



CONSERVATION STATUS AND LIFE HISTORY OF WHALE SHARK (*RHINCODON TYPUS*) IN THE INDIAN OCEAN

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Purpose, expectation and action intended

This paper is intended to support the provision of a recommendation by the SC to the Commission, as described in Resolution 25/08, that whale shark is a taxon of the greatest biological vulnerability and conservation concern, and that the provisional retention ban established in Resolution 25/08 (Paragraph 3) is an appropriate measure.

Discussions (for information and open discussion):

This paper summarises the conservation status, life history, and legal status of whale shark as it relates to suitability, feasibility and practicality of the proposed retention ban.

Recommendation (to ask the meeting to endorse a recommendation)

We request that the WP-EB, at its 2026 meeting, endorse the recommendation for adopting a retention ban for whale sharks. We also request the WP-EB to recommend to the SC that it should the Commission that such a measure is considered effective for whale shark and proportionate to its conservation status.



Abstract

IOTC Resolution 25/08 provisionally established a retention ban for whale shark (*Rhincodon typus*) in the Indian Ocean, subject to a recommendation from the IOTC Scientific Committee that whale shark is considered a species “*of the greatest biological vulnerability and conservation concern for which there are very few data*” and that the IOTC Scientific Committee “*explicitly and unambiguously recommends... a retention ban for whale sharks*”.

Here, we summarise aspects of the life history and conservation status of whale shark, and protections established under various national and international instruments.

Whale shark is a large-bodied species characterised by slow growth and late maturation, although there are no robust estimates of the intrinsic rate of population growth. The IUCN has assessed whale shark as being Endangered since 2016. Whale shark populations have a generation length of approximately 40 years.

A number of legal protections have been established for whale shark, both at a national level by many IOTC CPCs and through several international instruments. Despite this, whale shark remains threatened by several sources of anthropogenic mortality in the Indian Ocean, including fisheries bycatch and vessel strikes, as well as being vulnerable to climate change impacts on food availability. Whale shark is a data-limited species, with abundance data, biological data and catch data all considered incomplete.

Given that whale shark can be considered “*a taxon of the greatest biological vulnerability and conservation concern for which there are very few data*”, we recommend that the IOTC Scientific Committee provides explicit advice to the Commission that precautionary measures for whale shark are wholly appropriate, including a retention ban. This would enable paragraph 3(c) of IOTC Resolution 25/08 to enter into force.

Conservation status and Life History of Whale Shark (*Rhincodon typus*) in the Indian Ocean

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Abstract

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Keywords

Whale Shark; Bycatch; Vulnerability; Resolution 25/08; Retention Ban

Executive Summary: Scientific rationale for advising implementation of the retention provisions of Resolution 25/08

The best available scientific evidence supports the implementation of a retention ban as an appropriate and proportionate measure to reduce mortality of whale shark within the IOTC Area of Competence. This is expected to create minimal economic costs for CPCs, whilst providing a clear conservation benefit. This represents a proportionate and precautionary response consistent with the conservation status of whale shark in the Indian Ocean, as well as general objectives of the Commission relating to ecosystem-based fisheries management.

a) Precautionary management of an Endangered species

Whale shark is currently classified as Endangered on the IUCN Red List because of continuing global population declines (Pierce et al., 2025). Recent research in the Indian Ocean reinforces this classification and even suggests that they may be experiencing greater declines than previously recognised (Pillans et al., 2025; Patterson et al., 2025).

Under the precautionary approach embodied in the FAO Code of Conduct for Responsible Fisheries and the United Nations Fish Stocks Agreement, avoidable sources of mortality should be minimised wherever practical, particularly for species of elevated conservation concern. Preventing avoidable fisheries mortality is therefore justified even where the precise contribution of any individual fishery to overall population decline cannot be quantified.

