REVIEW OF CONSERVATION AND MANAGEMENT MEASURES RELATED TO DATA AND STATISTICS

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Summary

This paper provides an overview of all active IOTC Conservation and Management Measures (CMMs) related to data collection and reporting, summarising the current obligations of CPCs under each Resolution and the associated IOTC data reporting forms. It also reviews terminology issues, data resolution requirements, and reporting standards across fisheries and taxa. By consolidating this information, the paper aims to inform participants of WPDCS21 about the most recent updates to data-related CMMs and to highlight areas where further improvements may be required.

Introduction

Under Article XI of the Agreement establishing the Indian Ocean Tuna Commission (IOTC), Contracting Parties and Cooperating Non-Contracting Parties (CPCs) are required to collect and report fisheries data in compliance with the Conservation and Management Measures (CMMs). The overarching objective of the paper is to provide participants at the 21st Working Party on Data Collection and Statistics (WPDCS21) with an overview of current data-related CMMs, along with the key data reporting obligations content and specific reporting forms developed by the Secretariat for each dataset. Additionally, the paper highlights potential inconsistencies in some CMMs and challenges faced by the CPCs in collecting and reporting data to the IOTC, supporting the WPDCS's work in reviewing CMMs and providing clear, science-based recommendations for the Scientific Committee's (SC) consideration. Reporting requirements related to the monitoring of landings and transshipments of fish products in fishing ports (Resolution 25/11) and transshipments at sea (Resolution 25/05) are not included in this document as they pertain to compliance purposes.

Generic Data-Related Resolutions

Resolution 10/08 *Concerning a Record of Active Vessels Fishing for Tunas and Swordfish in the IOTC Area (3 July 2010)*

This Resolution applies to all CPCs with longline and surface fisheries and requires the reporting of a list of vessels that operated in the IOTC Area of Competence in the year prior to reporting, including information on vessel identification, ownership, operator details, fishing gear, and vessel characteristics (e.g. type, length, and gross tonnage).

IOTC Form Active Vessels supports mandatory reporting of Active Fishery Vessels, including their descriptive fields and relevant metadata.

Resolution 18/07 *On Measures Applicable in Case of Non-Fulfilment of Reporting Obligations in the IOTC (22 September 2018)*

This Resolution applies to all CPCs and mandates the reporting of the presence of IOTC species and the most commonly caught elasmobranch species in catches, as outlined in Annex II of Resolution 15/01 for each gear group.

IOTC Form 1DR supports mandatory reporting of species presence in the catch of each fishing fleet, organised by gear group and broad fishery category, along with relevant metadata.

Resolution 15/01 ***On the Recording of Catch and Effort Data by Fishing Vessels in the IOTC Area of Competence (10 September 2015)***

This Resolution applies to all CPCs with longline and surface fisheries and calls for the implementation of a data recording system (i.e., a bound paper or electronic logbook) on their fishing vessels. The Resolution specifies all the information and data that must be recorded for each fishing trip and operation of the fishing gear, including effort units and the taxa (i.e., species and species groups) for which data collection is mandatory vs. voluntary. In addition, the Resolution states that developing CPCs with coastal fisheries shall progressively implement a data recording system for vessels less than 24 m length overall operating inside the EEZ from 1 July 2016.

Resolution 15/02 ***On Mandatory Statistical Reporting Requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs) (10 September 2015)***

This Resolution applies to all CPCs and outlines the nature, source, unit, resolution, and reporting level of core fisheries datasets for each of the three main IOTC fisheries categories (longline, surface, and coastal), including retained catches, discards, efforts, and size frequencies. It covers the 16 tuna and tuna-like species under the IOTC mandate, as well as commonly caught elasmobranch species listed in Annex II of Res. 15/01 for each gear group. The Resolution also specifies data collection and reporting for support vessels assisting purse seine vessels, and for DFADs used in large-scale purse seine fisheries. Additionally, it provides recommendations on sampling strategies and target rates (e.g., 1 fish per metric tonne for size-frequency data) and calls for regular submission of documentation on extrapolation procedures for data from each fishery.

