Executive summary of the status of the Indian Ocean swordfish resource

(as adopted by the Scientific Committee, December 2009)

BIOLOGY

Swordfish (*Xiphius gladius*) is a large oceanic apex predator that inhabits all the world's oceans and in the Indian Ocean ranges from the northern coastal state coastal waters to 50°S. Swordfish is known to undertake extensive diel vertical migrations, from surface waters during the night to depths of 1000m during the day, in association with movements of the deep scattering layer and cephalopods, their preferred prey. By contrast with tunas, swordfish is not a gregarious species, although densities increase in areas of oceanic fronts and seamounts.

Genetic studies of the stock structure of swordfish in the Indian Ocean have failed to reveal spatial heterogeneity, and for the purposes of stock assessments one pan-ocean stock has been assumed. However, spatial heterogeneity in stock indicators (CPUE trends), indicate the potential for localised depletion of swordfish in the Indian Ocean.

As with many species of billfish, swordfish exhibit sexual dimorphism in maximum size, growth rates and size and age at maturity – females reaching larger sizes, growing faster and maturing later than males. Length and age at 50% maturity in SW Indian Ocean swordfish is 170 cm (maxillary-fork length = LJFL) for females and 120 cm for males. These sizes correspond to ages of 6-7 years and 1-3 years for females and males, respectively.

Swordfish are highly fecund, batch spawners with large females producing many millions of eggs per spawning event. One estimate for Indian Ocean populations suggests that a female swordfish in equatorial waters may spawn as frequently as once every three days over a period of seven months.

Swordfish are long lived – having a maximum age of more than 30 years. The species also exhibits rapid growth in the first year of life - by one year of age, a swordfish may reach 90 cm (~15 kg). The average size of swordfish taken in Indian Ocean longline fisheries is between 40 kg and 80 kg (depending on latitude).

The species life history characteristics of relatively late maturity, long life and sexual dimorphism make it vulnerable to over exploitation.

FISHERIES

Swordfish are taken as a target or by-catch of longline fisheries throughout the Indian Ocean (Figure 1) and is likely to be a component of the "unidentified Billfish" catch by Sri Lankan gill net fisheries in the central northern Indian Ocean

Exploitation of swordfish in the Indian Ocean was first recorded by the Japanese in the early 1950's as a by-catch in their tuna longline fisheries. Over the next thirty years, catches in the Indian Ocean increased slowly as the level of coastal state and distant water fishing nation longline effort targeted at tunas increased. In the 1990's, exploitation of swordfish, especially in the western Indian Ocean, increased markedly, peaking in 1998 at 35,100 t (Figure 2, Table 1). By 2002, twenty countries were reporting catches of swordfish (, Table 1). The average annual catch for the period from 2004 to 2008 was 29,900t and it was 28,100 t in 2007 and 22,300 in 2008. The highest catches are taken in the south west Indian Ocean; however, in recent years the fishery has been extending eastward (Figure 4).

Since the early 1990's China,Taiwan has been the dominant swordfish catching fleet in the Indian Ocean (41-60 % of total catch). Taiwanese longliners, particularly in the south western and equatorial western Indian Ocean, target swordfish using shallow longlines at night. The night sets for swordfish contrast with the daytime sets used by the Japanese and Taiwanese longline fleets when targeting tunas.

During the 1990's a number of coastal and island states, notably Australia, La Reunion/France, Seychelles and South Africa have developed longline fisheries targeting swordfish, using monofilament gear and light sticks set at night. This gear achieves significantly higher catch rates than traditional Japanese and Taiwanese longlines. As a

result, coastal and island fisheries have rapidly expanded to take over 10,000 t of swordfish per annum in the late 1990's.

STOCK STATUS

A stock assessment for swordfish was undertaken in 2009.

The longline Japanese and Taiwanese CPUE series have conflicting trends, with the Japanese (by-catch) fleet suggesting substantial decline in abundance prior to ~2000, and the Taiwanese (targeted) fleet suggesting stable abundance over this period.

The stock status reference points from the range of models varies considerably, but a number of general consistencies were evident. Given the limitations identified for each model, and the uncertainties associated with the data inputs, the SC felt that restricting the management advice to a single model would lead to an understatement of the uncertainty. This summary attempts a qualitative summary across models and data-based indicators.

The annual average sizes of swordfish in the respective Indian Ocean fisheries are variable but show no trend (Figure 6). It was considered encouraging that there are not yet clear signals of declines in the size-based indices, but these indices should be carefully monitored. It was noted that since females mature at a relatively large size, a reduction in the biomass of large animals could potentially have a strong effect on the spawning biomass.

When the current stock status estimates are compared among models, it is evident that there is a large degree of uncertainty. In recognition of the fact that MSY-related reference points are often difficult to quantify reliably, a number of management agencies prefer to use depletion-based biomass stock status indicators. Most approaches suggest that MSY could reasonably be in the range of ~28-34,000 tonnes, though this is the lower end of the range for some models and the upper end of the range for others. Similarly, all approaches suggest that depletion could be in the range of $B2007/B0 = 0.4 – 0.5$, though again this may be an upper or lower end of the plausible range depending on the model. Comparison across models suggest that current catches are probably near MSY (and F is probably near FMSY), but could be somewhat above or below.

The apparent fidelity of swordfish to particular areas is a matter for concern as this can lead to localised depletion. The CPUE of the Japanese fleet in the south west IO has the strongest decline of the four areas examined in 2009; furthermore, the La Reunion CPUE series shows a declining trend in this area over the last 10 years. In previous years, localised depletion was inferred on the basis of decreasing CPUEs following fine-scale analyses of the catch and effort data. Therefore the SC cannot discount the possibility that localised depletion is still occurring in some areas. Localised depletion has occurred in other parts of the world where swordfish have been heavily targeted

MANAGEMENT ADVICE

Given the general recent declining trend in all the CPUE series, and the fully exploited status of the stock, the WPB expects that abundance will likely decline further at current effort levels, especially considering that the issue of increases in efficiency has not been fully addressed in the current standardization. When combined with the uncertainty in the assessment, the WPB considers that there is a reasonably high probability that common target and limit reference points (*eg*. BMSY, 0.4B0) may be marginally exceeded, and this probability will increase over time if effort remains at current levels or increases further. Precautionary measures such as capacity control or catch limits will reduce the risk of creating an overcapacity problem or increasing the risk of exceeding common biomass limit reference points.

The SC recommended that catches of swordfish should not exceed the estimated MSY of 33,000t.

SWORDFISH SUMMARY

Management quantity	2008 Assessment	2009 Assessment
Most recent catch	28,100 t (2007)	22,300 t (2008)
Mean catch over the last 5 years (2004-2008)		29,900 t
Maximum Sustainable Yield		33,000 t Range: 32,000 – 34,000 t
F_{2007}/F_{MSY}		0.79 Range: 0.58 – 0.84
B_{2007}/B_{MSY}		1.31 Range: 1.13 – 1.46
SB_{2007}/SB_{MSY}		
B_{2007}/B_0		0.48 (0.19-0.87)
SB_{2007}/SB_0		
$B_{2007}/B_{2007,F=0}$		
$SB_{2007}/SB_{2007,F=0}$		

Table 1. *Best scientific estimates of the catches of swordfish (as adopted by the IOTC Scientific Committee) by gear and main fleets for the period 1957-2007 (in thousands of tonnes).*
Data as of July 2009 (Miguel)

Gear	Fleet	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Longlin	China																											
	Taiwan,China	0.2	0.2	0.3	0.3	0.5	0.5	0.3	0.3	0.2	0.6	0.8	1.2	0.9	0.9	0.6	1.0	0.9	0.9	0.9	0.6	1.1	1.3	1.1	1.5	1.9	1.7	2.0
	Indonesia																0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0
	Japan	0.5	0.6	0.7	0.8	0.6	0.8	1.0	1.1	1.6	1.1	1.1	1.2	1.1	0.9	0.8	0.8	0.8	0.4	0.3	0.9	0.6	0.6	0.8	1.0	1.2	1.3	2.2
	Korea, Rep							0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.1	0.3	0.5	0.6	0.7	0.8	0.6	0.3	0.4	0.3	0.3	0.1	0.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.7*	*0.8*	*0.9*	*1.1*	*1.1*	*1.4*	*1.5*	*1.5*	*1.8*	*1.9*	*2.2*	*2.7*	*2.1*	*2.0*	*1.6*	*2.0*	*2.3*	*1.9*	*1.9*	*2.4*	*2.3*	*2.3*	*2.3*	*2.8*	*3.4*	*3.2*	*4.3*
Gillnet	India																						0.1	0.1	0.4	0.1	0.2	0.1
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.4*	*0.1*	*0.2*	*0.2*
Other	*Total*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*
All	*Total*	*0.7*	*0.8*	*0.9*	*1.1*	*1.1*	*1.4*	*1.5*	*1.5*	*1.8*	*1.9*	*2.2*	*2.7*	*2.1*	*2.0*	*1.6*	*2.0*	*2.3*	*1.9*	*1.9*	*2.4*	*2.3*	*2.4*	*2.4*	*3.2*	*3.6*	*3.5*	*4.4*

