Conservation of Albatross and Petrels as Best Practice Advice, that encase the point and barb of baited hooks to prevent seabird bycatch during setting shall be used.	Hook-shielding devices that comply with the following performance characteristics. Devices must: <ul style="list-style-type: none"> <li>• encase the point and barb of the hook until it reaches a depth of at least 10 m or has been immersed for at least 10 minutes;</li> <li>• meet current minimum standards for branch line weighting, as follows: greater than a total of 45 g attached within 1 m of the hook or; greater than a total of 60 g attached within 3.5 m of the hook or; greater than a total of 98 g weight attached within 4 m of the hook.</li> <li>• be designed to be retained on the fishing gear rather than lost.</li> </ul>

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<sup>6</sup> Hook-shielding devices can be used as a stand-alone measure, subject to meeting line weighting requirements.

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**ANNEX I****SUPPLEMENTAL GUIDELINES FOR DESIGN AND DEPLOYMENT OF TORI LINES****Preamble**

Minimum technical standards for deployment of tori lines are found in Table 1 of this Resolution, and are not repeated here. These supplemental guidelines are designed to assist in the preparation and implementation of tori line regulations for longline vessels. While these guidelines are relatively explicit, improvement in tori line effectiveness through experimentation is encouraged, within the requirements of Table 1 in the Resolution. The guidelines take into account environmental and operational variables such as weather conditions, setting speed and ship size, all of which influence tori line performance and design in protecting baits from birds. Tori line design and use may change to take account of these variables provided that line performance is not compromised. On-going improvement in tori line design is envisaged and consequently review of these guidelines should be undertaken in the future.

**Tori line design (see Figure 1)**

1. An appropriate towed device on the section of the tori line in the water can improve the aerial extension.
2. The above water section of the line should be sufficiently light that its movement is unpredictable to avoid habituation by birds and sufficiently heavy to avoid deflection of the line by wind.
3. The line is best attached to the vessel with a robust barrel swivel to reduce tangling of the line.
4. The streamers should be made of material that is conspicuous and produces an unpredictable lively action (e.g. strong fine line sheathed in red polyurethane tubing) suspended from a robust three-way swivel (that again reduces tangles) attached to the tori line.
5. Each streamer should consist of two or more strands.
6. Each streamer pair should be detachable by means of a clip so that line stowage is more efficient.

**Deployment of tori lines**

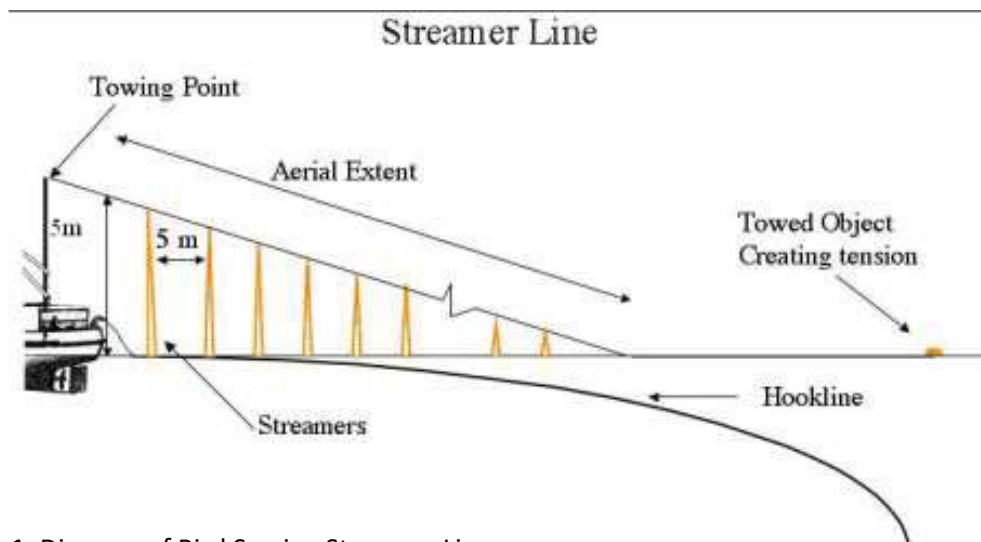
1. The line should be suspended from a pole affixed to the vessel. The tori pole should be set as high as possible so that the line protects bait a good distance astern of the vessel and will not tangle with fishing gear. Greater pole height provides greater bait protection. For example, a height of around 7 m above the water line can give about 100 m of bait protection.
2. If vessels use only one tori line it should be set to windward of sinking baits. If baited hooks are set outboard of the wake, the streamer line attachment point to the vessel should be positioned several meters outboard of the side of the vessel that baits are deployed. If vessels use two tori lines, baited hooks should be deployed within the area bounded by the two tori lines.
3. Deployment of multiple tori lines is encouraged to provide even greater protection of baits from birds.
4. Because there is the potential for line breakage and tangling, spare tori lines should be carried onboard to replace damaged lines and to ensure fishing operations can continue uninterrupted. Breakaways can be incorporated into the tori line to minimize safety and operational problems should a longline float foul or tangle with the in-water extent of a streamer line.
5. When fishers use a bait casting machine (BCM), they must ensure coordination of tori line and machine by: i) ensuring the BCM throws directly under the tori line protection, and ii) when using a



BCM (or multiple BCMs) that allows throwing to both port and starboard, two tori lines should be used.

6. When casting branchline by hand, fishers should ensure that the baited hooks and coiled branchline sections are cast under the tori line protection, avoiding the propeller turbulence which may slow the sink rate.

7. Fishers are encouraged to install manual, electric or hydraulic winches to improve ease of deployment and retrieval of tori lines.



**Figure 1.** Diagram of Bird Scaring Streamer Line.

**APPENDIX I**  
**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 19<sup>th</sup> 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 25<sup>th</sup> 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:

10. 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.
11. 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.
12. 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:
  - c) 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;
  - d) report the incident to the relevant authority of the flag State, with the following information:
    10. the species (if known);
    11. the number of individuals;
    12. a short description of the interaction, including details of how and why the interaction occurred and the gear type;
    13. the location of the encirclement or entanglement (if occurred);
    14. the steps taken to ensure safe release (if encirclement or entanglement occurred);
    15. an assessment of the life status of the animal on release, including whether the cetacean was released alive but subsequently died.
13. 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).
14. 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).

