

## Report on IOTC data collection and statistics

*Miguel Herrera<sup>1</sup>, Lucia Pierre<sup>2</sup> & Julien Million<sup>3</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 10/02: **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 Resolution 10/12 On the conservation of **THRESHER SHARKS** (family Alopiidae) caught in association with fisheries in the IOTC area of competence
  - Paragraph 7: The Contracting Parties, Co-operating non-Contracting Parties, especially those directing fishing activities for sharks, shall submit data for sharks, as required by IOTC data reporting procedures (including estimates of dead discard and size frequencies), in advance of the 2011 Scientific Committee meeting.
- 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 10/06 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 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.
- IOTC Resolution 11/04 On a Regional **OBSERVER SCHEME**
  - Paragraph 9: CPCs shall provide to the Executive Secretary and the Scientific Committee annually a report of the number of vessels monitored and the coverage achieved by gear type in accordance with the provisions of this Resolution.
  - Paragraph 11: ... The CPCs shall send within 150 days at the latest each report, as far as continuous flow of report from observer placed on the longline fleet is ensured, which is recommended to be provided with 1°x1° format to the Executive Secretary, who shall make the report available to the Scientific Committee upon request. ...

<sup>1</sup> IOTC Data Coordinator ([mh@iotc.org](mailto:mh@iotc.org))

<sup>2</sup> IOTC Data Assistant ([data.assistant@iotc.org](mailto:data.assistant@iotc.org))

<sup>3</sup> IOTC Tagging Officer ([jm@iotc.org](mailto:jm@iotc.org))

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 report covers the following areas:

- Overview
- Availability of IOTC statistics for 2010 (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

### ***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 10/07; IOTC Resolution 10/08; IOTC Resolution 05/03; IOTC Resolution 08/02), data collected through sampling at the landing place or at sea by scientific observers (IOTC Resolution 10/04) 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.

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

**Observer data:** data collected by observers on fishing vessels of IOTC CPCs implementing the Regional Observer Scheme.

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

## 2. AVAILABILITY OF IOTC STATISTICS FOR 2010

Tables 2i-2v (below) list the fleets for which the Secretariat received or estimated catches for the year 2010. 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 19 fishing parties before the deadline of June 30 (cf. 13 in 2010). Partial statistics were provided in some cases. Requests were sent to over fifty countries<sup>4</sup> in March-April 2011. Second and third requests were needed in most cases. Levels of reporting concerning statistics for the years 2009 and 2010 were similar.

Table 1 shows the extent to which 2010 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)<sup>5</sup>. 41% of the catch was available by 30 June and 64% of the catch was available by November. The proportion of statistics available for 2009 is shown for comparison. Levels of reporting were moderate in 2010, 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 2010).

Statistics available for 2008	Estim. Catch	NC		CE		SF	
		BD	WP	BD	WP	BD	WP
IOTC species (x1,000t)	1,405	578	897	577	583	504	655
% Available for 2010		<b>41</b>	<b>64</b>	<b>41</b>	<b>42</b>	<b>36</b>	<b>47</b>
% Available for 2009		43	66	41	48	37	39
Tropical tunas (x1,000t)	786	375	632	375	380	366	516
Temperate tunas (x1,000t)	50	28	28	28	28	21	21
Billfish (x1,000t)	63	27	49	27	29	17	17
Neritic tunas (x1,000t)	505	147	187	147	147	101	101

**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 Working Party on Data Collection and Statistics Meeting (**WP**)

<sup>4</sup> Note that specific requests were sent to EU countries having vessels known to operate in the IOTC Area (France, Portugal, Spain and the UK)

<sup>5</sup> Note that the IOTC Secretariat uses alternative sources to estimate the catches of non-reporting fleets; the percentages in this section represent the proportion that the NC, CE or SF available before the deadline or the SC represent over the totals estimated by the Secretariat. The amount of catches not reported is further reduced as countries that did not report statistics in time provide the missing datasets.

Table 2: Availability of IOTC statistics for the year 2010

## 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	177.4	SY						
	SEYCHELLES	75.8	SY						
	FRANCE-TERRITORIES	18.3	SY						
	THAILAND	5.4	SB						Fleet moved to the Atlantic Ocean in July 2010
	IRAN I R	3.2	YS						CE and SF not reported by IOTC grid
	JAPAN	2.1	SB						
L L	MALAYSIA	0.3	S						
	CHINA	3.4	BY						
	TAIWAN,CHINA	31.6	BY						
	INDONESIA	17.4	BY						
	JAPAN	7.7	BY						
	NEI-FRESH <sup>2</sup>	7.1	BY						
	OMAN	5.1	Y						
	SEYCHELLES	4.7	B						SF not reported for the deep-freezing longline component
	INDIA	4.0	BY						NC and CE very incomplete
	NEI-FROZEN <sup>1</sup>	2.2	YB						
	EUROPEAN COMMUNITY	1.2	BY						Data not reported from EU-France; CE data not reported by EU-Spain
	MALAYSIA	1.1	BY						Lack of monitoring of Malay longliners based in foreign ports
	KOREA REP	1.0	BY						
	PHILIPPINES	0.5	BY						SF only available for BET
	SOUTH AFRICA	0.3	BY						
	VANUATU	0.2	BY						
	THAILAND	0.2	BY						
	AUSTRALIA	0.1	BY						
	BELIZE	0.0	BY						
	MADAGASCAR	0.0	BY						
GUINEA	0.0	BY						Activity unknown; vessel also operate in the Atlantic Ocean	
TANZANIA	0.0	BY							
KENYA	0.0	YB							
MAURITIUS	0.0	B							
SIERRA LEONE	unk							Activity unknown	
SENEGAL	nil							No activity during 2010	
O t h e r  f l e e t s	SRI LANKA	149.2	SY						SF not by IOTC grid
	MALDIVES	71.6	SY						CE data provided for the WPPT but not officially released
	INDONESIA	62.9	SY						
	IRAN I R	50.6	YS						CE and SF not reported by IOTC grid
	INDIA	20.8	SY						
	MADAGASCAR	15.6	SY						
	YEMEN AR RP	13.7	Y						
	COMOROS	12.6	YS						IOTC-OFCF sampling scheme in place (2011)
	PAKISTAN	10.3	SY						Estimates of total catch highly uncertain
	OMAN	7.1	Y						
	FRANCE-TERRITORIES	0.8	SY						
	EUROPEAN COMMUNITY	0.2	Y						
	MAURITIUS	0.1	Y						NC reported for FAD fishing
	TANZANIA	0.1	Y						NC as reported in the National Report (not by species)
	KENYA	0.1	Y						NC as reported in the National Report (not by species)
	MOZAMBIQUE	0.0	SY						
	JORDAN	0.1	SY						
	UK-TERRITORIES	0.0	Y						SF only available for YFT
	EAST TIMOR	0.0	Y						
	SOUTH AFRICA	0.0	Y						
AUSTRALIA	0.0	Y							
SEYCHELLES	0.0	Y							
OTHER COUNTRIES	unk							No catch available for Somalia, Myanmar, and Bangladesh	

**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)  
**unk** Catches unknown; **nil** no activity (nil catch)

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	3.7	S						
	EUROPEAN COMMUNITY	0.2	A						
	FRANCE-TERRITORIES	0.0	A						
	SEYCHELLES	0.0	A						
L L	INDONESIA	16.8	A						
	CHINA	0.2	A						
	TAIWAN,CHINA	15.7	A						
	JAPAN	5.5	AS						
	NEI-FRESH	2.3	A						
	INDIA	1.8	A						
	EUROPEAN COMMUNITY	1.1	A						No data available for France; No CE data available for Spain
	KOREA REP	1.0	AS						
	SEYCHELLES	0.8	A						
	NEI-FROZEN	0.5	A						
	BELIZE	0.1	A						
	PHILIPPINES	0.1	A						
	VANUATU	0.1	A						
	GUINEA	0.1	A						
	TANZANIA	0.0	A						
	SOUTH AFRICA	0.0	A						
	MADAGASCAR	0.0	A						
	AUSTRALIA	0.0	A						
	KENYA	0.0	A						
	THAILAND	0.0	A						NC from National Report
MALAYSIA	0.0	A						Lack of monitoring of Malay longliners based in foreign ports	
MAURITIUS	0.0	A						Size data reported for foreign licensed vessels	
O T H	MAURITIUS	0.2	A						
	EUROPEAN COMMUNITY	0.1	A						
	INDIA	0.0	A						
	SOUTH AFRICA	0.0	A						

**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	0.5	S						
	TAIWAN,CHINA	9.3	SM						
	EUROPEAN COMMUNITY	5.9	S						Data not available for France; CE incomplete for Spain
	INDONESIA	3.1	SM						
	JAPAN	1.3	SM						
	NEI-FRESH	1.2	SM						
	NEI-FROZEN	1.2	SM						
	INDIA	1.2	SM						NC and CE incomplete for commercial fleet
	SEYCHELLES	0.9	S						SF not reported for deep-freezing longline component
	OMAN	0.5	MF						
	SOUTH AFRICA	0.4	S						
	GUINEA	0.4	S						
	AUSTRALIA	0.4	S						
	TANZANIA	0.2	S						
	MALAYSIA	0.2	SF						Lack of monitoring of Malay longliners based in foreign ports
	KENYA	0.1	S						NC not by species (marlins)
	MAURITIUS	0.1	S						NC not by species (marlins)
	KOREA REP	0.1	S						
	MADAGASCAR	0.0	S						
	THAILAND	0.0	S						
PHILIPPINES	0.0	S							
BELIZE	0.0	S						Marlins reported aggregated	
VANUATU	0.0	S							
O t h e r  f l e e t s	SRI LANKA	14.8	F						NC not by species (marlins)
	IRAN I R	9.2	F						CE not reported by IOTC grid
	PAKISTAN	3.1	F						NC not by species
	INDONESIA	2.1	M						
	INDIA	2.1	MF						
	MADAGASCAR	1.5	F						
	OMAN	1.2	F						
	COMOROS	0.6	F						
	YEMEN AR RP	0.3	M						
	TANZANIA	0.3	F						NC not by species (from National Report)
	KENYA	0.2	M						NC not by species (from National Report)
	UN ARAB EMIRATES	0.2	F						
	EUROPEAN COMMUNITY	0.0	M						
	FRANCE-TERRITORIES	0.0	M						
	SAUDI ARABIA	0.0	M						
UK-TERRITORIES	0.0	M							
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	AUSTRALIA	1.0	X						Catch not by species
	IRAN I R	0.2	F						Statistics incomplete; refers mostly to discards
	EUROPEAN COMMUNITY	0.0	L						Statistics incomplete; refers mostly to discards
	SEYCHELLES	0.0	F						Statistics incomplete; refers mostly to discards
O t h e r  f l e e t s	THAILAND	0.1	F						Fleet moved to the Atlantic Ocean in July 2010
	INDONESIA	168.8	KL						
	IRAN I R	100.8	LK						CE and SF not reported by IOTC grid
	INDIA	92.8	CK						
	MALAYSIA	24.5	KL						
	THAILAND	20.0	KL						
	PAKISTAN	16.1	CL						
	SRI LANKA	15.6	FC						NC not by species/gear
	OMAN	14.9	LC						
	YEMEN AR RP	11.2	KL						
	MADAGASCAR	10.5	CK						
	SAUDI ARABIA	7.8	CK						
	UN ARAB EMIRATES	6.0	C						
	MALDIVES	5.7	FK						
	QATAR	2.6	C						
	BANGLADESH	1.5	X						
	KENYA	1.2	C						NC not by species/gear (from National Report)
	TANZANIA	1.1	X						NC not by species/gear (from National Report)
	COMOROS	1.1	X						
	ERITREA	0.6	C						
	EGYPT	0.3	CK						
	AUSTRALIA	0.3	C						
	MOZAMBIQUE	0.1	C						
	KUWAIT	0.1	CG						
	BAHRAIN	0.1	C						
	DJIBOUTI	0.1	X						
	JORDAN	0.1	K						
	SEYCHELLES	0.0	K						
	SUDAN	0.0	C						
	EUROPEAN COMMUNITY	0.0							
UK-TERRITORIES	0.0								
SOUTH AFRICA	0.0	G							
MAURITIUS	0.0							NC provided for FAD fishery	
OTHER COUNTRIES	unk							No catch available for Somalia, Myanmar, and Bangladesh	

