BIGEYE THRESHER SHARK

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 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 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 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 12/09 On the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence** prohibits fishing vessels flying the flag of IOTC Members and Cooperating non-Contracting Parties (CPCs) from retaining on board, transhipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.

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**Extracts from Resolutions 15/01, 15/02, 11/04, 05/05 and 12/09**

**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 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 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 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.

**RESOLUTION 12/09 ON THE CONSERVATION OF THRESHER SHARKS (FAMILY ALOPIIDAE) CAUGHT IN ASSOCIATION WITH FISHERIES IN THE IOTC AREA OF COMPETENCE**

Para. 2. Fishing Vessels flying the flag of an IOTC Member or Cooperating non-Contracting Party (CPCs) are prohibited from retaining on board, transhipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae, with the exception of paragraph 7.

Para. 3 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. Para. 4 CPCs shall encourage their fishers to record and report incidental catches as well as live releases. These data will be then kept at the IOTC Secretariat.

FISHERIES INDICATORS

**Bigeye thresher shark: 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 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). Bigeye thresher can be found near the surface, and has even been recorded in the intertidal zone, but it is most commonly found at depths greater than 100m, often reaching 500 m and has even been recorded at a depth of 723 m (Compagno 2001, Nakano et al. 2003). There is currently no information on the predation of bigeye thresher sharks, however they may be preyed upon by makos, white sharks, and killer whales. Fishing is the major contributor to adult mortality. This species uses its long tail to attack prey (Compagno 2001, Aalbers et al. 2010). **TABLE 1** outlines some of the key life history traits of bigeye thresher sharks in the Indian Ocean.

![Fig. 1. Bigeye thresher shark: The worldwide distribution of the bigeye thresher shark (source: FAO).](image_url)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range and stock structure</td>
<td>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 <em>Alopias pelagicus</em>. Area of overlap with IOTC management area = high. No information is available on stock structure.</td>
</tr>
<tr>
<td>Longevity</td>
<td>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. In the Eastern Atlantic Ocean, the maximum ages reported in a recent life history study were 22 years for females and 17 years for males.</td>
</tr>
<tr>
<td>Maturity (50%)</td>
<td>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. Size at 50% maturity from the eastern Atlantic Ocean was estimated at 206 cm FL for females (95% CI: 199–213 cm FL), and 160 cm FL for males (95% CI: 156–164 cm FL)</td>
</tr>
<tr>
<td>Reproduction</td>
<td>Bigeye thresher shark is an aplacental viviparous with oophagy species. • Fecundity: very low (2–4) • Size at birth 130-150 cm TL • Generation time: around 15 years (due to oophagy) • Gestation Period: 12 months • Reproductive cycle: unknown Of the thresher sharks, the Bigeye Thresher has the lowest rate of annual increase, estimated at 1.6% under sustainable exploitation, or 0.002–0.009.</td>
</tr>
<tr>
<td>Size (length and weight)</td>
<td>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 \times 10^{-4} \times FL^{2.9783} )</td>
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</tbody>
</table>
**Bigeye thresher shark: 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) (**TABLE 2**). Typically, the size range elected by the fisheries is between 140–210 cm FL or 40-120 kg (Romanov pers. Comm.). In Australia thresher sharks used to be targeted by 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 1970s. Some countries still fail to collect shark data while others 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 IOTC Resolution 12/09. The practice of shark finning is considered to be regularly occurring and on the increase for this species (Clarke et al. 2006, Clarke 2008). The post-release mortality is unknown but probably high. In longline fisheries bigeye thresher sharks are often hooked by the tail (Compagno 2001, Romanov pers. Comm.) and die soon afterwards. Therefore, if not retained, they are usually discarded dead and in most cases discarded sharks are not recorded in fisheries logbooks. Hence the current management measures (notably Resolution 12/09) 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 2.** Bigeye thresher shark: Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries.

<table>
<thead>
<tr>
<th>Gears</th>
<th>PS</th>
<th>LL</th>
<th>BB/TROL/HAND</th>
<th>GILL</th>
<th>UNCL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SWO</td>
<td>TUNA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>absent</td>
<td>common</td>
<td>rare</td>
<td>unknown</td>
<td>unknown</td>
</tr>
<tr>
<td>Fishing Mortality</td>
<td>no</td>
<td>high</td>
<td>high</td>
<td>unknown</td>
<td>unknown</td>
</tr>
<tr>
<td>Post release mortality</td>
<td>N/A</td>
<td>unknown</td>
<td>unknown</td>
<td>unknown</td>
<td>unknown</td>
</tr>
</tbody>
</table>


**Bigeye thresher shark: Catch trends**

The catch estimates for bigeye thresher shark are highly uncertain, as is their utility in terms of minimum catch estimates (**TABLE 3**). Nine CPCs have historically reported nominal catch data for bigeye thresher sharks (EU, Spain, Guinea, Indonesian, India, Kenya, Sri Lanka, Senegal and Tanzania), but reported nominal retained catches have remained at zero since 2012.

**TABLE 3.** Bigeye thresher shark: Catch estimates for bigeye thresher shark in the Indian Ocean for 2013 to 2015.

<table>
<thead>
<tr>
<th>Catch</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most recent catch (reported)</td>
<td>bigeye thresher 0 t</td>
<td>0 t</td>
<td>0 t</td>
</tr>
<tr>
<td>neisharks</td>
<td>55,374 t</td>
<td>45,824 t</td>
<td>61,147 t</td>
</tr>
</tbody>
</table>

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.

A recent project estimated possible thresher 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 thresher sharks in the IOTC database may be a considerable underestimate (i.e. total estimated catches were approximately 70 times higher than that declared in the IOTC database).

**Bigeye thresher shark: 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. Historical research data shows overall decline both in nominal CPUE and mean weight of thresher sharks (Romanov pers. comm.).
**Bigeye thresher shark: Average weight in the catch by fisheries**

Data not available.

**Bigeye thresher shark: 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.

**LITERATURE CITED**


Bigeye thresher shark


Romanov EV (2002) Bycatch in the tuna purse-seine fisheries of the western Indian Ocean. Fish Bull 100:90-105


