INTER-AMERICAN TROPICAL TUNA COMMISSION

2nd WORKSHOP ON DATA IMPROVEMENT (C-03-05): PURSE-SEINE VESSELS ≤363 metric tons

(*by videoconference*)
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IDENTIFYING DATA SOURCES, GAPS AND INCENTIVES FOR IMPROVING DATA PROVISION: CLASS 1–5 PURSE-SEINE VESSELS

CONTENTS

EXECUTIVE SUMMARY

The Antigua Convention, which entered into force almost 15 years ago, has expanded the responsibilities

of the IATTC and the subsequent research and reporting required to fulfil them. Unfortunately, the established standards for data provision, pursuant to Resolution C-03-05 and its corresponding technical specifications, have not been updated accordingly, thereby making it difficult for the Commission and its staff to adequately and timely meet their obligations under the Convention, as well as its objectives and those of the five-year IATTC's Strategic Science Plans (the first and current one 2019–2023, IATTC-93-06a; the next one to be presented and adopted in 2025) as well as other future research activities. As an extension of IATTC's background document on data gaps for all gear types (SAC-12-09) and complementary to the 1st Workshop on Data Improvements focused on the industrial longline fishery (WSDAT-01-01, WSDAT-01-RPT, SAC-14 INF-Q), this document includes information on data sources and gaps for the small purse-seine fishery (i.e., vessels with a carrying capacity of ≤363 t; size classes 1–5). Additionally, it aims at highlighting potential means of improving data collection and their submission for the small purse-seine fishery through direct consultation with stakeholders in an open-ended participatory workshop setting. Staff considerations and recommendations are provided for improving logbook data, observer programs and reporting mechanisms for the small purse-seine fishery, primarily to improve data on species caught as bycatch, and seek feedback from participants on these during the workshop. The ultimate objective of the workshop is to review and revise these considerations and recommendations through a participatory approach to respond to a recommendation by the SAC (SAC-12-RPT), to hold a series of workshops, by gear type, on data provision and to ultimately update Resolution C-03-05 to align data reporting requirements with objectives of the Antigua Convention.

1. BACKGROUND

We briefly summarize the expansion of IATTC staff's research to better address the assessment of the tuna stocks and the broader ecological components of the Antigua Convention that require improved data provision for target and non-target species, with a focus on the small purse-seine fishery. However, we also encourage workshop participants to review SAC-12-09, for additional details related to all fisheries considered. In 2020, the staff reviewed IATTC's Resolutions related to data provision, primarily Resolution C-03-05—adopted over two decades ago—that forms the foundation of scientific research conducted by the staff as a basis for ensuring sustainable and responsible fisheries including through an ecosystem approach to fisheries management. This work was prompted by scientific drivers (e.g., technical challenges with the stock assessments of the tropical tuna species, see SAC-11-06; SAC-11-07; IATTC-95-05), political drivers (e.g., the growing awareness by the international community of the potential ecological impacts of fishing and tuna fisheries interactions with threatened or vulnerable species), market and conservation drivers (e.g., fishery improvement projects and certification), and fisheries drivers (e.g., increase in the number of FAD sets).

In 2023, the small purse-seine fishery included 57 vessels that fished in the eastern Pacific Ocean (EPO) from 5 CPCs and caught 46,536 metric tons (t) of skipjack tuna, 14,880 t of yellowfin tuna and 1,779 t of bigeye tuna. The major data challenges associated with the small purse-seine fishery are the limited information available on (1) the quantity (t) and sizes of discarded tunas, (2) animals caught incidentally (i.e., "bycatch"), both retained catches and discards, and (3) the lack of systematic and independent collection of data related to FAD activities undertaken by these vessels. Information on total catches, retained and discarded, as well as the use of FADs, are used for implementing tuna conservation measures (e.g., Resolution C-24-01). For example, these measures currently rely on vessel-specific annual catches for bigeye tuna (*Thunnus obesus*) whereby the status quo 72-day purse-seine fishery closure period may be extended for vessels that exceed certain annual catch thresholds in the previous year. Although discards of the target tuna species (1,788 t in 2023) are relatively low in the large purse-seine fishery (size Class 6, fish carrying capacity > 363 t) data (see Table A-2a, Fishery Status Report No.22), little is known on discards from the smaller purse seiners. Therefore, improving data reporting for the small purse-seine fishery by including discards offers a more complete data source.

Detailed data from purse seiners are needed not only to estimate catch and discards but also to provide indices of abundance for the target tuna species. Data on catch and effort of large purse seines fishing for tuna associated with dolphins has been used to build indices of adult abundance for the yellowfin stock assessment (Xu *et al.* 2019). Data on acoustic signals of electronic buoys, and FAD operations of purse seines associated with floating objects has been used to build indices of juvenile abundance for the three species (FAD-08-02).

Consistent with international instruments (e.g., the United Nations Convention on the Law of the Sea (UNCLOS), FAO's Code of Conduct for Responsible Fisheries and the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem), the Antigua Convention embodies an implicit commitment to incorporate an ecosystem approach to fisheries management (EAFM), more particularly in its Articles (e.g., Article IV 3; Article VII 1a,f, g; Article XV 3). The need to address ecosystem considerations and impacts the EPO tuna fisheries have on associated and dependent species has become more relevant because of these instruments and increasingly demanding external market and conservation drivers (e.g., eco-labeling and fishery certification) that requires greater demonstration of ecologically sustainable fisheries and implementation of the EAFM. In this respect too, undertaking the required ecological analyses to demonstrate sustainability has been hampered by the limited high-quality data on species caught as bycatch in the various fisheries, with limited to no data available for fisheries other than large purse-seine vessels (Class-6) that carry observers onboard.

Resolution C-03-05, and its corresponding technical specifications, governs the type of data pertaining to catches and effort to be submitted to the IATTC. Although the resolution implicitly refers to catches of all species, generally only landings of principal tuna and tuna-like species are reported. Catches of retained or discarded bycatch species are critical for improving the reliability of ecological assessments used to provide conservation and management advice to the Commission. But, currently, limited information on bycatch is reported to the IATTC for vessels other than large purse seiners (EB-02-01; Special Report 25). Despite recent progress on observer data from longline vessels (see e.g., SAC-15 INF-B) per Resolution C-19-08, which establishes a mandate of at least 5% observer coverage, these data have not been considered by the staff to be representative of the activities of the longline fleets. Observer coverage was deemed insufficient for estimating the total catch of the relatively data-rich yellowfin and bigeye tunas (BYC-10 INF-D). In contrast, trips made by large, Class 6 purse seiners, have been required to carry an onboard observer since 1993 (see the voluntary La Jolla Agreement which was replaced with the binding provisions of the Agreement on the International Dolphin Conservation Program (AIDCP)[1]), and therefore this observer dataset is the most comprehensive available for the fate of the catch (i.e., retained or discarded), including animals caught as bycatch, as well as for the activities on FADs. Observer coverage on small purse-seine vessels has been improving in recent years, primarily because of the voluntary Tuna Conservation Group (TUNACONS) program, a consortium of Ecuadorian tuna fishing companies established in 2018. In 2023, most trips (56%) made by small purse-seine vessels were unobserved. The trips that were observed were from the voluntary TUNACONS observer program (34% of trips), the Ecuadorian National observer program (6%), and the IATTC observer program (4%) (EB-02-01). However, the observer data from all programs, for vessel size Class < 6, covers a small spatial scale within the EPO Convention Area (e.g., in 2023 the small purse-seine fishery operated south of 5°N and east of 120°W) relative to the large purse-seine vessels, that operated throughout the Convention Area, and for which 100% of trips are observed (Figure 1 and see DAT-02-02).

[1] The Agreement for the International Dolphin Conservation Program (AIDCP) provides that all purse-seine vessels with a carrying capacity greater than 363 metric tons operating in the EPO shall carry an observer. The observer makes a comprehensive record of fishing operations.

