

STATUS OF IOTC DATABASES FOR BILLFISH SPECIES

IOTC Secretariat

Abstract

This document reviews the status of the information available on billfishes in the databases at the IOTC Secretariat. The review covers data on nominal catches, catch-and-effort, and size-frequency data.

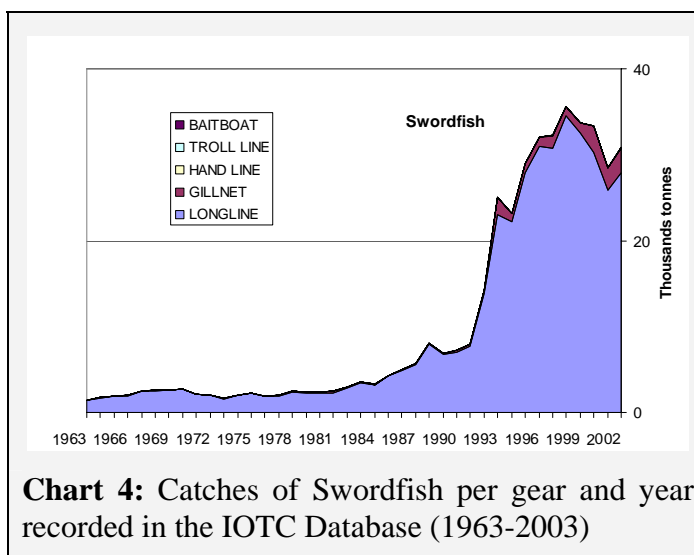
Catch trends (Nominal Catch Database)

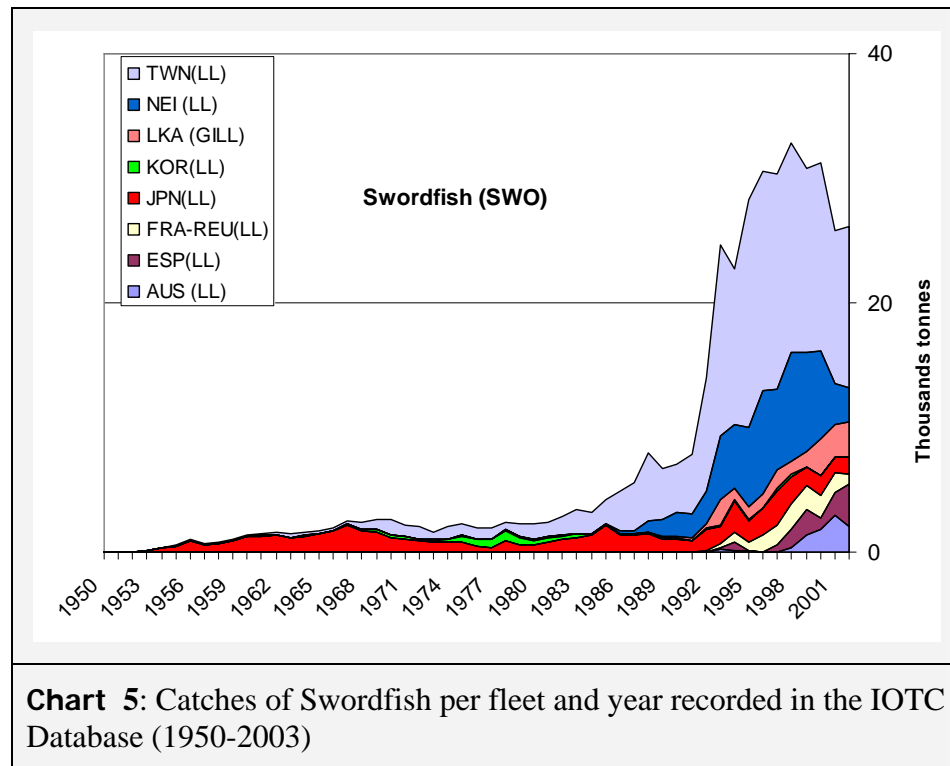
Swordfish (SWO)

Swordfish (Annex I: Table 1, Chart 1) are caught mainly under drifting longlines (95%) with remaining catches recorded under gillnets (5%) and other gears (**Chart 4**). Swordfish were mainly by-catch of industrial longline fisheries before the early nineties with catches slightly increasing from 1950 to 1990 proportionally to the increase in the catches of target species (tropical and temperate tunas).

The catches of Swordfish dramatically increased since to a peak of 36,000 tonnes in 1998, the year in which the maximum catch for the species was recorded.

Current catch levels are around 30,000 tonnes. The change in target species from tunas to swordfish by part of the Taiwanese fleet along with the development of longline fisheries in the region (Australia, Reunion island, Seychelles and Mauritius) and the arrival of longline fleets from the Atlantic Ocean (Portugal, Spain), all targeting swordfish, are the main reasons for this dramatic increase.





Longliners from **Taiwan,China** have been operating in the Indian Ocean since 1954, with catches of Swordfish never higher than 1,000 tonnes until 1978 besides a peak recorded in 1970. Swordfish catches increased gradually from 1,000 in 1978 to 4,000 tonnes in 1991. The catches increased dramatically, in the following decade as the species was targeted by this fleet with total catches recorded amounting to more than 15,000 tonnes. After a peak of 18,000 tonnes recorded in 1995, catches dropped to 13,000 tonnes in 2002 (**Chart 5**).

Other fleets for which important catches of Swordfish have been recorded in recent years are a fleet of deep-freezing and fresh tuna longliners operating under flags of non-reporting countries (**NEI**), with current catches of Swordfish between 1,500 t and 9,000 t (**Chart 5**).

The catches of Swordfish of industrial longliners from **Japan** (**Chart 5**) increased proportionally to those of yellowfin tuna, target species of this fleet during the first years of the fishery to remain quite stable until the early nineties. The average catches amounted 1,500 tonnes during the last two decades and catches over 2,500 tonnes recorded in 1994 and 1997.

Important catches of Swordfish have been recorded in recent years in **Sri Lanka** mostly by boats using a combination of drifting gillnet and longline have been recorded during the last decade. Swordfish catches have fluctuated between 1,000 and 3,000 tonnes during the last decade (**Chart 5**).

During the last decade, several domestic longline fisheries targeting swordfish started to operate in Reunion (**France**), **Australia**, **the Seychelles** and more recently **Mauritius**.

Spanish and Portuguese longliners coming from the Atlantic Ocean have been operating since the early 90s.

The catches of Albacore of longliners from the **Republic of Korea**, recorded since 1965, have never been above 1,000 t. The highest catches, 800 tonnes, were recorded in 1978 (**Chart 5**).

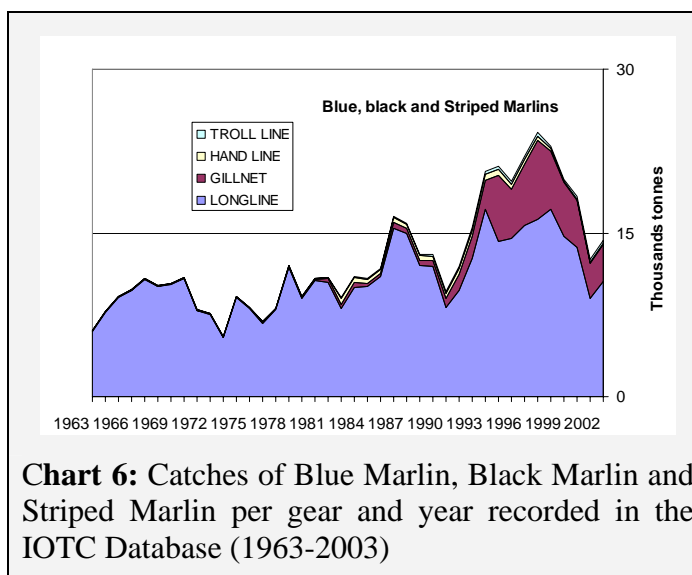
Marlins: Blue Marlin (BUM), Black Marlin (BLM) and Striped Marlin (MLS)

Marlins (Annex I: Table 1, Chart 2) are caught mainly under drifting longlines (70%) and gillnets (20%) with remaining catches recorded under troll and hand lines (**Chart 6**). These species are by-catch of industrial and artisanal fisheries being only target of some sport fisheries in the region. The catches of Blue Marlin have ever been close to twice the catches of Black marlin or Striped Marlin.

Catch trends for the species are uneven, higher or lower depending on the reporting fleet and year. The catches of marlins under drifting longlines have been more or less stable over time with maximum catches recorded in 1998 (17,000 tonnes), as it is the case with the swordfish. Current catches are around 8,000 tonnes. Catches under drifting longliners have been recorded under Taiwan, Japan fleets and, recently, Indonesia and several IUU fleets.

