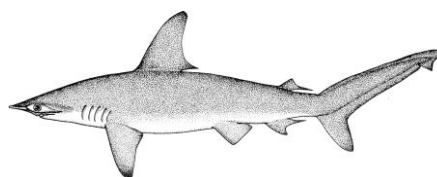


**DRAFT: EXECUTIVE SUMMARY: SCALLOPED HAMMERHEAD SHARK (*SPHYRNA LEWINI*)**

**Status of the Indian Ocean Scalloped Hammerhead Shark (SPL)  
(*Sphyrna lewini*)**

**TABLE 1.** Status of scalloped hammerhead shark (*Sphyrna lewini*) in the Indian Ocean

Area <sup>1</sup>	Indicators		2012 stock status determination
Indian Ocean	Reported catch 2011:	388 t	Uncertain
	Not elsewhere included (nei) sharks:	55,135 t	
Average reported catch 2007–2011:	120 t		
Not elsewhere included (nei) sharks:	63,783 t		
	MSY:	unknown	
	$F_{2011}/F_{MSY}$ :	unknown	
	$SB_{2011}/SB_{MSY}$ :	unknown	
	$SB_{2011}/SB_0$ :	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		

**TABLE 2.** IUCN threat status of scalloped hammerhead shark (*Sphyrna lewini*) in the Indian Ocean

Common name	Scientific name	IUCN threat status <sup>1</sup>		
		Global status	WIO	EIO
Scalloped hammerhead	<i>Sphyrna lewini</i>	Endangered	Endangered	–

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

Sources: IUCN 2007, Baum 2007

**INDIAN OCEAN STOCK – MANAGEMENT ADVICE**

**Stock status.** The current IUCN threat status of 'Endangered' applies to scalloped hammerhead sharks globally and specifically for the western Indian Ocean (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 scalloped hammerhead shark in the Indian Ocean therefore the stock status is highly uncertain. Scalloped hammerhead sharks are commonly taken by a range of fisheries in the Indian Ocean. They are extremely vulnerable to gillnet fisheries. Furthermore, pups occupy shallow coastal nursery grounds, often heavily exploited by inshore fisheries. Because of their life history characteristics – they are relatively long lived (over 30 years), and have relatively few offspring (<31 pups each year), the scalloped hammerhead shark is vulnerable to overfishing.

**Outlook.** Maintaining or increasing effort will probably result in further declines in biomass and productivity. 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 scalloped hammerhead shark will decline in these areas in the near future, and may result in localised depletion. The following should be noted:

<sup>1</sup> The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

- The available evidence indicates considerable risk to the stock status at current effort levels.
- The primary source of data that drive the assessment (total catches) is highly uncertain and should be investigated further as a priority.
- Noting that current reported catches (probably largely underestimated) are estimated at an average ~36 t over the last five years, ~120 t in 2011, maintaining or increasing effort will probably result in further declines in biomass and productivity.
- 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

Scalloped hammerhead 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 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.
- 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 1<sup>st</sup> July 2010.
- Resolution 12/03 *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).

*Extracts from Resolutions 05/05, 11/04 and 12/03*

#### **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 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 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 12/03 ON THE RECORDING OF CATCH AND EFFORT BY FISHING VESSELS IN THE IOTC AREA OF COMPETENCE**

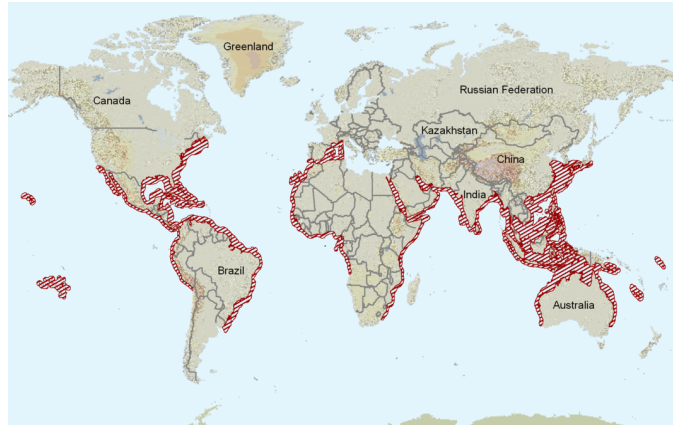
Para. 1. Each flag CPC shall ensure that all purse seine, longline, gillnet, pole and line, handline and trolling fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

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.