15. 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.
16. 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 Management Organisations, including the Western and Central Pacific Fisheries Commission, and that these guidelines be submitted to the Commission meeting for endorsement by 2025 at the latest.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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.
22. Resolution 13/04 *On the conservation of cetaceans* is superseded by this Resolution.

**APPENDIX J**  
**RESOLUTION 22/04**  
**ON A 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 (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 *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 21<sup>st</sup> Session of the IOTC Scientific Committee held in Seychelles, from 3 to 7 December 2018;

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

FURTHER RECALLING that the 23<sup>rd</sup> 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:

- a. “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
- b. “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.
- c. “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.
- d. “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.
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 K**  
**RESOLUTION 16/04**  
**ON THE IMPLEMENTATION OF A PILOT PROJECT IN VIEW OF PROMOTING THE REGIONAL**  
**OBSERVER SCHEME OF IOTC**

**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**

- 7. The observers selected to participate in this pilot project will be recognised by all CPCs participating in the project.
- 8.

**APPENDIX L**  
**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 [\[here\]<sup>7</sup>](#):
    - 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 field<sup>8</sup>,

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<sup>7</sup> <https://iotc.org/documents/ROS/DataStandards>

<sup>8</sup> Noting that for non-mandatory minimum data fields this may be “NA”

- 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:

- Purse-seine vessels over 24 meters length overall and under 24 meters LOA when fishing outside their EEZs,
- Longline vessels over 24 meters length overall and under 24 meters LOA when fishing outside their EEZs,
- Gillnet vessels over 24 meters length overall and under 24 meters LOA when fishing outside their EEZs,
- Pole and line vessels over 24 meters length overall and under 24 meters LOA when fishing outside their EEZs,
- Other gear types under 24 meters length overall (when fishing in the high seas).

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.



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**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 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.

**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:

- 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.

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 REMF – 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 REMF 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 3<sup>9</sup>. 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 [[here](#)<sup>10</sup>]. Within a given EM program, a certain level of harmonisation among vessels may also be necessary (camera placement and settings).

**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.

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<sup>9</sup> 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.

<sup>10</sup> 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.

**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 of 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)**

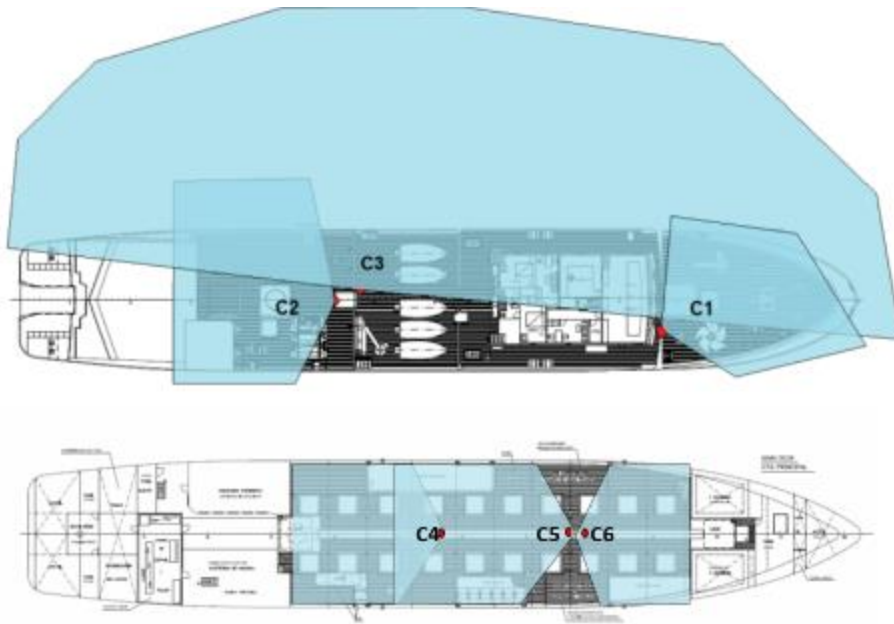
Each vessel should develop a “Vessel Monitoring Plan” so as to define how many and where cameras are located to collect the required ROS minimum data fields. Vessel Monitoring Plans should be reviewed by the CPCs fishery management agency and presented to the WGEMS/WPDCS to ensure it meets IOTC REMP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

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

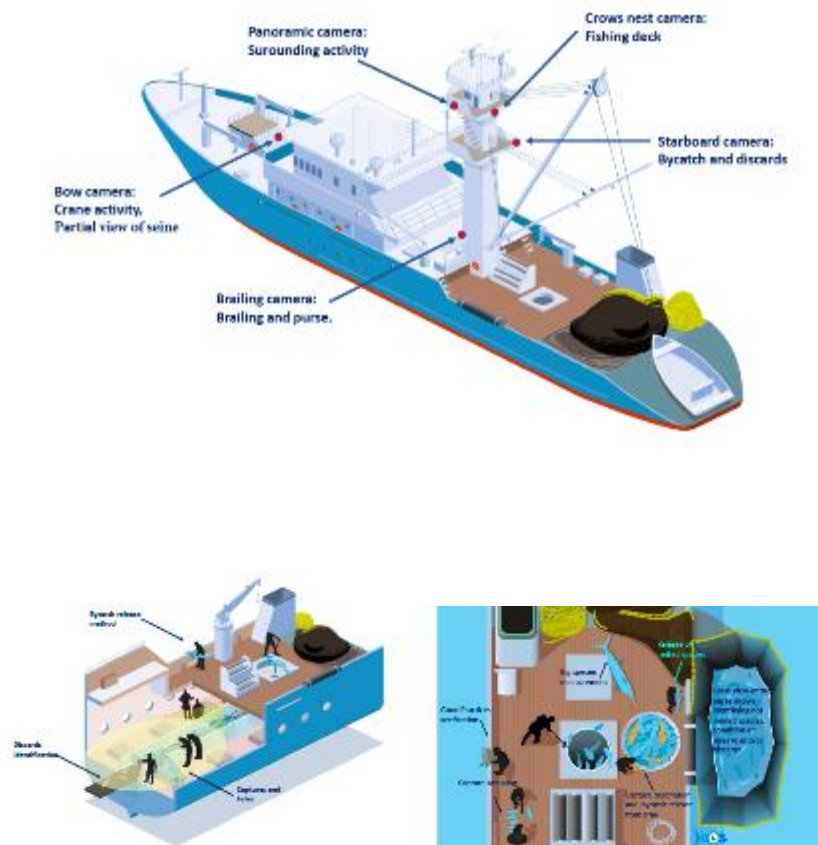
- the working deck (both port and starboard sides),
- the net sack and the brailer,
- the foredeck or amidships (e.g., FAD activity),
- and the well deck and conveyor belt (Murua et al., 2022; Restrepo et al., 2018): for the conveyor belt, in more than one place (e.g. at the beginning and at the end 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