The catches of marlins in Sri Lanka have been very important since the mid-eighties as a result of the development of a fishery using a combination of drifting gillnets and longlines. The highest catches (6,200 tonnes) were recorded in 1997 with current catches around 3,800 tonnes.

The reason why the catches of marlins dropped so dramatically in recent years is not fully known.

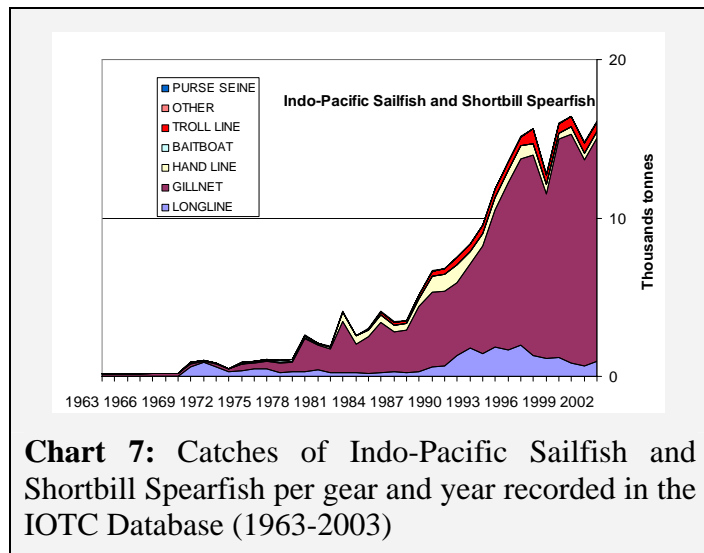


Indo-Pacific Sailfish (SFA) and Shortbill Spearfish (SSP)

Indo-Pacific Sailfish represent 90% of this group (Annex I: Table 1, Chart 3), this species is caught mainly under gillnets (80%) with remaining catches recorded under troll and hand lines (10%), longlines (7%) or other gears (**Chart 7**). All catches of Shortbill Spearfish are recorded under drifting longlines, although this species is probably bycatch of other artisanal fisheries and mislabelled or reported aggregated.

The catches of Sailfish have dramatically increased since the mid-eighties proportionally to the development of the gillnet / longline fishery in Sri Lanka.

Maximum catches were recorded in 2000 (16,500 tonnes) with current catches only slightly lower than those. The catches of both Sailfish and Shortbill Spearfish under drifting longlines do not show any specific trend with ups and downs over the years. These catches are thought mostly underreported due to both species being of scarce commercial value.



Revision of the IOTC databases

The Secretariat conducted several reviews of the NC database during 2003 and 2004. These revisions led to important changes in the estimates of catches of Sailfish (SFA) and Blue marlin (BUM) (Charts 9, 10) and, to a lesser extent, Black marlin (BLM) (Chart 11), Swordfish (SWO) (Chart 8), Striped marlin (MLS) and Shortbill spearfish (SSP) (Charts 13 to 14). The difference between 2004 and 2003 catch estimates originates mainly in a review conducted at the IOTC Secretariat aiming at assigning the catches not available per species in the IOTC database to the corresponding species (Chart 14). More details about this review can be found in a separate document (IOTC-2004-WPB-04-INFO1).

Chart 8: Swordfish catch estimates in 2004 *versus* catch estimates in 2003 and data from IOTC data base (1950-2002)

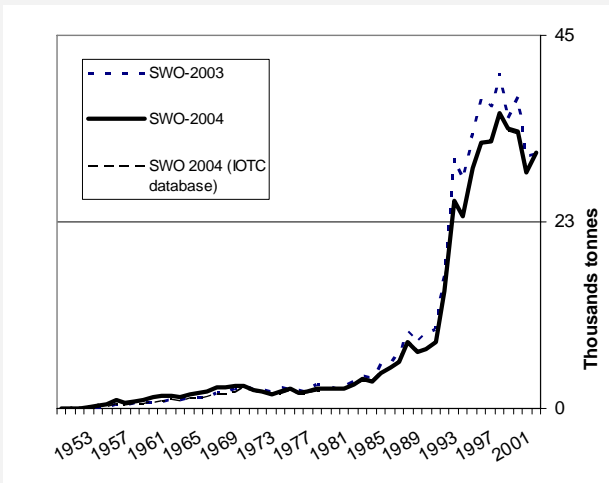


Chart 9: Sailfish catch estimates in 2004 *versus* catch estimates in 2003 and data from IOTC data base (1950-2002)

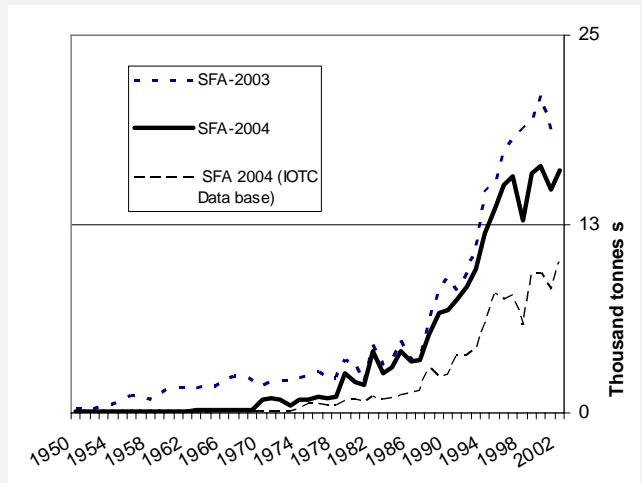


Chart 10: Blue Marlin catch estimates in 2004 *versus* catch estimates in 2003 and data from IOTC data base (1950-2002)

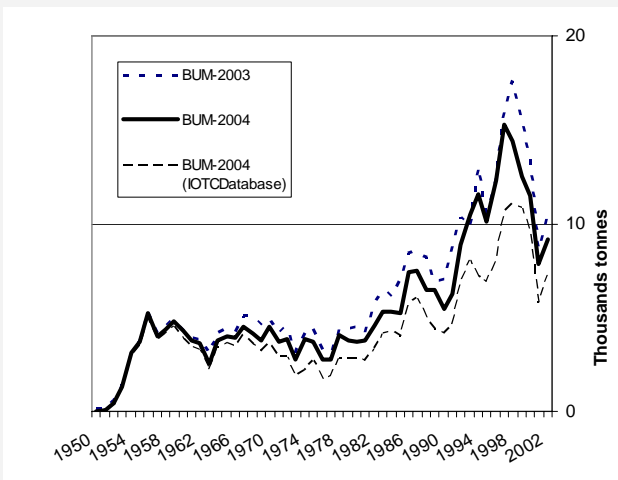


Chart 11: Black Marlin catch estimates in 2004 *versus* catch estimates in 2003 and data from IOTC data base (1950-2002)

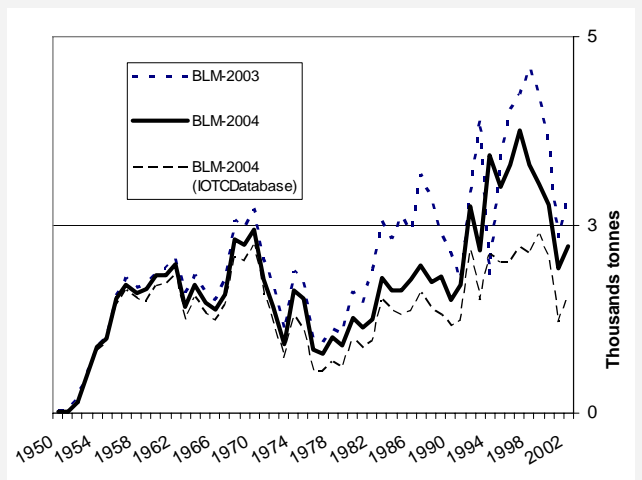


Chart 12: Striped Marlin catch estimates in 2004 *versus* catch estimates in 2003 and data from IOTC data base (1950-2002)

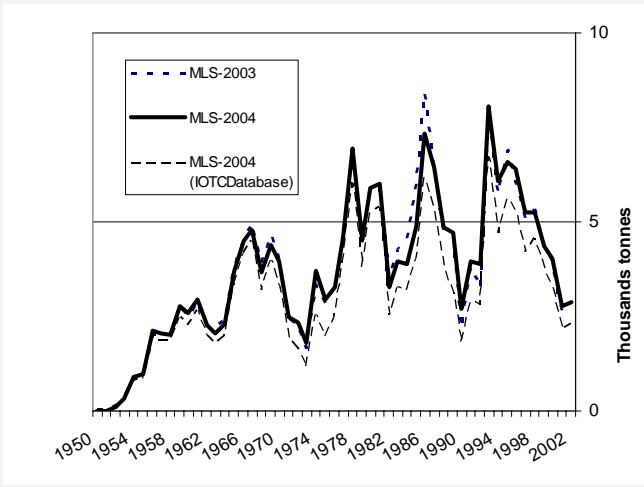


Chart 13: Shortbill spearfish catch estimates in 2004 *versus* catch estimates in 2003 and data from IOTC data base (1950-2002)