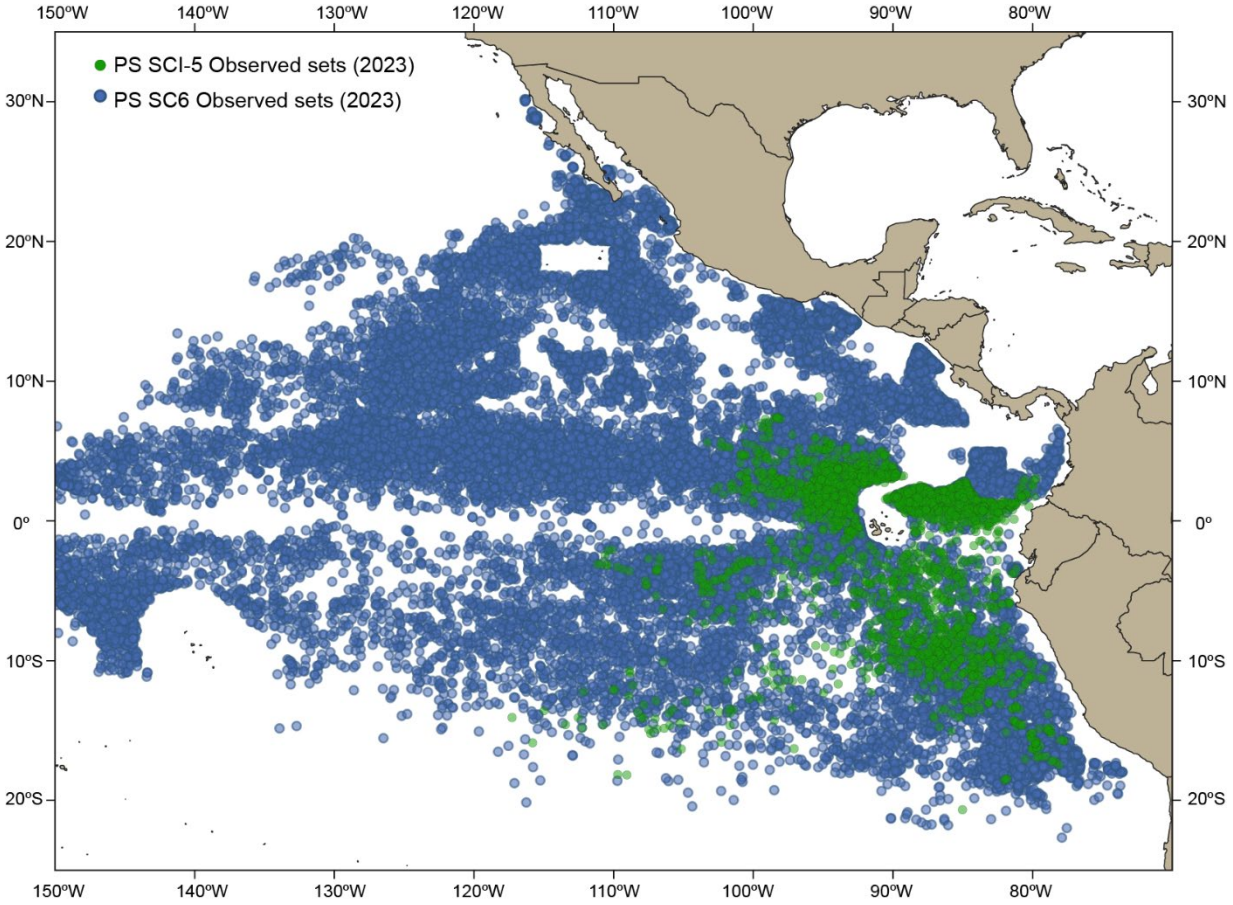

FIGURE 1. Observed purse-seine (PS) sets in 2023 for large (size Class 6, carrying capacity > 363 t, n = 25,590) and small (size Class <6, carrying capacity ≤ 363 t, n = 2,542) vessels.

As described in WSDAT-01-01 (section 2.2), IATTC's Ecosystem and Bycatch Program is tasked with identifying, prioritizing and conducting research to ensure the ecological sustainability of EPO tuna fisheries. Staff develop tools for data-poor species to assess ecological sustainability that can be used to guide the development and implementation of CMMs to fulfil the objectives of the EAFM. However, a major drawback frequently encountered by staff in developing reliable tools is the lack of spatially explicit, species-specific catches and other fisheries-related data (e.g., FADs) for fleets other than the large purse-seine fishery where 100% of trips are observed. These tools, at a minimum, require an accurate list of species that are caught by the various fisheries operating in the EPO (e.g., for the Ecological Assessment of Sustainable Impacts of Fisheries (EASI-Fish)), and retained and discarded catch estimates for these species (e.g., ecosystem models) as well as number of deployments, visits and sets on FADs (e.g., fleet behavior and indicator analyses). Outputs from these tools are subsequently used to identify and prioritize potentially vulnerable species and other FAD-related activities for data collection, research, and management. EASI-Fish is also used to simulate hypothetical CMMs, which in turn may be used to provide scientific advice to management bodies. Similarly, the staff's FAD research (e.g., see FAD-08-01) is used to provide scientific advice on FAD-related issues, including stock assessment and other ecological related matters (e.g., spatial management of FADs, mitigating FAD impacts). Another responsibility of the staff includes providing annual catch estimates for species caught as bycatch in the annual updates to the *Ecosystem Considerations* document provided to the SAC and/or the Ecosystem and Bycatch Working Group (EBWG) (e.g., see SAC-14-11, EB-02-01) and published in the *Fishery Status Reports* (e.g., see FSR No-22-2024). However, as with the data limitations to developing ecological tools—such as non-reporting of bycatch species by disposition, i.e., retained or discarded, or reporting bycatch as aggregated

taxonomic groups, e.g., "sharks"—the reliability of outcomes from these tools and the estimates of catches of bycatch species for routine reporting are compromised. Because compliance with Resolution C-03-05 in relation to bycatch species is generally poor, the staff's ability to fulfil its research and reporting obligations is impacted.

These limitations in data quality for bycatch may be a result of ambiguity in requirements for data provision on bycatch species in Resolution C-03-05. Improvements in the scope and quality of data are fundamental to the staff's ability to undertake scientifically defensible analyses from which management advice is based. Consequently, a staff recommendation was presented at the 14th and 15th meetings of the SAC in May 2023 and June 2024, respectively, to "*Establish a formal, non-voluntary, fleet-wide observer program for purse-seine vessels of less than 364 t carrying capacity, with a sampling coverage of at least 20%*" (SAC-14-14, SAC-15-13). To better address sampling coverage requirements for this fishery, detailed analyses are provided in a complementary document (DAT-02-02) to produce staff considerations for percent observer coverage and facilitate participant discussions at the workshop.

It is timely to collaborate with CPCs on means for improving data collection, submission and quality for the small purse-seine fishery—ideally through an expanded, non-voluntary observer program that collects samples that are representative of the metrics they are intended to monitor—to improve both stock and ecological assessments. This is particularly important for estimating total catches and other fisheries-related information used in these assessments. Of additional importance is to develop a standardized data-reporting system (e.g., Electronic Monitoring) for unobserved trips made by this fishery and other fisheries operating in the EPO.

1.1. Objectives of the Workshop

The objectives of the workshop are to respond to a recommendation by the SAC (SAC-12-RPT), to hold a series of workshops, by gear type, on data provision and to ultimately update Resolution C-03-05 to align data reporting requirements with objectives of the Antigua Convention, and to harmonize them with FAO and other tuna Regional Fisheries Management Organization's (t-RFMOs) as needed (SAC-12-16 see section B.3. "General Data Provisions"). This workshop focuses on the collection and provision of data by small purse-seine vessels (i.e., size Classes 1–5 with a carrying capacity ≤363 t), primarily to improve data reporting on tuna discards and retained and discarded bycatch as well as FAD-related activities.

This document details:

a) data sources and gaps in the available data for the small purse-seine fishery,

b) incentives for improving data reporting and data quality for both the target species and species caught as bycatch and other fisheries related data,

c) staff recommendations and considerations for improving data reporting (logbooks and observer programs) to be discussed during the workshop

d) potential future options for improving the data reporting process.

A complementary document (DAT-02-02) provides details on scientific analyses produced to evaluate representativeness of observer data from the small purse-seine fishery—similar to those analyses produced for the longline observer data in BYC-10 INF-D, as well as potential coverage levels to estimate catches of target and non-target species for the fleet.

2. DATA SOURCES AND GAPS

Data quality and quantity for the small purse-seine fishery, as with other fisheries (SAC-12-09, IATTC-102 INF-D), lags behind that of the purse-seine fishery of large vessels, for which there is 100% observer coverage and substantial port sampling. Set-by-set vessel logbook data, cannery unloading records and

port sampling are the primary sources of unobserved catch information for this fishery that are collected in a systematic manner, but oftentimes logbook data are the only source of information (SAC-08-06a). Although data sources on the small purse-seine fishery have been increasing in recent years (Table 1), the majority of these sources include little to no information on tuna discards, retained or discarded bycatch species or FAD-related activities (C-19-01).

2.1. Logbook data

The fisher-completed logbook data are collected by IATTC staff at various ports and include retained tuna catches by species and detailed information on fishing effort, which contain precise fishing positions, dates and times, and set type information for each set. Size data are not reported in the logbook data. Limited information on retained bycatch is available in the logbook or FAD form (C-19-01) data, but the quality and quantity of this information varies by CPC. For the small purse-seine fishery, four CPCs have provided detailed logbook data (Ecuador, Mexico, Colombia and Panama). Other CPCs that have small purse-seine vessels that fish in the EPO, typically do not provide detailed logs, but rather dates and catches from each trip. IATTC staff have developed standard forms and rules for the collection of logbook data.

2.2. Cannery data

Cannery unloading data are received by IATTC staff from various sources (i.e., directly from the cannery, from governments, from vessel owners, or from other sources). These data primarily consist of tuna, by species and weight (kg or t), unloaded from the vessel but includes only a broad geographic region of where the fish were caught (e.g., the EPO or western Pacific Ocean (WPO)), rather than the exact fishing position. Although Resolution C-24-01 requests that CPCs shall ensure that canneries will provide data for any fish in the IATTC Convention Area, information by trip is limited with information for 10% of trips provided for Class 4 purse-seine vessels and 17% of trips for Class 5 vessels in 2023 (see Table 1, SAC-15 INF-H). Canneries provide data in any format they choose resulting in variability in data provided (e.g., some include data on retained bycatch in weights (kg or t)—primarily Wahoo and Dorado—and others do not). Data are received by IATTC in a simplistic format (e.g., via email, Word, Excel, pdf document).