**Sps** Longtail tuna (L), frigate tuna and/or bullet tuna (F), kawakawa (K), narrow-barred Spanish mackerel (C), Indo-Pacific king mackerel (G), Seerfish(X)  
**Gear** Industrial purse seine (PS), industrial longline (LL) or other gears (pole-and-line; small purse seines, large and small gillnets, and small lines)  
**1** Freezing longliners whose catches are not reported by the flag states concerned  
**2** Fresh-tuna longliners whose catches are not reported by the flag states concerned

2v – Sharks seabirds and sea turtles

Gear	Fleet	Species					Comments
		Sharks			Sea Birds	Sea Turtles	
		NC	CE	SF			
P S	EUROPEAN COMMUNITY				n/a		Observer programme discontinued due to piracy
	SEYCHELLES				n/a		
	THAILAND				n/a		
	IRAN I R				n/a		
	AUSTRALIA				n/a		
	FRANCE-TERRITORIES				n/a		Observer programme discontinued due to piracy
	JAPAN				n/a		
	MALAYSIA				n/a		
L L	CHINA						Data presented at the WP on Ecosystems and Bycatch (not by species)
	TAIWAN, CHINA						
	JAPAN						
	INDONESIA						
	EUROPEAN COMMUNITY						No data available for France; No CE data available for Spain
	SEYCHELLES						
	KOREA REP						
	OMAN						
	PHILIPPINES						
	MALAYSIA						Lack of monitoring of Malay longliners based in foreign ports
	BELIZE						Nil catch of Sharks reported
	MAURITIUS						Data presented at the WP on Ecosystems and Bycatch (not by species)
	GUINEA						
	THAILAND						
	SOUTH AFRICA						
	AUSTRALIA						
	KENYA						NC not by species (from National Report)
	SENEGAL						
	INDIA						Information from research cruises presented at WPEB
	MADAGASCAR						Data presented at the WP on Ecosystems and Bycatch (not by species)
	NEI-FROZEN <sup>1</sup>						
	NEI-FRESH <sup>2</sup>						
A r t i s a n a l	IRAN I R				n/a		Data presented at the WP on Ecosystems and Bycatch (not by species)
	MALDIVES				n/a		NC presumed to be high
	INDONESIA				n/a		NC presumed to be high
	INDIA				n/a		NC Not by species
	SRI LANKA						NC Not by species
	OMAN				n/a		NC presumed to be high
	YEMEN AR RP				n/a		NC Not by species
	PAKISTAN				n/a		NC Not by species
	MALAYSIA				n/a		NC Not by species
	THAILAND				n/a		NC presumed to be low
	MADAGASCAR				n/a		NC presumed to be high
	COMOROS				n/a		Catch levels unknown
	UN ARAB EMIRATES				n/a		NC presumed to be low
	SAUDI ARABIA				n/a		Catch levels unknown
	QATAR				n/a		NC presumed to be low
	TANZANIA				n/a		NC not by species (from National Report)
	KENYA				n/a		NC not by species (from National Report)
	EGYPT				n/a		NC presumed to be low
	FRANCE-TERRITORIES				n/a		Catch levels unknown
	SEYCHELLES				n/a		NC/CE Not by species
	EUROPEAN COMMUNITY				n/a		NC presumed to be low
	MAURITIUS				n/a		NC aggregated by species
	AUSTRALIA				n/a		
	KUWAIT				n/a		NC presumed to be low
	ERITREA				n/a		NC presumed to be low
	JORDAN				n/a		NC presumed to be low
	BANGLADESH				n/a		NC presumed to be low
	BAHRAIN				n/a		NC presumed to be low
	DJIBOUTI				n/a		NC presumed to be low
	SUDAN				n/a		NC presumed to be low
UK-TERRITORIES				n/a		NC/CE Not by species; catch negligible	
SOUTH AFRICA				n/a			
EAST TIMOR				n/a		NC 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

<b>Gear</b>	Industrial purse seine (PS), industrial longline (LL) and artisanal gears (ART)	<b>Availability</b>		Fully available
<b>Catch</b>	Recent catches amounting to (thousands of tonnes)			Partially available
<b>Craft</b>	Number of craft operated (2006) (blank if unknown)	<b>SO</b> Data Source		Statistics fully available from flag country
<b>FC</b>	Fishing craft			Statistics partially available from flag country
<b>AV</b>	List of active vessels			Statistics available from sources other than flag country

Gear	Fleet	Availability				SO	Comments
		Catch	Craft	FC	AV		
P S	EUROPEAN COMMUNITY	177.6	21				
	SEYCHELLES	75.8	9				
	FRANCE-TERRITORIES	18.4	5				
	AUSTRALIA	4.6	9				
	THAILAND	3.6	4				
	IRAN I R	3.4	8				
	JAPAN	2.1	1				
	MALAYSIA	0.3	1				Active vessels not reported (data refers to authorized vessels)
	INDIA		5				
	INDONESIA		3				
	SUPPLY VESSELS-NEI		12				Reported by flag countries and/or third parties
L L	CHINA	4.1	20				
	TAIWAN,CHINA	56.6	562				
	INDONESIA	37.3	996				
	JAPAN	14.5	83				
	NEI-FRESH	10.6					
	EUROPEAN COMMUNITY	8.1	47				
	INDIA	7.0	53				Information from National Report
	SEYCHELLES	6.5	35				
	OMAN	5.6	48				
	NEI-FROZEN	3.9					
	KOREA REP	2.1	13				
	MALAYSIA	1.3	13				Number of vessels uncertain (data reported are conflicting)
	SOUTH AFRICA	0.8	23				
	PHILIPPINES	0.7	7				
	AUSTRALIA	0.5	4				
	GUINEA	0.4	3				Active vessels not reported (data refers to authorized vessels)
	TANZANIA	0.3	3				Information from National Report
	VANUATU	0.2	4				
	THAILAND	0.2	2				
	BELIZE	0.2	5				
KENYA	0.1	1					
MADAGASCAR	0.1	5				Information from National Report	
MAURITIUS	0.1	4				Data presented at the WP on Ecosystems and Bycatch	
O t h e r  O f f s h o r e  &  C o a s t a l	INDONESIA	233.7			n/a		
	SRI LANKA	179.5	45,163				
	IRAN I R	160.6	6,554				
	INDIA	115.7					
	MALDIVES	77.3	459				Active vessels not reported (data refers to authorized vessels)
	PAKISTAN	29.5					
	MADAGASCAR	27.6	38				Information from National Report
	YEMEN AR RP	25.3					
	MALAYSIA	24.5					
	OMAN	23.2					
	THAILAND	20.0	1,160				
	COMOROS	14.3	5,323				Census conducted in 2011 (IOTC-OFCF)
	SAUDI ARABIA	7.8					
	UN ARAB EMIRATES	6.2					
	QATAR	2.6					
	BANGLADESH	1.5					
	TANZANIA	1.5					
	KENYA	1.5					
	FRANCE-TERRITORIES	0.8					
	ERITREA	0.6					
	EGYPT	0.3					
	MAURITIUS	0.3					
	AUSTRALIA	0.3	35				
	EUROPEAN COMMUNITY	0.3					
	KUWAIT	0.1					
	JORDAN	0.1					
	BAHRAIN	0.1					
	DJIBOUTI	0.1					
	SEYCHELLES	0.0					
	SUDAN	0.0					
UK-TERRITORIES	0.0	47					
SOUTH AFRICA	0.0	18					
EAST TIMOR	0.0						

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



- **FADs and supply vessels:** EU-Spain provided information on the amount of Fish Aggregating Devices (FADs) set by purse seiners under its flag, by type and quarter, for 2010, and 2011 (quarters 1-2). In addition, EU-Spain provided information on the activity of supply vessels for 2009-11. EU-France provided total numbers of FADs set by purse seiners under its flag for the year 2008. However, the IOTC Scientific Committee considered that the numbers reported were unreliable, recommending that EU-France revises its report. France also indicated that it has not had supply vessels in operation in recent years. Australia indicated that purse seiners under its flag do not set FADs or use other vessels in support of fishing activities. No data was received for other fleets on FADs (France OT, Seychelles, Japan, Iran, Thailand), or activities of supply vessels (Seychelles, Japan, Thailand).
- **By-catch levels:** Australia and South Africa provided estimates of total bycatch levels for their fisheries for 2010, including bycatch levels for sharks, seabirds and marine turtles. In spite of the better reporting levels recorded for bycatch data during 2011, few statistics are still available for sharks, seabirds and sea turtles (Table 2v) (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.
- **Discard levels:** Table 2vii presents the information available for discards for the year 2010. Discard levels are only available for Korea, Australia, EU-France, EU-Portugal (nil discards), Sri Lanka (nil discards) and the UK (nil discards) in 2010. Discard rates are believed to be high for fisheries using longlines and oceanic gillnets (Iran, Pakistan) and moderate for purse seine sets on associated schools (mainly with FADs).

