

# Report on IOTC data collection and statistics

*IOTC Secretariat<sup>1</sup>*

## 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 including 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 Recommendation 05/08 *On SEA TURTLES*
  - *Paragraph 2: The Commission encourages CPCs to collect and voluntarily provide the Scientific Committee with all available information on interactions with sea turtles in fisheries targeting the species covered by the IOTC Agreement, including successful mitigation measures, incidental catches and other impacts on sea 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 2007 (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: biological data

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### ***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, quarter and 5 degrees square areas.

## 2. AVAILABILITY OF IOTC STATISTICS FOR 2007

Tables 2i-2v (below) list the fleets for which the Secretariat received or estimated catches for the year 2007. 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 2007). Partial statistics were provided in most cases. Requests were sent to over fifty countries<sup>2</sup> in March-April 2008. Second and third requests were needed in most cases. The amount of data available before the deadline was similar than that in 2007.

Table 1 shows the extent to which 2007 catch data was available in the IOTC Nominal Catches (NC) database by the deadline for data submission (30 June) and before the Scientific Committee Meeting (November 2008). 36% of the catch was available by 30 June and 71% of the catch was available by November. The proportion of statistics available for 2006 is shown for comparison. Levels of reporting were generally lower in 2008, especially for nominal catches 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 2007 (as of 20th November 2008).

Statistics available for 2007	Estim. Catch	NC		CE		SF	
		BD	SC	BD	SC	BD	SC
IOTC species 1000t	1394	508	986	328	689	405	692
%Available for 2007		<b>36</b>	<b>71</b>	<b>24</b>	49	29	<b>50</b>
%Available for 2006		42	79	33	49	31	42
Tropical tunas 1000t	866	372	744	279	570	337	590
Temperate tunas 1000t	41	9	39	9	19	6	9
Billfish 1000t	70	26	53	16	30	2	18
Neritic tunas 1000t	416	101	150	24	70	60	75

**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**, 30<sup>th</sup> June) and at the time of the Scientific Committee Meeting (**SC**)

<sup>2</sup> 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**

<b>Gear</b>	Industrial purse seine (PS), industrial longline (LL) and artisanal gears (ART)	<b>NC</b>	Nominal Catch		Fully available
<b>Catch</b>	Recent catches amounting to (thousands of tonnes)	<b>CE</b>	Catch and Effort		Partially available
		<b>SF</b>	Size Frequency		Not available
<b>TI</b>	Timeliness		Good (before 1st July)		Fair (within July)
			Poor (after 1st August)		
		<b>SO</b>	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	186.9	SY						Effort from supply vessels not available
	SEYCHELLES	49.7	SY						Effort from supply vessels not available
	THAILAND	11.4	SB						Effort from supply vessels not available
	FRANCE-TERRITORIES	9.1	SY						
	JAPAN	5.8	S						
	IRAN I R	2.8	Y						
	AUSTRALIA	Conf	Y						Data confidential
	NEI	0.1	S						
L L	CHINA	10.0	BY						SF data partially available from observers
	TAIWAN, CHINA	61.9	BY						
	JAPAN	39.6	YB						
	INDONESIA	15.9	YB						NC/SF not available for longliners not based in Indonesia
	SEYCHELLES	7.9	BY						SF not available for deep-freezing longliners
	INDIA	5.6	Y						
	KOREA REP	4.9	YB						SF data partially available from observers
	PHILIPPINES	3.2	BY						CE not available per 5 degrees area
	OMAN	2.2	B						
	MALAYSIA	2.1	YB						Statistics not available for longliners not based in Malaysia
	EUROPEAN COMMUNITY	1.8	BY						Statistics not available for Spain longliners
	TANZANIA	0.4	BY						
	THAILAND	0.2	BY						
	SOUTH AFRICA	0.2	Y						
	BELIZE	0.2	Y						CE not available per 5 degrees area
	MAURITIUS	0.2	Y						
	MADAGASCAR	0.1	YB						
	KENYA	0.0	BY						
	GUINEA	0.0	Y						
SENEGAL	0.0	Y							
AUSTRALIA	Conf	Y						Data confidential	
	NEI-FROZEN <sup>1</sup>	13.2	YB						
	NEI-FRESH <sup>2</sup>	4.5	BY						
A r t i s a n a l	MALDIVES	118.5	SY						CE confidential; SF not available per gear
	SRI LANKA	102.7	SY						CE/SF not available per 5 degrees area
	IRAN I R	81.6	SY						SF not available per 5 degrees area
	INDONESIA	52.2	SY						
	OMAN	17.9	Y						NC not available by gear
	INDIA	16.8	SY						
	YEMEN AR RP	15.9	Y						CE incomplete (only two governorates)
	PAKISTAN	9.2	YS						
	COMOROS	9.1	YS						
	FRANCE-TERRITORIES	0.8	SY						
	TANZANIA	0.6	Y						
	EUROPEAN COMMUNITY	0.1	Y						
	MAURITIUS	0.1	Y						
	KENYA	0.1	Y						NC not by species or gear
	JORDAN	0.1	S						
	UK-TERRITORIES	0.0	Y						CE not available by species
	SEYCHELLES	0.0	Y						
EAST TIMOR	0.0	Y							
AUSTRALIA	0.0	Y						CE confidential	
	SOUTH AFRICA	0.0	Y						

- Sps** Yellowfin tuna (Y), bigeye tuna (B) and skipjack tuna (S)  
**Conf** Catches confidential (included in NEI)  
**1** Vessels whose catches are not reported by their flag states  
**2** Non-reporting vessels from India and Indonesian vessels operating in countries other than Indonesia

## 2ii – Temperate tunas (ALB, SBF)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
P S	AUSTRALIA	4.8	S						CE confidential
	EUROPEAN COMMUNITY	0.6	A						Effort from supply vessels not available
	SEYCHELLES	0.1	A						Effort from supply vessels not available
	FRANCE-TERRITORIES	0.0	A						
L L	CHINA	0.1	A						
	TAIWAN, CHINA	16.9	A						
	JAPAN	10.0	AS						
	INDONESIA	2.8	AS						NC/SF not available for longliners not based in Indonesia
	EUROPEAN COMMUNITY	1.4	A						Statistics not available for Spain longliners
	BELIZE	0.7	A						CE not available per 5 degrees area
	OMAN	0.6	A						
	KOREA REP	0.5	A						SF data partially available from observers
	SEYCHELLES	0.4	A						
	MALAYSIA	0.3	A						Statistics not available for longliners not based in Malaysia
	THAILAND	0.2	A						
	PHILIPPINES	0.2	A						CE not available per 5 degrees area
	MAURITIUS	0.1	A						
	SOUTH AFRICA	0.0	A						
	MADAGASCAR	0.0	A						
	TANZANIA	0.0	A						
NEI-FROZEN <sup>1</sup>	0.5	A							
NEI-FRESH <sup>2</sup>	1.1	A							
ART	EUROPEAN COMMUNITY	0.0	A						

