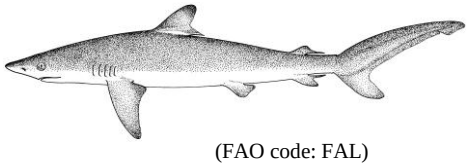
Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien
iotc ctoi



(FAO code: FAL)

STATUS OF THE INDIAN OCEAN SILKY SHARK (*CARCHARHINUS FALCIFORMIS*) RESOURCE

TABLE 1. Status of silky shark (*Carcharhinus falciformis*) in the Indian Ocean – IUCN threat status

Common name	Scientific name	IUCN threat status		
		Global status	WIO	EIO
Silky shark	*Carcharhinus falciformis*	Near Threatened	Near Threatened	Near Threatened

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean
SOURCES: IUCN (2007, 2011)

The WPEB **RECOMMENDED** the following management advice for silky sharks in the Indian Ocean, for the consideration of the Scientific Committee:

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The WPEB **RECOMMENDED** the following management advice for silky shark in the Indian Ocean, for the consideration of the Scientific Committee.

Stock status. The current IUCN threat status of 'Near Threatened' applies to silky sharks in the western and eastern Indian Ocean and globally (Table 1). There is a paucity of information available on this species and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment or basic fishery indicators currently available for silky shark in the Indian Ocean therefore the stock status is highly uncertain. Silky sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived (over 20 years), mature at 6–12 years, and have relativity few offspring (<20 pups every two years), the silky shark is vulnerable to overfishing. Despite the lack of data, it is clear from the information that is available that silky shark abundance has declined significantly over recent decades.

Outlook. Maintaining or increasing effort will probably result in 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 silky shark will decline in these areas in the near future, and may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the stock status at current effort levels.
- Total catches are highly uncertain and should be investigated further as a priority.
- Noting that current reported catches (probably largely underestimated) are estimated at an average ~ 670 t over the last five years, ~1, 153 t in 2010, maintaining or increasing effort will probably result in further declines in biomass.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.
- The SC agreed that three options should be considered for amendment of Resolution 08/04 concerning the recording of the catch by longline fishing vessels in the IOTC area in order to improve data collection and statistics on sharks that would allow the development of stock status indicators.

SUPPORTING INFORMATION

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

CONSERVATION AND MANAGEMENT MEASURES

Silky shark in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

- 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 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they fish outside the EEZ of their flag State. As per this resolution, catch of all sharks must be recorded.
- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on blue 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.

Extracts from Resolutions 09/06 and 11/04

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

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.

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

1. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system. ….

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

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

FISHERIES INDICATORS

General

Silky sharks (*Carcharhinus falciformis*) are one of the most abundant large sharks inhabiting warm tropical and subtropical waters throughout the world (Fig. 1). Table 2 outlines some of the key life history traits of silky shark in the Indian Ocean.

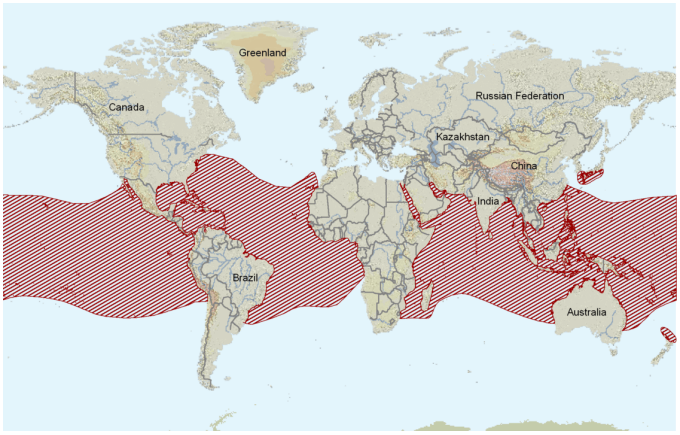


Fig. 1. The worldwide distribution of the silky shark (source: www.iucnredlist.org)

TABLE 2. Biology of Indian Ocean Silky sharks (*Carcharhinus falciformis*)

