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COORDINATING WORKING PARTY ON FISHERY STATISTICS

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Review of IOTC Statistics

Author: IOTC

Report on IOTC data collection and statistics

Miguel Herrera¹, Lucia Pierre² & Julien Million³

1. OVERVIEW

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

- IOTC Resolution 08/01: **Mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPC's): Defines IOTC's data reporting procedures for IOTC SPECIES and non-target, associated and dependent species.**
- IOTC Resolution 05/05 Concerning the conservation of **SHARKS** caught in association with fisheries managed by IOTC
 - *Paragraph 1: Contracting Parties, Cooperating non-Contracting Parties (CPCs) shall annually report data for catches of sharks, in accordance with IOTC data reporting procedures, including available historical data.*
 - *Paragraph 2: The ratio of fin-to-body weight of sharks shall be reviewed by the Scientific Committee and reported back to the Commission in 2006 for revision, if necessary.*
- IOTC Recommendation 05/09 On incidental mortality of **SEABIRDS**
 - *Paragraph 2: CPCs should be encouraged to collect and voluntarily provide Scientific Committee with all available information on interactions with seabirds, including incidental catches in all fisheries under the purview of IOTC.*
- IOTC Resolution 08/03 On reducing the incidental bycatch of **SEABIRDS** in longline fisheries
 - *Paragraph 7: CPCs shall provide to the Commission, as part of their annual reports, all available information on interactions with seabirds, including bycatch by fishing vessels carrying their flag or authorised to fish by them. This is to include details of species where available to enable the Scientific Committee to annually estimate seabird mortality in all fisheries within the IOTC area of competence.*
- IOTC Resolution 09/06 On **MARINE TURTLES**
 - *Paragraph 2: CPCs shall collect (including through logbooks and observer programs) and provide to the Scientific Committee all data on their vessels' interactions with marine turtles in fisheries targeting the species covered by the IOTC Agreement. CPC shall also furnish available information to the Scientific Committee on successful mitigation measures and other impacts on marine turtles in the IOTC Area, such as the deterioration of nesting sites and swallowing of marine debris.*

The document describes the progress achieved in relation to the collection and verification of data, identifies problem areas and proposes actions that could be undertaken to improve them. The progress achieved in relation to previous recommendations for the Scientific Committee is also reported.

The report covers the following areas:

- Overview
- Availability of IOTC statistics for 2008 (timeliness and completeness of data)
- Status of the IOTC nominal catches (NC), catch and effort (CE) and size frequency (SF) databases (Progress and problem areas)
- Other IOTC data holdings: observer data, biological data, tagging data

¹ IOTC Data Coordinator (mh@iotc.org)

² IOTC Data Assistant (data.assistant@iotc.org)

³ IOTC Tagging Officer (jm@iotc.org)

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 (IOTC Resolution 07/04; IOTC Resolution 05/03) or on imports of bigeye tuna from vessels under the flag concerned (IOTC Resolution 01/06).

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 and species. Information on the use of fish aggregating devices (FADs) and supply vessels is also collected.

Length frequency data: individual body lengths of IOTC species per fleet, year, gear, type of school, month and 5 degrees square areas.

2. AVAILABILITY OF IOTC STATISTICS FOR 2008

Tables 2i-2v (below) list the fleets for which the Secretariat received or estimated catches for the year 2008. The fleets are listed according to the size of their most recent catches. The standing of the catch, effort, size frequency and craft statistics information received is indicated using colours. Timeliness of reporting and data source are also shown. The availability and standing of statistics for tropical tunas (2i), temperate tunas (2ii), billfish (2iii), neritic tunas (2iv) and sharks, seabirds and sea turtles (2v) are presented separately. The availability of statistics on fishing crafts operating for each fleet is also presented in a separate table (2vi). Brief comments on bycatch, discards and Fishing craft statistics and active vessels are made at the end of this section.

Timeliness and completeness of data

IOTC statistics were available for 15 countries before the deadline of June 30 (cf. 15 in 2008). Partial statistics were provided in most cases. Requests were sent to over fifty countries⁴ in March-April 2009. Second and third requests were needed in most cases. The amount of data available before the deadline was similar than that in 2008.

Table 1 shows the extent to which 2008 catch data was available in the IOTC Nominal Catches (NC) database by the deadline for data submission (30 June) and before the WPDCS Meeting (November 2009). 32% of the catch was available by 30 June and 77% of the catch was available by November. The proportion of statistics available for 2007 is shown for comparison. Levels of reporting were moderate in 2009, especially for nominal catch and catch-and-effort data.

Late reports compromise the validation, verification and utility of data, especially when data are submitted close to or during Working Party meetings.

Table 1. Proportion of the NC, CE and SF statistics available at the IOTC Secretariat compared to the total catches estimated for 2008 (as of 15th November 2009).

Statistics available for 2008	Estim. Catch	NC		CE		SF	
		BD	WP	BD	WP	BD	WP
IOTC species (x1,000 t)	1361	441	1047	416	701	313	440
%Available for 2008		32	77	31	52	23	32
%Available for 2007		36	71	24	49	29	50
Tropical tunas (x1,000 t)	838	355	721	336	595	293	410
Temperate tunas (x1,000 t)	41	27	36	23	32	9	10
Billfish (x1,000 t)	58	21	44	18	23	11	12
Neritic tunas (x1,000 t)	425	38	246	38	52	0	8

Estim. Catch: Total catches estimated

NC: Amount of catch available

CE: Amount of catch for which catches and effort are available










SF: Amount of catch for which size frequency data are available

Available before the deadline for data submission (**BD**, 30th June) and at the time of the Working Party on Data Collection and Statistics Meeting (**WP**)











































































































⁴ Note that specific requests were sent to EC countries having vessels known to operate in the IOTC Area (France, Italy, Portugal, Spain and the UK)

Table 2: Availability of IOTC statistics for the year 2005

Key Tables 2i - 2vi

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

2i – Tropical tunas (YFT, BET, SKJ)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
P S	EUROPEAN COMMUNITY	204.9	SY						Effort from supply vessels/no.FADs set not available
	SEYCHELLES	56.1	SY						Effort from supply vessels/no.FADs set not available
	FRANCE-TERRITORIES	10.1	SY						Number of.FADs set by quarter not available
	THAILAND	9.4	SB						Effort from supply vessels/no.FADs set not available
	JAPAN	5.4	SY						Number of.FADs set by quarter not available
	IRAN I R	2.2	Y						Iran reported total yearly effort for 2008
	AUSTRALIA	Conf	S						Data confidential
	MALAYSIA	0.3	S						
	INDIA								Catch combined with that for other fleets
	INDONESIA								Catch combined with that for other fleets
L L	CHINA	5.9	B						
	TAIWAN,CHINA	41.0	BY						CE data does not cover the complete year 2008
	JAPAN	25.3	BY						
	INDONESIA	18.8	BY						Statistics not available for longliners not based in Indonesia
	INDIA	8.5	BY						
	OMAN	5.3	Y						
	SEYCHELLES	5.1	B						
	PHILIPPINES	2.7	B						
	MALAYSIA	2.5	BY						Statistics not available for longliners not based in Malaysia
	KOREA REP	1.5	Y						
	EUROPEAN COMMUNITY	1.1	BY						CE data not available from all EC vessels (EC-Spain)
	SOUTH AFRICA	0.3	BY						
	BELIZE	0.2	B						
	THAILAND	0.2	YB						
	MAURITIUS	0.1	Y						SF not available per 5 degrees area
	MADAGASCAR	0.0	Y						
	AUSTRALIA	Conf	B						Data confidential
	TANZANIA	0.0	Y						
	KENYA	0.0	Y						
	GUINEA	0.0	Y						
SENEGAL	0.0	Y							
NEI-FRESH ¹	12.5	YB							
NEI-FROZEN ²	1.8	B							
O t h e r f l e e t s	SRI LANKA	112.2	SY						CE/SF not available per 5 degrees area
	MALDIVES	110.0	SY						CE not available per 5 degrees area
	IRAN I R	59.8	SY						
	INDONESIA	52.2	SY						
	INDIA	26.1	SY						
	OMAN	19.2	Y						SF data available for 2009 (MFW / IOTC-OFCE Sampling)
	YEMEN AR RP	15.9	Y						
	COMOROS	9.4	YS						
	PAKISTAN	9.2	SY						
	FRANCE-TERRITORIES	0.8	SY						
	EUROPEAN COMMUNITY	0.1	Y						
	TANZANIA	0.1	Y						
	MAURITIUS	0.1	Y						
	KENYA	0.1	Y						
	JORDAN	0.0	S						
	SOUTH AFRICA	0.0	Y						
	EAST TIMOR	0.0	Y						
UK-TERRITORIES	0.0	Y							
AUSTRALIA	0.0	Y						CE confidential	
SEYCHELLES	0.0	Y							

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)

Conf Catches confidential (included in NEI)

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

2ii – Temperate tunas (ALB, SBF)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
P S	AUSTRALIA	4.4	S						CE confidential
	EUROPEAN COMMUNITY	1.3	A						Effort from supply vessels/no.FADs set not available
	SEYCHELLES	0.1	A						Effort from supply vessels/no.FADs set not available
	FRANCE-TERRITORIES	0.0	A						Number of.FADs set by quarter not available
L L	CHINA	0.2	A						
	TAIWAN,CHINA	15.3	A						CE data does not cover the complete year 2008
	JAPAN	7.1	AS						
	INDONESIA	3.4	AS						Statistics not available for longliners not based in Indonesia
	INDIA	2.1	A						
	EUROPEAN COMMUNITY	0.8	A						CE data not available from all EC vessels (EC-Spain)
	SEYCHELLES	0.8	A						
	KOREA REP	0.8	A						
	BELIZE	0.3	A						
	MALAYSIA	0.3	A						Statistics not available for longliners not based in Malaysia
	PHILIPPINES	0.1	A						
	TANZANIA	0.1	A						
	THAILAND	0.1	AS						
	SOUTH AFRICA	0.0	A						
	MADAGASCAR	0.0	A						
	MAURITIUS	0.0	A						SF not available per 5 degrees area
NEI-FROZEN ¹	0.5	A							
NEI-FRESH ²	1.7	A							
O T H	INDIA	1.1	A						
	EUROPEAN COMMUNITY	0.0	A						
	SOUTH AFRICA	0.0	A						
	SRI LANKA	0.0	A						CE/SF not available per 5 degrees area

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

2iii – Billfish (SWO, MARL, SFA, SSP)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
L L	CHINA	0.6	S						
	TAIWAN,CHINA	9.1	SM						CE data does not cover the complete year 2008
	EUROPEAN COMMUNITY	6.6	S						CE/SF data not available from all EC vessels
	INDONESIA	3.5	S						Statistics not available for longliners not based in Indonesia
	JAPAN	3.2	S						
	INDIA	2.0	S						
	SEYCHELLES	0.9	S						
	GUINEA	0.8	S						
	OMAN	0.5	MF						
	TANZANIA	0.5	S						
	MALAYSIA	0.4	SM						Statistics not available for longliners not based in Malaysia
	PHILIPPINES	0.3	S						
	MAURITIUS	0.3	S						SF not available per 5 degrees area
	KOREA REP	0.3	M						
	SOUTH AFRICA	0.3	S						
	KENYA	0.2	S						
	AUSTRALIA	Conf	S						Data confidential
	SENEGAL	0.1	S						
	BELIZE	0.1	S						
	THAILAND	0.1	S						
MADAGASCAR	0.0	S							
NEI-FROZEN ¹	0.5	S							
NEI-FRESH ²	2.3	SM							
O t h e r f i l l e t s	INDIA	6.1	FM						
	IRAN I R	5.6	F						
	SRI LANKA	5.3	FM						
	PAKISTAN	3.4	M						
	INDONESIA	1.7	FM						
	TANZANIA	0.9	M						
	YEMEN AR RP	0.6	F						
	OMAN	0.5	F						
	COMOROS	0.5	F						
	MAURITIUS	0.3	M						
	KENYA	0.2	F						
	UN ARAB EMIRATES	0.1	M						
	EUROPEAN COMMUNITY	0.0	M						
	FRANCE-TERRITORIES	0.0	M						
	UK-TERRITORIES	0.0	F						
SEYCHELLES	0.0	F							

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)
Conf Catches confidential (included in NEI)
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

