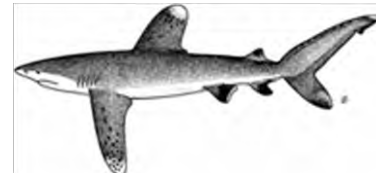


**APPENDIX XXIV**  
**EXECUTIVE SUMMARY: OCEANIC WHITETIP SHARK**



**Status of the Indian Ocean oceanic whitetip shark (OCS: *Carcharhinus longimanus*)**

**TABLE 1.** Oceanic whitetip shark: Status of oceanic whitetip shark (*Carcharhinus longimanus*) in the Indian Ocean

Area <sup>1</sup>	Indicators	2013 stock status determination
Indian Ocean	Reported catch 2012: 412 t Not elsewhere included (nei) sharks: 42,793 t Average reported catch 2008–2012: 292 t Not elsewhere included (nei) sharks: 48,708 t	Uncertain
	MSY: unknown $F_{2012}/F_{MSY}$ : unknown $SB_{2012}/SB_{MSY}$ : unknown $SB_{2012}/SB_0$ : unknown	

<sup>1</sup>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 ( $F_{year}/F_{MSY} \leq 1$ )		
Not assessed/Uncertain		

**NOTE:** IOTC Resolution 13/06 on a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries, prohibits retention onboard, transshipping, landing or storing any part or whole carcass of oceanic whitetip sharks.

**TABLE 2.** Oceanic whitetip shark: IUCN threat status of oceanic whitetip shark (*Carcharhinus longimanus*) in the Indian Ocean

Common name	Scientific name	IUCN threat status <sup>20</sup>		
		Global status	WIO	EIO
Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	Vulnerable	–	–

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean

Sources: IUCN 2007, Baum et al. 2006

CITES - In March 2013, CITES agreed to include oceanic whitetip shark to Appendix II to provide further protections prohibiting the international trade; which will become effective on September 14, 2014.

**INDIAN OCEAN STOCK – MANAGEMENT ADVICE**

**Stock status.** There remains considerable uncertainty about the relationship between abundance and the standardised CPUE series from the Japanese longline fleet, and about the total catches over the past decade (Table 1). The ecological risk assessment (ERA) conducted for the Indian Ocean by the WPEB and SC in 2012 (IOTC–2012–SC15–INF10 Rev\_1) consisted of a semi-quantitative risk assessment analysis to evaluate the resilience of shark species to the impact of a given fishery, by combining the biological productivity of the species and its susceptibility to each fishing gear type. Oceanic whitetip shark received a high vulnerability ranking (No. 5) in the ERA rank for longline gear because it was estimated as one of the least productive shark species, and was also characterised by a high susceptibility to longline gear. Oceanic whitetip shark was estimated as being the most vulnerable shark species to purse seine gear, as it was characterised as having a relatively low productive rate, and high susceptibility.

<sup>20</sup> The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

The current IUCN threat status of ‘Vulnerable’ applies to oceanic whitetip sharks globally (Table 2). There is a paucity of information available on this species in the Indian Ocean and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment and limited basic fishery indicators currently available for oceanic whitetip sharks in the Indian Ocean therefore the stock status is highly uncertain (Table 1). Oceanic whitetip sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived, mature at 4–5 years, and have relatively few offspring (<20 pups every two years), the oceanic whitetip shark is vulnerable to overfishing. Despite the lack of data, it is apparent from the information that is available that oceanic whitetip shark abundance has declined significantly over recent decades. Therefore stock status remains **uncertain** (Table 1).

**Outlook.** Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into certain areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on oceanic whitetip sharks will decline in these areas in the near future, and may result in localised depletion. The following should be noted:

- The available evidence indicates considerable risk to the stock status at current effort levels.
- The two primary sources of data that drive the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority.
- Noting that current catches (probably largely underestimated) are estimated at an average ~292 t over the last five years, ~412 t in 2012, maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- Mechanisms need to be developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.