Resolution 24/02 ***Procedures on a Fish aggregating devices (FADs) management plan (2 March 2025)***

This Resolution applies to all CPCs with fisheries using DFADs and mandates additional reporting of data related to the use of buoys and DFADs to complement the requirements established in Res. 15/02 (paragraph 6c). CPCs must require vessels flying their flag and fishing on DFADs to report:

- Daily information on the geographic position of each instrumented buoy monitored by their purse seine vessels, with a time delay of at least 30 days, but no longer than 60 days (paragraph 23)
- Any activity in association with a floating object (DFAD or log) and/or an instrumented buoy, from the deployment to the end of use (paragraph 45 and Annex I)
- The number of instrumented buoys assigned to them by the end of each calendar year, including instrumented buoys which have been lost, or abandoned and/or discarded by 1° by 1° grid area and month strata and DFAD type (paragraph 46d).

IOTC Form 3DA supports mandatory reporting of purse seine and support vessels' activities on drifting floating objects (DFOBs) and buoys, along with relevant metadata.

Resolution 19/02 remains binding for the Sultanate of Oman.

Resolution 19/04 ***Concerning the IOTC Record of Vessels Authorised to Operate in the IOTC Area of Competence (29 October 2019)***

This Resolution applies to all CPCs with longline and surface fisheries and requires the reporting of a list of fishery vessels authorised to operate in the IOTC Area of Competence, including support vessels, along with information such as vessel identification, ownership, operator details, fishing gear, and characteristics (type, length, gross tonnage).

IOTC Form Vessels supports mandatory reporting of Authorised Fishing Vessels, including their descriptive fields and relevant metadata.

Resolution 23/01 ***On the Management of Anchored Fish Aggregating Devices (AFADs) (9 June 2023)***

This Resolution applies to all CPCs that deploy and use AFADs for fishing tuna and tuna-like species under the IOTC mandate, excluding recreational fisheries. The Resolution requires reporting on AFADs deployed within the EEZ of CPCs, including the date of deployment, GPS position, and UNI number. All AFAD-related activities (e.g., repair, intervention, and consolidation) as well as catches must be recorded and reported, along with the fishing position,

date, and AFAD identifier. Catches should be reported for both IOTC species and bycatch species, including the disposition of the catch (i.e., whether retained, or discarded dead or alive).

IOTC Form 3AA supports mandatory reporting of AFAD-related activities, including catches retained and discarded, and relevant metadata.

Resolution 23/08 *On Electronic Monitoring Standards for IOTC Fisheries (1 July 2024)*

This Resolution applies to all CPCs and sets the terms and definitions pertaining to the implementation of EMS, consistent with this Resolution and Res. 24/04. The Resolution calls for the CPCs to share relevant information, approaches, and experiences, including those involving capacity building needs and any CPC-level knowledge exchange, with the SC and CC to support the implementation of the Regional Electronic Monitoring Program.

Resolution 25/06 *On a Regional Observer Scheme (22 August 2025)*

This Resolution applies to CPCs with longline and surface fisheries and requires a minimum of five percent observer coverage of all fishing vessel operations at sea to collect verified catch and other scientific data. It also mandates the monitoring of catches at unloading by observers to identify the species composition of tuna species targeted by purse seine fisheries. The Resolution specifies that observers collect key data according to the ROS minimum standard data fields and IOTC observer forms. Additionally, the Resolution sets a five percent coverage target for artisanal fisheries, requiring that landings be monitored at landing sites by field samplers, with catch samples taken to estimate catch-at-size by boat type, gear, and species.

IOTC Forms ROS-GN, ROS-LL, ROS-PL, and ROS-PS support both mandatory and voluntary reporting of all data fields collected under the Regional Observer Scheme, as endorsed by the Scientific Committee at its 27th session (see IOTC-2024-SC27-DATA01).

