IOTC-2010-WPB-07

STATUS OF IOTC DATABASES FOR BILLFISH SPECIES

IOTC Secretariat[1]

Abstract

This document reviews the status of the information available on billfishes in the databases at the IOTC Secretariat as of June 2010. It covers data on nominal catches, catch-and-effort, and size-frequency data.

1. OVERVIEW

This document summarises the standing of a range of information received for billfish species, in accordance with IOTC Resolution 10/02 *Mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's)*[2].

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.

Section 2 covers the main issues identified by the Secretariat concerning the statistics available at the IOTC for billfish species.

The report covers the following areas:

- Overview
- Main issues relating to the data available on billfish
- Overview of billfish fisheries in the Indian Ocean:
    - Catch trends
    - Status of fisheries statistics for billfish species

Major data categories covered by the report

Nominal catches which are highly aggregated statistics for each species estimated per fleet, gear and year for a large area. If these data are not reported the Secretariat estimates a total catch from a range of sources (including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; and data reported by other parties on the activity of vessels (IOTC Resolution 07/04; IOTC Resolution 05/03; IOTC Resolution 08/02) 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, fishing mode, 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, fishing mode, quarter and 5 degrees square areas.

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[2] This Resolution superseded IOTC Resolutions 98/01, 05/01 and 08/01

2. MAIN ISSUES IDENTIFIED RELATING TO THE STATISTICS OF BILLFISH

The following list is provided by the Secretariat for the consideration of the WPB. The list covers the main issues which the Secretariat considers affect the quality of the statistics available at the IOTC, by type of dataset and type of fishery.

1. Catch-and-Effort data from Artisanal Fisheries:

- **Drifting gillnet** fisheries of **Iran** and **Pakistan**: To date, Iran has not reported catches of swordfish and marlins for its gillnet fishery. Although Pakistan has reported catches of swordfish and black marlin, they are considered to be too low for a driftnet fishery and the catches of black marlin are thought to contain other marlins (mislabelling).
- **Gillnet/longline** fishery of **Sri Lanka**: Although Sri Lanka has reported catches of marlins by species for its gillnet/longline fishery, the catch ratio blue marlin:black marlin has changed dramatically over time. This is thought to be a sign of mislabelling rather than the effect of changes in catch rates for this fishery.
- **Artisanal** fisheries of **Indonesia**: The catches of billfish reported by Indonesia for its artisanal fisheries in recent years are considerably higher than those reported in the past. The quality of the dataset for the artisanal fisheries of Indonesia is thought to be very poor.
- **Artisanal** fisheries of **India**: To date, India has not reported catch-and-effort data for its artisanal fisheries.

2. Catch-and-Effort data from Sport Fisheries:

- **Sport** fisheries of **Australia, France(Reunion)**, **India**, **Indonesia**, **Madagascar**, **Mauritius**, **Oman Seychelles**, **Sri Lanka**, **Tanzania**, **Thailand** and **UAE**: To date, no data have been received from any of the referred sport fisheries.

3. Catch-and-Effort data from Industrial Fisheries:

- **Longline** fishery of **Indonesia**: The catches of swordfish and marlins estimated for the fresh tuna longline fishery of Indonesia may have been underestimated in recent years due to them not being sampled in port.
- **Longline** fishery of **India**: India has reported very incomplete catches and catch-and-effort data for its longline fishery.
- **Longline** fishery of the Republic of **Korea**: The nominal catches and catch-and-effort data series for billfish for the longline fishery of Korea are conflicting, with nominal catches of swordfish and marlins lower than the catches reported as catch-and-effort for some years.
- **Longline** fishery of **EU-Spain:** To date, the Secretariat has not received catch-and-effort data for marlins and sailfish for the longline fishery of EU-Spain.
- **Purse seine** fisheries of **EU**, **Seychelles**, **Thailand**, **Iran** and **Japan**: To date, the referred countries have not reported catches of billfish from purse seiners.

4. Size data from All Fisheries:

- **Gillnet** fisheries of **Iran** and **Pakistan:** To date, Iran and Pakistan have not reported size frequency data for their gillnet fisheries.
- **Gillnet/longline** fishery of **Sri Lanka:** Although Sri Lanka has reported length frequency data for swordfish and marlins in recent years, the lengths reported are considered highly uncertain, due to mislabelling of marlins and likely sampling bias (large specimens of swordfish and marlins are highly processed and not sampled).

- **Longline** fisheries of **India** and **Oman:** To date, India and Oman have not reported size frequency data for their longline fisheries.
- **Longline** fishery of **Indonesia**: Indonesia has reported size frequency data for its fresh-tuna longline fishery in recent years. However, the samples cannot be fully broken by month and fishing area (5x5 grid) and refer mostly to the component of the catch that is unloaded fresh. The quality of the samples in the IOTC database is for this reason uncertain.
- **Fresh-tuna longline** fishery of **Taiwan,China:** To date, Taiwan,China has not provided size frequency data for its fresh-tuna longline fishery.
- **Longline** fishery of **Japan:** Japan has not reported samples for its commercial fishery since 2000 and the number of samples reported from training vessels has dropped dramatically since that time.
- **Artisanal** fisheries of **India** and **Indonesia**: To date, India and Indonesia have not reported size frequency data for their artisanal fisheries.

5. Biological data for all billfish species:

- Industrial **longline** fisheries, in particular **Taiwan,China**, **Indonesia**, **EU**, **China** and the **Republic** of **Korea**: The Secretariat had to use length-age keys, length-weight keys, and processed weight-live weight keys for billfish species from other oceans due to the general paucity of biological data available from the fisheries indicated.
- Industrial **longline** fisheries, in particular **Taiwan,China**, **Indonesia**, **EU**, **China** and the **Republic** of **Korea**: There has not been regular reporting of length frequency data by sex from any of the referred fisheries.

3. STATUS OF FISHERIES STATISTICS FOR BILLFISH SPECIES

Swordfish (SWO)

- **Catch trends**

Swordfish are caught mainly using drifting longlines (95%) and gillnets (5%) (**Figure 1**). Swordfish were mainly by-catch of industrial longline fisheries before the early 1990's 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 markedly increased after 1990, reaching 35,000 tonnes in 1998 and 36,000 in 2003-04.