| Gear	Fleet	Av04/08	Av59/08	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Longlin	China	0.6	0.1										0.1	0.2	0.3	0.1	0.4	0.4	0.3	0.4	0.8	0.7	0.6	0.8	0.4	0.4
	Taiwan,China	7.5	5.2	3.2	3.8	5.4	4.1	3.8	4.7	9.0	15.3	12.5	18.3	17.6	17.2	16.8	14.7	15.2	12.9	13.5	14.4	12.3	7.5	6.8	6.0	4.7
	Spain	4.7	0.8								0.2	0.7	0.0	0.0	0.5	1.4	2.0	1.0	1.9	3.5	4.3	4.7	5.1	5.2	4.8	3.9
	NEI-Deep-freezing	2.8	1.5	0.2	0.2	0.8	0.6	0.8	0.9	1.4	4.2	3.6	5.4	7.7	5.5	7.3	6.5	6.0	2.9	3.1	2.6	5.4	5.4	1.9	1.2	1.6
	Indonesia	2.0	0.5	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.5	1.0	1.2	1.1	1.3	0.7	1.0	1.6	3.0	2.8	2.0	1.7	1.6	1.6
	Japan	1.7	1.2	1.3	1.4	1.5	1.0	1.0	0.9	1.7	1.4	2.6	1.7	2.1	2.8	2.2	1.5	1.6	1.2	1.3	1.1	1.2	1.5	1.8	2.2	1.6
	Portugal	1.3	0.2													0.1	0.2	0.2	0.6	0.8	0.9	0.9	1.1	2.2	2.0	0.5
	Seychelles	1.0	0.2										0.0	0.1	0.2	0.2	0.3	0.5	0.7	0.6	1.4	1.4	1.3	0.9	1.0	0.7
	France-Reunion	1.0	0.4						0.0	0.1	0.3	0.7	0.8	1.3	1.6	2.1	1.9	1.7	1.6	0.8	0.8	0.9	1.2	0.9	1.1	0.9
	India	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.4	0.1	0.0	0.0	0.0	0.8	0.5	0.9	1.2	1.1
	United Kingdom	0.8	0.1																			0.4	0.6	1.1	1.0	1.0
	Guinea	0.8	0.1																0.0	0.5	0.5	0.5	0.8	0.8	0.8	0.8
	Mauritius	0.6	0.1										0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.7	0.6	0.7	0.5	0.4
	Tanzania	0.4	0.0																				0.5	0.5	0.5	0.4
	Korea, Republic of	0.2	0.2	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	1.1	0.7	1.1	0.7	0.3	0.0	0.1	0.1	0.0	0.1	0.3	0.3	0.3	0.1	0.0
	Australia	0.1	0.2				0.0		0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.3	1.4	1.8	2.9	1.3	1.8	0.4	0.3			
	NEI-Fresh Tuna	0.1	0.2				0.5	0.7	0.6	0.7	0.7	1.1	0.9	0.9	1.1	1.0	0.9	0.9	0.1	0.0	0.1	0.1	0.1			
	Other Fleets	1.0	0.3	0.0	0.1	0.1	0.3	0.4	0.4	0.5	0.4	0.5	0.3	0.1	0.2	1.2	0.5	0.1	1.5	1.8	1.6	0.6	1.1	1.1	1.2	1.3
	Total	*27.6*	*11.5*	*4.9*	*5.6*	*7.9*	*6.7*	*7.0*	*7.8*	*13.8*	*23.2*	*23.4*	*28.8*	*32.3*	*31.3*	*34.5*	*32.1*	*30.2*	*27.6*	*29.4*	*33.9*	*34.1*	*30.3*	*27.7*	*25.7*	*20.1*
Gillnet	Sri Lanka	1.2	0.5	0.0	0.0	0.0	0.0	0.1	0.2	0.3	1.9	0.9	0.9	1.0	1.3	0.9	1.1	2.8	2.1	2.1	2.3	2.1	0.8	1.6	0.9	0.8
	India	0.5	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.3	0.4	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.9	0.7
	Pakistan	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.5	0.5	0.5	0.5
	Other Fleets	0.1	0.0	0.0	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1
	Total	*2.2*	*0.7*	*0.2*	*0.3*	*0.5*	*0.4*	*0.4*	*0.3*	*0.5*	*2.1*	*1.0*	*1.0*	*1.3*	*1.7*	*1.2*	*1.4*	*3.1*	*2.5*	*2.6*	*2.8*	*2.6*	*1.7*	*2.4*	*2.3*	*2.1*
Other	*Total*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*
All	*Total*	*29.9*	*12.2*	*5.1*	*5.9*	*8.4*	*7.1*	*7.5*	*8.1*	*14.3*	*25.3*	*24.5*	*29.8*	*33.7*	*33.2*	*35.8*	*33.5*	*33.4*	*30.2*	*32.2*	*36.8*	*36.8*	*32.1*	*30.2*	*28.1*	*22.3*
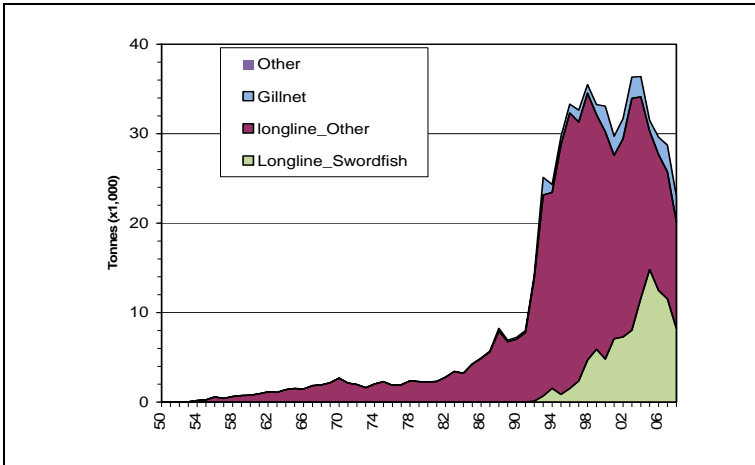
Figure 1. *Catches of Swordfish per gear and year recorded in the IOTC Database (19529-2008). Data as of July 2009*
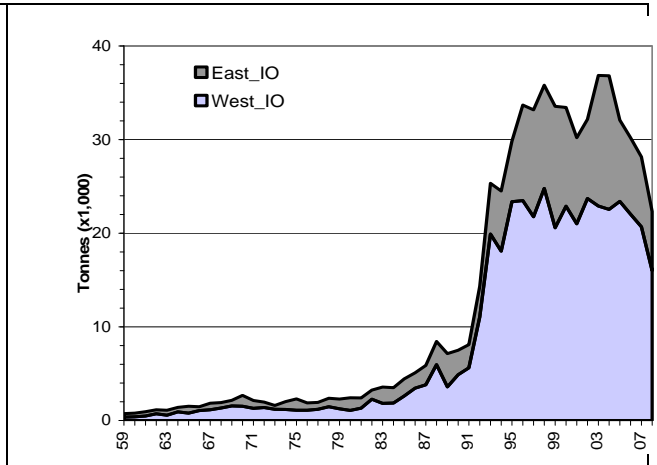
Figure 2. *Trends of the swordfish catches in the western and the eastern area of the Indian Ocean from 1959 – 2008. Data as of November 2009 (to be updated)*
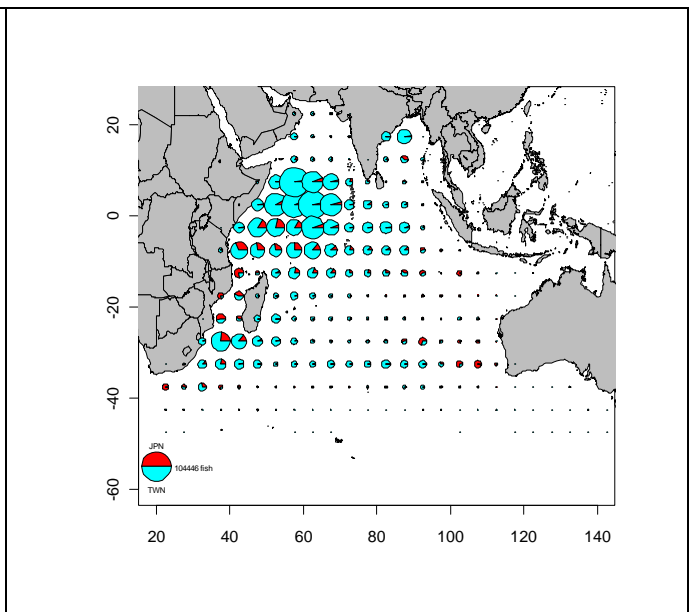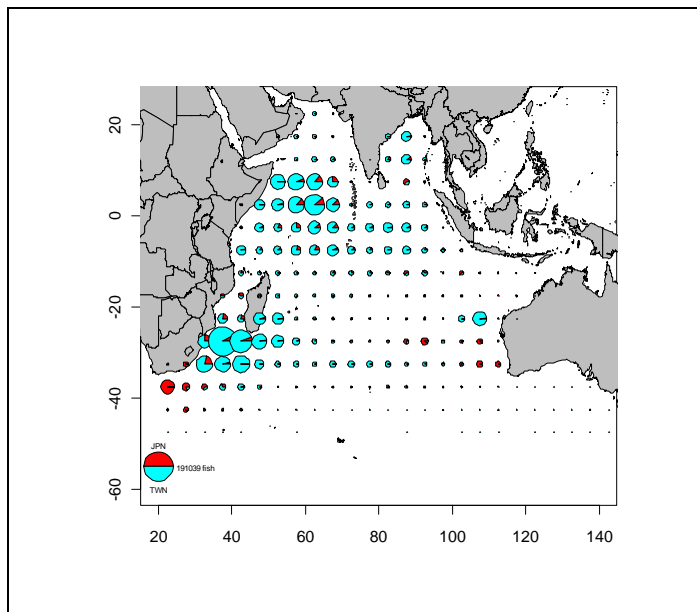
Figure 4. *Mean annual catches of swordfish (t) for the periods 1990 to 1999 and 2000 to 2007 for longline, gillnet and other fisheries in the Indian Ocean.*
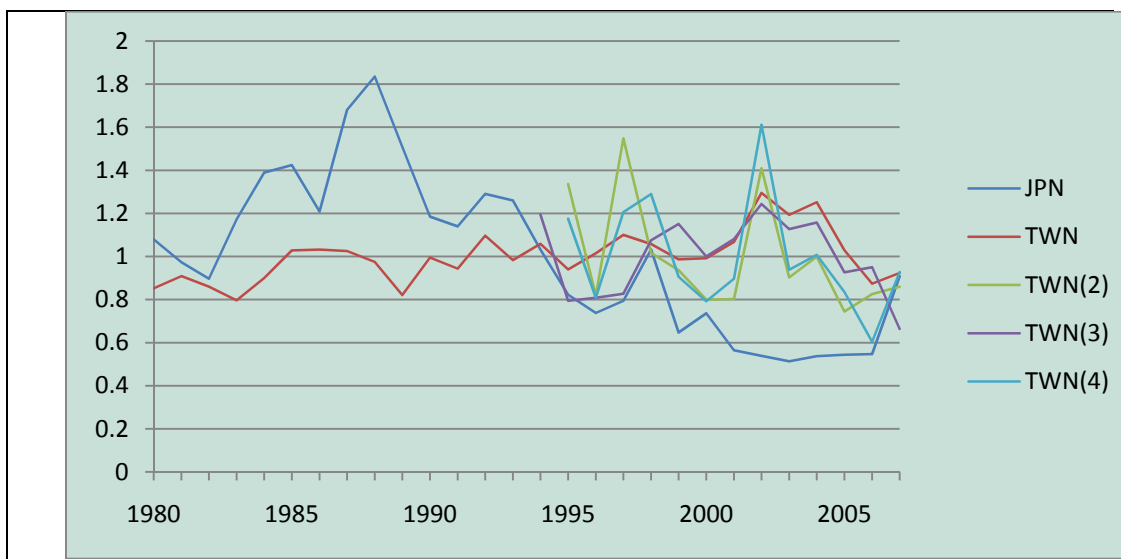

Figure 5: *Standardised CPUE index for the Japanese and Taiwanese longline fleets 1980 to 2007*
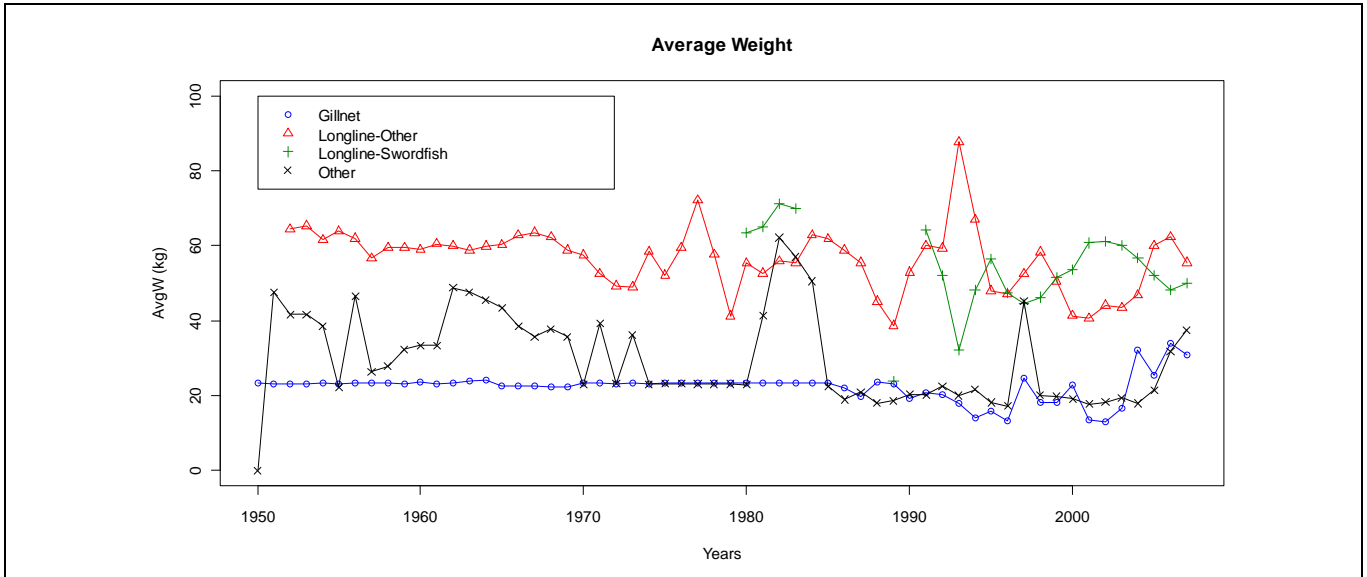
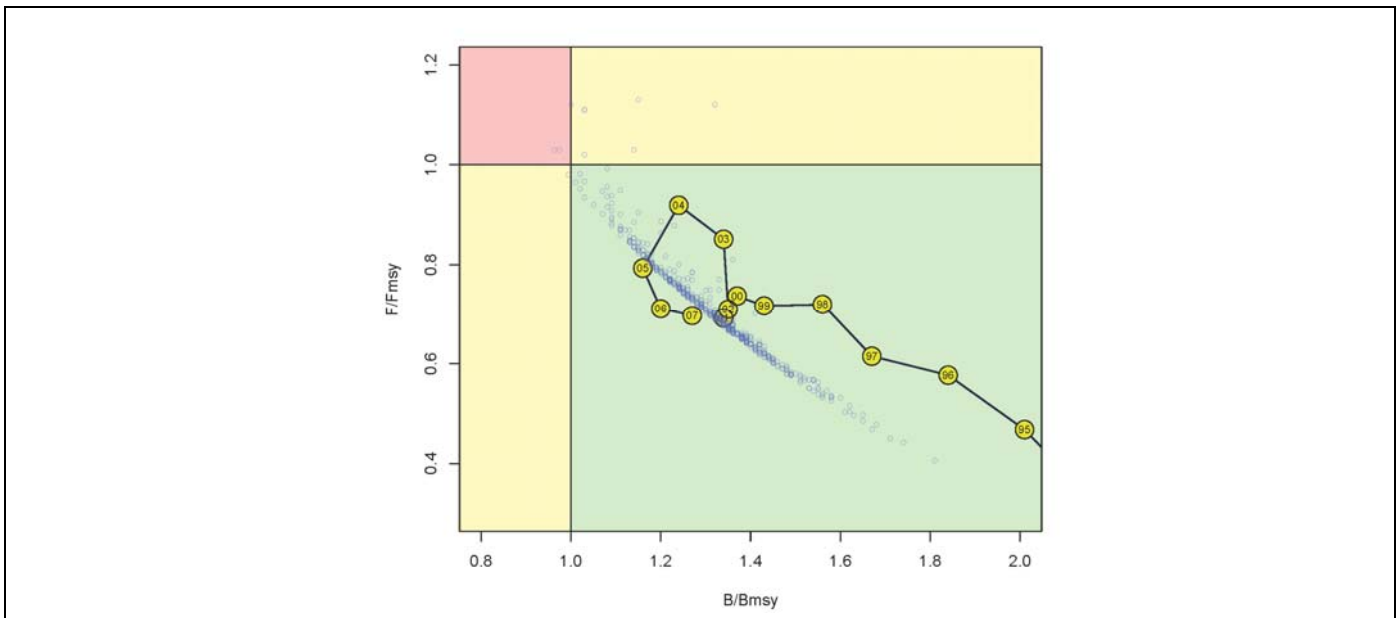**Figure 7.** *Trends in average size of swordfish per gear in the Indian Ocean.*

