REPORT ON IOTC DATA COLLECTION AND STATISTICS

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Purpose

To provide the IOTC Working Party on Data Collection and Statistics with an overview of the status of data holdings in the IOTC Secretariat, in particular statistics of catch, effort, size frequency and other biological data for IOTC species, sharks, and other species that are caught incidentally by fisheries directed at IOTC species.

Background

Prior to each IOTC Working Party (WP) meeting the IOTC Secretariat prepares a number of tables, figures and datasets that highlight historical and emerging trends in the fisheries data held by the IOTC Secretariat. This information is used during WP to inform discussions around stock status and in developing advice to the Scientific Committee.

This document presents the status of data in the IOTC databases, including: the status of reporting and availability of datasets related to catches up to 2018, as per the requirements set in IOTC Resolution 15/02 and other IOTC measures calling for IOTC CPCs to report data on their IOTC fisheries; an overview of the status of IOTC statistics over the time series; other datasets available at the Secretariat.

The report covers the following areas:

1. Overview

This document summarises the standing of a range of information received in accordance with IOTC resolutions and recommendations from its technical groups.

Table 1 presents an overview of the main IOTC datasets that need to be reported, while Table 2 provides a summary of the IOTC data related Resolutions and year in which each came into force. Appendix I includes more details on the Resolutions referred to below.

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Table 1. Summary of IOTC Data Requirements applicable to species managed by the IOTC

	Coastal fleets: EEZ vessels less than 24 m LOA	Industrial surface and longline fleets: Vessels with LOA ≥ 24 m and all high seas vessels		
Annual catches (Nominal catch + Discards)	Nominal catches (weight) by IOTC species, main species of pelagic sharks, other bycatch, per IOTC area, gear, species and year			
	Discard levels of IOTC species, sharks, seabirds, marine turtles, cetaceans per IOTC area, gear, species and year (in number and weight)			
Active fishing craft statistics	Number of fishing craft per boat-gear type category, per year	Individual vessel data for all fishing ships catching IOTC species		
Catch-and-effort (CE)	CE data by fishery (type of boat gear), area and period	Surface fisheries: CE by fishery, 1° grid and month	FADs anchored and drifting: CE by 1° grid and month (PS-BB)	Supply vessels: Effort 1° grid and month
Size data	Individual lengths of IOTC species sampled by fishery, species, 5° area and month			
Scientific observer data	Samples of catches landed to cover at least 5% of vessel activities	Sample of catches at-sea to cover at least 5% of fishing operations		
Socio-economic data	No standards have been set as yet			
Foreign fleets EEZ catch	No applicable	CE data for foreign licensed fishing vessels (as per the CE standards above)		

Table 2. Timeline of implementation of IOTC Resolutions as an indication of the year since which they are in force. For more details refer to Appendix I

Res.	Description	Fisheries applies to:	Species applies to:	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
15/02	Min. data reporting requirements: Nominal catch	All fisheries	IOTC species																								
			Main sharks																								
	Min. data reporting requirements: Catch-and-effort	All fisheries	IOTC species																								
			Main sharks																								
	Min. data reporting requirements: Size data	All fisheries	IOTC species																								
			Main sharks																								
	FADs and Supply vessels requirements	Purse seine	N/A																								
15/01	Minimum data requirements: Logbooks	Purse seine	IOTC species and main sharks																								
		Longline																									
		Pole-and-line; gillnet																									
		Handline; trolling																									
18/07	Non-fulfilment of data reporting obligations	All fisheries	All species																								
19/02	FAD logbook reporting requirements	Purse seine, pole-and-line	As 15/02																								
11/04	Regional Observer Scheme	Coastal fleets	As 10/02																								
		Industrial fleets >=24m LOA	All species																								
		Industrial fleets <24m LOA	All species																								
05/05	Data requirements: Sharks	As per 15/02	Main sharks																								
13/06	Data requirements: Oceanic whitetip shark	Authorised vessels	Oceanic whitetip																								
12/09	Data requirements: Thresher shark		Thresher sharks																								
13/05	Data requirements: Whale shark		Whale shark																								
12/06	Data requirements: Seabirds		Seabirds																								
12/04	Data requirements: Marine turtles		Marine turtles																								
13/04	Data requirements: Cetaceans		Ceteceans																								

Major data categories covered by the report

Nominal catches which are highly aggregated statistics for each species estimated per fleet, gear and year for a large area. If these data are not reported the Secretariat estimates a total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; and data reported by other parties on the activity of vessels, data collected through sampling at the landing place or at sea by scientific observers, or on imports of bigeye tuna from vessels under the flag concerned.

Catch-and-effort data which refer to the fine-scale data, usually from logbooks and reported per fleet, year, gear, type of school, month, grid (1° grid areas for surface fisheries, 5° grid areas for longline fisheries, and the most convenient resolution for coastal fisheries) and species. Information on the use of fish aggregating devices (FADs) and supply vessels is also collected. The standards of reporting to the IOTC are defined in IOTC Resolution 15/02. IOTC Resolution 15/01 *on the recording of catch and effort data by fishing vessels*

in the IOTC area of competence sets the minimal data requirement that IOTC CPCs shall implement for fleets using their flag or licensed to operate within their EEZs.

Length frequency data: individual body lengths of IOTC species per fleet, year, gear, type of school, month and 5º grid areas, as defined in IOTC Resolution 15/02.

Biological data: data used to derive length-weight, non-standard weights-live weight, non-standard measurements-standard lengths, sex-ratios, maturity, or any other data required for the assessments of IOTC and shark species, as defined in IOTC Resolution 15/02.

Observer data: summaries of the data collected by observers on fishing vessels of IOTC CPCs implementing the Regional Observer Scheme (trip reports), as defined in IOTC Resolution 11/04**.**

Tag release and recovery data: information on the release and recovery of tunas with tags, as collected from the Regional Tuna Tagging Project-Indian Ocean (RTTP-IO), or other small-scale Projects implemented in the Indian Ocean.

2. Timeliness and availability of IOTC catch statistics for the years 2012-2018

Late reporting of data compromises the validation and verification of data by the IOTC Secretariat, as well as the data available for stock assessments prior to Working Parties, especially when data are submitted close to, or during Working Party meetings.

In 2019, **23** fishing parties either fully or partially reported IOTC statistics (i.e., nominal catch, catch-and-effort and size data) by the data submission deadline of June 30 (**22** in 2018, and **21** in 2017). Requests were sent to over fifty countries[2] in March-April 2019, and in most cases second and third requests were also issued.

Five CPCs have not reported statistics to the IOTC at all for a period longer than four years (Sierra Leone; Yemen; Eritrea; Sudan).

Figure 1 shows the proportion of nominal catch, catch-and-effort, and size data, by species group, reported by the deadline and before the WPDCS meeting towards the end of each year[3], for 2012-2019.

The following key points should be noted:

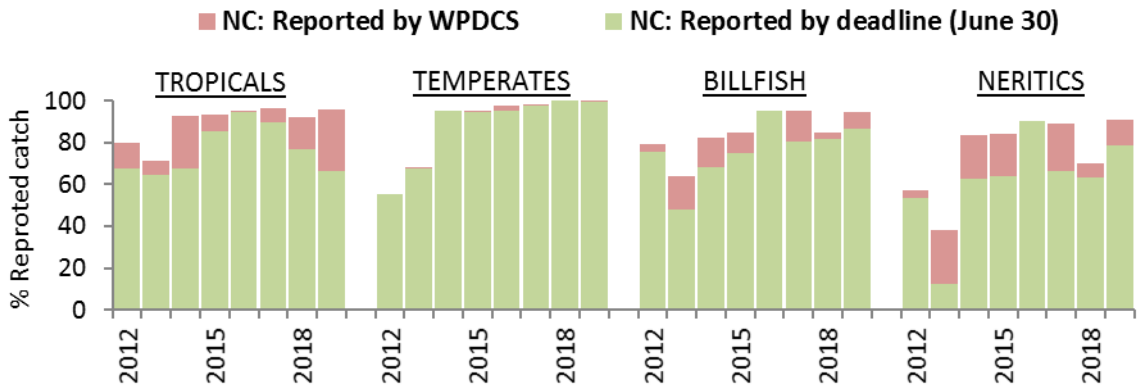
- Reporting coverage is highest for nominal catch, followed by catch-and-effort, while size data reporting levels are well below the levels reported by the other two datasets.
- Within each of the datasets (nominal catch, catch-and-effort, size data) levels of timeliness and reporting coverage vary substantially between species groups, e.g. catch-and-effort and size data are particularly poorly reported for neritic species (i.e., between 30% to 60%, compared to around 70% for tropical tunas) mostly as the majority of neritic catches are accounted for by coastal artisanal fleets.
- Similarly, the proportion of size data available for billfish species is also very low (≈20% to 55%), compared to tropical and temperate tunas.
- In recent years there have been improvements in the *timeliness* of reporting from some coastal CPCs, while some distant water fishing nations reported fisheries statistics either late or not in agreement with the basic data requirements. In 2019 (i.e., with fishing activities referring to year 2018) **72%** of nominal catches were fully or partially reported, compared to **73%** in 2018 (for reference year 2017) mostly as the result of late reporting by EU,Spain, Pakistan and Oman.
- However, improvements in the *timeliness* of data reported by CPCs to the IOTC Secretariat have not been accompanied by comparable increases in the *quality* of the information submitted, and data

[2] Note that specific requests were sent to EU countries having vessels known to operate in the IOTC Area (France, Italy, Portugal, Spain and the UK).

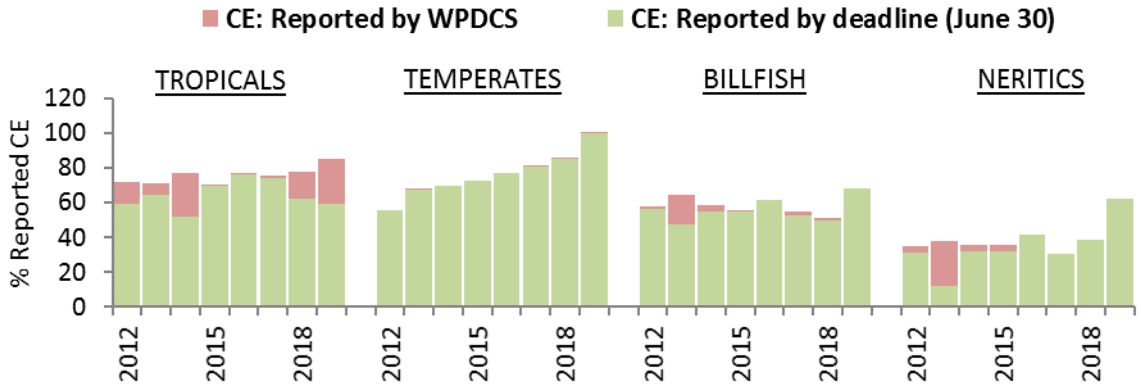
[3] Note that the IOTC Secretariat uses alternative sources to estimate the catches of non-reporting fleets; the percentages in this section represent the proportion that the NC, CE or SF reported before the deadline of the WPDCS compared to the total estimated by the Secretariat.

quality remains a major challenge for stock assessments of IOTC Species which in some cases remain highly uncertain.

Nominal catches



Catch-and-effort



Size-frequency

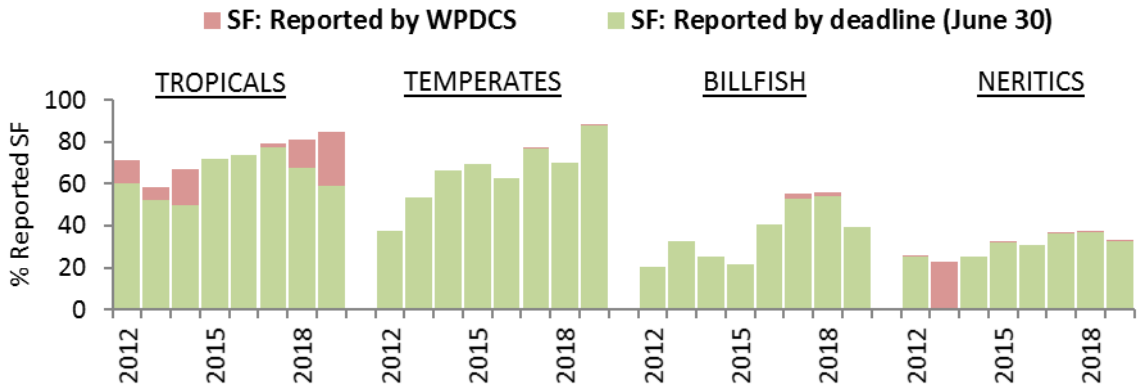


Fig.1 Timeliness of data: availability of data by the deadline for data submission (30 June) and at the time of the Working Party on Data Collection and Statistics Meeting each year, 2012-2019. Years refer to the year of reporting.

Definitions: **NC**: Proportion of total catch available; **CE**: Proportion of total catch for which catch-and-effort are reported; **SF**: Proportion of total catch for which size frequency data are reported.

Availability of IOTC datasets for reference year 2018

Tables 3i-3v list the fleets for which the Secretariat received or estimated catches for the reference year 2018, by main species groups and data sets (nominal catch, catch-and-effort and size frequency data). Fleets are listed according to the magnitude of their most recent catches, and timeliness of reporting and original data sources are also shown.