Current catch levels are around 25,000 t. The change in target species from tunas to swordfish by part of the Taiwanese fleet along with the development of longline fisheries in Australia, Reunion island, Seychelles and Mauritius and the arrival of longline fleets from the Atlantic Ocean (Portugal, Spain the UK and other fleets operating under various flags[3]), all targeting swordfish, are the main reasons for this significant increase.

Longliners from **Taiwan,China** have been operating in the Indian Ocean since 1954, with catches of swordfish rarely higher than 1,000 tonnes until 1979. Swordfish catches increased gradually from 1,000 in 1979 to 5,000 tonnes in 1988. The catches by the Taiwanese fleet increased dramatically during the 1990's to over 12,000 t per year as the species was increasingly targeted by the fleet. After a peak of 18,000 t recorded in 1995, catches dropped to 12,000 t in 2004, and again in the following years (5,000 t) (**Figure 2**).

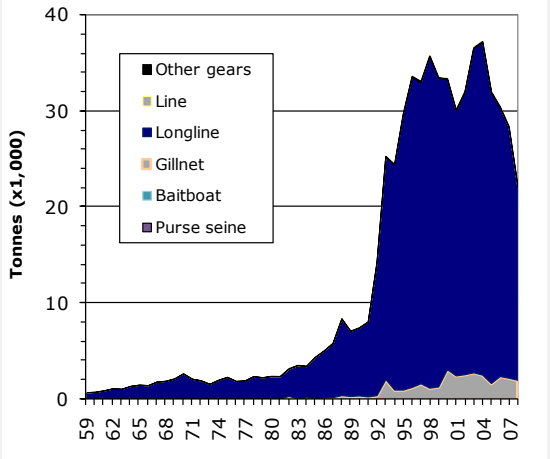

Figure 1: Catches of Swordfish per gear and year recorded in the IOTC Database (1959-2008)

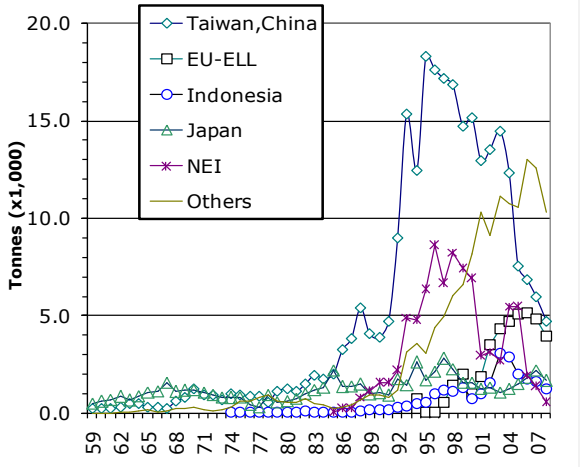

Figure 2: Catches of Swordfish by fleet recorded in the IOTC Database (1959-2008)

Catches of swordfish of up to 6,000 t have been recorded in recent years by a fleet of deep-freezing and fresh tuna longliners operating under flags of non-reporting countries (**NEI**). The catches have been low since 2006, with 2008 catches amounting to less than 1,000 t (**Figure 2**).

The catches of Swordfish of industrial longliners from **Japan** (**Figure 2**) 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 1990's. The average catches amounted 1,500 tonnes during the last two decades and catches around 2,500 tonnes were recorded in 1994, 1997 and 2007-08.

[3] Senegal, Guinea, etc.

In **Sri Lanka**, swordfish catches have fluctuated between 1,000 and 3,000 t over the last decade. These are taken mostly by boats that use a combination of drifting gillnets and longlines. This said, the first results from the sampling conducted by NARA[4] during 2005 and 2006 with the support of the IOTC-OFCF[5] Project in different locations in Sri Lanka appear to indicate that the historical catches of this species will need to be revisited.

The catches of **Indonesian** fresh-tuna longliners operating in Indian Ocean waters increased steadily until 2003 (3,000 t), having shown a decreasing trend since then. It is, however, likely that the catches recorded for years before 2003 are incomplete, as the statistics for this period are thought to be more uncertain (port sampling was initiated in 2003).

During the last decade, several domestic longline fisheries targeting swordfish started to operate in Reunion (EU-**France**), **Australia**, the **Seychelles** and more recently **Mauritius**, with total accumulated catches estimated to be between 2,000t and 3,000t in recent years.

Spanish, Portuguese and UK longliners coming from the Atlantic Ocean have been operating in the Indian Ocean since the early 90s with current accumulated catches around 5,000 t (EC-ELL on **Figure 2**). Around 25% of the catches of swordfish in the Indian Ocean have been taken by vessels operating under the EC in recent years.

The catches of swordfish by longliners from the **Republic of Korea**, recorded since 1965, have not exceeded 1,000 t. The highest catch, 800 t, was recorded in 1978. It is, however, likely that the catches recorded for Korea are incomplete as the operational data reported by Korea contains catches of swordfish higher than those reported as nominal catches.

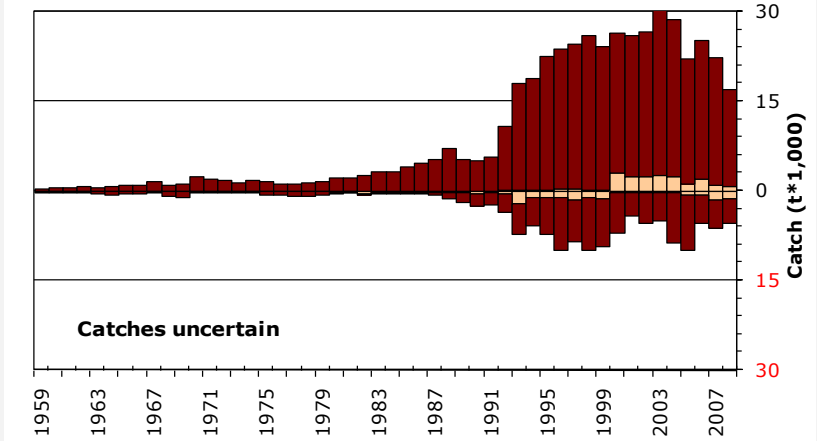

Figure 3. Uncertainty of annual catch estimates for swordfish.

