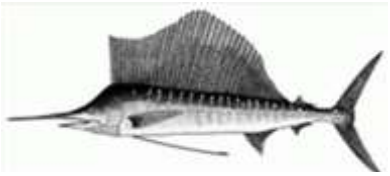
# DRAFT: EXECUTIVE SUMMARY: INDO-PACIFIC SAILFISH

Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien
iotc ctoi



## Status of the Indian Ocean Indo-Pacific sailfish (SFA: *Istiophorus platypterus*) resource

**TABLE 1**. Indo-Pacific sailfish: Status of Indo-Pacific sailfish (*Istiophorus platypterus*) in the Indian Ocean

| **Area**[1] | **Indicators** | | **2013 stock status determination** |
|---|---|---|---|
| Indian Ocean | Catch 2012:<br>Average catch 2008–2012: | 28,449t<br>26,283t | **Uncertain** |
| | MSY (range):<br>$F_{2012}/F_{MSY}$ (range):<br>$SB_{2012}/SB_{MSY}$ (range):<br>$SB_{2012}/SB_0$ (range): | unknown<br>unknown<br>unknown<br>unknown | |

[1]Boundaries for the Indian Ocean = IOTC area of competence

| **Colour key** | Stock overfished($SB_{year}/SB_{MSY} < 1$) | Stock not overfished ($SB_{year}/SB_{MSY} \geq 1$) |
|---|---|---|
| Stock subject to overfishing($F_{year}/F_{MSY} > 1$) | | |
| Stock not subject to overfishing ($F_{year}/F_{MSY} \leq 1$) | | |

### INDIAN OCEAN STOCK – MANAGEMENT ADVICE

***Stock status.*** No quantitative stock assessment is currently available for Indo-Pacific sailfish in the Indian Ocean; due to a lack of fishery data and poor quality of available data for several gears, only preliminary stock indicators can be used. A data poor approach was pursued by the WPB in 2013, though results were considered preliminary and require further sensitivity analysis. Therefore stock status remains **uncertain** (Table 1). However, aspects of the biology, productivity and fisheries for this species combined with the data poor status on which to base a more formal assessment are a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted. Given the limited data being reported for coastal gillnet fisheries, and the importance of sports fisheries for this species, efforts must be made to rectify these information gaps. Records of stock extirpation in the Gulf should also be examined to examine the degree of localised depletion in Indian Ocean coastal areas.

***Outlook.*** The estimated increase in coastal gillnet catch and effort in recent years is a substantial cause for concern for the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. The following key points should be noted:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches of Indo-Pacific sailfish are highly uncertain and need to be further reviewed.
- improvement in data collection and reporting, particularly for coastal gillnet and sports fisheries, is required to further assess the stock.
- research emphasis on improving indicators and further exploration of stock assessment approaches for data poor fisheries are warranted.

## SUPPORTING INFORMATION

*(Information collated from reports of the Working Party on Billfish and other sources as cited)*

### CONSERVATION AND MANAGEMENT MEASURES

Indo-Pacific sailfish (*Istiophorus platypterus*) in the Indian Ocean is currently subject to a number of Conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 13/03 on the recording of catch and effort by fishing vessels in the IOTC area of competence
- Resolution 13/07 concerning a record of licensed foreign vessels fishing for IOTC species in the IOTC area of competence and access agreement information

- Resolution 12/11 *on the implementation of a limitation of fishing capacity of Contracting Parties and Cooperating Non-Contracting Parties*
- Resolution 11/04 *on a regional observer scheme*
- Resolution 10/02 *mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's)*
- Resolution 10/08 *concerning a record of active vessels fishing for tunas and swordfish in the IOTC area*

## FISHERIES INDICATORS

### *Indo-Pacific sailfish: General*

Indo-Pacific sailfish (*Istiophorus platypterus*) is a large oceanic apex predator that inhabits tropical and subtropical Indo-Pacific oceans (Fig. 1). Table 2 outlines some key life history parameters relevant for management. There is limited reliable information on the catches of this species and no information on the stock structure or growth and mortality in the Indian Ocean.