Whale shark is listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and in Appendices I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

b) Consistency with the IOTC mandate

Whale sharks are exposed to multiple anthropogenic threats, including vessel strikes, habitat degradation, marine pollution (including potential entanglements in lost or discarded fishing gear), and climate change (FAO Expert Advisory Panel, 2025). However, these pressures fall largely outside the mandate of the IOTC. The Commission nevertheless has both the authority and responsibility to minimise fisheries-related mortality arising from fisheries under its competence. The existence of additional threats does not diminish the importance of reducing avoidable mortality from tuna fisheries and complementary management measures are required across different sectors.

c) Uncertainty in reported interactions

Official reports submitted to the IOTC have recorded very few whale shark interactions. However, observer programme data, from several CPCs, document more regular interactions between whale sharks and purse-seine fisheries. These lines of evidence indicate that reported interactions are almost certainly incomplete and multiple other sources describe more regular interactions, as well as historic directed fishing for whale sharks. Scientific uncertainty regarding the magnitude of interactions should not be interpreted as evidence of negligible impact but rather supports the need for precautionary management.

d) Reducing mortality rather than interactions

A retention ban is not expected to eliminate interactions between whale sharks and fishing operations but is expected to minimise the mortality resulting from those interactions. Immediate post-release mortality following release from purse-seine fisheries is consistently estimated to be low, provided appropriate handling and release procedures are followed. Given the reported high survival rates, mandatory release represents one of the most effective fisheries management measures available for reducing fisheries mortality of whale shark.

e) Implementation of existing Commission measures

The Commission has already agreed in principle that a retention ban may be appropriate and incorporated this provision into Resolution 25/08, following advice from the Scientific Committee that such a measure is scientifically justified. Our recommendation supports the fulfilment of the scientific review requested by the Commission, allowing the conditional retention prohibition in paragraph 3(c) to enter into force as envisaged by Resolution 25/08.

f) Proportionate conservation benefit

The FAO Expert Advisory Panel has emphasised that management measures should be effective in addressing the source of mortality they are intended to reduce. A retention ban directly addresses the avoidable component of fisheries mortality. Whale sharks have little or no commercial value in most IOTC fisheries, are already released in the majority of documented interactions, and exhibit high post-release survival, at least in the short term.

g) Strengthening the evidence base for management of IOTC fisheries

The conservation status of whale shark is an active area of research that requires monitoring samples and data, for instance tissue samples for close-kin mark recapture studies (Patterson et al., 2025). A retention ban does not necessarily prevent or impair ongoing scientific research. Where it is considered safe, practical and in line with best practice guidelines for safe release, scientific observers can and should continue to collect observations and samples. Provided it does not result in undue additional stress or injury to the captured animal, such efforts are an important contribution to a strengthened evidence base upon which the IOTC can base decisions regarding possible management measures in future.

Introduction

In 2025, the IOTC established Resolution 25/08, which provisionally included a retention ban for three elasmobranch taxa: whale shark, oceanic whitetip, and thresher sharks (IOTC, 2025a, para. 3). For whale shark, this resolution was subject to a review by the IOTC Scientific Committee (SC) concerning the “*existing data and information relating to the life history and conservation status of whale sharks*” and specially called upon the SC to evaluate whether whale shark would be considered “*a taxon of the greatest biological vulnerability and conservation concern for which there are very few data*” (Res 25/08 para. 43). Additionally, para. 45 of Res 25/08 linked entry into force of para. 3c to the SC “*explicitly and unambiguously*” recommending a retention ban as an appropriate mitigation measure for whale shark. The Scientific Committee considered whale shark as meeting the above definition on vulnerability, but has not yet explicitly recommended a retention ban (IOTC, 2025b, para. 123).

This document summarises the current knowledge of whale shark life history and conservation status, in support of the requested review by the SC, in support of Salgado et al. (2025) and following on from a similar review conducted for ICCAT (Cuevas et al. 2024).

Definitions

Although the term is not formally defined by the IOTC, for the purposes of this paper, we define a species or taxon as being of the “*greatest biological vulnerability and conservation concern*” based on the below criteria.

1. The taxon, or any sub-population thereof, is typified by life history traits that indicate low population productivity. These traits include; low fecundity and/or high parental investment in offspring, long generation times, high longevity.
2. The taxon, or any sub-population thereof, is assessed, by an appropriate scientific body, to be persistently declining and/or in a depleted state relative to historic levels.
3. The taxon, or any sub-population thereof, is, or has been, exposed to one or more direct or indirect sources of anthropogenic mortality, as listed under the IUCN (2026) Threats Classification Scheme (ver. 3.3).

These criteria are applied through the lens of IOTC Resolution 12/01 (IOTC, 2012), concerning the implementation of the Precautionary Approach. Consequently, any uncertainty regarding the life history or conservation status of whale shark shall be interpreted as indicating higher vulnerability. Since whale shark is a highly migratory species, we did not consider criteria relating to geographic isolation or restricted habitat availability. However, whale sharks are known to habitually occupy or revisit certain locations and, consequently, there is a level of spatial variability as regards risk of bycatch or other sources of mortality.