The amount of the catch below the zero-line has been categorised as uncertain according to the criteria given in the text. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets. Data as of June 2010

- ## Status of Fisheries Statistics at the IOTC

Retained catches are fairly known (**Figure 3**); catches are uncertain for:

- **Drifting gillnet** fisheries of **Iran** and **Pakistan**: To date, Iran has not reported catches of swordfish for its gillnet fishery. Although Pakistan has reported catches of swordfish they are considered to be too low for a driftnet fishery.

[4] National Aquatic Resources and Development Agency of Sri Lanka

[5] Overseas Fisheries Cooperation Foundation of Japan

- **Longline** fishery of **Indonesia**: The catches of swordfish for the fresh tuna longline fishery of Indonesia may have been underestimated in recent years due to insufficient sampling coverage.
- **Longline** fishery of **India**: India has reported very incomplete catches and catch-and-effort data for its longline fishery.
- **Longline** fleets from **non-reporting** countries (NEI): The Secretariat had to estimate catches of swordfish for a fleet of longliners targeting tunas or swordfish and operating under flags of various non-reporting countries. The catches estimated since 2006 are, however, low.

Changes to the catch series: There have not been significant changes to the catches of swordfish since the WPB in 2009 (**Figure 4**). The changes in recent years are mostly due to revisions to the catches of the longline fleets targeting swordfish, from Tanzania, Kenya, Senegal and Guinea.

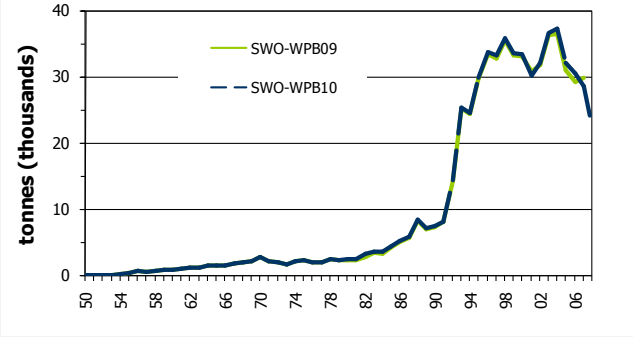

Figure 4: Swordfish: Catches used by the WPB in 2009 *versus* those estimated for the WPB10 (1950-2008)

Discards are believed to be low although they are unknown for most industrial fisheries, mainly longliners.

CPUE Series: Catch and effort series are available from some industrial longline fisheries. Nevertheless, catch and effort are not available from some fisheries or they are considered poor quality, especially since the early 90s (**Indonesia**, fresh-tuna longliners from **Taiwan,China**[6], Non-reporting longliners (**NEI**)) (**Figure 5**).

In addition, catch-and-effort data are not available for the drifting gillnet fisheries of **Iran** and **Pakistan**.

Trends in average weight can be assessed for several industrial fisheries although they are incomplete or poor quality for most fisheries before the early-80s and in recent years (low size of samples and time-area coverage of longliners from **Japan**) (**Figure 5**).

[6] Catch-and-effort statistics for the fresh-tuna longline fishery of Taiwan,China are available since 2007, although logbook coverage levels are still low (≈20%).

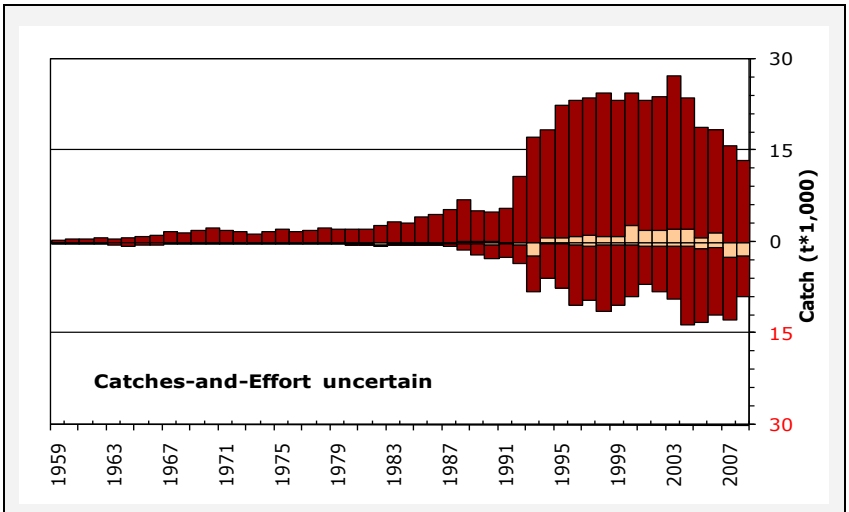

Figure 5: Uncertainty of catch-and-effort for swordfish.

The amount of the catch-and-effort below the zero-line has been categorised as uncertain according to the criteria given in the text. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets. Data as of June 2010

Catch-at-Size(Age) table: CAS are available but the estimates are thought compromised (**Figure 6**) for some years and fisheries due to:

- the uncertainty in the catches of swordfish for the drifting gillnet fisheries of **Iran** and the fresh-tuna longline fishery of **Indonesia**
- the lack of size data before the early-70s and from most artisanal fisheries (**Pakistan**, **India**, **Indonesia**)
- the paucity of size data available from industrial longliners since the early-1990s (**Japan**, **Philippines**, **India** and **China**)
- the lack of time-area catches for some industrial fleets (**Indonesia**, **India**, **NEI**)
- the paucity of biological data available, notably sex-ratio and sex-length-age keys

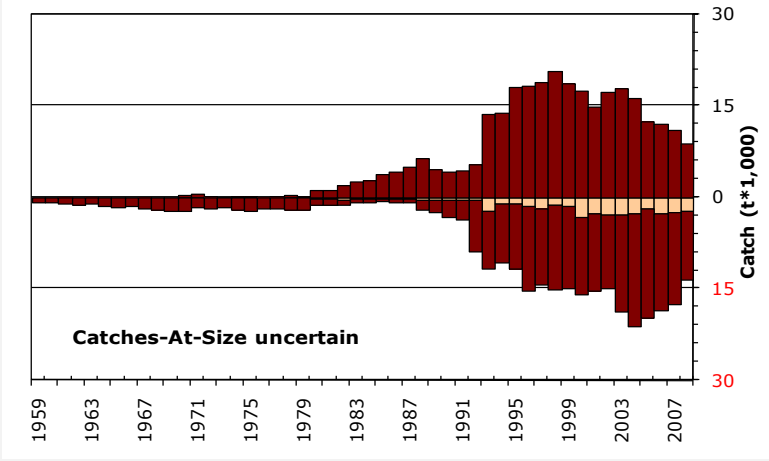

Figure 6. Uncertainty of catch-at-size data for swordfish.