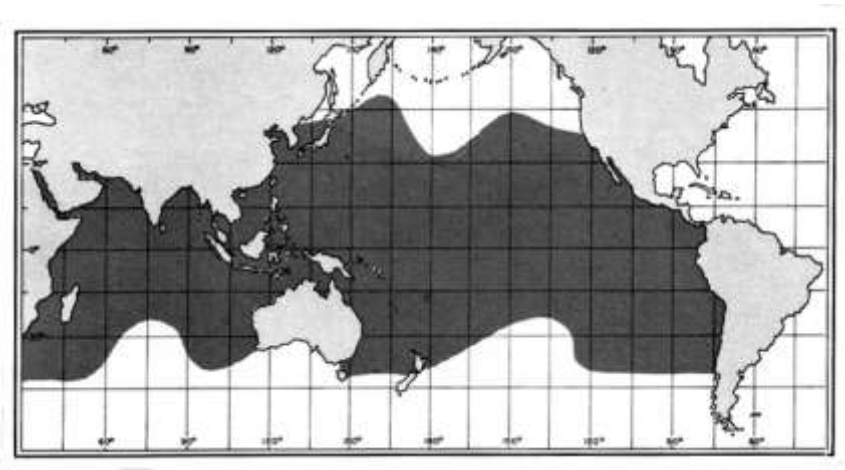


**Fig. 1. Indo-Pacific sailfish**: The worldwide distribution of Indo-Pacific sailfish (Source: Nakamura, 1984)

**TABLE 2.** Indo-Pacific sailfish: Biology of Indian Ocean Indo-Pacific sailfish (*Istiophorus platypterus*)

| Parameter | Description |
|---|---|
| Range and stock structure | Found throughout the tropical and subtropical regions of the Pacific and the Indian Oceans. It is mainly found in surface waters above the thermocline, close to coasts and islands in depths from 0 to 200 m. Indo–Pacific sailfish is a highly migratory species and renowned for its speed and (by recreational fishers) for its jumping behaviour — one individual has been reported burst swimming at speeds in excess of 110 km/h. The stock structure of Indo-Pacific sailfish in the Indian Oceans is uncertain: apparently there are local reproductively isolated stocks. At least one stock was reported in the Persian Gulf with no or very little intermixing with open Indian Ocean stocks. However outside of the Gulf no stock differentiation has been determined; thus for the purposes of assessment, one pan-ocean stock is assumed. However, spatial heterogeneity in stock indicators (catch–per–unit–effort trends) for other billfish species indicates that there is potential for localised depletion. |
| Longevity | Females: 11–13 years; Males: 7–8 years |
| Maturity (50%) | **Age**: females n.a.; males n.a.<br>**Size**: females n.a.; males n.a. |
| Spawning season | Spawning in Indian waters occurs between December to June with a peak in February and June. In subtropical waters of the southern hemisphere spawning is associated with warmer months: in Mozambique Channel and around Reunion Island high percentage of ripe females occurs in December. |
| Size (length and weight) | Maximum: 350 cm FL and weight 100 kg total weight.<br>The Indo-Pacific sailfish is one of the smallest-sized billfish species, but is relatively fast growing. Individuals may grow to over 3 m and up to 100kg, and live to around 7 years.<br>Young fish grow very quickly in length then put on weight later in life. Sexual dimorphism in size, growth rates and size and age at maturity - females reach larger sizes, grow faster and mature later than males.<br>Females: 300 cm LJFL, 50+ kg total weight; Males: 200 cm LJFL, 40+ kg total weight in the Indian Ocean.<br>Recruitment into the fishery: varies by fishing method, apparently at age 0+ and size less than 100 cm LJFL for artisanal fleets. The average weight of fish caught in the Kenyan sports fishery is ~25 kg whole weight. |

n.a. = not available.

