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 as of June 2008. 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 01/05 *Mandatory statistical requirements for IOTC Members*.

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.

A list of recommendations for the improvement in the standing of the data on billfish species currently available at the secretariat is made for the consideration of the Working Party (next page).

The report covers the following areas:

- Overview
- Recommendations to improve the data available on billfish to IOTC
- Overview of billfish fisheries in the Indian Ocean:
    - Catch trends
    - Status of fisheries statistics for billfish species
- Progress achieved on the recommendations made by the WPB in 2006

Major data categories covered by the report

Nominal catches which are highly aggregated statistics for each species estimated per fleet, gear and year for a large area. If these data are not reported the Secretariat estimates a total catch from a range of sources (including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; and data reported by other parties on the activity of vessels (IOTC Resolution 07/04; IOTC Resolution 05/03) or on imports of bigeye tuna from vessels under the flag concerned (IOTC Resolution 01/06).

Catch and effort data which refer to the fine-scale data – usually from logbooks, and reported per fleet, year, gear, type of school, month, grid and species. Information on the use of fish aggregating devices (FADs) and supply vessels is also collected.

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

2. RECOMMENDATIONS TO IMPROVE THE DATA AVAILABLE TO IOTC

The following list of recommendations is provided by the Secretariat for the consideration of the WPB. The recommendations include actions which the Secretariat considers would lead to a marked improvement in the standing of the data currently available at the secretariat. In general, these recommendations are made over and above the existing obligations and technical specifications relating to the reporting of data.

1. Improve the certainty of catch and effort data from artisanal fisheries, by:

- Members having artisanal fisheries for swordfish and marlins, notably Sri Lanka, to improving their collection and reporting of species and gear information.
- Members having artisanal fisheries for sailfish, notably Iran , India and Pakistan, to providing catch and effort data for those fisheries
- Members increasing sampling coverage to obtain acceptable levels of precision in their catch and effort statistics.

2. Improve the certainty of catch and effort data from sport fisheries, by:

- Members having sport fisheries collecting and reporting catches and effort data to the Secretariat.

3. Improve the certainty of catch and effort data from industrial fisheries by:

- Members having industrial fisheries for swordfish, marlins and sailfish to improving their collection and reporting of species information.
- The Republic of Korea improving the consistency of its catch and effort statistics.
- Indonesia and Taiwan,China collecting and reporting catch and effort data for their fresh tuna longliner fleets.
- The EC-Spain to provide catches of marlins and sailfish by time and area strata.
- Members reporting on IOTC species taken as bycatch.
- Members ensuring that log book coverage is appropriate to produce acceptable levels of precision in their catch and effort statistics.
- Members increasing observer coverage to produce acceptable levels of precision in their estimates of retained catches and discards.

4. Increase the amount of size data available to the Secretariat by:

- The EC and India collecting and reporting size data for its longline fleets, notably for marlins and sailfish.
- Taiwan,China collecting and providing size data from their fresh tuna longliners.
- Japan increasing size sampling coverage from its longline fleet.
- Members having sport fisheries collecting and reporting size data to the Secretariat.
- Members collecting and reporting size data for artisanal fisheries for billfish, in particular gillnet fisheries of Iran, India and Pakistan.
- Members reviewing their existing sampling schemes to ascertain that the data collected are representative of their fisheries.

5. Reduce uncertainty in the following biological parameters important for the assessment of stock status of IOTC species by:

- Conversion relationships: Members submitting to the Secretariat the basic data that would be used to establish length-age keys, length-weight keys, processed weight-live weight keys for billfish species.
- Sex ratio: Members undertaking research on the sex ratios of billfish species.

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 to a peak of 35,000 tonnes in 1998.

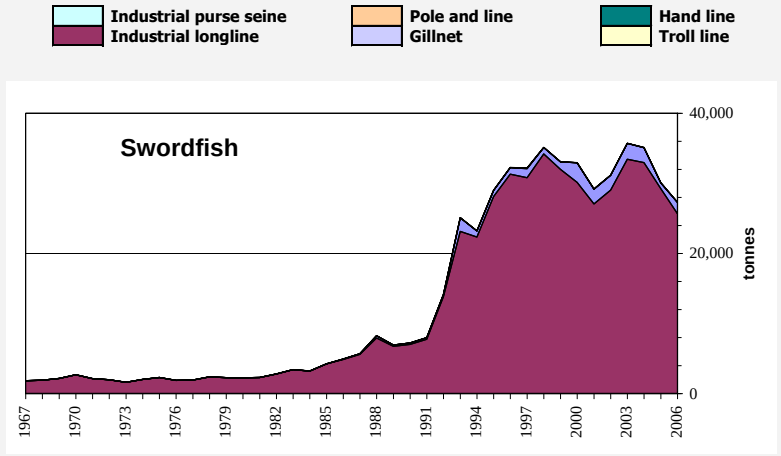

Figure 1: Catches of Swordfish per gear and year recorded in the IOTC Database (1967-2006)

Current catch levels are around 30,000 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[1]), all targeting swordfish, are the main reasons for this significant increase.