2iv – Neritic tunas (FRZ, LOT, KAW, COM, GUT)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
P S	IRAN I R	2.7	L						Iran reported total yearly effort for 2008
	THAILAND	0.2							CE not fully by species; refers mostly to discards
	SEYCHELLES	0.2	F						CE/SF Statistics incomplete; refers mostly to discards
	EUROPEAN COMMUNITY	0.1	F						CE/SF Statistics incomplete; refers mostly to discards
	INDIA								Catch combined with that for other fleets
	INDONESIA								Catch combined with that for other fleets
L L	EUROPEAN COMMUNITY	0.0	W						Refers mostly to discards
	CHINA	0.0							Refers mostly to discards
	TAIWAN, CHINA	0.0	W						Refers mostly to discards
	MADAGASCAR	0.0	W						Refers mostly to discards
	INDIA	0.0	W						Refers mostly to discards
	TANZANIA	0.0	W						Refers mostly to discards
	SOUTH AFRICA	0.0	W						Refers mostly to discards
	NEI-FRESH ²	0.0	W						Refers mostly to discards
O t h e r f l e e t s	INDONESIA	117.6	KL						
	INDIA	105.0	CK						
	IRAN I R	73.4	KL						
	THAILAND	18.8	KL						
	MALAYSIA	18.6	KL						
	PAKISTAN	14.5	CL						
	OMAN	12.8	LC						
	MADAGASCAR	12.0	C						
	YEMEN AR RP	11.2	LK						
	SAUDI ARABIA	9.0	CK						
	UN ARAB EMIRATES	7.7	CK						
	SRI LANKA	7.4	CK						CE/SF not available per 5 degrees area
	MALDIVES	6.2	K						CE not available per 5 degrees area
	QATAR	1.8	C						
	KENYA	1.2	CK						
	EGYPT	1.0	KC						NC not by species or gear
	TANZANIA	1.0	C						
	COMOROS	0.8	C						
	ERITREA	0.4	C						
	AUSTRALIA	0.3	C						CE confidential
	BAHRAIN	0.2	C						
	SEYCHELLES	0.1	K						
	KUWAIT	0.1	C						
	BANGLADESH	0.1							
	DJIBOUTI	0.1							
JORDAN	0.1								
EUROPEAN COMMUNITY	0.0	K							
SUDAN	0.0	W							
SOUTH AFRICA	0.0	C						CE not by species	
UK-TERRITORIES	0.0	W							

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



2v – Sharks seabirds and sea turtles

Gear	Fleet	Species					Comments
		Sharks			Sea Birds	Sea Turtles	
		NC	CE	SF			
P S	EUROPEAN COMMUNITY				n/a		
	SEYCHELLES				n/a		NC catches presumed to be low
	THAILAND				n/a		NC catches presumed to be low
	IRAN I R				n/a		NC catches presumed to be low
	AUSTRALIA	n/a			n/a	n/a	
	FRANCE-TERRITORIES				n/a		
	JAPAN				n/a		NC catches presumed to be low
	MALAYSIA				n/a		NC refers to retained catches and is not by species
	INDIA				n/a		NC catches presumed to be low
INDONESIA				n/a		NC catches presumed to be low	
L L	CHINA						NC/CE refer to retained catches and is not by species
	TAIWAN,CHINA						NC/CE refer to retained catches and is not by species
	JAPAN						
	INDONESIA						NC refers to retained catches and is not by species
	EUROPEAN COMMUNITY						CE not available for all fleets (EC-Spain)
	SEYCHELLES						NC/CE refer to retained catches and is not by species
	KOREA REP						NC/CE refer to retained catches and is not by species
	OMAN						
	PHILIPPINES						
	MALAYSIA						NC/CE refer to retained catches and is not by species
	BELIZE						NC/CE refer to retained catches and is not by species
	MAURITIUS						NC/CE refer to retained catches and is not by species
	GUINEA						
	THAILAND						
	SOUTH AFRICA						
	AUSTRALIA						
	KENYA						
	SENEGAL						
INDIA							
MADAGASCAR							
NEI-FROZEN ¹							
NEI-FRESH ²							
A r t i s a n a l	IRAN I R				n/a		NC catches presumed to be high
	MALDIVES				n/a		NC catches presumed to be low
	INDONESIA				n/a		NC catches presumed to be high
	INDIA				n/a		NC catches presumed to be high
	SRI LANKA				?		NC/CE Not by species
	OMAN				n/a		NC Not by species
	YEMEN AR RP				n/a		NC catches presumed to be high
	PAKISTAN				n/a		NC catches presumed to be high
	MALAYSIA				n/a		NC/CE Not by species
	THAILAND				n/a		NC catches presumed to be low
	MADAGASCAR				n/a		NC catch levels unknown
	COMOROS				n/a		NC catch levels unknown
	UN ARAB EMIRATES				n/a		NC catches presumed to be low
	SAUDI ARABIA				n/a		NC catch levels unknown
	QATAR				n/a		NC catches presumed to be low
	TANZANIA				n/a		NC catches presumed to be low
	KENYA				n/a		NC catches presumed to be low
	EGYPT				n/a		NC catches presumed to be low
	FRANCE-TERRITORIES				n/a		NC catch levels unknown
	SEYCHELLES				n/a		NC/CE Not by species
	EUROPEAN COMMUNITY				n/a		NC catches presumed to be low
	MAURITIUS				n/a		NC catches presumed to be low
	AUSTRALIA						
	KUWAIT				n/a		NC catches presumed to be low
	ERITREA				n/a		NC catches presumed to be low
	JORDAN				n/a		NC catches presumed to be low
	BANGLADESH				n/a		NC catches presumed to be low
BAHRAIN				n/a		NC catches presumed to be low	
DJIBOUTI				n/a		NC catches presumed to be low	
SUDAN				n/a		NC catches presumed to be low	
UK-TERRITORIES				n/a		NC/CE Not by species	
SOUTH AFRICA				n/a			
EAST TIMOR				n/a		NC catches presumed to be low	

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

2vi – Fishing craft statistics and list of active vessels

Gear	Industrial purse seine (PS), industrial longline (LL) and artisanal gears (ART)	Availability		Fully available
Catch	Recent catches amounting to (thousands of tonnes)			Partially available
Craft	Number of craft operated (2006) (blank if unknown)	SO		Statistics fully available from flag country
FC	Fishing craft			Statistics partially available from flag country
AV	List of active vessels		Statistics available from sources other than flag country	
				Not available

Gear	Fleet	Availability				SO	Comments
		Catch	Craft	FC	AV		
P S	EUROPEAN COMMUNITY	206.2	35				
	SEYCHELLES	56.4	12				
	FRANCE-TERRITORIES	10.1	2				
	THAILAND	9.6	4				
	JAPAN	5.4	5				
	AUSTRALIA	5.3	10				
	IRAN I R	4.9	8				
	MALAYSIA	0.3	1				
	INDIA		5				
	INDONESIA		3				
SUPPLY VESSELS-NEI		11					Vessels Authorized (activity presumed); catch aggregated to other Vessels Authorized (activity presumed); catch aggregated to other Names and characteristics of supply vessels not fully available
L L	CHINA	6.6	69				
	TAIWAN, CHINA	65.4	783				
	JAPAN	35.7	207				
	INDONESIA	25.6	907				Data refers to authorized vessels (presumed to be active)
	INDIA	12.6	133				Data refers to authorized vessels (presumed to be active)
	EUROPEAN COMMUNITY	8.5	76				
	SEYCHELLES	6.8	34				
	OMAN	5.8	36				
	MALAYSIA	3.3	69				Catch data only available for 28 vessels
	PHILIPPINES	3.2	17				
	KOREA REP	2.6	24				
	GUINEA	0.9	3				Data refers to authorized vessels (presumed to be active)
	BELIZE	0.6	9				
	SOUTH AFRICA	0.6	20				
	TANZANIA	0.5	3				Data refers to authorized vessels (presumed to be active)
	MAURITIUS	0.4	8				
	THAILAND	0.3	6				Catch data only available for 2 vessels
	KENYA	0.2	2				
	AUSTRALIA	0.2	5				
	MADAGASCAR	0.1	2				
SENEGAL	0.1	3				Data refers to authorized vessels (presumed to be active)	
SRI LANKA	0.0	2				Personal communication	
NEI-FRESH ²	16.5	23				Number of vessels uncertain (reports from third parties)	
NEI-FROZEN ¹	2.9	14				Number of vessels uncertain (reports from third parties)	
O t h e r O f f s h o r e & C o a s t a l	INDONESIA	171.6					Catch combined with industrial purse seine catch (3 vessels)
	IRAN I R	138.8	6,759				Catch combined for offshore and coastal vessels (752 offshore crafts)
	INDIA	138.2					Catch combined with industrial purse seine catch (5 vessels)
	SRI LANKA	124.9	41,733				Catch combined for offshore and coastal vessels (2809 offshore crafts)
	MALDIVES	116.2	965				Includes large scale baitboats; catches combined
	OMAN	32.5	14,794				
	YEMEN AR RP	27.7					
	PAKISTAN	27.1					Catch combined for offshore and coastal vessels (2308 offshore crafts)
	THAILAND	18.8	870				
	MALAYSIA	18.6					
	MADAGASCAR	12.0					
	COMOROS	10.7					
	SAUDI ARABIA	9.0					
	UN ARAB EMIRATES	7.9					
	TANZANIA	2.0					
	QATAR	1.8					
	KENYA	1.5					
	EGYPT	1.0					
	FRANCE-TERRITORIES	0.8					
	ERITREA	0.4					
	MAURITIUS	0.4					
	AUSTRALIA	0.3	56				Does not include vessels operating between 140 East and 150 East
	EUROPEAN COMMUNITY	0.2					
	BAHRAIN	0.2	63				
	SEYCHELLES	0.1					
	KUWAIT	0.1					
	JORDAN	0.1					
BANGLADESH	0.1						
DJIBOUTI	0.1						
SUDAN	0.0						
SOUTH AFRICA	0.0	15					
UK-TERRITORIES	0.0	47					
EAST TIMOR	0.0						

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

- **By-catch levels:** Australia, the EC, France and South Africa provided estimates of total bycatch levels for their fisheries for 2008, including bycatch levels for sharks, seabirds and marine turtles. In spite of the better reporting levels recorded for bycatch data during 2009, few statistics are still available for sharks, seabirds and sea turtles (Table v) (and other non-IOTC species caught by fleets targeting tunas and/or tuna-like species); for this reason, the quality of the data available is still poor. The statistics are seldom available by species and refer usually to the shark carcasses that are retained on board, not including the amounts of sharks that are discarded. Almost no statistics are available for other shark products, such as shark fins.
- **Discards levels:** Discard levels are only available for Australia, EC (France), South Africa, Sri Lanka (nil discards) and the UK (nil discards) in 2008. Discard rates are believed to be high for fisheries using longlines and oceanic gillnets (Iran, Pakistan) and moderate for purse seine sets on logs (FADs).
- **Fishing craft statistics and active vessels:** The number of vessels fishing for IOTC species in the Indian Ocean is thought to be more accurate in recent years thanks to the information collected after the implementation of new IOTC Resolutions that called for countries to report yearly lists of active vessels that operated under their flag and lists of the foreign fishing vessels that operated within their territory. Fishing craft statistics are generally available for industrial fleets whose catches are available. Craft statistics are not available, incomplete or inaccurate for many artisanal fleets. The number of non-reporting vessels operating in the Indian Ocean was re-estimated this year from new information collected through the IOTC Sampling Programs and new vessel records.

3. STATUS OF THE IOTC NOMINAL CATCHES (NC), CATCH AND EFFORT (CE) AND SIZE FREQUENCY (SF) DATABASES

General overview: Status of IOTC statistics by main fisheries and species groups

Tables 3a-3f show the presumed quality of the catches of tropical tunas, temperate tunas, billfish and neritic tunas for the entire time-series (1950-2008), by year (overall and by fishery). Figures 1a-1d show the proportion of catches that are presumed uncertain for the period 2002-2006, by main fleet and species group. The importance that the catches of each species group under each individual gear had over the total catches for that same group during the last decade (1999-2008), all gears combined, is presented in Figures 2a-2e. Figures 3a-3e show the proportion of catches that are presumed uncertain for the period 2002-2006, by main fleet and fishery. The catches for the last two years were excluded because they usually change for countries that report preliminary catches to the Secretariat, in particular countries having distant-water longline fisheries. The quality of the catches for these fleets is likely to improve in 2009-10, as more information is collected from the fisheries and reported to the Secretariat.

