COMPILATION OF DISCARDS DATA REPORTED TO THE IOTC (1996-2025)

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Purpose, expectation and action intended

The purpose of this paper is to present the first consolidated IOTC discards dataset, covering the period 1996-2025, and describe its compilation, harmonisation and limitations.

The WPDCS is invited to:

1. **NOTE** the compilation of historical discards data submitted by CPCs and the limitations affecting their interpretation and use
2. **REVIEW** the consolidated dataset and **ENDORSE** its publication and dissemination through the IOTC data dissemination platforms
3. **CONSIDER** approaches for progressively incorporating estimates of total discards into the IOTC nominal catch dataset, which currently consists predominantly of retained catches, taking into account the completeness, representativeness and quality of the available discards data
4. **RECOMMEND** improvements to discards data collection and reporting, including the provision of raised estimates and associated information on sampling coverage and estimation methods.

Abstract

This paper presents the first consolidated IOTC discards dataset, covering the period 1996-2025 and bringing together submissions received through successive reporting formats. The dataset contains 7,344 records submitted by 23 CPCs, covering 212 species and species-group codes across three main IOTC statistical areas. Historical submissions were harmonised to improve consistency while preserving the information originally reported. The paper examines the evolution of reporting across species categories and highlights limitations related to incomplete coverage, differences in reporting practices and the availability of raised estimates. The WPDCS is invited to review and endorse the publication of the dataset and consider the progressive integration of estimates of total discards into the IOTC nominal catch dataset, which currently predominantly reflects retained catches.

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Prepared by IOTC Secretariat

Background

Discards, defined as the part of the catch returned to the sea, whether dead or alive, are an important component of fisheries catches, particularly for non-target species and species of conservation concern. Dead discards contribute directly to fishing mortality, while live releases may also result in mortality following release. IOTC Resolutions 15/02 and 26/06 (subject to the entry into force) require CPCs *to report their annual catch estimates for all species, separating retained catches from discards whenever possible as well as the most commonly caught elasmobranch species according to records of catches and incidents established in Resolution 15/01*. Nevertheless, several issues and potential enhancements to the data components of certain Conservation and Management Measures (CMMs) have been highlighted through IOTC meetings (e.g., IOTC-2025-WPDCS21-05).

To support the submission of discards data, the Secretariat has developed the reporting Form 1DI. Other Resolutions may add species-specific requirements for sharks, rays, marine turtles, seabirds and cetaceans (see next section). Discards data submissions have been received in different formats and with different levels of detail and, have been generally scarce, not raised and not fully compliant with IOTC standards (IOTC-2025-WPEB21-07). This has limited their use by the Scientific Committee and its Working Parties. Therefore, the discard data submitted by CPCs have never been consolidated and published as a single dataset.

This paper accompanies the first public release of a consolidated dataset of discards data submitted to the IOTC Secretariat between 1996 and 2025. The dataset brings together submissions made using successive reporting formats, including the historical forms (identified in the dataset as *IOTC Form 1B* and *IOTC Form 1*), the original Form 1DI (*IOTC Legacy*) and the redesigned Form 1DI (*IOTC v1*), which is currently in use.

The objectives of this paper are to: (i) describe the dataset and the harmonisation procedures used to consolidate submissions of varying formats and levels of detail, in accordance with the reporting requirements established under IOTC Resolutions; (ii) examine the evolution of discards reporting practices across species categories; and (iii) identify the limitations of the available data and opportunities to improve discards reporting.

IOTC Resolutions related to the reporting of discards

The requirement to report discards has been in place since 2015 under Resolution 15/02, which requires CPCs to report annual catch estimates for all species, distinguishing retained catches from discards whenever possible. Resolution 26/06, adopted in 2026 but not yet in force, maintains and updates these requirements (see paper IOTC-2026-WPDCS22-05). Several other CMMs establish complementary requirements for recording and reporting discards, releases, interactions and incidental bycatch for specific species groups, fisheries or monitoring schemes (**Table 1**).