#### 2vii – Discards

Fleet	Units	Catch
EU-Portugal LL		Nil
EU-France PS	kg	Tunasnei 4,993
FranceOT PS		NIL
Australia L	# Fish	ALB 186 BET936 KGX243 SSP6; SBF6 MLS3 SWO145 41YFT
UK-OT (Chagos)		NIL
Korea Rep LL	# Fish	ALB711; YFT10 SBF434 BSH8,803POR672 SMA20 THR10
Sri Lanka		Nil

- **Fishing craft statistics and active vessels (2vi):** 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 IOTC Resolutions that call for countries to report yearly lists of domestic and foreign fishing vessels, information collected through the IOTC Transshipment Programme and market data provided by the International Seafood Sustainability Foundation (ISSF). 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 catch statistics by main fisheries and species groups*

Tables 3a-3f show the presumed quality of the nominal catches of tropical tunas, temperate tunas, billfish and neritic tunas for the entire time-series (1950-2010), by year (overall and by fishery). Figures 1a-1d show the proportion of catches that are presumed uncertain for the period 2004-2008, 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 (2001-2010), all gears combined, is presented in Figures 2a-2e. Figures 3a-3e show the proportion of catches that are presumed uncertain for the period 2004-2008, 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 2011-12, as more information is collected from the fisheries and reported to the Secretariat.

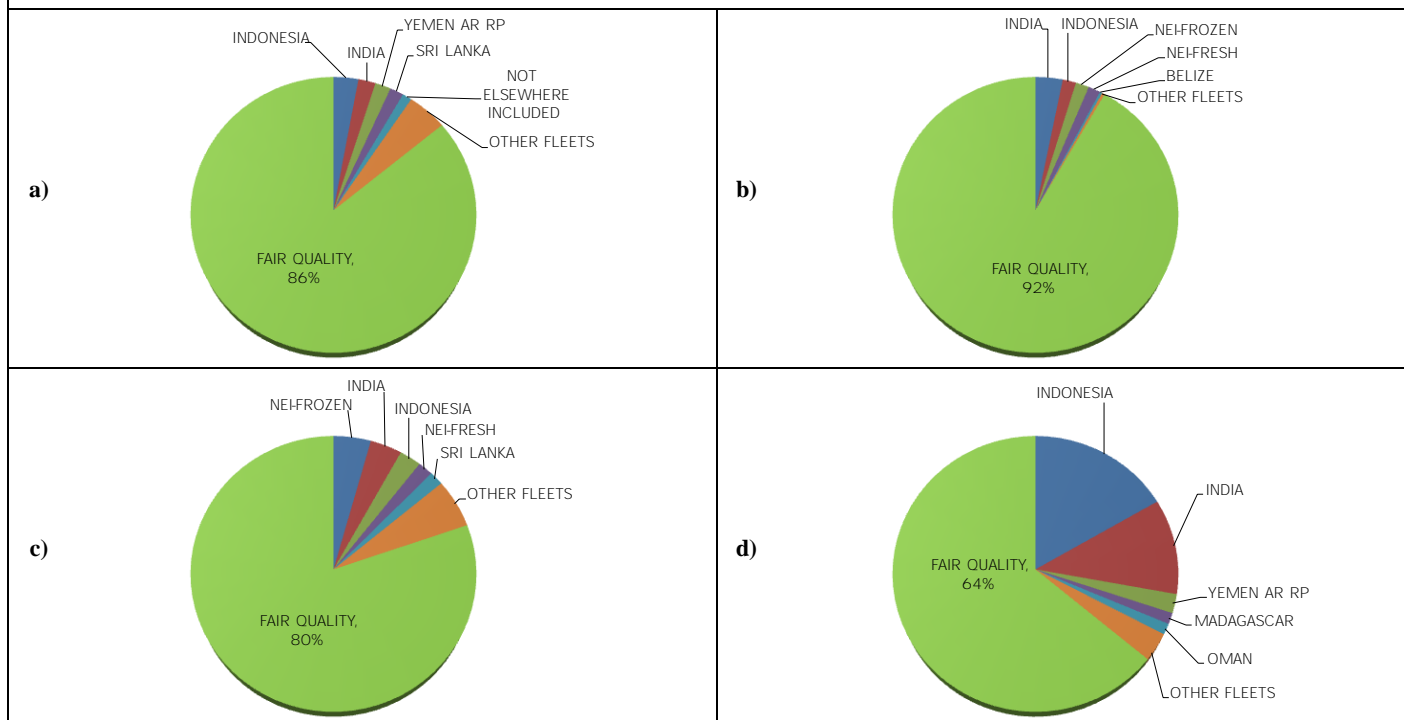
**Table 3a: Overall status of IOTC catch statistics, by species group (1950-2010)**

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	2010		
Tropical tunas	61	[Stacked bar chart showing quality distribution for Tropical tunas]																																
Temperate tunas	7	[Stacked bar chart showing quality distribution for Temperate tunas]																																
Billfish	4	[Stacked bar chart showing quality distribution for Billfish]																																
Neritic tunas	27	[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 1: Amount of nominal catch (in %) presumed to be uncertain (average 2004-2008), by fleet, over the total catches estimated for: a) Tropical tunas; b) Temperate tunas; c) Billfish; and d) Neritic tunas**



*Surface fisheries: Purse seine*

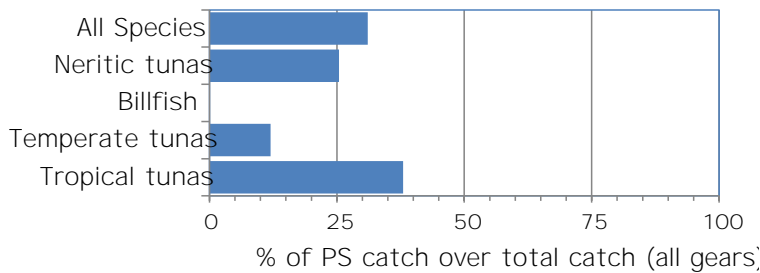
**Table 3b: Status of IOTC catch statistics for purse seine fisheries (1950-2010)**

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	2010	
Tropical tunas	79																																
Temperate tunas	2																																
Billfish	0																																
Neritic tunas	19																																
All species																																	

Key

- Catches represent more than 30% of the total PS catches (1950-2009)
- ▲ Catches represent between 15-30% of the total PS catches (1950-2009)
- ◆ Catches represent less than 15% of the total PS catches (1950-2009)
- 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 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 (2001-2010)**



**Figure 3a: Amount of PS catch (in %) presumed to be uncertain, by fleet, over the total PS catch (2004-2008)**



Overall, the catches recorded in the IOTC database for purse seine fisheries are considered to be of good quality (Table 3b). Purse seiners target tropical tunas or neritic tunas, depending on the type of vessel used. From 1950 to 2010, tropical tunas made up 79% and neritic tunas 19% of the total purse seine catches (Table 3b). Purse seine gears catch around 30% of the IOTC species in the Indian Ocean [WUFI, 2008] (Figure 2a).

88% of the catches of purse seine fisheries recorded in the IOTC database for recent years (2004-2008) are considered to be of good quality (Figure 3a). The catches for the following purse seine fleets are considered to be of uncertain quality:

- **Indonesia** The Secretariat estimates the catches for the coastal purse seine fishery of Indonesia (target is neritic tunas) based on aggregated catches reported by Indonesia; since 2006 Indonesia has been reporting catches but the completeness and quality of the reports are uncertain
- **NEI and Belize:** The catches of Russian vessels, recorded under the flag of Belize and other unidentified flag Secretariat in the past; since 2005 the vessels operate under the flag of Thailand are considered to be of uncertain quality (Box 1C, page 28). Thai fleet is not operating any more in the Indian Ocean (in the Atlantic Ocean since 2008)
- **Malaysia** The catches of a fleet of coastal purse seine vessels reported by Malaysia are not fully reported by species; the quality of the catches of neritic tunas.
- **Thailand:** The catches of large and coastal purse seine vessels reported by Thailand are not fully reported by species; the quality of the catches of both tropical tunas and neritic tunas.

*Surface fisheries: Pole-and-line*

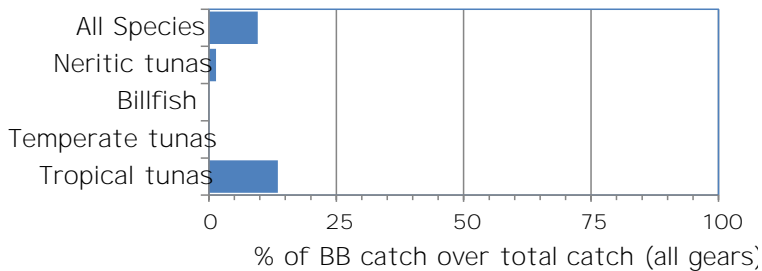
**Table 3c: Status of IOTC catch statistics for pole-and-line fisheries (1950-2010)**

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	2010
Tropical tunas	93	[Orange]																[Blue]														
Temperate tunas	1	[Orange]																[Blue]														
Billfish	0	[Orange]																[Blue]														
Neritic tunas	5	[Orange]																[Blue]														
All species		[Orange]																[Blue]														

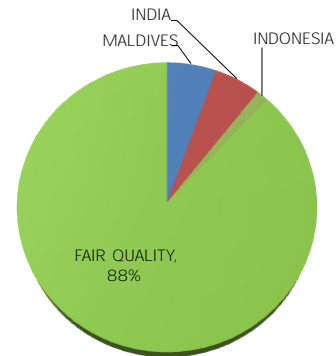
  

Key	● Catches represent more than 30% of the total BB catches (1950-2009)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total BB catches (1950-2009)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total BB catches (1950-2009)	■ 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 (2001-2010)**



**Figure 3b: Amount of BB catch (in %) presumed to be uncertain, by fleet, over the total BB catch (2004-2008)**



Overall, the catches recorded from pole fisheries in the IOTC database are considered to be of good quality (Table 3c). Baitboats target tropical tunas in the Indian Ocean; the time series (1950-2009) of the baitboat catches were made of tunas (Table 3c).

Pole-and-line gears catch around 10% of the IOTC species in the Indian Ocean (Y g d Y W] U ` ` m ` h f c d ] V 88% of the catches of pole-and-line fisheries recorded in the IOTC database for recent years (2004-2008) are considered to be of good quality (Figure 3b). Catches for the following baitboat fleets are considered to be of uncertain quality (2004-2008):

- Maldives A small proportion of the catches reported by Maldives are not by species, in particular some billfish.
- Indonesia The Secretariat estimates catches for the pole-and-line fishery of Indonesia from the total aggregated catches for Indonesia; since 2006 Indonesia has been reporting catches to the Secretariat, but the completeness and quality of reported remains uncertain.
- India (Lakshadweep) The Secretariat estimated catches for the pole-and-line fishery of India from the total aggregated catches for India in which India had not reported catches by gear, the Secretariat conducted a review in 2008 by the University of British Columbia (UBC) which led to higher catches of tropical tunas estimated for including the pole-and-line fishery operated in the Lakshadweep.