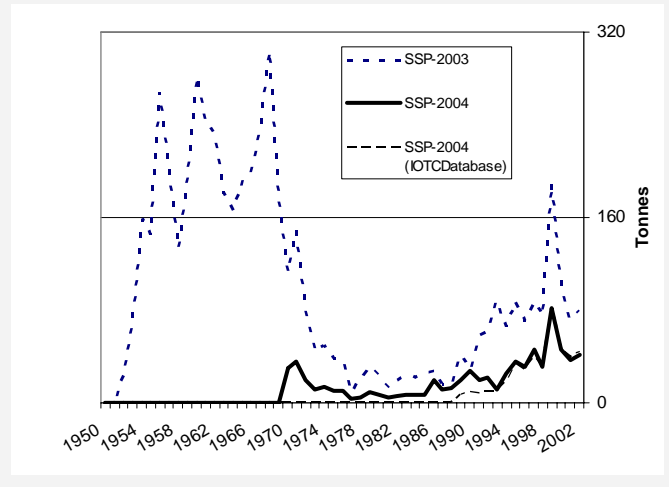
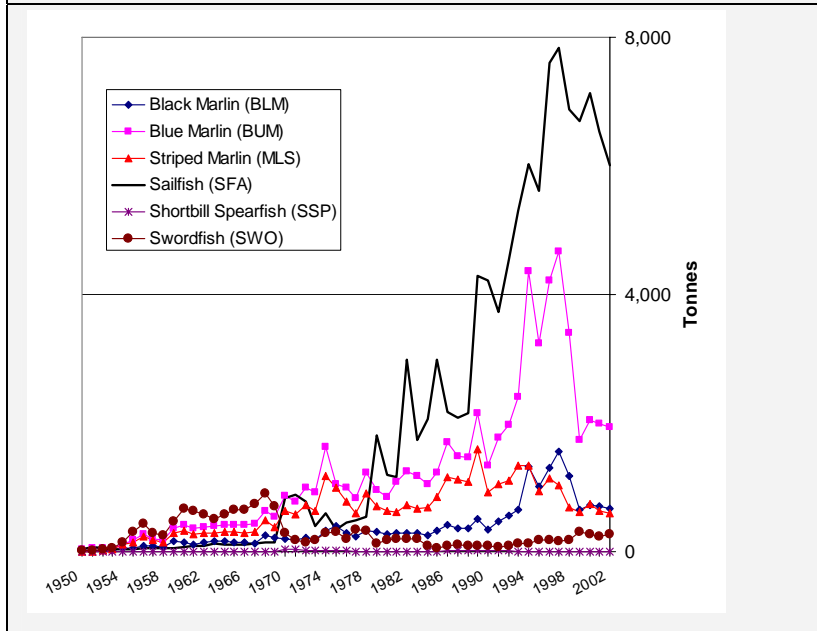


Chart 14: Disaggregated catches in 2004 : difference between the total catch disaggregated in 2004 and data from IOTC data base in 2004 (1950-2002)

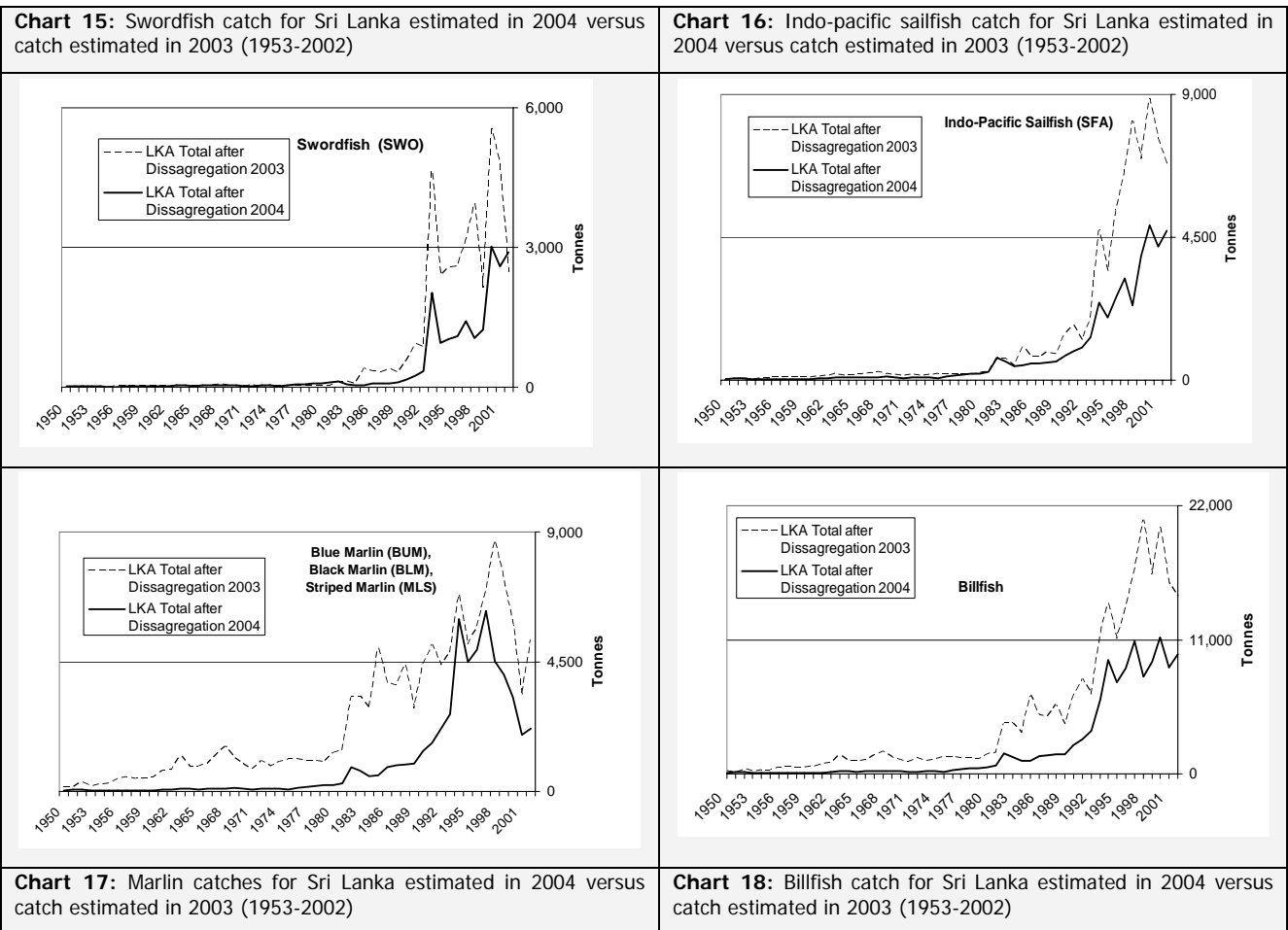


Data Availability and Data Quality

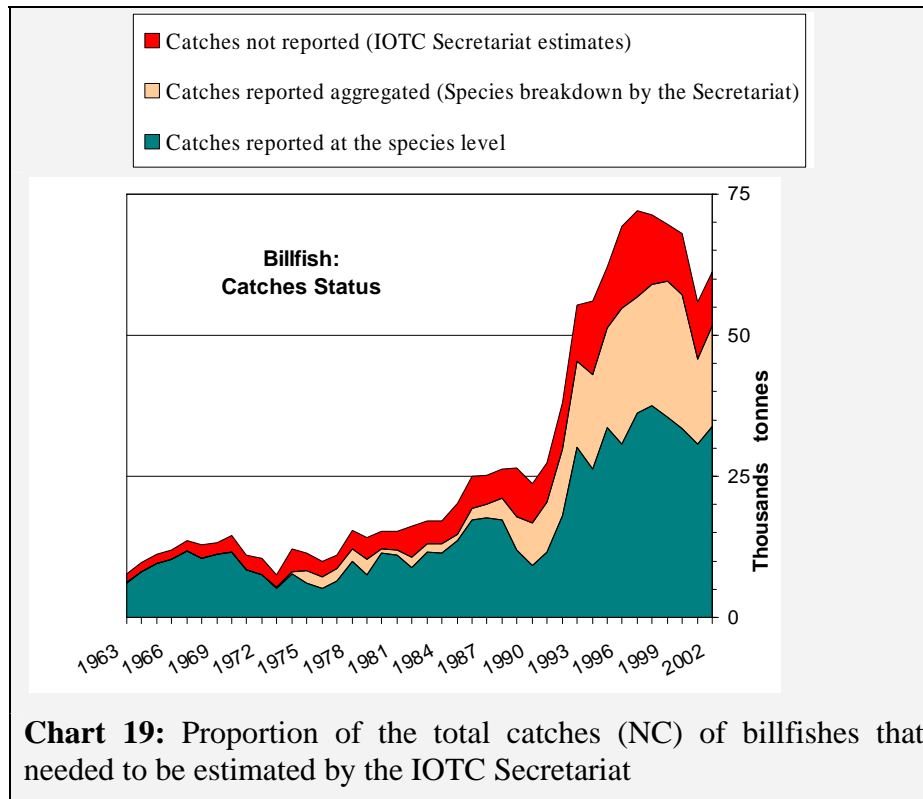
Most of the catches of swordfish and other billfish species had to be estimated for years prior to 1970 due to them not available or not recorded per species for fleets for which billfish species made up part of the catch. Nevertheless, billfish catches are only important for marlin species before that year.