The availability of statistics on fishing crafts operating for each fleet is presented in a separate table (3vi), with brief comments on bycatch, discards, fishing craft statistics and active vessels provided at the end of this section.

Table 3. Availability of IOTC datasets reported in 2019 (for reference year 2018)[4]

Gear	Industrial purse seine (**PS**), industrial longline (**LL**) and artisanal gears (**ART**)		**NC**	Nominal Catch	Fully available
Catch	Recent catches amounting to (thousands of tonnes)		**CE**	Catch and Effort	Partially available
			SF	Size Frequency	Not available
TI	Timeliness	Good (before 1st July) Fair (within July) Poor (after 1st August)	**SO**	Data Source	Statistics fully available from flag country Statistics partially available from flag country Statistics available from sources other than flag country

Table 3i. Tropical tunas (YFT, BET, SKJ)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
PS	European Union	289.6	SY						Less than 1 fish per metric ton measured; EU.ESP submitted late/ no data reported for EU-ITA
	SEYCHELLES	122.9	SY						
	INDONESIA	24.7	S						Low CE; Not by IOTC standard missing schooltype information
	MAURITIUS	22.4	YS						Less than 1 fish per metric ton measured
	KOREA REP.	19.2	S						Less than 1 fish per metric ton measured
	IRAN ISLAMIC REP.	4.3	Y						CE and SF not reported by IOTC standard: missing school information & gird
	JAPAN	2.7	S						
	PHILIPPINES	0.0							No activity in Indian Ocean in 2018
LL	CHINA	8.7	YB						Less than 1 fish per metric ton measured
	TAIWAN,CHINA	21.7	BY						Downloaded data
	SRI LANKA	10.2	BY						
	SEYCHELLES	9.1	YB						Less than 1 fish per metric ton measured
	JAPAN	6.4	BY						SF from observer program only; less than 1 fish per mt
	INDONESIA	5.2	BY						CE minor sample; SF from observer program only & no report submitted; less than 1 fish per mt
	KOREA REP.	1.9	Y						
	MALAYSIA	0.7	BY						SF only reported for vessels operating in Western Indian Ocean
	European Union	0.6	YB						EU-ESP reported CE only for SWO; SF: Less than 1 fish per MT measured, not reported for all fleet
	SOUTH AFRICA	0.5	YB						NC, CE & SF data aggregated for local LL and chartered vessel s
	MAURITIUS	0.3	Y						
	OMAN	0.2	Y						SF reported for 1 species only; less than 1 fish per MT measured
	MALDIVES	0.2	Y						
	KENYA	0.1	Y						CE&SF not by IOTC standard. Spatial information not defined
	AUSTRALIA	0.1	BY						
	MOZAMBIQUE	0.1	YB						SF data only availabe for 1 tropical tuna species (BET)
	MADAGASCAR	0.0	YB						
	INDIA	0.0							No activity from commercial vessel, only research vessels
	NEI.FRESH	0.0							
	NEI.FROZEN	0.0							
	BELIZE	0.0							No activity in Indian Ocean in 2018
	PHILIPPINES	0.0							No activity in Indian Ocean in 2018
	TANZANIA	0.0							No activity in Indian Ocean in 2018
	THAILAND	0.0							No activity in Indian Ocean in 2018
	VANUATU	0.0							No activity in Indian Ocean in 2018
Other fleets	MALDIVES	147.6	SY						SF not reported for all fisheries
	IRAN ISLAMIC REP.	108.1	YS						CE for offshore fishery not by IOTC standard; Less than 1 fish per metric ton measured for some species/fisherie
	INDONESIA	92.1	SY						CE minor sample; Sf - less than 1 fish measured for some fisheries
	INDIA	74.5	YS						
	SRI LANKA	73.3	SY						Less than 1 fish per metric ton measured for some species
	OMAN	28.6	Y						Downloaded data, missing gear information
	YEMEN	20.0	Y						
	PAKISTAN	13.0	YS						
	COMOROS	8.4	SY						
	TANZANIA	4.3	Y						
	MADAGASCAR	1.5	SY						NC, CE & SF not reported for all fishing regions
	European Union	0.6	YS						SF only reported for EU-Reunion
	KENYA	0.2	YS						SF reported for some species, missing area information
	MOZAMBIQUE	0.2	YS						Inconsistencies in CE; SF available only for recreational & sport fisheries
	MAURITIUS	0.1	YS						
	JORDAN	0.1	SY						
	MALAYSIA	0.0	S						
	UK.TERRITORIES	0.0	Y						
	EAST TIMOR	0.0	Y						
	SEYCHELLES	0.0	Y						Catches aggregated by species group for some species(TUN/TUX);Incomplete CE, missing effort
	AUSTRALIA	0.0	SY						
	BANGLADESH	0.0	Y						Catches aggregated by Species group
	SOUTH AFRICA	0.0							No activity in Indian Ocean in 2018

Sps	Yellowfin tuna (**Y**), bigeye tuna (**B**) and skipjack tuna (**S**)
Gear	Industrial purse seine (PS), industrial longline (LL) or other gears (pole-and-line; small purse seines, large and small gillnets, and small lines)
1	Freezing longliners whose catches are not reported by the flag states concerned
2	Fresh-tuna longliners whose catches are not reported by the flag states concerned

[4] Note that Tables 4i-4v disregard blank reports, i.e. fishing parties that did not report statistics for a species group will not show in the corresponding table.

Table3ii. Temperate tunas (ALB, SBF)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
PS	AUSTRALIA	5.3	S						
	European Union	0.1	A						Less than 1 fish per metric ton measured; EU.ESP submitted late/ no data reported for EU-ITA
	MAURITIUS	0.0	A						
	SEYCHELLES	0.0	A						
	INDONESIA	0.0	A						CE not by IOTC standard missing schooltype information
LL	CHINA	5.4	A						
	TAIWAN,CHINA	26.4	A						
	JAPAN	3.9	SA						
	MALAYSIA	1.8	A						SF only reported for vessels operating in Western Indian Ocean
	INDONESIA	1.5	AS						CE minor sample; SF data from observer program
	SEYCHELLES	0.6	A						
	KOREA REP.	0.5	AS						Less than 1 fish measured per metric ton
	European Union	0.2	A						CE: EU-Spain only reported Swordfish; SF not reported for all fleet
	SOUTH AFRICA	0.1	AS						NC, CE & SF data aggregated for local LL and chartered vessel
	SRI LANKA	0.1	AS						
	OMAN	0.1	A						
	MAURITIUS	0.0	A						SF not reported for vessels more than 24m
	MADAGASCAR	0.0	A						
	AUSTRALIA	0.0	A						
	MALDIVES	0.0	A						
	MOZAMBIQUE	0.0	A						
	KENYA	0.0	A						CE not by IOTC standard. Spatial information not defined
	NEI.FRESH								
	NEI.FROZEN								
	TANZANIA								No activity in Indian Ocean in 2018
	INDIA								No activity in Indian Ocean in 2018
	BELIZE								No activity in Indian Ocean in 2018
	PHILIPPINES								No activity in Indian Ocean in 2018
	THAILAND								No activity in Indian Ocean in 2018
	VANUATU								No activity in Indian Ocean in 2018
OTH	INDONESIA	4.8	A						CE minor sample; SF not reported for all coastal fisheries
	MAURITIUS	0.1	A						Less than 1 fish per metric ton measured
	European Union	0.1	A						SF not reported for coastal fisheries
	SRI LANKA	0.0	A						
	COMOROS	0.0	A						
	MOZAMBIQUE	0.0	A						
	MALDIVES	0.0	A						
	AUSTRALIA	0.0	AS						

Sps Southern bluefin tuna (**S**) and albacore (**A**)
Gear Industrial purse seine (PS), industrial longline (LL) or other gears (OTH: pole-and-line; small purse seines, large and small gillnets, and small lines)
1 Freezing longliners whose catches are not reported by the flag states concerned
2 Fresh-tuna longliners whose catches are not reported by the flag states concerned

Table 3iii. Billfish (SWO, BLM, BUM, MLS, SFA, *SSP*)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
PS	INDONESIA	0.2	**SM**						Low CE; Not by IOTC standard missing schooltype information
	European Union	0.0	**M**						No data submitted for EU-ITA
	KOREA REP.	0.0	M						
LL	CHINA	3.0	SM						Less than 1 fish per metric ton measured
	TAIWAN,CHINA	10.2	SM						Less than 1 fish per metric ton measured for some species (FLL)
	European Union	4.3	SM						EU-Spain: CE only for SWO; Less than 1 fish measured for some fleets
	SEYCHELLES	3.7	SM						Less than 1 fish per metric ton measured for the insdustrial longline
	SRI LANKA	3.4	SM						
	JAPAN	0.7	SM						SF data from observer program only & no report submitted, less than 1 fish per metric tons
	MAURITIUS	0.4	SM						Less than 1 fish measured per metric ton for some species
	KENYA	0.3	SM						CE&SF not by IOTC standard. Spatial information not defined
	MALAYSIA	0.3	SM						
	INDONESIA	0.2	MS						
	KOREA REP.	0.2	SM						
	AUSTRALIA	0.2	SM						
	SOUTH AFRICA	0.1	SM						
	MALDIVES	0.1	S						
	MOZAMBIQUE	0.1	MS						
	MADAGASCAR	0.0	SM						SF only available for 1 Billfish species (SWO)
	OMAN	0.0	M						
	INDIA	0.0							
	NEI.FRESH	0.0							
	NEI.FROZEN	0.0							
	TANZANIA								No activity in Indian Ocean in 2018
	THAILAND								No activity in Indian Ocean in 2018
	BELIZE								No activity in Indian Ocean in 2018
	PHILIPPINES								No activity in Indian Ocean in 2018
	VANUATU								No activity in Indian Ocean in 2018
Other fleets	IRAN ISLAMIC REP.	20.5	FM						
	INDIA	18.4	FM						
	SRI LANKA	14.3	SM						Less than 1 fish per metric ton; not available for all coastal fisheries
	PAKISTAN	8.0	FM						
	INDONESIA	3.4	MF						
	TANZANIA	2.7	F						
	OMAN	1.8	F						Downloaded data, missing gear & species details
	MADAGASCAR	0.8	FM						NC, CE & SF not reported for all fishing regions
	KENYA	0.5	F						
	MALDIVES	0.5	SM						
	COMOROS	0.4	SM						Less than 1 fish measured per ton for some fisheries
	European Union	0.4	F						SF data only available for La Reunion
	YEMEN	0.2	F						
	UN. ARAB EMIRATES	0.1	F						
	MOZAMBIQUE	0.1	M						CE Effort for coastal fisheries are likely to be incomplete
	MALAYSIA	0.0	M						
	SEYCHELLES	0.0	M						
	SAUDI ARABIA	0.0	F						
	ERITREA	0.0	F						
	UK TERRITORIES	0.0							

Sps Swordfish (**S**), blue marlin and/or black marlin and/or striped marlin (**M**), Indo-Pacific sailfish (**F**) and short-billed spearfish (**P**)
Gear Industrial purse seine (PS), industrial longline (LL) or other gears (pole-and-line; small purse seines, large and small gillnets, and small lines)
1 Freezing longliners whose catches are not reported by the flag states concerned
2 Fresh-tuna longliners whose catches are not reported by the flag states concerned

Table 3iv. Neritic tunas (BLT, FRI, LOT, KAW, COM, GUT)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
PS	INDONESIA	40.5	FK						CE not by IOTC standard missing schooltype information
	European Union	1.3	F						Statistics refers mostly to discards/ missing data for 1 member (EU-ITA)
	IRAN ISLAMIC REP.	1.0	L						
	SEYCHELLES	0.2	F						Statistics incomplete refers mostly to discard
	KOREA REP.	0.0							
	THAILAND	0.0							
	PHILIPPINES	0.0							
LL	INDONESIA	0.4	L						CE minor sample
	CHINA	0.0							
	TAIWAN,CHINA	0.0	L						
	SRI LANKA	0.0	F						Less than 1 fish meausred per metric ton for some species
	European Union	0.0	X						SF reported for KAW only
	MAURITIUS	0.0	X						
	AUSTRALIA	0.0							
	SOUTH AFRICA	0.0							
	INDIA	0.0							No activity from commercial vessel, only research vessels
	NEI.FRESH	0.0							
	NEI.FROZEN	0.0							
Other fleets	INDONESIA	145.1	FC						CE minor sample
	IRAN ISLAMIC REP.	141.7	LK						CE for offshore fishery not by IOTC standard; Less than 1 fish per metric ton measured for some species
	INDIA	103.1	CK						
	PAKISTAN	38.2	LK						
	OMAN	36.3	L						Downloaded data, missing gear information
	MALAYSIA	21.4	KC						
	UN. ARAB EMIRATES	19.6	C						
	THAILAND	15.6	KL						Less than 1 fish per metric tonne measured
	MYANMAR	11.9	CG						
	SRI LANKA	10.1	KC						Less than 1 fish per metric tonne measured for some fisheries
	YEMEN	9.0	CK						
	SAUDI ARABIA	8.3	FK						
	MADAGASCAR	6.0	CK						NC, CE & SF not reported for all fishing regions
	MOZAMBIQUE	5.0	C						Inconsistencies in CE; SF available only for recreational & sport fisheries
	TANZANIA	3.4	C						
	QATAR	2.5	C						
	KENYA	0.7	KC						SF reported for some species, missing area information
	EGYPT	0.7	CK						
	MALDIVES	0.5	F						SF not reported for all fisheries
	DJIBOUTI	0.3	X						
	COMOROS	0.3	K						
	AUSTRALIA	0.2	C						
	KUWAIT	0.2	C						
	European Union	0.1	C						SF only reported for EU-Reunion
	BANGLADESH	0.1	C						Catches aggregated by Species group
	ERITREA	0.1	C						
	JORDAN	0.1	KC						
	BAHRAIN	0.1	C						
	SUDAN	0.0	C						
	UK.TERRITORIES	0.0	K						
	MAURITIUS	0.0	X						
	SEYCHELLES	0.0	X						Catches aggregated by species group(TUN/TUX); missging effort

Sps Longtail tuna (**L**), frigate tuna and/or bullet tuna (**F**), kawakawa (**K**), narrow-barred Spanish mackerel (**C**), Indo-Pacific king mackerel (**G**), Seerfish(X)

Gear Industrial purse seine (PS), industrial longline (LL) or other gears (pole-and-line; small purse seines, large and small gillnets, and small lines)

1 Freezing longliners whose catches are not reported by the flag states concerned

2 Fresh-tuna longliners whose catches are not reported by the flag states concerned

Bycatch levels (Table 3v): Some CPCs (China, Sri Lanka, Maldives, Mozambique, Mauritius, Indonesia, Australia, Korea, South Africa, EU) provided partial estimates of bycatch levels for their fisheries for 2018, including bycatch levels for sharks, seabirds or marine turtles. Despite better reporting levels recorded for bycatch data in 2018, few statistics are still available for sharks, seabirds, sea turtles and other non-IOTC species caught by fleets targeting tunas and / or tuna-like species: for this reason, the quality of the data available remains still poor. In the case of sharks, the statistics are seldom available by shark species and usually refer to the carcasses that are retained on board, not including the amounts of sharks that are discarded.