Sources: Nakamura 1985, Hoolihan 2003, 2004, 2006, Speare 2003, Hoolihan & Luo 2007, Sun et al. 2007, Froese & Pauly 2009, Ndegwa & Herrera 2011

***Indo-Pacific sailfish: Catch trends***

Indo-Pacific sailfish is caught mainly under gillnets (79%) with remaining catches recorded by troll and hand lines (17%), longlines (4%) or other gears (Table 2, Fig. 3). The average annual catch over recent years is estimated at over 28,000 t. In recent years, the countries attributed with the highest catches of Indo-Pacific sailfish are situated in the Arabian Sea (India, I.R. Iran, Pakistan and Sri Lanka). Smaller catches are reported for line fishers in Comoros and Mauritius and by Indonesia longliners. This species is also a popular catch for sport fisheries (e.g. Kenya, Mauritius, Seychelles).

Catches of Indo-Pacific sailfish greatly increased since the mid-1990's (from around 5,000 t in the early 1990s to almost 29,000 t in 2011). The increases are largely due to the development of a gillnet/longline fishery in Sri Lanka (Fig. 4) and, especially, the extension in the area of operation of Iranian gillnet vessels to areas beyond the EEZ of I.R. Iran. In the case of Iranian gillnets (Fig. 5), catches have increased from less than 1,000 t in the early 1990's to over 9,800 t in 2012.

Catches of Indo-Pacific sailfish under drifting longlines (Table 3) and other gears have also increased – to a lesser extent than catches from gillnet – from around 1,500 t to over 2,500 t in recent years. However, it is likely that longline fleets under report catches of this species due to its little commercial value. In recent years, deep-freezing longliners from Japan have reported catches of Indo-Pacific sailfish in the central western Indian Ocean, between Sri Lanka and the Maldives and the Mozambique Channel (Fig. 4).

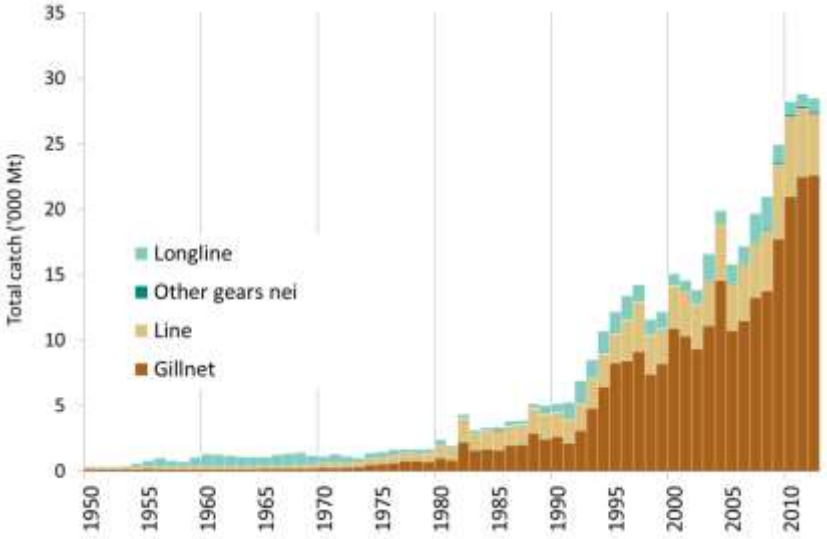



**Fig. 2. Indo-Pacific sailfish**. Catches of Indo-pacific sailfish by gear and year recorded in the IOTC Database (1950–2012) (Data as of October 2013).