Distribution

Whale shark has a circumglobal distribution in tropical and subtropical waters, broadly occurring between 30°N and 35°S, and is most commonly reported in waters with a sea surface temperature (SST) of between 26–30°C (Fig. 1; Sequeria et al., 2012).

Whale shark is distributed widely in the Indian Ocean, most commonly in the western Indian Ocean and off the northwestern coast of Australia (reviewed in Salgado et al., 2025). Whale sharks are subdivided into two major contiguous populations, one in the Atlantic Ocean, and the other spanning the Indo-Pacific (Fig. 1; Castro et al., 2007).

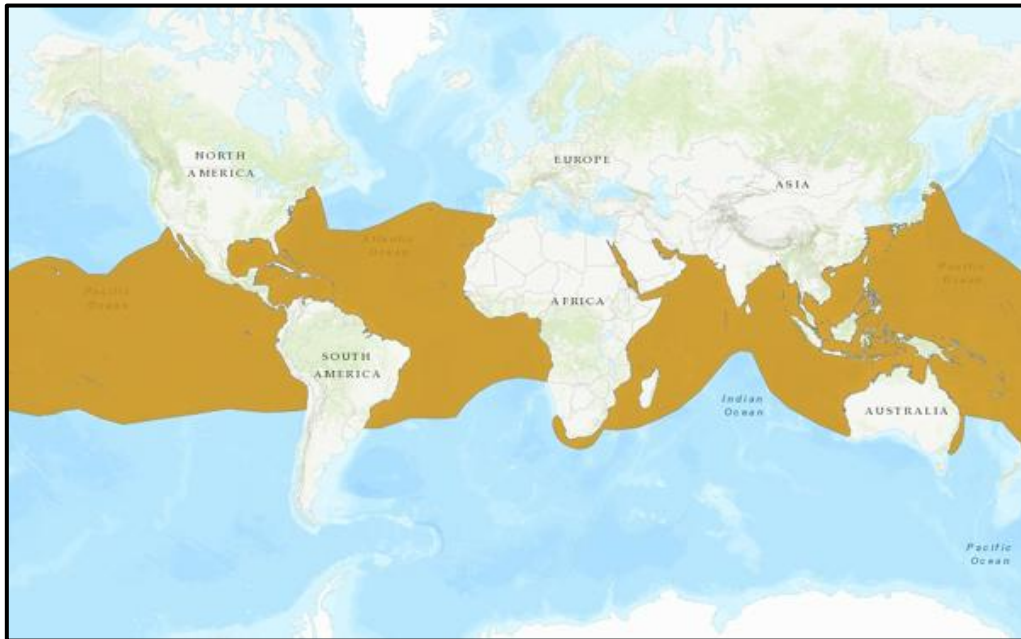


Figure 1 – Global distribution of whale shark (Figure produced by the IUCN Shark Specialist Group, and reproduced from Pierce et al., 2025).

Life history characteristics

Age and growth

Age at maturity is uncertain for whale shark, owing to difficulties in determining age of sharks generally. Pierce et al. (2021) estimated that Indo-Pacific whale shark typically begin maturing at around 25 years for males and between 30-40 years for females.

Longevity of whale shark is similarly difficult to estimate, but is considered to be at least 50 years (Ong et al., 2020). This exceeds estimates for most other shark species and suggests a high vulnerability to direct or indirect mortality effects. The generation length for whale shark has been estimated at approximately 40 years (Pierce et al., 2025).

Reproduction

Whale shark is aplacentally viviparous, but observations of litter sizes are scarce. The only pregnant female that has been physically examined had 304 pups at various stages of development, the largest litter size of any viviparous shark (Joung et al., 1996). The simultaneous presence of different sized embryos suggests that whale shark has a protracted pupping period, although there is little systematic evidence for seasonal cycles of mating or pupping, outside of limited observations where large females are known to aggregate at particular times of the year (and which are not fully known in the Indian

Ocean). Reproductive periodicity is uncertain but expected to be between 3-5 years, based on observations of ovaries in mature females (Pierce et al., 2021)

Several locations where large females are more routinely observed, and therefore putatively important for spawning or mating, have been identified for whale sharks in the Atlantic and Pacific Oceans, including:

- Yucatán Coast, Gulf of Mexico (de la Parra Venegas et al., 2011);
- St Helena Island (Perry et al., 2020); and
- Galapagos Islands (Rohner et al., 2021).