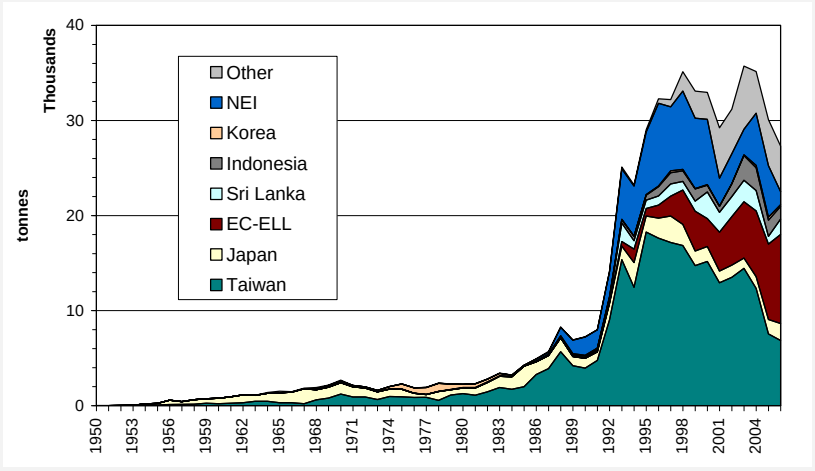

Figure 2: Catches of Swordfish by fleet recorded in the IOTC Database (1950-2006)

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

[1] Uruguay, Senegal, Guinea, etc.

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 2005 and 2006 (6,000 t) (**Figure 2**).

Around 5,000 t of swordfish 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 low catches estimated for 2006 (1,300 t) are consider preliminary and may increase as more information on the activities of non-reporting vessels become available (**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 over 2,500 tonnes were recorded in 1994 and 1997.

In Sri Lanka, swordfish catches have fluctuated between 1,000 and 3,000 t over the last decade (**Figure 2**). These are taken mostly by boats that use a combination of drifting gillnet and longlines. This said, the first results from the sampling conducted by NARA[2] during 2005 and 2006 with the support of the IOTC-OFCF[3] Project in different locations in Sri Lanka appear to indicate that the historical catches of this species will need to be revisited in the future.

The catches of Indonesian fresh-tuna longliners operating in Indian Ocean waters increased steadily until 2003 (2,600 t), decreasing in 2005 and 2006. It is, however, likely that the catches recorded for years before 2003 are lower than those that really occurred.

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

Spanish, Portuguese and UK longliners coming from the Atlantic Ocean have been operating since the early 90s with current catches exceeding the 8,500 t (EC-ELL on **Figure 2**).

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 (**Figure 2)**. It is, however, likely that the catches recorded for Korea are lower than those that really occurred as the catches recorded as catches and effort are usually higher than the nominal catches reported by Korea.

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

Retained catches are generally well known; catches are uncertain because:

- non-reporting industrial longliners (NEI): The amount of non-reporting longliners targeting swordfish has been increasing in recent years due to the shift of vessels from the Atlantic Ocean to the Indian Ocean.

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

[3] Overseas Fisheries Cooperation Foundation of Japan

- 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.

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

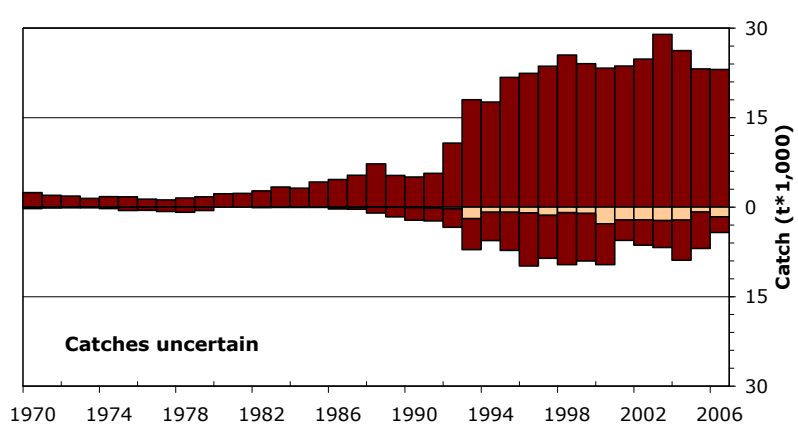

Figure 3. Uncertainty of annual catch estimates for swordfish.

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 2008

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 throughout the 90s [Indonesia, fresh-tuna longliners from Taiwan,China, Non-reporting longliners (NEI)] (Figure 4). The catch and effort that are available from artisanal fisheries are believed inaccurate (poor quality effort data for the gillnet/longline fishery of Sri Lanka).