Uncertainty may also occur with catches estimated for:

- Sri Lankan gillnet (and longline) fishery:** The catches series of billfish in Sri Lanka were re-estimated for 1950-2002 (**Chart 15 to 18**). The dramatic discrepancies between the different catch estimates produced in the country are of concern and make it very difficult any attempt to estimate catches. The new catches series estimated are, nevertheless, thought more accurate than the previous. The catches of Sri Lanka domestic fisheries, mainly gillnet, were re-estimated in 2004 for the period 1950-2002. The new catches of Swordfish, indo-Pacific Sailfish, Marlins estimated for Sri Lanka are lower than those recorded previously for the whole series. The new estimates are based on information collected through different missions by IOTC and OFCF staff to this country.



This process involved the estimation of catches amounting to as much as the 70% of the total catches estimated for the species in recent years (**Chart 19**). The changes in the catches referred mostly to Sailfish and, to a lesser extent, to Marlins.



- **Yemen gillnet fishery:** The information collected during several missions to Yemen by FAO staff indicates that gillnet catches in Yemen may be well up 40,000 tons per year, with important catches of yellowfin tuna recorded in current years. This figure is five times higher than that recorded in the FAO database, the only information available so far to the Secretariat.
- **Mozambique :** Swordfish and Indo-Pacific Sailfish Catches reported by Mozambique between 1983 and 2002 have been erased from the IOTC Database as those data referred to foreign fleets operating in the EEZ not to domestic fleets.
- **Fresh tuna longliners based in Indonesia:** The data collected since June 2002 has allowed the estimation of catches of longline vessels based in Bena for 2003. The new catch estimates differ from those obtained by using the previous catch estimation

procedure (CSIRO-RIMF sampling). Therefore, the catch series is expected to change once that new catches are estimated for 2003 (all previous estimates were based on the catches obtained through CSIRO-RIMF sampling in Benoa). The current catch series are, therefore, not thought fully accurate.

- **Other fresh tuna longline fleets:** Although the catches of fresh tuna longline ships based in different ports of the Indian Ocean were re-estimated from data coming from past or recent sampling schemes operated, the accuracy of the estimates is still far from complete, especially in the case of fleets operating from ports not covered by these schemes or past catches estimated on the basis of recent estimates, very far in time.
- **Deep-freezing longline fleets:** The Secretariat estimated new catches for 1992-2002 using new information collected during 2003. The catches are thought not too accurate due to the many assumptions made in estimating the total catches and species breakdown. A dramatic decrease in the number of vessels operating under flags of non-reporting countries has been recorded since 2001. The reason for this decrease is not fully known and changes in the catch estimates may occur as more information become available.

Swordfish (SWO)¹

Nominal Catch Data

The nominal catch data series of swordfish (SWO) is considered almost complete since 1970. The fleets catching most of the species have been reporting catch statistics since that year, with the only exception of catches of Illegal and/or Unregulated and/or Unreported (IUU) fleets (recorded as NEI- in the IOTC Database) that have always been estimated by the Secretariat.

The quality of the catches estimated for IUU fleets is thought poor due to the scarce information available on their activities (only the total number of vessels operating per year is available in most cases). The catches of several fresh tuna longline fleets operating in the Indian Ocean (Indonesia, Thailand, Malaysia, Sri Lanka and Maldives) are also thought uncertain in years prior to 1992. These are thought more accurate in recent years thanks to the implementation of sampling programs in some of these countries to monitor the activities of fresh tuna longliners.

Catch and Effort Data

Catch and effort data are fully or almost fully available up to the early 90s but only partially available since then (**Chart 20**), due to the almost complete lack of catch and effort records from IUU fleets and Sri Lanka gillnet/longline fishery since 1992.

The effort statistics are thought fair quality for most of the fleets for which long catches series are available, with the exception of Taiwan (1990-92) and the whole series for Korea. The use of data from Korea is, therefore, not recommended.

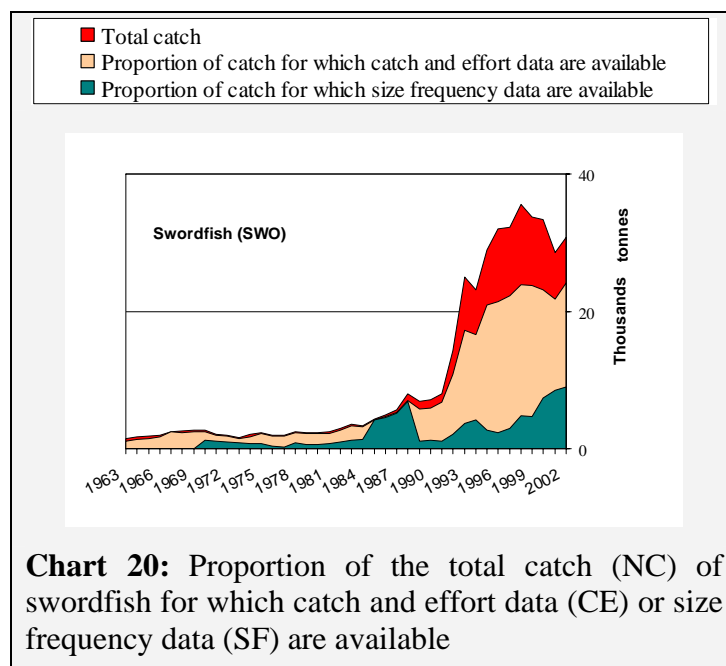
¹ See Table 1 and Chart 1 in Annex I and Data Catalogues (Swordfish) in Annex II

Size Frequency Data

For longline fisheries size frequency data is only available since 1970. Japan is the only country that has been reporting size-frequency data on a regular basis. Nevertheless, in recent years, the number of specimens measured is very low in relation to the total catch and has been decreasing year by year. The size-frequency statistics available from the two other main longline fleets are either very incomplete (Taiwan for which only four years are available) or inaccurate (Korea), which invalidates their use. Size data are also partially available for longline fleets that have been targeting swordfish since the early nineties (Reunion, Spain, Seychelles, South Africa and Mauritius). The recovery of size data from port sampling regarding fresh tuna longline fleets operating in Phuket, Penang, Sri Lanka and, Indonesia, continued in 2003 and 2004, with many swordfish specimens measured.

Size data is also available for the gillnet/longline fishery in Sri Lanka from 1988 to 1995.

In general, the amount of catch for which size data for the species are available is very low (**Chart 20**) and the amount of specimens measured per strata are considered very low. The quality of this dataset is, therefore, thought very poor.



*Blue Marlin (BLZ), Black Marlin (BLM) and Striped Marlin (MLS)*²

Nominal Catch Data

The fleets catching most of the Blue Marlin (BLZ), Black Marlin (BLM) and Striped Marlin (MLS) have usually reported nominal catches for these species but these catches are considered incomplete. Marlins are usually recorded under species aggregates (MARL for the three marlins together or BIL/BILL for marlins and other billfish together or TUX for billfish and tuna species together) or simply not recorded at all. The Secretariat has, in these cases, been trying to estimate or assign the catches of these species but this has not always been possible due to the scarce amount of information available on species making up the bycatch of longline, gillnet or other fisheries.

² See Table 1 and Chart 2 in Annex I and Data Catalogues (Marlins) in Annex II

Furthermore, the catches of these species by IUU fleets or fresh tuna longline vessels in Indonesia, so far estimated by the Secretariat, are also considered important.

The quality of the catches estimated for IUU fleets are thought very poor. The catches of several fresh tuna longline fleets operating in the Indian Ocean (Indonesia, Thailand, Malaysia, Sri Lanka and Maldives) are also thought uncertain. The implementation of Sampling Programs to monitor the activities of these fleets has reduced this uncertainty, although the identification of marlin species through port sampling is sometimes difficult³.

The new catches estimates of marlins for the gillnet and longline fisheries of Sri Lanka are uncertain.