Taxon-Specific Data-Related Resolutions

Resolution 12/04 *On the Conservation of Marine Turtles (24 August 2012)*

This Resolution applies to CPCs with longline and surface fisheries that may interact with marine turtles. It requires CPCs to collect data on marine turtle interactions – including incidental catch, release, and mortality – through observer programmes and logbooks, and to submit this information to the IOTC Secretariat in accordance with IOTC data standards and formats. CPCs are also required to implement mitigation measures to reduce turtle capture and to ensure that fishers handling marine turtles incidentally caught during fishing operations release them alive and unharmed whenever possible.

IOTC Form 1IN supports mandatory reporting of interactions with endangered, threatened, and protected species, along with relevant metadata.

Resolution 18/05 *On Management Measures for the Conservation of the Billfishes: Striped Marlin, Black Marlin, Blue Marlin and Indo-Pacific Sailfish (4 October 2018)*

This Resolution applies to all CPCs and prohibits the onboard retention, transshipment, or landing of any specimen of striped marlin, black marlin, blue marlin, or Indo-Pacific sailfish smaller than 60 cm in lower-jaw fork length. It mandates the immediate release of such specimens at sea in a manner that maximises their post-release survival while ensuring crew safety. The Resolution also reaffirms the data requirements set out in Resolutions 15/01 and 15/02.

IOTC Forms 1RC, 1DI, 3CE, and 4SF support mandatory reporting of billfish total retained catches, discards, geo-referenced catches and efforts, and geo-referenced size frequencies, respectively, along with relevant metadata.

Resolution 19/03 *On the Conservation of Mobulid Species Caught in Association with Fisheries in the IOTC Area of Competence (29 October 2019)*

This Resolution applies to CPCs with longline and surface fisheries, prohibiting the onboard retention, transshipment, landing, or storage of any part or whole carcass of mobulid rays, except in cases where sampling of individuals dead at

haulback is conducted as part of an IOTC-approved research project. CPCs must require all fishing vessels, other than those engaged in subsistence fisheries, to promptly release mobulid rays alive and unharmed, to the extent practicable, as soon as they are sighted in the net, on the hook, or on deck, and to do so in a manner that minimises harm to the individuals. The Resolution also calls for the reporting of data on interactions with mobulid rays (e.g., number of discards and releases) by vessels through fishers' logbooks or fisheries observer programmes.

IOTC Form 1DI supports mandatory reporting of mobulid discards, along with relevant metadata.

Resolution 23/06 *On the Conservation of Cetaceans (1 July 2024)*

This Resolution applies to all CPCs with longline and surface fisheries and requires that any unintentional encirclement of a cetacean in a purse seine net, or capture or entanglement in a gillnet, must be reported. The report should include information on the species, the number of individuals involved, a brief description of each interaction, the location of the encirclement or entanglement, the measures taken to ensure safe release, and an assessment of the animal's life status upon release, including whether it was released alive but subsequently died. Data may be collected through logbooks or observer programmes, and CPCs are also encouraged to use an Electronic Monitoring System (EMS) to enhance data collection as required by this Resolution.

IOTC Form 1IN supports mandatory reporting of interactions with endangered, threatened, and protected species, along with relevant reporting metadata.

Resolution 23/07 *On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries (1 July 2024)*

This Resolution applies to all CPCs with longline fisheries and calls for the reporting of interactions with seabirds (i.e., incidental bycatch) by species.

IOTC Form 1IN supports mandatory reporting of interactions with endangered, threatened, and protected species, along with relevant reporting metadata.

Resolution 25/08 *On the conservation of sharks caught in association with fisheries managed by IOTC (1 January 2026)*

This Resolution applies to CPCs with commercial tuna and tuna-like fisheries operating in the IOTC Area of Competence. It prohibits the onboard retention, transshipment, landing, or storage of any part or whole carcass of oceanic whitetip sharks, thresher sharks, and whale sharks. CPCs must require vessels flying their flag to promptly release these shark species alive and unharmed, to the extent practicable. The Resolution also requires CPCs to ensure that all sharks retained on board are fully utilised and that the practice of shark finning is strictly prohibited. In addition, CPCs must ensure that their longline vessels do not use branch lines running directly off longline floats or drop lines, known as shark lines.