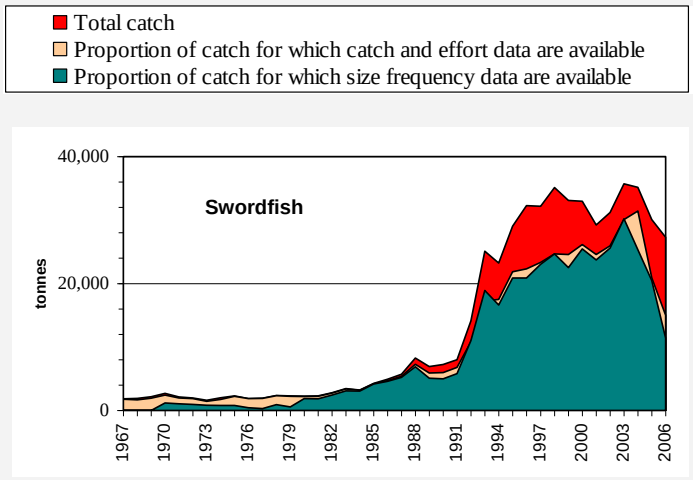

Figure 4: Proportion of the total catch (NC) of swordfish for which catch and effort data (CE) or size frequency data (SF) are available

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 for longliners from Japan) (Figure 4).

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

- a lack of size data before the early-80s and from artisanal fisheries (Sri Lanka)
- a paucity of size data available from industrial longliners since the early-1990s (Japan, Seychelles, Philippines, India, China)
- a paucity of catches per area available for some industrial fleets (NEI)
- a paucity of the biological data available, notably sex-ratio and sex-length-age keys

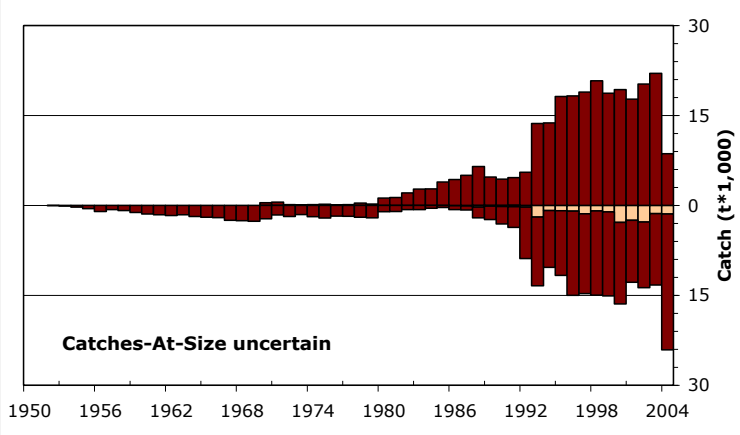

Figure 5. Uncertainty of catch at size data for swordfish.

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 February 2006

Blue Marlin (BUM)

- **Catch trends**

Blue marlins are caught mainly under drifting longlines (65%) and gillnets (34%) with remaining catches recorded under troll and hand lines (**Figure 6**). 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.

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 1998 (10,000 tonnes), as it is the case with the swordfish. Current catches are around 7,000 tonnes. Catches under drifting longlines have been recorded under Taiwan, Japan fleets and, recently, Indonesia and several NEI fleets (Figure 7).

The catches of blue marlin in Sri Lanka (Figure 7) 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 3,500 t.

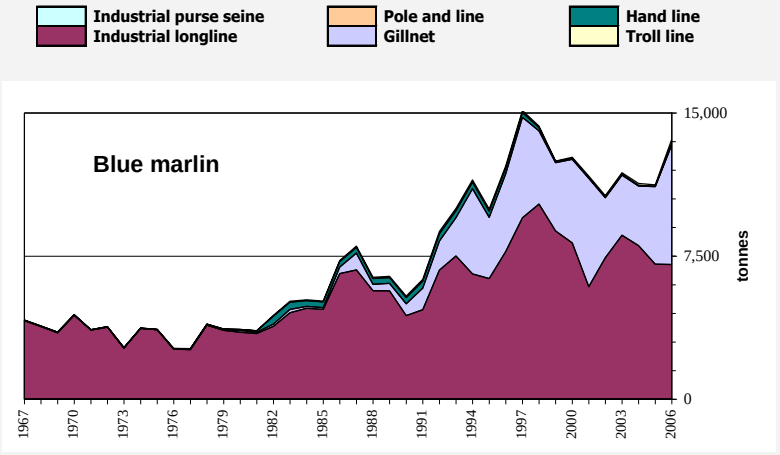

Figure 6: Catches of Blue Marlin per gear and year recorded in the IOTC Database (1967-2006)

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

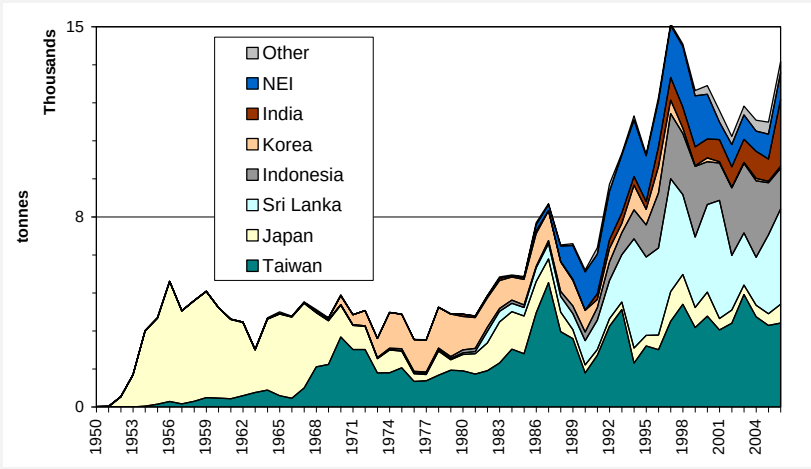

Figure 7: Catches of Blue marlin by fleet recorded in the IOTC Database (1950-2006)

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

Retained catches are poorly known for most fisheries due to:

- catches per 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 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 several sport fisheries (Mauritius, Madagascar).