Surface fisheries: Gillnet

Table 3d: Status of IOTC catch statistics for gillnet fisheries (1950-2010)

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	2010
Tropical tunas	38	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Temperate tunas	1																															
Billfish	4	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Neritic tunas	58	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
All species		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Key	● Catches represent more than 30% of the total GI catches (1950-2009)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total GI catches (1950-2009)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total GI catches (1950-2009)	■ 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 (2001-2010)

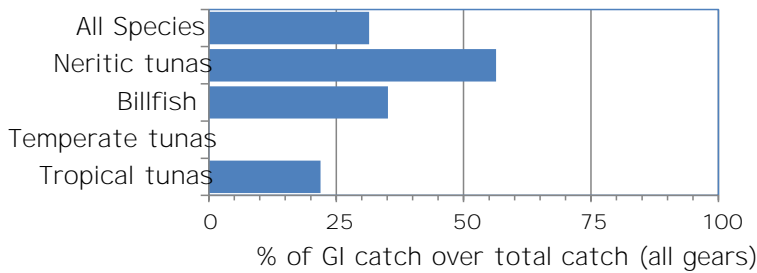
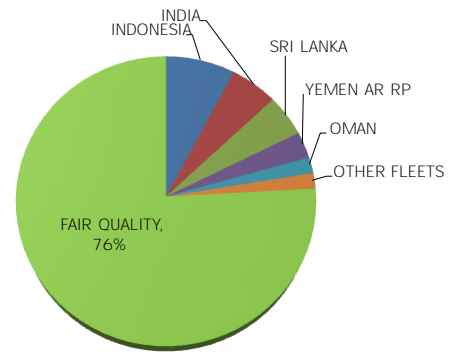


Figure 3c: Amount of GI catch (in %) presumed to be uncertain, by fleet, over the total GI catch (2004-2008)



Overall, the catches recorded for gillnet fisheries in the IOTC database are of fair to good quality after then (Table 3d). Over the time series 1950-2010, 38% of tropical tunas (Table 3d).

Gillnet gears catch around 30% of the IOTC species in the Indian Ocean (Y g d Y W) U ` ` mŁ zb`YVf]]`h`] ZW] h f c d ] WU ` ` h i b U g ` fl Á & \$ i Ł ` fl : ] [ i f Y ` & WŁ " 76% of the catches of gillnet fisheries recorded in the IOTC database for 400 years (2004-2008) to be of fair quality (Figure 3c). The catches for the gillnet fisheries considered to be of uncertain quality (2004-2008)

- Indonesia The Secretariat estimated catches for the gillnet fishery of Indonesia from the total aggregated catches for 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 since 2006, but the completeness and quality of the datasets reported remains uncertain.
- Sri Lanka Sri Lanka does not report catches fully by species. In particular, marlins are reported aggregated (see Box 2, page 30).
- Yemen The Secretariat estimated catches for the gillnet fishery of Yemen using reports from the Ministry of Fisheries and additional information collected through several IOTC/FAO projects to Yemen. This affects the quality of the catches of neritic tunas (Box 2, page 29).
- India: The Secretariat estimated catches for the gillnet fishery of India from the total aggregated catches for India; this affects the quality of the catches of neritic tunas. The Secretariat conducted a survey of the Indian fisheries using information published by the Sea Around Us Project (University of British Columbia) which led to higher catches of several species estimated for the Indian fisheries.
- Iran and Pakistan The amount of vessels under the flags of Iran and Pakistan using gillnets on the high seas has increased in recent years. However, these vessels do not complete logbooks and do not report catches at the landing place, and catches of other vessels. The Secretariat believes that the quality of the catches for Iran and Pakistan may be affected by insufficient monitoring of vessel activities for those fisheries on the high seas. In addition, the catches for Iran and Pakistan are thought to be very incomplete, not accounting for all the vessel activities (Box 3, page 31).

**Longline fisheries**

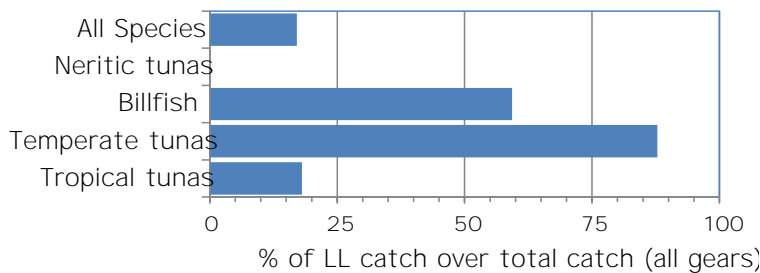
**Table 3e: Status of IOTC catch statistics for longline fisheries (1950-2010)**

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	2010
Tropical tunas	64	[Bar chart showing percentage of LL catches for tropical tunas from 1950 to 2010]																														
Temperate tunas	23	[Bar chart showing percentage of LL catches for temperate tunas from 1950 to 2010]																														
Billfish	13	[Bar chart showing percentage of LL catches for billfish from 1950 to 2010]																														
Neritic tunas	0	[Bar chart showing percentage of LL catches for neritic tunas from 1950 to 2010]																														
All species		[Bar chart showing percentage of LL catches for all species from 1950 to 2010]																														

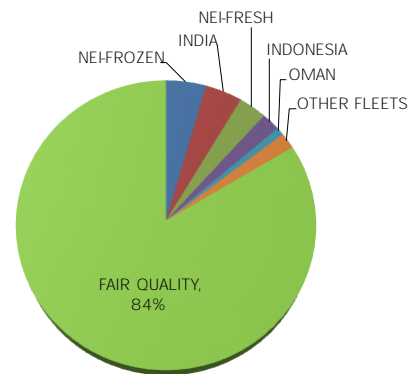
  

Key	● Catches represent more than 30% of the total LL catches (1950-2009)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total LL catches (1950-2009)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total LL catches (1950-2009)	■ 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 (2001-2010)**



**Figure 3d: Amount of LL catch (in %) presumed to be uncertain, by fleet, over the total LL catch (2004-2008)**



Overall, the catches recorded for longline fisheries in the IOTC database are of good quality until 1988 and since 2003 and fair quality between 1989 and 2002 (Table 3e). Over the time series (1950-2009), 64% of the longline catches were tropical tunas, 23% of temperate tunas, 13% of billfish and 0% of neritic tunas (Table 3e). Longline catches represent around 20% of the IOTC species in the Indian Ocean region (Y & W] U` ` m` h Y a d Y f U and tropical tunas, 23% of temperate tunas, 13% of billfish and 0% of neritic tunas. 84% of the catches of longline fisheries recorded in the IOTC database for 40 years (2004-2008) are of good quality (Figure 3d). The catches for the following longline fleets are considered to be of uncertain quality (2004-2008):

- NEI-Frozen The Secretariat estimates the catches of longline vessels that operate under flags of countries using information provided by Third Parties. This category includes also the catches of the IOTC CPCs that do not report complete sets of catches to the Secretariat, in particular, Indonesia, tropical tunas, temperate tunas and billfish (Box 1B, page 27).
- India: India does not report complete set of catches for its longline fleets (see above); this affects the tropical tunas and billfish.
- NEI-Fresh The Secretariat estimates the catches of longline vessels that operate under flags of countries using information from both the IOTC Project and Third Parties. This category includes also the catches under the flags of IOTC CPCs that do not report complete sets of catches to the Secretariat, in particular, Indonesia. 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 longline vessels and catches of albacore for which data; in addition, a small component of the catches of longline are not reported by species; this affects catches of tropical tunas, temperate tunas and billfish.
- China: China did not report catches fully by species before the catches reported since then are considered to be of uncertain quality.

**Other artisanal fisheries: Hand line, trolling and unidentified fisheries**

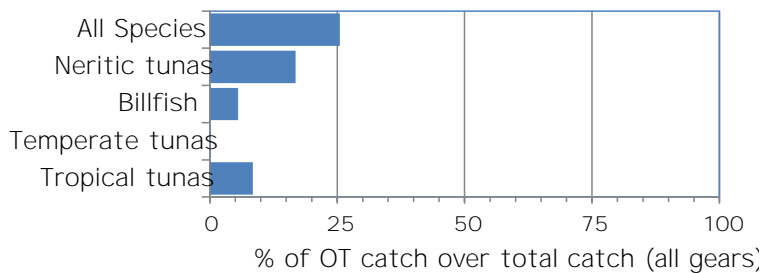
**Table 3f: Status of IOTC catch statistics for hand line, trolling and other unidentified fisheries (1950-2010)**

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	2010		
Tropical tunas	49																																	
Temperate tunas	2																																	
Billfish	2																																	
Neritic tunas	47																																	
All species																																		

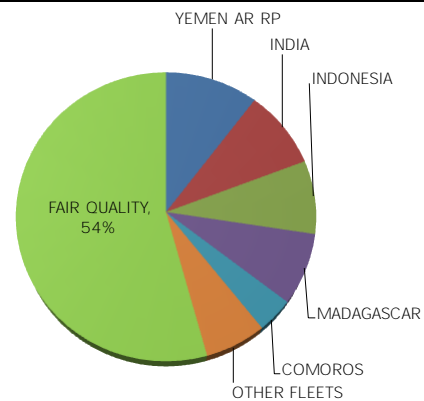
  

Key	● Catches represent more than 30% of the total OT catches (1950-2009)	■ Less than 40% of the catches reported by gear and species
	▲ Catches represent between 15-30% of the total OT catches (1950-2009)	■ Between 40% and 75% of the catches reported by gear and species
	◆ Catches represent less than 15% of the total OT catches (1950-2009)	■ 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 (2001-2010)**



**Figure 3e: Amount of OT catch (in %) presumed to be uncertain, by fleet, over the total OT catch (2004-2008)**



This category includes the catches of IOTC species that are not reported by gear. The majority of them are likely to refer to coastal gillnets, handline and other minor artisanal fisheries.