**Sps** Southern bluefin tuna (S) and albacore (A)

**1** Vessels whose catches are not reported by their flag states

**2** Non-reporting vessels from India and Indonesian vessels operating in countries other than Indonesia

## 2iii – Billfish (SWO, MARL, SFA, SSP)

Gear	Fleet	Availability of statistics					TI	SO	Comments
		Catch	Sps	NC	CE	SF			
L L	CHINA	0.5	S						
	TAIWAN, CHINA	10.6	SM						
	EUROPEAN COMMUNITY	9.4	S						Statistics not available for Spain longliners
	JAPAN	4.2	SM						
	INDONESIA	3.1	SM						NC/SF not available for longliners not based in Indonesia
	SEYCHELLES	1.1	S						SF not available for deep-freezing longliners
	GUINEA	0.8	S						
	MAURITIUS	0.7	S						
	MALAYSIA	0.4	SM						Statistics not available for longliners not based in Malaysia
	INDIA	0.4	SM						
	KOREA REP	0.4	SM						SF data partially available from observers
	OMAN	0.4	S						
	SOUTH AFRICA	0.3	S						
	KENYA	0.2	S						
	PHILIPPINES	0.2	S						CE not available per 5 degrees area
	SENEGAL	0.1	S						
	TANZANIA	0.1	MS						
	MADAGASCAR	0.1	S						
	BELIZE	0.0	S						CE not available per 5 degrees area
	THAILAND	0.0	MS						
AUSTRALIA	Conf	Y						Data confidential	
NEI-FROZEN <sup>1</sup>	1.5	MS							
NEI-FRESH <sup>2</sup>	2.0	S							
A r t i s a n a l	SRI LANKA	11.9	FM						CE/SF not available per 5 degrees area
	INDIA	7.8	F						
	IRAN I R	6.2	F						
	PAKISTAN	3.4	M						
	INDONESIA	1.7	M						
	TANZANIA	0.9	M						
	YEMEN AR RP	0.6	F						CE incomplete (only two governorates)
	COMOROS	0.4	F						
	OMAN	0.3	F						NC not available by gear
	MAURITIUS	0.3	F						
	KENYA	0.2	F						Data available from Sport fisheries only
	UN ARAB EMIRATES	0.1	F						
	EUROPEAN COMMUNITY	0.0	M						
	FRANCE-TERRITORIES	0.0	M						
SAUDI ARABIA	0.0	F							
SEYCHELLES	0.0	F							
UK-TERRITORIES	0.0	M						CE not available by species	

**Sps** Swordfish (S), blue marlin and/or black marlin and/or striped marlin (M), Indo-Pacific sailfish (F) and short-billed spearfish (P)

**Conf** Catches confidential (included in NEI)

**1** Vessels whose catches are not reported by their flag states

**2** Non-reporting vessels from India and Indonesian vessels operating in countries other than Indonesia

## 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	2.3	L						
	AUSTRALIA	1.4	K						Data confidential
	THAILAND	0.3							NC/CE not by species
	SEYCHELLES	0.1	F						Statistics incomplete
	EUROPEAN COMMUNITY	0.1	F						Statistics incomplete
L L	INDONESIA	0.1	W						NC/SF not available for longliners not based in Indonesia
	EUROPEAN COMMUNITY	0.0							Statistics not available for Spain longliners
	CHINA	0.0	W						
	TAIWAN, CHINA	0.0	W						
	SOUTH AFRICA	0.0	W						
	OMAN	0.0	W						
	INDIA	0.0							
	NEI-FROZEN <sup>1</sup>	0.0	W						
	NEI-FRESH <sup>2</sup>	0.0	W						
A r t i s a n a l	INDONESIA	117.6	KL						
	INDIA	104.5	CK						
	IRAN I R	60.2	LK						SF not available per 5 degrees area
	MALAYSIA	22.3	KL						
	THAILAND	18.7	KL						
	PAKISTAN	14.5	CL						
	OMAN	13.2	LC						
	MADAGASCAR	12.0	C						
	YEMEN AR RP	11.2	LK						CE incomplete (only two governorates)
	SRI LANKA	8.3	CK						CE/SF not available per 5 degrees area
	SAUDI ARABIA	7.8	C						
	UN ARAB EMIRATES	7.7	CL						
	MALDIVES	6.6	CF						CE confidential; SF not available per gear
	QATAR	2.0	C						
	TANZANIA	1.5	C						
	KENYA	1.2	C						NC not by species or gear
	COMOROS	0.7	K						
	EGYPT	0.7							
	SEYCHELLES	0.4	K						
	AUSTRALIA	0.3	C						CE confidential
	KUWAIT	0.2	G						
	ERITREA	0.1	C						
	BANGLADESH	0.1							
	BAHRAIN	0.1	C						
	JORDAN	0.1							
	DJIBOUTI	0.1	K						
EUROPEAN COMMUNITY	0.0	W							
SUDAN	0.0	C							
SOUTH AFRICA	0.0	G							
UK-TERRITORIES	0.0	K							

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

**1** Vessels whose catches are not reported by their flag states

**2** Non-reporting vessels from India and Indonesian vessels operating in countries other than Indonesia

## 2v – Sharks seabirds and sea turtles

Gear	Fleet	Species					Comments
		Sharks			Sea Birds	Sea Turtles	
		NC	CE	SF			
P S	EUROPEAN COMMUNITY				n/a		Preliminary results from observer programmes reported to WPEB
	SEYCHELLES				n/a		
	THAILAND				n/a		
	IRAN I R				n/a		
	AUSTRALIA	n/a			n/a	n/a	
	FRANCE-TERRITORIES				n/a		
	JAPAN				n/a		
NEI				n/a			
L L	CHINA						NC/CE not by species and do not include discards
	TAIWAN,CHINA						NC/CE Not by species and do not include discards
	JAPAN						
	INDONESIA						NC/CE Not by species and do not include discards
	EUROPEAN COMMUNITY						NC/CE not available for all fleets and/or not by species
	SEYCHELLES						NC/CE not by species; NC/CE likely to be incomplete
	KOREA REP						NC/CE Ndo not include discards; SF data from observers
	OMAN						
	PHILIPPINES						
	MALAYSIA						NC/CE Not by species and do not include discards
	BELIZE						NC/CE Not by species and do not include discards
	MAURITIUS						
	GUINEA						
	THAILAND						
	SOUTH AFRICA						Preliminary results from observer programmes reported to WPEB
	AUSTRALIA						
	KENYA						NC Not by species and do not include discards
	SENEGAL						
INDIA							
MADAGASCAR							
NEI-FROZEN <sup>1</sup>							
NEI-FRESH <sup>2</sup>							
A r t i s 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		CE Not by species and only from two governorates
	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/CE only available for sport fishery
	EGYPT				n/a		NC catches presumed to be low
	FRANCE-TERRITORIES				n/a		NC catch levels unknown
	SEYCHELLES				n/a		NC catches presumed to be low
	EUROPEAN COMMUNITY				n/a		NC Not by species
	MAURITIUS				?		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				?			
EAST TIMOR				n/a		NC catches presumed to be low	

Catches of seabirds are not likely to occur (n/a) or may occur (?)