Table 3v. Sharks seabirds and sea turtles*

Gear	Fleet	Species									Comments
		Sharks			ALV	OCS	RHN	Cetaceans	Sea Birds	Marine Turtles	
		NC	CE	SF							
PS	INDONESIA								n/a		
	European Union										Refers only to discards
	SEYCHELLES								n/a		
	KOREA REP.								n/a		Refers only to discards
	MAURITIUS								n/a		
	IRAN ISLAMIC REP.								n/a		
	AUSTRALIA								n/a		
	JAPAN								n/a		
	PHILIPPINES								n/a		
	THAILAND								n/a		
LL	INDONESIA										
	CHINA										
	TAIWAN,CHINA										EU-ESP: CE only reported for SWO, SF not available for all fleet
	European Union										ALV/OCS Fate of the sharks not specified (Turtle, seabird, cetacean, RHN from NR)
	SEYCHELLES										Reporting measurement of aggregated SKH;
	JAPAN										
	SRI LANKA										
	INDIA										No activity from commercial vessel, only research vessels
	KOREA REP.										ALV/OCS refers to discards
	MALAYSIA										
	SOUTH AFRICA										
	MAURITIUS										
	MALDIVES										Refers only to discards
	AUSTRALIA										
	MOZAMBIQUE										NC/CE only reported for BSH & aggregated MAK;
	MADAGASCAR										SF reported for one species only
	OMAN										
	NEI.FRESH										
	NEI.FROZEN										
	TANZANIA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	No activity in Indian Ocean in 2018
	BELIZE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	No activity in Indian Ocean in 2018
	PHILIPPINES	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	No activity in Indian Ocean in 2018
	THAILAND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	No activity in Indian Ocean in 2018
	VANUATU	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	No activity in Indian Ocean in 2018
Other Offshore & Coastal	INDONESIA				n/a	n/a	n/a	n/a	n/a	n/a	CE minor sample
	YEMEN AR RP				n/a	n/a	n/a	n/a	n/a	n/a	
	OMAN								n/a		NC not by species; Downloaded data, missing gear information
	IRAN I R								n/a		CE not by IOTC standard
	MADAGASCAR				n/a	n/a	n/a	n/a	n/a	n/a	NC, CE & SF not reported for all fishing regions
	PAKISTAN								n/a	n/a	
	SRI LANKA								n/a		
	BANGLADESH				n/a	n/a	n/a	n/a	n/a	n/a	NC not by species
	UN ARAB EMIRATES				n/a	n/a	n/a	n/a	n/a	n/a	
	TANZANIA				n/a	n/a	n/a	n/a	n/a	n/a	
	MALAYSIA				n/a	n/a	n/a	n/a	n/a	n/a	NC/CE not by species
	SAUDI ARABIA				n/a	n/a	n/a	n/a	n/a	n/a	
	ERITREA				n/a	n/a	n/a	n/a	n/a	n/a	
	KENYA				n/a	n/a	n/a	n/a	n/a	n/a	Missing area information for SF data
	SUDAN				n/a	n/a	n/a	n/a	n/a	n/a	
	SEYCHELLES				n/a	n/a	n/a	n/a	n/a	n/a	
	EGYPT				n/a	n/a	n/a	n/a	n/a	n/a	
	COMOROS				n/a	n/a	n/a	n/a	n/a	n/a	Less than 1 fish meausred for some species
	FRANCE OT				n/a	n/a	n/a	n/a	n/a	n/a	
	MAURITIUS				n/a	n/a	n/a	n/a	n/a	n/a	
	EUROPEAN UNION				n/a	n/a	n/a	n/a	n/a	n/a	NC/CE/SF not available for Mayotte
	AUSTRALIA				n/a	n/a	n/a	n/a	n/a	n/a	
	ERITREA				n/a	n/a	n/a	n/a	n/a	n/a	
	JORDAN				n/a	n/a	n/a	n/a	n/a	n/a	
	MALDIVES								n/a		Maldives banned catches of sharks in 2010
	BAHRAIN				n/a	n/a	n/a	n/a	n/a	n/a	
	DJIBOUTI				n/a	n/a	n/a	n/a	n/a	n/a	
	SUDAN				n/a	n/a	n/a	n/a	n/a	n/a	
	KUWAIT				n/a	n/a	n/a	n/a	n/a	n/a	
	SOUTH AFRICA				n/a	n/a	n/a	n/a	n/a	n/a	No activity in Indian Ocean in 2018
	EAST TIMOR				n/a	n/a	n/a	n/a	n/a	n/a	
	INDIA				n/a	n/a	n/a	n/a	n/a	n/a	NC aggregated by species group
	MOZAMBIQUE				n/a	n/a	n/a	n/a	n/a	n/a	NC/CE not by species

Catches of seabirds are not likely to occur (**n/a**) or may occur (**?**)
1 Freezing longliners whose catches are not reported by the flag states concerned
2 Fresh-tuna longliners whose catches are not reported by the flag states concerned

*ALV, OCS and RHN refer to *thresher sharks*, *oceanic whitetip shark* and *whale shark*, respectively, for which specific reporting requirements apply (ban on retention of catches and report on the number of sharks incidentally caught and released, and its fate; this measure is only in force for authorized vessels). Measures for seabirds and marine turtles apply only to authorized vessels.

Fishing craft statistics and active vessels (Table 3vi): The number of vessels fishing for IOTC species in the Indian Ocean is thought to be more accurate in recent years thanks to information collected after the implementation of IOTC Resolutions that call for countries to report yearly lists of domestic and foreign fishing vessels, information collected through the IOTC Transhipment Programme and market data provided by the International Seafood Sustainability Foundation (ISSF). Fishing craft statistics are generally available

for the same industrial fleets reporting total catches while are not available, incomplete or inaccurate for many artisanal fleets.

Table 3vi. Fishing craft statistics and list of active vessels

Gear	Fleet	Availability				SO	Comments
		Catch	Craft	FC	AV		
PS	European Union	291.6	26				Missing information for EU.ITA
	SEYCHELLES	123.3	13				
	INDONESIA	65.9	65				
	MAURITIUS	22.5	2				
	KOREA REP.	19.3	2				
	IRAN ISLAMIC REP.	5.3	7				
	AUSTRALIA	5.3	7				
	JAPAN	2.7	3				
	PHILIPPINES	0.0					No activity
	THAILAND	0.0					No activity
	SUPPLY VESSELS-NEI		16				Reported by flag countries and/or third parties
LL	CHINA	17.6	85				
	TAIWAN,CHINA	79.1	286				Downloaded data
	SEYCHELLES	17.8	70				
	SRI LANKA	13.8	20				Including semi-industrial longline
	JAPAN	11.5	46				
	European Union	10.5	40				
	INDONESIA	7.7	258				
	MALAYSIA	3.0	19				
	KOREA REP.	2.8	11				
	SOUTH AFRICA	1.4	20				
	MAURITIUS	0.8	13				
	KENYA	0.5	3				
	OMAN	0.3	1				
	AUSTRALIA	0.3	5				
	MALDIVES	0.2	3				
	MOZAMBIQUE	0.1	2				
	MADAGASCAR	0.1	5				
	INDIA	0.0					No activity from commercial vessel, only research vessels
	NEI.FROZEN	0.0					
	NEI.FRESH	0.0					
	TANZANIA						No activity
	BELIZE						No activity
	PHILIPPINES						No activity
	THAILAND						No activity
	VANUATU						No activity
	SENEGAL						No activity
	SIERRA LEONE						No information
	GUINEA						No information
Other Offshore & Coastal	IRAN ISLAMIC REP.	309.2	6,280				
	INDONESIA	270.2			n/a		
	INDIA	208.9			n/a		
	SRI LANKA	172.7	8,467				Not inclusive of small boats
	MALDIVES	148.6	549				Number refers to high seas boats only
	OMAN	78.2	24,414		n/a		Downloaded data
	PAKISTAN	66.2			n/a		
	YEMEN	36.1			n/a		
	MALAYSIA	22.7	12,430		n/a		
	UN. ARAB EMIRATES	20.1			n/a		
	TANZANIA	16.8			n/a		
	THAILAND	15.6	238		n/a		
	MADAGASCAR	14.0			n/a		
	MYANMAR	11.9			n/a		
	SAUDI ARABIA	9.5			n/a		
	MOZAMBIQUE	9.3	25		n/a		Refers only to semi-industrial vessels
	COMOROS	9.2			n/a		
	KENYA	2.9			n/a		
	QATAR	2.5			n/a		
	SEYCHELLES	2.3			n/a		
	European Union	1.4	266		n/a		
	BANGLADESH	0.7			n/a		
	EGYPT	0.2			n/a		
	DJIBOUTI	0.5			n/a		
	AUSTRALIA	0.3	43		n/a		
	ERITREA	0.3			n/a		
	MAURITIUS	0.3			n/a		
	JORDAN	0.2			n/a		
	KUWAIT	0.2			n/a		
	SUDAN	0.1			n/a		
	BAHRAIN	0.1			n/a		
	UK.TERRITORIES	0.0	47		n/a		Refers to (sport) baitboat vessels only
	EAST TIMOR	0.0			n/a		
	EAST TIMOR	0.0			n/a		
	SOUTH AFRICA						No activity in 2018
	SOMALIA				n/a		

1 Freezing longliners whose catches are not reported by the flag states concerned
2 Fresh-tuna longliners whose catches are not reported by the flag states concerned

Discard levels (Table 3vii): Below are summary tables by species groups of the information available for discards for the reference year 2018: discard levels are only available for Australia longliners, EU,France and EU,Spain purse seiners and longliners, India (exploratory longliners), Indonesia (longliners), Kenya (longliners), Republic of Korea purse seiners and longliners, Maldives longliners, Malaysia (nil), Mauritius

purse seiners, Mozambique longliners, Seychelles semi-industrial longliners and purse seiners (nil), South Africa longliners (foreign & local fleets), Sri Lanka (all gears), the UK Overseas Territories (nil discards), China and Taiwan,China longliners.

Discard rates are believed to be high for fisheries using longlines and oceanic gillnets, and moderate for purse seine sets on associated schools (mainly with FADs). However, the nets attached to FADs may also contribute substantially to *ghost fishing*.

