

OCEANIC WHITETIP SHARK**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 15/01 *on the recording of catch and effort data 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 15/02 *Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)* indicated that the provisions, applicable to tuna and tuna-like species, are applicable to shark species.
- 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.
- 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 1st July 2010.
- Resolution 17/05 *On 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 frozen shark fins retained onboard a vessel and a prohibition on the removal of fins for sharks landed fresh.

Extracts from Resolutions 15/01, 15/02, 13/06, 11/04 and 17/05

RESOLUTION 15/01 ON THE RECORDING OF CATCH AND EFFORT DATA 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. 10 (start). The Flag State shall provide all the data for any given year to the IOTC Secretariat by June 30th of the following year on an aggregated basis.

Resolution 15/02 MANDATORY STATISTICAL REPORTING REQUIREMENTS FOR IOTC CONTRACTING PARTIES AND COOPERATING NON-CONTRACTING PARTIES (CPCS)

Para. 2. Estimates of the total catch by species and gear, if possible quarterly, that shall be submitted annually as referred in paragraph 7 (separated, whenever possible, by retained catches in live weight and by discards in live weight or numbers) for all species under the IOTC mandate as well as the most commonly caught elasmobranch species according to records of catches and incidents as established in Resolution 15/01 *on the recording of catch and effort data by fishing vessels in the IOTC area of competence* (or any subsequent superseding Resolution).

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

Para 3. Notwithstanding paragraphs 1 and 2, CPCs shall prohibit, as an interim pilot measure, all fishing vessels flying their flag and on the IOTC Record of Authorised Vessels, or authorised to fish for tuna or tuna-like species managed by the IOTC on the high seas to retain onboard, tranship, land or store any part or whole carcass of oceanic whitetip sharks with the exception of paragraph 7. The provisions of this measure do not apply to artisanal fisheries operating exclusively in their respective Exclusive Economic Zone (EEZ) for the purpose of local consumption.

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 17/05 ON THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES

MANAGED BY IOTC

Para. 2. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks, with the exception of species prohibited by the IOTC. 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.

Para. 6. CPCs shall report data for catches of sharks no later than 30 June of the following year, in accordance with IOTC data reporting requirements and procedures in Resolution 15/02 *mandatory statistical requirements for IOTC Members and Cooperating Non-Contracting Parties (CPCs)* (or any subsequent superseding resolution), including all available historical data, estimates and life status of discards (dead or alive) and size frequencies.

FISHERIES INDICATORS

Oceanic whitetip shark: General

Oceanic whitetip shark (*Carcharhinus longimanus*) is 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 1** outlines some of the key life history traits of oceanic whitetip shark in the Indian Ocean.

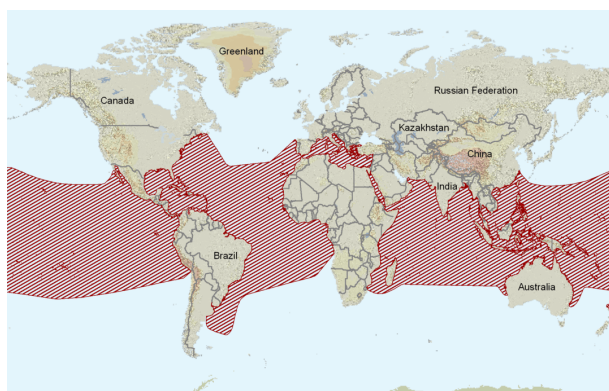


Fig. 1. Oceanic whitetip shark: The worldwide distribution of the oceanic whitetip shark (source: www.iucnredlist.org).

TABLE 1. 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, however, long distance movement has been observed for oceanic whitetip sharks ranging from the Mozambique Channel to the Somali Basin and the Southern Indian Ocean. Area of overlap with IOTC management area = high.
Longevity	Maximum age observed was 17 years.
Maturity (50%)	In the eastern Indian Ocean both males and females mature at around 190-200 cm TL. Similarly, 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 160-196 cm TL for males and 181-203 cm TL for females.
Reproduction	Oceanic whitetip sharks are placental viviparous. Litter sizes range from 1–15 pups in the Pacific Ocean (mean=6.2) and the Indian Ocean (mean = 12), with larger sharks producing more offspring. Each pup is approximately 50-65 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"> • Fecundity: medium (<20 pups) • Gestation Period: 12 months • Generation time: 11 years • Reproductive cycle is biennial
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, White 2007, Romanov & Romanova 2009, Coelho et al. 2009, Filamalter et al. 2012.

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 2**).

There is little information on the fisheries prior to the early 1970s, 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 50% (Coelho, 2016).

TABLE 2. 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 3**) are uncertain as is their utility in terms of minimum catch estimates. Sixteen CPCs have reported nominal catch data on sharks for the main species listed in Resolution 15/01 (i.e. Australia, Comoros, China, EU (France, Spain, Portugal and United Kingdom), India, Indonesia, and I.R. Iran, Japan, Rep. of Korea, Madagascar, Maldives, Mauritius, Pakistan Seychelles, South Africa and Sri Lanka). Four countries reported catches of oceanic whitetip shark in 2016 (India, I.R.Iran, Comoros and Seychelles).