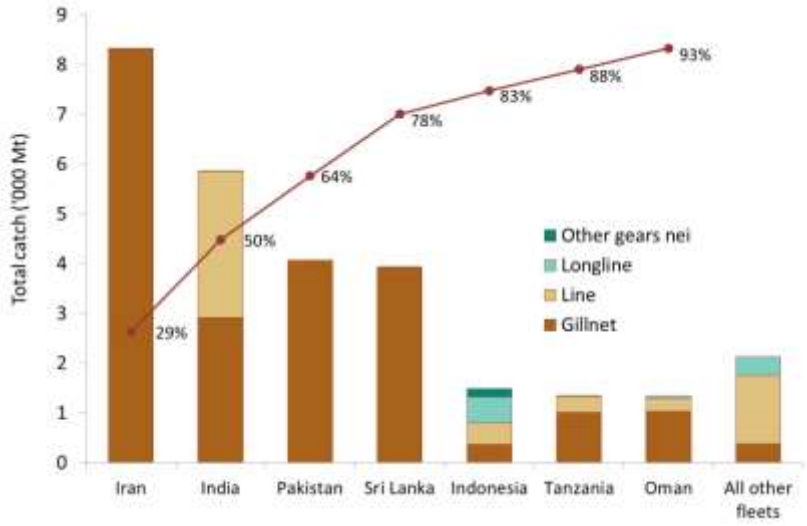



**Fig. 3. Indo-Pacific sailfish**: Average catches in the Indian Ocean over the period 2009–12, by country. Countries are ordered from left to right, according to the importance of catches of black marlin reported. The red line indicates the (cumulative) proportion of catches of Indo-Pacific sailfish for the countries concerned, over the total combined catches of this species reported from all countries and fisheries (Data as of October 2013).

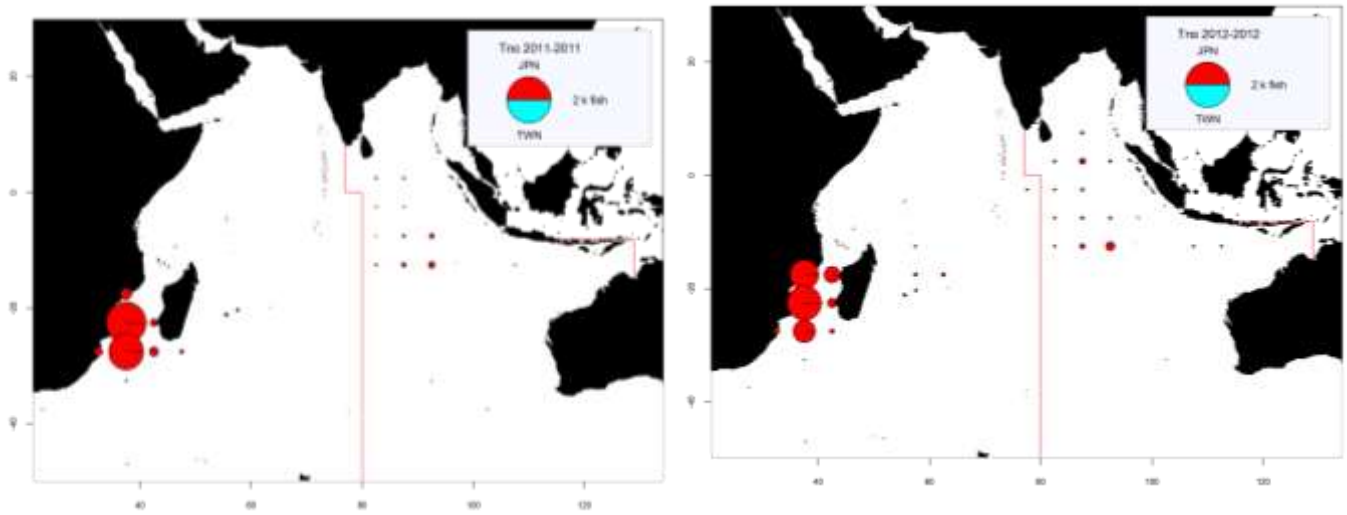


**Fig. 4a-b. Indo-Pacific sailfish**: Time-area catches (in number of fish) of Indo-Pacific sailfish as reported for the longline fisheries of Japan (JPN) for 2011 and 2012 by fleet.