## SUPPORTING INFORMATION

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

### CONSERVATION AND MANAGEMENT MEASURES

Oceanic whitetip shark in the Indian Ocean are currently subject to a number of Conservation and Management Measures adopted by the Commission:

- Resolution 13/03 *on the recording of catch and effort by fishing vessels in the IOTC area of competence* sets out the minimum logbook requirements for purse seine, longline, gillnet, pole and line, handline and trolling fishing vessels over 24 metres length overall and those under 24 metres if they fish outside the EEZs of their flag States within the IOTC area of competence. As per this Resolution, catch of all sharks must be recorded (retained and discarded).
- Resolution 13/06 *on a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries* prohibits, as an interim pilot measure, the retention onboard, transshipment, landing or storing any part or whole carcass of oceanic whitetip sharks (*Carcharhinus longimanus*) (and requests for all other species) by all vessels on the IOTC record of authorised vessels or authorised to fish for tuna or tuna-like species, with the exception of observers who are permitted to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs) from oceanic whitetip sharks that are dead at haulback and artisanal fisheries for the purpose of local consumption, and will conduct a review and an evaluation of the interim measure in 2016.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on shark interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1<sup>st</sup> July 2010.
- Resolution 05/05 *Concerning the conservation of sharks caught in association with fisheries managed by IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel.
- Resolution 10/02 *Mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPC's)* indicated that the provisions, applicable to tuna and tuna-like species, are applicable to shark species.

*Extracts from Resolutions 13/03, 13/06, 11/04 and 05/05*

**RESOLUTION 13/03 ON THE RECORDING OF CATCH AND EFFORT BY FISHING VESSELS IN THE IOTC AREA OF COMPETENCE**

Para. 1. Each flag CPC shall ensure that all purse seine, longline, gillnet, pole and line, handline and trolling fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

Para. 8 (start). The flag State and the States which receive this information shall provide all the data for any given year to the IOTC Secretariat by June 30<sup>th</sup> of the following year on an aggregated basis.

**RESOLUTION 13/06 ON A SCIENTIFIC AND MANAGEMENT FRAMEWORK ON THE CONSERVATION OF SHARK SPECIES CAUGHT IN ASSOCIATION WITH IOTC MANAGED FISHERIES**

Para. 3. CPCs shall to prohibit, as an interim pilot measure, to retain onboard, tranship, land or store any part or whole carcass of oceanic whitetip sharks with the exception of paragraph 7.

Para. 8. CPCs, especially those targeting sharks, shall submit data for sharks, as required by IOTC data reporting procedures.

**RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME**

Para. 10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

**Resolution 10/02 MANDATORY STATISTICAL REQUIREMENTS FOR IOTC MEMBERS AND COOPERATING NON-CONTRACTING PARTIES (CPC'S)**

Para. 3. The provisions, applicable to tuna and tuna-like species, shall also be applicable to the most commonly caught shark species and, where possible, to the less common shark species.

**RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC**

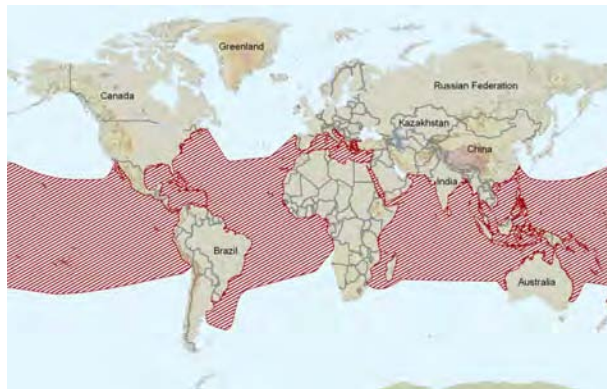
Para. 1. CPCs shall annually report data for catches of sharks, in accordance with IOTC data reporting procedures, including available historical data.

Para. 3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.

**FISHERIES INDICATORS**

***Oceanic whitetip shark: General***

Oceanic whitetip shark (*Carcharhinus longimanus*) was one of the most common large sharks in warm oceanic waters. It is typically found in the open ocean but also close to reefs and near oceanic islands (Fig. 1). Table 3 outlines some of the key life history traits of oceanic whitetip shark in the Indian Ocean.