Figure 8. *Kobe plot illustrated the result of the ASPIC model (a. 80% CI, b. blue circles 500 bootstraps)*

Executive summary of the status of black marlin

(as adopted by the Scientific Committee, December 2009)

BIOLOGY

Black marlin (*Makaira indica*) is mainly found in the tropical and subtropical waters of the Pacific and the Indian Oceans. Individuals have been reported in the Atlantic Ocean but there is no information to indicate the presence of a breeding stock in this area. Black marlin is mainly found in oceanic surface waters above the thermocline and typically near land masses, islands, coral reefs etc; however, they may range to depths of 1000 m.

Little is known on the biology of the black marlin in the Indian Ocean. In other oceans, black marlin can grow up to 4.5 m long and weigh 750kg. Young fish grow very quickly in length then put on weight later in life. In eastern Australian waters black marlin grows from 13 mm long at 13 days old to 1800 mm and around 30 kg after 13 months. Males are in general smaller than females.

Sexual maturity is attained at around 100kg for the females and 50 to 80 kg for males, no spawning grounds have been identified but in Australia spawning individuals apparently prefer water temperatures around 27-28°C. Females may produce up to 40 million eggs.

FISHERIES

Black marlin is caught mainly by longliners and gillnetters in the Indian Ocean (Figure 1). Minimum catch estimates have been derived from very small amounts of information and are therefore highly uncertain. Difficulties in the identification of marlins also contribute to the uncertainties of the information available to the Secretariat.

The minimum average annual catch estimated for the period 2004 to 2008 is around 4,873 t. The distribution of black marlin catches has changed since the 1980's with most of the catch now taken in the western areas of the Indian Ocean (Figure 2). In recent years, the fleets of Taiwan,China (longline), Sri Lanka (gillnet) and India (gillnets) are attributed with the highest catches of black marlin.

AVAILABILITY OF INFORMATION FOR STOCK ASSESSMENT

There is limited reliable information on the catches of black marlin and no information on the stock structure or growth and mortality of black marlin in the Indian Ocean. For example:

1. **Trends in catches**: catch estimates for black marlin are highly uncertain. Available catch data varies from year to year and mis-identification of marlins is probably common.
2. **Nominal CPUE Trends:** data is available from several fleets (mainly longline) and time periods but this species is not targeted therefore interpretation of catch rates may be problematic as they are likely to be affected by changes in the fisheries targeting other species.
3. **Average weight of fish in the catch:** the average weight of fish is derived from various weight and length information. The reliability of average weight estimates is reduced when relatively few fish out of the total catch are measured.
4. **Sex ratio:** such data are not available to the Secretariat
5. **Lengths of fish being caught** – fish size is derived from various length and weight information. The reliability of the size data is reduced when relatively few fish out of the total catch are measured.

No quantitative stock assessment on black marlin in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish. However, a preliminary estimation of stock indicators was attempted on the longline catch and effort datasets from Japan and Taiwan,China that represent the best available information. Nominal CPUE exhibited dramatic declines since the beginning of the fishery in two major fishing grounds (West Equatorial and north-west Australia) and the catches in the initial core areas also decreased substantially (Figures 3, 4 and 5). However, there is considerable uncertainty about the degree to which these indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends.

Further work must be undertaken to derive some 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.

MANAGEMENT ADVICE

No quantitative stock assessment is currently available for black marlin in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore the stock status is uncertain. However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

BLACK MARLIN SUMMARY

Management quantity	2008 Assessment	2009 assessment
Most recent catch	4,964 t (2007)	5,883 t (2008)
Mean catch over the last 5 years (2004-2008)		4,873 t
Maximum Sustainable Yield		
$F_{Current}/F_{MSY}$		
$B_{Current}/B_{MSY}$		
$SB_{Current}/SB_{MSY}$		
$B_{Current}/B_0$		
$SB_{Current}/SB_0$		
$B_{Current}/B_{Current,F=0}$		
$SB_{Current}/SB_{Current,F=0}$		

Table 1. *Best scientific estimates of the catches of black marlin (as adopted by the IOTC Scientific Committee) by gear and main fleets for the period 1959-2008 (in thousands of tonnes).* Data as of November 2009

Gear	Fleet	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Longline	China																											
	Taiwan,China	0.5	0.3	0.5	0.3	0.4	0.4	0.3	0.2	0.2	0.6	0.9	1.2	0.9	0.9	0.5	0.9	0.7	0.3	0.3	0.2	0.2	0.5	0.4	0.3	0.7	0.5	0.7
	Indonesia															0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Japan	1.0	1.4	1.2	1.5	0.9	1.1	1.0	1.0	1.2	1.5	1.2	1.1	0.7	0.3	0.2	0.4	0.4	0.2	0.1	0.4	0.2	0.2	0.3	0.3	0.4	0.6	0.5
	India																									0.0	0.0	0.0
	Korea, Republic of							0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.4	0.3	0.3	0.4	0.4	0.5	0.4	0.3	0.4	0.3	0.3
	NEI-Deep-freezing																											0.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*1.5*	*1.7*	*1.7*	*1.9*	*1.3*	*1.6*	*1.3*	*1.2*	*1.5*	*2.1*	*2.1*	*2.4*	*1.8*	*1.4*	*0.9*	*1.6*	*1.5*	*0.8*	*0.7*	*0.9*	*0.8*	*1.2*	*1.0*	*1.0*	*1.5*	*1.4*	*1.4*
Gillnet	India																						0.1	0.1	0.3	0.1	0.2	0.1
	Indonesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pakistan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.2
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.2*	*0.3*	*0.1*	*0.4*	*0.2*	*0.3*	*0.4*
Other gears	India																						0.0	0.0	0.0	0.0	0.0	0.0
	Indonesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sri Lanka	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.2*
All	*Total*	*1.5*	*1.7*	*1.7*	*1.9*	*1.3*	*1.6*	*1.4*	*1.3*	*1.5*	*2.1*	*2.1*	*2.4*	*1.8*	*1.4*	*0.9*	*1.6*	*1.5*	*0.8*	*0.8*	*1.0*	*1.1*	*1.5*	*1.2*	*1.6*	*1.9*	*1.9*	*2.0*