<sup>1</sup> Vessels whose catches are not reported by their flag states

<sup>2</sup> Non-reporting vessels from India and Indonesian vessels operating in countries other than Indonesia

## 2vi – Fishing craft statistics and list of active vessels

<p><b>Gear</b> Industrial purse seine (PS), industrial longline (LL) and artisanal gears (ART)</p> <p><b>Catch</b> Recent catches amounting to (thousands of tonnes)</p> <p><b>Craft</b> Number of craft operated (2006) (blank if unknown)</p> <p><b>FC</b> Fishing craft</p> <p><b>AV</b> List of active vessels</p>	<p><b>Availability</b></p> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 15px; height: 10px; background-color: #2e8b57; margin-right: 5px;"></div> Fully available         </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 15px; height: 10px; background-color: #d2691e; margin-right: 5px;"></div> Partially available         </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 10px; background-color: #ff0000; margin-right: 5px;"></div> Not available         </div>	
	<p><b>SD</b> Data Source</p> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 15px; height: 10px; background-color: #0000ff; margin-right: 5px;"></div> Statistics fully available from flag country         </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 15px; height: 10px; background-color: #ffff00; margin-right: 5px;"></div> Statistics partially available from flag country         </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 10px; background-color: #ffff00; margin-right: 5px;"></div> Statistics available from sources other than flag country         </div>	

Gear	Fleet	Availability				SO	Comments
		Catch	Craft	FC	AV		
P S	EUROPEAN COMMUNITY	187.5	41				
	SEYCHELLES	49.9	10				
	THAILAND	11.7	9				
	FRANCE-TERRITORIES	9.1	2				
	AUSTRALIA	6.3	11				Does not include vessels operating between 140 East and 150 East
	JAPAN	5.8	3				
	IRAN I R	5.2	9				
	SUPPLY VESSELS-NEI		14				Names and characteristics of supply vessels not fully available
L L	CHINA	10.6	67				
	TAIWAN, CHINA	89.3	782				
	JAPAN	53.8	215				Number of crafts from the IOTC active vessels list
	INDONESIA	21.9	1,075				Statistics not available for longliners not based in Indonesia
	EUROPEAN COMMUNITY	12.7	102				FC statistics are based on the IOTC active vessels list (Spain)
	SEYCHELLES	9.4	27				
	INDIA	6.0	81				FC statistics are based on the IOTC record of authorized vessels
	KOREA REP	5.8	31				
	PHILIPPINES	3.6	17				
	OMAN	3.2	29				Number of crafts from the IOTC active vessels list
	MALAYSIA	2.9	33				Statistics not available for longliners not based in Malaysia
	BELIZE	0.9	10				
	MAURITIUS	0.9	10				Number of crafts from the IOTC active vessels list
	GUINEA	0.9	3				Previous year data repeated
	SOUTH AFRICA	0.5	24				
	TANZANIA	0.5	3				Number of crafts from the IOTC active vessels list
	THAILAND	0.5	3				
KENYA	0.2	1				FC statistics are based on the IOTC record of authorized vessels	
MADAGASCAR	0.1	2				Previous year data repeated	
SENEGAL	0.1	3				Previous year data repeated	
NEI-FRESH	16.3	24				Third parties reports	
NEI-FROZEN <sup>1</sup>	6.5	15				Third parties reports	
A r t i s a n a l	INDONESIA	171.6					Includes large scale purse seiners; catches aggregated
	IRAN I R	148.0	6,760				No data for vessels operating outside the EEZ of Iran
	INDIA	129.1					
	MALDIVES	125.0	973				Includes large scale baitboats; catches aggregated
	SRI LANKA	122.9	42,678				No data for vessels operating outside the EEZ of Sri Lanka
	OMAN	31.4					Data reported in Arabic; pending translation
	YEMEN AR RP	27.7					
	PAKISTAN	27.1	2,308				No data for vessels operating outside the EEZ of Pakistan
	MALAYSIA	22.3					
	THAILAND	18.7	930				
	MADAGASCAR	12.0					
	COMOROS	10.3					
	UN ARAB EMIRATES	7.9					
	SAUDI ARABIA	7.8					
	TANZANIA	3.1					
	QATAR	2.0					
	KENYA	1.5					
	FRANCE-TERRITORIES	0.8					
	EGYPT	0.7					
	SEYCHELLES	0.4					
	MAURITIUS	0.4					
	AUSTRALIA	0.3	58				Does not include vessels operating between 140 East and 150 East
	EUROPEAN COMMUNITY	0.2	256				Does not refer to high seas or large scale vessels
KUWAIT	0.2						
JORDAN	0.1						
ERITREA	0.1						
BANGLADESH	0.1						
BAHRAIN	0.1	100					
DJIBOUTI	0.1						
SUDAN	0.0						
UK-TERRITORIES	0.0	47					
SOUTH AFRICA	0.0	14					
EAST TIMOR	0.0						

<sup>1</sup> Vessels whose activities are not reported by the flag states



- **By-catch:** Few statistics are available for sharks, seabirds, sea turtles (Table v) (and other non-IOTC species caught by fleets targeting tunas and/or tuna-like species); furthermore the quality of the available data is poor. The statistics are seldom available by species or gear and refer only to the shark carcasses that are retained on board. Almost no statistics are available for other shark products, such as shark fins.
- **Discards:** Discards are only available for Australia, EC (France) the UK (nil discards) and Sri Lanka (nil discards) in 2007. Discard rates are believed to be high, especially from longliners, oceanic gillnets and in purse seiners setting on logs.
- **Fishing craft statistics and active vessels:** 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

#### Main progress achieved during 2008

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	All
Period	1950-2007
Species	All
Details of activity	Disaggregation of catches recorded under gear and/or species aggregates in the IOTC database
Sources	Nominal Catches tables in the IOTC Database (WPTT-04-06)
Changes in data	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	<b>Indonesia's</b> artisanal fleets
Period	1950-2007
Species	Kawakawa, longtail tuna
Details of activity	Indonesia changed its sampling design to be able to produce catches by gear and species for all IOTC species and reported catches fully by species for 2004-06 and by species and gear for 2005-06. The Secretariat used the new catches to break the catches for 1950-2003, that were aggregated by gear and partially by species in the IOTC database
Sources	Directorate General for Capture Fisheries of Indonesia
Changes in data	Very significant decrease in the amount of catches that are not by species or gear Significant changes in the catches estimated for kawakawa and longtail tuna

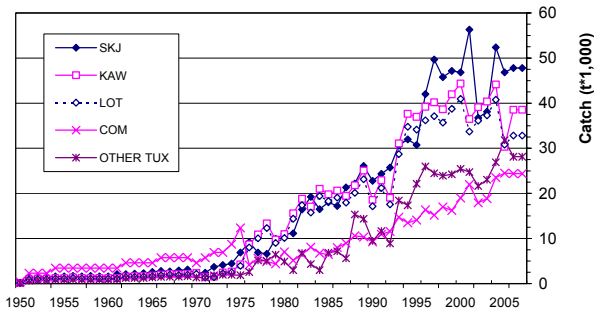


Figure 1: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in Indonesia

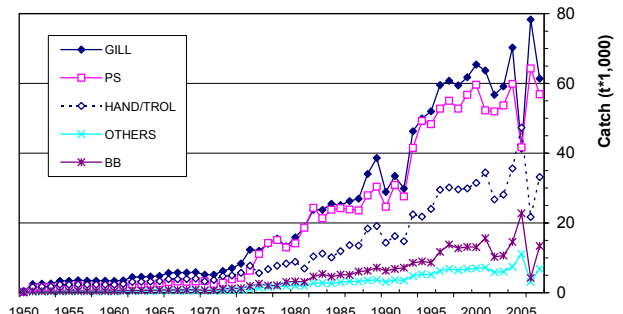


Figure 2: Total catches per gears in the Indian Ocean estimated for the artisanal fishery operating in Indonesia

Fishery	<b>India</b>
Period	1950-2007
Species	Neritic tunas
Details of activity	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
Sources	IOTC database, as reported by the CMFRI of India
Changes in data	Very significant decrease in the amount of catches of neritic tunas that are not available by gear and/or species