**TABLE 2. Indo-Pacific sailfish**: Best scientific estimates of the catches of Indo-Pacific sailfish by type of fishery for the period 1950–2012 (in metric tons). Data as of October 2013.

| Fishery | By decade (average) | | | | | | By year (last ten years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1950s | 1960s | 1970s | 1980s | 1990s | 2000s | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| LL | 299 | 819 | 446 | 338 | 1,412 | 1,470 | 2,025 | 960 | 1,440 | 1,405 | 2,227 | 2,532 | 1,307 | 1,000 | 941 | 1,010 |
| GN | 165 | 181 | 507 | 1,809 | 6,047 | 12,313 | 11,095 | 14,564 | 10,718 | 11,471 | 13,266 | 13,758 | 17,708 | 20,974 | 22,494 | 22,596 |
| HL | 171 | 213 | 456 | 1,430 | 2,499 | 3,982 | 3,402 | 4,269 | 3,574 | 4,220 | 4,073 | 4,549 | 5,749 | 6,071 | 5,207 | 4,712 |
| OT | 0 | 0 | 3 | 44 | 42 | 81 | 52 | 63 | 57 | 80 | 81 | 149 | 168 | 175 | 184 | 131 |
| **Total** | **634** | **1,212** | **1,411** | **3,620** | **10,000** | **17,847** | **16,574** | **19,856** | **15,789** | **17,177** | **19,646** | **20,988** | **24,931** | **28,219** | **28,826** | **28,449** |

**Fisheries:** Gillnet (**GN**); Longline (**LL**); Hook-and-Line (**HL**), including handline, trolling, baitboat, and sport fisheries; Other gears (**OT**)

### *Uncertainty of time–area catches*

Minimum catch estimates have been derived from very small amounts of information and are therefore highly uncertain. Unlike the other billfish, Indo-Pacific sailfish are probably more reliably identified because of the large and distinctive first dorsal fin that runs most of the length of the body.

Retained catches are poorly known for most fisheries (Fig. 5) due to:

- Catch reports often refer to total catches of all billfish species combined; catches by species are estimated by the Secretariat for some artisanal (gillnet/longline fishery of Sri Lanka and artisanal fisheries of India and Pakistan) and industrial (longliners of Indonesia and Philippines) fisheries.
- Catches of IP sailfish reported for some fisheries may refer to the combined catches of more than one species of billfish, in particular marlins and shortbill spearfish (gillnet fishery of Iran and many coastal fisheries).
- Catches likely to be incomplete for some artisanal fisheries (gillnets of Pakistan, pole and lines of Maldives) due to under-reporting.
- Catches are likely to be incomplete for industrial fisheries for which the Indo-Pacific sailfish is not a target species.
- A lack of catch data for most sport fisheries.
- **Discards** are unknown for most industrial fisheries, mainly longliners (for which they are presumed to be moderate-high).

**Changes to the catch series**: Catches of sailfish since the WPB meeting in 2012 have been revised downwards, in particular around the mid-2000s. The changes mostly affect catch estimates for I.R. Iran, which have been reduced following improvements in the estimation of catch-by-species (specifically, the disaggregation of reported catches of sailfish that likely refer to a combination of billfish species).