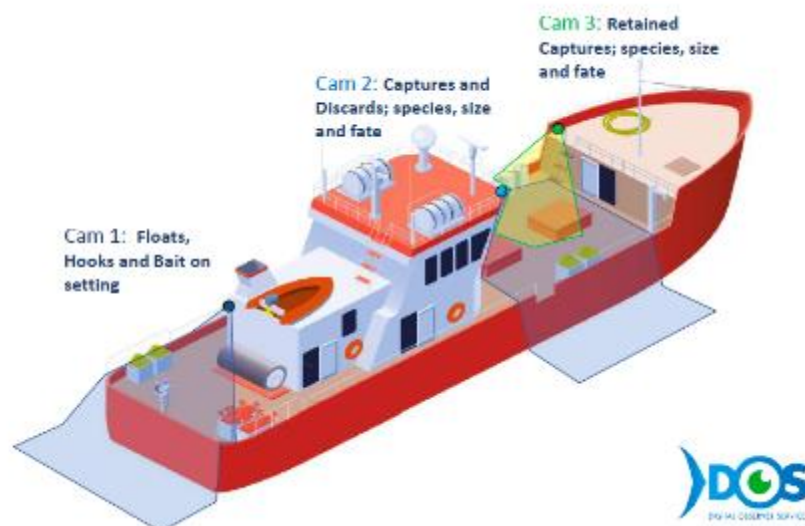
**Figure 1.** (A) An example of a 6-camera EM system installed in a purse seine covering main areas of fishing and fish handling operations (from Murua et al., 2020b) and (B) 7-camera EM system (4 in the upper deck and 3 in the well deck) installed in a purse seine covering main areas of fishing and 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 (%)
		Mitigation measures/marine pollution
Work deck	Catch onboard	Length and weight <sup>11</sup> by capture
		Condition
		Fate
		Predator observed
	Bycatch discarded, released, or retained	Total bycatch by set and species composition
Processing area	Catch	Total catch by set
		Length and weight <sup>1</sup> 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

<sup>11</sup> Estimated through length-weight relationships.

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



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



**APPENDIX M****RESOLUTION 19/05****ON A BAN ON DISCARDS OF BIGEYE TUNA, SKIPJACK TUNA, YELLOWFIN TUNA, AND NON-TARGETED SPECIES CAUGHT BY PURSE SEINE VESSELS IN THE IOTC AREA OF COMPETENCE****The Indian Ocean Tuna Commission (IOTC),**

RECOGNISING the need for action to ensure the achievement of IOTC objectives to conserve and manage bigeye tuna, skipjack tuna and yellowfin tuna in the IOTC area of competence;

RECOGNISING that the international community has recognised both ethical concerns and policy regarding discards of species in several international instruments and statements, including United Nations General Assembly resolutions (A/RES/49/118 (1994); A/RES/50/25 (1996); A/RES/51/36 (1996); A/RES/52/29 (1997); A/RES/53/33 (1998); A/RES/55/8 (2000); and A/RES/57/142 (2002)), United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea (UNCLOS) relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (United Nations Fish Stocks Agreement); The Rome Consensus on World Fisheries adopted by the FAO Ministerial Conference on Fisheries, Rome, 14–15 March 1995; the Code of Conduct for Responsible Fisheries, the FAO International Plan of Action (IPOA) on sharks; the Convention on Biological Diversity (CBD);

RECALLING that the United Nations Fish Stocks Agreement has underlined the importance of ensuring the conservation and optimum utilisation of highly migratory species through the action of regional fishery bodies such as the IOTC, and provides that *“States should minimize ... discards, ..., catch of non target species, both fish and non-fish species, and impacts on associated or dependent species, in particular endangered species...”*;

RECALLING that The Rome Consensus on World Fisheries adopted by the FAO Ministerial Conference on Fisheries, Rome, 14–15 March 1995, provides that *“States should...reduce bycatches, fish discards...”*;

RECALLING that the FAO Code of Conduct for Responsible Fisheries provides that *“States should take appropriate measures to minimize waste, discards...collect information on discards ...; ... take account of discards (in the precautionary approach) ...; develop technologies that minimize discards ...; use of selective gear to minimize discards”*;

RECALLING that the Commission adopted [Resolution 12/01](#) *On the implementation of the precautionary approach*;

CONCERNED about the morally unacceptable waste and the impact of unsustainable fishing practices upon the oceanic environment, represented by the discarding of tunas and non-target species in the purse seine fishery for tunas in the Indian Ocean;

CONSIDERING the important volume of tuna and non-targeted species discarded in the purse seine fishery for tunas in the Indian Ocean;

CONSIDERING the Millennium Development Goals, particularly Goal Number 2 aims to “end hunger, achieve food security and improved nutrition and promote sustainable agriculture”.

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

#### **RETENTION OF TARGETED TUNA SPECIES**

1. Contracting Parties and Cooperating Non-Contracting Parties shall require all purse seine vessels to retain on board and then land all bigeye tuna, skipjack tuna, and yellowfin tuna caught, except fish considered unfit for human consumption as defined in paragraph 4b (i).