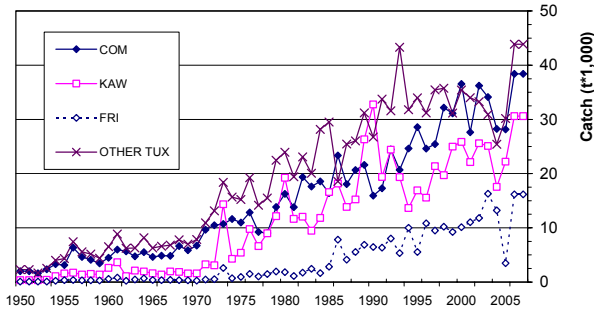


Figure 3: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in India

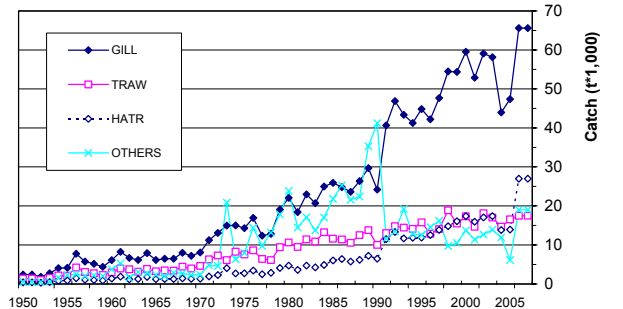


Figure 4: Total catches per gears in the Indian Ocean estimated for the artisanal fishery operating in India

Fishery	Artisanal fleets of <b>Maldives</b> and <b>Malaysia</b> and Artisanal fisheries of <b>Oman</b>
Period	1957-1969 (Maldives and Malaysia), 1950-2007 (Oman)
Species	Tropical tunas (Maldives, Oman), Neritic tunas (Malaysia, Oman)
Details of activity	Species and/or gear breakdown estimated by using the CE data available in the IOTC database
Sources	Catches-and-effort data in the IOTC database
Changes in data	Moderate changes in the catches recorded by species and gear

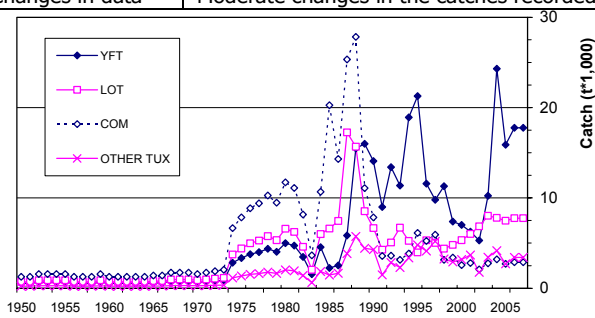


Figure 5: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in Oman

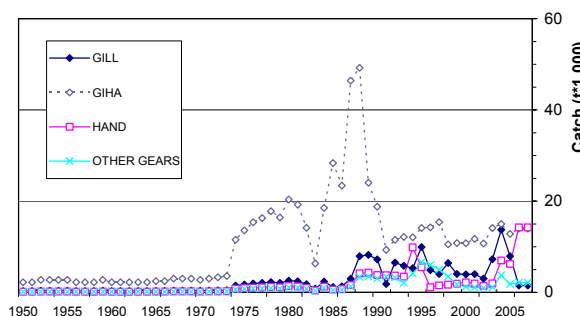


Figure 6: Total catches per gears in the Indian Ocean estimated for the artisanal fishery operating in Oman

Fishery	Longline vessels of <b>Belize</b>
Period	2001-06
Species	Bigeye tuna, yellowfin tuna, albacore
Details of activity	Belize revised the catches of Belize longline vessels providing new species breakdown; the Secretariat assigned the catches by type of longline operation (fresh-tuna or deep-freezing) by using data from Belize's active vessel list and catch rates for Taiwanese fresh-tuna and deep-freezing vessels
Sources	INMARBE Belize
Changes in data	Moderate changes in the catches of tropical tunas and albacore and new catches recorded by type of longliner

Fishery	Industrial purse seiners of <b>Thailand</b>
Period	2006-07
Species	Skipjack tuna, yellowfin tuna, bigeye tuna
Details of activity	Thailand revised the catches of its industrial purse seiners (ex-Soviet PS) for 2006-07
Sources	Directorate of Fisheries of Thailand (DOF)
Changes in data	Moderate changes to catches by species

<b>2-. Changes to total catches series</b>	
Fishery	<b>Indonesia's</b> Deep-freezing longline fleet
Period	2001-07
Species	Yellowfin tuna, bigeye tuna, albacore, swordfish
Details of activity	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
Sources	Directorate General for Capture Fisheries of Indonesia
Changes in data	Increase in the catches of tropical tunas, billfish and temperate tunas in the IOTC database See also Box 1B

Fishery	Non-reporting fresh tuna longliners operating under various flags ( <b>NEI</b> )
Period	2005-2007
Species	Yellowfin tuna, bigeye tuna, swordfish
Details of activity	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 longliners from India were also estimated as being fresh-tuna.
Sources	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 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
Changes in data	Moderate increase in the catches of fresh-tuna longliners in recent years See also Box 1A

Fishery	Non-reporting deep-freezing longliners operating under several flags ( <b>NEI</b> )
Period	2005-06
Species	Yellowfin tuna, bigeye tuna, albacore, swordfish
Details of activity	New review of the series of catches from data collected recently
Sources	IOTC Vessel Records and IOTC Activity Records
Changes in data	Change in recent year catches. Current catches are slightly higher than those previously recorded See also Box 1B

Fishery	Longliners of <b>Japan, Mauritius, Philippines, and South Korea</b> and drifting gillnets of <b>Taiwan,China</b>
Period	1950-2007
Species	Skipjack tuna (Japan), billfish, albacore (Philippines, South Korea, Taiwan,China)
Details of activity	Catches of skipjack tuna estimated in years in which they were not available basing on the catch rates of neighboring years or on the amounts reported in the CE (Japan) Catches of billfish, albacore and other species estimated by using the catches-an-effort available in the IOTC database (Mauritius, Philippines, South Korea, Taiwan,China)
Sources	IOTC database, as reported by each country
Changes in data	Moderate increase in the catches of skipjack tuna (Japan), billfish (Korea, Mauritius) and albacore and billfish (Taiwan,China, Philippines)

Fishery	Industrial purse seine fishery of <b>Iran</b>
Period	2002-2006
Species	Yellowfin tuna, longtail tuna
Details of activity	The Secretariat revised the catches of industrial purse seiners from Iran according to the figures reported by the flag country. In the past the Secretariat had estimated catches for part of this fleet in the belief that the catches reported were incomplete. The information received from Iran indicates that some of the vessels were not active throughout the period and that the catches were, for this reason, low. The Secretariat not having received information from other countries on the activities of Iranian purse seiners in its ports decided to remove the catches that had been previously estimated for such vessels.
Sources	IOTC Database
Changes in data	Significant reduction in the catches of industrial purse seiners for this period

Fishery	<b>Yemen</b>
Period	2003-2007
Species	Yellowfin tuna, longtail tuna
Details of activity	New review of catches basing on previous catches estimated and new catches available from the MFW
Sources	Ministry of Fish Wealth; data collected during a mission of the IOTC-OFCF Project to Yemen
Changes in data	Significant drop in the catches of YFT estimated for 2005-2007 See also Box 2

Fishery	Gillnet/longline fishery of <b>Sri Lanka</b>
Period	2000-2006
Species	Yellowfin tuna, skipjack tuna, swordfish and marlins
Details of activity	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)
Sources	Ministry of Fisheries and Aquatic Resources and National Aquatic Resources and Development Agency of Sri Lanka
Changes in data	Moderate Changes in catches and species composition for this period See also Box 3