Gear	Fleet	Av04/08	Av59/08	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Longline	China																									
	Taiwan,China	0.8	0.6	0.8	1.0	0.8	0.7	0.3	0.5	1.1	0.4	0.5	0.6	0.4	0.4	0.5	0.4	0.6	0.6	0.6	0.9	0.7	0.9	1.0	0.7	0.8
	Indonesia	0.5	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.5	0.4	0.5	0.3	0.3	0.5	1.0	0.7	0.5	0.3	0.2	1.0
	NEI-Fresh Tuna	0.3	0.1				0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.0	0.1	0.1	0.1	0.2	0.2	0.4	0.5
	Oman	0.2	0.0															0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2
	Japan	0.1	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1
	India	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2
	Korea, Republic of	0.0	0.1	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	NEI-Deep-freezing	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1
	NEI-Indonesia Fresh	0.0	0.0	0.0		0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0									
	Other Fleets	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2
	Total	*2.2*	*1.5*	*1.5*	*1.7*	*1.5*	*1.5*	*1.1*	*1.1*	*2.0*	*1.2*	*1.5*	*1.5*	*1.5*	*1.6*	*1.8*	*1.7*	*1.7*	*1.2*	*1.5*	*2.3*	*2.0*	*2.0*	*2.1*	*1.9*	*3.1*
Gillnet	Sri Lanka	0.8	0.3	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.5	1.3	0.9	1.1	1.4	1.0	1.0	1.2	1.6	0.7	0.7	0.6	1.1	1.2	0.6	0.6
	India	0.6	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.4	0.5	0.3	0.3	0.4	0.5	0.4	0.5	0.4	0.4	0.8	0.8	0.7
	Indonesia	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.1	0.7	0.7	0.7
	Pakistan	0.3	0.1	0.0	0.1	0.1	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.4	0.4	0.4	0.4
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*2.3*	*0.8*	*0.3*	*0.3*	*0.3*	*0.6*	*0.7*	*0.6*	*1.0*	*1.2*	*2.1*	*1.7*	*2.1*	*2.5*	*2.0*	*1.8*	*2.2*	*2.5*	*1.5*	*1.6*	*1.5*	*1.9*	*3.1*	*2.5*	*2.5*
Other gears	India	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2
	Indonesia	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0		0.1	0.1	0.1
	Sri Lanka	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	Total	*0.3*	*0.1*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*	*0.3*
All	*Total*	*4.9*	*2.5*	*1.9*	*2.2*	*1.9*	*2.3*	*2.0*	*2.0*	*3.2*	*2.7*	*3.9*	*3.5*	*3.9*	*4.4*	*4.0*	*3.8*	*4.0*	*4.0*	*3.2*	*4.1*	*3.7*	*4.1*	*5.7*	*5.0*	*5.9*
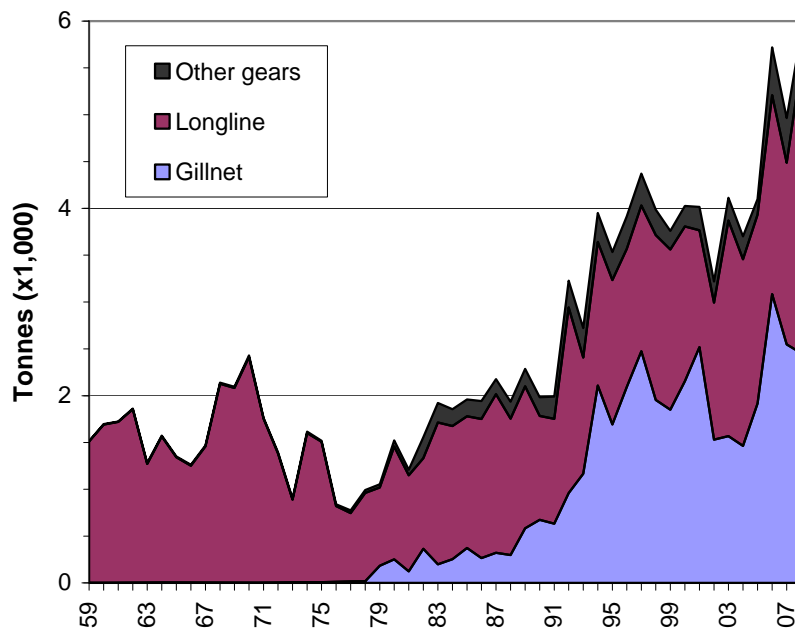
Figure 1: *Estimated catches of black marlin by gear recorded in the IOTC Database (1959-2008). Note, these are minimum catch estimates as they are derived from IOTC fleets only and the levels of catch by other fleets are unknown.*
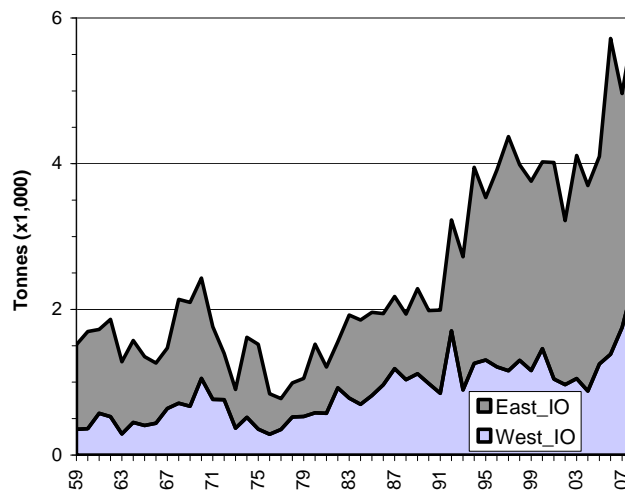
Figure 2. *Trends of the black marlin catches in the western and the eastern area of the Indian Ocean from 1959 – 2008.* <small>*Data as of November 2009*</small>
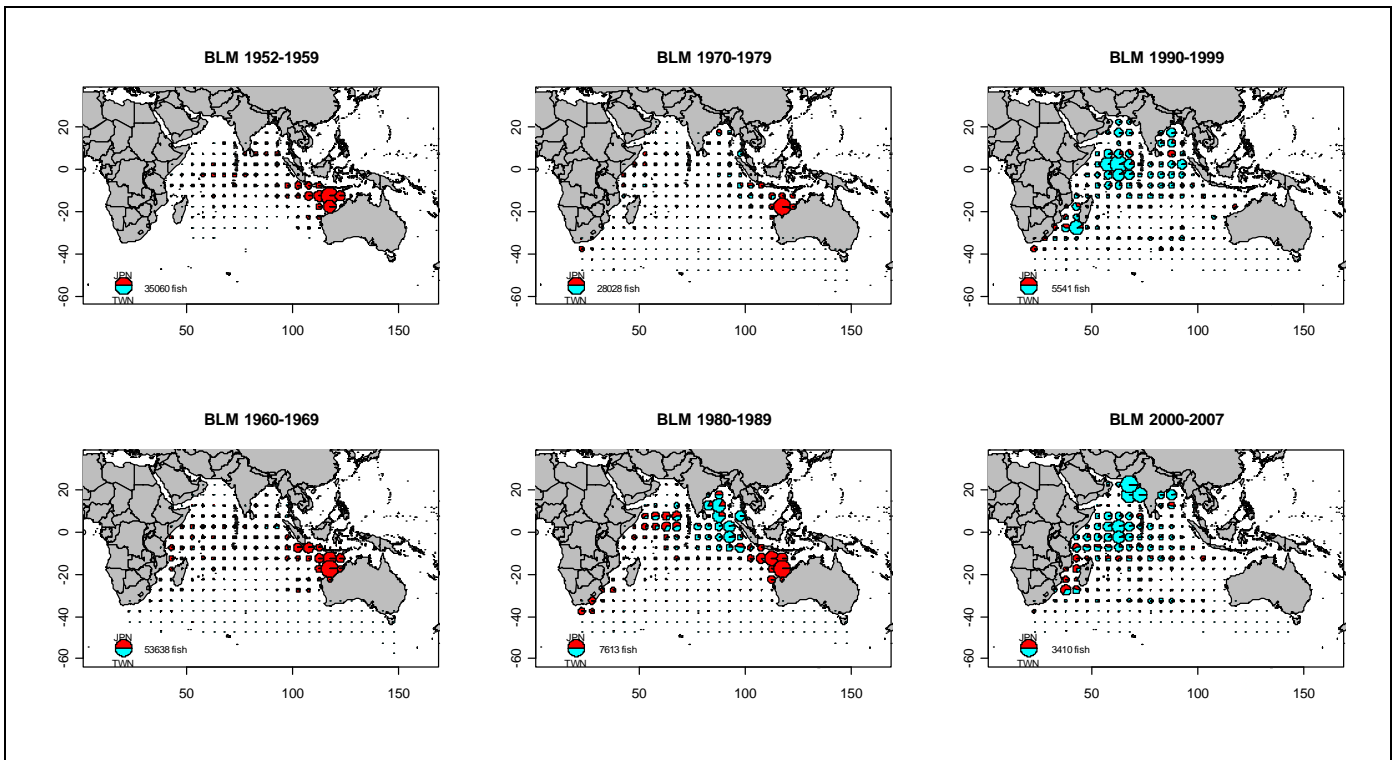
Figure 3: *Mean annual catches of black marlin (number) by Japanese and Taiwanese longline vessels operating in the Indian Ocean over the periods 1952 to 2007 per decade*

Figure 4. *Major marlin fishing areas (framed): Seychelles and NW Australia.*

Figure 5. (a) nominal yearly CPUE (in numbers of fishes / 1000 hooks) of Japanese longliners in the North West Australia area (10-20°S,110-120°E) for blue marlin (BUM), striped marlin (MLS) and black marlin (BLM) (b) nominal yearly CPUE (in numbers of fishes / 1000 hooks) of Japanese longliners in the area around Seychelles Islands (10°N-10°S,50-70°E).
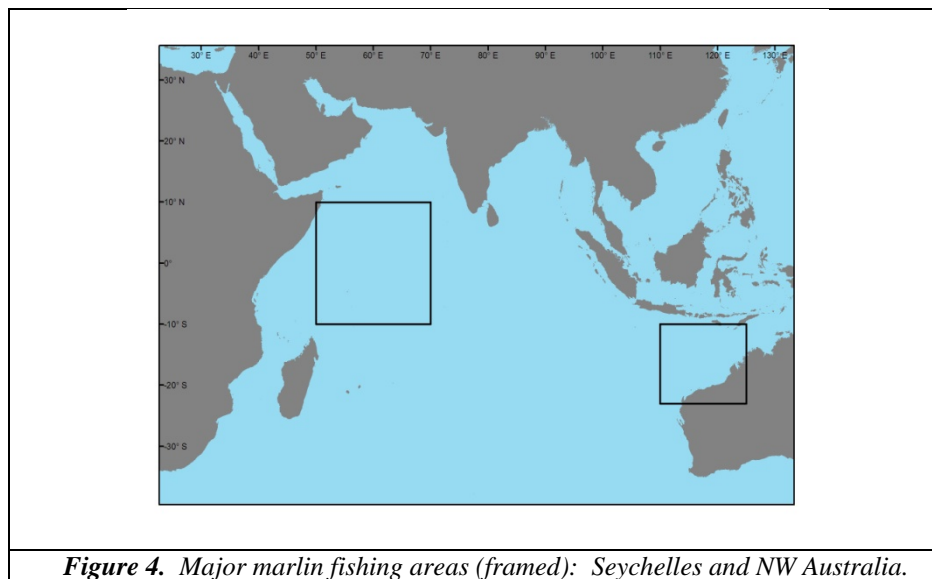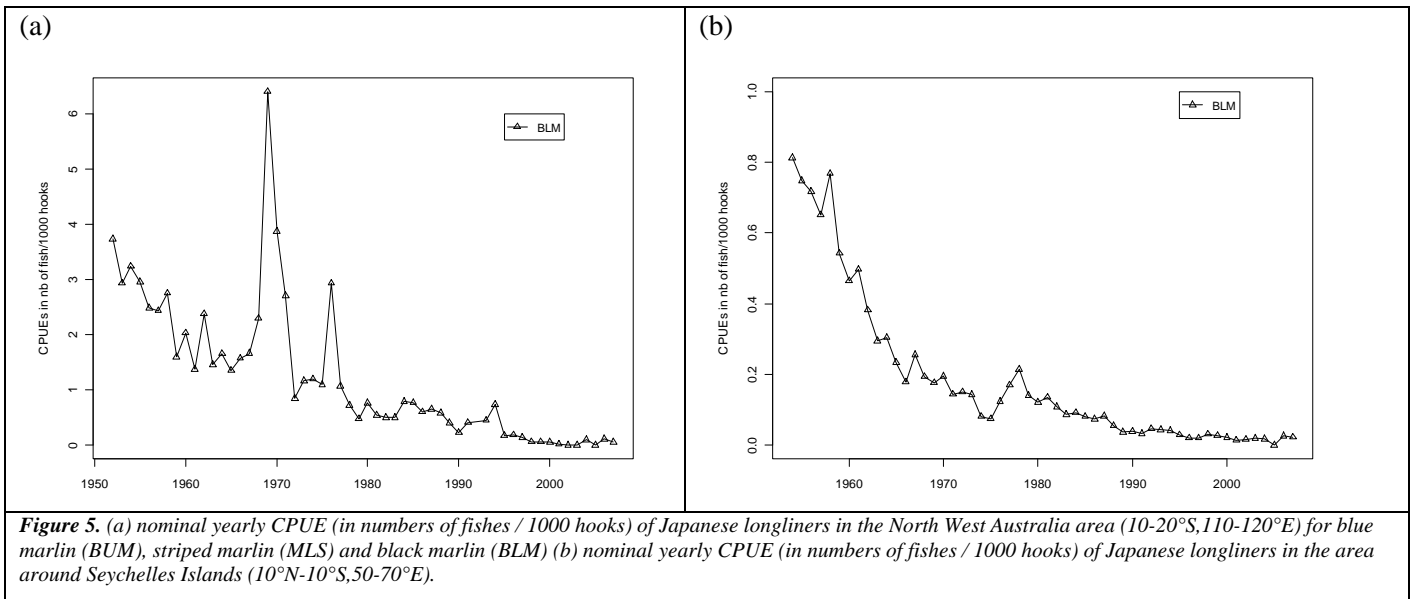
Executive summary of the status of the blue marlin

(as adopted by the Scientific Committee, December 2009)

BIOLOGY

Blue marlin[1] (*Makaira nigricans*) is found throughout the tropical and subtropical regions of the Pacific, Indian and Atlantic Oceans. Blue marlin is a solitary species and prefers the warm offshore surface waters (>24°C); it is scarce in waters less than 100m or close to land.

A highly migratory species, the blue marlin is known to make regular seasonal migrations, (in the Atlantic Ocean) moving toward the equator in winter and away again in summer. In the Pacific Ocean one tagged blue marlin is reported to have travelled 3000nm in 90 days.

Blue marlin may live up to 28 years. Females are typically grow larger than males, some attaining over 4 m and exceeding 900 kg. Males grow more slowly than females and generally do not exceed 3 m or 200 kg.

Sexual maturity is attained at between 2 and 4 years of age. A large female can produce in excess of 10 million eggs. Blue marlin is a serial spawner and in some environments females may spawn all year round.

FISHERIES

Blue marlin is caught mainly by longliners and gillnets in the Indian Ocean (Figure 1). Minimum catch estimates have been derived from very small amounts of information and are therefore highly uncertain. Difficulties in the identification of marlins also contribute to the uncertainties of the information available to the Secretariat.

The minimum average annual catch estimated for the period 2004 to 2008 is around 9500 t. The distribution of blue marlin catches has changed since the 1980's with most of the catch now taken in the western areas of the Indian Ocean (Figure 2). In recent years, the fleets of Taiwan,China (longline), Indonesia (longline), Sri Lanka (gillnet) and India (gillnet) are attributed with the highest catches of blue marlin.