Table 3a: Overall status of IOTC catch statistics, by species group (1950-2008)

Group	% Catch	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008		
Tropical tunas	60	[Stacked bar chart showing quality distribution for Tropical tunas]																															
Temperate tunas	7	[Stacked bar chart showing quality distribution for Temperate tunas]																															
Billfish	5	[Stacked bar chart showing quality distribution for Billfish]																															
Neritic tunas	28	[Stacked bar chart showing quality distribution for Neritic tunas]																															
All species		[Stacked bar chart showing quality distribution for All species]																															

Key

- Less than 40% of the catches reported by gear and species
- Between 40% and 75% of the catches reported by gear and species
- More than 75% of the catches reported by gear and species

Figure 1a: Amount of tropical tuna catch (in %) presumed to be uncertain, by fleet, over the total catches estimated for tropical tunas (2002-2006)

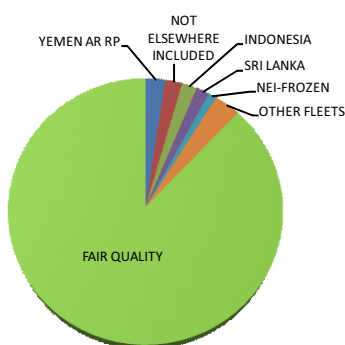


Figure 1b: Amount of temperate tuna catch (in %) presumed to be uncertain, by fleet, over the total catches estimated for temperate tunas (2002-2006)

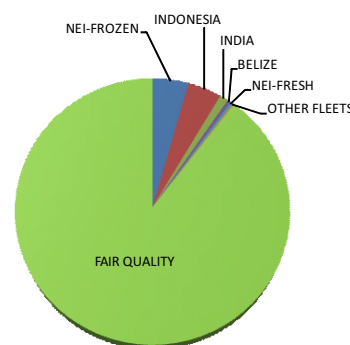


Figure 1c: Amount of billfish catch (in %) presumed to be uncertain, by fleet, over the total catches estimated for tropical tunas (2002-2006)

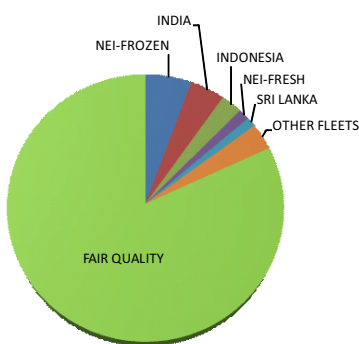
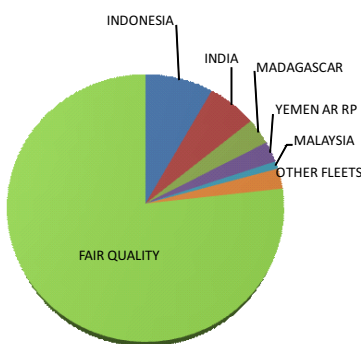


Figure 1d: Amount of neritic tuna catch (in %) presumed to be uncertain, by fleet, over the total catches estimated for tropical tunas (2002-2006)



Surface fisheries: Purse seine

Table 3b: Status of IOTC catch statistics for purse seine fisheries (1950-2008)

Group	%Catch	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008				
Tropical tunas	80	[Stacked bar chart showing 80% catch for tropical tunas from 1950-1978]																[Stacked bar chart showing 80% catch for tropical tunas from 1980-2008]																	
Temperate tunas	2	[Stacked bar chart showing 2% catch for temperate tunas from 1950-1978]																[Stacked bar chart showing 2% catch for temperate tunas from 1980-2008]																	
Billfish	0	[Stacked bar chart showing 0% catch for billfish from 1950-2008]																																	
Neritic tunas	18	[Stacked bar chart showing 18% catch for neritic tunas from 1950-1978]																[Stacked bar chart showing 18% catch for neritic tunas from 1980-2008]																	
All species		[Stacked bar chart showing total catch for all species from 1950-2008]																																	

Key	● Catches represent more than 30% of the total PS catches (1950-2008)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total PS catches (1950-2008)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total PS catches (1950-2008)	■ More than 75% of the catches reported by gear and species

Figure 2a: Contribution (in %) that the purse seine catches for each species group made out of the total catches of that same group for all fisheries combined (1999-2008)

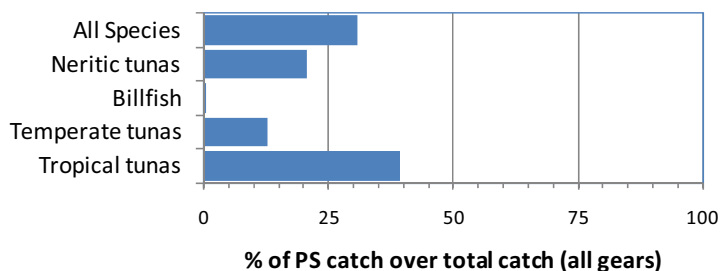
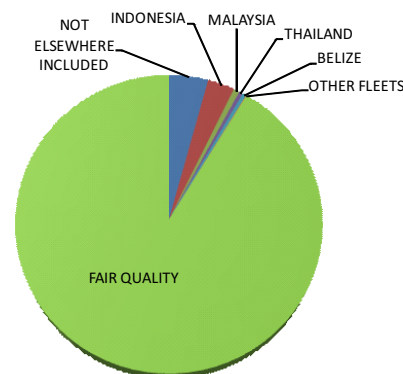


Figure 3a: Amount of PS catch (in %) presumed to be uncertain, by fleet, over the total PS catch (2002-2006)



Overall, the catches recorded for purse seine fisheries in the IOTC database are considered to be of **fair to good quality** (Table 3b). Purse seiners target tropical tunas or neritic tunas, depending on the type of fleet: over the time series (1950-2008) 80% of the purse seine catches were made of tropical tunas and 18% of neritic tunas (Table 3b).

Purse seine gears catch around 30% of the IOTC species in the Indian Ocean, especially tropical tunas (~40%) and neritic tunas (~20%) (Figure 2a).

91% of the catches of purse seine fisheries recorded in the IOTC database for recent years (2002-06) are considered to be of **good quality** (Figure 3a). The catches for the following purse seine fleets are considered to be of uncertain quality (2002-06):

- **NEI and Belize:** The catches of ex-Russian vessels, recorded under the flag of Belize and other unidentified flags, were estimated by the Secretariat in the past; since 2005 the vessels operate under the flag of Thailand and the catches are considered to be of better quality (Box 1C, page 28).
- **Indonesia:** The Secretariat estimated the catches of 3 large purse seine vessels (targeting tropical tunas); in addition, the Secretariat estimated catches for the coastal purse seine fishery of Indonesia (target is neritic tunas) from the total aggregated catches reported by Indonesia; since 2006 Indonesia has been reporting catches by gear to the Secretariat.
- **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 catches of both tropical tunas and neritic tunas.
- **Malaysia:** The catches of a fleet of coastal purse seine vessels reported by Malaysia are not fully reported by species; this affects the quality of the catches of neritic tunas.

Surface fisheries: Pole-and-line

Table 3c: Status of IOTC catch statistics for pole-and-line fisheries (1950-2008)

Group	% Catch	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008				
Tropical tunas	94	[Stacked bar chart showing 94% tropical tunas from 1950-1968]																[Stacked bar chart showing 94% tropical tunas from 1970-2008]																	
Temperate tunas	1	[Stacked bar chart showing 1% temperate tunas from 1950-1968]																[Stacked bar chart showing 1% temperate tunas from 1970-2008]																	
Billfish	0	[Stacked bar chart showing 0% billfish from 1950-2008]																																	
Neritic tunas	5	[Stacked bar chart showing 5% neritic tunas from 1950-1968]																[Stacked bar chart showing 5% neritic tunas from 1970-2008]																	
All species		[Stacked bar chart showing total catch from 1950-2008]																																	

Key	● Catches represent more than 30% of the total BB catches (1950-2008)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total BB catches (1950-2008)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total BB catches (1950-2008)	■ More than 75% of the catches reported by gear and species

Figure 2b: Contribution (in %) that the pole-and-line catches for each species group made out of the total catches of that group for all fisheries combined (1999-2008)

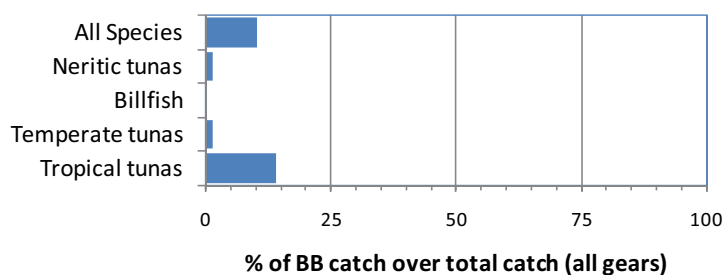
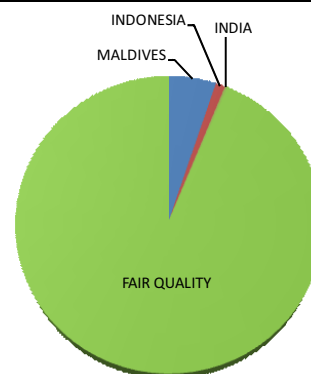


Figure 3b: Amount of BB catch (in %) presumed to be uncertain, by fleet, over the total BB catch (2002-2006)



Overall, the catches recorded for pole-and-line fisheries in the IOTC database are considered to be of **fair to good quality** (Table 3c). Baitboats target tropical tunas: over the time series (1950-2008) 94% of the baitboat catches were made of tropical tunas (Table 3c).

Pole-and-line gears catch around 10% of the IOTC species in the Indian Ocean, especially tropical tunas ($\approx 15\%$) (Figure 2b). **94% of the catches** of pole-and-line fisheries recorded in the IOTC database for recent years (2002-06) are considered to be of **good quality** (Figure 3b). The catches for the following baitboat fleets are considered to be of uncertain quality (2002-06):

- **Maldives:** A small proportion of the catches reported by Maldives are not by species, in particular some neritic tuna species.
- **Indonesia:** The Secretariat estimated catches for the pole-and-line fishery of Indonesia from the total aggregated catches reported by Indonesia; since 2006 Indonesia has been reporting catches by gear to the Secretariat.
- **India:** The Secretariat estimated catches for the pole-and-line fishery of India from the total aggregated catches for years in which India had not reported catches by gear; in recent years India has been reporting catches by gear to the Secretariat.

Surface fisheries: Gillnet

Table 3d: Status of IOTC catch statistics for gillnet fisheries (1950-2008)

Group	% Catch	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008
Tropical tunas	36	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Temperate tunas	1																														
Billfish	4	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Neritic tunas	59	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
All species		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Key	● Catches represent more than 30% of the total GI catches (1950-2008)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total GI catches (1950-2008)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total GI catches (1950-2008)	■ More than 75% of the catches reported by gear and species

Figure 2c: Contribution (in %) that the gillnet catches of each species group made out of the total catches of that group for all fisheries combined (1999-2008)

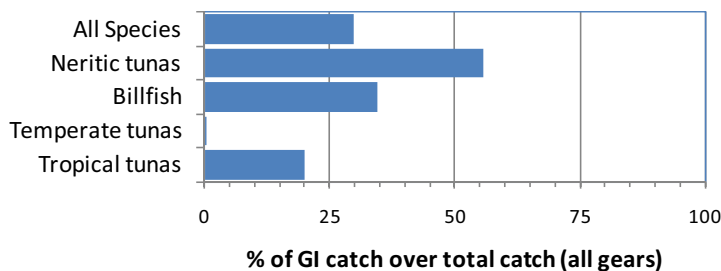
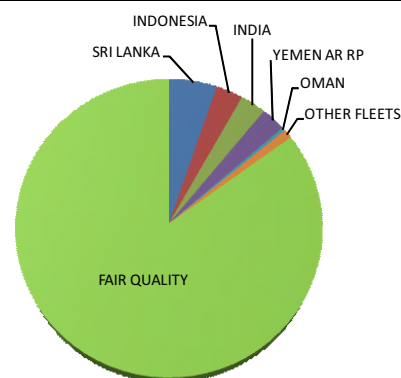


Figure 3c: Amount of GI catch (in %) presumed to be uncertain, by fleet, over the total GI catch (2002-2006)



Overall, the catches recorded for gillnet fisheries in the IOTC database are considered to be of **poor quality until the mid-1970's** and **fair to good quality** after then (Table 3d). Over the time series (1950-2008) 59% of the gillnet catches were made of neritic tunas and 36% of tropical tunas (Table 3d).