<b>B/ Bycatch</b>	
Fishery	All
Period	1950-2007
Species	All shark species
Details of activity	The Secretariat estimated catches of sharks for some fisheries by using catch rates from other fisheries or other information available
Sources	IOTC Database and ancillary data
Changes in data	Increase in the catches of sharks recorded in the IOTC database

<b>C/ Catches-and-Effort</b>	
Fishery	All Industrial purse seine fleets
Period	1980-2007
Species	Tropical tunas
Details of activity	The Secretariat estimated the amounts caught on free-schools and log-schools for industrial purse seiners not having catches recorded by school type. The data available in the IOTC database for other fleets, notably the EC, was used to estimate the proportion of catches of each species by type of school by stratum and this proportion used to break the catches not reported by school type
Sources	Data in the IOTC database
Changes in data	All the catches of industrial purse seiners in the IOTC database are now recorded by school type

Fishery	Artisanal fisheries of <b>Yemen</b> (hand lines)
Period	2003-2007
Species	Yellowfin tuna, longtail tuna
Details of activity	During a previous mission to Yemen staff from the IOTC-OFCF Project collected information on the activities and catches of Yemen artisanal boats in the Governorates of Hadramout and Al-Mahara. The information collected, in Arabic, was processed and input in the IOTC database recently.
Sources	Ministry of Fish Wealth (Hadramout Branch) and Marine Biological Research Authority in Aden
Changes in data	New catches and effort input in the IOTC databases. The catches in the referred Governorates represent the majority of the catches of yellowfin tuna in Yemen and therefore the catches and effort are thought quite complete for this species. The catches and effort for other species needs to be completed with the information from the other governorates in the Arabian Sea and in the Red Sea.

Fishery	Artisanal fisheries of <b>Oman</b>
Period	1990-2006
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 <b>Kenya</b>
Period	1980-2006
Species	Indo-Pacific Sailfish
Details of activity	The IOTC-OFCF Project provided support to the Kenya Marine Fisheries Research Institute for the compilation and computerization of catches-and-effort from the main sport clubs in Kenya
Sources	Sport fishing clubs in Malindi and Watamu
Changes in data	New catches and effort from this fishery; data to be available in the IOTC databases by early next year

Fishery	All fisheries
Period	1950-2007
Species	Tropical tunas, albacore 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, WPT and WPB; no new data input

<b>D/ Size frequency</b>	
Fishery	<b>Taiwan, China</b>
Period	1980-2006
Species	Yellowfin tuna, bigeye tuna, swordfish, albacore, striped marlin, blue marlin, black marlin
Details of activity	New length frequency data available for the three species of marlins by month and 10 degrees latitude by 20 degrees longitude grid. The information for other species was updated for recent years.
Sources	Internet
Changes in data	New length frequency data input for marlins and data updated for other species

Fishery	Gillnet fishery of <b>Iran</b>
Period	2003-2007
Species	Yellowfin tuna, longtail tuna
Details of activity	New size data provided by Iranian scientists
Sources	Iranian scientists (provided during the IOTC WPTDA meeting)
Changes in data	New size data input in the IOTC database

Fishery	Artisanal fisheries of <b>Maldives</b>
Period	1997-2006
Species	Tropical tunas, neritic tunas and other non-IOTC species
Details of activity	Length frequency data for 1998-2006 made available during the WPTT in 2007; data processed and input in 2007-08
Sources	Maldives scientist during the meeting of the WPTT in 2007
Changes in data	New data input in the IOTC database

Fishery	Coastal purse seine fisheries of <b>Thailand</b>
Period	2006-2007
Species	Neritic tunas
Details of activity	Length frequency data for 2006-2007 collected with the support of the IOTC-OFCF Project
Sources	Andaman Sea Fisheries Research and Development Centre and IOTC-OFCF Project
Changes in data	New data input in the IOTC database

Fishery	All
Period	1950-2007
Species	Tropical tunas, albacore 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**

<b>A/ Nominal catches</b>	
<b>1-. Statistics not available from the flag country</b>	
Reason/s Fishery/ies Period Species Proposed actions	Fisheries not monitored by the flag countries <b>NEI</b> 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) <b>Yemen, Comoros, Madagascar, Kenya, Tanzania, Mozambique, Myanmar, Somalia</b> 1950 to date Mainly tropical tunas and neritic tunas Countries concerned to implement new data collection systems or strengthen the existing The Secretariat to identify the deficiencies in data collection and processing in the countries concerned See also Box 2
Reason/s Fishery/ies Period Species Proposed actions	Statistics probably available at the country level but not reported <b>India</b> (longline), <b>Egypt, United Arab Emirates</b> 1950 to date Mainly tropical tunas and neritic tunas Countries concerned to report the data available to the Secretariat The Secretariat to identify the reasons why the catches are not reported by the flag countries See also Box 1
<b>2-. Statistics not available by gear and/or species</b>	
Reason/s Fishery/ies Period Species Proposed actions	Statistical systems unable to produce detailed estimates of catches <b>India, Thailand, Malaysia, Sri Lanka, Pakistan</b> 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 See also Box 3
<b>B/ Bycatch (non-IOTC species)</b>	
<b>1-. Statistics not available from the flag country</b>	
Reason/s Fishery/ies Period Species Proposed actions	Fisheries not monitored or insufficiently monitored for sharks or statistics not reported Most longline and purse seine industrial fleets and oceanic gillnet fisheries of <b>Pakistan, Iran and Sri Lanka</b> 1950 to date All shark species Countries concerned to implement new data collection systems, preferably observer programmes, or strengthen the existing and to report their shark statistics to the Secretariat The Secretariat to identify the fleets for which important shark catches have been unreported over the years
<b>2-. Statistics not available by gear and/or species</b>	
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
<b>C/ Discard levels</b>	
<b>1-. Statistics not available from the flag country or highly aggregated by gear and/or species</b>	
Reason/s Fishery/ies Period Species Proposed actions	Most of the discards are unreported and when reported they are usually incomplete and highly aggregated All, especially industrial fleets and oceanic gillnets ( <b>Pakistan, Iran and Sri Lanka</b> ) 1952 to date Undersized or spoiled tunas (tropical tunas), Sharks, low-value or spoiled billfishes (sailfish, short-billed spearfish) and other species 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 Fishery/ies  Period Species Proposed actions	Catch and effort (size frequency) statistics not collected by the flag country Many artisanal Deep-freezing longliners from <b>India</b> (CE+SF), <b>Indonesia</b> (CE+SF), <b>Belize</b> (SF), <b>Philippines</b> (SF) and <b>Seychelles</b> (SF) Fresh tuna longliners from <b>India</b> (CE+SF), <b>Taiwan,China</b> (CE+SF), <b>Indonesia</b> (CE) and <b>Belize</b> (SF) Industrial purse seiners from the <b>EC</b> and <b>Seychelles</b> (Effort supply vessels and FADs), <b>Iran</b> (CE+SF) and <b>Thailand</b> (SF) Non-reporting longline fleets ( <b>NEI</b> ) 1952 to date All IOTC species and sharks 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 in fleets which the retrieval of catch and effort (size frequency) records is considered important
Reason/s Fishery/ies  Period Species Proposed actions	Statistical systems unable to produce catch and effort (size frequency) statistics as per IOTC standards Many artisanal Oceanic gillnets from <b>Iran</b> and <b>Pakistan</b> and gillnet/longline fishery of <b>Sri Lanka</b> Longliners from Indonesia (SF), Belize (CE), South Korea and Philippines (CE) 1952 to date All IOTC species and sharks 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
Reason/s Fishery/ies Period Species Proposed actions	Catch and effort (size frequency) statistics collected by the flag country but no or incompletely reported to the IOTC Artisanal fisheries of <b>India</b> 1950 to date Neritic tunas India to report CE and SF data for its artisanal fleets as soon as possible
Reason/s Fishery/ies  Period Species Proposed actions	Low sampling coverage Longliners of <b>Japan</b> (SF), <b>South Korea</b> (CE+SF) and <b>China</b> (SF) Purse seiners of <b>Thailand</b> (SF) Various, notably in recent years Tropical tunas, billfish and albacore Countries concerned to increase sampling effort/coverage

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

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. This data includes the numbers (fishing craft) and/or characteristics of the vessels operating within their EEZ or calling to ports in their territory (Vessel Activity Records).