Discards are unknown for most industrial fisheries, mainly longliners.

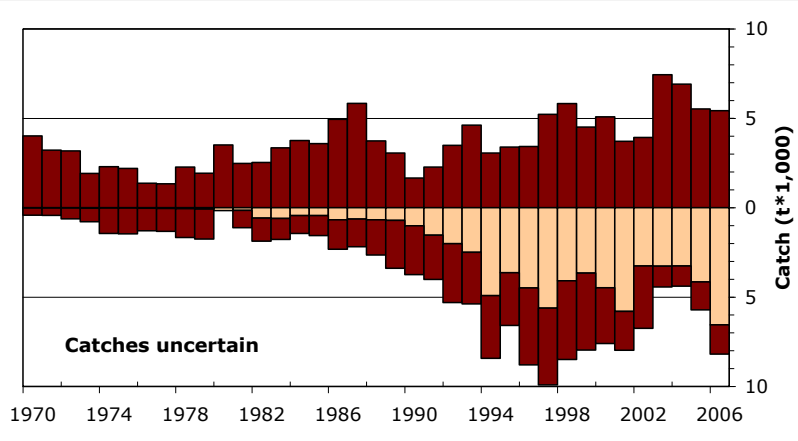

Figure 8. Uncertainty of annual catch estimates for blue marlin.

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 2008

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/longlines of Sri Lanka) 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. The number of specimens measured 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 for this species made it very difficult any attempt to estimate CAS.

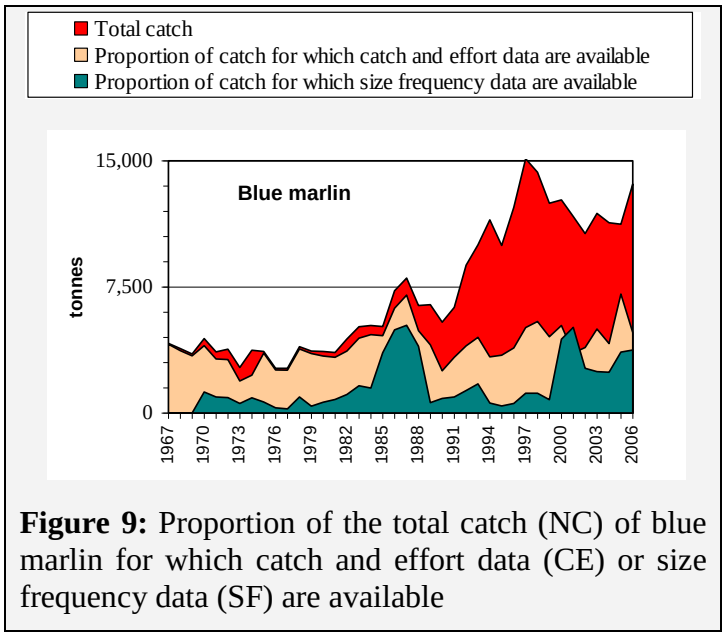

Figure 9: Proportion of the total catch (NC) of blue marlin for which catch and effort data (CE) or size frequency data (SF) are available

Black Marlin (BLM)

- **Catch trends**

Black marlins are caught mainly under drifting longlines (56%) and gillnets (40%) with remaining catches recorded under troll and hand lines (**Figure 10**). Black marlins are the by-catch of industrial and artisanal fisheries.

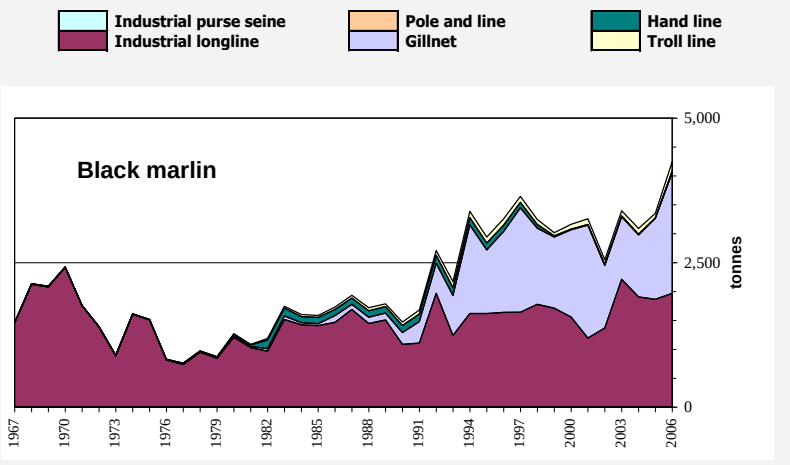

Figure 10: Catches of Black Marlin per gear and year recorded in the IOTC Database (1967-2006)

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, Japan, Korea fleets and, recently, Indonesia and several NEI fleets (Figure 11).