Table 3vii. Discards (IOTC species)

COUNTRY	FISHERY	UNIT	TUNAS					SEERFISH			BILLFISH						
			Yellowfin tuna	Bigeye tuna	Skipjack tuna	Albacore	Southern bluefin tuna	Frigate tuna	Bullet tuna	Wahoo	Swordfish	Blue Marlin	Black Marlin	Striped marlin	Indo-Pacific sailfish	Short-billed spearfish	Marlins and sailfish
Australia	Longline	Number	57	401	4	77	8			4	180		7	3		2	
EU.Spain	Purse Seine	Round weight	83	24	348	17		582		165	3		43	2	0	0	
EU.France	Purse Seine	Round weight		16					2			38	4				2
Kenya	Longline	Number	3	1							158						
Korea	Longline	Number	56	3	1	7					1				2		
	Purse Seine	Round weight			220								3				
EU.Reunion	Longline	Number		39		29							1				
Grand Total			199	484	573	130	8	582	2	169	342	38	58	5	2	2	2

Table 3vii. Discards (Sharks)

COUNTRY	FISHERY	UNIT	SHARKS																						
			Bigeye thresher	Blacktip reef shark	Blue shark	Carcharhinus sharks	Copper shark	Crocodile shark	Dusky shark	Giant Mantas	Grey Reef Shark	Hammerhead sharks	Longfin mako	Mako sharks	Oceanic whitetip shark	Pelagic thresher shark	Porbeagle	Scalloped hammerhead	Sharks various nei	Shortfin mako	Silky shark	Smooth hammerhead	Spinetail mobula	Thresher Shark	Thresher sharks nei	Tiger shark
Australia	Longline	Number			2624			3514		45					52		5			257						3
China	Longline	Number										743	750		1405						879				1206	
EU.Spain	Purse Seine	Round weight																			525					
EU.France	Purse Seine	Round weight			1																					
Indonesia	Longline	Number	15		300			148	2				5		10	2	1	1		13	12	1				3
Kenya	Longline	Number	10				10			1			1		89	1	15	2		1	83	6	15			
Korea	Longline	Number	3	37	5045							2			7	2	15			33	65					
	Purse Seine	Round weight																			2					
		Number													15											
Sri Lanka	Gillnet	Number													9									5		
	Longline	Number													63						5			174		
	Purse Seine	Number																						15		
Maldives	Longline	Number												10	6				2		7			12		
Mauritius	Purse Seine	Number																								
EU.Reunion	Longline	Number	4	16	651	24					2										43					
South Africa	Longline	Number	9												2	2	6				42	1		40		
Grand Total			41	53	8621	24	10	3662	2	46	2	745	756	10	1658	7	42	3	2	304	1663	8	15	246	1206	6

Table 3vii. Discards (marine mammals, seabirds and turtles)

COUNTRY	FISHERY	UNIT	MAMMALS	SEABIRDS										TURTLE					
			Bottlenose dolphin	Atlantic Yellow-nosed	Black-browed Albatross	Flesh-footed shearwat	Light-mantled sooty	Salvin's albatross	Sooty albatross	Wandering Albatross	White-capped Albatross	White-chinned Petrel	Yellow-nosed albatross	Green turtle	Hawksbill turtle	Leatherback turtle	Loggerhead turtle	Marine turtles	Olive ridley turtle
EU.Spain	Purse Sein	Round weight												0	0		0		1
Indonesia	Longline	Number	2			8													12
India	Longline	Number																	3
Korea	Purse Sein	Number																	1
Sri Lanka	Gillnet	Number												854	212	22	12		374
	Longline	Number												88		41			5
	Purse Sein	Number												6	151	8	3		26
Maldives	Longline	Number																8	
Mozambique	Longline	Number																9	
Mauritius	Purse Sein	Number												2	1			1	2
Taiwan	Longline	Number			1		1	1	7	2	5	17	6			1	10		1
South Africa	Longline	Number		1								15				1	5		
Grand Total			**2**	**1**	**1**	**8**	**1**	**1**	**7**	**2**	**5**	**32**	**6**	**950**	**364**	**73**	**30**	**18**	**425**

Table 3vii. Discards (others)

COUNTRY	FISHERY	UNIT	OTHERS																								
			Barracudas	Batfishes	Bigeye trevally	Brama	Carangids nei	Common dolphinfish	Dolphinfishes nei	Flat needlefish	Globefish, porcupin	Great barracuda	Hound needlefish	Lancetfishes nei	Long snouted lancetfish	Longfin batfish	Longfin yellowtail	Mackerel scad	Needlefishes, etc. nei	Ocean sunfish	Ocean triggerfish	Other non tuna-like fishes nei	Pompano dolphinfish	Scribbled leatherjac. filefish	Sharptail mola	Tripletail	Unicorn leatherjacket filefish
EU.Spain	Purse Seine	Round weight						634			0	12					0	14		1	114				1	11	
EU.France	Purse Seine	Round weight		0	0		0			0			0			1			0		146		0	0			5
Kenya	Longline	Number	1					1																			
		Round weight				79																					
Korea Rp	Longline	Number																				312					
EU.Reunion	Longline	Number						2	3					298	32												
Grand Total			**1**	**0**	**0**	**79**	**0**	**637**	**3**	**0**	**0**	**12**	**0**	**298**	**32**	**1**	**0**	**14**	**0**	**1**	**260**	**312**	**0**	**0**	**1**	**11**	**5**

FADs and supply vessels (Resolutions 15/02 and 19/02): In 2018 submission form for activities of Floating Objects (FOBs) was amended to also record information on the *ownership* of the Floating Objects (FOBs). In 2019 for the submission of 2018 data, most of the CPCs with purse seine fisheries used the updated format to report FOBs type, interaction and ownership, with Mauritius reporting complete FOBs activities also for its supply vessels .

Japan, EU,France, Mauritius and Rep. of Korea are the only CPCs that have fully or partially provided information on FOBs and supply vessels as requested in IOTC Resolutions 15/02 and 19/02. A summary of the status of data reporting for FOBs and supply vessels is provided below (green reflecting reporting, red non-reporting; & grey not applicable):

	FOBs	FOBs ownership	Supply vessels (days at sea)
EU.FRANCE	Yes	Yes	Yes
EU.SPAIN	No	No	Yes
EU.ITALY	No	No	No
KOREA	Yes	Yes	Yes
JAPAN	No	No	No
INDONESIA	No	No	No
MAURITIUS	Yes	Yes	Yes
SEYCHELLES	Yes	No	Yes
AUSTRALIA	NA	NA	NA
I.R.IRAN	No	No	No

No data was received for other fleets on FOBs or activities of supply vessels from the remaining PS fleets (including I.R. Iran, Japan and Indonesia).

3. Status of the IOTC nominal catches (NC), catch-and-effort (CE) and size-frequency (SF) databases

Tables 4a-f show the presumed quality of the nominal catches of tropical tunas, temperate tunas, billfish and neritic tunas for the last forty years (1979-2018), by species, and year (overall, Fig.4a, and by type of fishery Figs. 4b-f). Keys to the scoring system used to assess the quality of the statistics available for each species are presented below.

Figure 2 shows the proportion of nominal catches, catch and effort, and size frequency data that are presumed uncertain for the period 1979-2018, by main fleet and species group, including tropical and temperate tunas, billfish, and neritic tunas.

Figures 3a-7a present the importance that catches of each species group under each individual gear had over the total catches for that same group during the last decade (2009-2018), all gears combined. Figures 3b-7b show the proportion of catches that are presumed uncertain for the period 1979-2018, by type of dataset, main fleet and fishery: it is important to note that the quality of the statistics for the last two years is likely to improve in the future, as more information is collected from the fisheries and reported to the Secretariat.

Key to tables 4(a-f) and scoring system used to assess the quality of statistics of IOTC species available in the IOTC databases:

Key:

Species	Species code (Albacore ALB; bigeye tuna BET; black marlin BLM; bullet tuna BLT; blue marlin BUM; narrow-barred Spanish mackerel COM; frigate tuna FRI; Indo-Pacific king mackerel GUT; kawakawa KAW; longtail tuna LOT; striped marlin MLS; southern bluefin tuna SBF; Indo-Pacific sailfish SFA; skipjack tuna SKJ; swordfish SWO; yellowfin tuna YFT)
%Catch	Contribution (in %) that the catches of the species make out of the total combined catches of all IOTC species, over the entire time series of catch
Yfirst	Availability and quality of data in the IOTC database for the year, species, and gear concerned, by type of dataset
Ylast	

e.g.;

Species	%Catch	YearYY

$Species_1^n$ — % Catch, as defined above

- Availability and quality of **nominal catch** data
- Availability and quality of **catch-and-effort** data
- Availability and quality of **size frequency** data

Key to IOTC Scoring system

Nominal Catch	By species	By gear
Fully available	0	0
Partially available (part of the catch not reported by species/gear)*	2	2
Fully estimated (by the IOTC Secretariat)	4	4

*Catch assigned by species/gear by the IOTC Secretariat; or 15% or more of the catches remain under aggregates of species

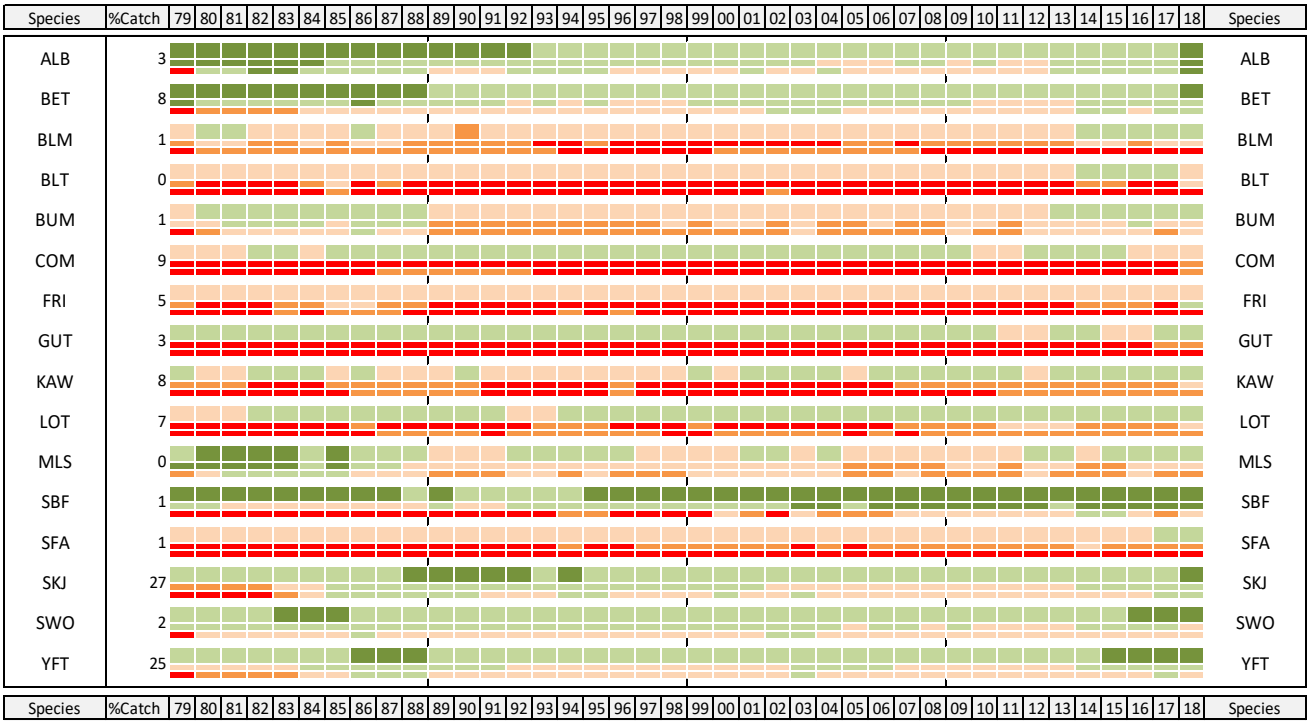
Catch-and-Effort	Time-period	Area
Available according to standards	0	0
Not available according to standards	2	2
Low coverage (less than 30% of total catch covered through logbooks)	2	
Not available at all	8	

Size frequency data	Time-period	Area
Available according to standards	0	0
Not available according to standards	2	2
Low coverage (less than 1 fish measured by metric ton of catch)	2	
Not available at all	8	

Key to colour coding

- Total score is 0 (or average score is 0-1)
- Total score is 2 (or average score is 1-3)
- Total score is 4 (or average score is 3-5)
- Total score is 6 (or average score is 5-7)
- Total score is 8 (or average score is 7-8)

Table 4a. Overall status of IOTC catch, effort, and size frequency statistics, by year and species (1979-2018)