Overall, the catches recorded for these fisheries in the IOTC database are of poor to fair quality (Table 3f). Over time series (1950-2010) 47% of the catches under this category were neritic tunas and 49% tropical tunas (Table 3f). Hand line, trolling and other unidentified gears catch around 25% of the IOTC species in the Indian Ocean special [ h ] W h i b U g f l A & \$ i t U b X h f c d ] W U h W \ Y g a i n Z c f = b X c b Y g ] U N g W c U 54% of the catches of these fisheries recorded in the IOTC database for recent years (2004-2008) are of poor to fair quality (Figure 3e). The catches for the following fleets are considered to be of uncertain quality (2004-2008)

- Yemen: The Secretariat estimated the hand line fishery of Yemen using reports from the Ministry of Fisheries and additional information collected through several missions to Yemen. This affects the quality of the catches of tropical tunas (Table 3f) (Box 2, page 29.)
- Madagascar and Comoros: Madagascar and Comoros have never reported catches for their fisheries. The catches estimated by the FAO for the Comoros and Madagascar; in the case of Madagascar, this data is recorded as marine fish by species; this affects the quality of the catches of tropical tunas and neritic tunas.
- Indonesia: The Secretariat estimated catches for the handline and trolling fisheries of Indonesia from reports by Indonesia; this affects the quality of the catches of both tropical tunas and neritic tunas. A large component of these catches is thought to be made of juveniles of tropical tunas and bigeye tuna caught around Rumpons (anchored FADs) with gillnets and purse seines. The catches aggregated represent around 25% of the total catches and they have been reported in an incorrect manner.
- India: The Secretariat estimated catches for the hand line and trolling fisheries of India from the reports of India which India had not reported catches by gear; this affects the quality of the catches of tropical tunas. The Secretariat conducted a review using information published by the Sea Around Us Project (SAUP) which led to higher estimates of catches of tropical tunas estimated for the Indian fisheries.
- Other fleets: Other fleets for which the catches are considered of uncertain quality are UAE, Tanzania, Mauritius and others.

**Main progress achieved during 2011**

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

<b>A/ Nominal catches</b>	
<b>1-. Improved species and gear breakdown</b>	
Fishery Period Species Details of activity Sources Changes in data	All 1950-2009 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
<b>2-. Changes to total catches series</b>	
Fishery Period Species Details of activity Sources Changes in data	Coastal fisheries of India 1950-2010 Tropical tunas, Neritic tunas, billfish The IOTC Secretariat estimated catches of IOTC species by year, gear, and species for the whole historical period; the catches were estimated using a catch reconstruction published by the Sea Around Us Project, covering statistics between 1950 and 2000. The catches for the period 2001-10 were also adjusted using information in the study and other information available. Catch reconstruction Sea Around Us Project (UBC) (Historical reconstruction of Indian marine fisheries catches, 1950-2000, as a basis for testing the 'Marine Trophic Index by Brajgeet Bhathal 2001) Significant changes in species composition and gear breakdown; slight changes in total catches over the time series. Significant increases in the catches of tropical tunas. See also Box 2
<p><b>Figure 4: Catch series for the coastal fisheries of India estimated in 2011 (orange) versus those estimated in 2010 (blue) (1950-2010)</b></p>	
<p><b>Figure 5: New catch series estimated for the coastal fisheries of Indonesia in 2011, by gear (1950-2010)</b></p>	
Fishery Period Species Details of activity Sources Changes in data	Indonesia's coastal fisheries 1950-07 All species The catch series for Indonesia was revised in order to estimate catches by gear over the entire series. The main basis for the review was information obtained from the document "Tuna Fishing in Indonesia" (J Marcille, T. Boely, M. Unar, G.S Merta, B. Sadhotomo, J.C.B Uktolseja (1984)) and information from recent years, as reported by Indonesia. Tuna Fishing in Indonesia (J Marcille, T. Boely, M. Unar, G.S Merta, B. Sadhotomo, J.C.B Uktolseja (1984)) IOTC Database Significant changes in species and gear composition of the catches, in particular in the early years of the fishery. Total catches not changed. See also Box 1A
Fishery Period Species Details of activity Sources Changes in data	Industrial and coastal fisheries of Australia All time series All species During 2011, Australia indicated that Nominal Catches and Catch-and-Effort previously not in the public domain can now be released, provided that the IOTC Confidentiality policy is observed. Following this communication, the IOTC Secretariat re-processed the datasets for Australia upon this basis. IOTC Liaison Officer Australia Nominal catches disaggregated according to IOTC standards.



2-. Changes to total catches series	
Fishery Period Species Details of activity  Sources  Changes in data	Coastal fisheries of the Comoros 2011 All species In 2011, the IOTC-OFCF Project provided assistance to the "Direction generale des ressources halieuthiques" of Comoros for the implementation of a frame survey and census of the fisheries in the three islands. In addition, the IOTC Secretariat provided assistance (IOTC accumulated funds) for the implementation of sampling during 2011. The activities implemented will allow estimation of catch in the Comoros for the first time since 1995, the last year in which sampling was in place. The new catches estimated will be used to re-visit the time-series for the Comoros. DGRH of Comoros with the assistance of the IOTC-OFCF Census and the IOTC Secretariat Significant changes in species and gear composition of the catches, in particular in the early years of the fishery. Total No changes in catches as yet. Catches to be revised as 2011 data becomes available.
Fishery Period Species Details of activity  Sources  Changes in data	Non-reporting fresh tuna longliners operating under various flags (NEI) 2006-2010 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 Amounts transshipped by vessel from the IOTC Transshipment Programme Data on exports of albacore by vessel for canning provided by the International Seafood Sustainability Foundation (ISSF) Moderate decrease in the catches of fresh-tuna longliners in recent years See also Box 1A
Fishery Period Species Details of activity  Sources  Changes in data	Non-reporting deep-freezing longliners operating under several flags (NEI) 2006-10 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 Amounts transshipped by vessel from the IOTC Transshipment Programme Data on exports of albacore by vessel for canning provided by the International Seafood Sustainability Foundation (ISSF) Change in recent year catches. Current catches are slightly higher than those previously recorded See also Box 1B See also Box 3

B/ Bycatch	
Fishery Period Species Details of activity  Sources  Changes in data	All 1950-2010 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; catches are still very preliminary

C/ Catches-and-Effort	
Fishery Period Species Details of activity Sources Changes in data	Industrial and coastal fisheries of Australia All time series All species During 2011, Australia indicated that Nominal Catches and Catch-and-Effort previously not in the public domain can now be released, provided that the IOTC Confidentiality policy is observed. Following this communication, the IOTC Secretariat re-processed the datasets for Australia upon this basis. IOTC Liaison Officer Australia Catch-and-Effort disaggregated according to IOTC standards.
Fishery Period Species Details of activity Sources Changes in data	Longline fishery of Japan 2009-10 Sharks First report of catch-and-effort for some species of sharks: blue shark, mako sharks, and porbeagle IOTC Liaison Officer Japan New catch-and-effort data input in the IOTC database
Fishery Period Species Details of activity Sources Changes in data	Longline fishery of Philippines 2010 Sharks First report of catch-and-effort for some species of sharks: blue shark, shortfin mako shark IOTC Liaison Officer Philippines New catch-and-effort data input in the IOTC database
Fishery Period Species Details of activity Sources Changes in data	Longline fishery of Korea Rep. 2010 Sharks First report of catch-and-effort for some species of sharks: blue shark, mako sharks, and porbeagle IOTC Liaison Officer Korea Rep. New catch-and-effort data input in the IOTC database
Fishery Period Species Details of activity Sources Changes in data	Longline fishery of EU-Portugal, and EU-United Kingdom 2010 Sharks First report of catch-and-effort for some species of sharks: blue shark, mako sharks, silky shark IOTC Liaison Officer EU New catch-and-effort data input in the IOTC database
Fishery Period Species Details of activity Sources Changes in data	All fisheries 1950-2010 Tropical tunas, albacore and swordfish Catches per month and 5 degrees square grid raised to total catches (IOTC Executive Summaries) IOTC Database; Background information Information prepared for the WPTT and WPB; no new data input

D/ Size frequency	
Fishery Period Species Details of activity Sources Changes in data	Fresh-tuna longline fisheries of Taiwan,China 2010 Yellowfin tuna, Bigeye tuna, Swordfish, Albacore Size data provided for the first time Internet New size data input in the IOTC database
Fishery Period Species Details of activity Sources Changes in data	Longline fishery of EU-Portugal 2001-10 Swordfish First report of size frequency data for swordfish IOTC Liaison Officer EU New size frequency data input in the IOTC database
Fishery Period Species Details of activity Sources Changes in data	Longline fishery of Korea Rep. 2010 Sharks First report of size data for some species of sharks: blue shark, mako sharks, and porbeagle IOTC Liaison Officer Korea Rep. New catch-and-effort data input in the IOTC database
Fishery Period Species Details of activity Sources Changes in data	All 1950-2010 Tropical tunas, albacore and swordfish Building of Catch-At-Size and Catch-At-Age matrices IOTC Database; Background information Information prepared for the WPTT, WPB, WPTeT, and WPDCS; 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 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, 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 other initiatives in the region (e.g. South West Indian Ocean Fisheries Project, Bay of Bengal Large Marine Ecosystem Project, etc.), concerning countries that participate on these initiatives to assess the way in which the statistics for such countries can be improved. The Secretariat to assist countries that have not completed the questionnaire on statistical systems, sent in 2010, to complete it and present the results to the WPDCS. The IOTC Secretariat to assist countries in the implementation of sampling for their coastal fisheries, to cover a minimum of 5% of the vessel activities. This to be carried out using funding from the IOTC-OFCE Project, IOTC or other donors. The IOTC Secretariat to assist countries in the implementation of observer programmes for their industrial fisheries, in particular through the organization of training sessions and workshops. See also Box 2
Reason/s Fishery/ies Period Species Proposed actions	Statistics probably available at the country level but not reported India (longline), United Arab Emirates 1950 to date Mainly tropical tunas and neritic tunas Countries concerned to report the data available to the Secretariat The Secretariat to follow-up with these countries See also Box 1
<b>2-. Statistics not fully available by gear and/or species</b>	
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 IOTC Secretariat to assist countries to strengthen their sampling systems to be able to produce estimates as per IOTC standards, where required. 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	<p>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</p> <p>The Secretariat to assist countries that have not completed the questionnaire on statistical systems, sent in 2009, to complete it and present the results to the WPDCS. The Secretariat to identify the fleets for which important shark catches or other by-catches have been unreported over the years on the basis of the above or other information existing</p> <p>The IOTC Secretariat to assist countries in the implementation of sampling for their coastal fisheries, to cover a minimum of 5% of the vessel activities. This to be carried out using funding from the IOTC-OFCE Project, IOTC or other donors.</p> <p>The IOTC Secretariat to assist countries in the implementation of observer programmes for their industrial fisheries, in particular through the organization of training sessions and workshops.</p>
2-. Statistics not available by gear and/or species	
Reason/s Fishery/ies Period Species Proposed actions	<p>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</p> <p>The Secretariat to identify the deficiencies in data collection and data processing in the countries concerned and, where required, to assist countries in the implementation of observer programmes for their industrial fisheries, in particular through the organization of training sessions and workshops.</p>
C/ Discard levels	
1-. Statistics not available from the flag country or highly aggregated by gear and/or species	
Reason/s Fishery/ies Period Species Proposed actions	<p>Most of the discards are unreported and when reported they are usually incomplete and highly aggregated All, especially industrial fleets and oceanic gillnets (Pakistan and Iran) 1952 to date Undersized or spoiled tunas (tropical tunas), Sharks, low-value or spoiled billfishes (sailfish, short-billed spearfish) and other fish species Countries concerned to collect data on industrial fisheries through observer programs</p> <p>The Secretariat to identify the fleets having high levels of discards and, where required, to assist countries in the implementation of observer programmes for their industrial fisheries, in particular through the organization of training sessions and workshops.</p>