Catch and Effort Data

Catch and effort data are fully or almost fully available up to the early 90s but only partially available since then (**Chart 21**), due to the almost complete lack of catch and effort records from IUU fleets and Sri Lanka gillnet/longline fishery since 1992.

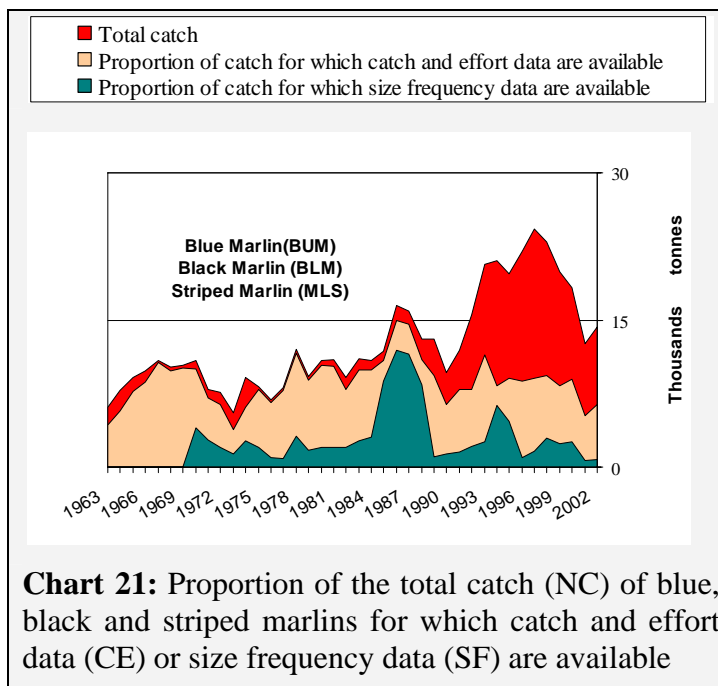
The effort statistics are thought fair quality for most of the longline fleets for which long catches series are available, with the exception of Taiwan (1990-92) and the whole series for Korea. The use of data from Korea is, therefore, not recommended. The catch and effort statistics available for the gillnet / longline fishery of Sri Lanka (1986-91) and Taiwanese drifting gillnets (1987-91) are considered fair quality.

³ Specimens of blue marlin and striped marlin are usually unloaded processed (headed and tailed), which makes it difficult to identify the species

Size Frequency Data

The amount of size frequency data available for marlin species has been low over the time with only regular reports from Japan (longline) and very partial reports from Taiwan (longline) and Sri Lanka (gillnet/longline). Some data is also available from port sampling (Sampling Programs) in recent years.

In general, the amount of catch for which size data for the species are available has been decreasing since the early nineties (**Chart 21**) and the amount of specimens measured per strata are considered very low. The quality of this dataset is, therefore, thought very poor.



*Indo-Pacific Sailfish (SFA) and Shortbill Spearfish (SSP)*⁴

Nominal Catch Data

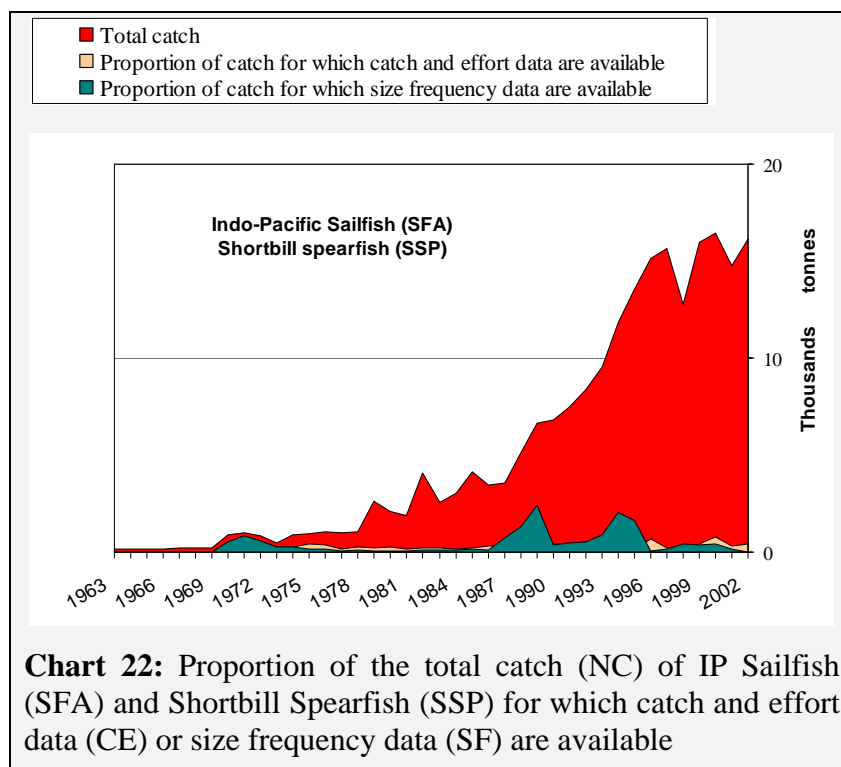
Catches of Indo-Pacific Sailfish or Shortbill Spearfish are usually missing from the reports. When reported, these species are usually aggregated with other billfish (BIL/BILL) or also with tunas (TUX). The catch series is, therefore, considered very incomplete. Almost no catches are available for the species before 1970.

The new catches estimates of marlins for the gillnet and longline fisheries of Sri Lanka are uncertain. Gillnet catches recorded for other countries did not usually include detailed catches of these species. The same applies to longline and other fisheries catching these species.

Catch and Effort Data

The amount of catch and effort data available for both gillnet and longline fisheries have been very low (**Chart 22**), especially since the mid-eighties. Catch and effort data are only available from 1986 to 1991 for the gillnet/longline fishery in Sri Lanka being very scarce for other gillnet or line fisheries. Regarding the longline fisheries, only Japan has reported statistics of the species over time. The lack of catch and effort data from all fisheries in recent years is of concern, especially taking into account the dramatic increase in the catches of the species since the mid- eighties.

⁴ See Table 1 and Chart 3 in Annex I and Data Catalogues (SFA and SSP) in Annex II



Size Frequency Data

The amount of size frequency data available for these species has been low over time with only regular reports from Japan (longline) and partial reports from Sri Lanka (gillnet/longline). Some data is also available from port sampling (Sampling Programs) in recent years.

The lack of size frequency data from most fisheries in recent years is of concern (**Chart 22**).

Estimation of catches of non-reporting fleets

The estimates of catches of non reporting fleets were updated in 2004 thanks to new information available during the year:

Fresh tuna longline: The catches of fresh tuna longliners were estimated according to the port where the different fleets were based. Most of the catches estimated are from Taiwanese longliners according to the information available.

- **Indonesia:** The catches of Indonesian vessels during 2002 were estimated on the basis of previous reviews. The information collected through the multilateral catch monitoring program in Indonesia will allow re-estimating the catch series for Indonesia. Changes in the total catches and species composition are expected in the future.
- **Thailand:** The catches of fresh tuna longliners from Taiwan, China and Indonesia in Phuket were estimated according to the data collected through the AFRDEC (Andaman Sea Fisheries Research and

Development Centre)-OFCF (Overseas Fisheries Cooperation Foundation of Japan)-IOTC Sampling Program.

- **Malaysia and Singapore:** The catches of fresh tuna longliners based in Malaysia and Singapore were estimated on the basis of previous data recorded (IPTP Sampling Program), new estimates from FRI (Fisheries Research Institute of Penang) and vessel activity in Singapore (Jurong), available since 1992.
- **Sri Lanka:** The catches of fresh tuna longliners unloading to processing plants in Sri Lanka were estimated on the basis of previous data collected by NARA (National Aquatic Resources Research and Development Agency) in Colombo and estimates from Phuket and Penang sampling.
- **Maldives:** The catches of fresh tuna longliners were not estimated due to lack of reliable information on their numbers and activity.

Deep-freezing longline: The catches of large longliners from several non-reporting countries were estimated according to the number of vessels estimated from the IOTC vessel record and the catches of Taiwanese longliners, on the assumption that most of the vessels operate as the longliners from Taiwan,China. The collection of new information regarding these non-reporting fleets during the last year, especially concerning the number and characteristics of longliners operating, led to better estimates of catches. A decrease in the number of vessel recorded operated since 1999 led to a dramatic decrease in the catches estimated. The reason for this decrease in the number of vessels (and catches) operating in the Indian Ocean is not fully explained. Nevertheless, this decrease is somewhat proportional to an increase in the number of vessels recorded operating under flags of reporting countries, such as Philippines and the Seychelles.