The catches for non-reporting 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 (that the non-reporting fleets were thought to operate in) and targeted the same species.

##### *Data Availability*

Data from artisanal fisheries are scarce and inconsistent in many cases. On the contrary, the statistics of industrial 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 more 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 has been estimated for 2005-06.

##### *Main Progress Achieved during 2008*

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	2000-07	Review to complete the craft statistics	Number of non-reporting deep-freezing longliners better known: Around 40 in recent years
	Non-reporting Fresh-tuna longliners	IOTC Sampling Programmes WASKI Indonesia DGCF Indonesia CSIRO Australia RIMF Indonesia	2000-07	Review to complete the number of fresh tuna longliners operating in the Indian Ocean	Number Indonesian fresh tuna longliners input: Around 1,200 boats in all in recent years. Current numbers are decreasing.
	Fresh-tuna longliners from Taiwan, China	Data downloaded from the internet	2006-2007	Number of fresh-tuna longliners operating in the Indian Ocean published	Around 340 vessels input for 2006-2007.
	Commercial Longline fleet	FSI India MAF Oman DGCF Indonesia FRI Malaysia	2005-07	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)	2000-07	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



DB	FLAG/S	SOURCES	PERIOD	DETAILS	MAIN RESULTS
	Belize, Senegal, Thailand, Oman, Tanzania	INMARBE Belize CRODT Senegal DOF Thailand MF Tanzania	2003-07	Submission of names and characteristics of ships fishing for tunas in the Indian Ocean	Number of vessels operating better known

### ***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 important longline fleets	Taiwan, China (fresh-tuna), Indonesia and NEI (various flags)	1980 to date	Lack of information, especially regarding the first years of operation	Continue collecting data through the IOTC sampling schemes (fresh-tuna longliners) Identify the fleets for which important tuna catches have been unreported over the years (through retrieval of vessel and, especially, activity records)
	No data or data inconsistent regarding many artisanal fleets	Many artisanal	1950 to date	Statistics not available	Identify the reasons why the statistics are not provided
				Statistical systems unable to produce reliable fishing craft statistics	Identify the deficiencies in data collection and processing in the countries concerned
Lack of detailed information	All	1950 to date	Incomplete data (vessel size, mechanization, etc. not available)	Identify the reasons why the statistics are not complete	
AV	Data not available	Indonesia, Malaysia (longliners not based in the flag country), India (commercial longliners), and various other flags	1998 to date	Fleets not monitored by the flag countries Statistics available but not provided	Continue the collection of information through the IOTC sampling programmes Continue collecting information on foreign fleets from third sources
	Information incomplete or inconsistent	All industrial, especially non-reporting flags	1995 to date	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: BIOLOGICAL DATA

Table 5 shows other datasets available at the IOTC Secretariat:

**Table 5:** Biological data available at IOTC

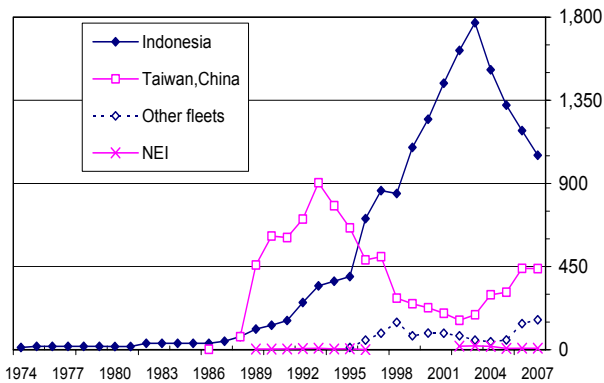
TYPE OF DATA	RAW DATA	PERIOD	SOURCE
Length-length-weight data of tuna and billfish caught by fresh tuna longliners in the Indian Ocean	Available	2000-06	AFDEC Thailand (IOTC Sampling Programmes) NARA Sri Lanka (IOTC Sampling Programs) RIMF Indonesia (IOTC Sampling Programs) FRI Malaysia (IOTC Sampling 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 (WPTT-06-??)
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

The Secretariat presented a document to the Working Party on Tropical Tunas on the status of data holdings regarding the biological information available on tuna and billfish species (IOTC-2007-WPTT-03).

## BOX 1: ESTIMATION OF CATCHES OF NON-REPORTING FLEETS

### A/ FRESH TUNA LONGLINE FLEETS

**Figure 7: Number of fresh-tuna longliners operating in the Indian Ocean from 1974-2007**

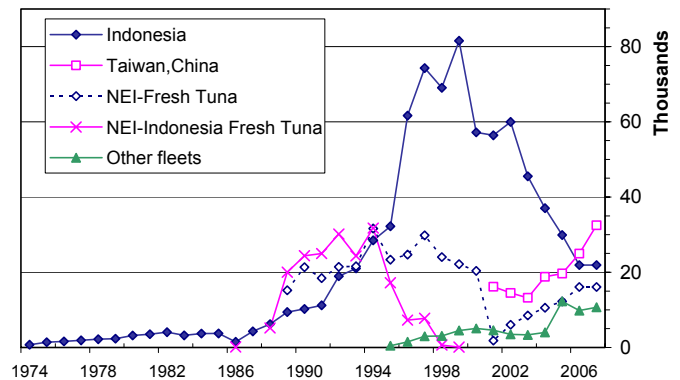


2006-07 numbers are preliminary

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

'NEI' includes Bolivia, Equatorial Guinea and Honduras

**Figure 8: Estimated catches in the Indian Ocean of fresh tuna longliners per flag country**



2006-07 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 7). 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 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 for 2006 and 2007, 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 9).

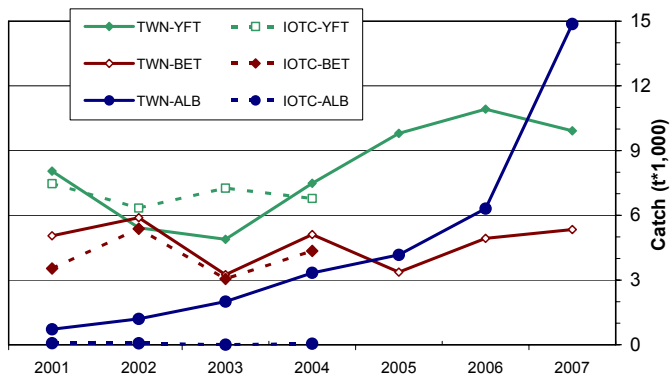
Belize, China, Indonesia, Malaysia and Oman submit catches for its fresh-tuna longline fleets routinely. However, **Indonesia** and **Malaysia** do not monitor the activities or the catches of all fresh-tuna longliners under its flag, but only those of vessels based in ports within its territory. The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

**India** has never reported catches for its 77-78 commercial longliners, that have been operating in the Indian Ocean since 2004. India recently reported a list of 77 longliners operating under its flag to be included in the IOTC Record of Authorized Vessels. The list, still under review, contains both deep-freezing longliners (46 vessels) and fresh-tuna longliners (31 vessels). If the details provided for the vessels are confirmed the Secretariat will need to revise the catches for these vessels because in the past the Secretariat had estimated the catches on the assumption that all Indian longliners were fresh-tuna longliners.