AVAILABILITY OF INFORMATION FOR STOCK ASSESSMENT

There is limited reliable information on the catches of blue marlin and no information on the stock structure or growth and mortality of blue marlin in the Indian Ocean. For example:

1. **Trends in catches**: catch estimates for blue marlin are highly uncertain. Available catch data varied from year to year and mis-identification of marlins is probably common.
2. **Nominal CPUE Trends:** data is available from several fleets (mainly longline) and time periods but this species is not targeted therefore interpretation of catch rates may be problematic as they are likely to be affected by changes in the fisheries targeting other species.
3. **Average weight of fish in the catch:** the average weight of fish is derived from various weight and length information. The reliability of average weight estimates is reduced when relatively few fish out of the total catch are measured.
4. **Sex ratio:** such data are not available to the Secretariat
5. **Lengths of fish being caught –** fish size is derived from various length and weight information. The reliability of the size data is reduced when relatively few fish out of the total catch are measured.

No quantitative stock assessment on blue marlin in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish. However, a preliminary estimation of stock indicators was attempted on the longline catch and effort datasets from Japan and Taiwan,China that represent the best available information. Nominal CPUE exhibited dramatic declines since the beginning of the fishery in two major fishing grounds (West Equatorial and north-west Australia) and the catches in the initial fishing grounds areas also decreased substantially (Figures 3, 4 and 5). There is considerable uncertainty about the degree to which those indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends.

Further work must be undertaken to derive some 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

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[1] Some scientists consider that blue marlin comprises two different species, *M. mazara* and *M. nigricans* based on differences in the lateral line. More commonly, however, these two species are lumped together as a single species.

the impacts of fishing.

MANAGEMENT ADVICE

No quantitative stock assessment is currently available for blue marlin in the Indian Ocean, and due to a lack of data for several gears, only preliminary stock indicators can be used. . Therefore the stock status is uncertain. However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

BLUE MARLIN SUMMARY

Management quantity	2008 Assessment	2009 assessment
Most recent catch	7,900 t (2007)	7,100 t (2008)
Mean catch over the last 5 years (2004-2008)		9,500 t
Maximum Sustainable Yield		
$F_{Current}/F_{MSY}$		
$B_{Current}/B_{MSY}$		
$SB_{Current}/SB_{MSY}$		
$B_{Current}/B_0$		
$SB_{Current}/SB_0$		
$B_{Current}/B_{Current,F=0}$		
$SB_{Current}/SB_{Current,F=0}$		

Table 1. *Best scientific estimates of the catches of blue marlin (as adopted by the IOTC Scientific Committee) by gear and main fleets for the period 1959-2008 (in thousands of tonnes).* Data as of November 2009

Gear	Fleet	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Longline	China																											
	Taiwan,China	0.4	0.3	0.3	0.4	0.6	0.7	0.4	0.3	0.7	1.6	1.7	2.8	2.3	2.3	1.3	1.3	1.5	1.0	1.0	1.3	1.5	1.4	1.3	1.4	1.7	2.3	2.1
	Indonesia															0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Japan	4.2	3.6	3.1	2.9	1.7	2.8	3.2	3.2	3.3	2.1	1.7	1.3	1.0	0.9	0.6	0.9	0.7	0.3	0.3	0.9	0.4	0.6	0.8	1.1	1.6	1.5	1.5
	India																									0.0	0.0	0.0
	NEI-Deep-freezing																											0.0
	Korea, Republic of							0.0	0.0	0.0	0.0	0.1	0.4	0.4	0.6	0.8	1.4	1.4	1.3	1.3	1.6	1.7	1.3	1.2	1.2	1.1	0.9	1.0
	Seychelles																									0.0	0.0	0.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*4.5*	*3.9*	*3.4*	*3.3*	*2.2*	*3.5*	*3.7*	*3.6*	*4.1*	*3.8*	*3.5*	*4.4*	*3.6*	*3.8*	*2.7*	*3.7*	*3.6*	*2.6*	*2.6*	*3.9*	*3.6*	*3.5*	*3.4*	*3.8*	*4.5*	*4.8*	*4.7*
Gillnet	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Other gears	Sri Lanka	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.5	0.4	0.3	0.3
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.5*	*0.4*	*0.3*	*0.3*
All	*Total*	*4.6*	*3.9*	*3.5*	*3.3*	*2.3*	*3.5*	*3.8*	*3.6*	*4.1*	*3.8*	*3.5*	*4.4*	*3.6*	*3.8*	*2.7*	*3.7*	*3.7*	*2.7*	*2.7*	*3.9*	*3.7*	*3.6*	*3.5*	*4.3*	*5.0*	*5.1*	*5.1*

Gear	Fleet	Av04/08	Av59/08	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Longline	China																									
	Taiwan,China	3.0	2.1	3.7	4.3	2.9	2.7	1.3	2.0	3.2	3.8	1.7	2.4	2.3	3.4	4.1	3.1	3.6	3.0	3.3	4.4	3.6	3.2	3.3	2.5	2.3
	Indonesia	1.4	0.6	0.0	0.1	0.2	0.3	0.3	0.3	0.6	0.6	0.9	1.0	1.9	2.3	2.1	2.5	1.4	1.3	2.4	2.6	2.9	1.9	1.6	0.6	0.2
	NEI-Fresh Tuna	0.8	0.2				0.3	0.5	0.4	0.5	0.5	0.7	0.6	0.6	0.7	0.6	0.6	0.5	0.1	0.4	0.6	0.6	0.7	0.8	0.9	0.9
	Japan	0.6	1.2	1.2	0.9	0.8	0.4	0.3	0.2	0.3	0.3	0.6	0.4	0.6	1.2	1.2	0.8	1.0	0.4	0.5	0.4	0.5	0.5	0.7	0.8	0.6
	India	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.4	0.5
	NEI-Deep-freezing	0.2	0.3	0.2	0.2	0.4	0.4	0.3	0.4	0.5	1.0	0.5	0.7	1.0	1.1	1.8	1.4	1.2	0.6	0.5	0.4	0.2	0.3	0.2	0.1	0.1
	Korea, Republic of	0.2	0.5	1.3	1.2	1.2	1.0	0.9	0.3	0.5	0.4	0.5	0.3	0.5	0.4	0.2	0.0	0.1	0.1	0.0	0.1	0.2	0.2	0.1	0.2	0.2
	Seychelles	0.1	0.0										0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1
	NEI-Indonesia Fresh	0.0	0.1	0.0		0.2	0.6	0.8	0.8	0.9	0.8	1.0	0.5	0.2	0.2	0.0	0.0									
	Other Fleets	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.3	0.4	0.2	0.2	0.2	0.3	0.3	0.3	0.3
	Total	*6.9*	*5.2*	*6.6*	*6.8*	*5.7*	*5.7*	*4.4*	*4.7*	*6.8*	*7.5*	*6.0*	*6.0*	*7.2*	*9.4*	*10.3*	*8.9*	*8.2*	*5.9*	*7.4*	*8.8*	*8.5*	*7.4*	*7.5*	*5.8*	*5.2*
Gillnet	Sri Lanka	2.5	1.0	0.2	0.2	0.3	0.3	0.6	0.7	1.0	1.4	3.9	2.7	3.1	4.2	3.0	2.8	3.4	4.6	2.1	2.0	1.9	3.1	3.8	2.0	1.8
	Other Fleets	0.1	0.0	0.0	0.6	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
	Total	*2.6*	*1.0*	*0.2*	*0.9*	*0.3*	*0.3*	*0.6*	*0.8*	*1.1*	*1.5*	*3.9*	*2.7*	*3.1*	*4.2*	*3.0*	*2.8*	*3.5*	*4.7*	*2.2*	*2.1*	*1.9*	*3.1*	*3.9*	*2.1*	*1.9*
Other gears	Sri Lanka	0.0	0.1	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.0*	*0.1*	*0.3*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.5*	*0.5*	*0.4*	*0.4*	*0.3*	*0.3*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
All	*Total*	*9.5*	*6.4*	*7.1*	*8.0*	*6.3*	*6.4*	*5.3*	*5.9*	*8.3*	*9.4*	*10.4*	*9.1*	*10.7*	*13.9*	*13.5*	*11.7*	*11.7*	*10.6*	*9.6*	*10.9*	*10.4*	*10.5*	*11.4*	*7.9*	*7.1*
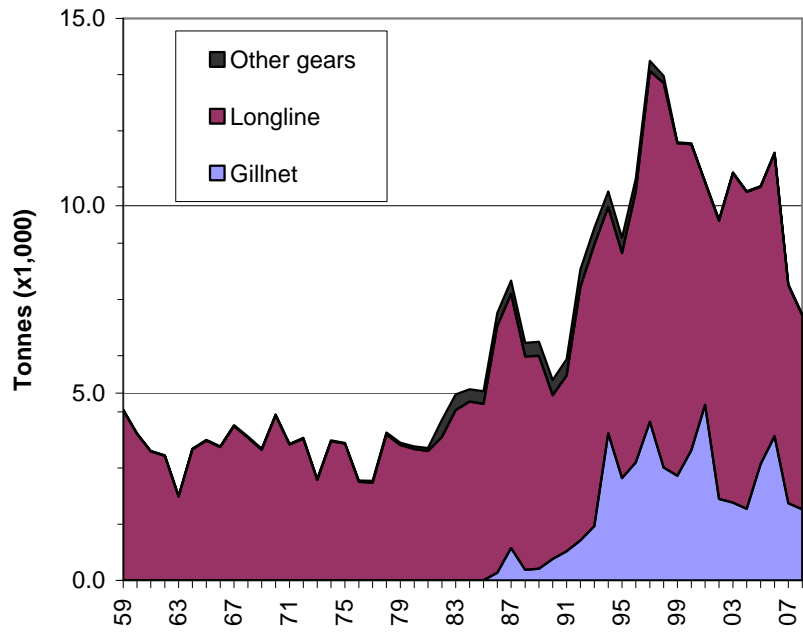
Figure 1: Estimated catches of blue marlin by gear recorded in the IOTC Database (1959-2008). Note, these are minimum catch estimates as they are derived from IOTC fleets only and the levels of catch by other fleets are unknown

Figure 2. Trends of the blue marlin catches in the western and the eastern area of the Indian Ocean from 1959 – 2008. Data as of November 2009

Figure 3: *Mean annual catches of blue marlin (number) by Japanese and Taiwanese longline vessels operating in the Indian Ocean over the periods 1952 to 200 per decade.*

Figure 4. *Major marlin fishing areas (framed): Seychelles and NW Australia.*

(a)

(b)