Within the Indian ocean and surrounding seas, several areas are known as habitual locations where whale shark aggregations can occur. These include; Ningaloo Reef off Western Australia, southern Mozambique (Auditore et al., 2025), and coastal regions around Qatar (Robinson et al. 2016) and Indonesia (Putra et al., 2026). However, locations of pupping or mating grounds in the Indian Ocean, where large females are regularly observed, are yet to be confirmed, supported only by scattered or anecdotal observations. It is therefore unknown to what degree interactions with Indian Ocean tuna fisheries may disturb whale sharks during mating or other reproductive behaviours.

Conservation status

The last assessment of whale shark by the International Union for Conservation of Nature (IUCN) was published in October 2025, and listed whale shark as Endangered and decreasing (Pierce et al., 2025). Whale shark has been listed as Endangered since 2016 (Pierce et al., 2025) meaning there is consistent scientific evidence demonstrating that the species is facing a high risk of extinction in the wild (IUCN, 2000).

The Indo-Pacific population of whale shark, representing around 75% of global whale shark abundance, is estimated to have declined by more than 65% since 1900 (Pierce et al., 2025). In more recent years, declines of 43.5% have been estimated, between 2000–2019 (Patterson et al., 2025; Pillans et al. 2025). The mean length of whale sharks in reported sightings has also declined at a number of locations (summarised in Pierce et al., 2025) and abundance estimates in the western Indian Ocean also declined in the 2000s (Sequeira et al., 2013; Auditore et al., 2025).

Whale sharks are exposed to several anthropogenic threats, including fisheries bycatch, ship strikes, habitat degradation and pollution (Cuevas et al., 2024; FAO, 2025; Pierce et al, 2025).

Interactions with tuna fisheries in the Indian Ocean

Interactions between tuna purse seine fisheries and whale sharks are commonly reported in the eastern Atlantic (Cuevas et al. 2024) and eastern Pacific (Román et al. 2018). Officially reported catches by IOTC fisheries are limited in number, with only three instances on record between 1950–2024, all by Sri Lankan gillnets in 2015 (IOTC, 2026). National observer reports from several IOTC CPCs record regular interactions between whale sharks and purse-seine fleets in the western Indian Ocean, most especially within the Seychelles EEZ and high seas areas immediately north (Salgado et al. 2025). There are also interactions with other fisheries in the Indian Ocean (e.g. Akhilesh et al., 2013). It is likely that catches of whale shark in the Indian Ocean, incidental or directed, have been under-reported.

Pravin (2000) and Hanfee (2001) both documented a directed fishery for whale shark that was actively operating in the Gujarat area of west India at that time, reportedly landing 14–145 individuals a month in 1999–2000 prior to being designated a protected species in 2001 (with some landings or bycatch reported until at least the 2010s; Akhilesh et al., 2012; Sathiyaselvam et al. 2016). Catches of whale

shark, both in India and the Maldives, were reported as declining strongly throughout the 1990s (Anderson and Ahmed, 1993; Pravin et al., 1998). Instances of whale shark catch have been reported elsewhere, including Oman, Indonesia and Iran (White and Cavanaugh, 2007; Rowat and Brooks, 2012; Pierce and Norman, 2016).

Whale sharks remain exposed to threats through bycatch in Indian Ocean tuna fisheries (FAO, 2025; Salgado et al., 2025), with recent modelling studies indicating particularly high exposure to fishing impacts around the Maldives (Reynolds et al., 2022). There may also be ongoing threats from artisanal fisheries for illicit trade of whale shark meat (Li et al., 2012; Nijman, 2023).

The proposed retention ban is primarily of relevance to incidental captures during purse seine operations but should ideally be complemented, where appropriate, by efforts to limit other sources of mortality (Tolotti et al., 2015; Manir Feitosa et al., 2025). In accordance with a ‘Mitigation Hierarchy’ approach, the most effective mitigation measures are those that reduce or eliminate interactions from occurring in the first place (Tolotti et al., 2015; Manir Feitosa et al., 2025). We stress that the provision in Res 25/08 (para. 28 on ensuring that nets are not intentionally set around whale sharks) is an important consideration that should be retained in any amended resolution and strengthened where possible.