## FISHERIES INDICATORS

### *Scalloped hammerhead shark: General*

Scalloped hammerhead shark (*Sphyrna lewini*) is widely distributed and common in warm temperate and tropical waters (Fig. 1). It is also found in estuarine and inshore waters. In some areas, the scalloped hammerhead shark forms large resident populations. In other areas, large schools of small-sized sharks are known to make seasonal migrations polewards. Scalloped hammerhead sharks feeds on pelagic fishes, rays and occasionally other sharks, squids, lobsters, shrimps and crabs. Table 3 outlines some of the key life history traits of scalloped hammerhead shark in the Indian Ocean.



**Fig. 1.** Scalloped hammerhead shark: The worldwide distribution of the scalloped hammerhead shark (source: [www.iucnredlist.org](http://www.iucnredlist.org))

**TABLE 3.** Scalloped hammerhead shark: Biology of Indian Ocean scalloped hammerhead shark (*Sphyrna lewini*)

Parameter	Description
Range and stock structure	The scalloped hammerhead shark is widely distributed and common in warm temperate and tropical waters down to 900 m. It is also found in estuarine and inshore waters. In some areas, the scalloped hammerhead shark forms large resident populations. In other areas, large schools of small-sized sharks are known to migrate seasonally polewards. Area of overlap with IOTC management area = high. There is no information available on stock structure.
Longevity	The maximum age for Atlantic Ocean scalloped hammerheads is estimated to be over 30 years with the largest individuals reaching over 310 cm TL. In the Eastern Indian Ocean, females are reported to reach 350 m TL
Maturity (50%)	Males in the eastern Indian Ocean mature at around 140-165 cm TL. Females mature at about 200 cm TL. In the northern Gulf of Mexico females are believed to mature at about 15 years and males at 9–10 years.
Reproduction	The scalloped hammerhead shark is viviparous with a yolk sac-placenta. Litters consist of 13–3 pups (mean=16.5). The reproductive cycle is annual and the gestation period is 9–10 months. The nursery areas are in shallow coastal waters. <ul style="list-style-type: none"> <li>• Fecundity: medium (&lt;31 pups)</li> <li>• Generation time: 17–21 years</li> <li>• Gestation Period: 9–10 months</li> <li>• Reproductive cycle is annual</li> </ul>
Size (length and weight)	The maximum size for Atlantic Ocean scalloped hammerheads is estimated to be over 310 cm TL. In the Eastern Indian Ocean, females are reported to reach 350 m TL New-born pups are around 45–50 cm TL at birth in the eastern Indian Ocean.

Sources: Stevens & Lyle 1989, Jorgensen et al. 2009

### *Scalloped hammerhead shark: Fisheries*

Scalloped hammerhead 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) (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 and on the increase for this species (Clarke et al. 2006, Clarke 2008, Holmes et al. 2009) and the bycatch/release injury rate is unknown but probably high.

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

Gears	PS	LL		BB/TROL/HAND	GILL	UNCL
		SWO	TUNA			
Frequency	rare	common		absent	common	unknown
Fishing Mortality	unknown	unknown	unknown	unknown	unknown	unknown
Post release mortality	unknown	unknown	unknown	unknown	unknown	unknown

Sources: Romanov 2002, 2008, Dudley & Simpfendorfer 2006, Romanov et al. 2008

#### **Scalloped hammerhead shark: Catch trends**

The catch estimates for scalloped hammerhead (Table 5) 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 5.** Catch estimates for scalloped hammerhead shark\* in the Indian Ocean for 2009, 2010 and 2011

Catch		2009	2010	2011
Most recent catch (reported)	Scalloped hammerhead shark	21 t	15 t	120 t
	nei-sharks	65,380 t	64,387 t	55,135 t
Mean catch (reported) over the last 5 years (2007–2011)	Scalloped hammerhead shark			36 t
	nei-sharks			63,783 t

\* catches likely to be misidentified with the smooth hammerhead shark (*S. zygaena*) which is an oceanic species.

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 one country reported catches of scalloped hammerhead sharks in the IOTC region.

#### **Scalloped hammerhead shark: Nominal and standardised CPUE Trends**

Data not available at the IOTC Secretariat. However, Indian longline research surveys, in which scalloped hammerhead sharks contributed up to 6% of regional catch, demonstrate declining catch rates over the period 1984–2006 (John & Varghese 2009). CPUE in South African protective net shows steady decline from 1978.

#### **Scalloped hammerhead shark: Average weight in the catch by fisheries**

Data not available.

#### **Scalloped hammerhead shark: Number of squares fished**

Catch and effort data not available.

### **STOCK ASSESSMENT**

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

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