Figure 5. (a) nominal yearly CPUE (in numbers of fishes / 1000 hooks) of Japanese longliners in the North West Australia area (10-20°S,110-120°E) for blue marlin (BUM), striped marlin (MLS) and black marlin (BLM) (b) nominal yearly CPUE (in numbers of fishes / 1000 hooks) of Japanese longliners in the area around Seychelles Islands (10°N-10°S,50-70°E).
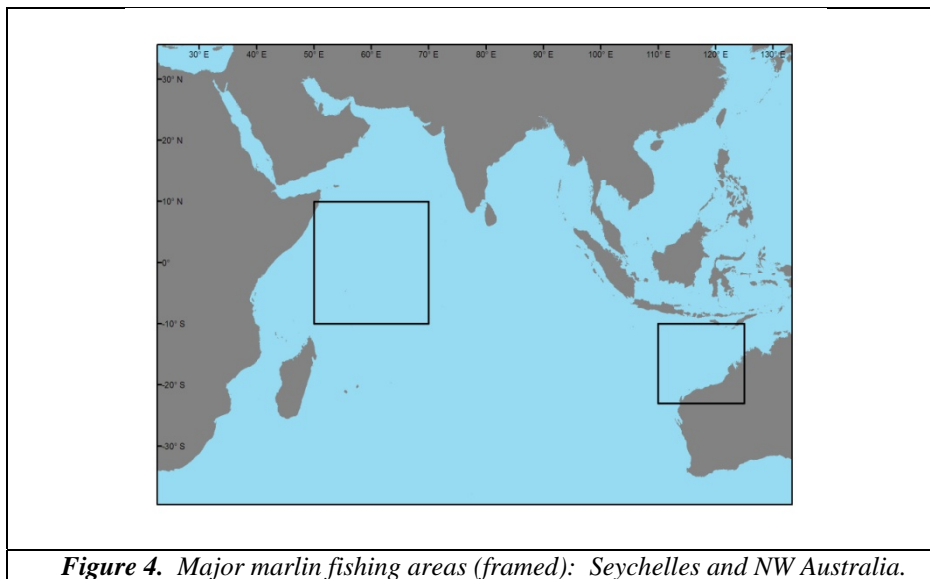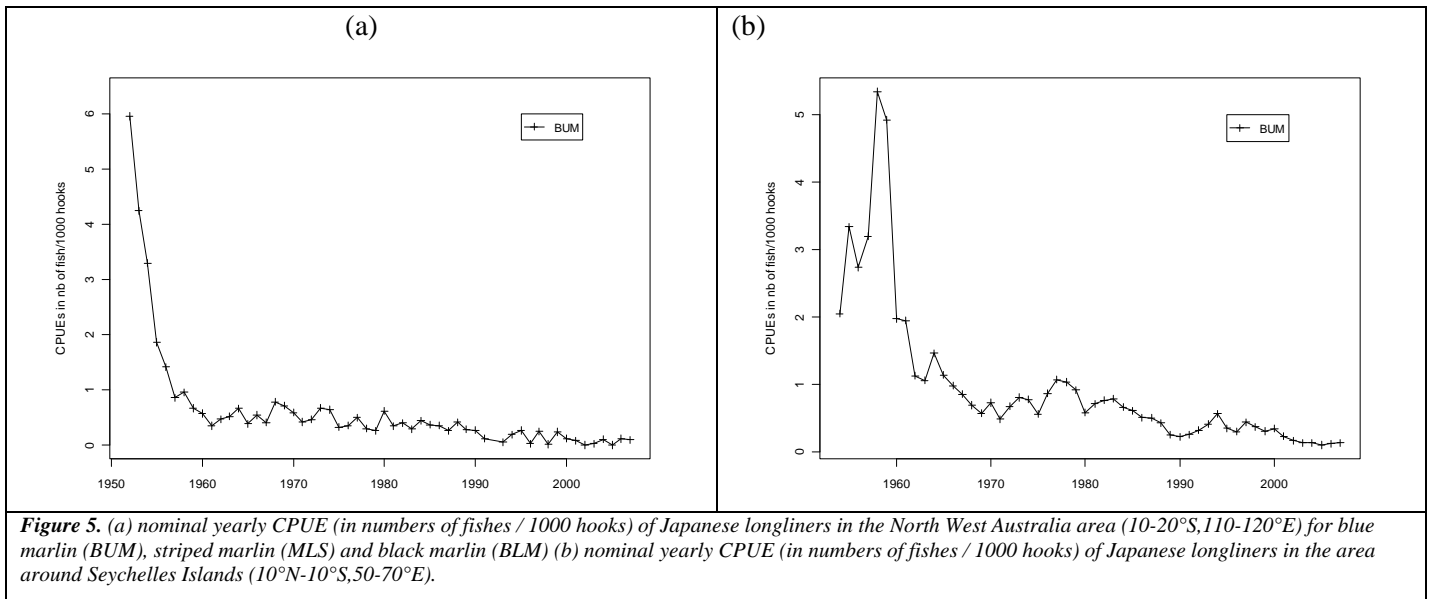
Executive summary of the status of the striped marlin

(as adopted by the Scientific Committee, December 2009)

BIOLOGY

The striped marlin (*Tetrapturus audax*) occurs in both the Pacific and Indian Oceans. Its distribution is different from other marlins in that it prefers more temperate or cooler waters and tends to be less migratory. Striped marlin is rarely found in the Atlantic Ocean. In the Indian Ocean seasonal concentrations of striped marlin occur in four main regions: off the east African coast (0º-10ºS), the south and western Arabian Sea, the Bay of Bengal, and north-western Australian waters.

Striped marlins may live up to 10 years and are relatively fast growing. The larger individuals may exceed 3 m long and 240 kg. Striped marlin is the smallest of the marlin species; but unlike the other marlin species, striped marlin males and females grow to a similar size.

Sexual maturity is attained at between 2 and 3 years of age and a large female can produce in excess of 20 million eggs. Unlike the other marlins which are serial spawners, striped marlin appear to spawn once per season

Striped marlin belong to the genus *Tetrapturus* whereas black and blue marlins belong to the genus *Makaira*. Stripped marlins can be distinguished from the blue and black marlins by a range of morphological and genetic characteristics; however, the distinction between the striped marlin and the white marlin (*T. albidus*) is apparently less clear and is the subject ongoing debate among scientists.

The stock structure of striped marlin in the Indian Oceans is uncertain.

FISHERIES

Striped marlin is caught mainly by longliners in the Indian Ocean (Figure 1). Minimum catch estimates have been derived from very small amounts of information and are therefore highly uncertain. Difficulties in the identification of marlins also contribute to the uncertainties of the information available to the Secretariat.

The minimum average annual catch estimated for the period 2004 to 2008 is around 3,100 t. The distribution of striped marlin catches has changed since the 1980's with most of the catch now taken in the western areas of the Indian Ocean (Figure 2). In recent years, the fleets of Taiwan,China (longline) and to a lesser extent Indonesia (longline) are attributed with the highest catches of striped marlin.

AVAILABILITY OF INFORMATION FOR STOCK ASSESSMENT

There is limited reliable information on the catches of striped marlin and no information on the stock structure or growth and mortality of striped marlin in the Indian Ocean. For example:

1. **Trends in catches**: catch estimates for striped marlin are highly uncertain. Available catch data varied from year to year and mis-identification of marlins is probably common.
2. **Nominal CPUE Trends:** data is available from several fleets (mainly longline) and time periods but this species is not targeted therefore interpretation of catch rates may be problematic as they are likely to be affected by changes in the fisheries targeting other species.
3. **Average weight of fish in the catch:** the average weight of fish is derived from various weight and length information. The reliability of average weight estimates is reduced when relatively few fish out of the total catch are measured.
4. **Sex ratio:** such data are not available to the Secretariat
5. **Lengths of fish being caught** – fish size is derived from various length and weight information. The reliability of the size data is reduced when relatively few fish out of the total catch are measured.

No quantitative stock assessment on striped marlin in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish. However, a preliminary estimation of stock indicators was attempted on the longline catch and effort datasets from Japan and Taiwan,China that represent the best available information. Nominal CPUE exhibited dramatic declines since the beginning of the fishery in two major fishing grounds (West Equatorial and north-west Australia) and the catches in the initial core areas also decreased substantially (Figures 3, 4 and 5). There is considerable uncertainty about the degree to which those indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends.

Table 1. *Best scientific estimates of the catches of striped marlin (as adopted by the IOTC Scientific Committee) by gear and main fleets for the period 1959-2008 (in thousands of tonnes).* Data as of November 2009

Gear	Fleet	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Longline	China																											
	Taiwan,China	0.5	0.3	0.3	0.2	0.6	0.7	0.4	0.3	0.3	1.0	1.9	2.0	1.1	1.1	0.7	1.3	1.3	2.1	3.2	4.0	2.4	3.9	4.4	1.9	2.6	2.1	3.1
	Indonesia															0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	India																									0.0	0.0	0.0
	NEI-Deep-freezing																											0.0
	Japan	2.1	2.0	2.4	1.8	1.3	1.4	3.0	3.9	4.2	2.3	2.2	1.6	1.0	0.8	0.5	1.4	0.9	0.5	0.5	1.8	1.1	1.1	0.9	0.6	0.6	1.0	1.0
	Seychelles																									0.0	0.0	0.0
	Korea, Republic of							0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.4	0.5	1.0	0.6	0.6	0.8	1.0	0.9	0.8	0.7	0.7	0.7	0.7	0.7
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*2.5*	*2.3*	*2.7*	*2.0*	*1.8*	*2.1*	*3.5*	*4.2*	*4.6*	*3.4*	*4.2*	*3.9*	*2.5*	*2.3*	*1.8*	*3.6*	*2.9*	*3.2*	*4.6*	*6.9*	*4.5*	*5.9*	*6.0*	*3.2*	*3.9*	*3.8*	*4.8*
Other gears	Indonesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
All	*Total*	*2.5*	*2.3*	*2.7*	*2.0*	*1.8*	*2.1*	*3.5*	*4.2*	*4.6*	*3.4*	*4.2*	*3.9*	*2.5*	*2.3*	*1.8*	*3.6*	*2.9*	*3.2*	*4.6*	*6.9*	*4.5*	*5.9*	*6.0*	*3.2*	*3.9*	*3.8*	*4.8*

Gear	Fleet	Av04/08	Av59/08	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Longline	China																									
	Taiwan,China	1.7	2.1	4.8	4.4	3.0	2.7	1.0	2.3	2.1	5.2	3.1	3.8	3.0	2.4	2.5	2.0	1.8	2.1	2.0	2.2	2.5	1.8	1.8	1.4	1.2
	Indonesia	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.2
	India	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.3	0.3
	NEI-Fresh Tuna	0.2	0.1				0.3	0.5	0.4	0.5	0.5	0.7	0.5	0.6	0.7	0.6	0.5	0.5	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2
	NEI-Deep-freezing	0.1	0.2	0.3	0.2	0.4	0.4	0.2	0.4	0.3	1.4	0.9	1.1	1.3	0.8	1.2	0.9	0.7	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1
	Japan	0.1	0.9	1.0	0.7	0.3	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
	Seychelles	0.1	0.0										0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
	China	0.1	0.0										0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0
	Korea, Republic of	0.1	0.4	1.1	1.0	1.0	0.8	0.7	0.2	0.4	0.4	0.4	0.4	0.6	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1
	France-Reunion	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other Fleets	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Total	*3.0*	*4.0*	*7.2*	*6.3*	*4.7*	*4.6*	*2.6*	*3.8*	*3.8*	*7.8*	*5.5*	*6.3*	*6.1*	*4.8*	*5.3*	*4.3*	*3.9*	*3.1*	*3.1*	*3.1*	*3.7*	*3.0*	*3.2*	*2.7*	*2.4*
Other gears	Indonesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
	Other Fleets	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Total	*0.1*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
All	*Total*	*3.1*	*4.0*	*7.2*	*6.4*	*4.8*	*4.6*	*2.7*	*3.9*	*3.8*	*7.9*	*5.6*	*6.4*	*6.2*	*4.9*	*5.3*	*4.4*	*4.0*	*3.2*	*3.2*	*3.2*	*3.8*	*3.1*	*3.3*	*2.8*	*2.5*
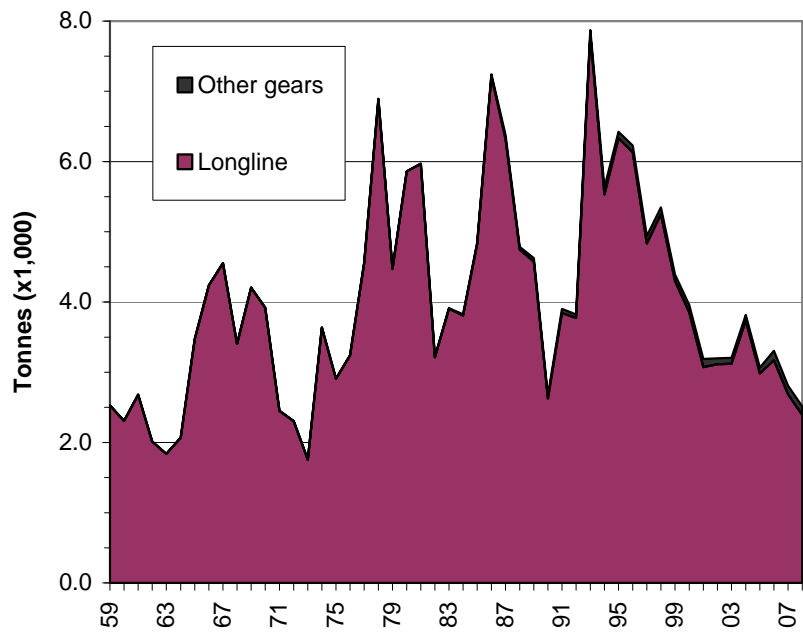
Figure 1: *Estimated catches of striped marlin by gear recorded in the IOTC Database (1959-2008). Note, these are minimum catch estimates as they are derived from IOTC fleets only and the levels of catch by other fleets are unknown*
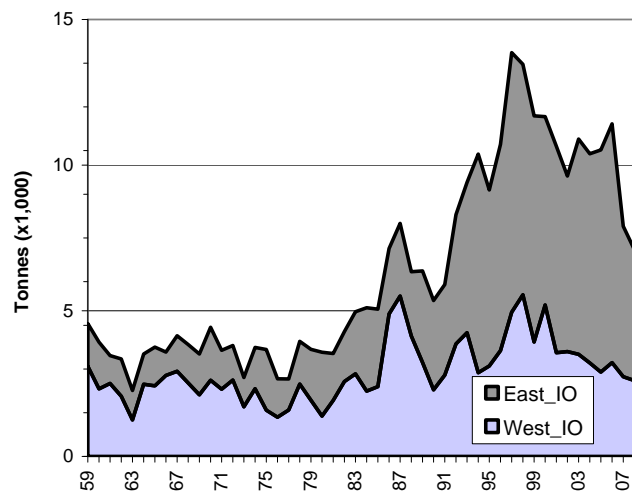