2.3. Port sampling data

Port sampling data (lengths and species counts) are obtained by sampling vessel wells and are used to estimate length frequencies and species composition for the tropical tunas with data stratified by 13 areas, month and set type (SAC-01-11). The port-sampling data pertains solely to retained (landed) catch primarily of the target tunas. Although most of the port sampling data comes from the large size Class 6 vessels, some trips made by the smaller purse-seine vessels are sampled for species composition and length frequencies. A standard IATTC form was developed for port sampling data.

2.4. Observer data

Observer data have been collected on large purse-seine vessels since 1979—primarily due to marine mammal involvement in the purse-seine fishery—to collect information on marine mammal sightings and interactions with the fishery, along with operational characteristics and target tuna catches (Joseph 1994, IATTC Special Report No 25). However, since small purse-seine vessels rarely make sets on, or in association with, marine mammals, because they do not have a dolphin mortality limit (DML), they rarely carry observers. Therefore, near real-time information from these small vessels (e.g., weekly catch reports while a vessel is at sea, submitted by IATTC Field Office staff) on retained and discarded catches is not available as for the large purse-seine fishery, but rather only available in the logbook data, which are received after the vessel has returned to port and unloaded the catch (SAC-08-06a).

In recent years, there has been an increase in the number of smaller vessels that have carried observers for varying reasons, such as abiding by AIDCP requirements to allow fishing during closure periods, a desire to obtain dolphin-safe fishery certification, participating in an IATTC pilot project trialing the efficacy of

electronic monitoring methodologies (SAC-11-11), participating in the TUNACONS voluntary observer program (EB-02-01), or if the vessel has sealed wells (Resolution C-12-08). To date, this limited observer data is the most comprehensive data source for the small purse-seine fishery. However, a formal, non-voluntary, observer program does not exist for these vessels. As a result, most trips on these vessels are unobserved (Table 2), and therefore, reliably quantifying the total catch, including discards, for the target tunas or bycatch has not been possible with the data sources currently available for the small purse-seine fishery (but see DAT-02-02).

Limited observer data are available for the small purse-seine fishery from four observer programs: the IATTC, Ecuadorian and Colombian National Programs and also from TUNACONS. Observers provide detailed data on tunas and bycatch including species-specific catches, disposition (i.e., retained and discarded), estimated size categories (i.e., small, medium, large) or measured sizes for taxa with dedicated observer forms (i.e., billfishes, turtles, sharks, rays) (see Appendices in IATTC Special Report 25). However, the data on discards for teleosts is highly uncertain due to the "Mixed" option (i.e., a combination of retained and discarded teleosts) on the Marine Fauna Record (MFR, see IATTC Special Report 25, Appendix A), and this uncertainty of discards applies to all size classes of purse-seine vessels with observers using the MFR (noting the observer forms are the same regardless of the size class of purse-seine vessels). The number of observed trips for the small purse-seine fishery has been low and has varied over time. The IATTC observer program began covering these vessels in 1986, although observed trips were sporadic until 2007, with <4% of all trips observed by the IATTC observer program over the time period. Because of this sporadic nature, we show the number and percentage of observed trips from 2007–2023 for each observer program (Table 2). Ecuador's National Program for small vessels began in 2005, with no data in 2006, and consistent but limited numbers of trips have been observed from 2007 to present. In 2017, 13% of all trips were observed by the Ecuadorian observer program, but otherwise <8% of trips were observed in the time series. The Colombian National Program remains sporadic with observed trips occurring in 2015–2016, 2019 and 2022, all of which covered <1% of all trips. The 'best' source of observer data for this fishery is from the TUNACONS data (2018–present) for which the number of observed trips has been increasing since its inception (~34% of all observed trips in 2023 were from the TUNACONS voluntary program, Table 2).

2.5. FAD and echosounder buoy data

Several Resolutions on FAD data collection have been adopted and amended since 2013, with some superseding others (see Resolutions C-13-04, C-15-03, C-16-01, C-18-05, C-19-01, C-23-04, C-23-05, C-24-06). As a result, self-reporting data on FADs for all purse-seine vessels began in 2015 with the implementation of Resolution C-13-04, although data received were limited and provided in an inconsistent format. With the implementation of Resolution C-18-05, a dedicated FAD form was designed to be used by skippers of purse-seine vessels fishing on FADs to improve data collection and reporting consistency and provide information on tunas and vulnerable species groups. In 2019 the Resolution was amended to require self-reporting, only for vessels without an observer, starting in 2020, because observers collect detailed information on bycatch. The FAD form also includes information on FAD details (e.g., manufacturer and model codes), descriptions of the type of FAD (e.g., natural FAD, FAD owned by vessel, anchored FAD), descriptions of the surface component of the FAD (i.e., raft, covering and floats), with each component possibly consisting of various materials (e.g., bamboo, palm leaves, plastic buoys) and activities on FADs. The FAD activities include the date and time of the activity, along with the position (latitude and longitude) and the type of activity (e.g., FAD deployment, a set on the FAD, or recovery of a FAD). The form includes space for reporting catches (tonnage) of tropical tunas (yellowfin, bigeye and skipjack) and catches (in number or tonnage) of bycatch taxa, including whether the bycatch taxa were released alive. However, bycatch data collected on the self-reporting FAD forms are of little use for

ecological assessments, because data are aggregated into broad taxonomic groups ("sharks", "turtles", "billfishes", "rays" or "other fish") and data quality is uncertain.

FADs with satellite-linked echosounder buoys attached provide information on the precise location of the FAD as well as the presence of fishes under the FAD, although discriminating species composition is not yet possible with echosounders (Fuller and Schaefer 2014). However, in combination with fisheries, species composition, and size composition data, echosounder buoy data from 2012–2023, have recently been used to provide preliminary abundance estimations for skipjack tuna in the EPO (FAD-08-02). Mandatory high-resolution buoy data, initiated in 2022, provides georeferenced and acoustic information. This data has proven invaluable for other scientific endeavors as well, such as the estimation and comparison of the lifespan and biomass aggregation patterns over time between conventional and biodegradable FADs (FAD-07-02).

2.6. Electronic monitoring data

Some electronic monitoring (EM) data are available from a pilot study conducted on purse-seine vessels in 2018 to explore options of electronic monitoring. Two small purse-seine vessels participated in the project (SAC-10-12; Project D.2a). EM data from these vessels' trips were compared with observer data onboard during the project. EM use is in its infancy in the EPO, but substantial progress has been made in terms of defining standards and requirements for implementation (SAC-11-10) and extensive collaborations from several workshops (WSEMS-01, WSEMS-02, WSEMS-03, WSEMS-04, WSEMS-05, WSEMS-06), and the *Ad Hoc* Working Group on Electronic Monitoring (WGEM-01, WGEM-02, WGEM-02b). Additionally, interim minimum standards for using EM in IATTC fisheries were adopted at the IATTC's 102nd meeting in 2024 (Resolution C-24-09). Information obtained from this data collection tool demonstrated the use of EM on unobserved small purse-seine vessels, as being capable of obtaining reliable EM data for small purse-seine fishing activities such as vessel activity, set information, catch, and discard information for target and non-target species, and for most of the data fields related to FADs. It is also expected to be helpful for providing a complementary tool to onboard observers and also for allowing onboard observers to perform other scientific sampling duties proposed by the staff (e.g., SAC-14 INF-J). Upon implementation of EM, high-resolution data on catches and discards of target and bycatch species obtained from this source will improve stock and ecological assessments used to provide management advice. However, some shortcomings of EM (e.g., extensive resources are required for reviewing EM data) are under consideration (e.g., potential use of Artificial Intelligence (AI), WSEMS-04 INF Pew-Project; Global Seafood Alliance) to improve efficiency in the data review. Even with EM's potential achievements, logbook and observer data will still be necessary for verifying human observer and EM data as well as for evaluating the necessary level of observer coverage.

2.7. Vessel monitoring systems

Reporting of Vessel Monitoring Systems (VMS) data to the IATTC secretariat commenced in 2023 (see Resolution C-21-04), but this data source only includes data on a vessel's identification, position (latitude and longitude), date/time, and speed and course. Note that Resolution C-24-01 requires VMS information to be provided only by vessels under IATTC capacity Classes 4 to 6 (182 metric tons carrying capacity or more) and that the recently amended Resolution on VMS (Resolution C-23-11) requires VMS equipment to be installed in all vessels above 24 m length overall. VMS information can be useful to derive proxies for fishing activities, although differentiation between set types (FAD vs unassociated sets) is still not possible.

3. INCENTIVES FOR IMPROVING DATA COLLECTION

3.1. Tropical tunas

The Commission adopted additional tuna conservation measures for the 2022–2024 triennia (Resolution

C-21-04) and extended these measures for years 2025–2026 (Resolution C-24-01). These measures are applicable to purse-seine vessels of size Classes 4–6 and longline vessels >24 meters length overall that fish for yellowfin, bigeye and skipjack tunas in the Convention Area. They also apply to smaller purse-seine vessels of size Classes 1–3 as related to the management of FADs. Information on total catches and information on FADs is required pursuant to this Resolution. Although the small purse-seine fishery does not have a substantial impact on the catches of tropical tunas relative to the large purse-seine fishery (e.g., 63,195 t compared to 665,670 t in 2023), any improvements to the tuna data will be positive. As previously mentioned, a data gap for the small purse-seine fishery related to the tunas is the lack of information on discards due to the limited observer coverage on this fleet segment (but note recent improvements in this data source with the establishment of the voluntary TUNACONS observer program, section 2.4). Considering data improvements (e.g., including tuna discards in the logbook data, establishing a non-voluntary observer program to capture information on retained and discarded tunas by size category) for the small purse-seine fishery will complement the tropical tuna catches by the large purse-seine fishery where 100% observer coverage is available, thereby providing a more complete data source for the entire purse-seine fishery.