In terms of reporting, CPCs shall ensure that all interactions with vulnerable shark species (including oceanic whitetip shark, silky shark, shortfin mako, and thresher sharks) and blue sharks are recorded and reported to the Secretariat. Both retained and discarded catches, as well as size-frequency data for all shark species, must be reported to the Secretariat in accordance with IOTC data reporting requirements and procedures established in Resolution 15/02.

IOTC Form 1IN supports mandatory reporting of interactions with endangered, threatened, and protected species, along with relevant metadata.

IOTC Forms 1RC, 1DI, 3CE, and 4SF support mandatory reporting of shark total retained catches, discards, geo-referenced catches and efforts, and geo-referenced size frequencies, respectively, along with relevant metadata.

Resolution 25/09 *On the conservation of shortfin and longfin mako sharks caught in association with IOTC fisheries (1 January 2026)*

This Resolution applies to all vessels flying the flag of a CPC and fishing for tuna and tuna-like species in the IOTC Area of Competence. CPCs must ensure that fishers record and report all catches, including dead discards and live releases of shortfin mako sharks, at species level and in accordance with Resolution 15/01. By 1 January 2028, CPCs that

reported annual average catches (landings and dead discards) of shortfin mako exceeding one tonne between 2020 and 2023 must present to the WPEB and the Scientific Committee the statistical methodology used to estimate dead discards and live releases. As part of their annual data submissions, CPCs shall also provide all relevant data for shortfin mako sharks, including estimates of dead discards and live releases, using the methods approved by the Scientific Committee.

IOTC Forms 1RC, 1DI, 3CE, and 4SF support mandatory reporting of shark total retained catches, discards, geo-referenced catches and efforts, and geo-referenced size frequencies, respectively, along with relevant metadata.

Improving Data-Related Resolutions

Several issues and potential enhancements to the data components of certain CMMs have been highlighted through IOTC meetings and CPC feedback. These were presented at the previous session of the WPDCS and are reiterated here, as they remain unresolved pending updates to Resolutions 15/01 and 15/02.

Terminology

Artisanal and industrial fisheries

Resolution 15/02 defines the three main categories of IOTC fisheries: longline, surface, and coastal. Coastal fisheries are those composed of fishing vessels not listed in the IOTC Record of Authorised Vessels (RAV; Res. 19/04), meaning they do not operate in areas beyond national jurisdiction (or high seas). The term 'coastal' therefore refers to the area of operation relative to the distance from shore, implicitly considering vessel size, which relates to engine power and onboard systems for fish preservation. Resolution 15/02 also specifies that 'coastal' is equivalent to 'artisanal' in IOTC terminology. Conversely, the term 'industrial' is commonly used within IOTC to refer to longline or surface fisheries, although it is not mentioned in any CMM.

The interchangeable use of ‘coastal’ and ‘artisanal’ has caused some confusion among the CPCs, as they technically refer to different concepts: 'coastal' primarily refers to the area of operation, while 'artisanal' describes a type of fishing scale or method. Some coastal fishing vessels, particularly in the context of sport fisheries, can be highly industrialised in terms of technology, despite being considered part of the artisanal category. By contrast, some older fishing vessels, such as traditional dhows from I.R. Iran, may operate on the high seas far from shore and defined as industrial, yet remain very artisanal in their methods of operation.

According to FAO, an artisanal fishery is a “*traditional fishery that involves fishing households (as opposed to commercial companies), using relatively small amounts of capital and energy, relatively small fishing vessels (if any), making short fishing trips close to shore, mainly for local consumption*” (FAO 2005). The concept of ‘artisanal’ therefore encompasses dimensions beyond the area of operation and removing the equivalence between 'coastal' and 'artisanal' would enhance understanding from the CPCs.

Artisanal fisheries are also commonly referred to as ‘small-scale fisheries’ (SSF), although no universal definition for describing SSFs (Smith and Basurto 2019; Kjellevold et al. 2022). To better describe the diversity of SSFs and artisanal fisheries catching tuna and tuna-like species in the Indian Ocean, the Secretariat has conducted some surveys with the CPCs based on the FAO fishery matrix (IOTC Secretariat 2022, 2023). An update of the work providing an overview of the spectrum of IOTC artisanal fisheries is available in IOTC-2024-WPDCS20-10.