Figure 2. *Trends of the Striped marlin catches in the western and the eastern area of the Indian Ocean from 1959 – 2008. Data as of November 2009*
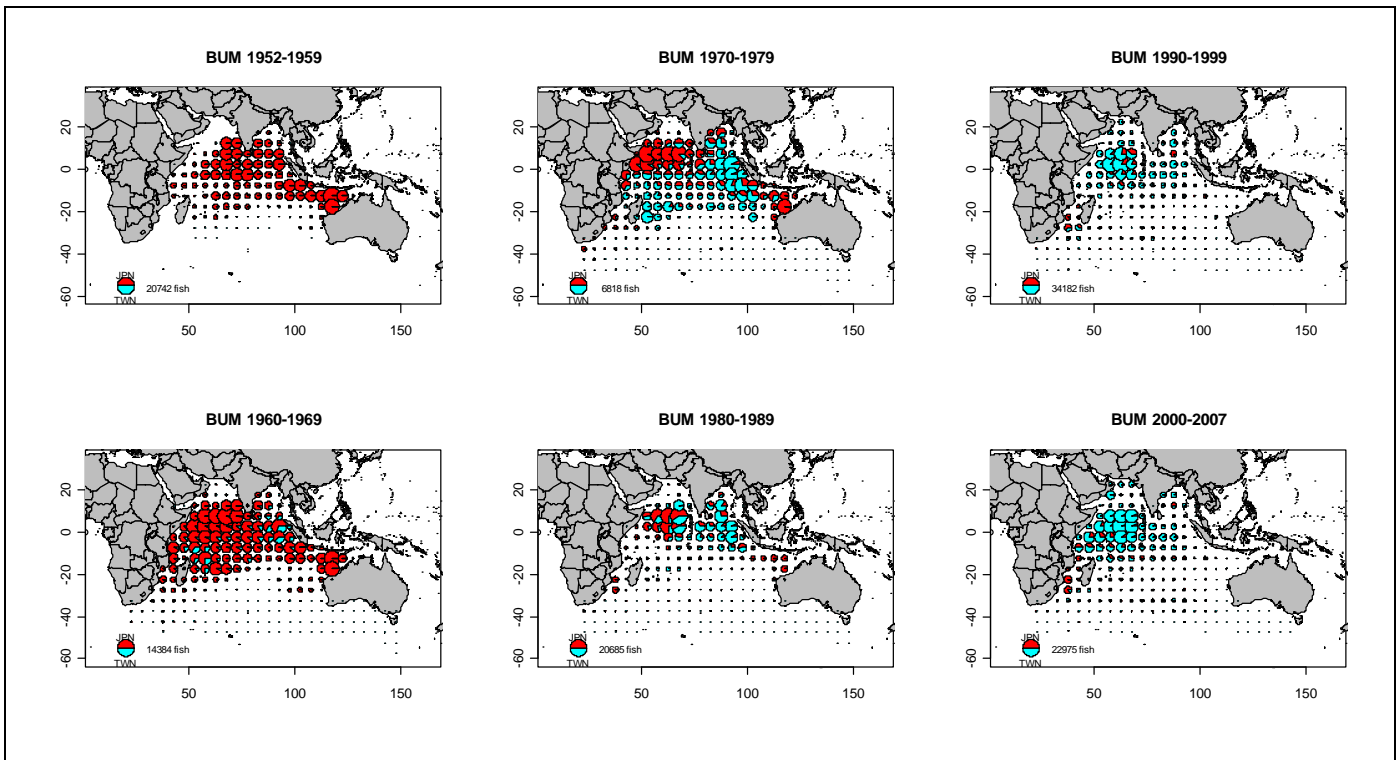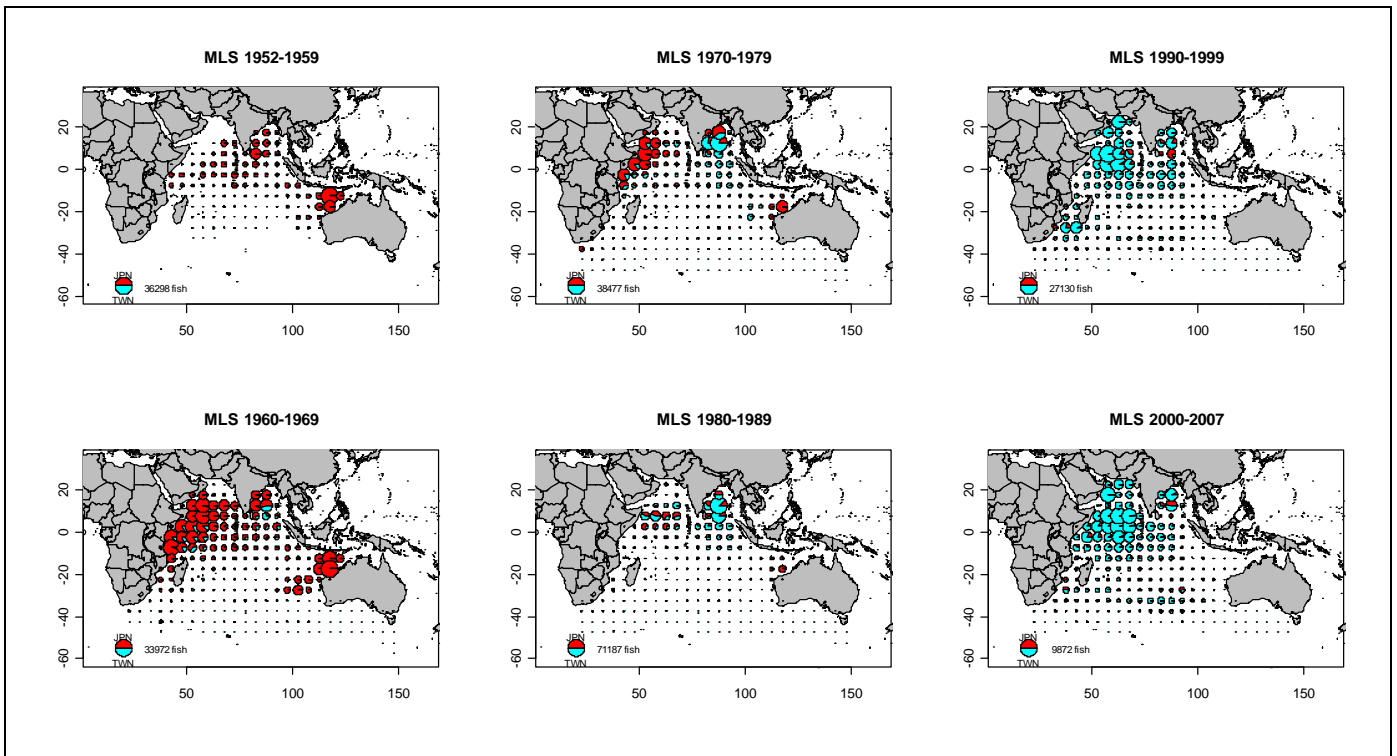
Figure 3: *Total annual catches of striped marlin (number) by Japanese and Taiwanese longline vessels operating in the Indian Ocean over the periods 1952 to 2007 per decade.*

Figure 4. *Major marlin fishing areas (framed): Seychelles and NW Australia.*

Figure 3. *(a) nominal yearly CPUE (in numbers of fishes / 1000 hooks) of Japanese longliners in the North West Australia area (10-20°S,110-120°E) for blue marlin (BUM), striped marlin (MLS) and black marlin (BLM) (b) nominal yearly CPUE (in numbers of fishes / 1000 hooks) of Japanese longliners in the area around Seychelles Islands (10°N-10°S,50-70°E).*
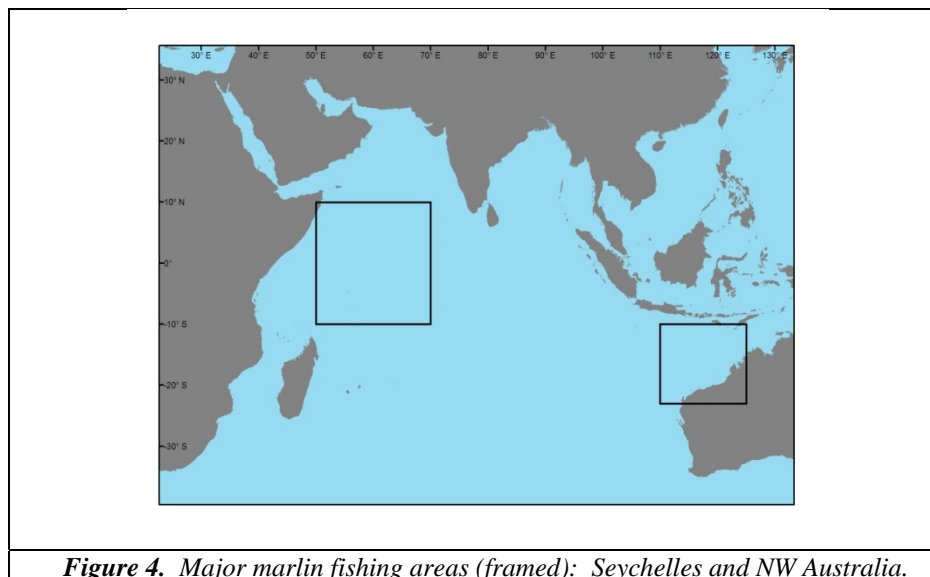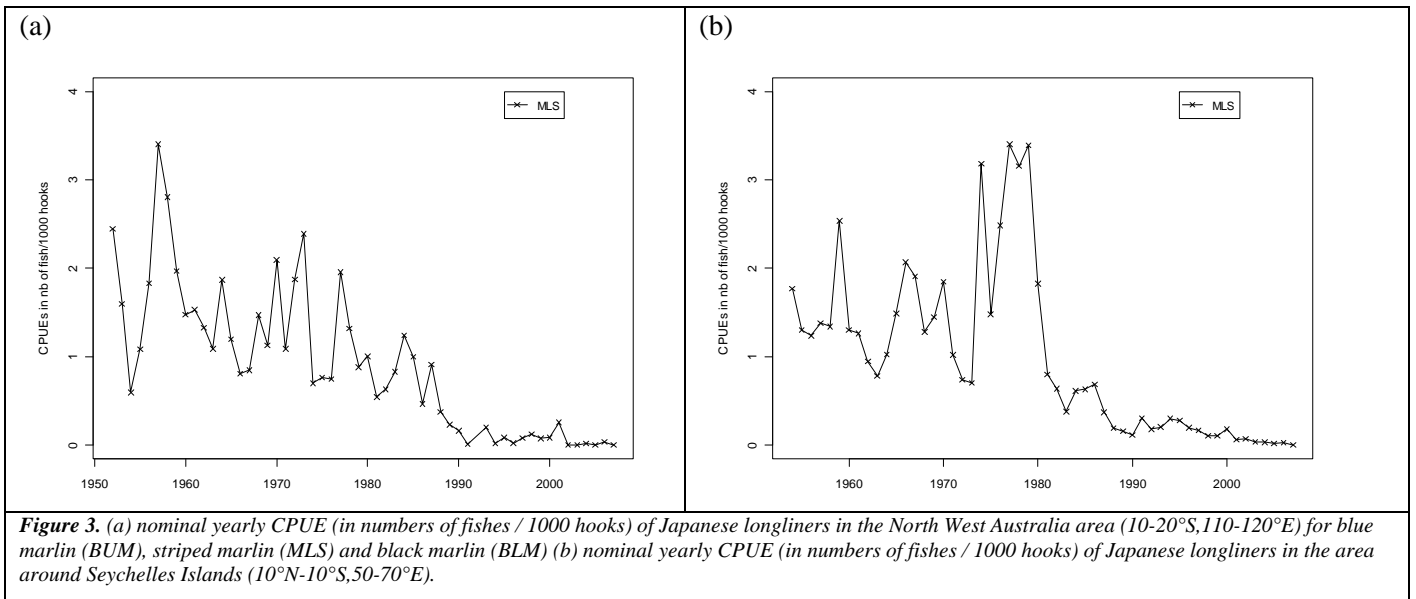
Executive summary of the status of the Indo-Pacific sailfish

(as adopted by the Scientific Committee, December 2009)

BIOLOGY

Indo-Pacific sailfish[2] (*Istiophorus platypterus*) is 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. 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 swimming at speeds in excess of 110 km/h over short periods.