The catches of black marlin in Sri Lanka (Figure 11) 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 (1,500 t) was recorded in 1994, 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 recorded under each species.

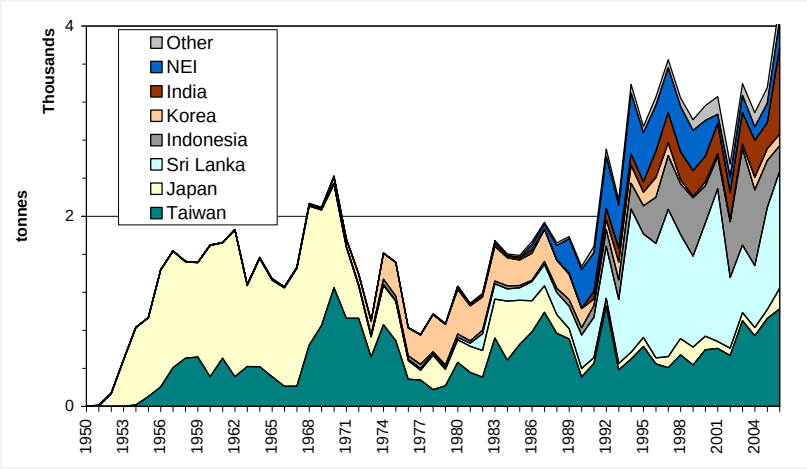

Figure 11: Catches of Black marlin by fleet recorded in the IOTC Database (1950-2006)

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

Retained catches are poorly known for most fisheries due to:

- catches per 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 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 several sport fisheries (Mauritius, Madagascar).

Discards are unknown for most industrial fisheries, mainly longliners.

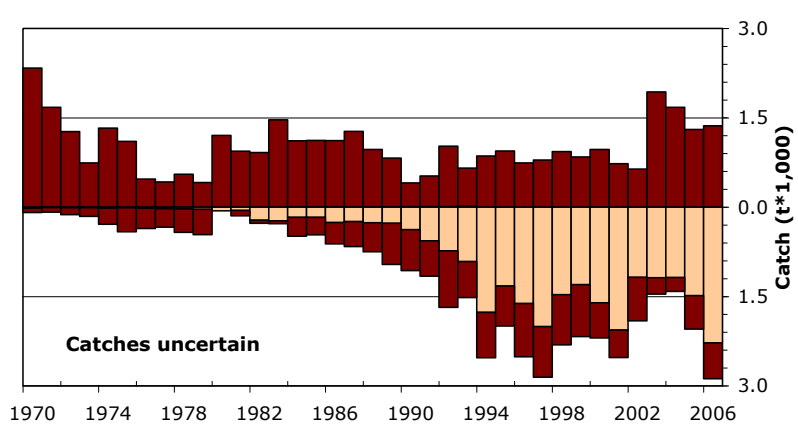

Figure 12. Uncertainty of annual catch estimates for black marlin.

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 2008

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/longlines of Sri Lanka) or industrial fisheries (NEI longliners and all purse seiners).

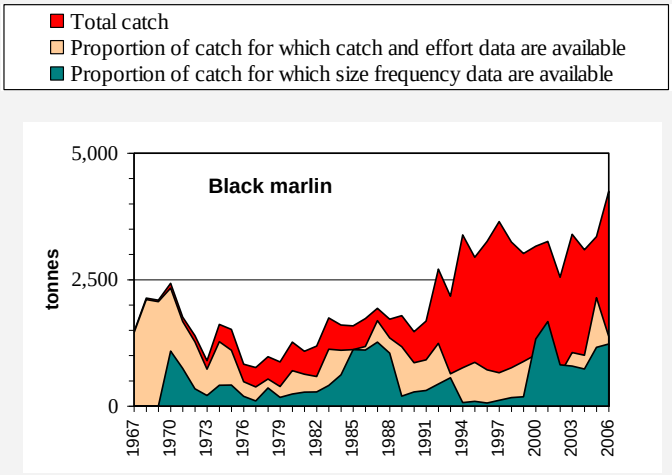

Figure 13: Proportion of the total catch (NC) of black marlin for which catch and effort data (CE) or size frequency data (SF) are available

Trends in average weight can only be assessed for the longline fishery of Japan since 1970. The amount of specimens measured 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 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 14**). 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.

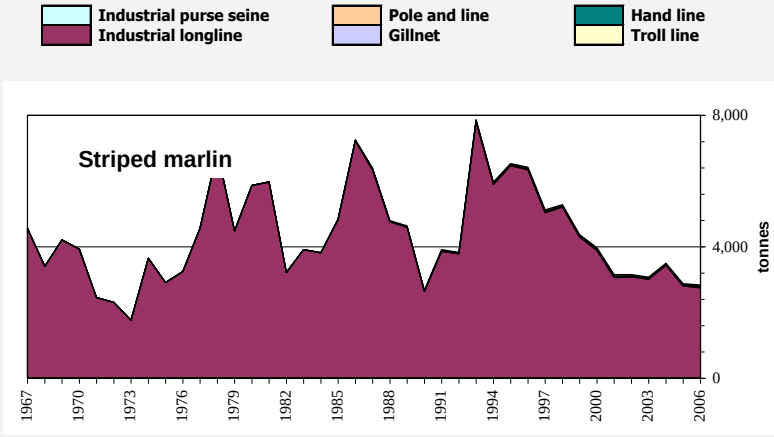

Figure 14: Catches of Striped Marlin per gear and year recorded in the IOTC Database (1967-2006)

Catches under drifting longlines have been recorded under Taiwan, Japan, Korea fleets and, recently, Indonesia and several NEI fleets (Figure 15).