D/ Catch-and-Effort and Size frequency 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, and Deep-freezing longliners from India (CE+SF) and driftnet fishery of Pakistan (CE, SF) Fresh tuna longliners from India (CE+SF), Malaysia (CE, SF) Industrial purse seiners from the EC-France and Seychelles (FADs and supplies) Non-reporting longline fleets (NEI) 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 for fleets for 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, and Oceanic gillnets from Iran Longliners from Indonesia (CE, SF), and Malaysia (CE, SF) 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 assist countries that have not completed the questionnaire on statistical systems, sent in 2009, to complete it and present the results to the WPDCS. The IOTC Secretariat to assist countries in the implementation of sampling for their coastal fisheries, to cover a minimum of 5% of the vessel activities. This to be carried out using funding from the IOTC-OFCE Project, IOTC or other donors. The IOTC Secretariat to assist countries in the implementation of observer programmes for their industrial fisheries, in particular through the organization of training sessions and workshops.
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 India, purse seine fisheries of Iran (CE+SF), and gillnet/longline fishery of Sri Lanka (CE) 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 Japan (SF), South Korea (SF) and China (SF) Purse seiners of Thailand (SF) Various, notably in recent years Tropical tunas, billfish and albacore Countries concerned to increase sampling effort/coverage
Reason/s Fishery/ies Period Species Proposed actions	SF statistics not reported by IOTC standards (5° square grid and month) Longliners of Japan (SF up to 2008) and Taiwan,China (SF up to 2006) Complete time-series Tropical tunas, temperate tunas, billfish and albacore Japan and Taiwan,China to provide size frequency data by 5° square grid and month (instead of 10°Lat-20°Lon and quarter), where required

#### 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

During 2009, the Secretariat participated in a study to estimate **input-fishing capacity** for the fleets fishing for IOTC species in the Indian Ocean during 2006-08; the results of this study were presented to the IOTC Scientific Committee in 2009. The estimate was not revised in 2010.

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:

- Numbers of foreign fishing craft operated, by gear and year of operation;
- Identification, dimensions and other vessels attributes, by vessel, for those foreign vessels that owed fishing licenses to operate within the Economic Exclusive Zone (EEZ) of the reporting country (as specified in IOTC Resolution 10/08);
- Identification and total catches unloaded, by species and vessel, for those foreign vessels using ports in the territory of the reporting country(as specified in IOTC Resolution 05/03);
- Identification and total catches transhipped, by species and vessel, for vessels participating in the IOTC Transhipment Programme(as specified in IOTC Resolution 08/02);
- Data provided by other parties, including data on the imports of tuna for canning, by species and vessel, from processors cooperating with the International Seafood Sustainability Foundation (ISSF) or other initiatives.

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

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 know for Pakistan.

**Offshore gillnet/longline fishery of Sri Lanka:** The number of offshore gillnet/longline vessels that operate under the flag of Sri Lanka is well known.

**Pole-and-line fishery of Maldives:** The number of pole-and-line vessels that operate under the flag of Maldives is well known.

### ***Main Progress Achieved during 2011***

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

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

<b>DB</b>	<b>FLAG/S</b>	<b>SOURCES</b>	<b>PERIOD</b>	<b>DETAILS</b>	<b>MAIN RESULTS</b>
<b>FC</b>	Non reporting DWFNs	IOTC Active Vessels List	2010	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	2010	Review to complete the number of fresh tuna longliners operating in the Indian Ocean	Number fresh tuna longliners input: Around 1,000 boats in all in recent years. Current numbers are decreasing.
	Fresh-tuna longliners from Taiwan,China	Active vessel data downloaded from the internet	2009-10	Number of longliners operating in the Indian Ocean published	Numbers of deep-freezing and fresh-tuna longliners input
<b>AV</b>	Fresh-tuna longliners from Taiwan,China	Data downloaded from the internet	2009-10	Number of longliners operating in the Indian Ocean reviewed and published	Drop in the number of large-scale and small-scale longline vessels in operation
	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 Imports from canning factories (ISSF)	2009-10	Reporting of foreign tuna fleets putting in to ports, licensed to operate within the EEZ of these countries, participating on the IOTC Transshipment Programme or ISSF	New vessel and activity records input
	All industrial fleets and oceanic fleets	IOTC Active vessel list IOTC vessel unloading list IOTC Authorized Vessel List IOTC-OFCF Project 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 in the future.

**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 information on the activities of foreign vessels 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	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 and other countries	Recent years	Fleets not fully monitored by the flag countries	Promote compliance by the flag states concerned Promote the collection of information on the activities of foreign vessels from IOTC CPCs (fresh-tuna longliners)
	Information incomplete or inconsistent	Indonesia, India, Malaysia	Recent years	Reports from different sources including the numbers of active vessels are conflicting (Malaysia) 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
Length-weight-sex data of Bigeye species caught by longliners from the India	Not available	2003-09	IOTC-2010-WPTT-41
Length-sex data of Yellowfin species caught by Purse seine fisheries in Western and Central Indian Ocean	Not available	2009	IRD-Seychelles (IOTC-2010-WPTT-48)
Length-weight-sex data of sharks species caught by Soviet longliners in Indian Ocean	Not Available	1961-89	IRD France (IOTC-2009-WPEB-06)

### b. Observer data

The Secretariat has received limited information concerning the past and current sub-regional and national observer programmes in the Indian Ocean, the latest falling under the IOTC Regional Observer Scheme (cf. Resolution 11/04 *on a Regional Observer Scheme*).

The observer programmes and information available are summarized in Tables 6-7. Table 6 presents the countries having authorized vessels in the IOTC Area, and those that reported fishing activities during 2010. A summary of the information available is presented and this information is extended in Table 7, which provides further details about on-going observer programmes.

In 2009, 2010 and 2011, the IOTC adopted Resolutions 09/04, 10/04 and 11/04 *on a Regional Observer Scheme*. The Resolutions make provision for a Regional Observer Scheme, based on national implementation, to start on 1<sup>st</sup> July 2010.

The objective of the IOTC observer scheme shall be to sample catches and collect scientific data related to the fisheries for tuna and tuna-like species in the IOTC area.

At least 5 % of the number of operations/sets for each gear type by the fleet of each CPC while fishing in the IOTC Area of 24 meters overall length and over, and under 24 meters if they fish outside their EEZs shall be covered by this observer<sup>6</sup> scheme. For vessels less than 24 meters if they fish outside their EEZ, the above mentioned coverage should be achieved progressively by January 2013.

<sup>6</sup>Observer: a person that collects information on board fishing vessels. Observer programmes can be used for quantifying species composition of target species, bycatch, by-products and dead discards, collecting tag returns, etc.

**Table 6: IOTC CPCs having vessels authorized to operate in the IOTC Area that reported on activity during 2010**

Country	Active Vessels LOA $\geq$ 24m or High Seas vessels				# Fishing events	# observer reports	# Accredit. observers	Remarks
	Long line	Purse Seine	Gillnet	Bait boat				
Australia	4	9				3		To be reported at the WPDCS
Belize	5							
China Taiwan, China	20 562					1		
Comoros							7	All small-scale
Eritrea								No information
European Union	47	21				1	3	EU-Portugal EU-France EU-Spain EU-UK
France-OT		5					15	No information
UK-OT								All small-scale
Guinea	3							No information; activity unknown
Indonesia	996							No information
India	53							No information; number of longliners uncertain
Iran		8	863					No observer program
Japan	83	1					14	
Kenya	1						5	Developing an observer program
Korea, Rep.	13						3	Since 2002
Sri Lanka			3346					No information; refers to vessels using gillnets and longlines
Madagascar	3						8	
Maldives				459				No observer program
Mauritius	4						8	Developing an observer program
Malaysia	41	1						No information; number of longliners uncertain
Oman	48							No information
Pakistan			10					No information
Philippines	7							No information
Sudan								No information
Senegal	3							No activity
Sierra Leone								No information; activity unknown
Seychelles	35	9					7	Developing an observer program
Thailand	2	4						No information
Tanzania	3							No information
Vanuatu	4							No information
South Africa	23							No information

The Secretariat held a workshop in May 2010 in order to set the minimum data requirements for observer projects under the framework of the scheme and to develop an IOTC Observer Manual, forms and an Observer Trip Report Template for the reporting of the collected data.

During this workshop, several on-going observer projects, or progressing initiatives were presented including:

- The South West Indian Ocean Fisheries Project (SWIOFP)
- The Fisheries Regional Monitoring Programme of the Indian Ocean Commission
- The 'Observateurs des Pêches' Project (OBSPEC) of the 'Terres Australes et Antarctiques Françaises' (TAAF)

So far, the Secretariat has received lists of accredited observers from 6 CPCs and 2 observer trip reports (for more information on the Regional Observer Scheme, please see document IOTC-2011-WPEB07-09 and IOTC-2011-SC14-34).

**Table 7:** Existing 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 List of accredited observers submitted
Spanish surface longline	2005	Weight- round weight – fin weight of sharks	IOTC-2008-WPEB-08 And raw data
Portugal surface longline	2011		List of accredited observers submitted 1 observer trip report submitted
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 List of accredited observers submitted
European Community-PS <sup>7</sup>	2003 to date		Observ_WPTT-03-06 Partial list of accredited observers submitted
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 1 observer trip report submitted
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
Madagascar	2011		List of accredited observers submitted
Comoros	2011		List of accredited observers submitted
France(OT)	2011		List of accredited observers submitted

### c. Field sampling

IOTC Resolution 11/04 contains also provisions covering the monitoring of artisanal fisheries: *“The number of the artisanal fishing vessels landings shall also be monitored at the landing place by field samplers<sup>8</sup>. The indicative level of the coverage of the artisanal fishing vessels should progressively increase towards 5% of the total levels of vessel activity (i.e. total number of vessel trips or total number of vessels active).”*

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

### d. Tagging data

Since 2002, the Secretariat has been coordinating and supervising the Indian Ocean Tuna Tagging Programme (IOTTP). This programme was a combination of a main tagging project, the Regional Tuna Tagging Project in the Indian Ocean (RTTP-IO), funded by the EU (9<sup>th</sup> EDF, DG-Dev), and several pilot and small-scale tuna tagging projects, funded by the DG-Fish (ex DG-Mare) and the government of Japan. During those projects, more than 200,000 tropical tuna -skipjack, yellowfin and bigeye - were tagged and released in the whole Indian Ocean. Tag recovery schemes have been developed and implemented in most of the coastal countries and in the main distant water fishing nations in order to ensure the reporting of a maximum of recaptured tagged tunas. As a result, more than 31,000 tuna have been recaptured and reported to the Secretariat, which represent a global recovery rate of 15.77%.