Parameter	Description
Range and stock structure	Essentially pelagic, the silky shark is distributed from slopes to the open ocean. It also ranges to inshore areas and near the edges of continental shelves and over deepwater reefs. It also demonstrates strong fidelity to seamounts and natural or man-made objects (like FADs) floating at the sea surface. Silky sharks live down to 500 m. Typically, smaller individuals are found in coastal waters. Small silky sharks are also commonly associated with schools of tuna, particularly under floating objects. Large silky sharks associate with free-swimming tuna schools. Silky sharks often form mixed-sex schools containing similar sized individuals. Area of overlap with IOTC management area = high. No information is available on stock structure.
Longevity	20+ years for males; 22+ years for females in the southern Gulf of Mexico and maximum size is over 300 cm long. Generation time was estimated to be between 11 and 16 years in the Gulf of Mexico years.
Maturity (50%)	The age of sexual maturity is variable. In the Atlantic Ocean, off Mexico, silky sharks mature at 10-12+ years. By contrast in the Pacific Ocean, males mature at around 5-6 years and females mature at around 6-7 years. Size: not available.
Reproduction	The silky shark is a placental viviparous species with a gestation period of around 12 months. Females give birth possibly every two years. The number of pups per litter ranges from 9-14 in the Eastern Indian Ocean, and 2-11 in the Pacific Ocean. • Fecundity: medium (<20 pups) • Generation time: 11-16 years • Gestation period: 12 months • Reproductive cycle is biennial
Size (length and weight)	Maximum size is over 300 cm long FL. New-born pups are around 75-80 cm TL or less at birth. Length–weight relationship for both sexes combined in the Indian Ocean is TW=0.160*10-4 * FL2.91497.

SOURCES: Strasburg (1958); Anderson & Ahmed (1993); Mejuto et al (2005); Matsunaga (2007); Romanov & Romanova (2009)

Fisheries

Silky sharks are often targeted by some semi-industrial, artisanal and recreational fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and purse seine fishery). Sri Lanka has had a large fishery for silky shark for over 40 years.

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 and on the increase for this species (Clarke 2008; Clarke et al. 2006) and the bycatch/release injury rate is unknown but probably high.

TABLE 3. 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	abundant		common	abundant	abundant
Fishing Mortality	study in progress	study in progress	study in progress	unknown	unknown	unknown
Post release mortality	study in progress	unknown	unknown	unknown	unknown	unknown

SOURCES: Romanov (2002, 2008); Ariz et al. (2006); Peterson et al. (2008); Romanov et al. (2008)

Catch trends

The catch estimates for silky shark are highly uncertain as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri-Lanka) while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories). For CPCs reporting longline data by species (i.e. Australia, Spain, Portugal, United Kingdom and South Africa), 1.5% of the catch of sharks by longliners, all targeting swordfish, were silky sharks, and for CPCs reporting gillnet data by species (i.e. Sri Lanka), 22% of the catches of shark were silky sharks.

TABLE 4. Catch estimates for silky shark in the Indian Ocean for 2009 and 2010.

Catch		2009	2010
Most recent catch	Silky shark	543 t	1,153 t
	nei-sharks	62,229 t	61,966 t
Mean catch over the last 5 years (2006–2010)	Silky shark		670 t
	nei-sharks		64,838 t

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 2010, seven countries reported catches of silky sharks in the IOTC region.

Nominal and standardised CPUE Trends

Data not available at the IOTC Secretariat. However, Maldivian shark fishermen report significant declines in silky shark abundance over past 20 years (Anderson 2009). In addition, Indian longline research surveys, in which silky sharks contributed 7% of catch, demonstrate declining catch rates over the period 1984–2006 (John & Varghese 2009). No long-term data for purse-seine CPUE are available, however there are verbal evidences of five-fold decrease of silky shark catches per set between 1980s and 2005s.

Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

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

LITERATURE CITED

Anderson RC, 2009. Opinions count: decline in abundance of silky sharks in the central Indian Ocean reported by Maldivian fishermen. IOTC-2009-WPEB-08.

Ariz J, Delgado de Molina A, Ramos ML, and 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 2006.

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, and Shivji MS, 2006. Global estimates of shark catches using trade records from commercial markets. Ecology Letters 9:1115-1126.

IUCN, 2007. IUCN Species Survival Commission's Shark Specialist Group. Review of Chondrichthyan Fishes.

IUCN, 2011. IUCN Red List of Threatened Species. Version 2011.1. www.iucnredlist.org

John ME and Varghese BC, 2009. Decline in CPUE of oceanic sharks in the Indian EEZ: urgent need for precautionary approach. IOTC-2009-WPEB-17.

Matsunaga H, 2007. Standardized CPUE for blue sharks caught by the Japanese tuna longline fishery in the Indian Ocean, 1971-2005. IOTC-2007-WPEB-17.

Mejuto J, Garcia-Cortes B and 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.

Petersen S, Nel D, Ryan P and Underhill L, 2008. Understanding and mitigating vulnerable bycatch in southern African trawl and longline fisheries. 225 p. WWF South Africa Report Series.

Romanov EV, 2002. Bycatch in the tuna purse-seine fisheries of the western Indian Ocean. Fishery Bulletin 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 Journal of Marine Science 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.

Strasburg DW, 1958. Distribution, abundance, and habits of pelagic sharks in the central Pacific Ocean. Fish. Bull. U.S. Fish. Wildl. Serv, 58:335-61.