The amount below the zero-line indicates the amount of catch for which the estimated catch at size has been categorised as uncertain according to the criteria given in the text. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets. Data as of June 2010

Blue Marlin (BUM)

- **Catch trends**

Blue marlins are caught mainly under drifting longlines (60%) and gillnets (30%) with remaining catches recorded under troll and hand lines (**Figure 7**). Blue marlins are the by-catch of industrial and artisanal fisheries. The catches of blue marlin are typically close to twice that of black marlin and striped marlin combined.

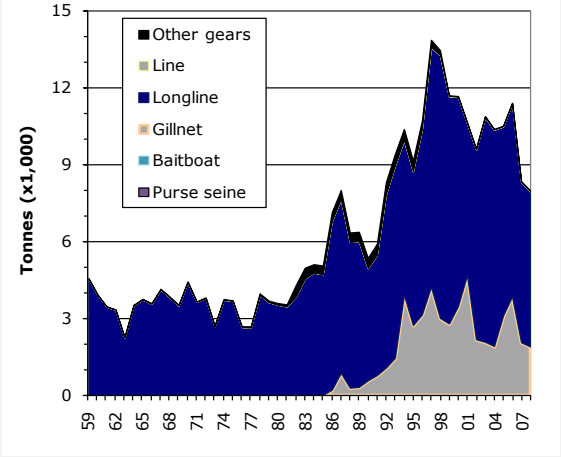

Figure 7: Catches of Blue Marlin per gear and year recorded in the IOTC Database (1959-2008)

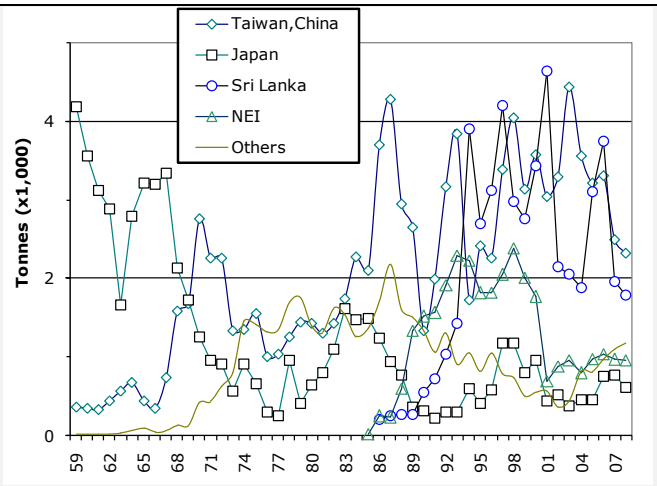

Figure 8: Catches of Blue marlin by fleet recorded in the IOTC Database (1959-2008)

Catch trends for blue marlin are variable; however, this may reflect the level of reporting. The catches of blue marlin under drifting longlines were more or less stable until the mid-80's, at around 3,000 t, steadily increasing since then. The largest catches were recorded in 1997 (14,000 tonnes). Current catches are around 8,000 tonnes. Catches under drifting longlines have been recorded under **Taiwan,China** and **Japan** fleets and, recently, **Indonesia** and several **NEI** fleets (**Figure 8**).

The catches of blue marlin in **Sri Lanka** (**Figure 8**) have been high since the mid-1980's as a result of the development of a fishery using a combination of drifting gillnets and longlines. The highest catch (4,600 t) was recorded in 2001, while current catches are around 2,000 t. However, the catches of marlins have been frequently miss-labelled in Sri Lanka making it uncertain the catches by species.

- **Status of Fisheries Statistics at the IOTC**

Retained catches are poorly known (**Figure 9**) for most fisheries due to:

- catches by species not being available for many artisanal (gillnet/longline fishery of **Sri Lanka** and artisanal fisheries of **India**, **Iran** and **Pakistan**) and some industrial (longliners of **Indonesia** and **Philippines**) fisheries
- uncertain catches for non-reporting industrial longliners (**India**, **NEI**)
- catches being incomplete for most industrial fisheries for which the blue marlin is seldom the target species. No catches are available for industrial purse seiners although they are known to occur
- conflicting catch reports: The catches of **South Korean** longliners reported as nominal catches and catches and effort are conflicting, with higher catches recorded in the CE table
- a lack of catch data for most sport fisheries.

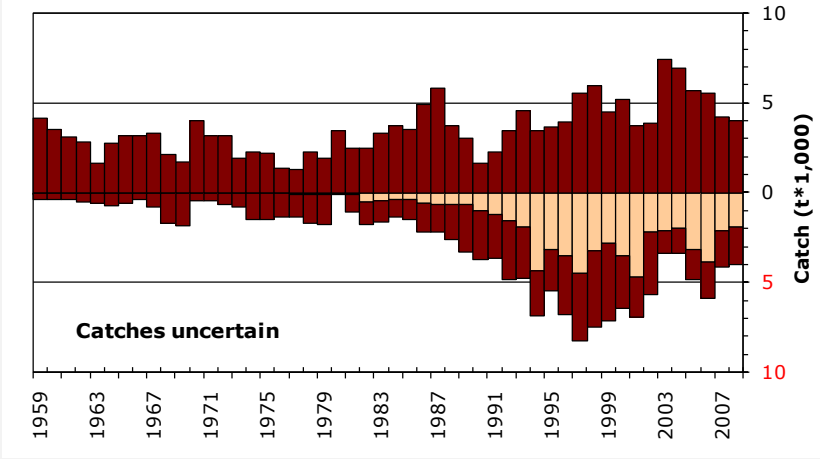

Figure 9. Uncertainty of annual catch estimates for blue marlin.