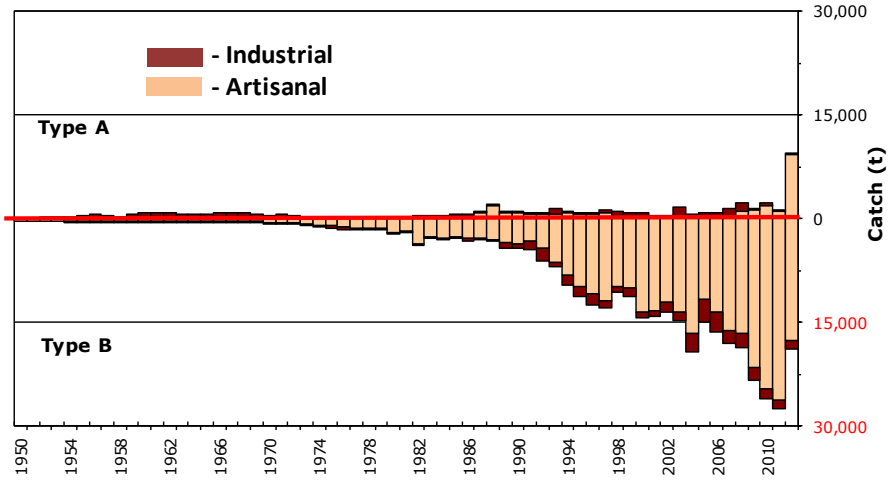



**Fig. 5**. Indo-Pacific sailfish: Uncertainty of annual catch estimates for Indo-Pacific sailfish. (Data as of October 2013). Catches below the zero-line (Type B) refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat), do not report catch data by gear and/or species (broken by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

***Indo-Pacific sailfish: Effort trends***

Total effort from longline vessels flagged to Japan, Taiwan,China and EU,Spain by five degree square grid in 2011 and 2012 are provided in Fig. 6, and total effort from purse seine vessels flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2011 and 2012 are provided in Fig. 7.

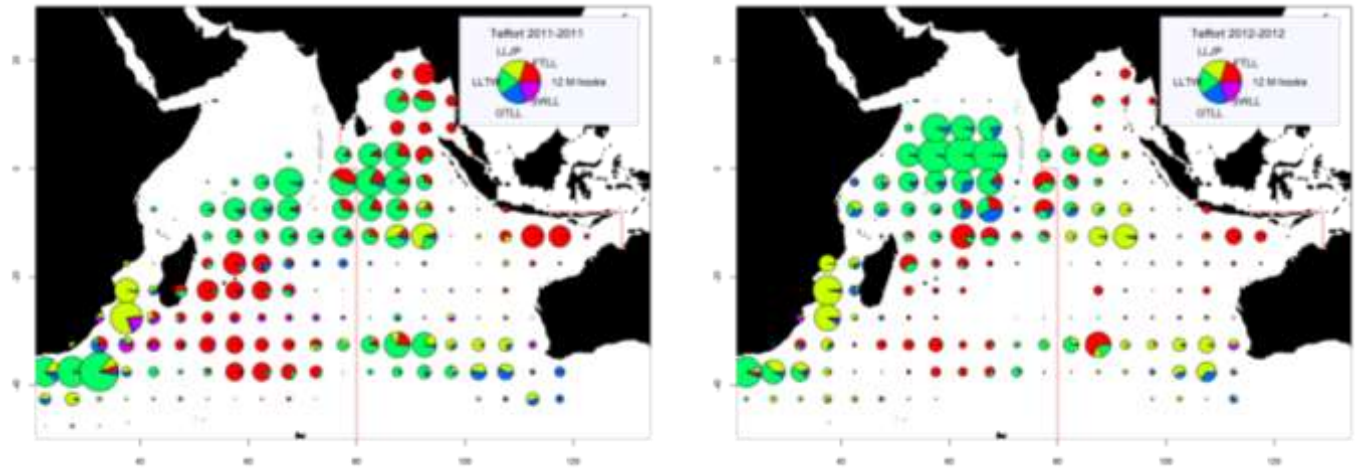


**Fig. 6.** Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2011 (left) and 2012 (right) (Data as of October 2013)
LLJP (light green): deep-freezing longliners from Japan
LLTW (dark green): deep-freezing longliners from Taiwan,China
SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)
FTLL (red) : fresh-tuna longliners (China, Taiwan,China and other fleets)
OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)