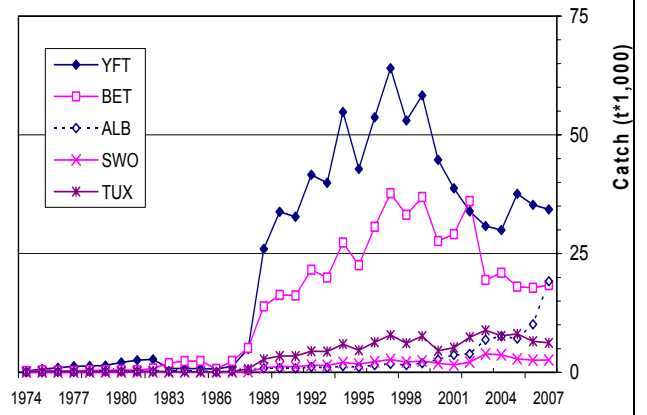
The estimation of number of vessels and catches has been improving over time, thanks to the information collected through the Sampling Programs implemented by the IOTC-OFCF in key ports of landing of these vessels in the Indian Ocean. The amount of historical and current information collected through 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 Indonesia and Thailand no longer receive full 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.

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).



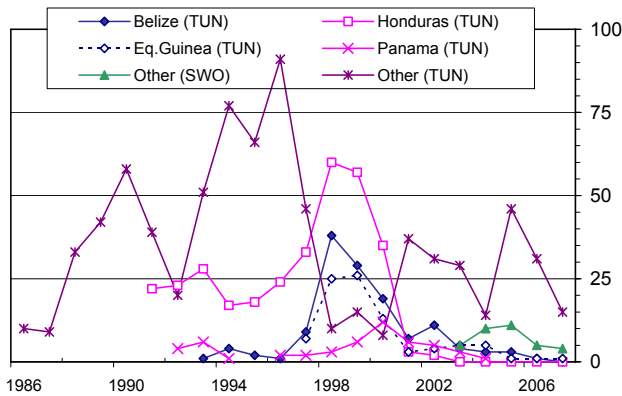
**Figure 9: Catches available for Taiwanese fresh-tuna longliners for 2001-07 versus the catches previously estimated by the Secretariat**



**Figure 10: Total catches per species in the Indian Ocean estimated for fresh tuna longline fleets**

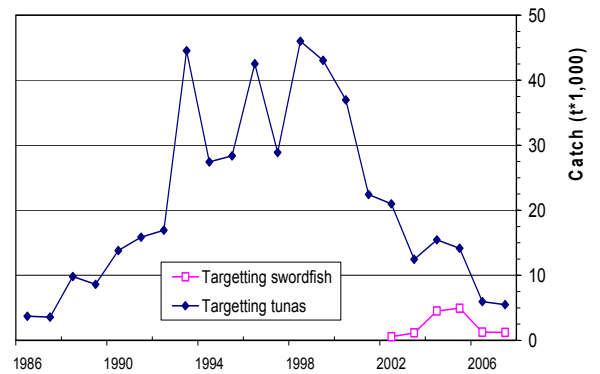
## B/ NON REPORTING DEEP-FREEZING LONGLINE FLEETS

**Figure 11: Number of non-reporting deep-freezing longliners estimated to operate in the Indian Ocean (per flag country)**



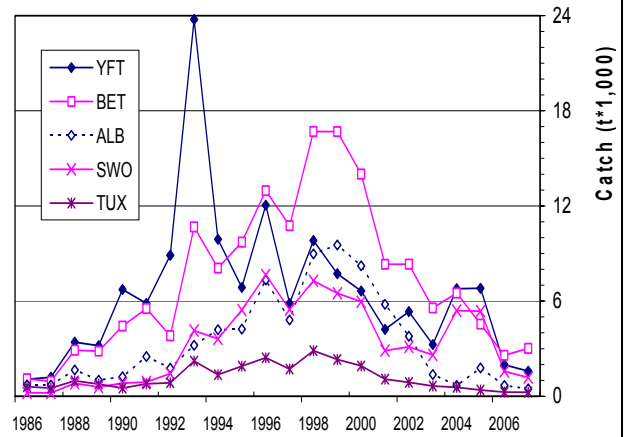
Note: Belize is an IOTC Member since 2007 and has reported catches for its longline fleet in recent years

**Figure 12: 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. The main sources for these data are the fishing craft statistics and the IOTC lists of active vessels. No catches have been estimated for 2007 yet. 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 10,000 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 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 spatio-temporal strata than the Taiwanese or Spanish over time could be wrong for some flags and periods.

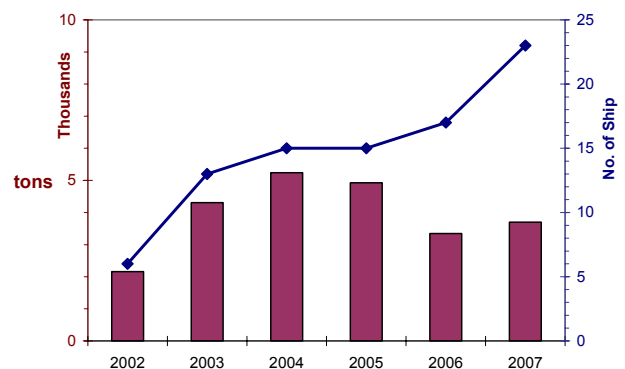


**Figure 13: Total catches per species in the Indian Ocean estimated for non-reporting deep-freezing longline fleets**

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. 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 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 Indonesia and Malaysia recently, basing on the numbers reported and the average catches by species by vessel reported by Taiwan for the same period. No catches have been estimated for Indian vessels yet (46 vessels in 2007).



**Figure 14: 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

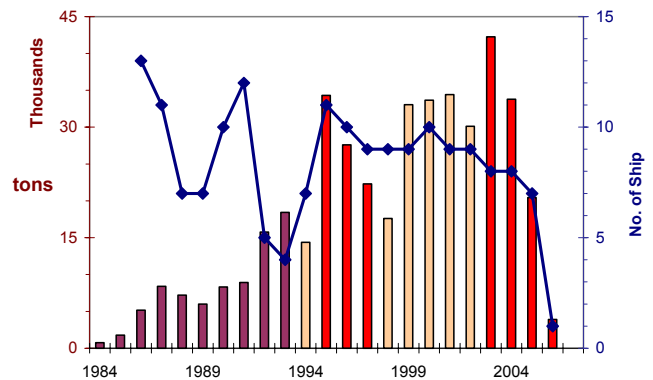
Between 6 and 11 non-reporting purse seiners operated in the Indian Ocean between 1995 and 2005 under several flags. The catches of these vessels, mainly of skipjack, ranged between 30,000 and 40,000 tonnes.