Gillnet gears catch around 30% of the IOTC species in the Indian Ocean, especially neritic tunas (≈55%), billfish (≈35%) and tropical tunas (≈20%) (Figure 2c).

85% of the catches of gillnet fisheries recorded in the IOTC database for recent years (2002-06) are considered to be of **good quality** (Figure 3c). The catches for the following gillnet fleets are considered to be of uncertain quality (2002-06):

- **Sri Lanka:** Sri Lanka does not report catches fully by species; in particular, the catches of marlins are reported aggregated (Box 3, page 30).
- **Indonesia:** The Secretariat estimated catches for the gillnet fishery of Indonesia from the total aggregated catches reported by Indonesia; this affects the quality of the catches of both tropical tunas and neritic tunas. Since 2006 Indonesia has been reporting catches by gear and species to the Secretariat.
- **India:** The Secretariat estimated catches for the gillnet fishery of India from the total aggregated catches for years in which India had not reported catches by gear; this affects the quality of the catches of neritic tunas. In recent years India has been reporting catches by gear to the Secretariat.
- **Yemen:** The Secretariat estimated catches for the gillnet fishery of Yemen using reports from the Ministry of Fish Wealth of Yemen and additional information collected through several missions of the IOTC-OFCF Project to Yemen. This affects the quality of the catches of neritic tunas (Box 2, page 29).
- **Oman:** The Secretariat estimated catches for the gillnet fishery of Oman from the total aggregated catches; this affects the quality of the catches of tropical tunas and neritic tunas.

Longline fisheries

Table 3e: Status of IOTC catch statistics for longline fisheries (1950-2008)

Group	%Catch	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008
Tropical tunas	65	[Blue bar]																[Orange bar]													
Temperate tunas	22	[Blue bar]																[Orange bar]													
Billfish	13	[Blue bar]																[Orange bar]													
Neritic tunas	0	[Blue bar]																[Orange bar]													
All species		[Blue bar]																[Orange bar]													

Key	● Catches represent more than 30% of the total LL catches (1950-2008)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total LL catches (1950-2008)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total LL catches (1950-2008)	■ More than 75% of the catches reported by gear and species

Figure 2d: Contribution (in %) that the longline catches of each species group made out of the total catches of that group for all fisheries combined (1999-2008)

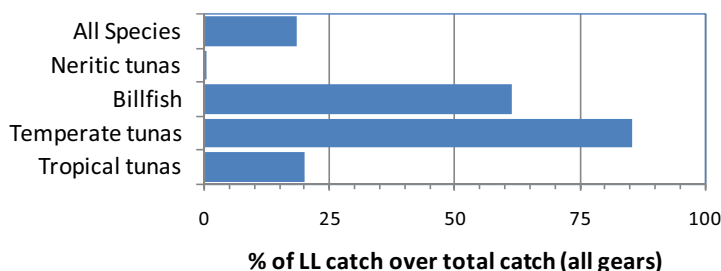
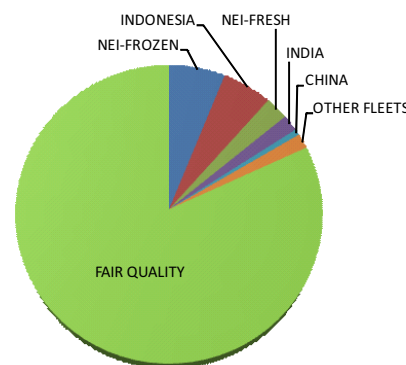


Figure 3d: Amount of LL catch (in %) presumed to be uncertain, by fleet, over the total LL catch (2002-2006)



Overall, the catches recorded for longline fisheries in the IOTC database are considered to be of **good quality until 1988 and since 2003** and **fair quality between 1989 and 2002** (Table 3e). Over the time series (1950-2008) 65% of the longline catches were made of tropical tunas, 22% of temperate tunas and 13% of billfish (Table 3e).

Longline gears catch around 20% of the IOTC species in the Indian Ocean, especially temperate tunas (~85%), billfish (~60%) and tropical tunas (~20%) (Figure 2d).

82% of the catches of longline fisheries recorded in the IOTC database for recent years (2002-06) are considered to be of **good quality** (Figure 3d). The catches for the following longline fleets are considered to be of uncertain quality (2002-06):

- **NEI-Frozen:** The Secretariat estimates the catches of deep-freezing longline vessels that operate under flags of non-reporting countries using information provided by 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, in particular, India. This affects the quality of the catches of tropical tunas, temperate tunas and billfish (Box 1B, page 27).
- **Indonesia:** The Secretariat estimated the catches of deep-freezing longline vessels; in addition, a small component of the catches of fresh-tuna longliners are not reported by species; this affects the quality of the catches of tropical tunas, temperate tunas and billfish.
- **NEI-Fresh:** The Secretariat estimates the catches of fresh-tuna 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, in particular, India, Malaysia and Indonesia. This affects the quality of the catches of tropical tunas, temperate tunas and billfish (Box 1A, page 25).
- **India:** India does not report a complete set of catches for its longline fleets (see above); this affects the quality of the catches of tropical tunas and billfish.
- **China:** China did not report catches fully by species before 2006; the catches reported since then are considered to be of good quality.

Other artisanal fisheries: Hand line, trolling and unidentified fisheries

Table 3f: Status of IOTC catch statistics for hand line, trolling and other unidentified fisheries (1950-2008)

Group	% Catch	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008		
Tropical tunas	35	■	■				■	■	■	■	■																						■
Temperate tunas	3																																
Billfish	2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■																	■
Neritic tunas	60																																
All species																																	■

Key	● Catches represent more than 30% of the total OT catches (1950-2008)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total OT catches (1950-2008)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total OT catches (1950-2008)	■ More than 75% of the catches reported by gear and species

Figure 2e: Contribution (in %) that the hand line, trolling and unidentified gears catches of each species group made out of the total catches of that group for all fisheries combined (1999-2008)

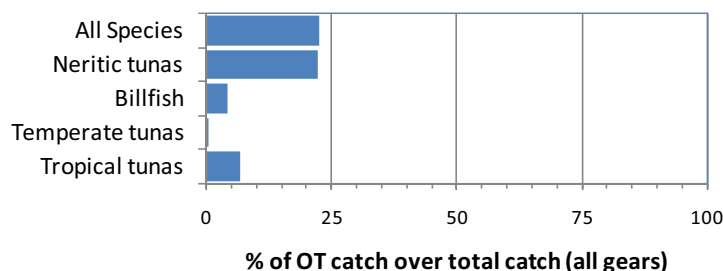
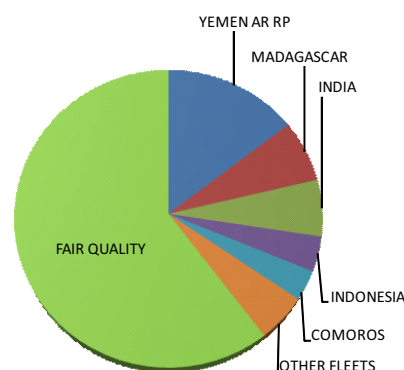


Figure 3e: Amount of OT catch (in %) presumed to be uncertain, by fleet, over the total OT catch (2002-2006)



This category includes the catches of IOTC species that are not reported by gear. The majority 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 to be of **poor to fair quality** (Table 3f). Over the time series (1950-2008) 60% of the catches under this category were made of neritic tunas and 35% of tropical tunas (Table 3f). **Hand line, trolling and other unidentified gears catch around 20% of the IOTC species in the Indian Ocean**, especially neritic tunas (≈20%) (Figure 2e).

60% of the catches of longline fisheries recorded in the IOTC database for recent years (2002-06) are considered to be of **good quality** (Figure 3e). The catches for the following fleets are considered to be of uncertain quality (2002-06):

- **Yemen:** The Secretariat estimated catches for the hand line fishery of Yemen using reports from the Ministry of Fish Wealth of Yemen and additional information collected through several missions of the IOTC-OFCF Project to Yemen. This affects the quality of the catches of tropical tunas (yellowfin tuna). (Box 2, page 29.)
- **Madagascar and Comoros:** Madagascar and Comoros have never reported catches for their fisheries. The Secretariat uses the catches estimated by the FAO for these two countries; this affects the quality of the catches of tropical tunas (Comoros) and neritic tunas (Madagascar). (Box 2, page 29.)
- **India:** The Secretariat estimated catches for the hand line and trolling fisheries of India from the total aggregated catches for years in which India had not reported catches by gear; this affects the quality of the catches of neritic tunas. In recent years India has been reporting catches by gear to the Secretariat.
- **Indonesia:** The Secretariat estimated catches for the handline and trolling fishery of Indonesia from the total aggregated catches reported by Indonesia; this affects the quality of the catches of both tropical tunas and neritic tunas. Since 2006 Indonesia has been reporting catches by gear and species to the Secretariat.
- **Other fleets:** Other fleets for which the catches are considered of uncertain quality are UAE, Tanzania, Mauritius and Kenya.

Main progress achieved during 2009

The main progress achieved in the collection and verification of the data in the IOTC Nominal catches (NC), by-catch (BY), catch and effort (CE) and size frequency (SF) databases are summarized below.

Status of the IOTC NC, CE and SF tables: Main Progress Achieved since the last SC Meeting

A/ Nominal catches	
1-. Improved species and gear breakdown	
Fishery Period Species Details of activity Sources Changes in data	All 1950-2007 All Disaggregation of catches recorded under gear and/or species aggregates in the IOTC database Nominal Catches tables in the IOTC Database (WPTT-04-06) The amount of catches in the IOTC database that are not recorded by gear or species has decreased significantly in recent years thanks to the more detailed statistics reported by some countries (notably Indonesia)
Fishery Period Species Details of activity Sources Changes in data	India 1950-2008 Neritic tunas Disaggregation of catches by gear and species for the entire catch data series. The secretariat assigned the catches by year and species for years in which the catches were recorded aggregated using the information existing in recent years for India, where catches are available by gear and species. This review affected mostly the catches of neritic tuna species IOTC database, as reported by the CMFRI of India Very significant decrease in the amount of catches of neritic tunas that are not available by gear and/or species
Figure 4: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in India	Figure 5: Total catches by gear in the Indian Ocean estimated for the artisanal fishery operating in India
Fishery Period Species Details of activity Sources Changes in data	Artisanal fleets of Oman 1984-2008 Yellowfin tuna, longtail tuna and narrow-barred Spanish mackerel Catches broken by gear type New information provided by the Ministry of Fish Wealth of Oman during a visit to the country. Moderate changes in the catches recorded by species and gear
Figure 6: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in Oman	Figure 7: Total catches by gear in the Indian Ocean estimated for the artisanal fishery operating in Oman