Table 1. IOTC Resolutions containing provisions relevant to the recording and reporting of discards, releases, interactions and incidental bycatch during the period covered by the dataset (1996–2025). Superseded Resolutions are also indicated, some of which remain binding on CPCs that have objected to the Resolutions replacing them

Resolution	Title	Provisions relevant to discard reporting
15/01	Recording of catch and effort data by fishing vessels in the IOTC area of competence	Establishes logbook recording requirements for catches and fishing operations, providing a source of information on discards and associated species
15/02	Mandatory statistical reporting requirements for IOTC CPCs	Requires annual catch estimates to distinguish retained catches from discards, whenever possible. Discards are reported by species and fishery, in live weight or numbers, using Form 1DI.
18/07	Measures applicable in case of non-fulfilment of reporting obligations	Requires reporting of the presence or absence of catches by species and gear, including zero catches where neither retained catches nor discards occurred
25/06 (supersedes 24/04, 22/04)	Regional observer scheme	Establishes observer coverage and data collection requirements, including the recording of discards and their fate. Observer data provide an additional source of information for assessing catches and discards
24/06 (supersedes 19/05)	Ban on discards of bigeye tuna, skipjack tuna, yellowfin tuna and non-targeted species	Requires purse seine vessels to retain specified species, subject to exemptions. When discarding is permitted, vessels masters must record the estimated quantities and species composition of discarded and retained catches
25/08 (supersedes 18/02, 17/05, 13/05, 13/06, 12/09)	Conservation of sharks caught in association with fisheries managed by IOTC	Establishes requirements for recording and reporting shark catches, discards, live releases and interactions, including information on the fate of discarded individuals. Its applicability is subject to objections by India and Somalia
19/03	Conservation of mobulid rays caught in association with fisheries in the IOTC area of competence	Requires reporting of interactions with mobulid rays, including numbers discarded and released, using information from logbooks and observer programmes
23/06 (supersedes 13/04)	Conservation of cetaceans	Requires reporting of cetacean encirclement, capture and entanglement, including species, numbers, locations, release measures and life status upon release
23/07 (supersedes 12/06)	Reducing the incidental bycatch of seabirds in longline fisheries	Establishes requirements for recording and reporting seabird incidental bycatch by species, primarily through observer programmes and, where applicable, logbooks
12/04	Conservation of marine turtles	Requires the recording and reporting of interactions with marine turtles, including incidental catches, releases and mortality, through logbooks and observer programmes
19/02 (supersedes 24/02)	FAD management (management plans; management of drifting FADs)	Establish reporting requirements for FAD-related fishing activities, including catch composition and the fate of catches, whether retained or discarded dead or alive

The interpretation of the discards dataset is complicated by differences in the terminology and reporting requirements established under these Resolutions. While some refer explicitly to discards, others require information on releases, interactions or incidental bycatch. These terms describe related but distinct aspects of fishing operations and do not necessarily correspond to equivalent data. Furthermore, the sources of information vary between reporting requirements, with data collected through fishers' logbooks, scientific observer programmes or both.

Species-specific reporting requirements have also evolved throughout the period covered by the dataset, with successive Resolutions introducing or revising obligations for particular species groups. Consequently, differences in the coverage and detail of historical discards submissions may partly reflect changes in the applicable reporting requirements, in addition to differences in data collection and reporting practices among CPCs.

Methods

Discards data reported to the IOTC Secretariat for the period 1996–2025 were compiled and harmonised to reconcile historical, legacy and current reporting formats and coding systems, wherever possible. Records were compiled from successive generations of reporting forms and other submissions (**Table 2**). Fields that were not included in earlier reporting formats (e.g. discard condition, coverage, sampling and raising information) were left empty where the corresponding information was unavailable, rather than inferred.

Table 2. Number of records by reporting format and corresponding years of fishing activity

Reporting format	Years with records	Records
IOTC Form 1B	1996-2005, 2007, 2015	125
IOTC legacy (Form 1DI, original)	2003, 2010-2023	2,056
IOTC current (Form 1DI, v1)	2022-2025	5,109
Other formats (Word report, other formats)	1999, 2000, 2006, 2014,2015, 2016, 2018	54
Total	**1996-2025**	**7,344**

The main harmonisation procedures are described below:

- **Discard condition.** The legacy form only recorded three status codes ('Alive', 'Dead' and 'Unknown'), whereas the current form records eight, dividing 'Alive' into five sub-categories according to the apparent probability of survival. This distinction is particularly important for species of conservation concern that are released alive. The old 'Alive' classification corresponds exactly to the 'Alive – status unknown' category on the current form. The 'Unknown' category simply involves changing the code name from two to three letters, a new code, 'Stunned', has also been added which did not exist prior to the current form
- **Coverage**. The legacy form recorded coverage as a percentage range grouped into bands, combined with a monitoring threshold (e.g. "70 per cent or more of trips covered"), the current form records an exact percentage and a separate coverage type. Rather than forcing the conversion of this data to a single scale, two explicit numeric fields (minimum and maximum percentage) were added to describe the documented range of the data reported via the old form, and an exact value from the current form is converted to a range of zero width. A legacy coverage code ("Total enumeration") is considered equivalent to 100 per cent coverage only when corroborated by the corresponding data processing field, which also indicates 'total enumeration'; where the two fields do not match the coverage cannot be assumed
- **Species codes**. Legacy species codes were compared with the current official list of species, first by code and then, in the case of aggregated categories, by the full name in English. A total of 49 legacy aggregated codes were identified, of which 16 retain the same code, 28 were recoded according to the name (with no changes) and only 5 remain truly unassignable and were labelled as "others". Additionally, the fields SPECIES, SPECIES_CATEGORY_CODE, SPECIES_WP_CODE and SPECIES_GROUP_CODE were added by matching SPECIES_CODE against the IOTC reference list of species.
- **Fishery gear and fishery codes**. The fishery codes and fishing gear codes were retained in separate fields. The current fishery classification provides more detailed information on fishing gear, fishing method, and target species than the historical classification. Legacy fishing gear codes were preserved and interpreted using their original reference table.

Historical discards were generally reported as totals by fishing gear, whereas a single legacy gear code may correspond to several current fishery codes. For example, the legacy codes LL and PS correspond to 18 and 48 current fishery codes, respectively, reflecting differences in fishery type, target species and fishing mode. Where a CPC operated several fisheries using the same gear, the original records did not provide sufficient information to allocate discards among them. Such allocations would require additional assumptions, for example using catch or effort proportions, and would result in estimated fishery-level discards rather than directly reported values.

Each record therefore retains the originally reported code and discard quantity. A current fishery code was assigned in a separate field only where the correspondence was unambiguous, either because the CPC reported a current fishery code or because its fleet operated a single fishery using the reported gear. Where several fisheries could correspond to the same legacy gear code, discards were retained at gear level.

- **Sampling and raising information**. The sample type and raising methodology combined two distinct concepts across the different forms. The first concept was the sample type, which indicated whether a record reflected an original sample or an already raised total. The second concept was whether a raising procedure had been applied, which provides 3 codes in the current form. Four variables were defined to preserve this information: (i) sampling design; (ii) whether raising was applied (YES/NO); (iii) raising level, using the codes defined in the current form; and (iv) a free-text field retaining any methodological information provided in the original submission.
- **Data reporting source**: Finally, a separate field was added to identify the reporting form and version associated with each record.

Compiled discard data

The dataset is distributed as a single workbook containing 7,344 records covering the period 1996–2025, submitted by 23 CPCs and representing 212 species and species-group codes across three main IOTC statistical areas. Discards quantities are retained in their originally reported units, including numbers of individuals and weights, and have not been converted to a common unit.

The dataset includes descriptive labels associated with the fleet, fishing gear, species, data source, data processing, coverage type, raising procedure, discards unit and discard condition codes to facilitate interpretation. In addition, three fields (SPECIES_WP_CODE, SPECIES_GROUP_CODE and SPECIES_CATEGORY_CODE) were derived from SPECIES_CODE using the corresponding mappings in the IOTC Reference Data Catalogue. These derived classifications facilitate the aggregation and analysis of discards data by Working Party, species group and species category.

Table 3. Description of the fields included in the consolidated IOTC discards dataset. The dataset also includes descriptive labels for FLEET_CODE, GEAR_CODE, SPECIES_CODE, DATA_SOURCE_CODE, DATA_PROCESSING_CODE, COVERAGE_TYPE_CODE, RAISING_CODE, DISCARDS_UNIT_CODE and DISCARDS_CONDITION_CODE, derived from the corresponding IOTC reference code lists

Field	Definition	Code list name	Code list URL
YEAR	Gregorian calendar year in which the reported fishing activities occurred		
FISHING_GROUND_CODE	Code identifying the main IOTC fishing area in which the reported discards occurred	IOTC main areas	https://data.iotc.org/reference/latest/domain/admin/index.html#iotcAreas
FLEET_CODE	Legacy code identifying the fishing fleet responsible for the reported discards	Fleets	https://data.iotc.org/reference/latest/domain/legacy/#legacyFleets
GEAR_CODE	Legacy code identifying the fishing gear used to catch the discarded individuals	Legacy gears	https://data.iotc.org/reference/latest/domain/legacy/#legacyGears