Data related issues for billfish species

A number of problem areas were identified in the data situation for billfishes:

- High difference between the catches of Korean longliners reported as Nominal catch and catch and effort.
- Lack of Catch and Effort statistics from Taiwan,China between 20-30 degrees East (1960-2003).
- Poor knowledge of the catches, effort and size-frequency from fresh tuna longline vessels, especially from Taiwan,China and several non-reporting fleets (1985-1992).
- Poor knowledge of the catches, effort and size-frequency from non-reporting fleets of deep-freezing tuna longliners, especially since the mid-eighties.
- Lack of accurate catch, effort and size-frequency data for the Indonesian longline fishery (1973-1995).
- Poor knowledge of the catches, effort and size-frequency data for gillnet and other artisanal fisheries, especially the gillnet/longline fishery in Sri Lanka.

Improvements have taken place in a number of areas. These include:

A better level of reporting: New NC, CE and SF datasets have been obtained from several countries as for South Africa and Seychelles longline fisheries.

Revision of the IOTC databases: Several revisions have been conducted during the last 2 years on the IOTC databases. This has led to new datasets being input, especially regarding CE and SF statistics (Indonesia, Sri Lanka, Mozambique) and to new series of NC data for some countries.

Desagregation of catch data: Revisions have been conducted at the IOTC Secretariat aiming at assigning the catches not available per species in the IOTC database to the corresponding species.

An improved Vessel Record: More information has been obtained on the number and type of vessels operating under flags of non-reporting parties. This information comes mostly from various licensing schemes in the Indian Ocean and has become an important element in the estimation of the catches of non reporting fleets.

Improved estimation of catches of non-reporting fleets: The collection of historical and current information on the landings of small fresh tuna longliners in ports in the Indian Ocean has improved the accuracy of earlier estimates. The more complete Vessel Record also permitted the estimation by flag of the catches of deep-freezing longliners.

IOTC/OFCF sampling programmes: The collection of information on the activities of fresh tuna longliners landing in Phuket and Penang has continued during 2004. This has led to more complete and accurate estimates of catches of these fleets. Other valuable data collected in the scope of these programmes refer to length frequencies which will allow length-length, length-weight and weight-length relationships to be established.

Plan of Action in Indonesia: A large scale operation involving several local and foreign institutions was initiated in April 2002 in Indonesia. The primary objective of this multi-lateral cooperation is building the necessary capabilities in the country, so as to allow Indonesia to generate good quality statistics in the near future. Sampling of landings of fresh tuna longliners operating in this country started in June 2002 , with more than 14,000 samplings conducted (1 million fish monitored) between June 2002 and July 2004, with coverage levels ranging from 30% to 40% of the catches unloaded by longliners in Indonesia.

Plan of Action in Sri Lanka: A multi-lateral cooperation between NARA (National Aquatic Resources Research and Development Agency), OFCF (Overseas Fisheries Cooperation Foundation of Japan)-IOTC will be initiated before the end of this year. The objective of this Project is to strengthen data collection and processing systems on Sri Lankan tuna and billfish fisheries (Gillnet and longline Fishery (Offshore Fishery) and longline Fishery for large Yellowfin Tuna (Coastal Fishery) so as to allow producing more accurate effort and catch estimates per area and species and increase the amount of size frequency data collected for tropical tuna and billfish species in Sri Lanka.

Annex I: Nominal Catch Data (IOTC Database)

Table 1: Total Catches of Black Marlin (BLM), Blue Marlin (BUM), Striped Marlin (MLS), Indo-Pacific Sailfish (SFA), Short-bill Spearfish (SSP) and Swordfish (SWO) in the Indian Ocean for the period 1953-2002 (in thousand of metric tonnes)

BLM

Table with 48 columns (years 53-02) and 12 rows (Gear types: Purse Seine, Baitboat, Longline, Gillnet, Hand Line, Troll Line, Other, Total). Data represents catches in thousand metric tonnes for Black Marlin.

BUM

Table with 48 columns (years 53-02) and 12 rows (Gear types: Purse Seine, Baitboat, Longline, Gillnet, Hand Line, Troll Line, Other, Total). Data represents catches in thousand metric tonnes for Blue Marlin.

MLS

Table with 48 columns (years 53-02) and 12 rows (Gear types: Purse Seine, Baitboat, Longline, Gillnet, Hand Line, Troll Line, Other, Total). Data represents catches in thousand metric tonnes for Striped Marlin.

SFA

Table with 48 columns (years 53-02) and 12 rows (Gear types: Purse Seine, Baitboat, Longline, Gillnet, Hand Line, Troll Line, Other, Total). Data represents catches in thousand metric tonnes for Indo-Pacific Sailfish.

SSP

Table with 48 columns (years 53-02) and 12 rows (Gear types: Purse Seine, Baitboat, Longline, Gillnet, Hand Line, Troll Line, Other, Total). Data represents catches in thousand metric tonnes for Short-bill Spearfish.

SWO

Table with 48 columns (years 53-02) and 12 rows (Gear types: Purse Seine, Baitboat, Longline, Gillnet, Hand Line, Troll Line, Other, Total). Data represents catches in thousand metric tonnes for Swordfish.