The amount of the catch below the zero-line has been categorised as uncertain according to the criteria given in the text. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets. Data as of June 2010

Changes to the catch series: There have not been significant changes to the catches of blue marlin since the WPB in 2009 (**Figure 10**). The changes in recent years are mostly due to revisions to the catches of the longline and gillnet fleets from Japan, Sri Lanka, with current catch estimates lower than those used by the WPB in 2009.

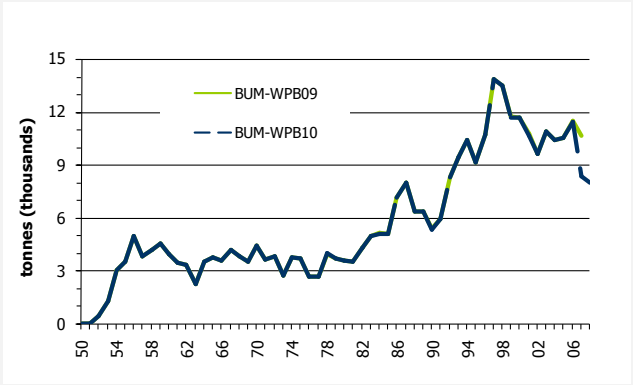

Figure 10: Blue Marlin: Catches used by the WPB in 2009 *versus* those estimated for the WPB10 (1950-2008)

Discards are unknown for most industrial fisheries, mainly longliners.

CPUE Series: Catch-and-effort series are available from some industrial longline fisheries although the catch might be incomplete (the catches of species other than the target are not always recorded in the logbooks). No catch and effort are available from sport fisheries, besides the sport fisheries of Kenya, or other artisanal (gillnets of **Iran** and **Pakistan**, gillnet/longlines of **Sri Lanka**) or industrial fisheries (**NEI** longliners, **Taiwanese** fresh-tuna longliners and all purse seiners).

Trends in average weight can only be assessed for the longline fisheries of **Japan** since 1970 and **Taiwan,China** since 1980. The number of specimens measured on Japanese longliners in recent years is, however, very low.

Catch-at-Size(Age) table: The Secretariat has not built CAS or CAA tables for blue marlin. The paucity of size data available and other biological data (e.g. length-weight equations) for this species made it very difficult any attempt to estimate CAS.

Black Marlin (BLM)

- **Catch trends**

Black marlins are caught mainly under drifting longlines (44%) and gillnets (49%) with remaining catches recorded under troll and hand lines (**Figure 11**). Black marlins are the by-catch of industrial and artisanal fisheries.

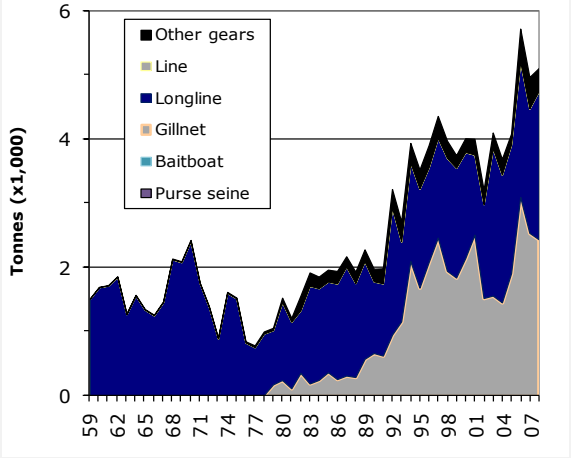

Figure 11: Catches of Black Marlin per gear and year recorded in the IOTC Database (1959-2008)

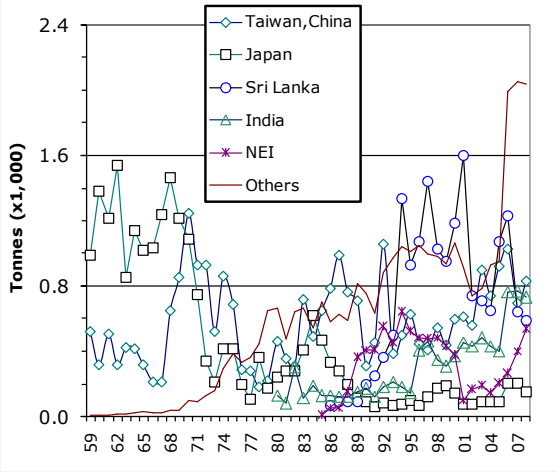

Figure 12: Catches of Black marlin by fleet recorded in the IOTC Database (1959-2008)

Catch trends for black marlin are variable; however, this may reflect the level of reporting. The catches of black marlin under drifting longlines have been more or less stable over time, at around 1,500-2,000 t. The largest catches were recorded in 1970 (2,400 t). Current catches are around 2,000 tonnes. Catches under drifting longlines have been recorded under **Taiwan,China**, **Japan**, South **Korea** and, recently, **Indonesia** and several **NEI** fleets (**Figure 12**).

The catches of black marlin in **Sri Lanka** (**Figure 12**) have been high since the mid-1980's as a result of the development of a fishery using a combination of drifting gillnets and longlines. The highest catch (1,600 t) was recorded in 2001, while current catches are around 1,000 t.

However, the catches of marlins have been frequently miss-labelled in **Sri Lanka** making it uncertain the catches by species.

Indonesia has reported catches of black marlin under gillnets amounting to 700t in 2006 and 2007 (**Figure 12**, increase in category **Others**), which represents a more than two-fold increase over previous estimates. This may be partially true as many Indonesian longline vessels have changed its fishing gear from longline into gillnet, following years of poor longline catch rates. However, the high catches of black marlin need to be confirmed as they may refer also to other marlins but have been recorded as black marlin due to miss-labelling.