3.2. Assessing ecosystem sustainability

The requirement of the Antigua Convention to ensure the sustainability of non-target species that are associated with, or dependent on, principal tuna species has resulted in the IATTC increasingly needing to demonstrate that the activities of tuna fisheries in the EPO are ecologically sustainable. Although staff have developed tools to facilitate the required research, such as developing ecological risk assessment methods (e.g., EASI-Fish) and the ETP ecosystem model, their utility has been greatly hindered owing to a lack of fundamental data for many EPO fisheries, (e.g., species lists and their disposition, operational characteristics of each fishery). As such, the staff have a limited capacity to identify and prioritize potentially vulnerable species for data collection, research, and management. Compliance with the provisions of Resolution C-03-05 in relation to bycatch species is generally poor, which significantly affects the staff's ability to fulfil its research and reporting obligations.

Animals caught as bycatch are sometimes included in the "TASK I" data of total annual catch summaries and the corresponding "TASK II" monthly aggregated catches, but there is significant uncertainty as to whether the IATTC receives all bycatch data (i.e., all retained and discarded catches, by species) from each CPC with data from small purse-seine vessels. This suspected partial reporting may be due to the language in Resolution C-03-05, which does not explicitly mention "non-target" or "bycatch" species. In contrast, the corresponding technical specifications on data provision explicitly mention these species. Consistency between these two documents (i.e., the Resolution and the technical specifications) should be further improved to avoid any possible confusion or hindrance in their implementation, including, through updating and revising of Resolution C-03-05 and associated species lists defined in the specifications. Arguably one of the most important issues is the reporting of bycatch by broad taxonomic groups (e.g., "sharks") instead of species-specific catches to improve ecological sustainability assessments and reporting. With the adoption of Resolution C-24-05 on conservation measures for the protection and sustainable management of sharks—including a list of 18 priority shark species for research and management (Annex 4)—it is timely to discuss updates to the data provision Resolution to clarify the species for which data shall be provided to the Commission.

3.2.1. EASI-Fish vulnerability assessments and hypothesis testing of CMMs

Ecological risk assessment (ERA) approaches have been employed by IATTC staff since 2010 as a tool to adapt to the data deficiencies of bycatch species and smaller fisheries, such as the small purse-seine fishery, to make progress in assessing ecological sustainability through the identification of potentially vulnerable bycatch species. Since the IATTC staff's development of EASI-Fish in 2017 (SAC-09-12), quantitative vulnerability assessments of the cumulative impacts of all EPO fisheries have been conducted

on several data-poor species including the spinetail devil ray (*Mobula mobular*) (BYC-09-01), the critically endangered eastern Pacific leatherback turtle stock (BYC-10 INF-B), all shark species caught in EPO pelagic fisheries (SAC-13-11) and silky and hammerhead sharks (SAC-14-12). In some of these studies, several different CMMs were simulated to assess their potential efficacy in reducing a species' vulnerability (e.g., see SAC-14-12). While the fishery of small purse-seine vessels was included in these assessments, a lack of fishery-specific information required this fishery to be assigned the same characteristics as the data-rich purse-seine fishery by Class 6 vessels. Although this was considered a precautionary approach in the absence of reliable information, it is possible that the estimated impacts of the small purse-seine fishery were overestimated, primarily as a result of encounterability and size selectivity ogives that may not represent the size and depth of the net that differ to those of the Class 6 vessels. The outcomes of EASI-Fish assessments—as well as conventional stock assessment models—are strongly influenced by assumptions of the size selectivity of a fishery's gear since it directly affects estimates of fishing mortality at length or age. Therefore, it is important to have available data from each fishery from which selectivity ogives can be developed.

3.2.2. Ecosystem models

Ecosystem models are another tool used by IATTC staff to advance elements of EAFM. These models are required to detect changes in the structure and internal dynamics of an ecosystem but are generally data and labor-intensive to construct. A good understanding of ecosystem components and the direction and magnitude of the trophic flows between them is essential for developing an ecosystem model. Consequently, detailed ecological studies involving stomach contents and/or stable isotope studies are needed in addition to total retained and discarded catches by fishery (e.g., purse seine and longline) and functional group (e.g., grouping species based on preferred habitat, diet or ontogeny). Seven ecological indicators are produced from an ecosystem model of the eastern tropical Pacific Ocean on a near annual basis (e.g., see EB-02-01). Ecosystem models allow for hypothesis testing of the effects of fisheries and climate change on an ecosystem. For example, potential impacts of increased fishing effort on purse-seine floating object sets were explored in SAC-12-13. However, the main shortcomings of the ETP ecosystem model include (1) outdated stomach contents data and (2) limited to no information on catches of bycatch species and their disposition (i.e., retained or discarded) for gears other than large purse seine.

3.3. Morphometric relationships

As this section on data deficiencies in biological sampling pertains to all fisheries operating in the EPO and the SAC recommended to hold a series of workshops by fishery to improve data provision (SAC-12-16 see section B.3. "General Data Provisions"), the text here is included to acknowledge a data gap. It is recognized that the small purse-seine fishery might not directly facilitate data improvements on morphometric relationships but rather proposed projects (e.g., Project F.3.a) will likely be needed to close this gap. Therefore, this section is included for information purposes only.

Length-weight (L-W) relationships and conversion factors (e.g., processed to total weight) vary spatially and temporally depending on biological, environmental, and gear-selectivity factors (i.e., due to size-related differences in catches by gear with e.g., purse-seine fisheries catching, on average, smaller fish than longline fisheries). This variability can influence both stock and ecological assessments (e.g., EASI-Fish), as well as catch estimations, and if ignored, increase uncertainty in these analyses. L-W relationships are used to convert catch in numbers to weights and vice versa. Use of imprecise and/or outdated relationships contribute to biased estimations.

Tuna catches are reported in metric tons. Size composition data are often recorded in weight and converted to length and therefore rely on the accuracy of the L-W relationship. L-W relationships for tunas are grossly outdated (e.g., yellowfin: 1986, bigeye: 1966 and skipjack: 1959). Recently participants in the external review of data used in stock assessments of tropical tuna acknowledged the need to prioritize

updating these relationships (RVDTT-01-RPT). Consequently, at the 102nd meeting of the IATTC, the Commission approved the initiation of morphometric sampling of tunas within the framework of the enhanced monitoring program (EMP) and described in SAC-15 INF-H—currently focused on the large purse-seine fishery—and staff are in the process of implementing sampling designs in the ports of Mazatlán, Mexico, and Manta, Ecuador.

Taxa caught as bycatch, are primarily reported by observers in numbers of individuals (see IATTC Special Report 25). The dedicated species forms for sharks (2004), billfishes (2006) and rays (2016), used by observers in the purse-seine fishery allow observers to record lengths of individuals at sea. These lengths are used to determine weights using a conversion formula for the species to facilitate reporting of bycatch in weights (see e.g., EB-02-01). The process for converting catch in numbers to weights is described in IATTC Special Report 25. The observer data therefore provides the most comprehensive size data for bycatch taxa with associated dedicated observer forms.

For other, non-observed data, alternative weight metrics may be reported, depending on the type of processing used when the fish are landed. For example, the Areas Beyond National Jurisdiction (ABNJ) program for improving data collection for artisanal shark fisheries in Central American EPO States was recently completed. Sharks landed by artisanal fisheries along the Central American coast were landed along a range of whole animals to highly processed trunks, therefore requiring conversion factors to convert processed weights to whole shark weights. Consequently, estimates of shark catches were deemed sensitive to uncertainty in several parameters, including these conversion factors (SAC-11-15, SAC-14 INF-L).

Different stocks or sub-stocks of the same species may also have different relationships. Evidence of structure in EPO stocks of tuna species has been shown from extensive tagging studies, meristic and morphometric analyses, and genetic work. Future assessments will account for stock structure and any differences in relationships should be included. Inclusion of length type (e.g., fork length: fishes, total length: sharks; lower-jaw fork length: billfishes), weight type (e.g., whole weight, trunk weight), length and weight units (e.g., cm, kg, respectively), and any conversion methodology used (e.g., L-W or W-W relationship and corresponding types and units) in the reporting of data from the small purse-seine fishery—as with other EPO fisheries—will contribute to improvements in both stock assessments and ecological assessments, including improvements to catch estimations (e.g., SAC-14-03, SAC-14-11, SAC-14 INF-L) and for setting and implementing tuna conservation measures (Resolutions C-21-04 and C-24-01). Consequently, the staff have initiated a new project proposal (F.3.a) to conduct a feasibility study to develop a sampling program for updating morphometric relationships and collecting biological samples for priority species in EPO tuna fisheries (SAC-14 INF-J). This project remains unfunded in 2025, but the EMP program and the ABNJ-2 program may potentially facilitate feasibility studies to opportunistically sample priority bycatch species (e.g., sharks, rays) for length and weight measurements when rarely encountered in ports.