Chart 1: Catches of Swordfish (SWO) in the Indian Ocean for the period 1963-2002

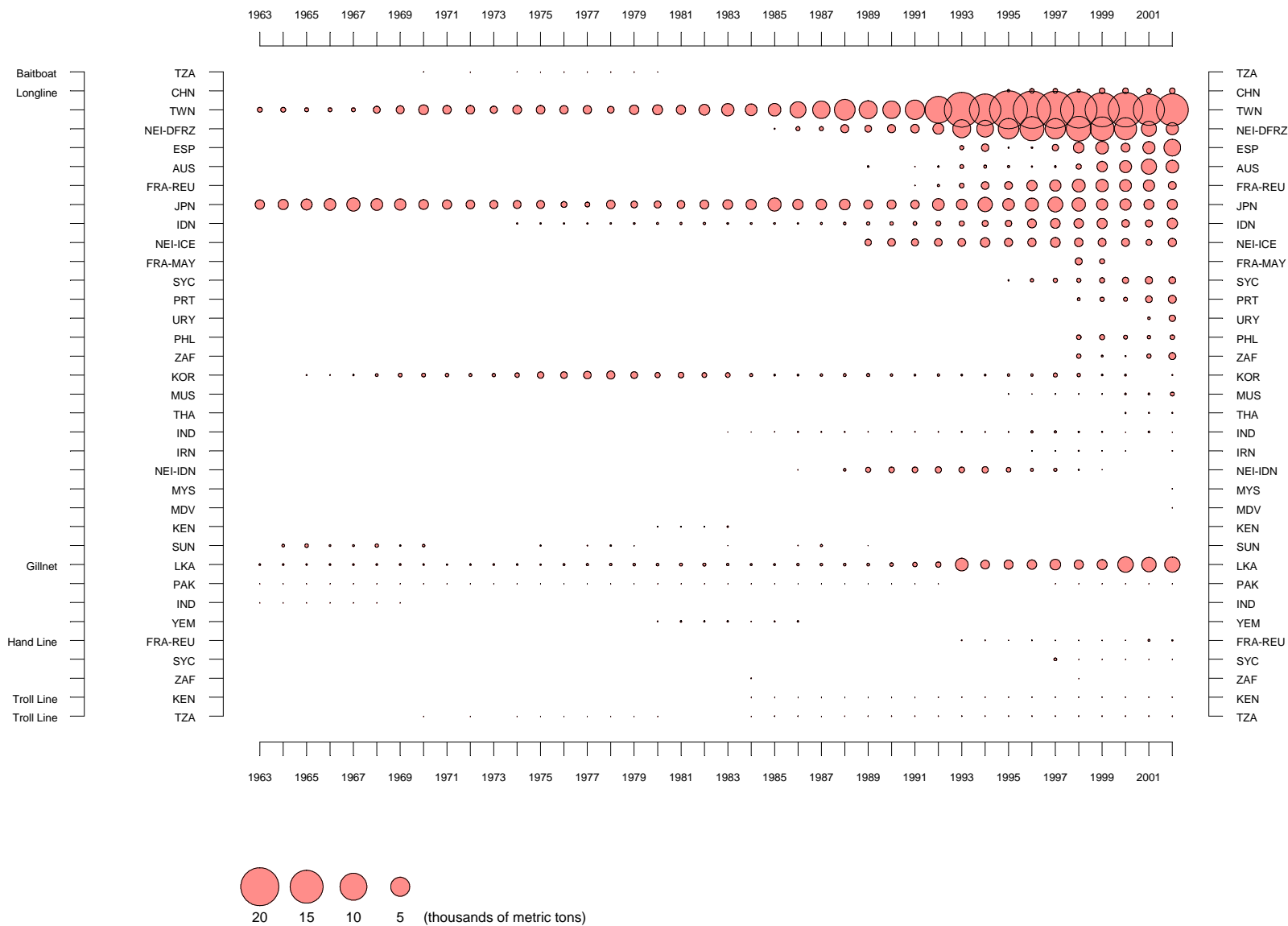
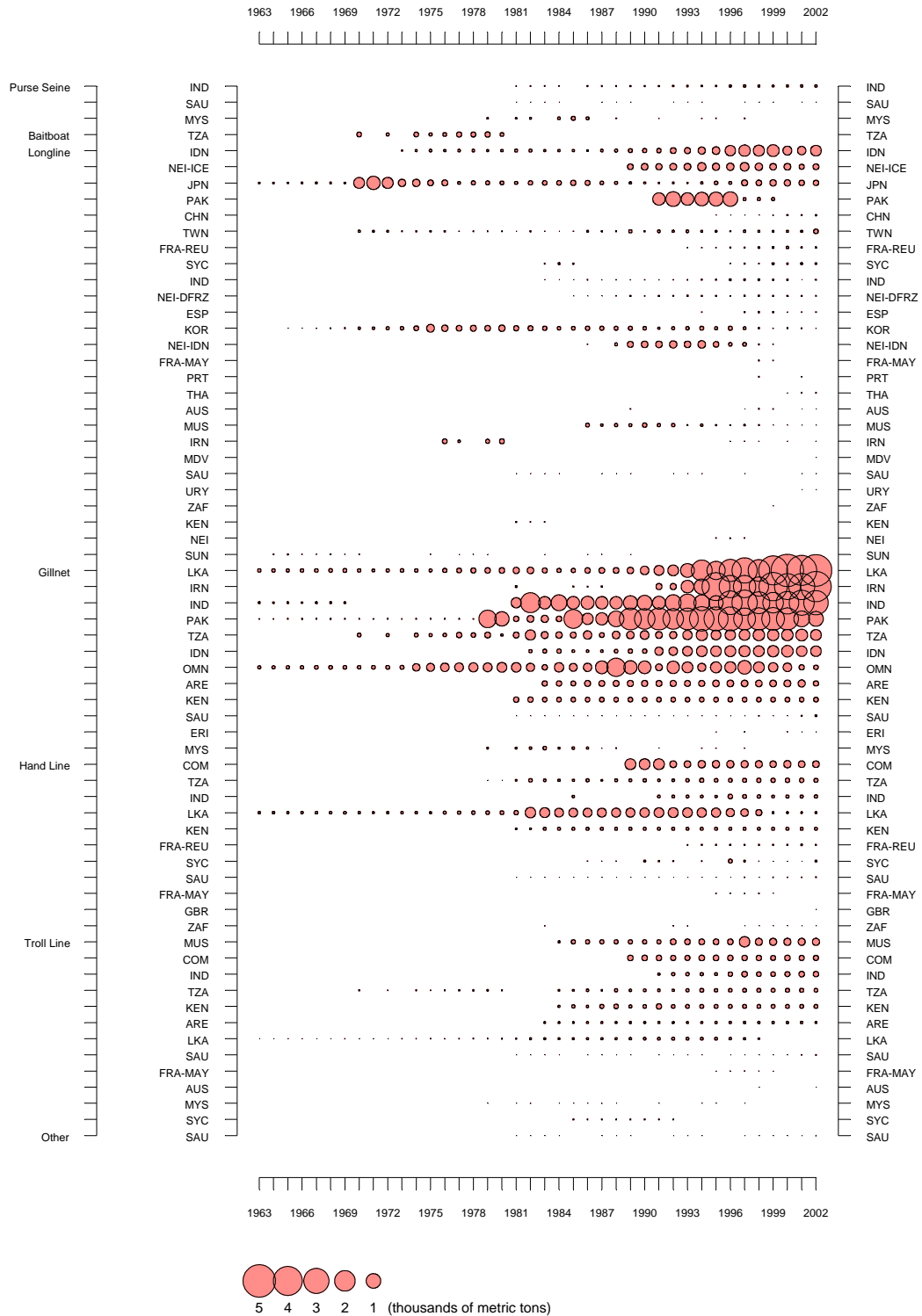


Chart 2: Catches of Blue Marlin (BUM), Striped Marlin (MLS) and Black Marlin (BLM) in the Indian Ocean for the period 1963-2002



Chart 3: Catches of Indo-Pacific Sailfish (SFA) and Short Bill Spearfish (SSP) in the Indian Ocean for the period 1963-2002



Annex II: Data Catalogues




Nominal Catch
Catch and Effort
Size Frequency
(IOTC Database)

Data Catalogues

1/ Availability

(Availability of Nominal Catches, Catch and Effort and Size Frequency Statistics in the IOTC databases)

Legend: SpC Mean catches of the Species for the last five years

	Nominal catches available
	Catch and Effort data available
	Size frequency data available

Billfish not elsewhere included

IOTC-2004-WPB-01

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch		
Purse Seine																					India	0.01		
Longline	[Yellow bar from 63 to 99]																				Taiwan,China	0.64		
	[Blue bar from 63 to 99]																				China	0.35		
	[Blue bar from 85 to 99]																				NEI-Deep-freezing	0.23		
	[Blue bar from 85 to 87]																				NEI-Fresh Tuna	0.16		
	[Blue bar from 85 to 87]																				Seychelles	0.12		
	[Blue bar from 79 to 99]																				Korea, Republic of	0.11		
	[Blue bar from 89 to 91]																				Thailand	0.02		
	[Blue bar from 85 to 99]																				Mauritius	0.01		
	[Blue bar from 91 to 99]																				Pakistan	0.01		
	[Blue bar from 85 to 99]																				India	0.00		
	[Blue bar from 85 to 87]																				Portugal	0.00		
	[Blue bar from 63 to 69]																				Australia			
	[Blue bar from 63 to 69]																				Japan			
	[Blue bar from 63 to 69]																				Soviet Union			
	Gillnet																					India	2.09	
																						Pakistan	1.79	
																						Indonesia	0.76	
																						United Arab Emirates	0.17	
																						Sri Lanka	0.02	
																						Malaysia		
Line																						India	0.30	
																						Mauritius	0.29	
																						Comoros	0.12	
																							United Arab Emirates	0.03
																							Seychelles	0.01
																							Malaysia	
																						South Africa		
Other																						India	1.26	
																						Tanzania	0.79	
																						United Arab Emirates	0.03	
																						Malaysia		
																							Not Elsewhere Included	
Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch		

Indo-Pacific sailfish and Shortbill spearfish

IOTC-2004-WPB-01

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline																					Indonesia	0.49
																					NEI-Fresh Tuna	0.19
																					Japan	0.16
																					Taiwan,China	0.08
																					Pakistan	0.05
																					France-Reunion	0.02
																					Seychelles	0.01
																					India	0.01
																					Spain	0.01
																					NEI-Indonesia Fresh Tuna	0.00
																					Portugal	0.00
																					France-Territories	0.00
																					Thailand	0.00
																					Australia	0.00
																					Iran, Islamic Republic	0.00
																					Mauritius	0.00
																					South Africa	0.00
																				Kenya	0.00	
																				Korea, Republic of	0.00	
Gillnet																					Sri Lanka	3.68
																					Iran, Islamic Republic	3.19
																					Oman	0.30
																					Kenya	0.09
																					Saudi Arabia	0.00
																					Eritrea	0.00
																					Pakistan	0.00
Line																					Comoros	0.22
																					Kenya	0.11
																					Sri Lanka	0.05
																					France-Reunion	0.01
																					Saudi Arabia	0.00
																					Seychelles	0.00
																					Australia	0.00
																					United Kingdom	0.00
																				South Africa	0.00	
Other																					Saudi Arabia	0.02
																					Kenya	0.00
																					South Africa	0.00
Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch

Marlins not elsewhere included

IOTC-2004-WPB-01

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline																					Taiwan, China	4.94
																					Indonesia	2.56
																					NEI-Deep-freezing	1.75
																					Japan	1.14
																					NEI-Fresh Tuna	0.99
																					Philippines	0.11
																					France-Reunion	0.08
																					Korea, Republic of	0.07
																					Seychelles	0.03
																					France-Territories	0.02
																					Australia	0.02
																					India	0.02
																					Uruguay	0.02
																					NEI-Indonesia Fresh Tuna	0.01
																					Malaysia	0.01
																					Thailand	0.01
																					Spain	0.01
																					South Africa	0.00
																					Mauritius	0.00
																					Iran, Islamic Republic	0.00
Gillnet																					Sri Lanka	2.85
																					Sri Lanka	0.06
Line																					Kenya	0.04
																					France-Reunion	0.03
																					South Africa	0.00
																					Australia	
																					United Kingdom	
Other																					Seychelles	
																					Australia	
																				South Africa		
Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch

Swordfish

IOTC-2004-WPB-01

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline																					Taiwan,China	14.38
																					NEI-Deep-freezing	5.17
																					Spain	1.96
																					Australia	1.68
																					France-Reunion	1.63
																					Japan	1.57
																					Indonesia	1.02
																					NEI-Fresh Tuna	0.73
																					France-Territories	0.47
																					Seychelles	0.44
																					Portugal	0.38
																					Uruguay	0.30
																					China	0.28
																					Philippines	0.24
																					South Africa	0.23
																					Mauritius	0.11
																					Korea, Republic of	0.06
																					India	0.02
																					Thailand	0.02
																					Iran, Islamic Republic	0.01
NEI-Indonesia Fresh Tuna	0.01																					
Malaysia	0.00																					
Kenya																						
Soviet Union																						
Gillnet																					Sri Lanka	2.00
Line																					France-Reunion	0.02
																					Kenya	0.00
																					South Africa	
																					Seychelles	
Other																					Japan	
																					Yemen	
Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch

Data Catalogues

2/ Quality


(Quality of the statistics held in the Nominal Catches, Catch and Effort and Size Frequency databases)

Nominal Catches Database: The higher or lower quality of each individual record (strata) was assigned depending on whether the catches reported (or estimated) in that strata (Country-RepCountry-Year-Gear-Area-Species-Source) were thought to accurately represent the actual catches occurred in the strata concerned.