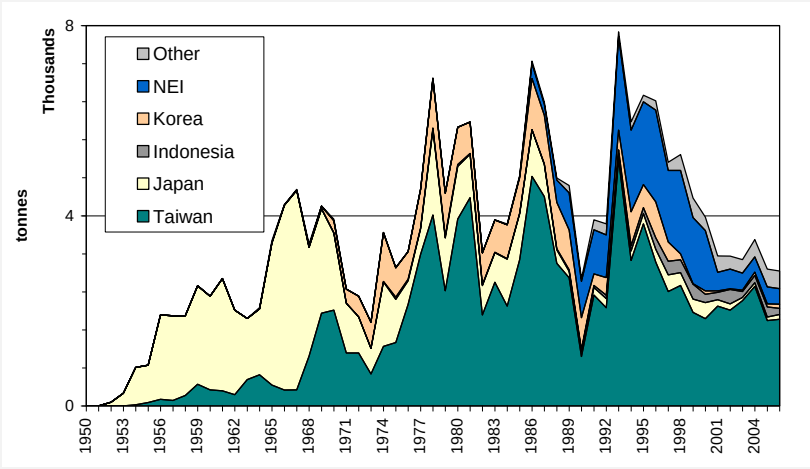

Figure 15: Catches of Striped marlin by fleet recorded in the IOTC Database (1950-2006)

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

Retained catches are reasonably well known; catches are uncertain because:

- 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
- a lack of catch data from several sport fisheries (Mauritius, Madagascar).

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

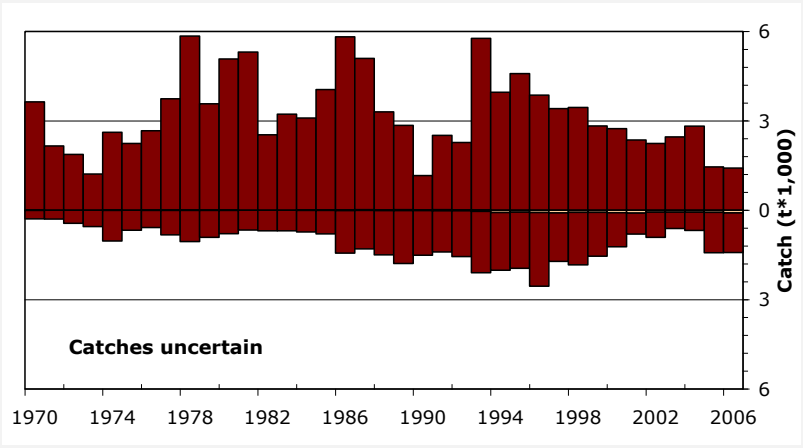

Figure 16. Uncertainty of annual catch estimates for striped marlin.

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 2008

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).

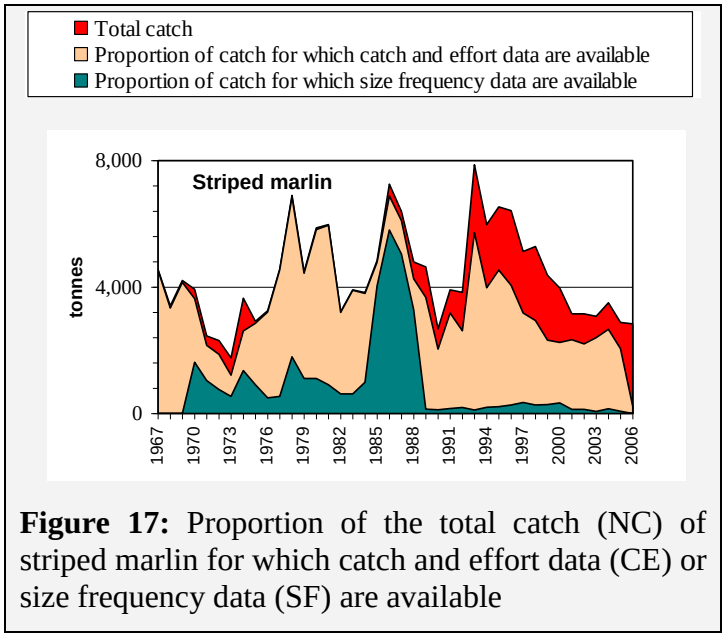

Figure 17: Proportion of the total catch (NC) of striped marlin for which catch and effort data (CE) or size frequency data (SF) are available

Trends in average weight can only be assessed for the longline fishery of Japan since 1970. The amount of specimens measured 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 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 18**).

The catches of sailfish have greatly increased since the mid-1980's in response to the development of the gillnet / longline fishery in Sri Lanka (Figure 19) 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

Current catches are around the 25,000 t.