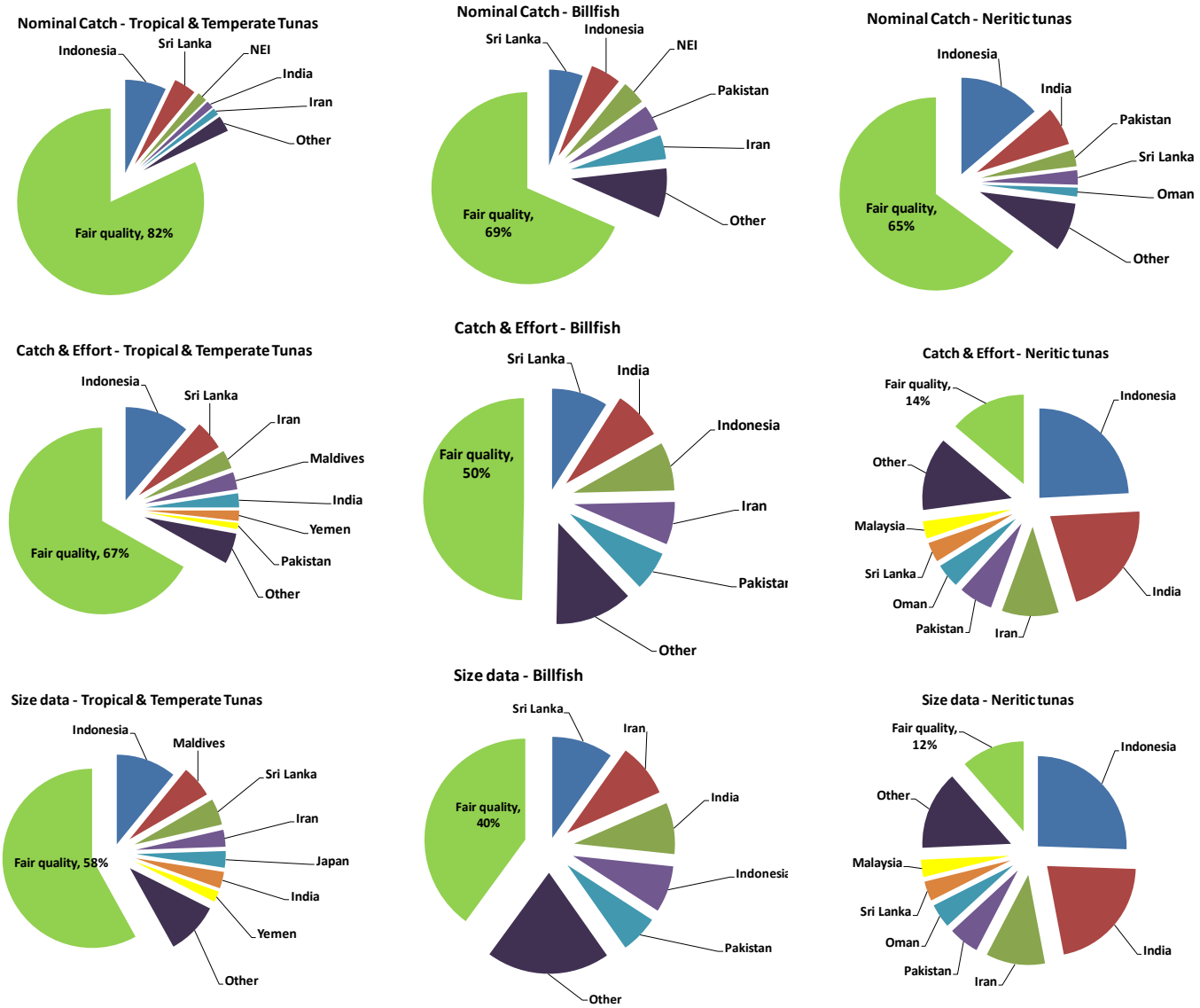
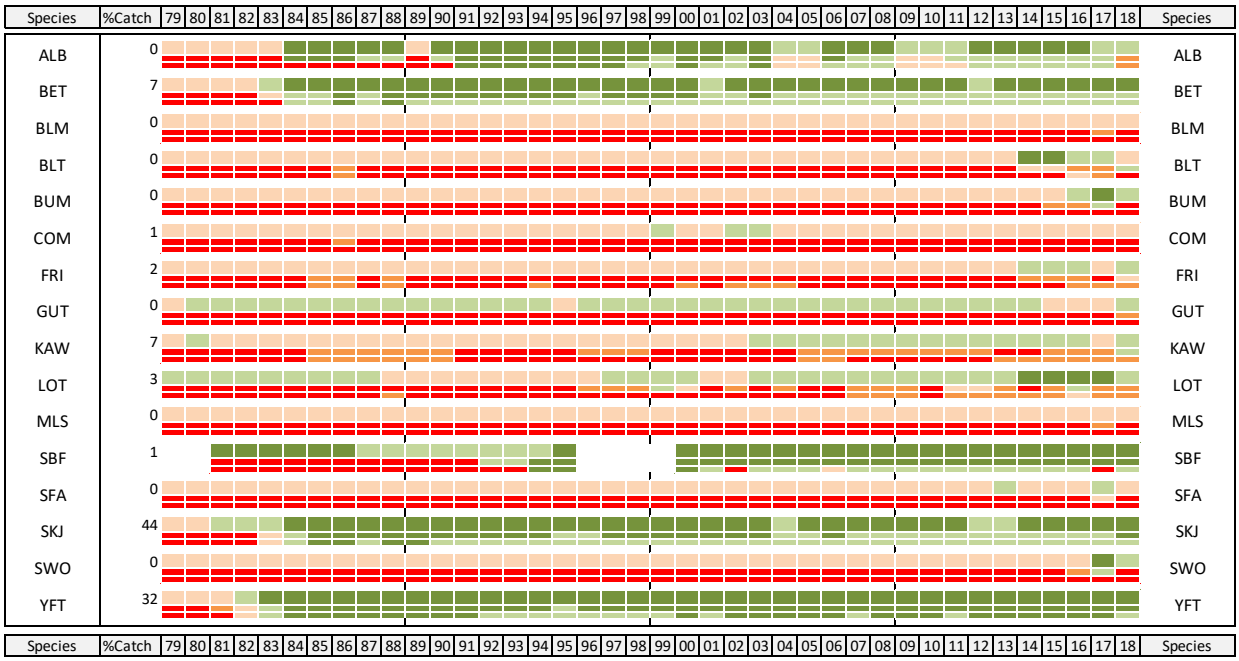
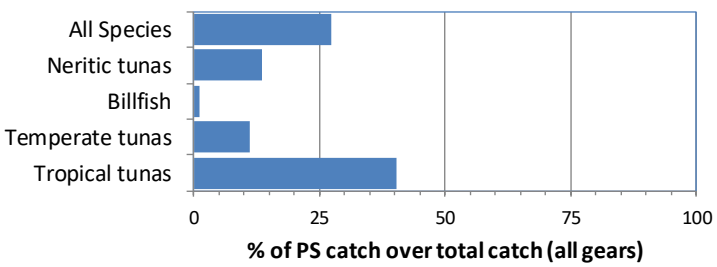


Fig. 2. Presumed uncertainty of the nominal catch (top row), catch-and-effort (middle row), and size data (bottom row) available in the IOTC databases for tropical and temperate tunas, billfish, and neritic tunas, and main fleets that contribute to that uncertainty, for the period 1979-2018 (all gears combined).

Surface fisheries: Purse seine

Table 4b. Status of IOTC catch statistics for purse seine fisheries, by year and species (1979-2018)





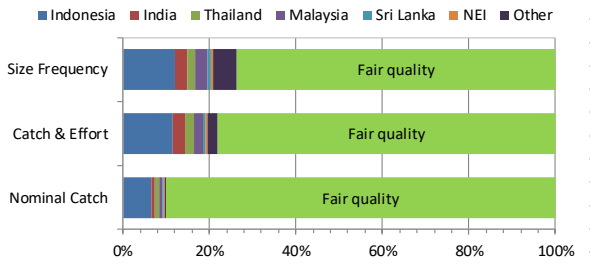


Fig. 3. (**a**, left) Contribution (in %) from purse seine catches over catches of all fisheries combined, for each species group and for all species combined (2009-2018), (**b**, right) Amount of PS statistics (in % over the total PS catch 1979-2018) presumed to be uncertain, by type of dataset and fleet

Overall, nominal catches recorded for purse seine fisheries in the IOTC database are considered of **fair to good quality**, particularly for tropical and temperate tuna species (Table 4b). Purse seiners target tropical tunas or neritic tunas, depending on the type of vessel and area of operation.

During the last decade, **purse seine gears have reported over 27% of the catches of IOTC species in the Indian Ocean**, especially for tropical tunas (≈40%), neritic tunas (≈14%), and temperate tunas (≈11%, the majority southern Bluefin tuna) (Fig. 3.a).

Over the last forty years (1979-2018), over **90% of the nominal catches**, **78% of the catch-and-effort**, and **74% of the size frequency statistics** of purse seine fisheries recorded in the IOTC database are considered of good quality (Fig. 3.b).

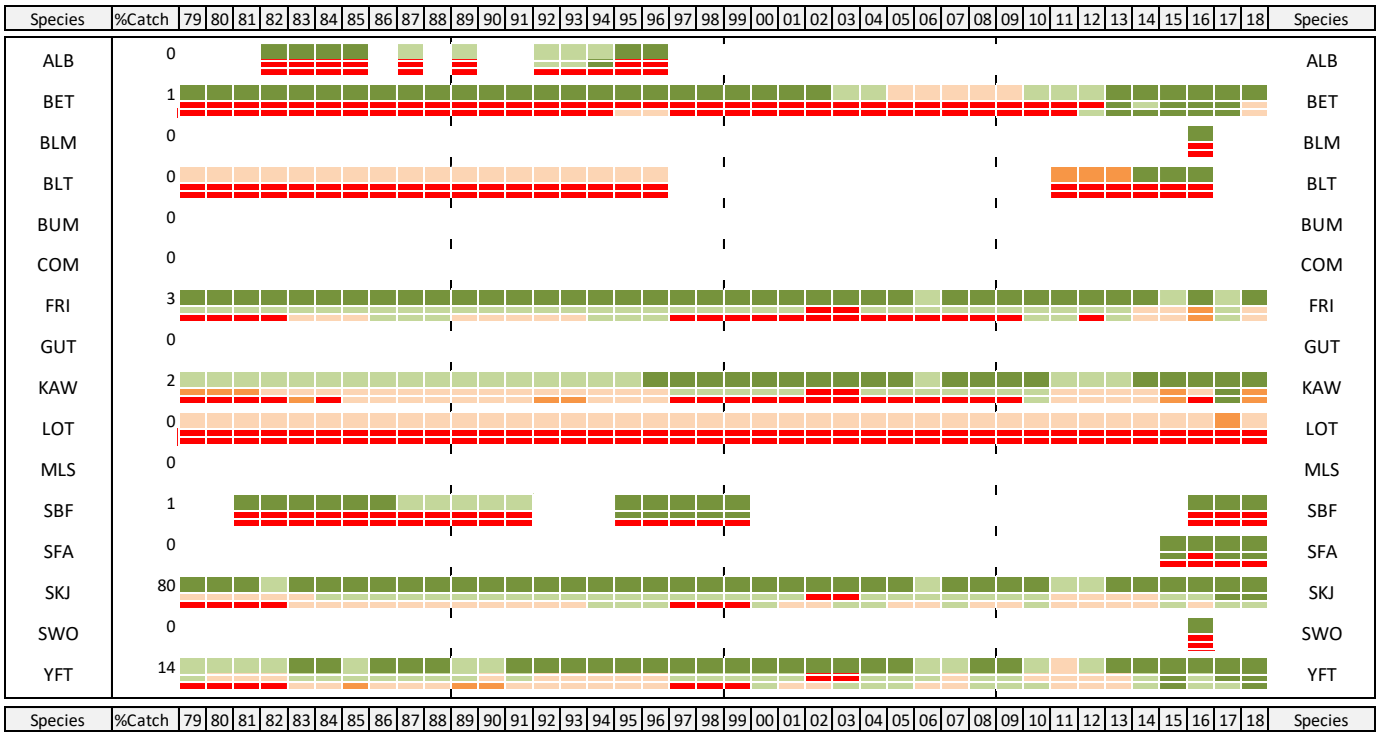
The statistics for the following purse seine fleets are of uncertain quality (1979-2018):

- **Indonesia**: in 2019, Indonesia reported for the first time catch and effort for its coastal and industrial purse seine fisheries (reference year 2018). However, the coverage is relatively low (less than 5% of logbooks) and less species were monitored from the catch and effort compared to the list of species reported for the nominal catch. The time-area information reported for the industrial fisheries shows that these vessels are mostly operating within the EEZ of Indonesia, hence the species caught are similar to those caught by the coastal purse seine fishery that was received separately. Due to persisting uncertainties in the coastal fishery catches, the IOTC Secretariat estimated catches for the coastal purse seines targeting neritic-tunas from the total aggregated catches reported by the country; since 2006 Indonesia has been reporting catches by gear to the Secretariat, but the completeness and quality of the datasets reported remains uncertain. Indonesia reported size frequency for the tropical species for the coastal purse seine fishery only.

- **Thailand**: The catches of large and coastal purse seine vessels reported by Thailand are not fully reported by species; this affects the quality of the nominal catches and catch-and-effort of both tropical tunas and neritic tunas. In 2015, Thailand began reporting size data for its coastal purse seine fisheries. In 2016 Thailand reported some historical size frequency data for the neritic species for year 2005 to 2012. The main Thai large (offshore) PS fleet no longer operates in the Indian Ocean, since moving to the Atlantic Ocean in July 2010. Thailand recently registered a large purse seine vessel, but the vessel only targets small pelagic species in the Western Indian Ocean. The is no longer operating in Indian Ocean
- **India**: To date, India has not reported catch-and-effort and size data for its purse seine fisheries.
- **Japan**: Japan has only reported size data for its purse seine fisheries in recent years.
- **NEI**: The catches of ex-Russian vessels, recorded under the flag of Belize and other unidentified flags, were estimated by the Secretariat in the past; between 2005 and 2010 these vessels operated under the flag of Thailand for which the statistics are considered of better quality. However, the amount of size data available for this fleet is very low.

Surface fisheries: Pole-and-line

Table 4c. Status of IOTC catch statistics for pole-and-line fisheries, by year and species (1979-2018)



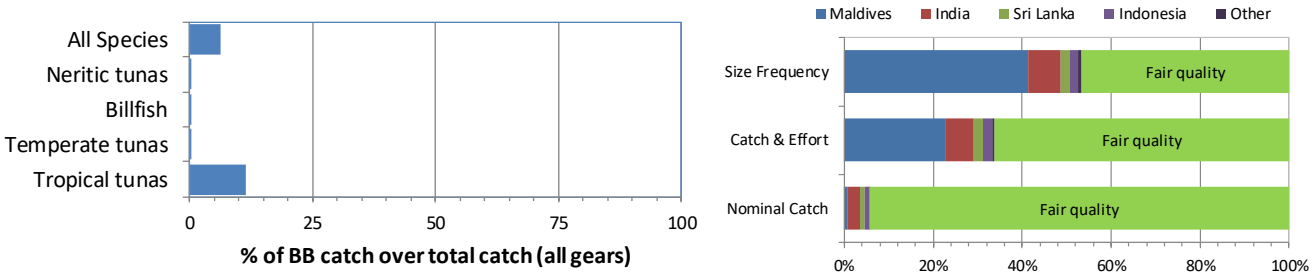


Fig. 4. (**a**, left) Contribution (in %) from pole-and-line catches over catches of all fisheries combined, for each species group and for all species combined (2009-2018), (**b**, right) Amount of BB statistics (in % over the total BB catch 1978-2017) presumed to be uncertain, by type of dataset and fleet

Overall, the nominal catches recorded for pole-and-line fisheries in the IOTC database are considered of **fair to good quality** (Table 4c). Baitboats target tropical tunas in the Indian Ocean: over the last forty years (1979-2018) over 90% of baitboat catches were accounted for by tropical tunas (% Catch column, Table 4c)).