<sup>7</sup> The observer programme onboard the European purse-seine fleet has been on hold from 2008 to 2010 due to the piracy activities in the western Indian Ocean, and is resuming slowly in 2011.

<sup>8</sup> Field sampler: a person that collects information on land during the unloading of fishing vessels. Field sampling programmes can be used for quantifying catch, retained bycatch, collecting tag returns, etc.

The specific objective of this programme was to reinforce the scientific knowledge of tropical tuna stocks and the rate of exploitation in the Indian Ocean by obtaining the crucial model parameters for stock assessment.

All the tagging and recapture data is hosted at IOTC 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. The data of the small-scale and pilot projects is yet to be reviewed and computerized in the same database. There are also plans to include the data from past projects, including Jamarc and Maldives, within the same system.

Tagging data contains the following information:

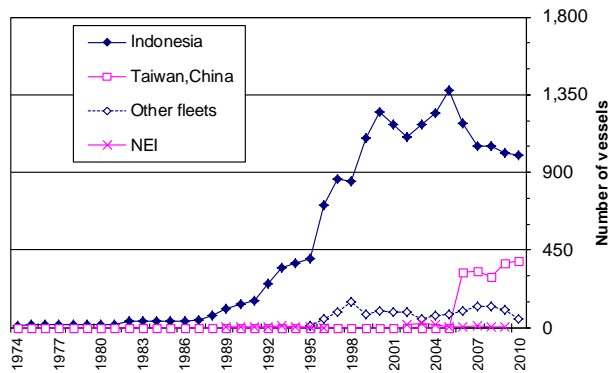
- Tag series and tag number
- Species
- Fork length
- Data and position of tagging
- Type of tag
- Tagger
- Gear
- Information on the school
- Quality codes
- ...

Recovery data contains the following information:

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

The tagging data generated by the RTTP-IO and the broader IOTTP, were used for the yellowfin assessment in 2008, 2009, 2010 and 2011, for the bigeye assessment in 2010 and for the first time in a skipjack assessment in 2011. Growth curves for the three species and natural mortality rates have also been derived from the tagging data, and were updated for some species (growth for yellowfin and skipjack, exploitation rate and natural mortality for skipjack). These studies will be further refined in 2012 for the Tuna Tagging Symposium that will be held in November 2012 in Mauritius.

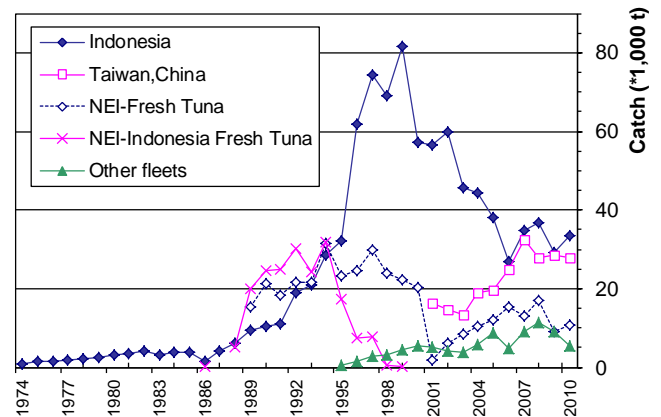
In 2011, the Secretariat has worked with 2 consultants in order to clean and validate the tagging and recovery data from the Maldivian small-scale projects, and to incorporate all the data generated by the small-scale projects into the main database developed for the RTTP-IO. The Secretariat is also currently working on the validation of the other datasets from the pilot and small-scale project. Finally, historical tagging data, generated during past tagging project (e.g. in Maldives, during the second Projet Régional Thonier (PTR2), by Japan...) should also be incorporated in the tagging database at IOTC.

**BOX1: ESTIMATION OF CATCHES OF NON-REPORTING FLEETS****A/ FRESH TUNA LONGLINE FLEETS****Figure 6: Number of fresh-tuna longliners operating in the Indian Ocean from 1974-2010**

2008-10 numbers are preliminary

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

'NEI' includes Bolivia, Equatorial Guinea and Honduras

**Figure 7: Estimated catches in the Indian Ocean of fresh tuna longliners by flag country (1974-2010)**

2009-10 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 6). 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 6-7) 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 8).

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.

The catches of albacore estimated using port sampling data in Indonesia are likely to be incomplete, not accounting for all vessel activities. Albacore is generally preserved frozen and may be unloaded selectively at-sea, to cargo freezers, or in land, to freezing plants; at present the DGCF of Indonesia collects only samples of fresh or frozen fish unloaded through processing plants. For this reason, the IOTC Secretariat used alternative datasets to estimate catches of albacore for Indonesian longliners, including export statistics, from DINAS Perikanan offices in Indonesia, and data on exports of albacore provided by canning factories under the ISSF. The catches of albacore estimated are much higher than previous estimates, especially since 2003 (Figure 5)

**India** has never reported complete catches for its 75-130 commercial longliners, which 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. At present, there is 53 longliners flagged in India, but this figure is uncertain as the Secretariat has received reports from various sources and these reports are conflicting.

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, Taiwan,China (since 2007), 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 (10,000 t are estimated for non-reporting fresh-tuna vessels), mostly yellowfin tuna (YFT), albacore (ALB) and bigeye tuna (BET) (Figure 9).

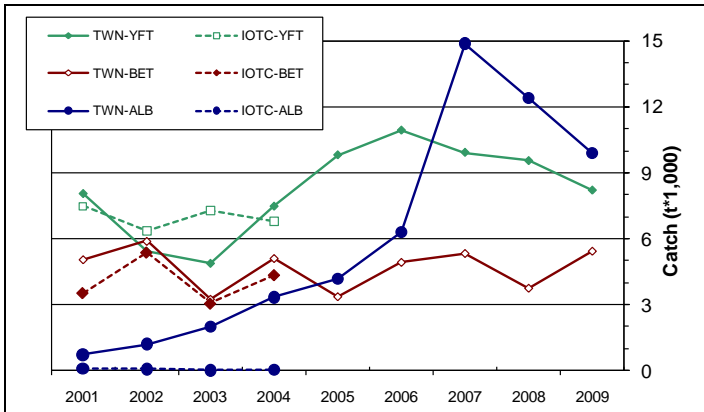


Figure 8: Catches available for Taiwanese fresh-tuna longliners for 2001-09 versus the catches previously estimated by the Secretariat

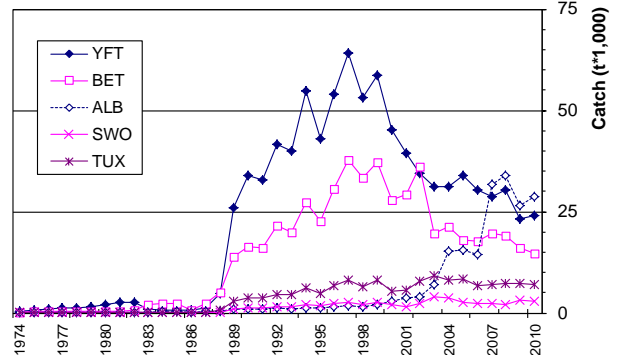
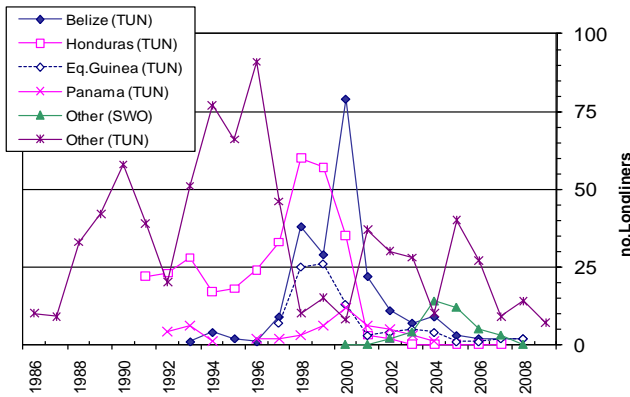


Figure 9: Total catches in the Indian Ocean estimated for fresh tuna longline fleets, by year and species

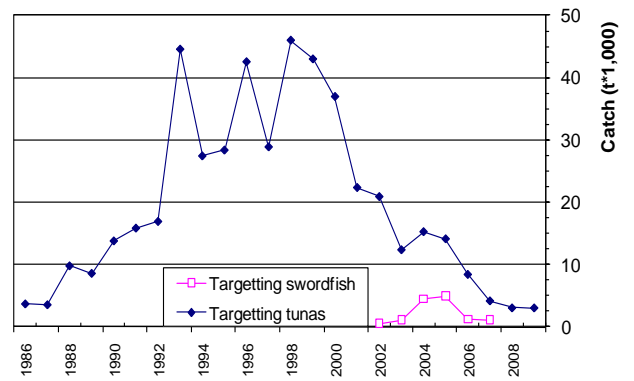
**B/ NON REPORTING DEEP-FREEZING LONGLINE FLEETS**

Figure 10: Number of non-reporting deep-freezing longliners estimated to operate in the Indian Ocean, by flag country and year



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

Figure 11: 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 10). The main sources for these data are the fishing craft statistics and the IOTC lists of active vessels. The catches estimated for 2009 are still preliminary (Figures 11-12). 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 20 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-

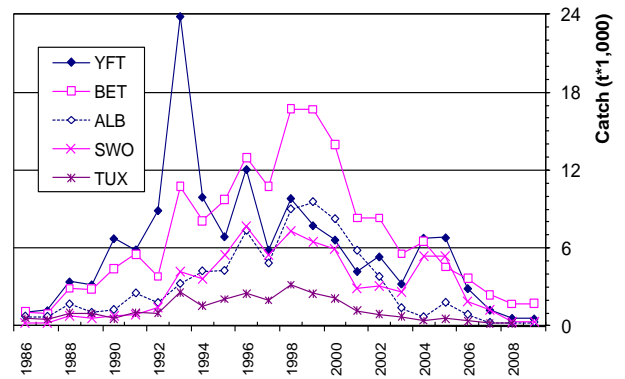


Figure 12: Total catches by species in the Indian Ocean estimated for non-reporting deep-freezing longline fleets