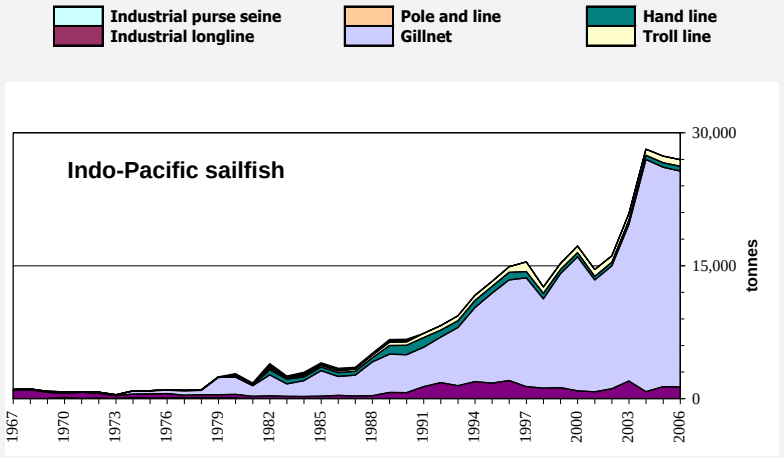

Figure 18: Catches of Indo-Pacific sailfish per gear and year recorded in the IOTC Database (1967-2006)

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

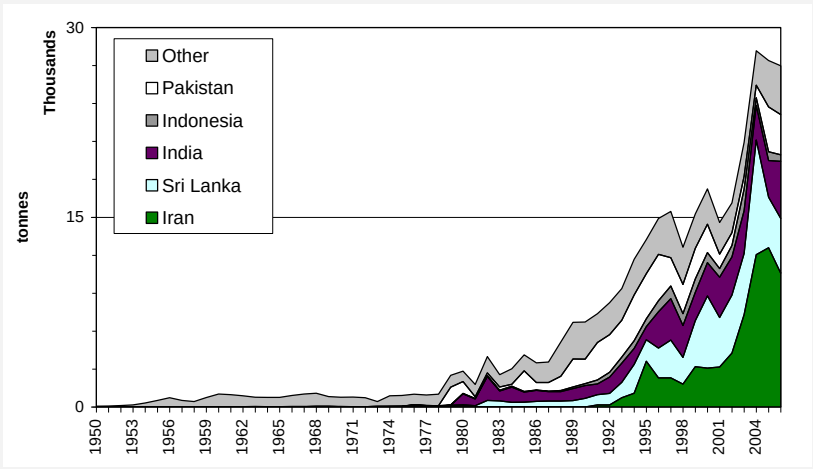

Figure 19: Catches of Indo-Pacific sailfish by fleet recorded in the IOTC Database (1950-2006)

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

Retained catches are poorly known for most fisheries due to:

- catches per 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 several sport fisheries (Mauritius, Madagascar).

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

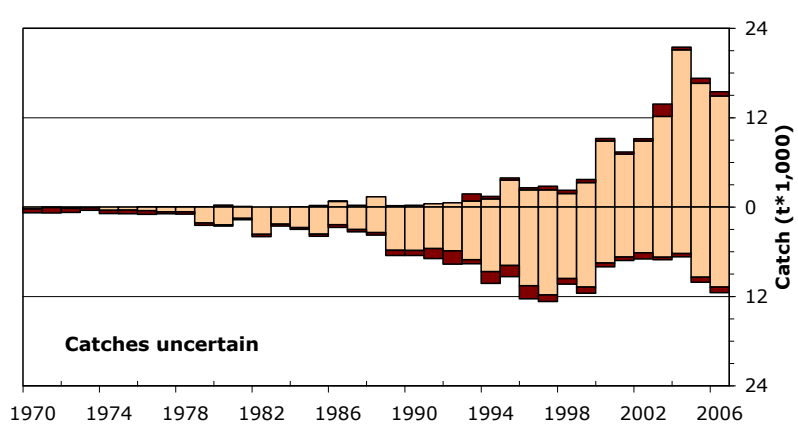

Figure 20. Uncertainty of annual catch estimates for IP sailfish.

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 2008

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).

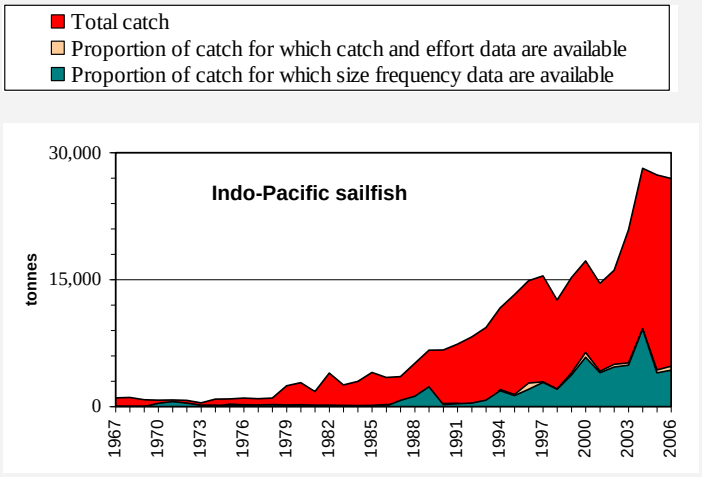

Figure 21: Proportion of the total catch (NC) of IP sailfish for which catch and effort data (CE) or size frequency data (SF) are available

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.

