

(FAO code: BTH)



## STATUS OF THE INDIAN OCEAN BIGEYE THRESHER SHARK (*ALOPIAS SUPERCILIOSUS*) RESOURCE

**TABLE 1.** Status of bigeye thresher shark (*Alopias superciliosus*) in the Indian Ocean – IUCN threat status.

Common name	Scientific name	IUCN threat status		
		Global status	WIO	EIO
Bigeye thresher shark	<i>Alopias superciliosus</i>	Vulnerable	–	–

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

### INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The WPEB **RECOMMENDED** the following management advice for bigeye thresher shark in the Indian Ocean, for the consideration of the Scientific Committee, noting that there remains considerable uncertainty in the stock status due to lack of information necessary for assessment or to for the development of other indicators of the stock.

**Stock status.** The current IUCN threat status of ‘Vulnerable’ applies to bigeye thresher shark 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 and limited basic fishery indicators currently available for bigeye thresher shark in the Indian Ocean therefore the stock status is highly uncertain. Bigeye thresher sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived (+20 years), mature at 9-13 years, and have few offspring (2-4 pups every year), the bigeye thresher shark is vulnerable to overfishing.

**Outlook.** Current longline fishing effort is directed to other species, however bigeye thresher sharks is a common bycatch these fisheries. Hooking mortality is apparently very high, therefore IOTC regulation 10/12 prohibiting retaining of any part of thresher sharks onboard and promoting life release of thresher shark are apparently ineffective for species conservation. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. However there are few data to estimated CPUE trends, in view of IOTC regulation 10/12 and reluctance of fishing fleet to report information on discards/non-retained catch. 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 other areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on bigeye thresher shark will decline in these areas in the near future, which may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the status of the IO stock at current effort levels.
- Two important sources of data that inform 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 ~4 t over the last five years, ~5 t in 2010, maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- 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.
- The SC recommended that the Resolution 10/12 *on the conservation of thresher sharks (Family Alopiidae) caught in association with fisheries in the IOTC area of competence* is clarified in order for observers to be allowed to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs) from sharks that are dead at haulback, whose retention is prohibited by the current Resolution.

**SUPPORTING INFORMATION***(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)***CONSERVATION AND MANAGEMENT MEASURES**

Bigeye thresher shark in the Indian Ocean is 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 (although for thresher sharks this has been largely superseded by Resolution 10/12 as it is prohibited to retain any part).
- 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 (retained and discarded) 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 10/12 *On the Conservation of Thresher Sharks (Family Alopiidae) caught in Association with Fisheries in the IOTC Area of Competence* prohibiting Fishing Vessels flying the flag of IOTC Members and Cooperating non-Contracting Parties (CPCs) from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on bigeye thresher 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.

*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.<sup>1</sup>

**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 10/12 ON THE CONSERVATION OF THRESHER SHARKS (FAMILY ALOPIIDAE) CAUGHT IN ASSOCIATION WITH FISHERIES IN THE IOTC AREA OF COMPETENCE**

1. Fishing Vessels flying the flag of an IOTC Member and Cooperating non-Contracting Parties (CPCs) are prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.
2. CPCs shall require vessels flying their flag to promptly release unharmed, to the extent practicable, thresher sharks when brought along side for taking on board the vessel.
3. CPCs shall encourage their fishermen to record incidental catches as well as live releases. These data will be then kept at the IOTC secretariat.

**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*

Bigeye thresher shark (*Alopias superciliosus*) is found in pelagic coastal and oceanic waters throughout the tropical and temperate oceans worldwide (Fig. 1). Found in coastal waters over the continental shelves, sometimes close inshore in shallow waters, and on the high seas in the epipelagic zone far from land; also caught near the bottom in deep water on the continental slopes (Compagno 2001). It can be found near the surface, and has even been recorded in the intertidal, but it is commonest below 100m depth, occurs regularly to at least 500 m deep and has been recorded to 723 m deep (Nakano et al. 2003, Compagno 2001). No predation on bigeye thresher sharks has been reported to date; however it may be preyed upon by makos,

<sup>1</sup> This is not applicable to Alopiidae in view of Resolution 10/12 *On the conservation of thresher sharks (Family Alopiidae) caught in association with fisheries in the IOTC area of competence.*

white sharks, and killer whales. Fishing is the major contributor to adult mortality. This species used its long tail to attack prey (Compagno, 2001; Aalbers et al., 2010). Table 2 outlines some of the key life history traits of bigeye thresher shark in the Indian Ocean.