Immediate post-release mortality is thought to be low, between 0–4% (Capietto et al., 2014; Escalle et al., 2018; Acevedo-Iglesias et al., 2025), though there is little information about longer-term or sub-lethal effects. The low post-release mortality rate supports the use of a retention ban for whale shark as an effective measure, provided that best practices for handling and safe release are observed (as detailed in IOTC Res 25/08 Annex III, and summarised by Salgado et al., 2025).

Ongoing research and monitoring

A possible consequence of implementing a retention ban is that it could limit opportunities for collecting scientific samples and measurements from captured sharks. This does not have to be the case, and a similar precedent has been established in other RFMOs (e.g. ICCAT Recommendation 13-10) whereby scientific sampling of species under retention bans is permissible. Such sampling is important to continue strengthening the evidence base available to the IOTC, supporting ongoing scientific studies, such as close-kin mark recapture (Patterson et al., 2025), that aim to determine the population status and trajectory of the whale shark population in the Indo-Pacific.

In cases where a shark is encircled or otherwise caught, it should remain at the discretion of the Master and any scientific observer(s) on board, whether scientific observations can be made prior to release, ensuring minimal risk both to crew and any captured whale shark(s).

It would be valuable, for ongoing monitoring programmes, to introduce a provision for sampling and measurements to be taken from live animals prior to release. If amended by the Commission, a provision within Res 25/08 could be introduced that encourages ongoing scientific research whilst ensuring that any captured whale sharks are released as efficiently as possible and in the best possible condition. Resolution 25/08 (para. 4) currently has provision for collection of scientific samples and measurements from only animals that are dead at haulback. We recommend this be amended to permit collection of samples and measurements from live individuals, prior to their release.

If amended by the Commission, Res 25/08 should clearly state that collection of samples from any captured individual should be:

- via non-lethal methods only, and conducted in accordance with relevant and applicable national or international regulations, protocols, or guidelines concerning animal welfare;

- reserved for non-commercial research purposes only, as part of a research programme endorsed by the IOTC SC;
- conducted only where all competent persons¹ involved agree that it is safe and practical to do so and without compromising safe release; and
- conducted only by appropriately trained scientific observers or other individuals duly permitted by a CPC. Where neither are present, release of captured animals should proceed without delay and in accordance with the safe release practices described in Res 25/08 Annex III.

Legal protection status of whale shark

Whale shark is widely recognised as a species of conservation concern. Many IOTC Coastal States have established varying degrees of protected status for whale shark, at either a local or national level, including; Australia, Bangladesh, India, Indonesia, Maldives, Malaysia, Mozambique, Pakistan, Reunion, Seychelles, South Africa, Tanzania, Thailand and the United Arab Emirates.

Whale shark is listed across several international conventions and agreements, in support of their conservation (summarised in Pierce et al., 2021), including:

- Annex I of the UN Convention on the Law of the Sea (Highly Migratory Species);
- Appendices I and II of the Convention for the Conservation of Migratory Species of Wild Animals (CMS), for which the Appendix I listing requires that Parties shall *inter alia* “endeavour to strictly protect them by: prohibiting the taking of such species, with very restricted scope for exceptions...”; and
- Appendix I in 2025 of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) meaning that all international trade, as well as landings from catch in international waters, is prohibited, upgraded from Appendix II.

Under Article III, Paragraph 5 of CMS, Parties that are Range States of Appendix I-listed species “*shall prohibit the taking of animals belonging to such species*”, with permissible exceptions including for scientific purposes;

The inclusion of whale shark in Appendix I of CITES creates additional practical barriers to ongoing research and monitoring efforts, such that samples collected from the high seas cannot be imported, and no samples can be exchanged internationally, except with the appropriate permit. Actions by CITES Member States that aim to minimise these barriers for species sampled as part of recognised research and monitoring programmes are encouraged.

Among the tuna RFMOs, retention of whale shark is prohibited in the western Pacific (WCPFC, 2025) and Atlantic (ICCAT, 2023). IATTC have not as yet declared a retention ban but instead prohibit only the deliberate setting of purse seine nets around whale sharks when sighted (IATTC, 2019).

A generalised retention ban, fully adopted by IOTC throughout its convention area, is therefore consistent with many existing agreements and policies both at a national level among IOTC CPCs, and internationally.

¹ ‘Competent Persons’ are here defined as any member ship’s crew or scientific observers whose role on board involves them in operations relating to either the release of live whale shark or collection of scientific measurements and samples, and whom have the appropriate training or experience to undertake such operations.

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