#### **RETENTION OF NON-TARGETED SPECIES**

2. Contracting Parties and Cooperating Non-Contracting Parties shall require all purse seine vessels to retain on board and then land, to the extent practicable, the following non-targeted species or species group; other tunas, rainbow runner, dolphinfish, triggerfish, billfish, wahoo, and barracuda, except fish considered unfit for human consumption as defined in paragraph 4b (i), and/or species which are prohibited from retention, consumption, or trade through domestic legislations and international obligations.
3. Contracting Parties and Cooperating Non-Contracting Parties using other gear types not provided for in paragraph 1 and 2 of this resolution, which are targeting tuna and tuna like species in the IOTC area of competence should encourage their vessel to:
  - a) take all reasonable steps to ensure the safe release of non-targeted species taken alive, to the extent possible, while taking into consideration the safety of the crew;
  - b) retain on board and then land all dead non-targeted species except those considered unfit for human consumption as defined in paragraph 4b(i) and/or are prohibited from retention through domestic legislations and international obligations.
4. Procedures for the implementation of full retention requirements include:
  - a) No bigeye tuna, skipjack tuna, yellowfin tuna and non-targeted species referred to in paragraph 2 caught by purse seine vessels may be discarded after the point in the set when the net is fully pursed and more than one half of the net has been retrieved. If equipment malfunctions affect the process of pursing and retrieving the net in such a way that this rule cannot be complied with, the crew must make efforts to release the tunas and the non-targeted species as soon as possible.
  - b) The following two exceptions to the above rule shall apply:
    - (i) Where it is determined by the captain of the vessel that tuna (bigeye tuna, skipjack tuna or yellowfin tuna) and the non-targeted species as listed in Para 2 caught are unfit for human consumption, the following definitions shall be applied:
      - "unfit for human consumption" are fish that:
        - is meshed or crushed in the purse seine; or
        - is damaged due to depredation; or
        - has died and spoiled in the net where a gear failure has prevented both the normal retrieval of the net and catch, and efforts to release the fish alive;
      - "unfit for human consumption" does not include fish that:
        - is considered undesirable in terms of size, marketability, or species composition; or

- is spoiled or contaminated as the result of an act or omission of the crew of the fishing vessel.
- (ii) Where the captain of a vessel determines that tuna (bigeye tuna, skipjack tuna or yellowfin tuna) and the non-targeted species as listed in Para 2 were caught during the final set of a trip and there is insufficient storage capacity to accommodate all tuna (bigeye tuna, skipjack tuna or yellowfin tuna) and the non-targeted species caught in that set. This fish may only be discarded if:
- the captain and crew attempt to release the tuna (bigeye tuna, skipjack tuna or yellowfin tuna) and the non-targeted species alive as soon as possible; and
  - no further fishing is undertaken after the discard until the tuna (bigeye tuna, skipjack tuna, and/or yellowfin tuna) and the non-targeted species on board the vessel has been landed or transhipped.

#### **NON-RETENTION**

5. Where the captain of the vessel determines that fish should not be retained on board in accordance with Clause 4.b (i) and (ii), the captain shall record the event in the relevant logbook including estimated tonnage and species composition of discarded fish; and estimated tonnage and species composition of retained fish from that set.

#### **REVIEW**

6. The IOTC Scientific Committee, the IOTC Working Party on Tropical Tunas, and the IOTC Working Party on Ecosystems and Bycatch shall as a matter of priority:
  - a) act on its recommendation in the Report of the 18th Session of the IOTC Scientific Committee and undertake work to examine the benefits of retaining non-targeted species catches, other than those prohibited via IOTC Resolution, and present its recommendations to the 22nd Annual Session of the Commission. The work should take into account all species that are usually discarded on all major gears (i.e., purse-seines, longlines and gillnets), and should look at fisheries that take place both on the high seas and in coastal countries and the feasibility of both retraining on-board and processing of the associated landings.

#### **IMPLEMENTATION**

7. This Resolution will be revised, according to the advice of the IOTC Scientific Committee resulting from the review of the IOTC Working Party on Tropical Tunas (for bigeye tuna, skipjack tuna and yellowfin tuna) and of the IOTC Working Party on Ecosystems and Bycatch (for non-target species).
8. This Resolution supersedes Resolution 17/04 On a ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna and a recommendation for non-targeted species caught by purse seine vessels in the IOTC area of competence.

**APPENDIX N****RESOLUTION 12/12****TO PROHIBIT THE USE OF LARGE-SCALE DRIFTNETS ON THE HIGH SEAS IN THE IOTC AREA****The Indian Ocean Tuna Commission (IOTC),**

RECALLING that the United Nations General Assembly (UNGA) Resolution 46/215 calls for a global moratorium on large-scale high seas driftnet fishing;

NOTING that a number of vessels continue to engage in large-scale high seas driftnet fishing in the Indian Ocean area (IOTC area of competence);

MINDFUL that any vessel fishing with large-scale driftnets on the high seas in the IOTC area of competence, or configured to conduct large-scale high seas driftnet operations, has the capacity to take species of concern to the IOTC and is likely to undermine the effectiveness of IOTC Conservation and Management Measures;

NOTING with concern that recent information indicates that such vessels are interacting more frequently with highly migratory species, such as tunas, swordfish, sharks, and other species covered by the IOTC Agreement; and that associated “ghost fishing” by lost or discarded driftnets have serious detrimental effects on these species of concern and the marine environment;

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

1. The use of large-scale driftnets<sup>12</sup> on the high seas within the IOTC area of competence shall be prohibited.
2. Each Contracting Party and Cooperating Non-Contracting party (hereinafter referred to as CPCs) shall take all measures necessary to prohibit their fishing vessels from using large-scale driftnets while on the high seas in the IOTC area of competence.
3. A CPC-flagged fishing vessel will be presumed to have used large-scale driftnets on the high seas in the IOTC area of competence if it is found operating on the high seas in the IOTC area of competence and is configured<sup>13</sup> to use large-scale driftnets.
4. Paragraph 3 shall not apply to a CPC-flagged vessel duly authorised to use large-scale driftnets in their EEZs. While on the high seas in the IOTC area of competence all of such driftnets and related fishing equipment shall be stowed or secured in such a manner that they are not readily available to be used for fishing.
5. CPCs shall include in their Annual Reports a summary of monitoring, control, and surveillance actions related to large-scale driftnet fishing on the high seas in the IOTC area of competence.