4. PROGRESS ACHIEVED ON THE RECOMMENDATIONS MADE IN 2006

6.3 Recommendations concerning data

1) Taiwanese data: The WPB recognized the valuable contribution in new data and analyses provided by Taiwanese scientists, particularly in relation to information on gear configuration of Taiwanese longliners (e.g. hooks per basket) and the heterogeneity of the configuration among vessels. It was noted that these data were only collected after 1995. In the Taiwanese analyses, data prior to 1979 were aggregated by 5x5 degree areas. Taiwan,China reported that since 2003 their longline vessels logbooks has included a field for time of setting the line, which the WPB noted was critical for evaluating the targeting practices of this important fleet. **It is also recommended that data related to the use of light-sticks and bait types should be recorded for catch rate standardization.** Catch, effort and size data for the Taiwanese deep-freezing longline fleet were made available for use at the meeting, and a Taiwanese scientist provided valuable scientific support to the WPB. These efforts are acknowledged and appreciated.

To date, the Secretariat has not received new information concerning the above recommendation.

2) Marlins and sailfishes: there is a critical lack of statistical data for this group of fishes. **It is strongly recommended to better estimate catches and discards by species and by gear, by size and sex.**

Total catches: the catches of marlins and sailfish are considered incomplete due to:

- *The non-reporting of by-catches and/or discards from most industrial longline fisheries*
- *The aggregation of catches of marlins and sailfish and the catches of non-billfish species (e.g. TUX, referring to unidentified tuna, seerfish and billfish species) on many artisanal and some industrial fisheries. This makes it very difficult for the Secretariat to derive catches per species from the aggregated catches.*

Breakdown by gear and species: The identification of marlins per species is still very poor on some IOTC fisheries, notably:

- *Gillnet-longline fishery of Sri Lanka: Mislabelling of blue marlin and black marlin is likely to occur. It is believed that the catches of these two species have been frequently switched in the reports. Catches are not available for gillnets and longlines separately.*
- *Some deep-freezing longline fleets (Philippines, Korea, China): The catches of marlins and sailfish are usually reported aggregated.*

- *Fresh-tuna longline fisheries (Indonesia, Taiwan,China): The catches of marlins and sailfish are usually reported aggregated. The identification of marlins and sailfish is done in port, on specimens highly processed and usually frozen. The catches are usually aggregated for this reason.*

Catches per sex: To date, no catches of marlins and sailfish have been reported per sex.

Length frequency data: The Secretariat has recently received length frequency data for striped marlin, black marlin and blue marlin for the Taiwanese deep-freezing longline fishery from 1980 to 2006. The amount of data available for the sailfish is still very poor.

3) Purse seine landings: It is strongly recommended that past and future catches of marlins taken as by-catches by purse seiners be estimated. The historical yearly landing of marlins by tropical purse seiners could be estimated from observer data, and in the future, landings data should be monitored (preferably by species and by size). **It is also recommended to develop permanent observer programmes on these fleets, at least at a small scale, in order to better estimate by-catches of billfishes.**

Catches of billfish from industrial purse seine fleets: To date, the Secretariat has not received new information concerning this issue.

Implementation of observer programmes: The Secretariat is aware of observer programmes on both EC and Iran purse seine fleets. The estimation of bycatches of billfish species may be possible in the future from the data collected through these programs.

4) Sex ratio by size: It is desirable to sample the size of swordfish and marlins as a function of their sex whenever possible.

To date, the Secretariat has not received new information concerning the above recommendation.

5) IOTC-OFCF project: The WPB emphasizes its support to the IOTC-OFCF project and **recommends that priority be given to countries with substantial catches of swordfish and billfishes which are not properly monitored or are reported as aggregates** (e.g.: Sri Lanka gillnet fisheries).

The IOTC-OFCF Program in Sri Lanka was discontinued in 2007. Unfortunately it is thought hat marlins are still poorly identified. Furthermore, time-area coverage has decreased since the end of the IOTC-OFCF activities.

The situation for other fisheries is described on 2 above.

6) Written statistical reports should be obtained from scientists from each fishing country on all fisheries, even when a country cannot participate in the working group meeting. The IOTC Secretariat should request these reports before WPB meetings.

To date, the Secretariat has not received any written reports concerning the above, other than routine data reports.

7) Billfishes length measurements: Length data should be reported to the IOTC in a standard format to facilitate comparison of data from different countries**. When these lengths are collected in a non-standard way, they should be converted to the standard**

form of reporting using robust methods. The basic data used to establish these conversions should be kept by IOTC. The WPB strongly recommends that size measurements should be always taken in straight length, never in round length (this is because the condition factors and shapes of fishes are highly variable at a given size between time and area strata).

The Secretariat receives size data in different forms. The Secretariat standardized all the size data that was available preparing tables by species in fork length (lower-jaw fork length). The equations used to convert from processed size to standard (fork) length are available with the Secretariat.