2-. Changes to total catches series	
Fishery Period Species Details of activity Sources Changes in data	<p>Indonesia's Deep-freezing longline fleet 2001-07 Yellowfin tuna, bigeye tuna, albacore, swordfish The DGCF of Indonesia reported numbers of Indonesian deep-freezing longliners operating in the Indian Ocean during 2001-06. The Secretariat estimated the catches of these vessels basing on the numbers reported and average catches by species by vessel for Taiwanese longliners during the same period Directorate General for Capture Fisheries of Indonesia Increase in the catches of tropical tunas, billfish and temperate tunas in the IOTC database See also Box 1B</p>
Fishery Period Species Details of activity Sources Changes in data	<p>Gillnet/longline fishery of Sri Lanka 2007-2008 Yellowfin tuna, skipjack tuna, swordfish and marlins New catches series reported by the Ministry of Fisheries and Aquatic Resources of and data collected by the National Aquatic Resources Agency of Sri Lanka (IOTC-OFCF sampling) Ministry of Fisheries and Aquatic Resources and National Aquatic Resources and Development Agency of Sri Lanka Significant changes in catches and species composition for this period</p>
Fishery Period Species Details of activity Sources Changes in data	<p>Non-reporting fresh tuna longliners operating under various flags (NEI) 2004-2008 Yellowfin tuna, bigeye tuna, swordfish Re-estimation of the catches of non-reporting fresh tuna longliners thanks to the new information available. Most of the catches refer now to Indonesian and Malaysia vessels based in countries other than the flag country. The catches of non-reporting fresh-tuna longliners from India were also estimated using the number of vessels active (on the assumption that all authorized vessels were active during the year in which they were authorized) and average catches by vessel from a proxy fleet. Number of vessel unloadings and catches unloaded reported by the Andaman Sea Fisheries Research and Development Centre (AFRDEC) of Thailand Number of vessel unloadings and catches unloaded reported by the Fisheries Research Institute (FRI) of Malaysia Number of vessel unloadings and catches unloaded reported by the Fisheries Research Institute (FRI) of Mauritius Number of vessel calls and landings recorded by the Ministry of Fisheries and aquatic resources of Maldives Number of calls of foreign vessels recorded by the Veterinarian Authority (AVA) of Singapore Number of vessels active IOTC-OFCF Project in Yemen Number of vessels operated reported by the Ministry of Agriculture of India Moderate decrease in the catches of fresh-tuna longliners in recent years See also Box 1A</p>
Fishery Period Species Details of activity Sources Changes in data	<p>Non-reporting deep-freezing longliners operating under several flags (NEI) 2004-08 Yellowfin tuna, bigeye tuna, albacore, swordfish New review of the series of catches from data collected recently The catches of non-reporting deep-freezing longliners from India and Indonesia were also estimated using the number of vessels active (on the assumption that all authorized vessels were active during the year in which they were authorized) and average catches by vessel from a proxy fleet. IOTC Vessel Records and IOTC Activity Records Number of vessels authorized reported by the Ministry of Agriculture of India Number of vessels authorized reported by the Ministry of Fisheries of Indonesia Change in recent year catches. Current catches are slightly higher than those previously recorded See also Box 1B See also Box 3</p>

B/ Bycatch	
Fishery Period Species Details of activity Sources Changes in data	<p>All 1950-2008 All shark species The Secretariat estimated catches of sharks for some fisheries by using catch rates from other fisheries or other information available IOTC Database and ancillary data Increase in the catches of sharks recorded in the IOTC database</p>

C/ Catches-and-Effort	
Fishery	Artisanal fisheries of Oman
Period	1984-2008
Species	Yellowfin tuna, longtail tuna, narrow-barred Spanish mackerel
Details of activity	New catches and effort reported by Oman for the period, by gear for yellowfin tuna and skipjack tuna. The catches were input in the IOTC database as reported
Sources	Ministry of Fish Wealth of Oman
Changes in data	New catches and effort input in the IOTC database
Fishery	Sport fisheries of Kenya
Period	2007-08
Species	Indo-Pacific sailfish, marlins and tunas
Details of activity	New information collected by the Kenya Marine Fisheries Research Institute from sport fishing clubs in Malindi and Watamu
Sources	Data compiled by the Kenya Marine Fisheries Research Institute
Changes in data	No changes to database yet; data to be processed and input
Fishery	All fisheries
Period	1950-2008
Species	Tropical tunas and swordfish
Details of activity	Catches per month and 5 degrees square grid raised to total catches (Atlas)
Sources	IOTC Database; Background information
Changes in data	Information prepared for the WPTT and WPB; no new data input

D/ Size frequency	
Fishery	Seychelles
Period	2007-2008
Species	Yellowfin tuna, bigeye tuna, swordfish, albacore, striped marlin, blue marlin, black marlin, sharks
Details of activity	New length frequency data available for the above species by month and 5 degrees square grid.
Sources	Data provided by the Seychelles Fishing Authority
Changes in data	New length frequency data input into the IOTC database for the above species
Fishery	Gillnet and handline fisheries of Oman
Period	2009
Species	Yellowfin tuna, longtail tuna, narrow-barred Spanish mackerel
Details of activity	Size data collected by the Ministry of Fish Wealth of Oman in cooperation with the IOTC-OFCF Project.
Sources	Ministry of Fish Wealth of Oman
Changes in data	New size data to be input in the IOTC database soon
Fishery	All
Period	1950-2007
Species	Tropical tunas and swordfish
Details of activity	Building of Catch-At-Size and Catch-At-Age matrices
Sources	IOTC Database; Background information
Changes in data	Information prepared for the WPTT, WPT and WPB; no new data input

Problem Areas Identified

Despite the progress achieved regarding the statistics in the IOTC NC, BY, CE and SF databases in recent years, there are still several problems regarding the completeness and quality of the data which should be addressed. The main areas of concern regarding the statistics in these databases are summarized below.

Status of the IOTC NC, CE and SF databases: Problem Areas Identified

A/ Nominal catches	
1-. Statistics not available from the flag country	
Reason/s Fishery/ies Period Species Proposed actions	Fisheries not monitored by the flag countries NEI fleets (various flags) 1980 to date Tropical tunas, temperate tunas and billfish Countries to continue collection and reporting of data from foreign vessels operating within their territory The Secretariat to identify the fleets for which important tuna catches have been unreported over the years (through retrieval of vessel and, especially, activity and port calls records) See also Box 1
Reason/s Fishery/ies Period Species Proposed actions	Statistical system unable to produce reliable estimates of catches (as regards IOTC species) Yemen, Comoros, Madagascar, Kenya, Tanzania, Mozambique, Myanmar, Somalia 1950 to date Mainly tropical tunas and neritic tunas Countries concerned to implement new data collection systems or strengthen the systems existing The Secretariat to liaise with the South West Indian Ocean Fisheries Project and the Bay of Bengal Large Marine Ecosystem Project concerning countries that participate on these initiatives to assess the way in which the statistics for such countries can be improved. The Secretariat to identify the deficiencies in data collection and processing in the countries concerned; the Secretariat sent a questionnaire in 2009 in order to obtain more information about the statistical systems existing in countries having fisheries for IOTC species in the IOTC Area. See also Box 2
Reason/s Fishery/ies Period Species Proposed actions	Statistics probably available at the country level but not reported India (longline), Egypt, United Arab Emirates 1950 to date Mainly tropical tunas and neritic tunas Countries concerned to report the data available to the Secretariat See also Box 1
2-. Statistics not fully available by gear and/or species	
Reason/s Fishery/ies Period Species Proposed actions	Statistical systems unable to produce detailed estimates of catches India, Thailand, Malaysia, Sri Lanka, Pakistan 1950 to date Neritic tunas, billfish Countries concerned to strengthen the existing data collection and processing systems The Secretariat to identify the deficiencies in data collection and data processing in the countries concerned; the Secretariat sent a questionnaire in 2009 in order to obtain more information about the statistical systems existing in countries having fisheries for IOTC species in the IOTC Area See also Box 3
B/ Bycatch (non-IOTC species)	
1-. Statistics not available from the flag country	
Reason/s Fishery/ies Period Species Proposed actions	Fisheries not monitored or insufficiently monitored for sharks or statistics not reported Most longline fleets and oceanic gillnet fisheries of Pakistan, Iran and Sri Lanka 1950 to date All sharks, seabirds and marine turtles caught incidentally on IOTC fisheries Countries concerned to implement new data collection systems, preferably observer programmes, or strengthen the existing and to report their by-catch statistics to the IOTC The Secretariat to identify the fleets for which important shark catches or other by-catches have been unreported over the years; the Secretariat sent a questionnaire in 2009 in order to obtain more information about the statistical systems existing in countries having fisheries for IOTC species in the IOTC Area
2-. Statistics not available by gear and/or species	
Reason/s Fishery/ies Period Species Proposed actions	Statistical systems unable to produce detailed estimates of catches Most industrial fleets 1950 to date All shark species Countries concerned to strengthen the existing data collection and processing systems, preferably observer programmes The Secretariat to identify the deficiencies in data collection and data processing in the countries concerned; the Secretariat sent a questionnaire in 2009 in order to obtain more information about the statistical systems existing in countries having fisheries for IOTC species in the IOTC Area

C/ Discard levels	
1-. Statistics not available from the flag country or highly aggregated by gear and/or species	
Reason/s	Most of the discards are unreported and when reported they are usually incomplete and highly aggregated
Fishery/ies	All, especially industrial fleets and oceanic gillnets (Pakistan and Iran)
Period	1952 to date
Species	Undersized or spoiled tunas (tropical tunas), Sharks, low-value or spoiled billfishes (sailfish, short-billed spearfish) and other fish species
Proposed actions	Countries concerned to collect data on industrial fisheries through observer programs The Secretariat to identify the fleets having high levels of discards

D/ Catches and Effort and Size data	
1-. Statistics not available from the flag country or incomplete	
Reason/s	Catch and effort (size frequency) statistics not collected by the flag country
Fishery/ies	Many artisanal Deep-freezing longliners from India (CE+SF), Indonesia (CE+SF), Belize (SF) and Philippines (SF) Fresh tuna longliners from India (CE+SF), Taiwan,China (CE+SF), Indonesia (CE) and Belize (SF) Industrial purse seiners from the EC and Seychelles (Effort supply vessels and FADs), Iran (CE+SF) and Thailand (SF) Non-reporting longline fleets (NEI)
Period	1952 to date
Species	All IOTC species and sharks
Proposed actions	Countries concerned to implement/strengthen logbook systems and length frequency sampling on their fleets and report the data required to the Secretariat The Secretariat to retrieve any information that might be available from other sources, especially for fleets for which the retrieval of catch and effort (size frequency) records is considered important
Reason/s	Statistical systems unable to produce catch and effort (size frequency) statistics as per IOTC standards
Fishery/ies	Many artisanal Oceanic gillnets from Iran and Pakistan and gillnet/longline fishery of Sri Lanka Longliners from Indonesia (SF), Belize (CE), and Philippines (CE)
Period	1952 to date
Species	All IOTC species and sharks
Proposed actions	Countries concerned to strengthen logbook systems and length frequency sampling on their fleets and report the data required to the Secretariat The Secretariat to identify the deficiencies in data collection and processing in the countries concerned; the Secretariat sent a questionnaire in 2009 in order to obtain more information about the statistical systems existing in countries having fisheries for IOTC species in the IOTC Area
Reason/s	Catch and effort (size frequency) statistics collected by the flag country but no or incompletely reported to the IOTC
Fishery/ies	Artisanal fisheries of India
Period	1950 to date
Species	Neritic tunas
Proposed actions	India to report CE and SF data for its artisanal fleets as soon as possible
Reason/s	Low sampling coverage
Fishery/ies	Longliners of Japan (SF), South Korea (CE+SF) and China (SF) Purse seiners of Thailand (SF)
Period	Various, notably in recent years
Species	Tropical tunas, billfish and albacore
Proposed actions	Countries concerned to increase sampling effort/coverage
Reason/s	SF statistics not reported by IOTC standards (5° square grid and month)
Fishery/ies	Longliners of Japan (SF), and Taiwan,China (SF)
Period	Complete time-series
Species	Tropical tunas, temperate tunas, billfish and albacore
Proposed actions	Japan and Taiwan,China to provide size frequency data by 5° square grid and month (instead of 10°Lat-20°Lon and quarter)

4. STATUS OF THE IOTC FISHING CRAFT STATISTICS (FC) AND ACTIVE VESSELS (AV) DATABASES

The numbers of vessels fishing for 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

In 2009 the Secretariat participated in a study intended to estimate **input-fishing capacity** for the fleets fishing for IOTC species in the Indian Ocean during 2006-08; the results of this study will be presented at the next meeting of the Commission, in March 2010 (Busan, Republic of Korea).

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 the number (fishing craft) and/or characteristics of the vessels operating within their EEZ (as specified in IOTC Resolution 07/04) or calling to ports in their territory (as specified in IOTC Resolution 05/03).

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.