**Fig. 1.** Oceanic whitetip shark: The worldwide distribution of the oceanic whitetip shark (source: [www.iucnredlist.org](http://www.iucnredlist.org))

**TABLE 3.** Oceanic whitetip shark: Biology of Indian Ocean oceanic whitetip shark (*Carcharhinus longimanus*)

Parameter	Description
Range and stock structure	The population dynamics and stock structure of the oceanic whitetip shark in the Indian Ocean are not known. Area of overlap with IOTC management area = high.
Longevity	Maximum age observed was 17 years.
Maturity (50%)	Both males and females mature at around 6 to 7 years old or about 180–190 cm TL in the western South Atlantic Ocean and 4-5 years or 170–190 cm TL in the Central and western Pacific Ocean. Range of observed sizes-at-maturity was 160-196cm TL for males and 181-203cm TL for females.
Reproduction	Oceanic whitetip sharks are placental viviparous. Litter sizes range from 1–15 pups (mean=6.2) in the Pacific Ocean, with larger sharks producing more offspring. Each pup is approximately 60-65 cm at birth. In the south western Indian Ocean, oceanic whitetip sharks appear to mate and give birth in the early summer, with a gestation period which lasts about one year. The reproductive cycle is believed to be biennial. The locations of the nursery grounds are not well known but they are thought to be in oceanic areas. <ul style="list-style-type: none"> <li>• Fecundity: medium (&lt;20 pups)</li> <li>• Gestation Period: 12 months</li> <li>• Generation time: 11 years</li> <li>• Reproductive cycle is biennial</li> </ul>
Size (length and weight)	Oceanic whitetip sharks are relatively large sharks and grow to up to 350 cm FL. Females grow larger than males. The maximum weight reported for this species is 167.4 kg. Length–weight relationship for both sexes combined in the Indian Ocean is $TW=0.386*10^{-4} * FL^{2.75586}$ .

Sources: Bass et al. 1973, Mejuto et al. 2005, Romanov & Romanova 2009, Coelho et al. 2009

### ***Oceanic whitetip shark: Fisheries***

Oceanic whitetip sharks are targeted by some semi-industrial and artisanal fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and purse seine fishery) (Table 4).

There is little information on the fisheries prior to the early 1970's, and some countries continue not to collect shark data while others do collect it but do not report it to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but the statistics are limited by the lack of species-specific data and data from the major fleets.

The practice of shark finning is considered to be regularly occurring for this species (Clarke et al. 2006, Clarke 2008) and the bycatch/release injury rate is unknown but probably high.

At-haulback mortality of oceanic whitetip sharks in the Atlantic ocean longline fishery targeting swordfish was estimated to be at 30.6% (Coelho et al. 2011).

**TABLE 4.** Oceanic whitetip shark: Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries

Gears	PS	LL		BB/TROL/HAND	GILL	UNCL
		SWO	TUNA			
Frequency	common	common		common	common	unknown
Fishing Mortality	Study in progress	58%		unknown	unknown	unknown
Post release mortality	Study in progress			unknown	unknown	unknown

Sources: Romanov 2002, 2008, Ariz et al. 2006, Peterson et al. 2008, Romanov et al. 2008, Poisson et al. 2010

### ***Oceanic whitetip shark: Catch trends***

The catch estimates for oceanic whitetip shark (Table 5) are highly uncertain as is their utility in terms of minimum catch estimates. Five CPCs have reported detailed data on shark landings (i.e. Australia, EU (Spain, Portugal and United Kingdom), I.R. Iran, South Africa, and Sri Lanka) while thirteen CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Rep. of Korea, Indonesia, Mozambique, Malaysia, Oman, Seychelles, Mauritius, Philippines, UK-territories, Vanuatu). For CPCs having longline fisheries targeting swordfish that report catches of sharks by species (i.e. Australia, EU, Spain, EU, Portugal, United Kingdom, Madagascar, and South Africa), 0.9% of the catch of sharks by longliners, all targeting swordfish, were oceanic whitetip sharks, and for CPCs reporting gillnet data by species, I.R. Iran reported 3% of the catches of shark as oceanic whitetip sharks (drifting gillnet and longline combination fishery, where longline have usually been directed at sharks).

**TABLE 5.** Oceanic whitetip shark: Catch estimates for oceanic whitetip shark in the Indian Ocean for 2010 to 2012

Catch		2010	2011	2012
Most recent catch (reported)	Oceanic whitetip shark	533 t	251 t	412 t
	nei-sharks	51,581 t	53,658 t	42,793 t
Mean catch (reported) over the last 5 years (2008–2012)	Oceanic whitetip shark			292 t
	nei-sharks			48,708 t

Nei-sharks: not elsewhere indicated sharks

Note that the catches recorded for sharks are thought incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2011 four countries reported catches of oceanic whitetip sharks in the IOTC region. A recent project estimated possible oceanic white tip shark catches for fleets/countries based on the ratio of shark catch over target species by metier (Murua et al. 2013). This estimation was done using target species nominal catch IOTC database and assuming that target catches are declared correctly. The estimated figure by this study highlighted that the possible underestimation of oceanic white tip shark in IOTC database is considerable (i.e. the estimated catch is around 20 times higher than the declared in the IOTC database). Although this figure needs to be further investigated, it gives a global figure of possible underreporting level of oceanic white tip in the area.