During the last decade, **pole-and-line gears caught around 6% of the IOTC species in the Indian Ocean**, especially tropical tunas (≈11%) (Fig. 4.a).

Over the last forty years (1979-2018), over **94% of the nominal catches**, **66% of the catch-and-effort**, and **47% of the size frequency statistics** of pole-and-line fisheries recorded in the IOTC database are considered of good quality (Fig. 4.b).

The statistics for the following baitboat fleets are considered of uncertain quality, for the species and time-periods identified (1979-2018):

- **India (Lakshadweep)**: The Secretariat estimated catches for the pole-and-line fishery of India from the total aggregated catches for years in which the catches reported by gear for India are inconsistent. Apart from a partial report of catch-and-effort data for 2013, India has not reported catch-and-effort and size data for its pole-and-line fisheries to date.
- **Sri Lanka**: Since 2014 Sri Lanka is collecting and reporting logbook data from the offshore fisheries, however catches for the coastal fisheries are still considered to be uncertain.
- **Indonesia**: The Secretariat estimated catches for the pole-and-line fishery component from the total aggregated catches reported by Indonesia; since 2006 Indonesia has been reporting catches by gear to the Secretariat but the completeness and quality of the datasets reported remains uncertain. To date, Indonesia has not reported catch-and-effort and size data for its pole-and-line fisheries.

Surface fisheries: Gillnet

Table 4d. Status of IOTC catch statistics for gillnet fisheries, by year and species (1979-2018)

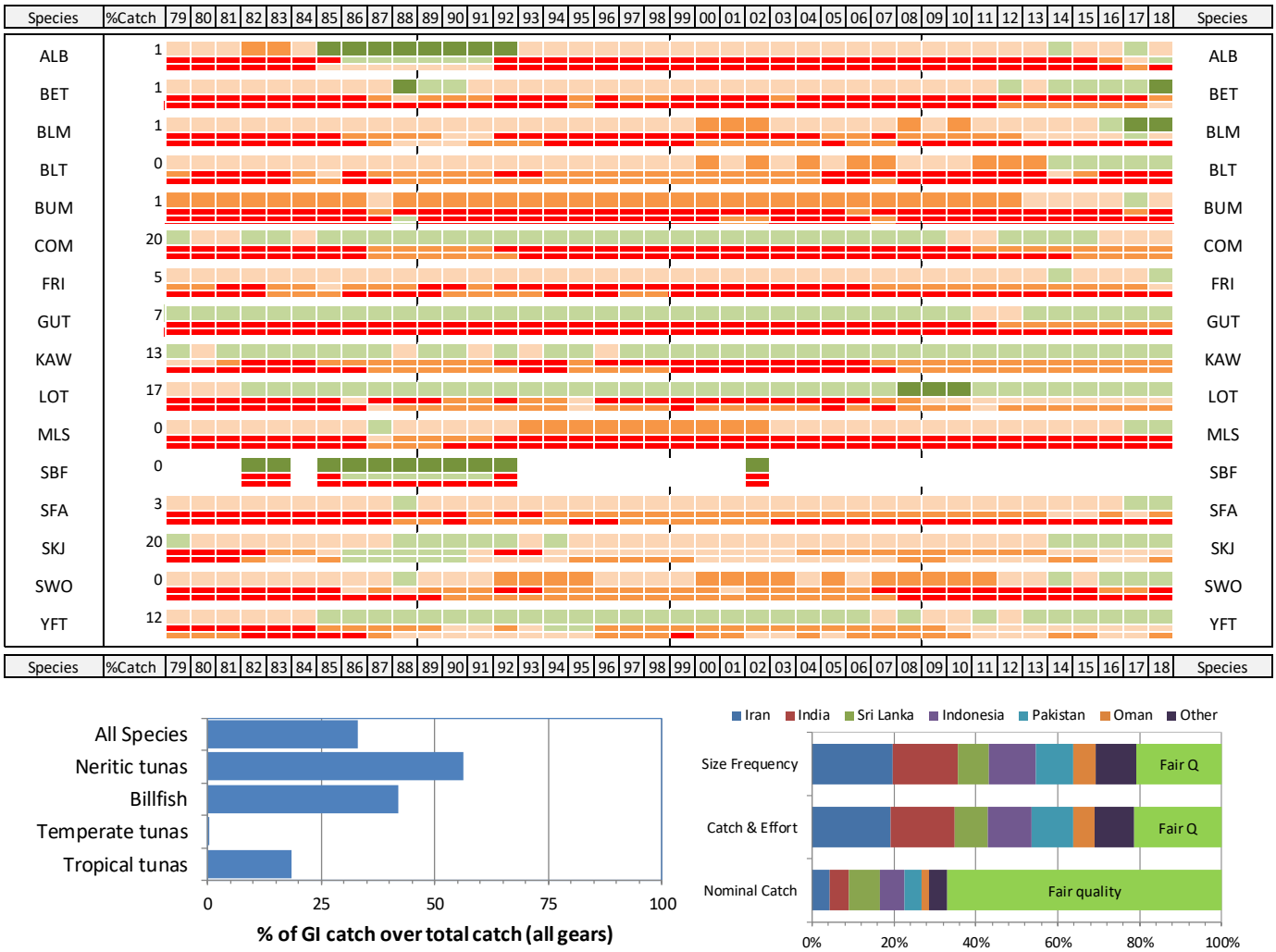


Fig. 5. (**a**, left) Contribution (in %) from gillnet catches over catches of all fisheries combined, for each species group and for all species combined, (**b**, right) Amount of GI statistics (in % over the total GI catch 1979-2018) presumed to be uncertain, by type of dataset and fleet.

Overall, the nominal catches recorded for gillnet fisheries in the IOTC database are considered of **poor to fair quality**, depending on the fleet and time period (Table 4d)). Over the last forty years (1979-2018) around ≈62% of the gillnet catches were composed of neritic tunas and ≈33% of tropical tunas.

During the last decade, **gillnet gears caught around 33% of the IOTC species in the Indian Ocean**, especially neritic tunas (≈56%), billfish (≈42%) and tropical tunas (≈19%) (Fig. 5.a)).

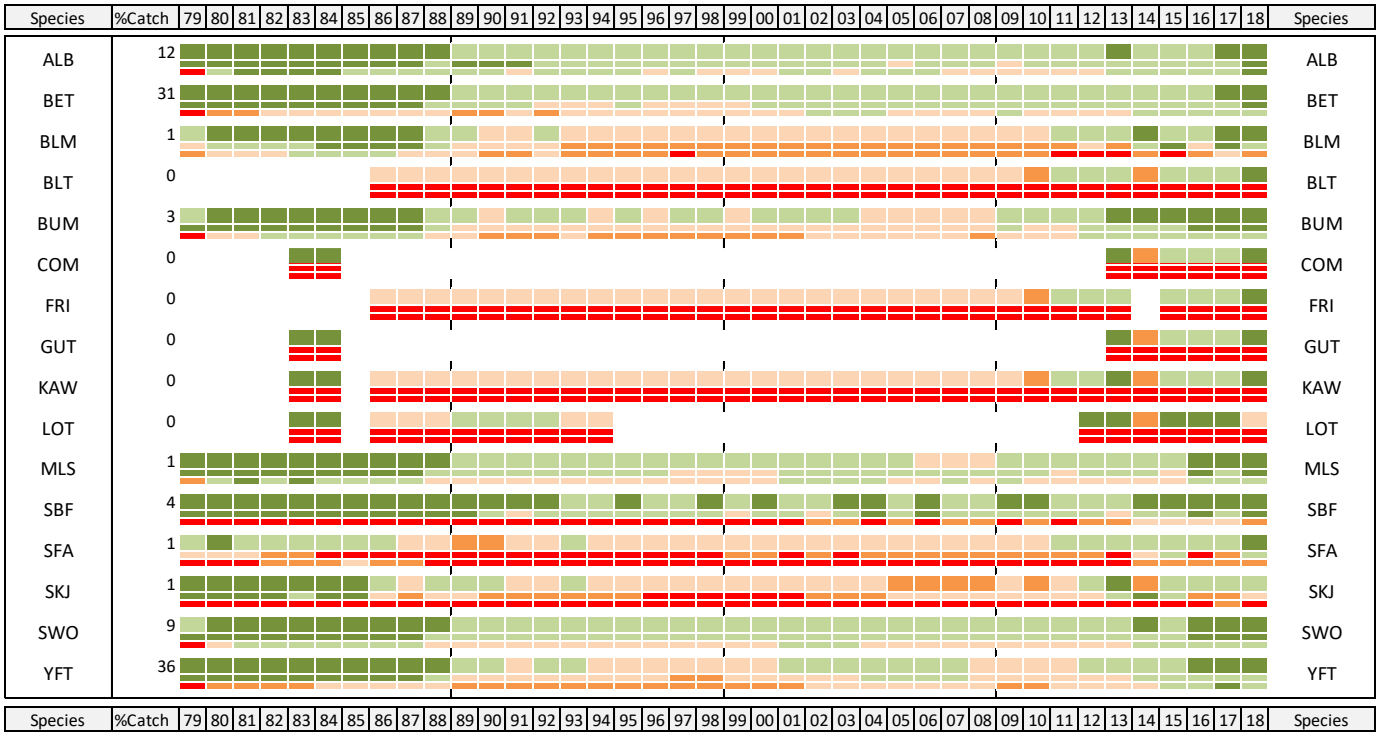
Over the last forty years (1979-2018), **≈67% of the nominal catches**, **≈21% of the catch-and-effort**, and **≈21% of the size frequency statistics** of gillnet fisheries recorded in the IOTC database are considered of **good quality** (Fig. 5.b)

The statistics for the following gillnet fleets are considered of uncertain quality (1979-2018):

- **I.R. Iran**: Since 2018 I.R. Iran, with the assistance of the IOTC Secretariat, has submitted catch-and-effort data for its coastal fisheries according to the IOTC reporting standards (from 2007 onwards). Data for offshore gillnets is provided separately and now disaggregated by month but not yet by grid / area.
- **India**: The Secretariat estimated catches for the gillnet fishery of India from the total aggregated catches for years in which the catches by gear for India were inconsistent, and this severely affected the quality of catches of neritic tunas. To date, India has not reported catch-and-effort and size data for its gillnet fisheries.
- **Sri Lanka**: Since 2014 Sri Lanka has been collecting logbook data from the offshore fisheries and started reporting catches for these same fisheries according to IOTC standards. Catches for the coastal fisheries are still uncertain.
- **Indonesia**: in 2019, Indonesia reported for the first time catch and effort for its gillnet fisheries (reference year 2018). However, the sampling coverage is relatively low and less species were monitored from the catch and effort compared to the list of species reported for the nominal catch. Due to persisting uncertainties in the gillnet catches, the IOTC Secretariat estimated catches for the fishery from the total aggregated catches reported by the country; since 2006 Indonesia has been reporting catches by gear to the Secretariat, but the completeness and quality of the datasets reported remains uncertain. Indonesia reported size frequency for its gillnet fishery but only for tropical tuna species.
- **Pakistan**: Since 2017, Pakistan provided revisions to its historical catch time series that incorporate information from WWF-Pakistan: the IOTC Secretariat is currently assisting Pakistan in the validation of the new catch series (Skipjack and Yellowfin tunas) which appears to be significantly different from the current estimates available in the IOTC database.
- **Oman**: To date, Oman has not provided size-frequency data, while catch and effort for its gillnet fishery are not reported by IOTC standard. However, following a mission conducted in Oman by the IOTC Secretariat in 2019, a number of information assets already collected and processed by the ministry of fisheries in Oman were identified which can be considered as adequate for the reporting of time-area catches according to IOTC Standards. In the future, the IOTC Secretariat expects to receive these data sets after additional preparatory work is performed by the statistical division of the Oman ministry of Fisheries and Agriculture.

Longline fisheries

Table 4e. Status of IOTC catch statistics for longline fisheries, by year and species (1979-2018)



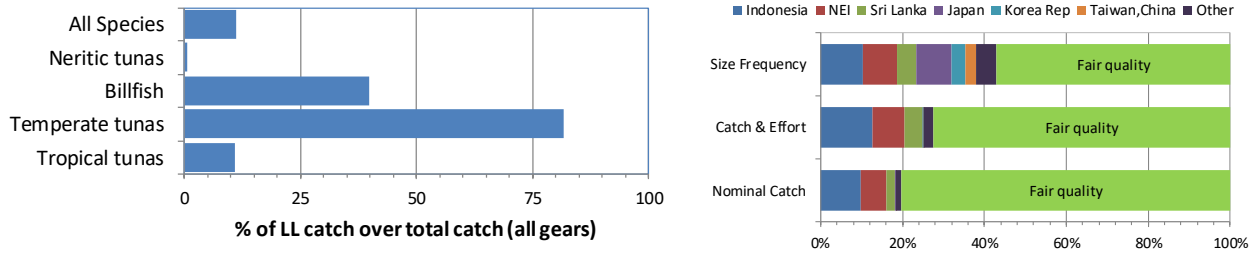


Fig. 6 (**a**, left) Contribution (in %) from longline catches over catches of all fisheries combined, for each species group and for all species combined, (**b**, right) Amount of LL statistics (in % over the total LL catch 1979-2018) presumed to be uncertain, by type of dataset and fleet.