3.4. MSC certification and Fishery Improvement Projects (FIPs)

A political driver for improving data collection includes increasing global awareness of the ecological impacts of fishing, particularly on threatened and vulnerable species, and the need to support and operationalize EAFM. To address ecological concerns and sustainability, fisheries and non-governmental organizations have been moving towards ecolabeling and certification to promote sustainable seafood. Several tuna and tuna-like fisheries in the EPO have engaged in Fishery Improvement Projects (FIPs) and/or have been granted, or are pursuing, MSC (Marine Stewardship Council) certification for sustainable fisheries. MSC certification is granted by independent bodies that assess the fisheries against the MSC standards. The standards are centered on three principles: Principle 1 "*Sustainable fish stocks*" analyzes the target stock, Principle 2 "*Minimizing environmental impact*" analyzes the impact of the fishery on non-target species and the ecosystem, and Principle 3 "*Effective fisheries management*" analyzes the

governance system. Good quality fisheries monitoring, estimation of stock status and estimation of impact on bycatch species are central to achieving high scores on the standards. A criterion for MSC certified fisheries includes demonstration that the fishery has independent observation of catches (e.g., through an observer program or through electronic monitoring). The MSC's "*Evidence Requirements Framework project*", with external review that commenced in 2024, states that fisheries that interact with Endangered, Threatened and Protected and Out-of-Scope Species, are required to have independent observation that covers at least 30% of annual fishing operations, if the fishery is managed by an RFMO and the fishery operates on the high seas (MSC 2024). Currently, there are five species of tuna in the EPO that are MSC certified (North Pacific albacore, South Pacific albacore, skipjack, bigeye and yellowfin (see Table 3a). The analysis conducted in DAT-02-02 provides further support that rates of at least 30% are likely needed to accurately estimate total catches of many species.

In addition to the MSC certified fisheries, there are several Fishery Improvement Projects active in the EPO (see Table 3b). Comprehensive FIPs have an end-goal of achieving MSC certification across all of the above-mentioned Principles, while basic FIPs are working towards a subset of improvements.

3.5. FAD spatial management

As mentioned above, limited FAD activity data are available for small purse seiners, which self-report FAD forms for unobserved trips and provide high resolution satellite echosounder buoy data to the IATTC via Resolutions C-19-01 and C-24-01, respectively. The representativeness and quality of the information reported in the FAD form remain unknown, including locations of FAD deployments and other related activities (e.g., visits, retrievals, redeployments), and limited independent observer data exist to validate these. Recently, the IATTC (C-24-06) has encouraged the development of programs that would reduce the impacts of stranding and lost and abandoned FADs, including FAD recovery programs in the high seas or closer to the coast, and other spatial management options that would assess and mitigate the spatial temporal risk of FAD activities in the EPO (e.g., risk maps of deployment locations, identification of hotspots and FAD passages, areas with better deployment to set ratios). Developing such options would require a better understanding of FAD trajectories and the FAD activities conducted by all purse seiners, including Class 1–5 vessels. Unfortunately, independent, validated information on such FAD activities is still lacking for this fleet component.

4. FISHERY STATISTICS REQUESTED BY OTHER T-RFMOS

An important component of these data improvement workshops is to initiate discussions to harmonize data collection and submission processes to make data reporting easier for CPCs. As part of this process, staff have compiled Table 4, detailing fisheries statistics—with a focus on purse-seine gear—and links to each t-RFMO's data requirements to facilitate review and guide discussions on potential improvements to data collection during the workshop. Additionally, data reporting mechanisms for each of the t-RFMOs are provided in section 6.

5. SMALL PURSE-SEINE DATA PROVISION: STAFF RECOMMENDATIONS

Based on the rationale presented above and in DAT-02-02, the staff puts forward the following recommendations for data provision related to the small purse-seine fishery. The staff will seek discussion and to receive feedback on these recommendations and considerations during the workshop.

RECOMMENDATIONS:

1. Logbook data:

(a) For the target tuna species: In addition to already reported species composition data for the retained catches in the set-by-set logbook data, also report the species composition of the discarded catches.

(b) For other species (non-target): Where available, report species composition data for the retained and discarded catches in the set-by-set logbook data (in numbers of individuals) (species in Tables 5a and 5b).

2. Observer data:

(a) Establish a non-voluntary, fleet-wide observer program for small purse-seine vessels of less than 364 t carrying capacity that mimics the Class 6 observer program, to the extent possible, including but not limited to catch, disposition (e.g., retained, discarded) and fate (e.g., released alive, released injured, dead) in numbers of individuals, and length composition data on animals caught as target and bycatch.

(b) Ensure that the observer program is representative of the Class 1–5 fishing grounds and time periods (or other definitions of representativeness as appropriate for program objectives). Coverage may include human observers and/or electronic monitoring systems (EMS), following implementation of EMS minimum standards defined in Resolution C-24-09.

(c) The Commission defines the objective precision level of the total catch for key bycatch species (common and rare), based on the analyses presented in DAT-02-02.

Considerations

(d) For example, to maintain mean absolute percent error rates in total catch at a reasonable arbitrary level of 25% or less for common bycatch species, (e.g., common dolphinfish, silky shark), a representative 30–40% observer coverage (human or electronic) is needed (see DAT-02-02 for details and definitions of "representative").

(e) For example, to maintain mean absolute percent error rates in total catch at a reasonable arbitrary level of 25% or less for rare, key bycatch species (e.g., oceanic whitetip shark, hammerhead sharks, thresher sharks, mobulid rays), a minimum of representative 80% observer coverage (human or electronic) is needed (see DAT-02-02 for details and definitions of "representative").

6. OPTIONS FOR DATA REPORTING MECHANISMS

In this section, we describe potential options for submitting improved purse-seine data to the IATTC, using current methods employed by IATTC and the other t-RFMOs and recommend potential future tools for improved data reporting mechanisms, which are intended to be discussed among participants during the workshop to determine feasibility.

6.1. IATTC current data submission mechanisms

6.1.1. Observer data

As observer data are the most comprehensive in terms of information on bycatch, data submission mechanisms for this data source are discussed first despite limited observer coverage on the small purse-seine vessels. The observer forms filled out by observers onboard large, size Class 6 purse-seine vessels are the same forms filled out by observers onboard the smaller purse-seine vessels. These forms include the Flotsam Information Record (FIR, last modified in 2019) and the Marine Fauna Record (MFR) that was introduced in 1993 and has since been modified to include catch data for tunas, fishes, seabirds, invertebrates and other fauna due to the introduction of dedicated taxa-specific observer forms (see Appendix A: IATTC Special Report 25). Dedicated forms have been developed for recording catches, fates and sizes of sea turtles (2001; Appendix B), sharks (2004; Appendix C), billfishes (2006; Appendix D), and

rays (2016; Appendix E) as well as additional information on marine mammals (via a Marine Mammal Sighting and Set Record Appendix F) (IATTC Special Report 25). These observer forms are processed using an intensive quality control procedure described in IATTC Special Report 25, section 7.8 Data processing.

6.1.2. Logbook data

Logbook data for the purse-seine fishery are collected by IATTC staff directly from the majority of purse-seine vessels that fish for tuna in the Convention Area (Resolution C-03-05 and corresponding technical specifications). Either captain's or navigator's logs are provided to the IATTC field office staff and staff review, process and keypunch the data.

6.1.3. Cannery (unloading) data

Much like the industrial longline data (see WSDAT-01-01, section 6.1. IATTC current data submission mechanisms), the IATTC receives cannery data from various sources (see section 2.2). Each CPC submits data in a format they design either in an email, pdf, Word or Excel document. As discussed in WSDAT-01-01, flexibility is an advantage to this approach whereby each CPC does not have to conform to a specific template. The staff review, process and keypunch the data. An observed disadvantage to this approach is inconsistent quality and consistency of data.

6.1.4. Port sampling data

IATTC field office staff directly collects port sampling data (species and size composition data) using a standard IATTC form.

6.2. WCPFC current data submission mechanisms

WCPFC14 Summary Report Attachment T provides reporting standards, specifications, and procedures for electronic reporting. Data are provided to WCPFC in one of the following file types: Microsoft Excel file; Comma separated values (CSV) text file; Text file (TAB delimited); text file (no delimiters); XML; JSON; NAF (see page 4: electronic formatting specifications). E-Reporting Apps are also available and used to obtain purse-seine logbook data managed through the integrated Fisheries Information Management System (iFIMS), which uses a Web-based platform in combination with an Android App for industry to enter and electronically submit data (WCPFC-SC10-2014/ ST-WP-07).

6.3. IOTC current data submission mechanisms

Data for, "*vessels over 24 meters length overall and those under 24 meters if they fish outside the EEZs of their flag States within the IOTC area of competence*" are collected by fishers with bound paper or electronic logbooks and data entry tools—the smaller vessels are subject to special conditions provided in the IOTC Resolution 15/01 paragraphs 11 and 12 to facilitate capacity building and implementation of the Resolution for these smaller vessels from developing countries. Data are then submitted to the IOTC Secretariat by email using IOTC's set of standardized Excel forms related to the different data types (see IOTC column in Table 4). For example, estimates of total annual retained catches in live weight by IOTC Area, species and type of fishery (Form 1RC), estimates of discard levels (dead individuals) in live weight (or number) by IOTC Area, species and type of fishery (Form 1DI), binary matrix of annual records of retained catches or discards by species and fishery group (Form 1DR), total annual number of fishing crafts operated by type of fishery, type of craft and craft size (Form 2FC), catch by species in number or live weight and effort in number of sets (or other effort unit options defined in Form 3CE) by 1° grid area, month strata and purse-seine fishing mode (e.g., free-swimming school), and length/weight data by species, type of fishery (i.e., gear type) and fishing mode (e.g., purse-seine free-swimming schools) and 5° grid area and month strata (Form 4SF; IOTC Resolution 10/02). All of these IOTC forms may be downloaded here.