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<sup>12</sup> “Large-scale driftnets” are defined as gillnets or other nets or a combination of nets that are more than 2.5 kilometers in length whose purpose is to enmesh, entrap, or entangle fish by drifting on the surface of, or in, the water column.

<sup>13</sup> “Configured” to use large-scale drift-nets means having on board assembled gear that collectively would allow the vessel to deploy and retrieve large-scale driftnets.

6. The IOTC shall periodically assess whether additional measures should be adopted and implemented to ensure that large-scale driftnets are not used on the high seas in the IOTC area of competence. The first such assessment shall take place in 2013.
7. Nothing in this measure shall prevent CPCs from applying more stringent measures to regulate the use of large-scale driftnets.
8. This Resolution supersedes Resolution 09/05 *to prohibit the use of large-scale driftnets on the high seas in the IOTC area.*

**APPENDIX O**  
**RESOLUTION 18/04**  
**ON BIOFAD EXPERIMENTAL PROJECT**

**Keywords:** BIOFAD, Research project, biodegradability

**The Indian Ocean Tuna Commission (IOTC),**

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;

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

HAVING REGARD to Annex V of the International Convention for the Prevention of Pollution from Ships (MARPOL);

RECOGNISING that promoting the use of natural origin biodegradable materials in the construction of FADs could contribute to the reduction of marine litter;

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;

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 17/08 [superseded 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 and use of biodegradable materials to reduce the incidence of entanglement of non-target species as specified in Annex III of Resolution 17/08 [superseded by Resolution 18/08]; calling to reduce the amount of synthetic marine debris and promote the use of biodegradable materials (such as hessian canvas, hemp ropes, etc.);

Further RECALLING that the Scientific Committee noted the challenges in conducting studies on biodegradable FADs (BIOFADs), such as the limit on the number of active FADs per purse seine vessel

in the Indian Ocean that may hinder the deployment of biodegradable FADs following experimental sampling designs, and also engagement with the fleet is necessary in order to incentivise them to deploy biodegradable FADs that may not be successful for fishing;

Furthermore, NOTING that IOTC, along with other tuna RFMOs, recommended and adopted resolutions to promote reduction of the amount of synthetic marine debris by the use of natural or biodegradable materials for drifting FADs;

RECALLING that SC20 ENDORSED (IOTC SC20 paras 157 to 165) a scientific research project ("the BIOFAD Research Project", IOTC-2017-SC20-INF07) by a consortium ('the Project Consortium') led by the Technological Center for Food and Marine Innovation (AZTI), the Spanish Oceanographic Institute (IEO) and the Institut de recherche pour le développement (IRD) to test the use of biodegradable materials and designs for the construction of drifting FADs in natural environmental conditions and REQUESTED the project to present the outcomes of the at sea trials to the next WPEB, WPTT and SC meetings;

NOTING that, the Scientific Committee ENDORSED that the Project Consortium carries out a large-scale experiment with the deployment of 1000 biodegradable FADs with experimental sampling designs (BIOFADs) in 2018-2019 in order to obtain sufficient data by the BIOFAD Research Project to conduct reliable scientific research and to avoid the limitations identified in earlier small scale trials (250 in each quarter to analyse temporal effects). The SC equally noted that the project counts on the active collaboration of Seychelles, Mauritius and European Union purse seiners with a participation of 42 purse seine vessels operating in the Indian Ocean. The SC noted that in total, each vessel will deploy around 24 BIOFADs, 6 BIOFADs by trimester (2 BIOFADs per vessel/month for the duration of the project from April 2018 to April 2019).

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

1. To acknowledge and support the Biodegradable FAD (BIOFAD) project with the objective of reducing the impact and the amount of synthetic marine debris of the use of non-biodegradable FAD in the ecosystem as requested in Resolution 17/08 [superseded by Resolution 18/08]. The description of the project is contained in Annex 1.
2. BIOFADs used for the collection of scientific data on biodegradable FADs tested under the supervision of the BIOFAD Project Consortium and the Scientific Committee, and deployed by the Project Consortium, shall not be exempted from the application of FADs limit number established by Resolutions 17/01 [superseded by Resolution 18/01] and 17/08 [superseded by Resolution 18/08].
3. As part of the project referred to in paragraph 1, each BIOFAD deployed shall be marked in a clear manner by the Project Consortium to distinguish it from other FADs and to avoid that it becomes unreadable or disassociated with the BIOFAD Research project.
4. Vessels not participating in the Research Project fishing on FADs clearly identified as a BIOFAD shall specifically report to their national scientists the BIOFAD (and devices) status and activities on this BIOFAD (including catch data if applicable). Vessels not participating in the Research Project that encounter such FADS are encouraged to report to their national scientists the BIOFAD (and devices) status and activities on this BIOFAD.

5. The Project Consortium will make available to the IOTC Scientific Committee the results of the project at the latest two months in advance of its 2020 meeting. The Scientific Committee will analyse the outcomes of the project and provide scientific advice on possible additional FAD management options for consideration by the Commission in 2021.