- **Status of Fisheries Statistics at the IOTC**

Retained catches are poorly known (**Figure 13**) for most fisheries due to:

- catches by species not being available for many artisanal (gillnet/longline fishery of **Sri Lanka** and artisanal fisheries of **India**, **Iran** and **Pakistan**) and some industrial (longliners of **Indonesia** and **Philippines**) fisheries
- uncertain catches for non-reporting industrial longliners (**India**, **NEI**) and the gillnet fishery of **Indonesia**
- catches being incomplete for most industrial fisheries for which the black marlin is seldom the target species. No catches are available for industrial purse seiners although they are known to occur

- conflicting catch reports: The catches for **South Korean** longliners reported as nominal catches and catches and effort are conflicting, with higher catches recorded in the CE table
- a lack of catch data for most sport fisheries.

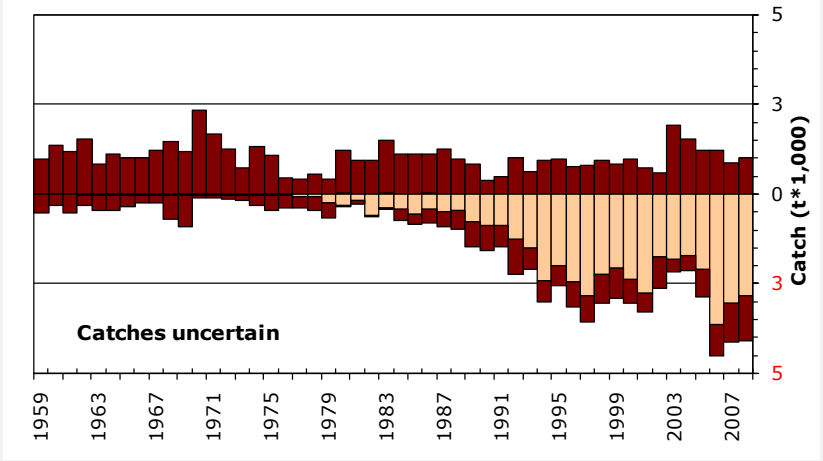

Figure 13. Uncertainty of annual catch estimates for black marlin.

The amount of the catch below the zero-line has been categorised as uncertain according to the criteria given in the text. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets. Data as of June 2010

Changes to the catch series: The catch series used by the WPB in 2009 and that to be used for the WPB in 2010 are different for 1978 - 2004 (**Figure 14**), with current catches of black marlin slightly higher than those used in 2009. The reason for this is a revision that the Secretariat conducted during 2010, which involved breaking the catches of billfish for those years by species, using new information reported by India in 2010.

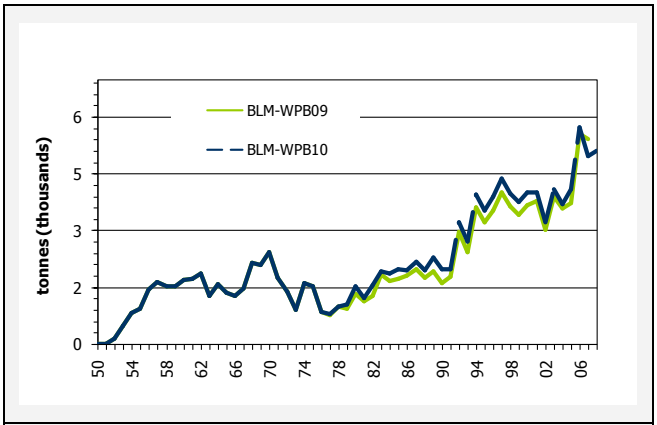

Figure 14: Black Marlin: Catches used by the WPB in 2009 *versus* those estimated for the WPB10 (1950-2008)

Discards are unknown for most industrial fisheries, mainly longliners.

CPUE Series: Catch and effort series are available from some industrial longline fisheries although the catch might be incomplete (the catches of species other than the target are not always recorded in the logbooks). No catch and effort are available from sport fisheries, besides the sport fisheries of Kenya, or other artisanal (gillnet fisheries of **Iran** and **Pakistan**, gillnet/longlines of **Sri Lanka**, gillnets of **Indonesia**) or industrial fisheries (**NEI** longliners and all purse seiners).

Trends in average weight can only be assessed for the longline fishery of Japan since 1970 and Taiwan,China since 1980. The number of specimens measured on Japanese longliners in recent years is, however, very low.

Catch-at-Size(Age) table: The Secretariat has not built CAS or CAA tables for black marlin. The paucity of size data available and other biological data (e.g. length-weight equations) for this species would make it very difficult any attempt to estimate CAS.

Striped Marlin (MLS)

- **Catch trends**

Striped marlins are caught almost exclusively under drifting longlines (98%) with remaining catches recorded under gillnets and troll lines (**Figure 15**). Striped marlins are the by-catch of industrial fisheries.

Catch trends for striped marlin are variable; however, this may reflect the level of reporting. The catches of striped marlin under drifting longlines have been changing over time, between 2,000 t and 8,000 t. The largest catches were recorded in 1993 (8,000 t). Current catches are around 3,000 tonnes.

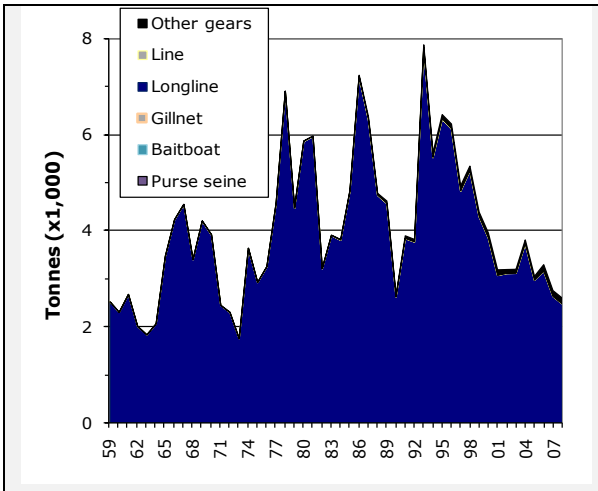

Figure 15: Catches of Striped Marlin per gear and year recorded in the IOTC Database (1959-2008)