TABLE 3. Oceanic whitetip shark: Catch estimates for oceanic whitetip shark in the Indian Ocean for 2014 to 2016.

Catch		2014	2015	2016
	Oceanic whitetip shark	191 t	215 t	503 t
Most recent catch (reported)	nei-sharks	41,196 t	54,466 t	54,495 t

Nei-sharks: sharks not elsewhere included

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. A recent project estimated possible oceanic whitetip shark catches for fleets/countries based on the ratio of shark catch over target species by metier (Murua et al. 2013). This estimation was based on nominal catches of target species from the IOTC database under the assumption that target catches are declared correctly. The study highlighted that the catch data on oceanic whitetip sharks in the IOTC database may be a considerable underestimate (i.e. total estimated catches were approximately 20 times higher than that declared in the IOTC database). Although this figure needs further investigation, it gives an initial estimate of the potential level of underreporting of oceanic whitetip sharks in the area. The retention ban on oceanic whitetip sharks since Resolution 13/06 came into force is likely to have resulted in worse data reporting since the reporting of discards is not as good as the reporting of nominal (retained) catches. Nevertheless, information on these catches should still be recorded and reported in logbooks and by observers.

Oceanic whitetip shark: Nominal and standardised CPUE trends

Statistics not available at the IOTC Secretariat.

Trends in nominal CPUE and mean weight of oceanic whitetip sharks indicate an overall decline over time (Romanov et al. 2008). Anecdotal reports suggest that oceanic whitetips 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 data problems. The updated results are in line with those presented to the WPEB07, although there were some differences in the initial years of the data series, which were due to an improvement on the filtering process.

Trends in the EU,Spain standardised CPUE series (1998–2011) suggest that the longline vulnerable biomass declined from 1999 until 2007 and has since been variable (Fig. 2; Ramos-Cartelle et al. 2012).

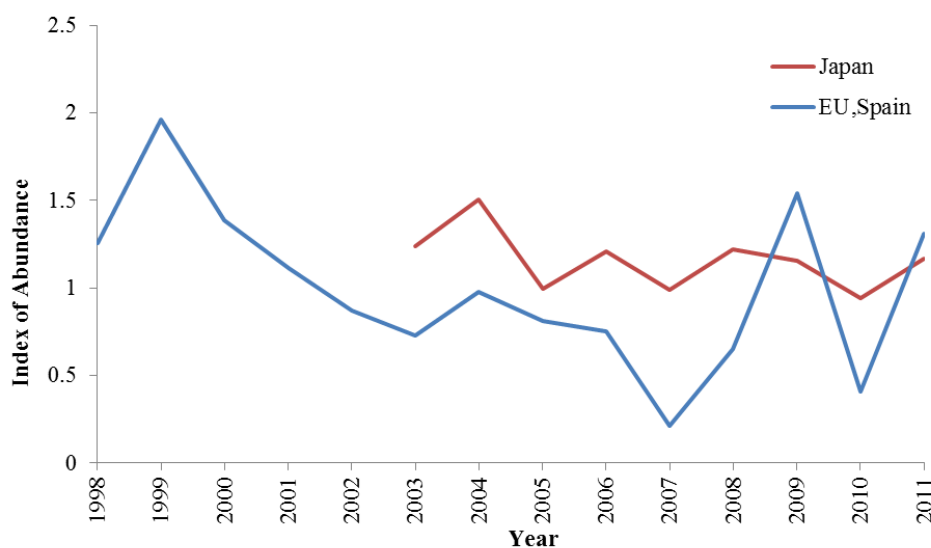


Fig. 2. Oceanic whitetip shark: Comparison of the oceanic whitetip shark standardised CPUE series for the longline fleets of Japan and EU,Spain.

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>. 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, 2016. Hooking mortality of oceanic whitetip sharks caught in a pelagic longline targeting swordfish in the SW Indian Ocean: comments on the efficiency of no-retention measures. IOTC-2106-WPEB12-26.
- 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.

- Filmalter J, Forget F, Poisson F, Vernet AL, Bach P, Dagorn L (2012a) Vertical and horizontal behaviour of silky, oceanic white tip and blue sharks in the western Indian Ocean. IOTC-2012-WPEB08-23. 8 p Fishbase - <http://www.fishbase.org/summary/Carcharhinus-longimanus.html>
- IUCN (2011) IUCN Red List of Threatened Species. Version 2011.1. 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
- Tolotti, W.T., Capello, M., Bach, P., Romanov, E., Murua, H. and Dagorn, L. Using FADs to estimate a population trend for the oceanic whitetip shark in the Indian Ocean. IOTC-2016-WPEB12-25 Rev_1.
- 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