## ANNEX I

## BIOFAD PROJECT INFORMATION AND GUIDELINES TO DEPLOY AND USE OF BIOFADS

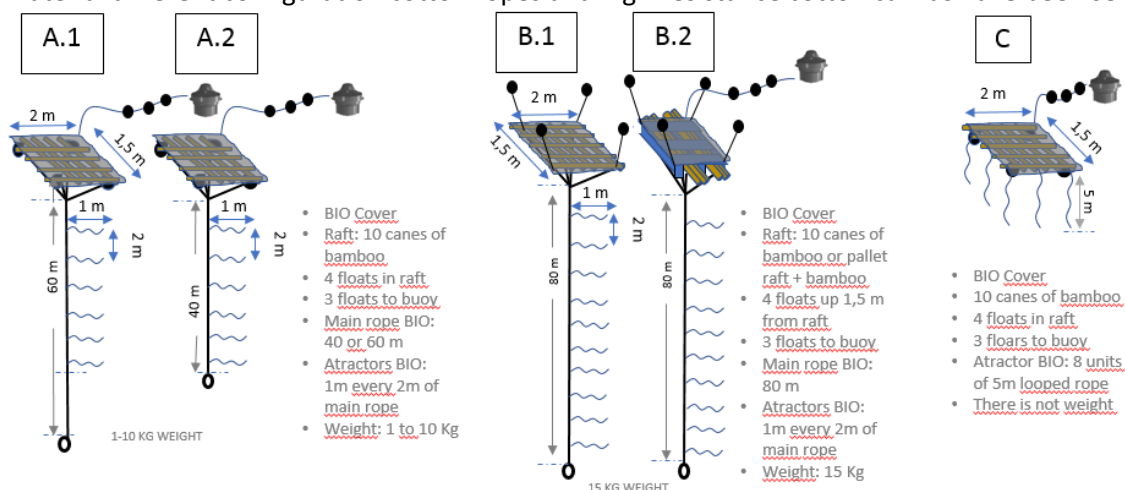
The consortium formed by AZTI, IRD and IEO aims through the project “Testing designs and identify options to mitigate impacts of drifting FADs on the Ecosystem” to address current impediments and to provide solutions that shall support the implementation of non-entangling and biodegradable FADs in the IOTC Convention Area. This project will have the collaboration of the EU, Seychelles and Mauritius purse seine fishery and the International Seafood Sustainability Foundation active. The purpose of this specific contract is to:

- i) to test the use of specific biodegradable materials and designs for the construction of drifting FADs in natural environmental conditions;
- ii) to identify options to mitigate drifting FADs impacts on the ecosystem, and
- iii) to assess the socio-economic viability of the use of BIO FADs (i.e. non-entangling and biodegradable) in the purse seine tropical tuna fishery.

The consortium will oversee both the construction of experimental BIOFADs and the monitoring of deployed BIOFADs, and their paired conventional non-entangling FADs (hereafter named CONFAD), at sea, as well as the data collection and reporting. Purse seine vessels participating in the BIOFAD project in the Indian Ocean will follow the summarized protocol regarding i) material and prototypes selection, ii) deployment strategy and identification of experimental FADs, and iii) data collection and reporting.

## i) MATERIAL AND PROTOTYPES

Three are the prototypes selected for the BIOFAD project. These designs include all the details in terms of dimension and materials as guide for their construction by the tuna purse seine industry. These prototypes were designed in consensus and aim to cover the different drifting performance that fisherman currently seek with the conventional non-entangling FADs: superficial FADs (prototype C), semi-superficial FADs (prototypes A1 and A2), and deep FADs (B1 and B2). Synthetic material like plastic gallons, plastic bottles, fishing nets, synthetic canvas, and metallic frame used for the construction of the raft are all prohibited for the construction of BIOFAD. To replace these synthetic material different configuration cotton ropes and high-resistance cotton canvas have been selected.



Summary of the dimensions and materials of the prototypes selected for the BIOFAD project.

## ii) DEPLOYMENT STRATEGY AND IDENTIFICATION

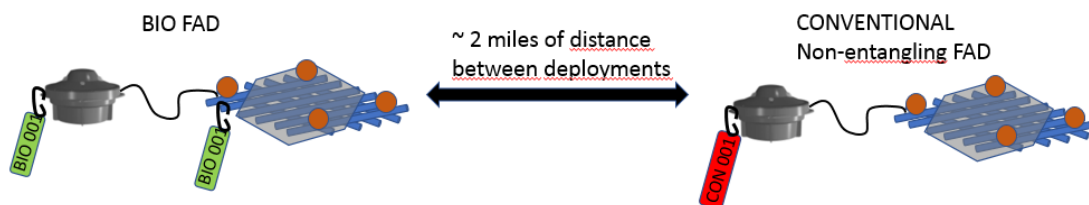
An effective FAD deployment strategy will be adopted considering the PS fleet FAD fishing strategy and its dynamics in the Indian Ocean. A total of 1000 BIOFADs (24 FADs per vessel) are planned to be deployed from April 2018 to April 2019, 2 BIOFADs per month and vessel (6 BIOFADs per vessel and

quarter-season, preferably). Deployment effort will be shared among the 42 purse seiners from Mauritius, Seychelles and EU operating in the Indian Ocean. This will make it approximately 250 FADs being deployed each quarter.

To assess the efficiency of BIOFADs in terms of tuna and non-tuna species aggregation, structure durability and degradation rate, and FAD performance (e.g., drift), comparison between BIOFADs and currently using conventional non-entangling FADs (hereafter named CONFAD) will be conducted.

The following deployment procedure is defined:

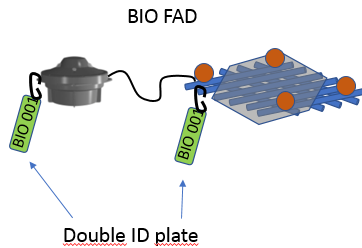
- Every BIOFAD deployment will be accompanied by a “pair” CONFAD deployment.
- The CONFAD construction will be of similar dimension of its pair BIOFAD but made by currently used synthetic material.
- The BIOFAD and its pair CONFAD will use same model/brand of echo-sounder buoy at first deployment.
- The distance between the deployment of BIOFAD and its pair CONFAD will be approximately 2 miles.



Drawing of the deployment strategy for the BIOFAD and its pair CONFAD.

BIOFAD and CONFAD identification procedure are described in the following points:

- All the BIOFADs and CONFADs will be identified in every moment by an identification number to ensure their traceability (e.g. from BIO-0001 to BIO-1000 and from CON-0001 to CON-0001).
- This ID number will always belong to the same BIOFAD or CONFAD through all its lifetime.
- All BIOFADs will be identified by two metallic plates showing the ID number. One of them will be attached to the raft and the other to the echo-sounder buoy associated with the BIOFAD.
- CONFADs as its pair BIOFADs will share same serial number (e.g. CON-0001 and BIO-0001).
- All CONFAD will be identified by a unique metallic plate showing the ID number and attached to the associated echo-sounder buoy.
- The metallic plate attached to the raft of the BIOFAD will never be removed from it. Only if the part of the structure where the plate is attached is replaced, the ID plate will be removed and attached again to the newly replaced part.
- It is very important that when a BIOFAD or CONFAD change hands (i.e. every time there is an echo-sounder buoy replacement), the ID number plate will be transferred from old buoy to newly associated buoy.