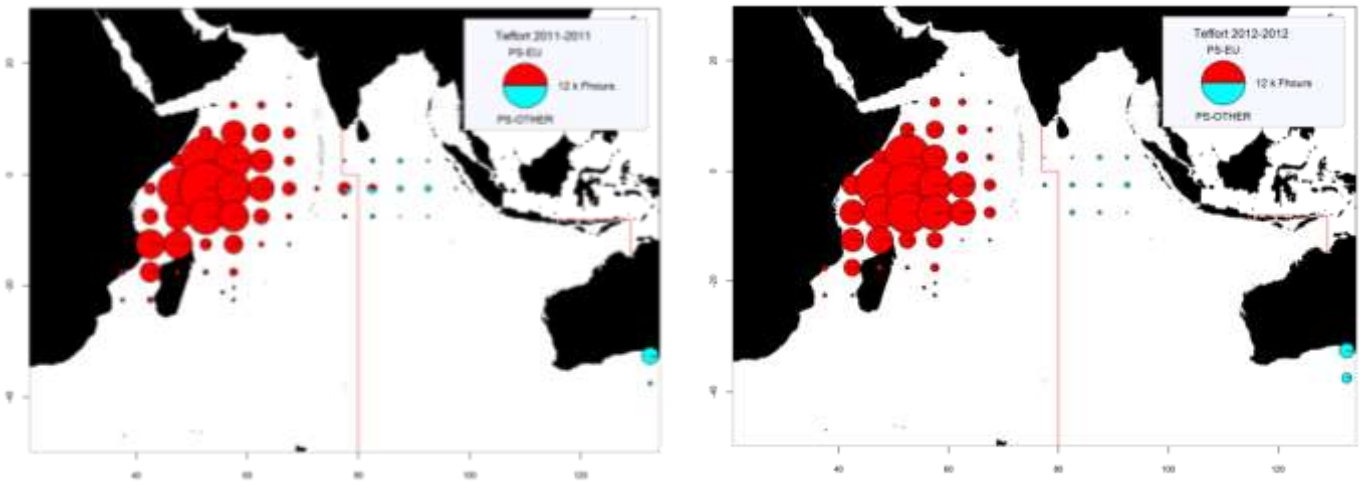


**Fig. 7.** Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2011 (left) and 2012 (right) (Data as of October 2013)
PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags)
PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)

### *Indo-Pacific sailfish: Catch–per–unit–effort (CPUE) trends*

Currently there is insufficient data to develop a CPUE series for Indo-Pacific sailfish caught in the IOTC area of competence. No catch and effort data are available from sports fisheries, other than for partial data from the sports fisheries of Kenya; or other artisanal (gillnet fisheries of I.R. Iran and Pakistan, gillnet/longlines of Sri Lanka, gillnets of Indonesia) or industrial fisheries (NEI longliners and all purse seiners).

### *Indo-Pacific sailfish: Fish size or age trends (e.g. by length, weight, sex and/or maturity)*

**Average fish weight** can only be assessed for the longline fishery of Japan since 1970 and the gillnet/longline fishery of Sri Lanka since the late 1980s. The number of specimens measured on Japanese longliners in recent years 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)** tables have not been built for this species due to a lack of information reported by CPCs. Fish size is derived from various length and weight information, however the reliability of the size data is reduced when relatively few fish out of the total catch are measured.

**Sex ratio** data have not been provided to the Secretariat by CPCs.

## STOCK ASSESSMENT

No quantitative stock assessment for Indo-Pacific sailfish in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish (Table 4). Further work must be undertaken to derive stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing. The IOTC Secretariat should contact U.A.E. to obtain any information regarding its sailfish fishery in the Gulf, as the most recent information submitted to the WPB some time ago suggested that the fishery may be collapsing. Any new information received should be submitted to the next WPB meeting as part of a general review of sailfish fisheries in the Indian Ocean.

**TABLE 3.** Indo-Pacific sailfish (*Istiophorus platypterus*) stock status summary

| Management Quantity | Aggregate Indian Ocean |
|---|---|
| 2012 catch estimate | 28,449 t |
| Mean catch from 2008–2012 | 26,283 t |
| MSY (80% CI) | unknown |
| Data period used in assessment | – |
| $F_{2012}/F_{MSY}$ (80% CI) | – |
| $B_{2012}/B_{MSY}$ (80% CI) | – |
| $SB_{2012}/SB_{MSY}$ | – |
| $B_{2012}/B_0$ (80% CI) | – |
| $SB_{2012}/SB_0$ | – |
| $B_{2012}/B_{0,\ F=0}$ | – |
| $SB_{2012}/SB_{0,\ F=0}$ | – |

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