Overall, the catches recorded for longline fisheries in the IOTC database are considered of **good quality until the late-1980's and of fair quality since then for most species** (Table 4e). Over the last forty years (1979-2018) 68% of the longline catches were of tropical tunas, 16% of temperate tunas and 15% of billfish (Table 4e).

During the last decade, **longline gears caught around 11% of the IOTC species in the Indian Ocean**, especially temperate tunas (≈82%), billfish (≈40%) and tropical tunas (≈11%) (Fig. 6.a).

Over the last forty years (1979-2018), around **80% of the nominal catches**, **72% of the catch-and-effort**, and **57% of the size frequency statistics** of longline fisheries recorded in the IOTC database are considered of good quality (Fig. 6.b).

However, the quality of statistics in recent years has worsened, particularly in terms of the availability of catch-and-effort and size frequency data. The statistics for the following longline fleets are considered of uncertain quality (1979-2018):

- **Indonesia**: improvements in the data reporting for the longline fleet of Indonesia were noted as time-area catches were received for the first time in 2019 (although sampling coverage was low, accounting for less than 5% of logbooks sampled). The Secretariat estimated the catches of longline vessels and, in addition, a small component of the catches of fresh-tuna longliners that was not originally reported by species: this affected the quality of the catches of tropical tunas, temperate tunas and billfish. To date, Indonesia has an

observer program for their longline fleet through which size data is collected and reported. In addition, Indonesia also provided size-frequency data from landing place although not fully by IOTC standards.

- **NEI**: The Secretariat estimates the catches of deep-freezing longline vessels that operate under flags of non-reporting countries using information from both the IOTC-OFCF Project and Third Parties. This category includes also the catches estimated for fleets under the flags of IOTC CPCs that do not report complete sets of catches to the Secretariat. Catch-and-effort and size data are usually not available for this component, in particular for the deep-freezing longliners part. For the past years the number of longline NEI vessels have decreased.
- **Japan**, **Republic of Korea** and **Taiwan,China**: The quality of size data and the level of coverage by Japan, Korea and Taiwan,China were poor, in particular at the beginning of the time series.

Hand line, trolling and other small-scale fisheries

Table 4f. Status of IOTC catch statistics for hand line, trolling and small-scale line fisheries, by year and species (1979-2018)

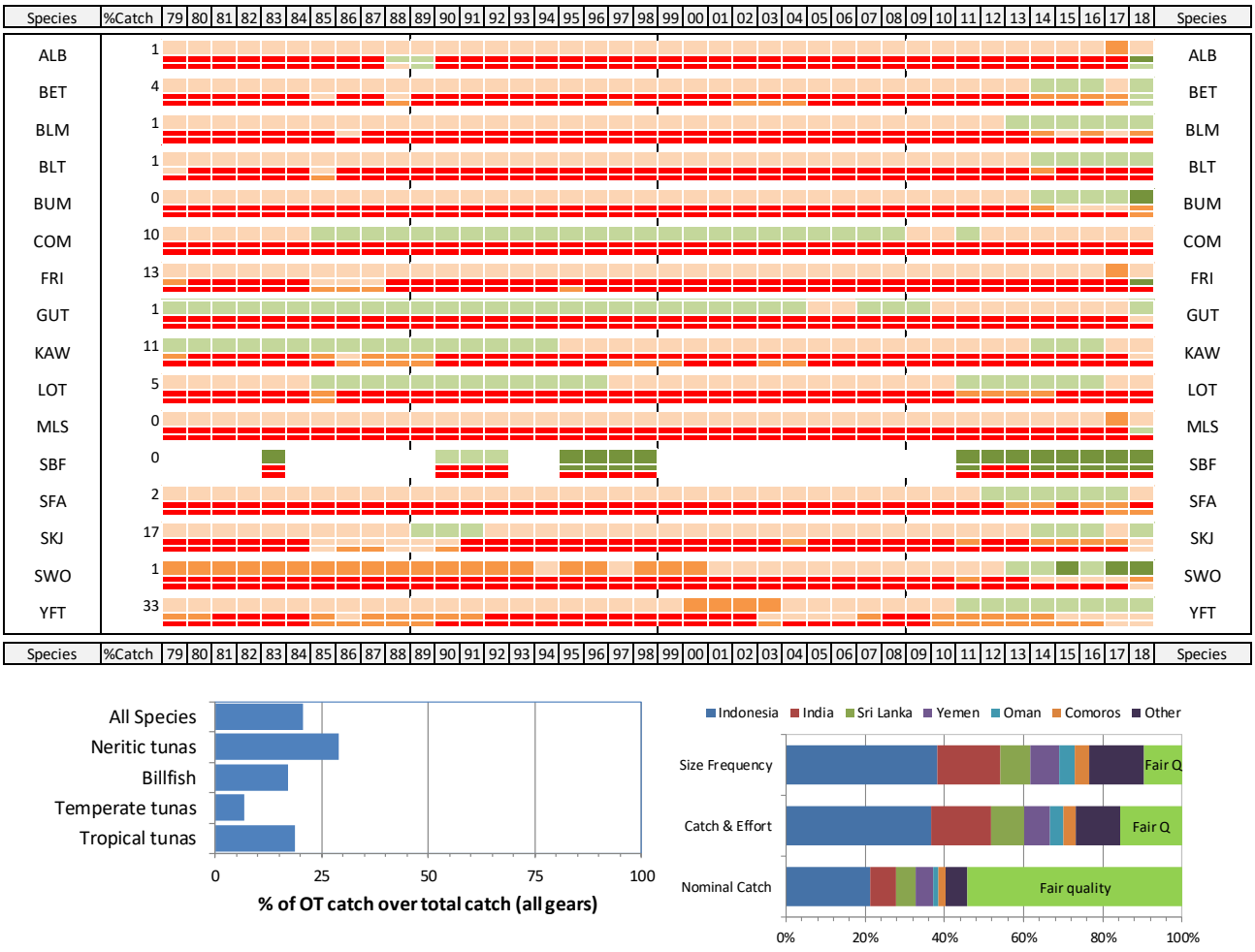


Fig. 7 (**a**, left) Contribution (in %) from hand line, trolling and other NEI gears catches over catches of all fisheries combined, for each species group and for all species combined (2009-2018), (**b**, right) Amount of LI+OT statistics (in % over the total LI+OT catch 1979-2018) presumed to be uncertain, by type of dataset and fleet.

This category includes the catches of hand and troll lines and catches of other IOTC species that are not reported by gear. Most of the catches not reported by gear are likely to refer to coastal gillnets, hand line, trolling and other minor artisanal fisheries.

Overall, the catches recorded for these fisheries in the IOTC database are considered of **poor quality** (Table 4f). Over the last forty years (1979-2018) over 41% of catches under line fisheries were made of neritic tunas and over 54% of tropical tunas.

Hand line, trolling and other unidentified gears catch **over 21% of the IOTC species in the Indian Ocean**, especially neritic tunas (≈29%), tropical tunas (≈19%), and billfish (≈17%) (Fig. 7.a).

Over the last forty years (1979-2018), **54% of the nominal catches**, **16% of the catch-and-effort**, and **10% of the size frequency statistics** of these fisheries recorded in the IOTC database are considered of good quality (Fig. 7.b).

The catches for the following fleets are considered of uncertain quality (1979-2018):

- **Indonesia**: in 2019, Indonesia reported for the first time catch and effort for its line fisheries (including handline, trolling and liftnet for the reference year 2018). However, the sampling coverage is relatively low and less species were monitored from the catch and effort compared to the list of species reported for the nominal catch. Due to persisting uncertainties in the line fishery catches, the IOTC Secretariat estimated catches for the handline and trolling fishery of Indonesia from the total aggregated catches reported by the country; since 2006 Indonesia has been reporting catches by gear to the Secretariat, but the completeness and quality of the datasets reported remains uncertain. Indonesia reported size frequency for its line and NEI fisheries.
- **India**: The Secretariat estimated catches for the hand line and trolling fisheries of India from the catch by species and split gears as catches for years in which the catches reported by gear for India are inconsistence; this affects the quality of the catches of neritic tunas. To date, India has not reported catch-and-effort and size data for line and other NEI fisheries.
- **Sri Lanka**: Since 2014 Sri Lanka is collecting logbook data from the offshore fisheries. However, catches for coastal fisheries are still uncertain.
- **Yemen**: No data reported by Yemen: catches have been estimated based on data published by FAO.
- **Comoros**: No data reported for the historical time series, up to 2012. Improvements in data collection and reporting have been noted since assistance provided by the IOTC-OFCF Project in 2012; notably improvements in the catch estimation and reporting of size frequency data.
- **Oman**: To date, Oman has not provided size-frequency data, while catch and effort for its handline fishery are not reported by IOTC standard. However, following a mission conducted in Oman by the IOTC Secretariat in 2019, a number of information assets already collected and processed by the ministry of fisheries in Oman were identified which can be considered as adequate for the reporting of time-area catches according to IOTC Standards. In the future, the IOTC Secretariat expects to receive these data sets after additional preparatory work is performed by the statistical division of the Oman ministry of Fisheries and Agriculture.

4. Status of the IOTC fishing craft statistics (FC) and active vessels (AV) databases

The number of vessels targeting IOTC species in the IOTC Area of Competence are used to:

- Derive input-fishing capacity in the Indian Ocean.
- Estimate the catches of fleets that operate under the flags of countries that do not report data to the IOTC.
- Assess the completeness of the catches reported by IOTC CPCs completing those catches when the fleets concerned are not fully monitored by their flag countries.

During 2009, the Secretariat participated in a study to estimate **input-fishing capacity** for the fleets fishing for IOTC species in the Indian Ocean during 2006-08; the results of this study were presented to the IOTC Scientific Committee in 2009.

In 2013 the IOTC Secretariat worked with an independent consultant to update previous estimates of input fishing capacity in the Indian Ocean and complete information for 2009 and following years. The study included a full review of the IOTC numbers of industrial vessels, as defined by the Commission[5], over the entire time-series; and an attempt to estimate numbers of small-scale fishing craft fishing that fished for tunas in the Indian Ocean during the same period. The Report prepared by the Secretariat is available[6] and was presented at the 16th Meeting of the IOTC Scientific Committee (Busan, December 2013). In 2014 / 15 the IOTC Secretariat updated the fishing craft statistics series to incorporate estimates up to 2014 and update past estimates, where necessary.

NEI category: numbers of vessels

The numbers of vessels operating under the flags of **countries that do not report their catches** to the IOTC are estimated from data reported by other countries. Those data include:

- IOTC IUU list (IOTC Resolution 11/03);
- Identification, dimensions and other vessels attributes, by vessel, for those foreign vessels that owed fishing licenses to operate within the Economic Exclusive Zone (EEZ) of the reporting country (as specified in IOTC Resolution 14/05);
- Identification and total catches unloaded, by species and vessel, for those foreign vessels using ports in the territory of the reporting country (as specified in IOTC Resolution 10/11 & 05/03);
- Identification and total catches transhipped, by species and vessel, for vessels participating in the IOTC Transhipment Programme (as specified in IOTC Resolution 14/06);
- Data provided by other parties, including data on the imports of tuna for canning, by species and vessel, from processors cooperating with the International Seafood Sustainability Foundation (ISSF) or other initiatives.

The catches for those fleets are estimated by using the estimated vessel numbers (obtained as above) and the catch data for vessels from other (reporting) fleets that operated in the same areas and targeted the same species. The catches of this component are recorded under the NEI category.

Partially reported fleets

In addition, the Secretariat estimates catches for countries that report only partial statistics for their fleets. This refers to the **catches of fleets of IOTC CPCs** that are not fully monitored by their flag states. The catches

[5] The term industrial vessel includes all large-scale vessels (vessel length overall is 24 m or greater) that fished for IOTC species within the IOTC Area of Competence during the year concerned; and all small-scale vessels that fished for IOTC species within the IOTC Area of Competence, and where fishing occurred partially or fully beyond the Economic Exclusive Zones of their flag countries during the year concerned.

[6] IOTC Secretariat, 2013. Estimation of fishing capacity by tuna fishing fleets in the Indian Ocean. Report presented at the 16th Meeting of the Scientific Committee of the Indian Ocean Tuna Commission, Busan, Rep. of Korea, 2-6 December 2013. *IOTC–2013–SC16–INF04: 88 pp.*

reported by these countries are assumed incomplete because the average catches estimated by vessel by year are significantly lower than those estimated for similar fleets of other countries, on the assumption that the same levels of activity apply to both fleets. This applies to the following fleets:

- Longline fleet of **India**: Up to 100 longliners have been operating in India in recent years, including fresh-tuna longliners and deep-freezing longliners.
- Longline fleets of **Indonesia**: Indonesia do not monitor the catches of vessels under its flag that are unloaded in ports outside its territory.

The additional catches estimated for these countries are also included into the NEI category.