Drawing of the procedure to attach the BIOFAD ID number shown in the metallic plate to the raft and associated echo-sounder buoy.

### iii) DATA COLLECTION AND REPORTING

The following fishing operations have been considered for the data collection procedure related to BIOFAD and CONFAD:

- In every new deployment of BIOFAD or CONFAD: type of prototype (e.g. A1), ID number of the metallic plate (e.g. BIO-0001), and associated echo-sounder buoy codification number will be collected.
- In every set, visit with buoy replacement, or retrieval of a BIOFAD or CONFAD: ID number of the metallic plate, codification number of the echo-sounder buoy, the prototype type, and FAD's component state control will be recorded. If there is buoy replacement codification number of new buoy and old buoy must be recorded.
- In every simple visit (no buoy replacement) to a BIOFAD or CONFAD: It will encourage to record above described information.

To provide information on BIOFAD components status control the following procedure is defined:

- Every time there is a set on BIOFAD or CONFAD, if possible, the experimental FAD will be lifted up for the assessment of the state control of FAD's components.
- Observers onboard and crew (Skipper/Captain) will be responsible to collect this information.
- All parts of the structure described in the table below will be checked. A scale from 1 to 4 will be applied to value the status of the FADs (1 = Very good, not damaged; 2 = Good, a bit damaged; 3 = Bad, quite damaged; 4 = Very bad, close to sinking). More detailed description of each of the values for each component is also provided.
- Pictures of the components of BIOFAD and CONFAD will be taken whenever possible.
- Every time there is a replacement of any component of the BIOFAD and CONFAD, will be reported in the table below.
- In the case of the BIOFADs, any damaged parts susceptible of replacement will be replaced by biodegradable material, similar to the material used when it was first constructed and keeping design of the original prototype.
- The operator is encouraged to provide any observation to further describe the status of the structure (e.g. degradation % of each component).

Participating vessels are also requested to report data from echo-sounder buoys associated to BIOFADs and CONFADs deployed during the project.

All collected information described above will be reported following a specific form created for the BIOFAD project. An email template has been created for the crew (Skipper/Captain) to provide required information to the Consortium by the following email address [biofad@azti.es](mailto:biofad@azti.es).



**APPENDIX P**  
**RESOLUTION 18/09**  
**ON A SCOPING STUDY OF SOCIO-ECONOMIC DATA AND INDICATORS OF IOTC**  
**FISHERIES**

**Keywords:** Socio-Economics, scoping study.

**The Indian Ocean Tuna Commission (IOTC),**

CONSIDERING the objective of the Commission provided for in Article V to promote cooperation among its Members with a view to ensuring, through appropriate management, the conservation and optimum utilization of stocks covered by this Agreement and encouraging sustainable development of fisheries based on such stocks;

FURTHER CONSIDERING the responsibility of the Commission provided for in Article V(2)(d) to keep under review the economic and social aspects of the fisheries based on the stocks covered by the Agreement bearing in mind, in particular, the interest of developing coastal states;

FURTHER CONSIDERING the objective 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;

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 paragraph 75 of the 20th Session of the IOTC Scientific Committee report (IOTC-2017-SC20-R) that states:

*“75. The SC AGREED that the development of the ecosystem report card is a first step in developing the approach. Initiating the process with the development and monitoring of simple indicators and then linking these to management objectives and actions is an iterative process where the data collection and research activities are based on higher level guidance from the Commission. The SC noted that the consideration of socioeconomic dimensions are specifically mentioned in the IOTC Agreement and so the scientific subsidiary bodies are therefore mandated to work on these issues as well.”*

RECALLING Article IV, paragraph 2(d) of the IOTC Agreement which states:

*“2. In order to achieve these objectives, the Commission shall have the following functions and responsibilities, in accordance with the principles expressed in the relevant provisions of the United Nations Convention on the Law of the Sea: (d) 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 state”*

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

1. The terms of reference for a scoping study of socio-economic aspects of IOTC fisheries, are those specified in Annex I.

2. Pursuant to Article XII.5 of the Agreement, the Commission shall review the results of the scoping study and determine if a permanent Working Party on the Socio-Economic Aspects of the Fisheries the IOTC Area of the Competence is needed, at its 23<sup>rd</sup> Session in 2019.
3. The IOTC Secretariat shall facilitate the process of recruitment of the consultant or consulting company for delivery of the scoping study as specified in Annex I. The Commission requested the Secretariat to seek sources of extra-budgetary funds to support the proposed work.
4. The CPCs shall cooperate with the consultant for the purpose of this study, using their best endeavors and in line with their respective national legislation.

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**ANNEX I**  
**TERMS OF REFERENCE FOR A SCOPING STUDY ON THE SOCIO-ECONOMIC DATA AND INDICATORS**  
**OF IOTC FISHERIES**

**Objectives**

1. To describe the economic and social aspects of the fisheries, bearing in mind, in particular, the interests of developing coastal States, and identify the availability of data and socio-economic indicators that would describe the respective CPCs economic and social aspects of fisheries, including but not limited to: socio-economic contribution to the fisheries, economic dependence on fishery resources; income from exports; employment conditions and interactions between fleet segments; impact of fishery resource rents, including fisheries agreements with third parties to the local economies in terms of income, investments and jobs.
2. To evaluate and document what socio-economic data have been, and are currently collected by CPCs or other organisations that are in the public domain, on IOTC fisheries;
3. To evaluate and document what socio-economic data have been, and are currently collected by CPCs or other organisations but are not in the public domain on IOTC fisheries, where feasible under domestic law;
4. To evaluate if a) the data can be feasibly and uniformly collected, and b) would be adequate to calculate the indicators proposed. This should include, where feasible, a discussion on the data themselves, data quality, time periods and coverage rates;
5. To make recommendations on indicators taking into consideration the available data. To make recommendations on data requirements and harmonisation; and
6. To make recommendations on data management, reporting and associated costs to IOTC.
7. The consultant shall consider existing initiatives focusing on the socio-economic importance of fisheries, including, where applicable, the Overseas Fisheries Cooperation Foundation of Japan (OFCF) pilot project on socio-economic aspect of fisheries, to avoid any duplication

**Outputs**

8. A draft of the Consultant's report will be provided 120 days in advance of the 23<sup>rd</sup> Session of the IOTC (S23) in 2019.
9. The CPCs shall be tasked to review the report and provide feedback to the Consultant 60 days before the 23<sup>rd</sup> Session of the IOTC (S23), via the IOTC Secretariat.
10. The final Consultant's report shall be submitted to the IOTC Secretariat no later than 30 days prior to the commencement of the 23<sup>rd</sup> Session in 2019, in accordance with the IOTC Rules of Procedure (2014).