FISHERY_CODE	Code identifying the fishery associated with the reported discards, where it can be determined unambiguously	Fisheries	https://data.iotc.org/reference/latest/domain/fisheries/#fisheries
SPECIES_CODE	Code identifying the species or taxonomic group to which the reported discards belong	Species	https://data.iotc.org/reference/latest/domain/biology/#allSpecies
SPECIES_WP_CODE	Code identifying the IOTC Working Party responsible for the species or taxonomic group, derived from SPECIES_CODE	Working Parties	https://data.iotc.org/reference/latest/domain/admin/index.html#workingParties
SPECIES_GROUP_CODE	Code identifying the broader species group to which the species or taxonomic group belongs, derived from SPECIES_CODE	Group of species	https://data.iotc.org/reference/latest/domain/biology/index.html#speciesGroups
SPECIES_CATEGORY_CODE	Code identifying the IOTC species category associated with the reported species or taxonomic group, derived from SPECIES_CODE	Categories of species	https://data.iotc.org/reference/latest/domain/biology/index.html#speciesCategories
DATA_SOURCE_CODE	Code identifying the source of information used to derive the reported discards data	Sources of discard data	https://data.iotc.org/reference/latest/domain/data/index.html#dataSourcesDi
DATA_PROCESSING_CODE	Code identifying the processing method applied to the reported discards data	Processings of discard data	https://data.iotc.org/reference/latest/domain/data/index.html#dataProcessingsDi
COVERAGE_TYPE_CODE	Code identifying the metric used to express the coverage of the data collection programme within the reporting stratum	Types of coverage	https://data.iotc.org/reference/latest/domain/data/index.html#coverageTypes
ORIGINAL_COVERAGE_VALUE	Coverage value as recorded in the original submission, expressed either as a numerical value or as a coverage class		
COVERAGE_MIN_PCT	Minimum percentage of coverage associated with the reported coverage value or class		
COVERAGE_MAX_PCT	Maximum percentage of coverage associated with the reported coverage value or class		
IS_RAISED	Indicates whether the reported discards quantity has been raised from sampled observations to represent the reporting stratum	Logical responses	https://data.iotc.org/reference/latest/domain/data/index.html#logicalResponses
RAISING_CODE	Code identifying the level or extent to which the reported discards data have been raised	Raisings	https://data.iotc.org/reference/latest/domain/data/index.html#dataRaisings
DISCARDS_UNIT_CODE	Code identifying the unit in which the reported discards quantity is expressed	Catch Units	https://data.iotc.org/reference/latest/domain/fisheries/index.html#catchUnits
DISCARDS_CONDITION_CODE	Code identifying the condition of discarded individuals at the time of release, including whether they were dead or alive	Individual conditions	https://data.iotc.org/reference/latest/domain/biology/index.html#individualConditions
DISCARDS_QUANTITY	Amount of fish discarded		

Evolution of reporting by species category groups

The mandatory reporting of discards is handled differently by the CPCs. **Figure 1** shows the combination of species categories for which at least one discard record was submitted by the CPCs in a given year: IOTC species (tunas, billfish and seerfish), sharks and rays, marine turtles, seabirds and cetaceans (TSC), and all other species (Others).