In the Indian Ocean, some sailfish make regular seasonal migrations to Arabian Gulf waters, aggregating around October to April each year before moving northwest into Iranian waters. It is not known, however, where the population goes over the period from July to September.

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.

The stock structure of Indo-Pacific sailfish in the Indian Oceans is uncertain.

FISHERIES

Indo-Pacific sailfish is caught mainly by gillnets and to a much lesser extent by troll and handlines, and longlines. This species is also a popular catch for sport fisheries, e.g. off Kenya.

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

The minimum average annual catch estimated for the period 2004 to 2008 is around 24,500 t. In recent years, the countries attributed with the highest catches of Indo-Pacific sailfish are situated in the Arabian Sea and are Iran, Sri Lanka, India and Pakistan. Smaller catches are reported for line fishers in Comores and Mauritius and by Indonesia longliners.

AVAILABILITY OF INFORMATION FOR STOCK ASSESSMENT

There is no information on the stock structure of Indo-Pacific sailfish in the Indian Ocean, and no information on age and growth information in the Indian Ocean. Possible fishery indicators:

1. **Trends in catches**: catch estimates for Indo-Pacific sailfish are highly uncertain and there is little information available for the years prior to 1970. However, catches appear to have been rapidly increasing since the mid 1980's.
2. **Nominal CPUE Trends:** few data are available, furthermore this species is not generally targeted therefore interpretation of catch rates may be problematic as they are likely to be affected by changes in the fisheries targeting other species.
3. **Average weight in the catch by fisheries:** few data are available to the Secretariat.
4. **Sex ratio:** such data are not available to the Secretariat
5. **Number of squares fished:** such data are not available to the Secretariat.

No quantitative stock assessment on 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.

MANAGEMENT ADVICE

No quantitative stock assessment is currently available for Indo-Pacific sailfish in the Indian Ocean, and due to a paucity of data there a no stock indicators that are considered to be reliable, therefore the stock status is uncertain. However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

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[2] There is some debate on whether there is a single worldwide sailfish species, *I. Platypterus*; or two species, being an Indo–Pacific sailfish (*I. platypterus*) and an Atlantic species *I. albicans*.

Management quantity	2008 Assessment	2009 assessment
Most recent catch	20,000 t (2007)	20,100 t (2008)
Mean catch over the last 5 years (2004-2008)		24,500 t
Maximum Sustainable Yield		
$F_{Current}/F_{MSY}$		
$B_{Current}/B_{MSY}$		
$SB_{Current}/SB_{MSY}$		
$B_{Current}/B_0$		
$SB_{Current}/SB_0$		
$B_{Current}/B_{Current,F=0}$		
$SB_{Current}/SB_{Current,F=0}$		

Table 1. *Best scientific estimates of the catches of Indo-Pacific Sailfish (as adopted by the IOTC Scientific Committee) by gear and main fleets for the period 1959-2008 (in thousands of tonnes).* Data as of November 2009

Gear	Fleet	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Longline	Indonesia															0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Japan	0.7	1.0	0.9	0.8	0.7	0.7	0.7	0.8	0.9	0.9	0.7	0.4	0.6	0.4	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1
	Korea, Republic of							0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	Total	*0.7*	*1.0*	*0.9*	*0.8*	*0.7*	*0.7*	*0.7*	*0.8*	*0.9*	*1.0*	*0.7*	*0.5*	*0.7*	*0.5*	*0.3*	*0.4*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.4*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*
Gillnet	Iran, Islamic Republic																									0.0		0.0
	India																						0.5	0.3	1.0	0.5	0.6	0.4
	Pakistan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						0.0	0.0	0.0	0.0	1.3	0.8	0.1	0.2	0.2	0.1	1.4
	Tanzania												0.1		0.0		0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.5	0.2	0.2	0.2
	Indonesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Oman	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2
	United Arab Emirates																									0.1	0.1	0.1
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.1
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.1*	*0.0*	*0.2*	*0.2*	*0.3*	*0.4*	*0.4*	*1.7*	*1.6*	*1.0*	*2.0*	*1.3*	*1.4*	*2.5*
Line	India																						0.2	0.1	0.2	0.2	0.2	0.1
	Mauritius																										0.0	0.1
	Oman	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
	Sri Lanka	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.4	0.4
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2
	Total	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.4*	*0.3*	*0.9*	*0.8*	*0.8*	*0.8*
Other gears	*Total*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.0*	*0.1*	*0.1*
All	*Total*	*0.7*	*1.0*	*1.0*	*0.9*	*0.8*	*0.8*	*0.8*	*0.9*	*1.0*	*1.1*	*0.8*	*0.8*	*0.8*	*0.7*	*0.4*	*0.9*	*0.9*	*1.0*	*1.0*	*1.0*	*2.3*	*2.5*	*1.7*	*3.3*	*2.4*	*2.6*	*3.7*

Gear	Fleet	Av04/08	Av59/08	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
Longline	NEI-Fresh Tuna	0.4	0.1				0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.0	0.2	0.3	0.3	0.4	0.4	0.5	0.5
	Indonesia	0.4	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.5	0.6	0.6	0.7	0.4	0.3	0.5	1.3	0.2	0.3	0.1	0.7	0.5
	Japan	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.4	0.5	0.5
	Korea, Republic of	0.0	0.1	0.2	0.2	0.2	0.2	0.1		0.0	0.1	0.0		0.0	0.0								0.0			0.0	0.0
	Pakistan	0.0	0.1						0.7	1.0	0.7	0.9	0.9	1.0	0.0	0.0	0.0									
	Other Fleets	0.4	0.1	0.1	0.0	0.1	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.5	0.4	0.5	0.6
	Total	*1.6*	*0.9*	*0.4*	*0.3*	*0.3*	*0.7*	*0.7*	*1.4*	*1.8*	*1.5*	*1.8*	*1.7*	*1.9*	*1.3*	*1.2*	*1.2*	*0.9*	*0.8*	*1.1*	*2.0*	*0.9*	*1.4*	*1.4*	*2.2*	*2.0*
Gillnet	Iran, Islamic Republic	9.4	1.6	0.0	0.0				0.2	0.2	0.7	1.1	3.6	2.3	2.3	1.8	3.2	3.1	3.2	4.3	7.3	12.1	12.6	10.6	6.2	5.6
	Sri Lanka	4.3	1.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.7	1.8	1.3	2.0	2.7	1.9	3.6	5.7	3.9	4.6	4.8	9.0	4.0	4.3	2.3	2.1
	India	3.2	0.9	0.5	0.4	0.4	0.5	0.5	0.7	1.1	1.3	1.1	0.9	2.5	2.8	2.1	1.9	2.3	2.8	2.6	2.9	2.7	2.3	5.0	2.4	3.4
	Pakistan	2.0	0.9	0.6	0.6	1.1	1.9	1.7	2.0	1.7	1.9	2.4	2.3	2.3	1.9	2.0	2.1	2.0	1.0	0.7	0.7	0.7	2.3	2.3	2.5	2.5
	Tanzania	0.6	0.3	0.3	0.1	0.3	0.3	0.4	0.2	0.2	0.4	0.6	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.7	0.7	0.7	0.7
	Indonesia	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.6
	Oman	0.1	0.2	0.2	0.4	0.8	0.4	0.4	0.1	0.4	0.3	0.1	0.3	0.4	0.6	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
	United Arab Emirates	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1
	Other Fleets	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Total	*20.4*	*5.2*	*1.9*	*1.8*	*2.9*	*3.5*	*3.5*	*3.9*	*4.5*	*5.8*	*7.6*	*9.4*	*10.5*	*11.5*	*9.4*	*12.2*	*14.4*	*12.2*	*13.3*	*16.9*	*25.6*	*22.5*	*23.7*	*14.8*	*15.3*
Line	India	0.9	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.5	0.6	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	1.3	1.2	0.9
	Yemen	0.5	0.0																				0.6	0.6	0.6	0.6
	Comoros	0.4	0.2				0.7	0.7	0.7	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5
	Mauritius	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Oman	0.1	0.1	0.1	0.2	0.4	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2
	Sri Lanka	0.0	0.2	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other Fleets	0.4	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4
	Total	*2.6*	*1.0*	*0.9*	*0.9*	*1.3*	*1.7*	*1.7*	*1.8*	*1.7*	*1.7*	*1.7*	*1.6*	*1.9*	*2.4*	*1.7*	*1.5*	*1.7*	*1.6*	*1.5*	*1.7*	*1.7*	*2.3*	*3.1*	*2.9*	*2.8*
Other gears	*Total*	*0.0*	*0.1*	*0.1*	*0.1*	*0.3*	*0.1*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
All	*Total*	*24.5*	*7.1*	*3.3*	*3.2*	*4.8*	*6.0*	*6.0*	*7.0*	*8.0*	*9.0*	*11.1*	*12.8*	*14.4*	*15.2*	*12.4*	*15.0*	*17.0*	*14.7*	*16.0*	*20.7*	*28.2*	*26.2*	*28.2*	*20.0*	*20.1*

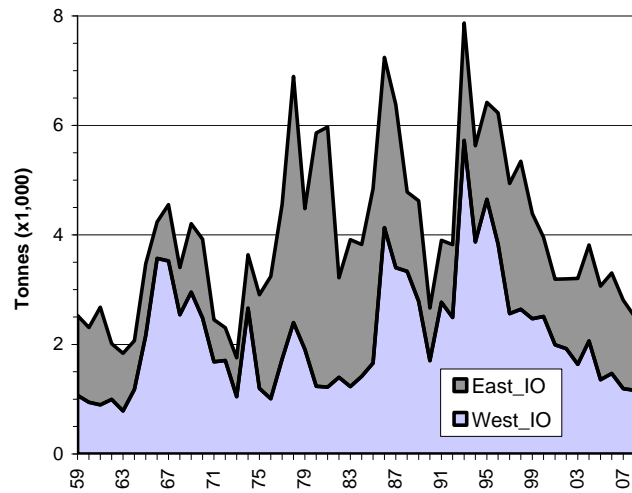*Figure<< : Estimated catches of Indo-Pacific sailfish by gear recorded in the IOTC Database (1959-2008).*
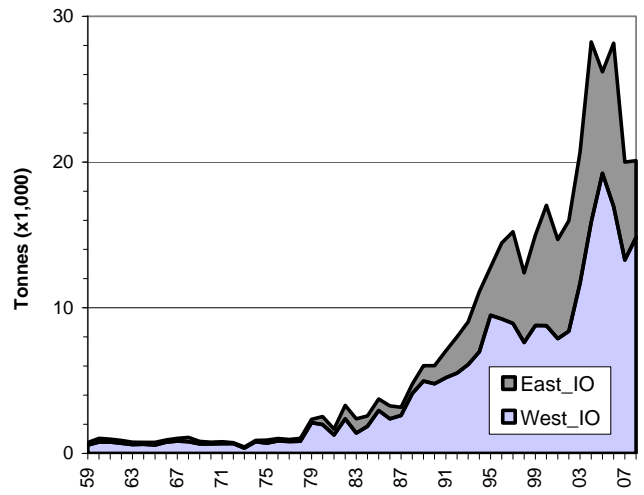
Trends of the Indo-Pacific sailfish catches in the western and the eastern area of the Indian Ocean from 1959 – 2008.
*Data as of November 2009*