The final Consultant's report should be presented to the Commission for consideration at its meeting in 2019 and a presentation by the Consultant during the Session to answer any questions from CPCs.

**APPENDIX Q**  
**RESOLUTION 19/02**  
**PROCEDURES ON A FISH AGGREGATING DEVICES (FADS) MANAGEMENT PLAN**

**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, by Resolution 18/08 and then by [Resolution 19/02](#)] 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

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- 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.

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**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.
- DFAD logbook template (data to be collected specified in Annex III).

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**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).

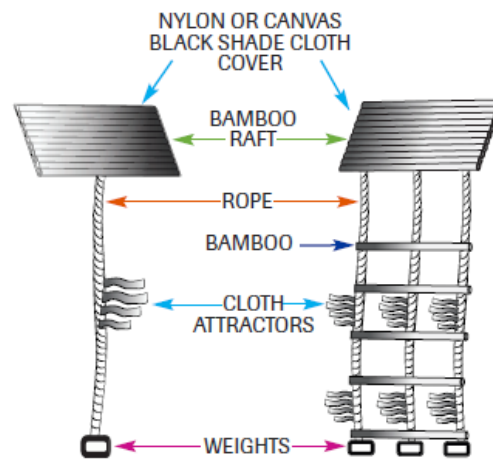
**ANNEX III**  
**DATA COLLECTION FOR DFADS**

- 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).
- b) 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.



**ANNEX V****PRINCIPLES FOR DESIGN AND DEPLOYMENT OF FADS****EXAMPLE OF NON-ENTANGLING FAD**

1. The surface structure of the FAD shall not be covered, or only covered with non-meshed material
2. If a sub-surface component is used, it shall not be made from netting but from non-meshed materials such as ropes or canvas sheets.

**APPENDIX R**  
**RESOLUTION 22/01**  
**ON CLIMATE CHANGE AS IT RELATES TO THE INDIAN OCEAN TUNA COMMISSION**

**Keywords:** Climate change, Precautionary approach.

**The Indian Ocean Tuna Commission (IOTC)**

RECOGNISING international initiatives to address the impacts of climate change including through the United Nations Framework Convention on Climate Change and the Paris Agreement;

NOTING the work of the Intergovernmental Panel on Climate Change;

MINDFUL of the work of the Scientific Committee and the Working Parties in assessing the impacts of climate change on tuna stocks and by-catch, and species belonging to the same ecosystem or dependent or associated with the target stocks in the Convention Area;

CONVINCED of the importance of addressing the potential impacts of climate change and other environmental degradation on target stocks, non-target species, and species belonging to the same ecosystem or dependent or associated with the target stocks in the IOTC Area of Competence;

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) was adopted in cognisance of the need to avoid adverse impacts on the marine environment, preserve biodiversity, maintain the integrity of marine ecosystems and minimise the risk of long-term or irreversible effects of fishing operations;

RECALLING that Article 5 of the UNFSA requires States to assess the impacts of fishing, other human activities and environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks and to adopt, where necessary, conservation and management measures for species belonging to the same ecosystem or associated with or dependent upon the target stocks, with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened;

CONCERNED by the findings of the 2022 Intergovernmental Panel on Climate Change with high confidence that climate change is causing the redistribution of marine fish stocks, increasing risk of transboundary management conflicts among fisheries users, and negatively affecting equitable distribution of food provisioning services as fish stocks shift from lower to higher latitude regions, thereby increasing the need for climate-informed transboundary management and cooperation

RECALLING the concern of the 23<sup>rd</sup> Session of the Working Party on Tropical Tuna that changes in ocean temperatures could have direct impacts on tuna spatial distributions and stock dynamics.

FURTHER RECALLING that the 24<sup>th</sup> Session of the Scientific Committee noted the importance of understanding the impact of climate change in particular on tropical tuna;

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

1. The Commission shall in its deliberations, to the extent possible, including in the development of conservation and management measures, take into account scientific information available from the Scientific Committee and other relevant international processes on the potential impacts of climate change on tuna stocks, bycatch and species belonging to the same ecosystem or dependent on or associated with tuna stocks.
2. The Commission shall support further scientific research into the relationship between climate change, tuna fisheries and tuna stocks, bycatch, and ecosystem or dependent on or associated with the tuna stocks, including research to inform potential measures to mitigate and/or adapt to climate change impacts.
3. The IOTC Scientific Committee, when requested by the Commission, shall consider and where possible, advise on the potential impacts of climate change on highly migratory fish stocks and any related impacts on the economies, food security and livelihood of CPCs in particular developing States among them Least Developing States and Small Island Developing States.
4. The IOTC Scientific Committee shall consider how climate change and fishing activities may be related and provide advice to the Commission on the potential implications for these relationships for the conservation and management of tuna and associated stocks.
5. The IOTC Executive Secretary, with the advice of the IOTC Scientific Committee, upon the availability of supplementary funds, shall undertake capacity-building programs in particular in the developing coastal States among them the Least Developed States and Small Island Developing States, to improve climate change science and the understanding of climate change impacts on tuna stocks, bycatch and species belonging to the same ecosystem or dependent on or associated with the tuna stocks.
6. The IOTC Executive Secretary shall seek funding for the implementation of climate change related scientific works and capacity building programs through various funding mechanisms such as the Global Environmental Facility, World Bank and others for the implementation of this resolution.
7. The IOTC Executive Secretary shall propose for endorsement by the Commission, for its 2023 session, options and alternatives to reduce the environmental impacts of the IOTC activities related to headquarters' operation and meetings of the Commission and its subsidiary bodies. In particular, the Secretariat is requested to propose guidelines to reduce the impact of in person meetings, including a list of meetings to be held virtually.