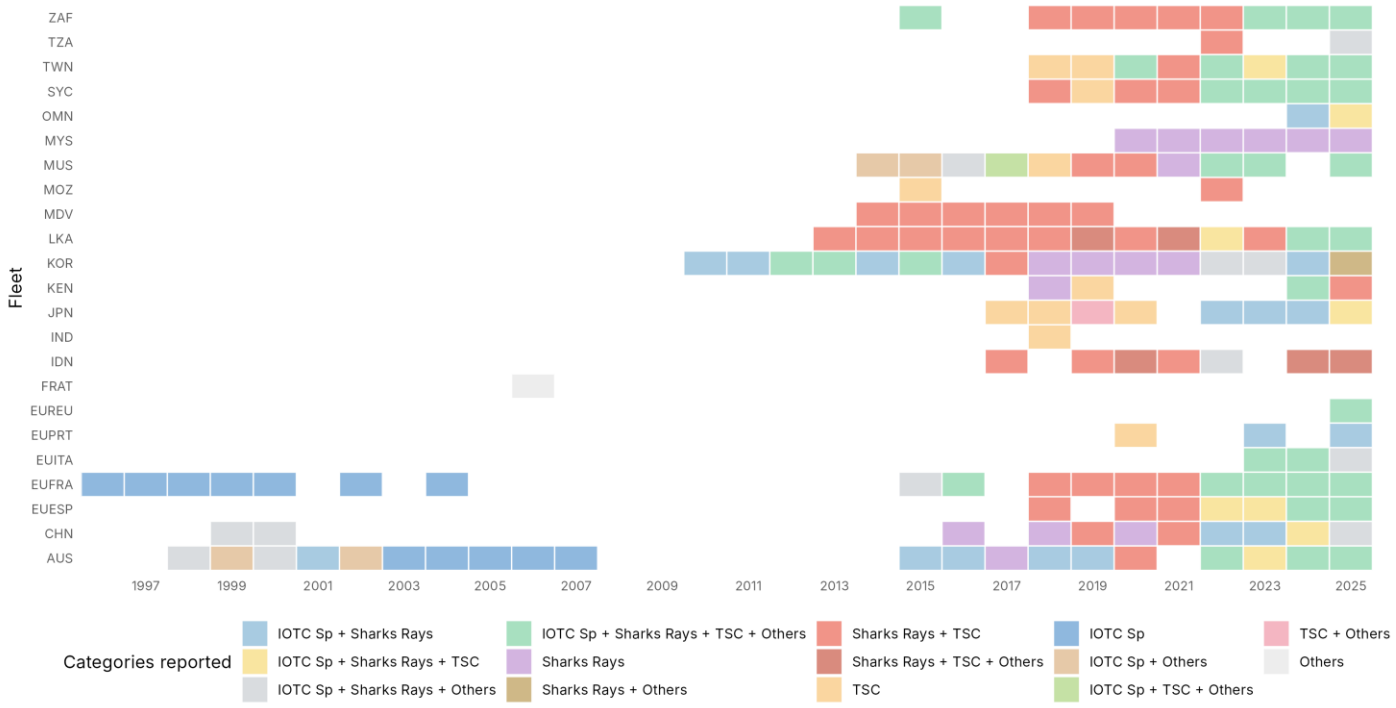

Figure 1. Categories of species reported in the discard data by fleet (CPC) and year, 1996-2025. Each tile shows the combination of categories for which the CPC submitted at least one record in that year. IOTC Sp: tropical, temperate and neritic tunas, billfish, seerfish and tunas nei; Sharks Rays: sharks and rays; TSC: marine turtles, seabirds and cetaceans; Others: all other species. Blank tiles: no records in the dataset.

The figure shows the categories reported, not the completeness of the reporting: a tile indicates that at least one record was submitted, and the absence of a category can mean that no discards occurred, that they were not monitored or that they were not reported.

Limitations and recommended use

The dataset is a compilation of discards as reported by CPCs and as described, has limitations that users should consider:

Reported values, not total discards. Records are not extrapolated or raised to the whole fishery unless the CPC did so (field IS_RAISED), and monitoring coverage varies widely between CPCs, years and fisheries. The sum of the records must not be interpreted as total discards.

Uneven coverage in time and across CPCs. Few CPCs reported before 2013 and the number of records is concentrated in 2022-2024 (71%). Some CPCs appear in only one year (e.g. IND, OMN, TZA, FRAT).

Different reporting patterns. As shown in Figure 1, the categories of species reported differ among CPCs and years, and the absence of a record cannot be interpreted as zero discards.

Mixed units. Quantities are reported in numbers and in weight (T, KG) and cannot be converted to a common unit without additional biological information (currently not available for some species).

Gear and fishery codes. Legacy gear codes (e.g. LL, PS) correspond to several current fishery codes, so they cannot be converted to a single code (see Methods).

Incomplete metadata. Discard condition, data source, coverage and raising information are blank for part of the records, particularly in older submissions.

The publication of this consolidated dataset represents a first step towards improving the accessibility and use of discards data reported to the IOTC. However, the limitations identified highlight the need for more complete and consistent reporting, particularly the provision of estimates raised to represent total discards. Improving the availability and quality of these estimates would support their progressive integration into the IOTC nominal catch dataset, providing a more comprehensive representation of total catches and fisheries removals.

References

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