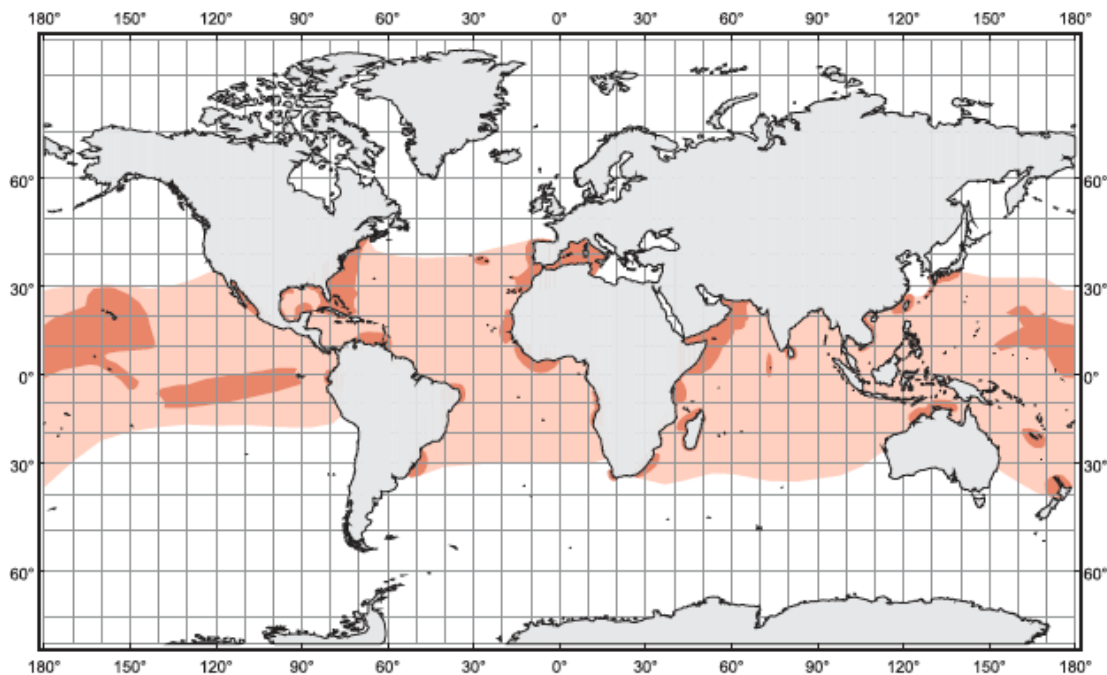


Fig. 1. The worldwide distribution of the bigeye thresher shark (source: FAO).

TABLE 2. Biology of Indian Ocean bigeye thresher shark (*Alopias superciliosus*).