6.4. ICCAT current data submission mechanisms

Similar to IOTC, ICCAT also has a set of standardized Excel fixed-field forms for users to fill in. Each Excel form is specific to the type of data to be collected and submitted (see ICCAT column in Table 4). For example, ICCAT has a dedicated form for nominal annual catch of tuna, tuna-like species and sharks by region, gear, flag and species (Form ST02-T1NC), fleet characteristics (Form ST01-T1FC), catch and effort statistics by area, gear, flag, species and by month (Form ST03-T2CE), and size frequency data (Form ST04-T2SZ, ST05-T2CS).

6.5. Potential options and future tools for submitting data to IATTC

The IATTC staff would like to discuss the following options for CPCs to submit data with the idea of easing the reporting process of CPCs at the forefront of each of these options in the near future. For the longer-term option of online forms and e-reporting apps, the workflow would be automatized and with stricter data quality controls in place. Any update to the forms would be also synchronized automatically on devices. This option is obviously more complex in nature due to the higher investments in time and resources as much thought will be required to implement a web API associated with adequate data-entry devices to facilitate data collection.

Option 1: The IATTC staff develop standards, guidelines and templates for mandatory data fields, to allow CPCs to submit data in their preferred format (e.g., CSV, XLS) as long as they follow these templates for unobserved purse-seine sets.

Option 2: The IATTC staff develop default, fixed-field digital templates available in Excel to ease CPCs workflow.

Option 3: The IATTC staff develop online forms and e-reporting apps, in the longer-term as reporting frequency increases.

RECOMMENDATION:

Any revisions to Resolution C-03-05 and/or the corresponding technical specifications or a new Resolution related to data provision should include a default template (e.g., in Excel) or at a minimum the mandatory data fields to be provided.

7. REFERENCES

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Xu, H., C.E. Lennert-Cody, M.N. Maunder, and C.V. Minte-Vera. 2019. Spatiotemporal dynamics of the dolphin-associated purse-seine fishery for yellowfin tuna (Thunnus albacares) in the eastern Pacific Ocean. Fisheries Research 213: 121-131.

TABLE 1. Available data sources for small purse-seine (PS) vessels (i.e., ≤364 t fish carrying capacity, size Class <6). NP: National Program

Data source	Description	Temporal extent	Spatial extent	Taxa
Observer data	Small PS vessels are not required to carry onboard observers except under special circumstances[1]; most trips are unobserved	1986–present (temporal extent for each observer program below)	primarily east of 120°W and south of 10°N	Tunas; detailed information on bycatch
TUNACONS	Voluntary observer program for small PS vessels; established by the Tuna Conservation Group—a consortium of Ecuadorian tuna fishing companies; 34% of all observed trips in 2023 were from TunaCons trips	2018–present		
Ecuador NP	Ecuadorian National Program (NP) observer data; 6% of all observed trips in 2023 were from this NP	2005–present		
IATTC NP	IATTC National Program (NP) observer data; 4% of all observed trips in 2023	1986–present		
Colombian NP	Colombian National Program (NP) observer data; No observed trips in 2023	sporadic (2015–2016; 2019; 2022)		
Vessel logbook records	Provided by 4 CPCs; day-by-day set data are provided (i.e., positions for days in which sets were made. Either navigator's or captain's logs are provided to the field offices and field office staff key punch the data	1959–present	Between ~25°N and 20°S and east of ~115W	Tunas (t); little to no bycatch. If species other than tunas are retained, the log includes a place to record this information. When bycatch are included in logs, the field office staff will include this data.
Cannery unloading records	Total catch (t) provided by canneries to the IATTC. Cannery data only applies to the top 4 countries providing logs	1959–present	Cannery data includes only a general area and not an exact catch location (e.g., EPO).	Tunas (t); little to no bycatch. Size categories are provided for SKJ, BET, YFT, ALB but the size categories (weights in kg) are different for each cannery; size categories are also dependent on the species. Any cannery data is only for animals retained and unloaded at the cannery.
Port sampling records	Sampling includes obtaining length frequencies and species composition data for the tropical tunas.	2000–present but see SAC-01-11 for references to historical sampling protocols; length frequency data collection began in 1955	PS wells are sampled and stratified by 13 EPO fishing areas, month and fishing mode (e.g., set type) - see SAC-01-11. Includes a general area (e.g., EPO and not an exact catch location)	Tunas: size categories in kg (size categories differ by CPC and can include up to 13 size categories). Port sampling data includes weights by species.
FAD form	Uncertainty in data quality	late 2018–present		Tunas; sensitive species aggregated into broad groups (e.g., "sharks", "turtles")
Summarized buoy data	Data reported under C-21-04. Unknown methods for aggregating the data (number of active FADs per vessel and day, number of active FADs for each 1 degree cell and month).	2018–2021	EPO	None
High-resolution buoy data	Data reported under C-24-01. Raw satellite echosounder buoy data, containing high resolution location, speed, date and time information, as well as biomass data.	2022–present	EPO	Proxy for tuna biomass
Electronic monitoring data	Pilot study, comparison of the capabilities of the human vs electronic observers			Tunas; bycatch
VMS	Data reported under C-21-04 and C-24-01. Information on vessel ID, location, speed, and course reported.	starting in 2023	EPO	None

TABLE 2. Number of unobserved and observed trips for small purse-seine vessels by observer program and the voluntary Tuna Conservation Group (TUNACONS). Percentages in parenthesis. Sporadic observer coverage from IATTC since 1986 with consistent, but limited, observed trips from 2007–present.

Year	Unobserved trips	Colombia	Ecuador	IATTC	TUNACONS	Total Number Trips
2007	489 (98.8)		2 (0.4)	4 (0.8)		495
2008	545 (98.7)		2 (0.4)	5 (0.9)		552
2009	494 (97.6)		10 (2.0)	2 (0.4)		506
2010	360 (97.3)		7 (1.9)	3 (0.8)		370
2011	432 (98.2)		4 (0.9)	4 (0.9)		440
2012	403 (96.9)		6 (1.4)	7 (1.7)		416
2013	421 (95.5)		5 (1.1)	15 (3.4)		441
2014	444 (96.3)		10 (2.2)	7 (1.5)		461
2015	464 (96.3)	1 (0.2)	5 (1.0)	12 (2.5)		482
2016	393 (90.6)	2 (0.5)	25 (5.8)	14 (3.2)		434
2017	446 (84.5)		69 (13.1)	13 (2.5)		528
2018	474 (86.3)		45 (8.2)	16 (2.9)	14 (2.6)	546
2019	404 (78.1)	1 (0.2)	29 (5.6)	20 (3.9)	63 (12.2)	517
2020	327 (77.3)		19 (4.5)	8 (1.9)	70 (16.5)	424
2021	259 (73.0)		22 (6.2)	6 (1.7)	68 (19.2)	355
2022	252 (65.8)	2 (0.5)	20 (5.2)	6 (1.6)	103 (26.9)	383
2023	205 (56.0)		23 (6.3)	13 (3.6)	125 (34.2)	366

TABLE 3. (a) Marine Stewardship Council (MSC) certified tuna fisheries in the Eastern Pacific Ocean (EPO) and (b) active Fishery Improvement Projects in the EPO.

a.

Fishery	Albacore	Bigeye	Yellowfin	Skipjack
AGAC four oceans Integral Purse Seine Tropical Tuna Fishery		x	x	x
Atún Sostenible EPO Panamá Tuna Fishery			x	x
Canada Highly Migratory Species Foundation (CHMSF) British Columbia Albacore Tuna North Pacific	x			
AAFA and WFOA North Pacific albacore tuna	x			
AAFA and WFOA South Pacific albacore tuna	x			
Eastern Pacific Ocean tropical tuna - purse seine (TUNACONS) fishery		x	x	x
Eastern Pacific Ecuador Purse Seine Tropical Tuna Fishery (FSC and FAD set fishery)			x	x
Hawaii longline swordfish, bigeye and yellowfin tuna fishery				x

b.

Fishery	Albacore	Bigeye	Yellowfin	Skipjack	Mahi mahi
Eastern Pacific Ocean tuna – purse seine (Messinia G)		x	x	x	
Mexico Oaxaca artisanal skipjack and black skipjack tuna - handline				x	
Pacific Ocean tuna (longline, Multiple companies)	x	x	x	x	
Panama Pacific mahi-mahi and yellowfin tuna - longline			x		x

TABLE 4. Comparison of the types of statistical data required by each tuna Regional Fishery Management Organization (t-RFMO), with links to corresponding documents detailing data requirements and submission. PS: Purse seine.