Catch and Effort Database: The higher or lower quality of each individual record (strata) was assigned depending on whether the catches reported (or estimated) in that strata (Country-RepCountry-Year-Gear-Area-Species-Source) were thought representative of the total catches occurred in the strata concerned.

Size Frequency Database: The higher or lower quality of each individual record (strata) was assigned depending on whether the specimens sampled in that strata (Country-RepCountry-Year-Gear-Area-Species-Source) were thought representative of all specimens caught in the strata concerned.

Legend: SpC Mean catches of the Species for the last five years

	Poor quality
	Unknown quality
	Fair quality
	Good quality

Nominal Catches

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch											
Purse Seine															↔	↔	↔	↔	↔	↔	↔	↔	India	0.01									
Longline	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	Taiwan,China	0.64			
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	China	0.35		
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	NEI-Deep-freezing	0.23	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	NEI-Fresh Tuna	0.16	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Seychelles	0.12	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Korea, Republic of	0.11
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Thailand	0.02
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Mauritius	0.01
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Pakistan	0.01
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	India	0.00
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Portugal	0.00
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Australia	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Japan	
↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Soviet Union		
Gillnet	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	India	2.09	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Pakistan	1.79	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Indonesia	0.76
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	United Arab Emirates	0.17
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Sri Lanka	0.02
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Malaysia	
Line	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	India	0.30	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Mauritius	0.29
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Comoros	0.12
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	United Arab Emirates	0.03
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Seychelles	0.01
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Malaysia	
Other	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	India	1.26	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Tanzania	0.79
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	United Arab Emirates	0.03
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Malaysia	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Not Elsewhere Included	

Catch And Effort Statistics

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch											
Purse Seine																						Indonesia											
Baitboat																						Indonesia											
Longline	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Taiwan,China	0.64	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	China	0.35
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	NEI-Fresh Tuna	0.16
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Seychelles	0.12
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Korea, Republic of	0.11
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Mauritius	0.01
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	India	0.00
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Portugal	0.00
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Australia	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	France-Reunion	
Gillnet	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	India	2.09	
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Pakistan	1.79
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Indonesia	0.76
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Iran, Islamic Republic	
Line	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Indonesia		
	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	South Africa	
Other	↔										↔										↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Indonesia		

Nominal Catches

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline																					Indonesia	0.49
																					NEI-Fresh Tuna	0.19
																					Japan	0.16
																					Taiwan,China	0.08
																					Pakistan	0.05
																					France-Reunion	0.02
																					Seychelles	0.01
																					India	0.01
																					Spain	0.01
																					NEI-Indonesia Fresh Tuna	0.00
																					Portugal	0.00
																					France-Territories	0.00
																					Thailand	0.00
																					Australia	0.00
																					Iran, Islamic Republic	0.00
	Gillnet																					Sri Lanka
																				Iran, Islamic Republic	3.19	
																				Oman	0.30	
																				Kenya	0.09	
																				Saudi Arabia	0.00	
																				Eritrea	0.00	
																				Pakistan		
Line																					Comoros	0.22
																					Kenya	0.11
																					Sri Lanka	0.05
																					France-Reunion	0.01
																					Saudi Arabia	0.00
																					Seychelles	0.00
																					Australia	
																					United Kingdom	
																					South Africa	
Other																					Saudi Arabia	0.02
																					Kenya	
																					South Africa	
Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch

Catch And Effort Statistics

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline																					NEI-Fresh Tuna	0.19
																					Japan	0.16
																					France-Reunion	0.02
																					Seychelles	0.01
																					India	0.01
																					Portugal	0.00
																					Australia	0.00
																					Mauritius	
																					Korea, Republic of	
																					NEI-Deep-freezing	
Gillnet																					Sri Lanka	3.68
																					Oman	0.30
																					Taiwan,China	
Line																					Sri Lanka	0.05
																					France-Reunion	0.01
Other																					Australia	
																					South Africa	
Other																					United Kingdom	
																					Sri Lanka	
Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch

Size Frequency Statistics

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Baitboat																					Maldives	
Longline																					NEI-Fresh Tuna	0.19
																					Japan	0.16
Gillnet																					Sri Lanka	3.68
																					Pakistan	
Line																					Sri Lanka	0.05
Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch

Nominal Catches

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline	[Red arrows]																				Taiwan,China	14.38
	[Red arrows]																				NEI-Deep-freezing	5.17
	[Red arrows]																				Spain	1.96
	[Red arrows]																				Australia	1.68
	[Red arrows]																				France-Reunion	1.63
	[Red arrows]																				Japan	1.57
	[Red arrows]																				Indonesia	1.02
	[Red arrows]																				NEI-Fresh Tuna	0.73
	[Red arrows]																				France-Territories	0.47
	[Red arrows]																				Seychelles	0.44
	[Red arrows]																				Portugal	0.38
	[Red arrows]																				Uruguay	0.30
	[Red arrows]																				China	0.28
	[Red arrows]																				Philippines	0.24
	[Red arrows]																				South Africa	0.23
	[Red arrows]																				Mauritius	0.11
	[Red arrows]																				Korea, Republic of	0.06
	[Red arrows]																				India	0.02
	[Red arrows]																				Thailand	0.02
	[Red arrows]																				Iran, Islamic Republic	0.01
[Red arrows]																				NEI-Indonesia Fresh Tuna	0.01	
[Red arrows]																				Malaysia	0.00	
[Red arrows]																				Kenya		
[Red arrows]																				Soviet Union		
Gillnet	[Red arrows]																				Sri Lanka	2.00
Line	[Red arrows]																				France-Reunion	0.02
	[Red arrows]																				Kenya	0.00
	[Red arrows]																				South Africa	
Other	[Red arrows]																				Seychelles	
	[Red arrows]																				Japan	
[Red arrows]																				Yemen		

Catch And Effort Statistics

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline	[Green bars]																				Taiwan,China	14.38
	[Green bars]																				NEI-Deep-freezing	5.17
	[Green bars]																				Spain	1.96
	[Green bars]																				Australia	1.68
	[Green bars]																				France-Reunion	1.63
	[Green bars]																				Japan	1.57
	[Green bars]																				NEI-Fresh Tuna	0.73
	[Green bars]																				Seychelles	0.44
	[Green bars]																				Portugal	0.38
	[Green bars]																				China	0.28
	[Green bars]																				Philippines	0.24
	[Green bars]																				South Africa	0.23
	[Green bars]																				Mauritius	0.11
	[Green bars]																				Korea, Republic of	0.06
	[Green bars]																				India	0.02
	[Green bars]																				Malaysia	0.00
[Green bars]																				Oman		
Gillnet	[Green bars]																				Sri Lanka	2.00
[Green bars]																				Taiwan,China		
Line	[Green bars]																				France-Reunion	0.02
	[Green bars]																				South Africa	
	[Green bars]																				Australia	
Other	[Green bars]																				Sri Lanka	
	[Green bars]																				Sri Lanka	

Size Frequency Statistics

Gear	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	01	Fleet	AvCatch
Longline	[Red arrows]																				Taiwan,China	14.38
	[Red arrows]																				Spain	1.96
	[Red arrows]																				Australia	1.68
	[Red arrows]																				France-Reunion	1.63
	[Red arrows]																				Japan	1.57
	[Red arrows]																				NEI-Fresh Tuna	0.73
	[Red arrows]																				Seychelles	0.44
	[Red arrows]																				South Africa	0.23
	[Red arrows]																				Mauritius	0.11
	[Red arrows]																				France	
Gillnet	[Red arrows]																				Sri Lanka	2.00