In addition, the Secretariat completes the catches reported in cases where those catches are believed underreported. This refers to the **catches of fleets of IOTC CPCs** that are not fully monitored by their flag states. The catches 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**: More than 100 longliners have been operating in India in recent years, including fresh-tuna longliners and deep-freezing longliners. However, the catches reported by India for this component represent only the catches reported in the logbooks completed by some of the vessels operating. The Secretariat has used the total number of vessels to estimate additional catches for this fleet, separately for fresh-tuna longliners and deep-freezing longliners.
- Longline fleets of **Indonesia** and **Malaysia**: Indonesia and Malaysia do not monitor the catches of vessels under their flag that are unloaded in ports outside their territory. The Secretariat estimates these catches using information provided from third parties.
- Longline fleet of **Philippines**: The catches of bigeye tuna reported by Philippines for its longline fleet in the Indian Ocean have been consistently lower than the amounts of Indian Ocean bigeye tuna imported by Japan from this fleet. The Secretariat has been estimating additional catches for this country using the information available from Japan. However, the new catches estimated are probably still lower than the actual catches of Philippines longliners as the estimates assume that every bigeye tuna caught by Philippines is exported to Japan. These catches may need to be further revised in the future.

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

Finally, the Secretariat estimated catches for the longline fleet of **Tanzania**. Tanzania has never reported catches for the three longliners that operate under its flag. The catches were estimated by using these numbers and the catch data for vessels from other fleets, assuming that those operated in the same areas and targeted the same species. In this case, the catches estimated were assigned to Tanzania.

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 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. This fleet is flagged mainly from the European Community, Seychelles, Iran, Japan and Thailand.

Longline fleets: There are many longline fleets fishing tuna in the Indian Ocean, mainly under the flags of Australia, Belize, China, Taiwan, China, the EC, India, Indonesia, Japan, Kenya, the Republic of Korea, Madagascar, Malaysia, Mauritius, Oman, Philippines, Senegal, 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.

Oceanic gillnet fisheries of Iran and Pakistan: The number of oceanic gillnet vessels operating in the Indian Ocean is well known for Iran and poorly known 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.

Main Progress Achieved during 2009

The progress achieved in the collection and verification of the data in the IOTC FC and AV databases is summarized in the Table 3 below.

Table 3: Status of the IOTC FC, VR and FTVA databases: main progress achieved

DB	FLAG/S	SOURCES	PERIOD	DETAILS	MAIN RESULTS
FC	Non reporting DWFNs	IOTC Active Vessels List	2006-08	Review to complete the craft statistics	Number of non-reporting deep-freezing longliners better known: Around 20 in recent years
	Non-reporting Fresh-tuna longliners	IOTC Sampling Programmes WASKI Indonesia DGCF Indonesia CSIRO Australia RIMF Indonesia	2000-08	Review to complete the number of fresh tuna longliners operating in the Indian Ocean	Number Indonesian fresh tuna longliners input: Around 1,000 boats in all in recent years. Current numbers are decreasing.
	Fresh-tuna longliners from Taiwan, China	Data downloaded from the internet	2007-2008	Number of fresh-tuna longliners operating in the Indian Ocean published	Around 440 vessels input for 2006-2008.
	Commercial Longline fleet	FSI India MAF Oman DGCF Indonesia FRI Malaysia	2005-08	India, Oman, Indonesia and Malaysia reported new lists of longline vessels operating in the Indian Ocean	Vessels input to fishing craft statistics. The new data is thought to be more complete although the numbers reported by India, Malaysia and Indonesia are still under review and may change in the future
AV	All Industrial	AVA Singapore NARA Sri Lanka MAF Oman AFDEC Thailand (IOTC) CSP Madagascar DGCF Indonesia FRC Albion Mauritius SFA Seychelles Fisheries Administration Mozambique Fisheries Department Kenya DPMA France TAAF MRAG BIOT Japan (list of IUU vessels)	2000-08	Reporting of foreign tuna fleets putting in to ports or licensed to operating within the EEZ of these countries	New vessel and activity records input
	Belize, Senegal, Thailand, Oman, Tanzania	INMARBE Belize CRODT Senegal DOF Thailand MF Tanzania	2003-08	Submission of names and characteristics of ships fishing for tunas in the Indian Ocean	Number of vessels operating better known
ALL	All industrial fleets and oceanic fleets	IOTC Active vessel list IOTC vessel unloading list Fishing craft statistics	2006-08	Estimation of input-fishing capacity in the Indian Ocean	Total number of large-scale vessels fishing in the Indian Ocean and number of medium-scale vessels that fish sometimes outside the EEZ of their flag countries estimated. Changes to Fishing Craft Statistics are expected after the report is presented to the Commission.

Problem Areas Identified

The main area problems identified in the IOTC database concerning the tuna fleets operating in the Indian Ocean are summarised in the Table 4 below. Several alternative actions to undertake to reduce these uncertainties are proposed in the right column.

Table 4: Status of the IOTC FC, VR and FTVA databases: problem areas identified

DB	PROBLEM	FLAG/S	PERIOD	REASON/S	PROPOSED ACTION/S
FC	Series incomplete for some longline fleets	India, Indonesia and NEI (various flags)	1980 to date	No data available for some periods	Promote compliance by the flag states concerned Promote the collection of vessel unloading data from IOTC CPCs (fresh-tuna longliners)
	No data or data inconsistent regarding some artisanal fleets	Indonesia, Yemen	1950 to date	Statistics not available	Identify the reasons why the statistics are not provided (questionnaire)
				Statistical systems unable to produce reliable fishing craft statistics	Identify the deficiencies in data collection and processing in the countries concerned (questionnaire)
Lack of detailed information	Indonesia, Pakistan, Sri Lanka, Maldives	1950 to date	Incomplete data (vessel size, mechanization, etc. not available)	Promote compliance by the flag states concerned	
AV	Data not available	Oceanic vessels of Pakistan, Sri Lanka, Maldives and other countries	Recent years	Statistics available but not provided Fleets not monitored by the flag countries	Promote compliance by the flag states concerned Promote the collection of vessel unloading data from IOTC CPCs (fresh-tuna longliners)
	Information incomplete or inconsistent	Indonesia, India	Recent years	Ship names, identification or characteristics mistakenly recorded Ship characteristics inconsistent between reports Lack of information about ship activity in the Indian Ocean (vessels bearing licenses to operate but not actually operating)	

5. OTHER IOTC DATA HOLDINGS:

a. Biological data

Table 5 shows other datasets available at the IOTC Secretariat:

Table 5: Biological data available at IOTC

TYPE OF DATA	RAW DATA	PERIOD	SOURCE
Length-length-weight data of tuna and billfish caught by fresh tuna longliners in the Indian Ocean	Available	2000-06	AFDEC Thailand (IOTC Sampling Programmes) NARA Sri Lanka (IOTC Sampling Programs) RIMF Indonesia (IOTC Sampling Programs) FRI Malaysia (IOTC Sampling Programs) IFREMER Reunion-France (PPR Programme) BRS (Pelagic Observer Program)
Length-length-weight-sex-maturity of tuna and tuna-like species caught by longliners and purse seiners within the EEZ of Chagos	Available	1996-06	MRAG United Kingdom (observer data)
Length-weight-sex data of tuna species caught by longliners from the republic of Korea	Available	2001-03; 2007	MOMAF Korea
Length-length-weight-sex of sharks caught as a by-catch by Spanish longline vessels	Available	2006-07	IEO Spain
Compilation of biological data collected during several years at the IOT canning factory (Seychelles)	Not available	1984-2006	IRD and SFA (IOTC-2006-WPTT-09)
Biological data available from <u>Atlantic</u> : -Length-length-weight data of tuna and billfish	Not available Available	1992-04	ICCAT, Literature NMFS Pelagic Observer Program
-Relationships between straight and curved body measurements	Available	1992-04	NMFS Pelagic Observer Program
-Length-length-weight data of sharks	Not available	-	Literature
Biological data available from <u>Pacific</u> : -Length-length-weight data of billfish	Not available	2004	SPC, Literature

b. Observer data

The Secretariat has received limited information concerning the observer programmes that are currently ongoing in the Indian Ocean. The observer programmes and information available are summarized in Table 6:

Table 6: Observer programmes in the IOTC Region and type of data available at the Secretariat

PROGRAMME	PERIOD	DATA COLLECTED	INFORMATION AVAILABLE AT THE IOTC SECRETARIAT
Japan	May 2006 – February 2007	Length; Sex for Billfish; Tunas; Shark	IOTC-2007-WPEB-12
Spanish surface longline	2005	Weight- round weight – fin weight of sharks	IOTC-2008-WPEB-08 And raw data
Australia	April 2003- June 2004	Length – sex ; Billfish	IOTC WPB Australian Observer Reportv4
Seychelles (Observers on Longliners operating around Seychelles Waters)			IOTC-2006-WPTT-25
European Community-PS	2003 to date		Observ_WPTT-03-06
Korea	2007	Length – weight- sex; Tunas; Billfish; Sharks	Raw data
South Africa	1998 to date	Length , biological sample ; Target and By-catch species	Total levels of seabird bycatch Shark bycatch Biological data sharks (raw data)
China	2006 to date	Biological data, environmental measurement	Raw data 2006-07
Taiwan China	2001 to date	Biological data of target species and bycatch	IOTC-2008-SC-INF31
United Kingdom Territories	1996-2006	Biological data	Raw data

The Secretariat presented documents to the Working Party on Tropical Tunas (IOTC-2009-WPTT-13) and Working Party on Billfish on the status of data holdings regarding the biological information available for these species groups (IOTC-2009-WPB-05). In addition, the Secretariat updated the reports on the Status of the IOTC Databases for Albacore and Neritic tunas, which are presented in separate documents (IOTC-2009-WPDCS-05 and IOTC-2009-WPDCS-06, respectively).

c. 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 EC, and several pilot and small-scale tuna tagging projects, funded by the DG-Fish and the government of Japan. During those projects, more than 200 000 tuna, skipjack, yellowfin and bigeye, were tagged and released in the whole Indian Ocean. Tag recovery scheme have been developed in most of the coastal countries and in the main fishing nations in order to ensure the reporting of a maximum of the recaptured tagged tunas.

The specific objective of this programme is 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 and is in the public domain. The data is available on request to IOTC. At the moment, all the data from the RTTP-IO is stored in a special database developed for the project, and all the small-scale and pilot data is in the process of being included with to it.

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:

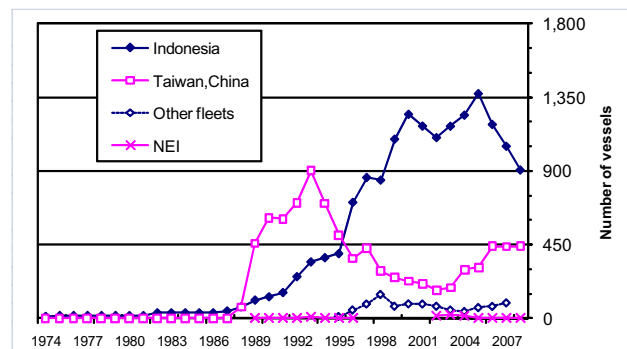
- Species
- Fork length and/or weight at recovery
- If found during fishing: date and position of recovery
- If found during processing: estimated date and position of recovery
- Date of reporting
- Country of reporting
- Gear
- Place and process where found
- Name of the vessel (*confidential*)
- Name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

The Chief Coordinator of the project presented document related to the tagging data during the Working Party on Tropical Tunas (IOTC-2009-WPTT-24) and these data have already been used for the yellowfin stock assessment in 2008 and 2009.