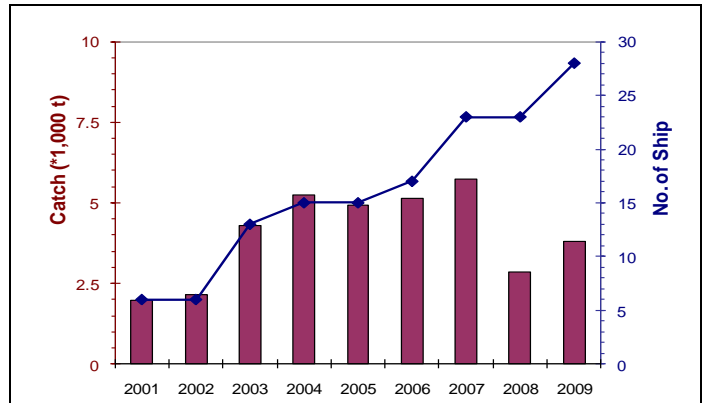
reporting countries operate in a similar manner to vessels from Taiwan, China or Spain, respectively. Although there are many indications to support this, the assumption that the vessels from non-reporting countries are exploiting the same time-area strata than the Taiwanese or Spanish over time could 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 (Figure 11). 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 13) 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 13: 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**

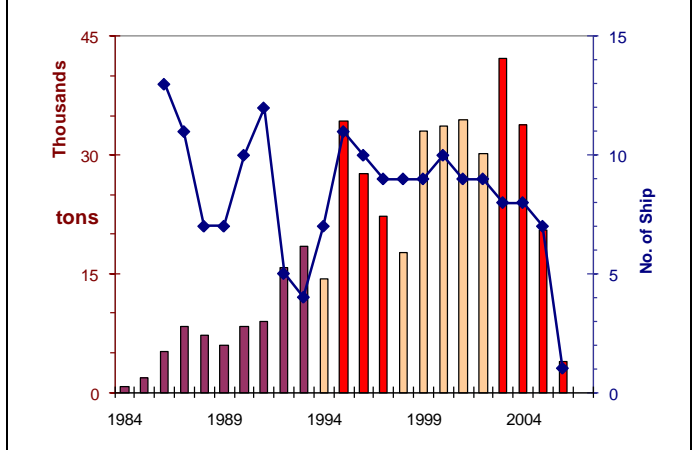
Between 1 and 11 non-reporting purse seiners operated in the Indian Ocean between 1995 and 2006 under several flags. The catches of these vessels, mainly of skipjack, ranged between 30,000 and 40,000 tonnes (Figure 14).

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>9</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 14: 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>9</sup> Catches for 1997 and 2003 were also provided although only for several months.

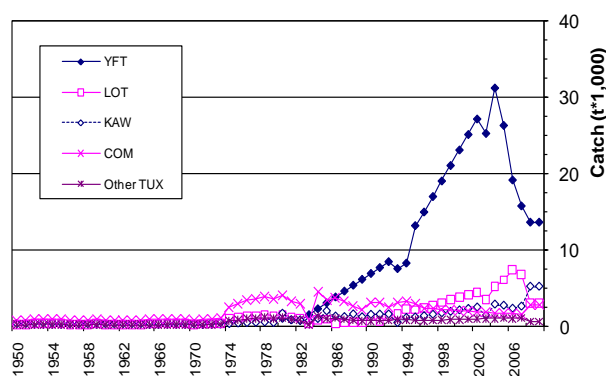
## BOX2: NO STATISTICAL SYSTEM: YEMEN AND MADAGASCAR

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).

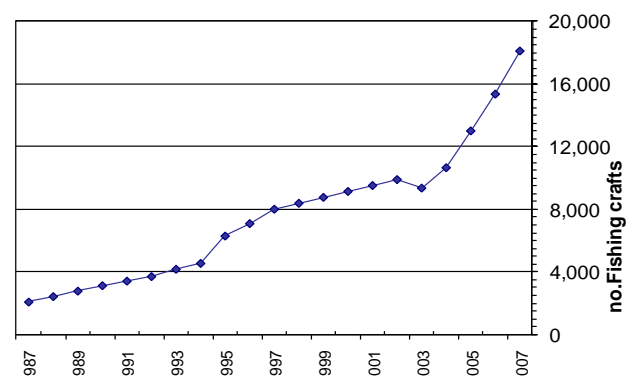
In 2007, the Secretariat revised the catch estimates for artisanal boats operating in Yemen for 2003-2006, notably those for yellowfin tuna, longtail tuna, kawakawa and narrow-barred Spanish mackerel. The new estimates are probably more realistic than the previous although they are still uncertain due 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. No catches have been estimated for 2008-10 as yet, the catches in the IOTC Database representing a repetition of those that were estimated for 2007.

The IOTC-OCFC 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. The situation in Yemen has not improved since then.

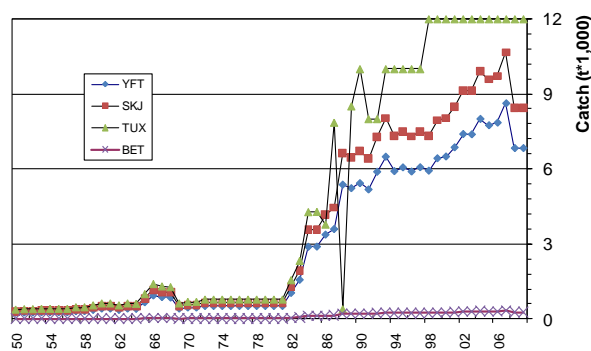


**Figure 15: Total catches per species in the Indian Ocean estimated for the artisanal fishery operating in Yemen**



**Figure 16: Total number of crafts estimated for the artisanal fishery operating in Yemen**

**Madagascar** (Figure 17) have never reported statistics to the IOTC and have indicated in several occasions that it does not have a statistical system for the collection of data from its fisheries. The IOTC Secretariat has been using the catches published by the FAO for Madagascar but these figures are considered highly unreliable.



**Figure 17: Total catches in the Indian Ocean for the artisanal fishery operating in Madagascar, by species and year**

In 2010 the IOTC Secretariat conducted a review intended to break the catches of marine fish that **Madagascar** reported to the FAO, in aggregated form, by species. The Secretariat used information from other fisheries using troll lines in the region, including Comoros and India. The ratio catches of species other than tropical tunas, especially narrow-barred Spanish Mackerel (COM), catches of tropical tunas from other fisheries was used to derive catches of yellowfin tuna (YFT), skipjack tuna (SKJ) and bigeye tuna (BET) for Madagascar. In addition, the catches of COM were broken by species, on the assumption that they contained catches for more than one species of neritic tuna. The combined catches of yellowfin tuna and skipjack tuna estimated have been around 15,000 tons in recent years (Figure 18). The catches estimated are considered highly uncertain.



### BOX3: 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
- Incidental catches are not recorded

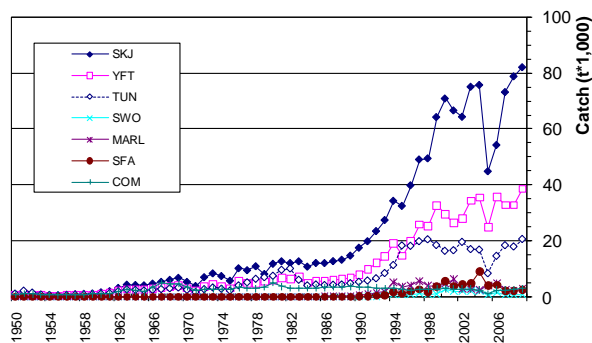
Although the IOTC/OFCF/NARA sampling implemented in 2005 did not cover all fisheries the catches estimated for 2005 and 2006 using this information are believed to be more precise.

The catches for 2007-10 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, in particular for the coastal component

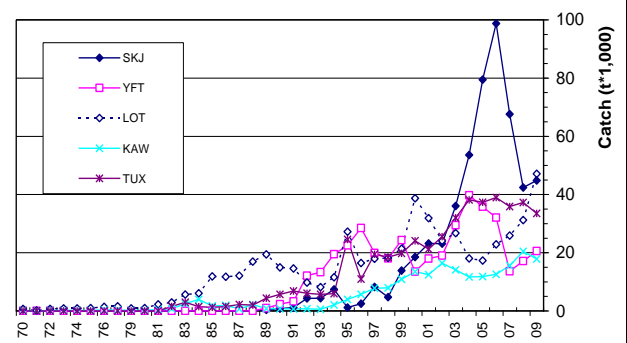
Figure 18 shows the new catches estimated for the gillnet and longline fishery of Sri Lanka in 2005-06 versus the catches in the IOTC database before and after this period.

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.

In order to address these concerns, in 2011 the IOTC-OFCF Project agreed to assist the Statistical Unit of the Ministry of Fisheries and Aquatic Resources of Sri Lanka towards strengthening of data management. The IOTC-OFCF Project provided funds to cover for the services of a Consultant, which will develop a new Fisheries Centralized Database System, and additional funds to purchasing the necessary hardware and software. Additional plans for the IOTC Secretariat to assist the National Aquatic Resources Research and Development Centre (NARA) in the strengthening of sampling of coastal and offshore fisheries had to be cancelled due to lack of response from NARA.



**Figure 18: 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 (1950-2009)**

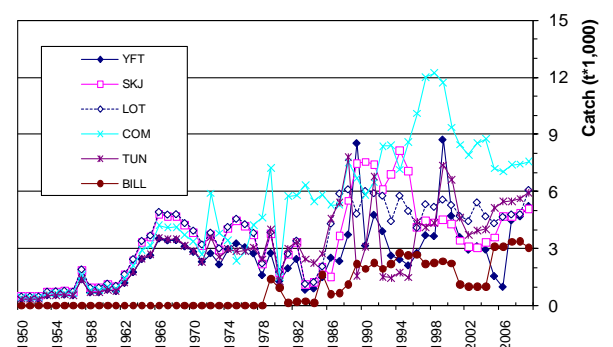


**Figure 19: Total catches per species in the Indian Ocean estimated for the gillnet fishery operating in Iran for 1970-2009**

**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 the catches reported by Iran are considered good quality, at least for target species, those reported by Pakistan and Sri Lanka are uncertain.

Of particular concern is the lack of catches-and-effort from these fleets. 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 850 gillnet vessels from Iran and more than 3,300 gillnet and longline vessels from Sri Lanka have been operating on the high seas in recent years. The numbers of gillnet vessels from Pakistan that operate on the high seas are unknown.

In addition, none of these countries have reported levels of bycatch for their fisheries, levels that are presumed high on gillnet fisheries.



**Figure 23: Total catches per species in the Indian Ocean estimated for the gillnet fishery operating in Pakistan for 1950-2009**