Fishing craft statistics: data availability

- Data from **artisanal** (small-scale) fisheries are scarce and inconsistent in many cases. On the contrary, the statistics of large-scale and medium-scale fleets are thought to be fairly complete:
- **Purse seine fleets**: The number of purse seiners fishing for tropical tunas on the high seas (usually referred to as "industrial") is well known. At present, this fleet is flagged mainly in countries of the European Union, Seychelles, I.R. Iran, Mauritius, Japan, Philippines and the Republic of Korea.
- **Longline fleets**: There are many longline fleets fishing tuna in the Indian Ocean, mainly under the flags of Australia, , China, Taiwan,China, the EU, India, Indonesia, Japan, the Republic of Korea, Madagascar, Malaysia, Mauritius, Mozambique, Oman, Philippines, Sri Lanka, Seychelles, South Africa, ~~Tanzania,~~ Thailand and other longliners operating under various flags of non-reporting countries. The total number of non-reporting longliners is estimated whenever the Secretariat receives new data from third parties (NEI category).
- **Oceanic gillnet fisheries of I.R. Iran and Pakistan**: The number of oceanic gillnet vessels operating in the Indian Ocean is well known for I.R. Iran and poorly know for Pakistan.
- **Offshore gillnet/longline fishery of Sri Lanka**: The number of offshore gillnet/longline vessels that operate under the flag of Sri Lanka is well known.
- **Pole-and-line fishery of Maldives**: The number of pole-and-line vessels that operate under the flag of Maldives is well known.

5. Other IOTC data holdings

Biological data

The IOTC Secretariat compiles datasets and information related to IOTC species and main shark species (as identified by the Commission) including the data used to derive standard measurements and other biological information of interest.

The IOTC Secretariat is also responsible for the periodical update of the available length-weight equations in accordance with the information received from the Working Parties: in 2013 a summary of the range of length-weight equations available for each of the main IOTC species was presented to the WPDCS[7] and in 2016, following a study by the European Union on the length-weight relationship of tropical tunas caught by the purse seine fishery, important updates to the length-weight conversion factors for tropical tuna species were included in the standard equations[8].

Observer data

In terms of Resolution 11/04 *on a Regional Observer Scheme*, there are increasing number of regional and national observer reports submitted to the IOTC. However, CPCs are still facing difficulties to implement and / or properly report the information as requested by the resolution. The IOTC Secretariat is currently piloting an electronic data collection and management interface to support the ROS data entry, validation and reporting to the IOTC Secretariat. The

[7] Geehan, J. & Pierre, L. (IOTC Secretariat), 2013. Biological data on tuna and tuna-like species gathered at the IOTC Secretariat: Status Report. Document presented at the 9th Meeting of the Working Party on Data Collection and Statistics of the Indian Ocean Tuna Commission, Busan, Republic of Korea, 29-30 November 2013. *IOTC–2013–WPDCS09–13.*

[8] Chassot E, Assan C, Esparon J, Tirant A, Delgado de Molina A, Dewals P, Augustin E, Bodin N, 2016: IOTC-2016-WPDCS12-INF05 - Updating_LW_TT_PS

information received so far, aggregated according to the requirements of Resolution 12/02, is publicly available through the IOTC Regional Observer Database web portal (under finalization).

All ROS-related data, including the level of reporting by CPC, is also routinely summarized and presented during the annual meeting of the IOTC Scientific Committee.

Field sampling

IOTC Resolution 11/04 contains also provisions covering the monitoring of artisanal fisheries:

"*The number of the artisanal fishing vessels landings shall also be monitored at the landing place by field samplers*[9]*. The indicative level of the coverage of the artisanal fishing vessels should progressively increase towards 5% of the total levels of vessel activity (i.e. total number of vessel trips or total number of vessels active).*"

In order to assess the level of coverage of artisanal fleets by coastal countries in the IOTC Region, in 2011 the IOTC Secretariat initiated a Pilot Project. To this purpose, the Secretariat hired the services of a Consultant, who prepared a report covering the fisheries in nine coastal countries in the Region, having important catches of tropical tunas (70% of the total catches estimated for coastal countries): the final report produced by the Consultant is available at the Secretariat and summarized in a document presented to the IOTC Scientific Committee in 2011 (IOTC-2011-SC14-38).

Since the last IOTC WPDCS Meeting, the IOTC Secretariat has coordinated capacity building activities in some of the countries covered in the above report. These actions followed requests from local institutions, as well as priorities identified by the IOTC Working Parties and Scientific Committee and were possible thanks to financial support from the IOTC and its partners, including the Overseas Fisheries Cooperation Foundation of Japan, WWF and the European Union.

Capacity building activities were implemented in Indonesia, Tanzania, Oman and Mauritius with more details about these activities provided in a separate document[10].

Tagging data

Since 2002, the Secretariat has been coordinating and supervising the Indian Ocean Tuna Tagging Programme (IOTTP). This programme was a combination of a main tagging project, the Regional Tuna Tagging Project in the Indian Ocean (RTTP-IO), funded by the EU (9th EDF, DG-Dev), and several pilot and small-scale tuna tagging projects funded by the DG-Fish (ex DG-Mare) and the government of Japan.

The specific objective of this programme was to reinforce the scientific knowledge of tropical tuna stocks and the rate of exploitation in the Indian Ocean by obtaining the crucial model parameters for stock assessment: all the tagging and recapture data is hosted at IOTC Secretariat and available upon request to the Executive Secretary.

At present, all data from the RTTP-IO is stored in a standalone database specifically developed for the project that was enriched, in 2012, with data from past tagging projects implemented in Maldives in the 1990s.

As of November 2019, this database contains 219,121 releases and 34,340 recoveries.

[9] Field sampler: a person that collects information on land during the unloading of fishing vessels. Field sampling programmes can be used for quantifying catch, retained bycatch, collecting tag returns, *etc.*

[10] Geehan, J (IOTC Secretariat), 2016. IOTC Capacity Building Activities in Support of developing coastal IOTC CPCs: 2016 Activities. Document presented at the 12th Meeting of the Working Party on Data Collection and Statistics of the Indian Ocean Tuna Commission, Seychelles, 28-30 November 2016. *IOTC–2016–WPDCS12–09.*

Tagging data contains the following information:

- Tag series and tag number
- Species
- Fork length
- Data and position of tagging
- Type of tag
- Tagger
- Gear
- Information on the school
- Quality codes

Recovery data contains the following information:

- Species
- Fork length and/or weight at recovery
- If found during fishing: date and position of recovery
- If found during processing: estimated date and position of recovery
- Date of reporting
- Country of reporting
- Gear of recapture
- Place and process where found
- Name of the vessel (*confidential*)
- Name and details of recoverer (*confidential*)
- Reward given (*confidential*)
- Name of staff collecting data and checking data

Every year the IOTC Secretariat prepares and makes available the files including the tagging data to be used for the assessments of tropical tuna species, as required by the WPTT. The tagging data generated by the RTTP-IO, and the broader IOTTP, have been used in the assessments of tropical tuna species since 2008.

Growth curves for the three species and natural mortality rates have also been derived from the tagging data and were updated for some species (i.e., growth rates for yellowfin tuna and skipjack tuna, exploitation rate and natural mortality for skipjack tuna).

6. Appendix

Resolutions containing requirements for the collection and/or reporting of data to the IOTC

- IOTC Resolution 15/01: On the recording of **catch and effort data** by fishing vessels in the IOTC area of competence: Establishes minima data requirements for the collection of operational catch and effort data on authorized vessels, including the species for which those requirements apply. Data requirements are set for industrial purse seine, longline, drifting gillnet, pole-and-line, trolling, and handline. This Resolutions calls also port states that license foreign fishing vessels to collect logbooks on fishing by those vessels within their EEZs and report this information in aggregated form to the IOTC Secretariat.
- IOTC Resolution 15/02: **Mandatory statistical requirements** for IOTC Members and Cooperating Non-Contracting Parties (CPC's): Defines IOTC's data reporting procedures for **IOTC SPECIES,** main **shark species** caught by IOTC fisheries**,** and **non-target, associated and dependent species**.
- IOTC Resolution 18/07: On measures applicable in case of **non-fulfilment of reporting obligations** in the IOTC
- IOTC Resolution 19/02: Procedures on a **fish aggregating devices (FADs)** management plan.
- IOTC Resolution 19/03: On the conservation of **MOBULID RAYS** caught in association with fisheries in the IOTC area of competence
    - Paragraph 12: CPCs are encouraged to investigate at-vessel and post-release mortality in mobulids including, but not exclusively, the application of satellite tagging programs that may be provisioned primarily through the national support complementing possible funds allocation from the IOTC to investigate the effectiveness of this measure.
    - Paragraph 13: Scientific observers shall be allowed to collect biological samples of mobulid rays caught in the IOTC Area of Competence that are dead at haul-back, provided that the samples are a part of a research project approved by the IOTC Scientific Committee. In order to obtain the approval, a detailed document outlining the purpose of the work, number of samples intended to be collected and the spatio-temporal distribution of the sampling effect must be included in the proposal. Annual progress of the work and a final report on completion shall be presented to the SC.
- IOTC Resolution 17/05: Concerning the conservation of **SHARKS** caught in association with fisheries managed by IOTC
    - Paragraph 2: CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks, with the exception of species prohibited by the IOTC. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.
    - Paragraph 2: a) Sharks landed fresh: CPCs shall prohibit the removal of shark fins on board vessels. CPCs shall prohibit the landing, retention on-board, transhipment and carrying of shark fins which are not naturally attached to the shark carcass until the first point of landing.
    - Paragraph 2: b) Sharks landed frozen: CPCs that do not apply sub-paragraph 3 a) for all sharks shall require their vessels to not have on board fins that total more than 5% of the weight of sharks on board, up to the first point of landing. CPCs that currently do not require fins and carcasses to be offloaded together at the point of first landing shall take the necessary measures to ensure compliance with the 5 % ratio through certification, monitoring by an observer, or other appropriate measures.

- IOTC Resolution 13/06[11]: On A Scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries

[11] This Resolution was objected to by India and therefore is non-binding to India.

- Paragraph 5: CPCs shall encourage their fishers to record incidental catches as well as live releases of **OCEANIC WHITETIP SHARKS**. These data shall be kept at the IOTC Secretariat.

- IOTC Resolution 12/09: On the conservation of **THRESHER SHARKS** (family Alopiidae) caught in association with fisheries in the IOTC area of competence
  - Paragraph 4: CPCs shall encourage their fishers to record and report incidental catches as well as live releases. These data will be then kept at the IOTC Secretariat.
  - Paragraph 8: The Contracting Parties, Cooperating Non-Contracting Parties, especially those directing fishing activities for sharks, shall submit data for sharks, as required by IOTC data reporting procedures.

- IOTC Resolution 13/05: On the conservation of **WHALE SHARKS** (Rhincodon typus)
  - Paragraph 3: CPCs shall require that, in the event that a whale shark is unintentionally encircled in the purse seine net, the master of the vessel shall:

    b.report the incident to the relevant authority of the flag State, with the following information…
  - Paragraph 4: CPCs using other gear types fishing for tuna and tuna-like species associated with a whale shark shall report all interactions with whale sharks to the relevant authority of the flag State and include all the information outlined in paragraph 3b(i–v).
  - Paragraph 7: CPCs shall report the information and data collected under paragraph 3(b) and paragraph 4 through logbooks, or when an observer is onboard through observer programs, and provide to the IOTC Secretariat by 30 June of the following year and according to the timelines specified in Resolution 10/02 (or any subsequent revision).

- IOTC Resolution 13/04: On the conservation of **CETACEANS**
  - Paragraph 3: CPCs shall require that, in the event that a Cetacean is unintentionally encircled in the purse seine net, the master of the vessel shall:

    b.report the incident to the relevant authority of the flag State, with the following information…
  - Paragraph 4: CPCs using other gear types fishing for tuna and tuna-like species associated with cetaceans shall report all interactions with cetaceans to the relevant authority of the flag State and include all the information outlined in paragraph 3b(i–v).
  - Paragraph 7: CPCs shall report the information and data collected under paragraph 3(b) and paragraph 4 through logbooks, or when an observer is onboard through observer programs, and provide to the IOTC Secretariat by 30 June of the following year and according to the timelines specified in Resolution 10/02 (or any subsequent revision).

- IOTC Resolution 12/06: On reducing the incidental bycatch of **SEABIRDS** in **longline fisheries**
  - Paragraph 1: CPCs shall record data on seabird incidental bycatch by species, notably through scientific observers in accordance with Resolution 11/04 and report these annually.

- IOTC Resolution 12/04: On the conservation of **MARINE TURTLES**
  - Paragraph 3: CPCs shall collect (including through logbooks and observer programs) and provide to the IOTC Secretariat no later than 30 June of the following year in accordance with Resolution 10/02 (or any subsequent revision), all data on their vessels' interactions with marine turtles. The data shall include the level of logbook or observer coverage and an estimation of total mortality of marine turtles incidentally caught in their fisheries.

- IOTC Resolution 11/04: On a Regional **OBSERVER SCHEME**
  - Paragraph 9: CPCs shall provide to the Executive Secretary and the Scientific Committee annually a report of the number of vessels monitored and the coverage achieved by gear type in accordance with the provisions of this Resolution.

- Paragraph 11: CPCs shall send within 150 days at the latest each report, as far as continuous flow of report from observer placed on the longline fleet is ensured, which is recommended to be provided with 1°x1° format to the Executive Secretary, who shall make the report available to the Scientific Committee upon request.