		Data Provision Requirements			
Type of Data	**Description of Data**	**IATTC**	**WCPFC**	**IOTC**	**ICCAT**
TASK I Annual Catches	Annual catch statistics	*Gross annual removals (round weight of all fish caught or killed during fishing operations) and disposition (retained or discarded) of tuna and tuna-like species and other species taken in fisheries which capture tuna and tuna-like species in the Antigua Convention Area. If the data provided are nominal catches (round weight of retained catch when there is no information on discards), please note this when providing the data. These catch data should be reported as round weight, in metric tons or in kilograms, by species, by year, gear and disposition (retained or discarded). If the round weights are estimated by conversion from processed or sampled weights or measurements, or by some other means, the method and the sample data used to obtain the estimates should be provided.* [see Tables 1&2 in IATTC's technical specifications for species lists]	*The following estimates of catches during each calendar year shall be provided to the Commission for each gear type: catches of bigeye tuna, skipjack tuna, yellowfin tuna, blue marlin, black marlin, shortbill spearfish and sailfish in: 1) the WCPFC Statistical Area (see paragraph #8), and 2) the portion of the WCPFC Statistical Area east of the 150° meridian of west longitude; catches of albacore, striped marlin, swordfish, Pacific bluefin tuna, thresher sharks, blue shark and mako sharks in: 1) the Pacific Ocean south of the Equator, 2) the Pacific Ocean north of the Equator, 3) the WCPFC Statistical Area north of the Equator, 4) the WCPFC Statistical Area south of the Equator, and 5) the portion of the WCPFC Statistical Area east of the 150° meridian of west longitude; and blue shark, silky shark, oceanic whitetip shark, thresher sharks, mako sharks, porbeagle shark (south of 20°S, until biological data shows this or another geographic limit to be appropriate), hammerhead sharks (winghead, scalloped, great, and smooth), and whale shark in the WCPFC Statistical Area (see paragraph number 8). Estimates of discards/releases shall also be provided for each species listed above. Catch estimates shall also be provided for other species as determined by the Commission. All catch estimates shall be reported in metric tonnes.*	*Amount of fish caught and retained: Total annual estimates of the amount of fish caught and retained by fishing fleet, fishery, IOTC main area, retain reason, and species. Estimates of retained catches in live weight equivalent (metric tonnes; t) for the IOTC species, common sharks, and other bycatch species.* *Amount of discards: Total annual estimates of the amount of fish caught and discarded by fishing fleet, fishery, IOTC main area, species, and condition. Estimates of discards in numbers or live weight equivalent for the IOTC species, mobulid rays, whale sharks, cetaceans, common sharks, and other bycatch species.* *Interactions with Endangered, Threatened and Protected Species: Annual estimates of the numbers of interactions of longline fisheries and surface fisheries with endangered, threatened, and protected species by fishing fleet, fishery, IOTC main area, and species group. Number of interactions with marine turtles, seabirds, mobulid rays, cetaceans, and whale sharks, with information on national legislation in place in the case of cetaceans and whale sharks.* *[https://iotc.org/sites/default/files/documents/compliance/cmm/iotc_cmm_15-02_en.pdf]*	*Task I nominal catches: Yearly (calendar) total catch estimates in live weight (kg) (landings, dead discards, live discards, BFT alive catches transferred to farms) disaggregated by fleet, species, year, gear, sampling areas, and fishing zone. Should contain all catches (targeted, non-target/bycatch) including the ones from recreational/sport fisheries, research and training vessels. "ZERO" catches should be explicitly reported in subform ST02B.* *see List of datasets requested by form pg 4*

		Data Provision Requirements			
Type of Data	**Description of Data**	**IATTC**	**WCPFC**	**IOTC**	**ICCAT**
TASK I Effort	Annual effort statistics	*Fishing power (fleet) statistics. The number of fishing vessels, by gear, operating in the Antigua Convention Area in each calendar year should be reported.*	*The number of vessels active in the WCPFC Statistical Area during each calendar year shall be provided to the Commission for each gear type. For purse seiners, the number of vessels active shall be provided by gross registered tonnage (GRT) class. The GRT classes are defined as follows: 0–500, 501–1000, 1001–1500, 1500+*	*Fishing craft statistics: Annual number of active fishing vessels by gear, boat type, size class, and fish preservation method. Estimates of the numbers of fishery vessels active during the year, stratified by boat type, mechanisation type, fish preservation method, and refrigeration storage system.*	*Task I Fleet characteristics: Fleet characteristics of the active fleet (by vessel OR by fleet component) in the Atlantic Ocean and Mediterranean Sea by calendar year. Applies only to fishing vessels with positive fishing effort (actively fishing) and fishing for any of the ICCAT species in the Convention area. see List of datasets requested by form pg 4*
TASK II Catch & Effort	Catch and effort statistics by area, gear, and species	*Gross removals and disposition (retained or discarded) for each species, and the associated fishing effort, should be reported at the finest possible level of resolution, in metric tons or in kilograms. If the data provided are nominal catches, please note this when providing the data. If the round weights are estimated by conversion from processed or sampled weights or measurements, or by some other means, the method and the sample data used to obtain the estimates should be provided. Level 1. Operational (logbook) data: The IATTC staff collects operational data directly from the majority of purse-seine (PS) and pole-and-line (LP) vessels that fish for tunas in the Convention Area.*	*Operational level catch and effort data (e.g. individual sets by longliners and purse seiners, and individual days fished by pole-and-line vessels and trollers) shall be provided to the Commission, in accordance with the standards adopted by Commission at its Second Regular Session. [see Annex 2.2 in the WCPFC link] If the coverage rate of the operational catch and effort data that are provided to the Commission is less than 100%, then catch and effort data aggregated by time period and geographic area that have been raised to represent the total catch and effort shall be provided. Purse-seine catch and effort data shall be aggregated by periods of month, areas of 1° longitude and 1° latitude, and type of school association. CCMs are to provide, to the extent possible, the number of individual vessels per stratum and area covered by their operational data with the aggregated catch and effort data they submit to the Commission.*	*Georeferenced catches and efforts: Estimates of species-specific catches and efforts by fishing fleet, fishery, and space and time strata, including the effort exerted by the support vessels assisting the purse seiners. Estimates of efforts expressed in units consistent with the recording requirements established in Res. 15/01 and complemented by numbers of fishing operations for longline fisheries and surface fisheries (IOTC-2022-SC25-R). For purse-seines primary effort is number of fishing hours, secondary effort is number of fishing operations. In purse seine fisheries, the numbers of successful and null fishing operations, searching time, and surface area explored may complement the information provided by fishing time and the total number of fishing sets. Estimates of catches for the IOTC species, common sharks, and other bycatch species. Extrapolated to national monthly catch totals is mandatory (M) for longline fisheries and surface fisheries and optional (O) for coastal fisheries. Temporal resolution: Monthly, Spatial resolution: 1°grid area, Catch unit (surface fisheries) live weight.*	*Task II catch and effort: Monthly catch (all species catch composition) and effort statistics, disaggregated by fleet, gear, month, and geographical squares (longline: 5x5 or higher resolution, other gears: 1x1 or higher resolution). Preferably, observed data obtained from various sources (logbooks, auction sales, port sampling, landing ports, transhipments, etc.). Could also be equivalent estimations, raised to Task 1 nominal catches see List of datasets requested by form pg 4*

		Data Provision Requirements			
Type of Data	**Description of Data**	**IATTC**	**WCPFC**	**IOTC**	**ICCAT**
TASK II Size Data	Catch-at-size data	*Lengths and weights of individual tunas and tuna-like fishes in the catch should be provided at the highest spatial-temporal resolution possible (i.e. Level 1 if known). Type of measurement and condition of the fish should be noted for each measurement.*	*Length and/or weight composition data that are representative of catches by the fisheries shall be provided to the Commission at the finest possible resolution of time period and geographic area and at least as fine as periods of quarter and areas of 20° longitude and 10° latitude. [Lengths (cm) and weights (kg) shall be provided for skipjack, albacore, yellowfin, bigeye and billfish]. The statistical and sampling methods that are used to derive the size composition data shall be reported to the Commission, including reference to whether sampling was at the level of fishing operation or during unloading, details of the protocol used, and the methods and reasons for any adjustments to the size data. Where feasible, this shall also be applied to all historical data.*	*Geo-referenced size frequencies: Monthly estimates of size-frequencies of the catch retained and discarded by fishing fleet, fishery, grid area of 5° longitude and latitude, species, and sex for IOTC species, common sharks, and other bycatch species. Straight length measurements made using a calliper or measuring board are recommended over fish weights and vary according to fish groups. Size-frequency data must be collected for the 16 IOTC species and the most commonly caught elasmobranch species listed in IOTC Res. 15/01 for taxa identified at species level. Size data can be collected either at sea or on land and must be linked to the spatial origin of the catch. Data should be reported following a spatial resolution of 5° grid areas or finer when required by the Scientific Committee.*	*Size Samples: Actual size frequencies (size/weight classes) with number of fishes sampled, disaggregated by fleet, gear, sample unit, month, geographic rectangles (1x1, 5x5, 5x10, 10x10) or ICCAT sampling areas (port sampling). Only observed size/weight frequencies (i.e. without substitution/raising procedures). Use one form per species (as many years as required). Catch-at-size estimations: Catch-at-size: estimations of the size composition of the catch (equivalent in weight to Task 1 catches) disaggregated by fleet, gear, month and 5x5 geographical squares. Only for: bluefin, albacore, yellowfin, bigeye, skipjack and swordfish. Optional for all CPCs except when required by the SCRS. The methodology used on those estimations (statistical inference, substitutions, raising process, etc.) should be made available to the SCRS. List of datasets requested by form pg 4*

TABLE 5a. Principal tunas, billfishes, and priority sharks (see Resolution C-24-05, Annex 4) for which data should be provided. Shark species were revised from WSDAT-01-01 based on C-24-05. Taxonomic tables should be the same for each gear type, and correspondingly each data improvement workshop dedicated to discussions focused on revising Resolution C-03-05, will include the same tables or will be updated based on workshop participant's discussions and/or current resolutions.