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 1998-2002<sup>3</sup>. 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 15: 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)

<sup>3</sup> Catches for 1997 and 2003 were also provided although only for several months.

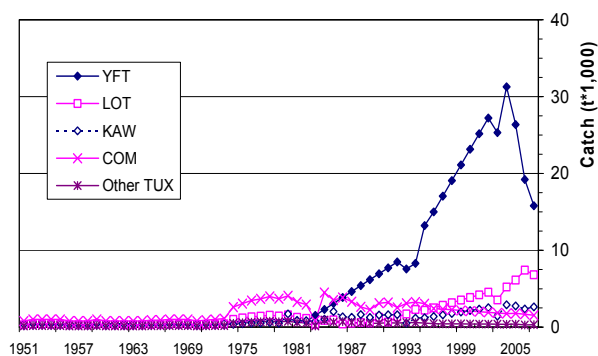
## BOX 2: NO STATISTICAL SYSTEM: YEMEN, COMOROS AND MADAGASCAR

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 16).

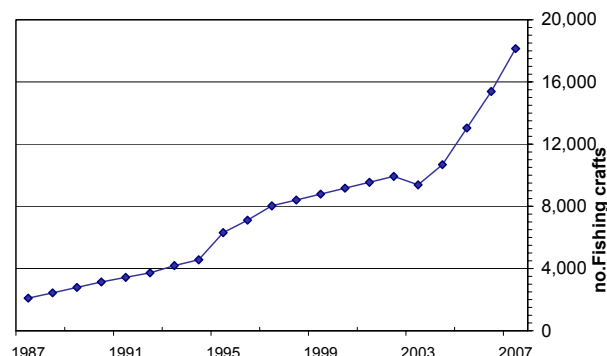
In 2007, the Secretariat revised the catch estimates for artisanal boats operating in Yemen for 2003-2006, notably those for yellowfin tuna, longtail tuna, kawakawa and narrow-barred Spanish mackerel. The new estimates are probably more realistic than the previous although they are still uncertain due 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.

The IOTC-OFCF Project is currently considering 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 during the same period.

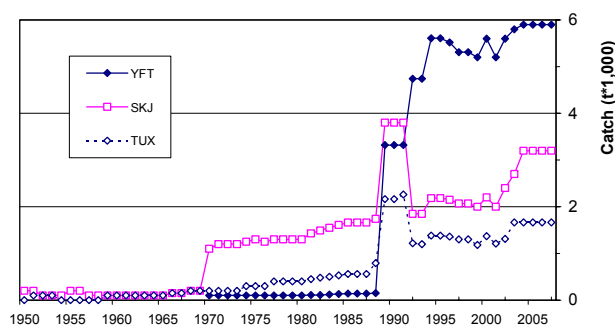


**Figure 16: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in Yemen**

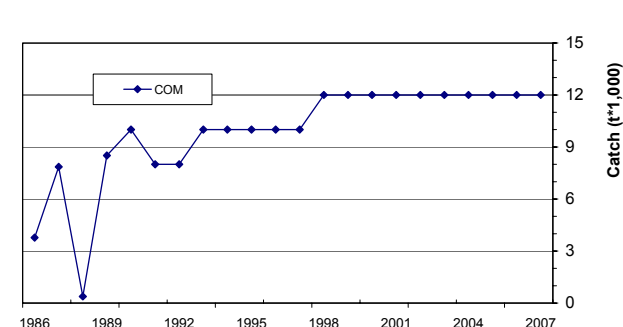


**Figure 17: Total number of crafts estimated for the artisanal fishery operating in Yemen**

**Comoros and Madagascar** 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 18: Total catches per species in the Indian Ocean for the artisanal fishery operating in Comoros**



**Figure 19: 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. Nevertheless, the data available at the IOTC Secretariat for this country are considered very poor quality for the following reasons:

- Catches are incomplete, especially in the early years of the fishery.
- Marked differences exist between catches reported by the National Aquatic Resources and Development Agency (NARA) and the Statistical Unit of the Ministry of Fisheries and Aquatic Resources (MOFAR), the two institutions reporting catches to the IOTC.
- Catches are highly aggregated by gears and/or species
- Species are often misidentified or mislabelled, mainly of billfish species

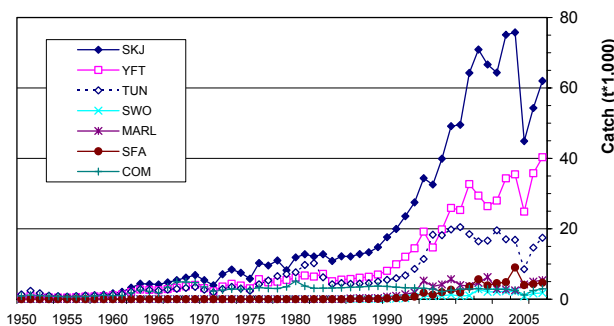
Although the IOTC/OFCF/NARA sampling implemented in 2005 did not cover all fisheries the catches estimated for 2005 and 2006 using this information are believed to be more precise. Furthermore, they indicate that the previous catch figures have been overestimated and are probably much higher than the actual catches, mainly due to an overestimation of vessel numbers and activity (effort).

The catches for 2007 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.

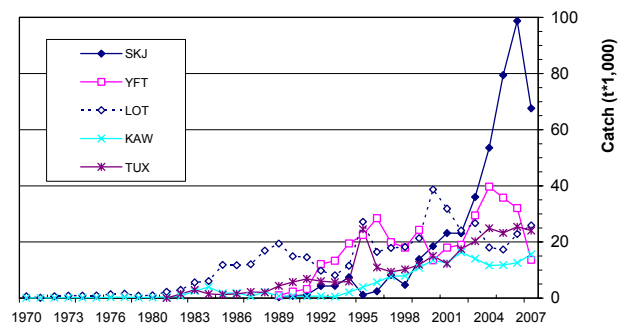
The catch estimates for swordfish, marlins, skipjack tuna and, to a lesser extent, yellowfin tuna and other species are likely to be affected if the above is confirmed true.

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 20 shows the new catches estimated for the gillnet and longline fishery of Sri Lanka in 2005-06 versus the catches in the IOTC database for 2004 and previous years.



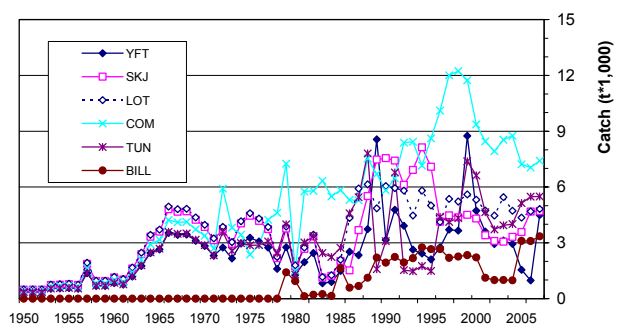
**Figure 20: Total catches per species in the Indian Ocean estimated for the gillnet and longline fishery operating in Sri Lanka in 2005-06 and catches in the IOTC database for previous years**



**Figure 21: Total catches per species in the Indian Ocean estimated for the gillnet fishery operating in Iran for 1950-2007**

**Iran, Pakistan and Sri Lanka** 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 700 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, but they are believed to be high.

None of the above countries is reporting catches and effort as per IOTC standards to the Secretariat.



**Figure 22: Total catches per species in the Indian Ocean estimated for the gillnet fishery operating in Pakistan for 1950-2007**