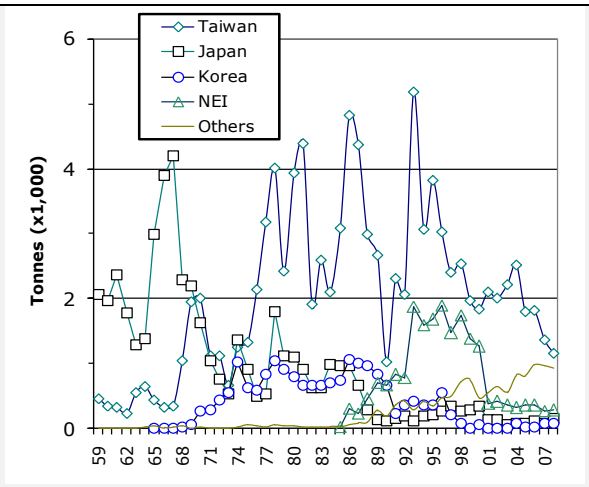

Figure 16: Catches of Striped marlin by fleet recorded in the IOTC Database (1959-2008)

Catches under drifting longlines have been recorded under **Taiwan,China Japan**, **Korea** fleets and, recently, **Indonesia** and several **NEI** fleets (**Figure 16**). Taiwan,China and Japan have reported large drops in the catches of striped marlin for its longline fleets in recent years. The reason for such decrease in catches is not fully understood.

- **Status of Fisheries Statistics at the IOTC**

Retained catches are reasonably well known (**Figure 17**) although they remain uncertain for some fleets:

- catches per species are not available for some industrial fisheries (longliners of **Indonesia** and **Philippines**).
- uncertain catches for non-reporting industrial longliners (**India**, **NEI**)
- catches are believed to be incomplete for most industrial fisheries for which the striped marlin is seldom the target species.
- conflicting catch reports: The catches for **South Korean** longliners reported as nominal catches and catches and effort are conflicting, with higher catches recorded in the CE table

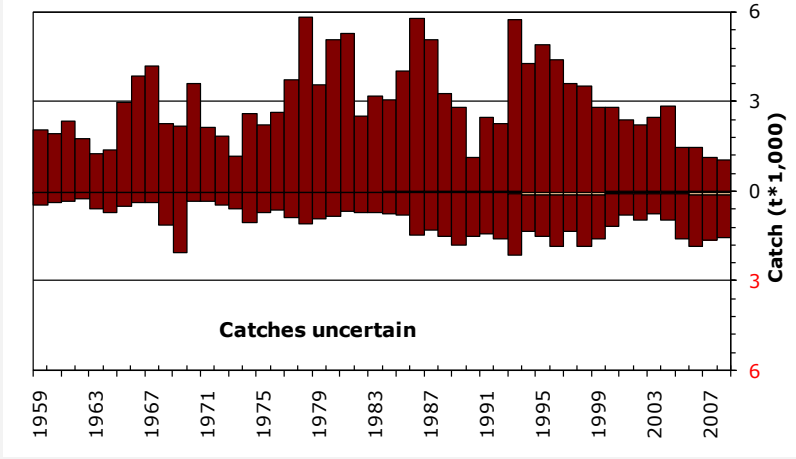

Figure 17. Uncertainty of annual catch estimates for striped marlin.

The amount of the catch below the zero-line has been categorised as uncertain according to the criteria given in the text. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets. Data as of June 2010

Changes to the catch series: There have not been significant changes to the catches of Striped marlin since the WPB in 2009 (**Figure 18**).

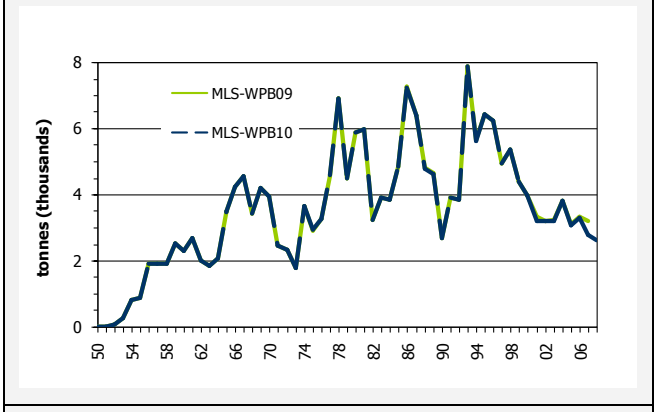

Figure 18: Striped Marlin: Catches used by the WPB in 2009 *versus* those estimated for the WPB10 (1950-2008)

Discards are believed to be low although they are unknown for most industrial fisheries, mainly longliners.

CPUE Series: Catch and effort series are available from some industrial longline fisheries although the catch might be incomplete (the catches of species other than the target are not always recorded in the logbooks). No catch and effort are available from sport fisheries, besides the sport fisheries of Kenya or industrial fisheries (**NEI** longliners).

Trends in average weight can only be assessed for the longline fishery of Japan since 1970 and Taiwan,China since 1980. The number of specimens measured on Japanese longliners in recent years is, however, very low.

Catch-at-Size(Age) table: The Secretariat has not built CAS or CAA tables for striped marlin. The paucity of size data available and other biological data (e.g. length-weight equations) for this species would make it very difficult any attempt to estimate CAS.

Indo-Pacific Sailfish (SFA)

Indo-Pacific Sailfish is caught mainly under gillnets (89%) with remaining catches recorded under troll and hand lines (5%), longlines (5%) or other gears (**Figure 19**). Current catches are around the 22,000 t.

The catches of sailfish have greatly increased since the mid-1980's in response to the development of a gillnet/longline fishery in Sri Lanka (**Figure 20**) and, especially, the extension in the area of operation of **Iranian** gillnet vessels to areas beyond the EEZ of Iran. Pakistan and India have also important fisheries for this species. Both **Iran** and **India** have reported large drops in the catches of sailfish in recent years.

The catches of **Iranian** gillnets (**Figure 20**) increased dramatically, more than six-fold, after the late nineties, from values averaging the 2,000t in the late 80's to a maximum of 12,600t in 2005. The catches decreased in 2006 and again in 2007, the current catches being less than half those recorded in 2005.