Parameter	Description
Range and stock structure	In the tropical Indian Ocean, the greatest abundance of bigeye thresher shark occurs at depths of 50 to 300 m, in temperatures ranging from 8 to 25°C. It is considered a highly migratory species, however, no published information on horizontal movements of bigeye thresher shark is known for the Indian Ocean. This species exhibits a prominent diurnal pattern in vertical distribution spending daytime at the depth between 200 and 700 m depth and migrating to the upper layers at night. Bigeye thresher shark is a solitary fish however it is often caught in the same areas and habitats as pelagic thresher sharks <i>Alopias pelagicus</i> . Area of overlap with IOTC management area = high. No information is available on stock structure.
Longevity	No ageing studies is known for the Indian Ocean. In the Pacific Ocean (China, Taiwan Province) the oldest bigeye thresher sharks reported were a 19 year old male and a 20 year old female for fish ~ 370 cm TL. Taking into consideration that maximum length is exceed 400 cm longevity is apparently around 25-30 years.
Maturity (50%)	Age: Sexual maturity is attained at 12-13 years (females), 9-10 years (males). Size: Males mature at 270-300 cm total length (TL) and females at 332-355 cm TL.
Reproduction	Bigeye thresher shark is an ovoviviparous species, without a placental attachment. <ul style="list-style-type: none"> <li>• Fecundity: very low (2-4)</li> <li>• Generation time: around 15 years</li> <li>• Gestation Period: 12 months</li> <li>• Reproductive cycle: unknown</li> </ul> Of the thresher sharks, the Bigeye Thresher has the lowest rate of annual increase, estimated at 1.6% under sustainable exploitation (Smith <i>et al.</i> 2008), or 0.002-0.009 (Cortés 2008, Dulvy <i>et al.</i> 2008).
Size (length and weight)	Maximum size is around 461 cm TL. New-born pups are around 64-140 cm TL. Length–weight relationship for both sexes combined in the Indian Ocean is $TW=0.155*10^{-4}*FL^{2.97883}$

SOURCES: Compagno (2001); Chen *et al.* (1997); Lui *et al.* (1998); Nakano *et al.* (2003); Weng, Block (2004); Amorim *et al.* (2007); Stevens *et al.* (2010); Romanov (2011) pers. comm.

**Fisheries**

Bigeye thresher shark are often targeted by some recreational, semi-industrial and artisanal fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries). Typically, the fisheries take bigeye thresher sharks between 140-210 cm FL or 40 to 120 kg (Romanov, 2011 pers. comm.). In Australia thresher sharks used to be a target of sport fishermen. Sport fisheries for oceanic sharks are apparently not so common in other Indian Ocean countries.

There is little information on the fisheries prior to the early 1970’s. Some countries still fail to collect shark data while others do collect it but fail to report to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many existing 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 their statistics are limited by the lack of species-specific data and data from the major fleets. Thresher sharks were marketed both locally and in European markets until at least up until early 2011 despite the 2010 IOTC regulation. The practice of shark finning is considered to be regularly occurring and on the increase for this species (Clarke 2008; Clarke et al. 2006). The post-release mortality is unknown but probably high. In longline fisheries bigeye thresher sharks are often hooked by the tail (Compagno, 2001; Romanov, 2011 pers. comm.) and die soon afterward. Therefore they are discarded dead if not retained. In most cases discarded sharks are not recorded in fisheries logbooks. Therefore the current IOTC regulation measures (notably Resolution 10/12) appear to have limited conservation effect while contributing to further loss of fisheries data. Other types of conservation efforts such as protected areas should be considered for this species group by the WPEB, taking into account a detailed analysis of catch distribution and 'hotspots' of abundance derived from research data.

**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	absent	Common		rare	unknown	unknown
Fishing Mortality	no	high	high	unknown	unknown	unknown
Post release mortality	N/A	unknown	unknown	unknown	unknown	unknown

SOURCES: Boggs (1992); Anderson & Ahmed (1993); Romanov (2002, 2008); Ariz et al., 2006; Peterson et al. (2008); Romanov et al. (2008).

#### Catch trends

The catch estimates for bigeye thresher 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).

**TABLE 4.** Catch estimates for bigeye thresher shark in the Indian Ocean for 2009 and 2010.

Catch		2009	2010
Most recent catch	bigeye thresher	5 t	5 t
	nei-sharks	62,229 t	61,966
Mean catch over the last 5 years (2006–2010)	bigeye thresher		4 t
	nei-sharks		64,838 t

Note that reported shark catches are 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 bigeye thresher sharks in the IOTC region.

#### Nominal and standardised CPUE trends

Data not available at the IOTC Secretariat. There are no surveys specifically designed to assess shark catch rates in the Indian Ocean. Trends in the Indian Ocean research CPUE data series suggest that the longline vulnerable biomass has declined (Romanov, E. per com.). Historical research data shows overall decline both in CPUE and mean weight of thresher sharks (Romanov, 2011, pers. comm.).

#### 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 bigeye thresher shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

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