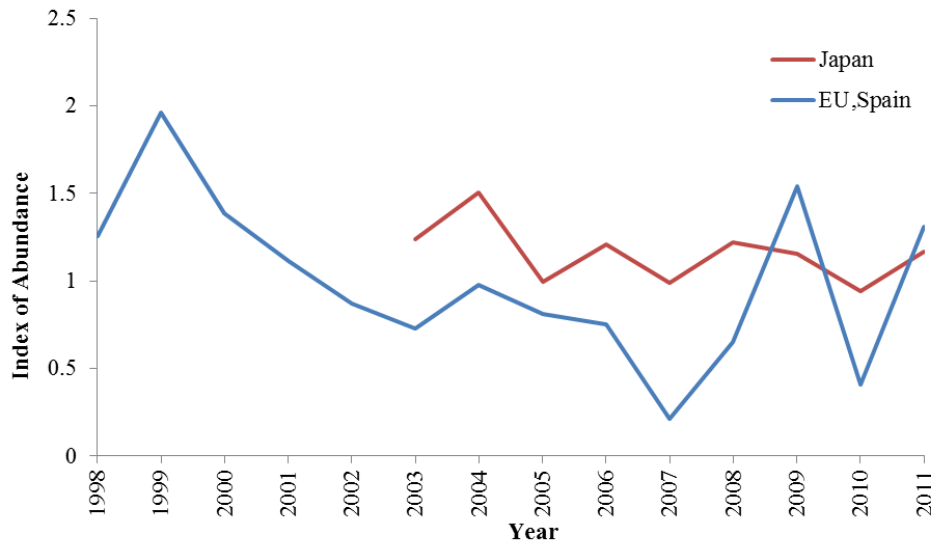
#### ***Oceanic whitetip shark: Nominal and standardised CPUE Trends***

Statistics not available at the IOTC Secretariat.

Historical research data shows overall decline in CPUE and mean weight of oceanic whitetip shark (Romanov et al. 2008). Anecdotal reports suggest that oceanic white tips have become rare throughout much of the Indian Ocean during the past 20 years. Indian longline research surveys reported zero catches from the Arabia Sea during 2004–09 (John & Varghese 2009).

Trends in the Japanese standardised CPUE series (2003–2011) suggest that the longline vulnerable biomass has decreased (Fig. 2; Yokawa & Semba 2012). The authors stated that the early CPUE (2000–02) were not reliable due to the data problems. The updated results are in line with those presented to the WPEB07, although there are some differences on the initial years of the data series, which were due to an improvement on the filtering process. However, the analysis is based on a relatively short period and may not be reflecting the abundance trend of the stock as the fishery started operating well before. Discarding data in an arbitrary manner was not desirable, and using more comprehensive statistical techniques for examining outliers should be presented, if data are not included in an analysis.

Trends in the EU, Spain standardised CPUE series (1998–2011) suggest that the longline vulnerable biomass declined until 2007 and has been variable since (Fig. 2; Ramos-Cartelle et al. 2012). There were concerns related to the areas used in the study and considering other criteria's such as examining Areas 1 and 2 (see paper) only may give a more appropriate CPUE signal. The use of other stratifications related to the biological distribution of the species or to the Longhurst ecological provinces in the Indian Ocean should be considered.



**Fig. 2.** Oceanic whitetip shark: Comparison of the oceanic whitetip shark standardised CPUE series for the longline fleets of Japan and EU,Spain

***Oceanic whitetip shark: Average weight in the catch by fisheries***

Data not available.

***Oceanic whitetip shark: Number of squares fished***

Catch and effort data not available.