BOX 1: ESTIMATION OF CATCHES OF NON-REPORTING FLEETS

A/ FRESH TUNA LONGLINE FLEETS

Figure 8: Number of fresh-tuna longliners operating in the Indian Ocean from 1974-2008

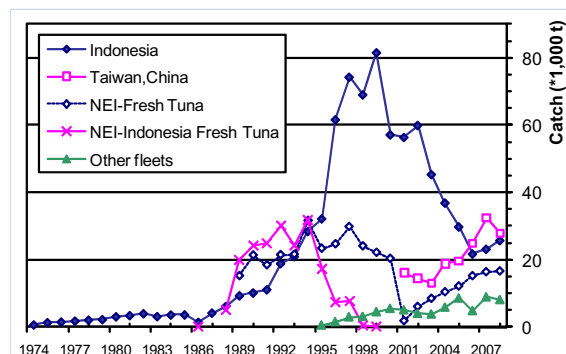


2007-08 numbers are preliminary

'Other fleets' includes Belize, China, India, Malaysia, Maldives and Oman

'NEI' includes Bolivia, Equatorial Guinea and Honduras

Figure 9: Estimated catches in the Indian Ocean of fresh tuna longliners per flag country



2007-08 catches are preliminary

'NEI-' includes catches estimated for non reporting fleets based in Indonesia ('NEI-Indonesia Fresh tuna') or elsewhere ('NEI-Fresh Tuna')

'Other fleets' includes Belize, China, India, Malaysia, Maldives and Oman

The estimated numbers of fresh tuna longliners operating in the Indian Ocean sharply increased after the mid-1980's, reaching around 2,000 vessels in 2003 (Figure 8). Prior to 2004 few countries reported fisheries statistics for its fresh tuna longliners. In recent years, the majority of these longliners have apparently been operating under the Indonesian and Taiwan,China flag. The drop in the number of Taiwanese vessels and catches (Figure 9) observed between 1993 and 2000 is due to re-flagging of many vessels to Indonesia. The Secretariat received reports indicating that several Indonesian vessels changed its flag back to Taiwan,China and are currently based in ports other than Indonesia's. This is confirmed by the large numbers of Taiwanese fresh-tuna longliners recorded since 2006, as much as 440 (data available from the internet). Taiwan,China has been estimating catches for its fresh-tuna longline fleet since 2006. Other than the catches of albacore, the catches estimated for 2001-07 are close to those that the Secretariat was estimating before for Taiwanese vessels (Figure 10).

Belize, China, Indonesia, Malaysia and Oman submit catches for its fresh-tuna longline fleets routinely. However, **Indonesia** and **Malaysia** do not monitor the activities or the catches of all fresh-tuna longliners under its flag, but only those of vessels based in ports within its territory. The reports that the Secretariat receive on the activities of foreign vessels in countries of the IOTC region appear to indicate that significant numbers of Indonesian and Malaysian fresh-tuna longliners are not based in their flag countries.

India has never reported complete catches for its 75-130 commercial longliners, that have been operating in the Indian Ocean since 2004. India reported a list of 133 longliners operating under its flag in 2008, to be included in the IOTC Record of Authorized Vessels. The list, still under review, contains both deep-freezing longliners and fresh-tuna longliners. At present, the Secretariat estimates the catches for each component separately.

The estimation of number of vessels and catches has been improving over time, thanks to the information collected through the Sampling Programs that were implemented by the IOTC-OFCF in key ports of landing of these vessels in the Indian Ocean. The amount of historical and current information collected through these cooperation schemes has helped to improve the estimates in Thailand, Malaysia, Sri Lanka and Indonesia. The collection of past information should continue to allow better estimates of historical catches in countries like Indonesia. It is important to note that, although Malaysia, Indonesia and Thailand no longer receive support from the IOTC-OFCF Project to monitor their fisheries, these countries have allocated funds to maintain the sampling activities and routinely report the statistics for their longline fleets to the IOTC. Mauritius also reports data to the Secretariat concerning the activities of foreign fresh-tuna longliners within its EEZ and the catches unloaded in Port Louis.

Belize, China, Taiwan,China, Indonesia, Malaysia and Oman have provided catches for their fresh-tuna longline fleets in recent years. Catches and effort are only available for Belize, China, Malaysia and Oman. Size data are available for Indonesia and Taiwan,China (IOTC-OFCF sampling and Indonesia's and Thailand's sampling)

Current catches have been estimated at about 80,000 tonnes (16,000 t are estimated for non-reporting fresh-tuna vessels), mostly yellowfin tuna (YFT), albacore (ALB) and bigeye tuna (BET) (Figure 11).

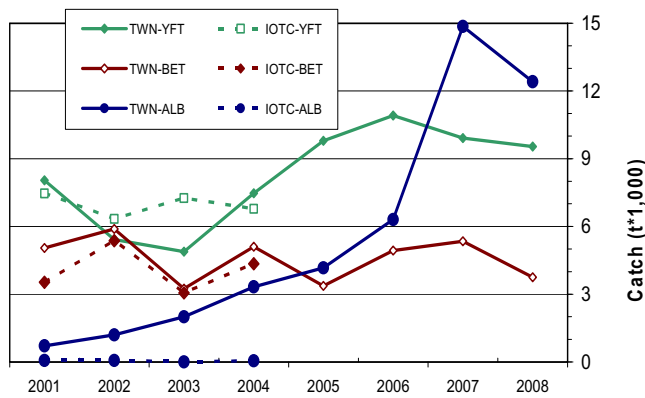


Figure 10: Catches available for Taiwanese fresh-tuna longliners for 2001-08 versus the catches previously estimated by the Secretariat

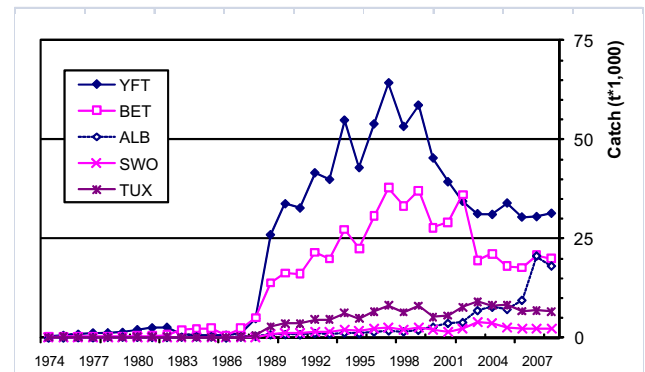
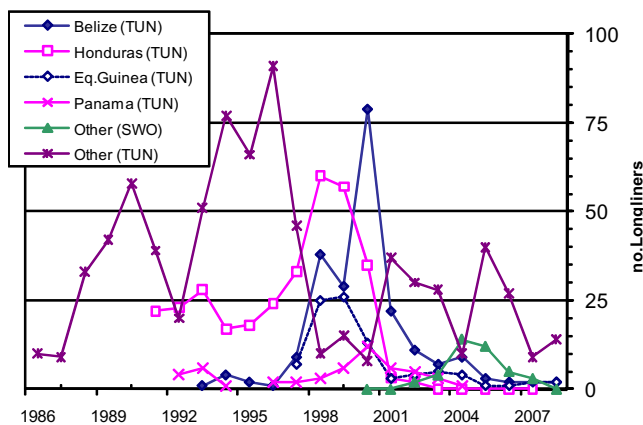


Figure 11: Total catches per species in the Indian Ocean estimated for fresh tuna longline fleets

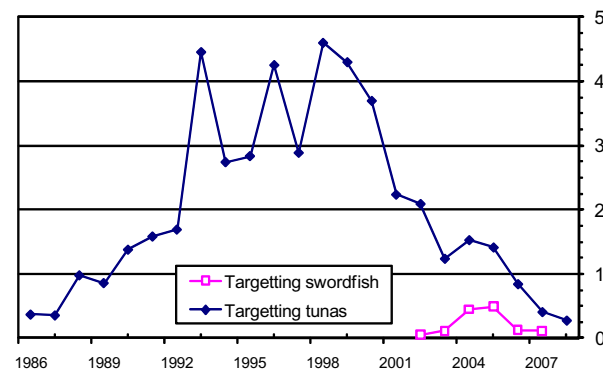
B/ NON REPORTING DEEP-FREEZING LONGLINE FLEETS

Figure 12: Number of non-reporting deep-freezing longliners estimated to operate in the Indian Ocean (per flag country)



Note: Belize is an IOTC Member since 2007 and has reported catches for its longline fleet in recent years

Figure 13: Estimated catches of non-reporting deep-freezing longliners according to the type of operation



The numbers of non-reporting deep-freezing longliners by flag are estimated by using data collected from various sources (Figure 12). The main sources for these data are the fishing craft statistics and the IOTC lists of active vessels. The catches estimated for 2008 are still preliminary (Figures 13-14). The main reason is that the Secretariat is waiting to complete the lists of active vessels with information reported from parties regarding the vessels calling to its ports and the catches unloaded.

Around 15 non-reporting longliners are believed to be operating in the Indian Ocean in recent years, with total catches estimated at 2,500 tonnes. Honduras, Equatorial Guinea and Panama were the flags most used by non-reporting longliners over the last decade with an increasing number of vessels operating under other flags as Togo, Mongolia, Namibia, Cambodia, Bolivia and Georgia in recent years. The catch series was estimated according to average catches per vessel and species composition for the Taiwanese or Spanish fleet during that period, assuming that most of the vessels operating under flags of non-reporting

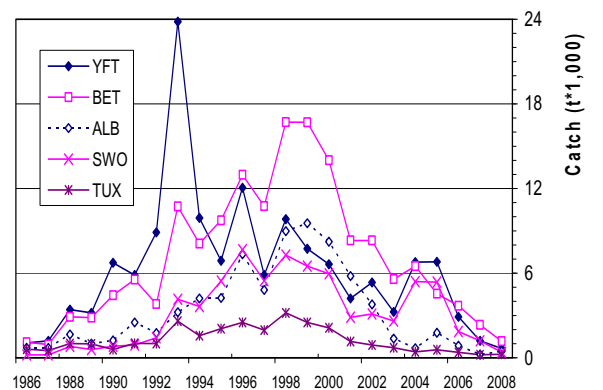


Figure 14: Total catches by species in the Indian Ocean estimated for non-reporting deep-freezing longline fleets

countries operate in a similar manner to vessels from Taiwan, China

or Spain, respectively. Although there are many indications to support this, the assumption that the vessels from non-reporting countries are exploiting the same time-area strata than the Taiwanese or Spanish over time could be wrong for some flags and periods.

The lack of catch-and-effort and size frequency records from non-reporting vessels is of concern.

The dramatic drop in the number of non reporting longliners vessels operating and catches estimated since 2001 is not fully understood

(Figure12). This could be due to the re-flagging of vessels recorded before under this category to flags of reporting countries. The increase in the number of longliners operating in the Indian Ocean reported by Philippines, Seychelles, India, Malaysia, Indonesia, Oman and other coastal countries in recent years would support this assumption.

Indonesia, Malaysia and India have not reported complete statistics for its deep-freezing longliners. The numbers of longliners using the flag of these countries has been increasing in recent years, as many as 75 longliners in recent years. The Secretariat has estimated catches for longliners of India, Indonesia (Figure 15) and Malaysia recently, basing on the numbers reported and the average catches by species by vessel for Taiwan,China for the same period.

It is important to note that the catch rates of large-scale vessels that operate under the flag of Taiwan,China have decreased significantly in recent years. Such decrease has coincided with a drop in the average size of the Taiwanese fleet, with smaller vessels involved in the fishery in recent years. Taking into account that the drop in average vessel size has not been noted for any of the fleets above, the catches estimated in recent years for this component may be too low. The secretariat will revise these catches as soon as more information is available.

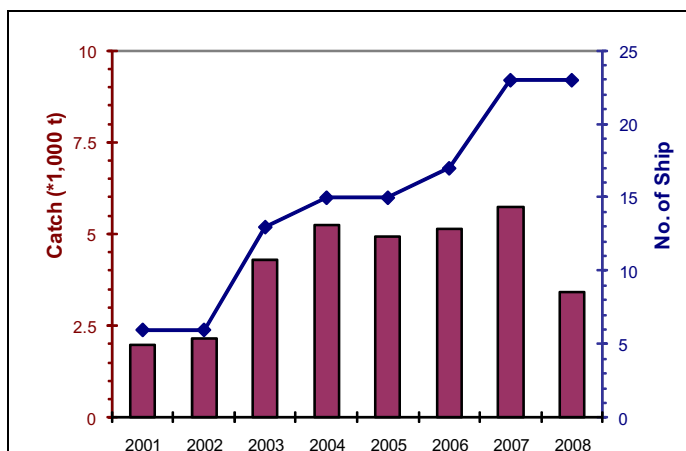


Figure 15: No of ships and total catches per species in the Indian Ocean estimated for the deep freezing longline fishery operating in Indonesia

C/ NON REPORTING INDUSTRIAL PURSE SEINE FLEETS

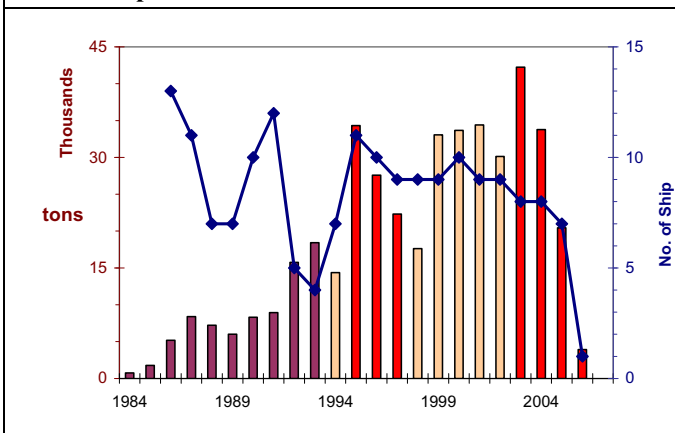
Between 1 and 11 non-reporting purse seiners operated in the Indian Ocean between 1995 and 2006 under several flags. The catches of these vessels, mainly of skipjack, ranged between 30,000 and 40,000 tonnes (Figure 16).