Subsistence fisheries

Subsistence fishery refers to a fishery where the catch is consumed directly by the fishers' families, rather than being sold to intermediaries or at larger markets (FAO 1999). Resolution 19/03 explicitly references subsistence fisheries, noting that fishing vessels engaged in subsistence fishing are permitted to retain mobulid rays for consumption. Assessing the importance of subsistence fisheries in the IOTC is critical, as they provide a livelihood safety net, helping to alleviate poverty, malnutrition, and gender inequality among populations dependent on marine resources (Virdin et al. 2023). Their contribution to food security, alongside that of commercial small-scale fisheries in developing coastal States – particularly in small island developing State CPCs – has been discussed within the Technical Committee on Allocation Criteria (IOTC-2024-TCAC13-REF02). To address the current lack of information on IOTC subsistence

fisheries, the 'purpose' component of IOTC fisheries includes a code '*SUB' (Subsistence)* for cases where fish is caught exclusively for consumption by fishers and their households (see Fishery Purposes). Given that subsistence fisheries are generally not monitored or reported in fishery statistics (Macinko and Schumann 2007), estimating their catch magnitude and composition may require developing specific surveys at the national level. As some fisheries may serve both commercial and subsistence purposes, introducing a code '*SCO*' *(Subsistence-Commercial)* could be useful to reflect cases where these purposes are intertwined, indicating the fishery includes a subsistence component.

Data Collection

Paragraph 11 of Resolution 15/01 indicates that "*the data recording systems for vessels less than 24 metres of developing CPCs operating inside the EEZ shall be implemented progressively from 1 July 2016*". Since no timeline of implementation is set in the Resolution, it might be necessary to (i) review the status of the development and implementation of data recording systems for IOTC coastal fisheries and (ii) update the Resolution accordingly.

Data Resolution

Species resolution

Annex II of Resolution 15/01 provides a list of commonly caught elasmobranch species subject to the same data reporting obligations as the 16 IOTC species. However, the species list varies by gear type, despite monitoring and reporting being intended as gear independent. Data should be collected at the species level, when possible, but the Annex does not provide species-specific codes for mako sharks, hammerhead sharks, and thresher sharks. Finally, collecting data on large species groups of unknown composition such as 'other sharks', 'other bony fishes', 'seabirds', 'marine mammals', 'other rays', and 'marine turtles' is of limited scientific value.

Spatial Resolution

Resolution 15/02 lacks clarity regarding the spatial resolution to be applied when reporting size-frequency data for coastal fisheries. Paragraph 4c of the Resolution allows catch and effort data from coastal fisheries to be reported "*using an alternative geographical area if it better represents the fishery concerned*". By definition, this means that the lowest spatial resolution for data reporting corresponds to the National Jurisdiction Area (NJA) of the CPC coastal State as available from the reference layer Indian Ocean National Jurisdiction Areas. This is primarily due to the widespread lack of recording systems to collect information on fishing grounds for small fishing vessels, in contrast to longline and surface fisheries.

For geo-referenced size-frequency data, however, paragraph 5 of the Resolution initially states that "*Size data shall be provided for all gears and for all species according to paragraph 4*", implying that the same spatial resolution as catch and effort data should be applied. However, the paragraph further specifies that "*Length data by species, including the total number of fish measured, shall be submitted by a 5° grid area by month, by gear and fishing mode*", indicating that the spatial resolution of reporting should align with that of longline and surface fisheries.

There is a discrepancy between the spatial resolution of the IOTC ROS data collection forms designed at the operational level and the resolution specified in paragraph 19 of Resolution 25/06: "*The data referenced in paragraph 18 shall be provided by 1°x1° square and month. CPC shall endeavour to send these data in an electronic format suitable for automated data extraction*". The aggregation of the data is made for dissemination purpose according to Resolution 12/02 on Data Confidentiality policy and procedures while ROS data should be collected and reported at the operational level to the Secretariat.

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