**STOCK ASSESSMENT**

No quantitative stock assessment for oceanic whitetip shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

**LITERATURE CITED**

- Ariz J, Delgado de Molina A, Ramos ML, Santana JC (2006) Check list and catch rate data by hook type and bait for bycatch species caught by Spanish experimental longline cruises in the south-western Indian Ocean during 2005. IOTC-2006-WPBy-04
- Bass AJ, Aubrey D', DJD, Kitnasamy N (1973) Sharks of the east coast of Southern Africa. I. Genus *Carcharhinus* (Carcharhinidae). South Afr Assoc Mar Biol Res Invest Rep. 38, 100.
- Baum J, Medina E, Musick JA, Smale M (2006) *Carcharhinus longimanus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 08 November 2012
- Clarke S (2008) Use of shark fin trade data to estimate historic total shark removals in the Atlantic Ocean. *Aquat Living Res* 21:373-381
- Clarke SC, McAllister MK, Milner-Gulland EJ, Kirkwood GP, Michielsens CGJ, Agnew DJ, Pikitch EK, Nakano H, Shivji MS (2006) Global estimates of shark catches using trade records from commercial markets. *Ecol Let* 9:1115-1126
- Coelho R, Fernandez-Carvalho J, Lino PG, Santos MN (2011) At haulback fishing mortality of elasmobranchs caught in pelagic longline fisheries in the Atlantic Ocean. ICCAT SCRS Doc. 2011/085
- Coelho R, Hazin FHV, Rego M, Tambourgi M, Carvalho F, Burgess G (2009) Notes on the reproduction of the oceanic whitetip shark, *Carcharhinus longimanus*, in the southwest equatorial Atlantic. *Collect. Vol. Sci. Pap. ICCAT*, 64: 1734-1740. IUCN, 2007. IUCN Species Survival Commission's Shark Specialist Group. Review of Chondrichthyan Fishes
- Compagno LJV (1984) FAO Species Catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Part 2 - Carcharhiniformes. FAO Fish. Synop. 125(4/2):251-655.
- Fishbase - <http://www.fishbase.org/summary/Carcharhinus-longimanus.html>
- IUCN (2011) IUCN Red List of Threatened Species. Version 2011.1. [www.iucnredlist.org](http://www.iucnredlist.org)

- John ME, Varghese BC (2009) Decline in CPUE of oceanic sharks in the Indian EEZ: urgent need for precautionary approach. IOTC–2009–WPEB05–17
- Mejuto J, Garcia-Cortes B, Ramos-Cartelle A (2005) Tagging-recapture activities of large pelagic sharks carried out by Spain in collaboration with the tagging programs of other countries. SCRS/2004/104 Col. Vol. Sci. Pap. ICCAT, 58(3): 974-1000
- Murua H, Santos MN, Chavance P, Amande J, Seret B, Poisson F, Ariz J, Abascal FJ, Bach P, Coelho R, Korta M (2013). EU project for the provision of scientific advice for the purpose of the implementation of the EUPOA sharks: a brief overview of the results for Indian Ocean. IOTC-2013-WPEB-09-19. Petersen S, Nel D, Ryan P, Underhill L (2008) Understanding and mitigating vulnerable bycatch in southern African trawl and longline fisheries. 225 p. WWF South Africa Report Series
- Poisson F, Gaertner JC, Taquet M, Durbec JP, Bigelow K (2010) Effects of the lunar cycle and operational factors on the catches of pelagic longlines in the Reunion Island swordfish fishery. Fish Bull 108:268–281
- Ramos-Cartelle A, García-Cortés B, Ortíz de Urbina J, Fernández-Costa J, González-González I, Mejuto J (2012) Standardized catch rates of the oceanic whitetip shark (*Carcharhinus longimanus*) from observations of the Spanish longline fishery targeting swordfish in the Indian Ocean during the 1998–2011 period. IOTC–2012–WPEB08–27, 15 p
- Romanov EV (2002) Bycatch in the tuna purse-seine fisheries of the western Indian Ocean. Fish Bull 100:90-105
- Romanov EV (2008) Bycatch and discards in the Soviet purse seine tuna fisheries on FAD-associated schools in the north equatorial area of the Western Indian Ocean. Western Indian Ocean J Mar Sci 7:163-174
- Romanov E, Bach P, Romanova N (2008) Preliminary estimates of bycatches in the western equatorial Indian Ocean in the traditional multifilament longline gears (1961-1989) IOTC Working Party on Ecosystems and Bycatch (WPEB) Bangkok, Thailand. 20-22 October, 2008. 18 p
- Romanov E, Romanova N (2009) Size distribution and length-weight relationships for some large pelagic sharks in the Indian Ocean. IOTC–2009–WPEB–06, 12 p
- Yokawa K, Semba Y (2012) Update of the standardized CPUE of oceanic whitetip shark (*Carcharhinus longimanus*) caught by Japanese longline fishery in the Indian Ocean. IOTC–2012–WPEB08–26, 5 p