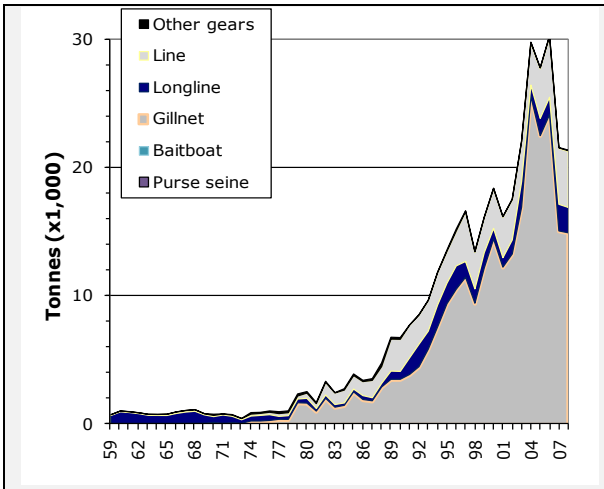

Figure 19: Catches of Indo-Pacific sailfish per gear and year recorded in the IOTC Database (1959-2008)

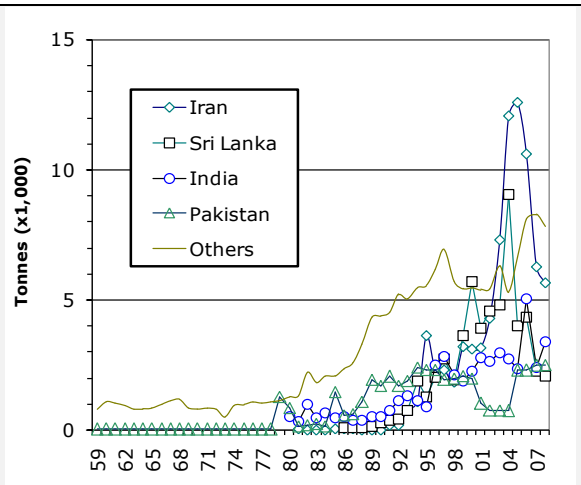

Figure 20: Catches of Indo-Pacific sailfish by fleet recorded in the IOTC Database (1959-2008)

The catches of sailfish under drifting longlines and other gears do not show any specific trends over the years. However, catches of this species are probably underreported due to its little commercial value.

- ## Status of Fisheries Statistics at the IOTC

Retained catches are poorly known (**Figure 21**) for most fisheries due to:

- catches by species not being available for many artisanal fisheries (mainly **India** and **Indonesia**)
- catches being very incomplete for most industrial fisheries for which this species is a by-catch. No catches are available for industrial purse seiners although they are known to occur
- catches being incomplete for many artisanal fisheries (gillnets of **Pakistan**, pole and lines of **Maldives**) due to under-reporting.
- a lack of catch data for most sport fisheries.

Changes to the catch series: There have not been significant changes to the catches of Indo-pacific sailfish since the WPB in 2009 (**Figure 22**).

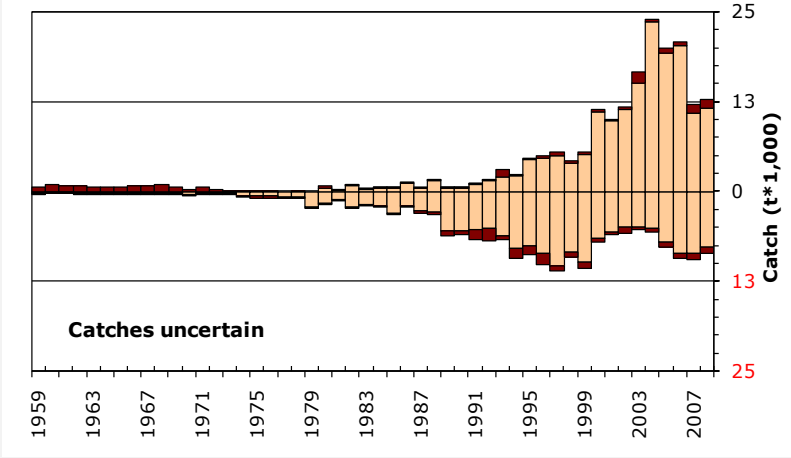

Figure 21. Uncertainty of annual catch estimates for IP sailfish.

The amount of the catch below the zero-line has been categorised as uncertain according to the criteria given in the text. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets. Data as of June 2010

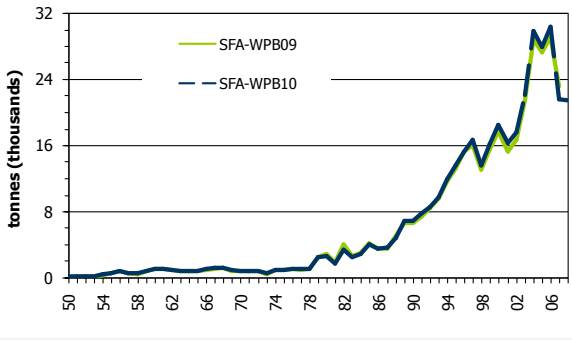

Figure 22: Indo-Pacific sailfish: Catches used by the WPB in 2009 *versus* those estimated for the WPB10 (1950-2008)

Discards are unknown for most industrial fisheries, mainly longliners (for which they are presumed to be moderate-high).

CPUE Series: Catch and effort series are available from some industrial longline fisheries but they are believed to be poor quality (catches of sailfish are incomplete). No catch and effort are available from sport fisheries besides the sport fisheries of Kenya. The catch and effort that are available from artisanal fisheries are believed inaccurate (no data from Iran and Pakistan and poor quality effort data for the gillnet/longline fishery of Sri Lanka).

Trends in average weight can only be assessed for the longline fishery of Japan since 1970 and the gillnet/longline fishery of Sri Lanka since the late 80s. The amount of specimens measured is, however, very low. Furthermore, the specimens discarded might be not accounted for in industrial fisheries, where they are presumed to be of lower size (possible bias of existing samples).

Catch-at-Size(Age) table: The Secretariat has not built CAS or CAA tables for IP sailfish. The paucity of size data available for this species would make it very difficult any attempt to estimate CAS.