The catches were estimated from two different sources:

- No catch data available (1995-97; 2003- 2006): The estimate was conducted taking into account past average catch rates for the ex Soviet Union fleet (to which most of these vessels belonged to) and species composition for the European fleet, assuming that the two fleets exploit the same areas. This assumption could be biased for periods in which the European vessels operate in the EEZs of third countries, which could not be the case with the ex-Soviet vessels. Only one vessel remained in operation in 2006, under the flag of Equatorial Guinea. The Secretariat has not received any reports of activity of this vessel for 2007 and therefore catches have not been estimated for this year. The other vessels now operate under the flag of Thailand.
- Catch data available (1998-2002): The total catches and number of sets per day and area (1 degree square) were provided for the period 1998-2002⁵. The catches of EC purse seiners were used to estimate catches per species and type of set (free or log school). The catches estimated for these years are thought more accurate.

Detailed information about the fleet and catch estimates of non-reporting fleets has been provided in documents presented to the species Working Parties since 2000.

Figure 16: Number of ships and total catches per species in the Indian Ocean estimated for non-reporting industrial purse seine fleets



The catches of the ex Soviet vessels (brown pattern) are also shown for reference

The catches of NEI-PS are shown in red or light orange depending on the estimation procedure (see text on the right)

⁵ Catches for 1997 and 2003 were also provided although only for several months.

BOX 2: NO STATISTICAL SYSTEM: YEMEN, COMOROS AND MADAGASCAR

Following a recommendation from the SC the IOTC Secretariat undertook three missions to **Yemen** in 2007-08, and its main results were reported to the WPTT meetings (IOTC-2007-WPTT-INF02 and other documents). The data collected from some national and foreign institutions, mainly estimates of total catches (by species or aggregated) and number of operated crafts for several regions and years, is very conflicting, with some institutions publishing catches being as much as twice or even higher than those from other sources. Nevertheless, the information collected was sufficient for the Secretariat to be able to derive new estimates of catches for the artisanal fleets operating in Yemen (Figure 17).

In 2007, the Secretariat revised the catch estimates for artisanal boats operating in Yemen for 2003-2006, notably those for yellowfin tuna, longtail tuna, kawakawa and narrow-banded Spanish mackerel. The new estimates are probably more realistic than the previous although they are still uncertain due to a scarcity of information and numerous assumptions needed to complete the series. More details about the estimation were provided in a document presented to a previous Working Party on Tropical Tunas (IOTC-2005-WPTT-06). The new catches of yellowfin estimated are more than 30 times higher than those previously in the IOTC database.

The catches were revised again in 2008 basing on new information collected from the Ministry of Fish Wealth of Yemen. The total catches estimated by the MFW are considered unreliable due to the procedure used by the MFW to convert the numbers of yellowfin tuna and other species monitored (total enumeration) into weight. The trend in the catches was, however, considered realistic and was used to adjust the catches previously estimated by the Secretariat. The new catches of yellowfin tuna estimated are in line with the catches estimated for other countries, showing a sharp decrease in the catches of yellowfin tuna since 2005. No catches have been estimated for 2008 as yet, the catches in the IOTC Database representing a repetition of those that were estimated for 2007.

The IOTC-OFCF Project plans to support the Ministry of Fish Wealth of Yemen for the collection of data on the total numbers of fish unloaded by species and total number of vessel trips by month and numbers and type of vessels based in each Governorate for as many years as possible, had to be cancelled in 2009 due to the situation in Yemen.

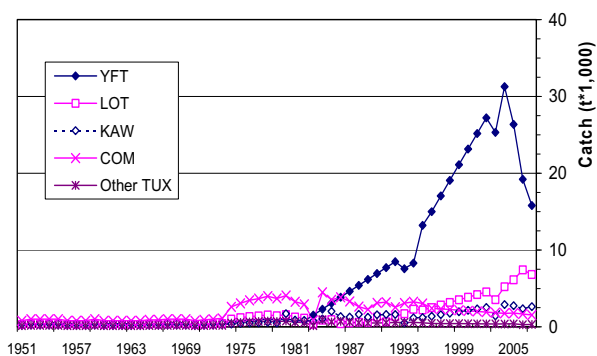


Figure 17: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in Yemen

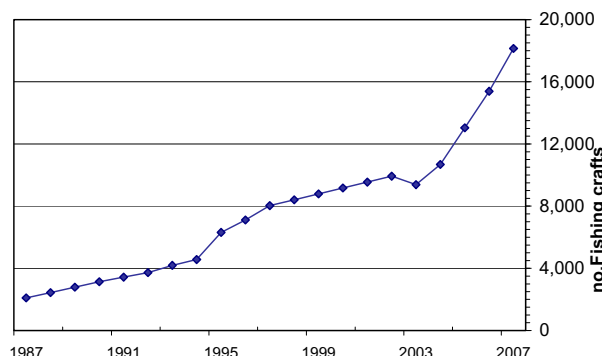


Figure 18: Total number of crafts estimated for the artisanal fishery operating in Yemen

Comoros (Figure 19) and **Madagascar** (Figure 20) have never reported statistics to the IOTC and have indicated in several occasions that they do not have a statistical system for the collection of data from their fisheries. The IOTC Secretariat has been using the catches published by the FAO for these countries but these figures are considered highly unreliable.

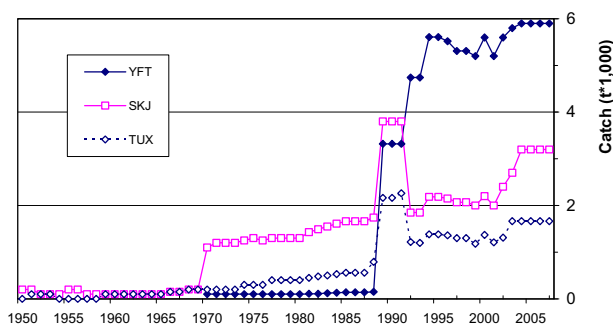


Figure 19: Total catches per species in the Indian Ocean for the artisanal fishery operating in Comoros

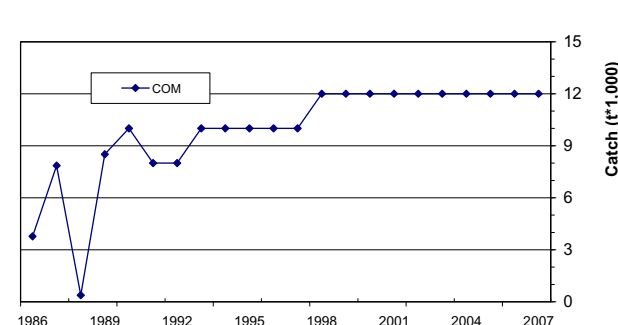


Figure 20: Total catches per species in the Indian Ocean for the artisanal fishery operating in Madagascar

BOX 3: INSUFFICIENT MONITORING GILLNET FLEETS: SRI LANKA, PAKISTAN AND IRAN

Important tuna and tuna-like fisheries have been in existence in **Sri Lanka** since well before 1950. Catch data are available for Sri Lanka since 1950 (Figure 21). Nevertheless, the quality of the data available at the IOTC Secretariat for this country is compromised for the following reasons:

- Catches may be incomplete, especially in the early years of the fishery.
- Catches are not available by gear type
- Species are often misidentified or mislabelled, in particular the species of marlins

Although the IOTC/OFCF/NARA sampling implemented in 2005 did not cover all fisheries the catches estimated for 2005 and 2006 using this information are believed to be more precise.

The catches for 2007 and 2008 are, however, likely to be uncertain due to the significant drop in sampling effort after the end of the IOTC-OFCF cooperation. This situation is likely to compromise future estimates of catches in Sri Lanka.

Figure 21 shows the new catches estimated for the gillnet and longline fishery of Sri Lanka in 2005-06 versus the catches in the IOTC database before and after this period.

It is important to note that the catches estimated for 2005-06 are significantly lower than the catches reported by Sri Lanka before and after this period. Although the main reason behind this is likely to be the tsunami that hit Sri Lanka in December 2004, there may be other issues that affected the quality of the estimates. For this reason, an examination and possible revision of the Sri Lankan catch series from 1994-2004 is required. This review is expected to take a significant amount of time and resources from the Secretariat.

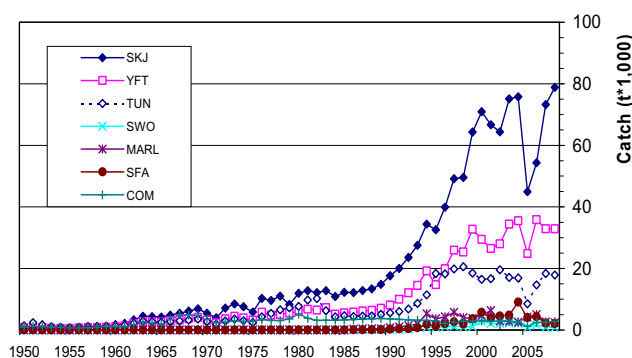


Figure 21: Total catches per species in the Indian Ocean estimated for the gillnet and longline fishery operating in Sri Lanka in 2005-06 and catches in the IOTC database before and after those years

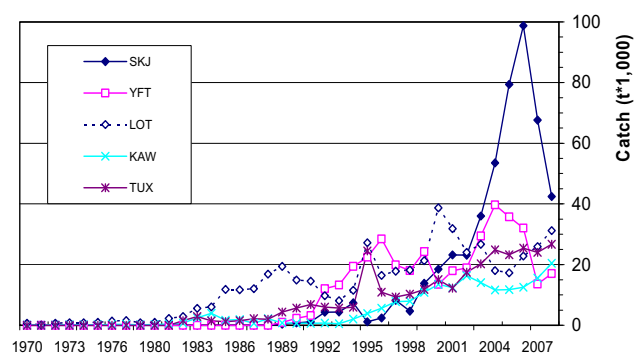


Figure 22: Total catches per species in the Indian Ocean estimated for the gillnet fishery operating in Iran for 1950-2008

Iran (Figure 22), **Pakistan** (Figure 23) and **Sri Lanka** (Figure 21) have been reporting catches for their gillnet fisheries for a number of years. While most of the catches in the past came from coastal waters, in recent years catches on the high seas have increased substantially. As many as 750 gillnet vessels from Iran have been operating on the high seas in recent years. The numbers of gillnet/longline vessels from Sri Lanka and gillnet vessels from Pakistan that operate on the high seas are unknown.

While Iran and Pakistan have not reported catch-and-effort data in recent years, the datasets reported by Sri Lanka are incomplete, not containing catch-and-effort by IOTC area (1° square grid).

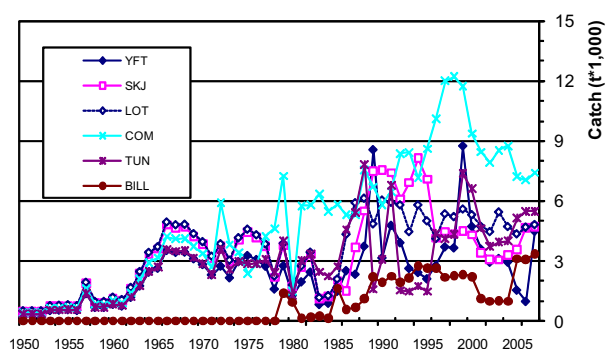


Figure 23: Total catches per species in the Indian Ocean estimated for the gillnet fishery operating in Pakistan for 1950-2008