Taxonomic Group	Common name	Scientific or family name	ASFIS code
Tunas	Albacore tuna	*Thunnus alalunga*	ALB
	Bigeye tuna	*Thunnus obesus*	BET
	Pacific bluefin tuna	*Thunnus orientalis*	PBF
	Skipjack tuna	*Katsuwonus pelamis*	SKJ
	Yellowfin tuna	*Thunnus albacares*	YFT
	Unidentified tunas nei	Scombridae nei	TUN
	Eastern Pacific bonito	*Sarda chiliensis*	BEP
	Striped bonito	*Sarda orientalis*	BIP
	Unidentified bonitos	*Sarda* spp.	BZX
	Black skipjack tuna	*Euthynnus lineatus*	BKJ
Billfishes	Black marlin	*Istiompax indixa*	BLM
	Blue marlin	*Makaira nigricans*	BUM
	Striped marlin	*Kajikia audax*	MLS
	Sailfish	*Istiophorus platypterus*	SFA
	Shortbill spearfish	*Tetrapturus angustirostris*	SSP
	Unidentified billfishes, but not including swordfish[1]	Istiophoridae nei	BIL
	Swordfish	*Xiphias gladius*	SWO
Sharks*	Pelagic thresher shark[3]	*Alopias pelagicus*	PTH
	Bigeye thresher shark[3]	*Alopias superciliosus*	BTH
	Common thresher shark[3]	*Alopias vulpinus*	ALV
	Copper Shark	*Carcharhinus brachyurus*	BRO
	Silky shark	*Carcharhinus falciformis*	FAL
	Galapagos shark	*Carcharhinus galapagensis*	CCG
	Oceanic whitetip shark	*Carcharhinus longimanus*	OCS
	Tiger shark	*Galeocerdo cuvier*	TIG
	Shortfin mako[2]	*Isurus oxyrinchus*	SMA
	Longfin mako[2]	*Isurus paucus*	LMA
	Salmon shark	*Lamna ditropis*	LMD
	Porbeagle shark	*Lamna nasus*	POR
	Blue shark	*Prionace glauca*	BSH
	Crocodile shark	*Pseudocarcharias kamoharai*	PSK
	Whale shark	*Rhincodon typus*	RHN
	Scalloped hammerhead shark[4]	*Sphyrna lewini*	SPL
	Great hammerhead shark[4]	*Sphyrna mokarran*	SPK
	Smooth hammerhead[4]	*Sphyrna zygaena*	SPZ

links to species fact sheets are provided where available
* where available, include other sharks (see Table 4b)
[1] not elsewhere identified
[2] if species-specific catch reporting is not possible, aggregate into "mako sharks, nei"
[3] if reporting species-specific catch is not possible, aggregate into "thresher sharks, nei"
[4] if reporting species-specific catch is not possible, aggregate into "hammerhead sharks, nei"

TABLE 5b. Selected principal taxa of interest known to be caught by vessels and gears fishing for species under the purview of the Commission in the Antigua Convention Area. Catches of species not shown on this list should be reported using the common name, and the scientific name if known, as well as the ASFIS 3-alpha code if available. Note that codes have not been assigned for all species. Resolutions pertaining to certain taxa and general data provision are provided in the technical guidelines for data provision corresponding to C-03-05. This table may be modified as needed. Table was revised from WSDAT-01-01 based on input from workshop participants and the priority list of shark species adopted in Resolution C-24-05, Annex 4. Noting, a list of priority ray species will be presented at the Scientific Advisory Committee meeting in 2025. Depending on the outcomes of the annual Commission meeting, ray species may be moved to table 4a for final consideration in updating C-03-05. Taxonomic tables should be the same for each gear type, and correspondingly each data improvement workshop dedicated to discussions focused on revising Resolution C-03-05, will include the same tables or will be updated based on workshop participant's discussions and/or current resolutions.

Taxonomic Group	Common name	Scientific or family name	ASFIS code
Sharks	Scalloped bonnethead shark	*Sphyrna corona*	SSN
	Scoophead shark	*Sphyrna media*	SPE
	Bonnethead shark	*Sphyrna tiburo*	SPJ
	Great white shark	*Carcharodon carcharias*	WSH
	Sand tiger shark	*Carcharias taurus*	CCT
	Blacktip shark	*Carcharhinus limbatus*	CCL
	Spottail shark	*Carcharhinus sorrah*	CCQ
	Silvertip shark	*Carcharhinus albimarginatus*	ALS
	Bull shark	*Carcharhinus leucas*	CCE
	Dusky shark	*Carcharhinus obscurus*	DUS
	Sandbar shark	*Carcharhinus plumbeus*	CCP
	Carcharhinus sharks nei	*Carcharhinus* spp.	CWZ
	Requiem sharks nei	Carcharhinidae	RSK
	Longnose velvet dogfish	*Centroscymnus crepidater*	CYP
	Velvet dogfish	*Scymnodon squamulosus*	SSQ
	Cookie cutter shark	*Isistius brasiliensis*	ISB
	Bigeye sand tiger shark	*Odontaspis noronhai*	ODH
	Nurse shark	*Ginglymostoma cirratum*	GNC
	Sicklefin smooth-hound	*Mustelus lunulatus*	MUU
	Speckled guitarfish	*Rhinobatos glaucostigma*	RBL
	Tope shark	*Galeorhinus galeus*	GAG
	Whitenose shark	*Nasolamia velox*	CNX
	Kitefin shark	*Dalatias licha*	SCK
	Sharks nei	Elasmobranchii	SKX
Rays	Pelagic stingray	*Pteroplatytrygon violacea*	PLS
	Stingrays nei	*Dasyatis* spp.	STI
	Alfred manta	*Mobula alfredi*	RMA
	Giant manta	*Mobula birostris*	RMB
	Devil fish	*Mobula mobular*	RMM
	Munk's devil ray	*Mobula munkiana*	RMU
	Chilean devil ray	*Mobula tarapacana*	RMT
	Smoothtail manta	*Mobula thurstoni*	RMO
	Manta rays nei	*Mobula* spp.	RMV
Turtles	Olive Ridley turtle	*Lepidochelys olivacea*	LKV
	Green turtle	*Chelonia mydas*	TUG
	Loggerhead turtles	*Caretta caretta*	TTL
	Hawksbill turtle	*Eretmochelys imbricata*	TTH
	Leatherback turtle	*Dermochelys coriacea*	DKK
Seabirds	Albatrosses nei	Diomedeidae	ALZ
	Petrels nei	*Procellaria* spp.	PTZ
	Shearwaters nei	*Puffinus* spp.	PQW
	Seagulls nei	*Larus* spp.	LHX
	Boobies and gannets nei	Sulidae spp.	SZV

Taxonomic Group	Common name	Scientific or family name	ASFIS code
Marine Mammals	Pantropical spotted dolphin	*Stenella attenuata*	DPN
	Spinner dolphin	*Stenella longirostris*	DSI
	Striped dolphin	*Stenella coeruleoalba*	DST
	Rough-toothed dolphin	*Steno bredanensis*	RTD
	Common dolphin	*Delphinus delphis*	DCO
	Long-beaked common dolphin	*Delphinus* sp.	
	Bottlenose dolphin	*Tursiops truncatus*	DBO
	Risso's dolphin	*Grampus griseus*	DRR
	Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	DWP
	False killer whale	*Pseudorca crassidens*	FAW
	Melon-headed whale	*Peponocephala electra*	MEW
	Dolphins nei	Delphinidae	DLP
	Pilot whales nei	*Globicephala* spp.	GLO
Fishes	Common dolphinfish	*Coryphaena hippurus*	DOL
	Pompano dolphinfish	*Coryphaena equiselis*	CFW
	Dolphinfishes nei	Coryphaenidae	DOX
	Wahoo	*Acanthocybium solandri*	WAH
	Jacks, crevalles nei	*Caranx* spp.	TRE
	Rainbow runner	*Elagatis bipinnulata*	RRU
	Yellowtail amberjack	*Seriola lalandi*	YTC
	Longfin yellowtail	*Seriola rivoliana*	YTL
	Greater amberjack	*Seriola dumerili*	AMB
	Samson fish	*Seriola hippos*	RLH
	Amberjacks nei	*Seriola* spp.	AMX
	Sunfish	*Mola* spp.	MOP
	Barracudas nei	Sphyraenidae	BAZ
	Opah	*Lampris guttatus*	LAG
	Opahs nei	*Lampris* spp.	LAP
	Escolar	*Lepidocybium flavobrunneum*	LEC
	Oilfish	*Ruvettus pretiosus*	OIL
	Luvar	*Luvaris imperialis*	LVM
	Snake mackerel	*Gempylus serpens*	GES
	Snake mackerels, escolars nei	Gempylidae	GEP
	Long snouted lancetfish	*Alepisaurus ferox*	ALX
	Short snouted lancetfish	*Alepisaurus brevirostris*	ALO
	Lancetfishes nei	*Alepisaurus* spp.	ALI
	Sickle pomfret	*Taractichthys steindachneri*	TST
	Dagger pomfret	*Taractes rubescens*	TCR
	Big-scale pomfret	*Taractichthys longipinnis*	TAL
	Rough pomfret	*Taractes asper*	TAS
	Pomfrets, ocean breams nei	Bramidae	BRZ
	Finescale triggerfish	*Balistes polylepis*	BIY
	Spotted oceanic triggerfish	*Canthidermis maculata*	CNT