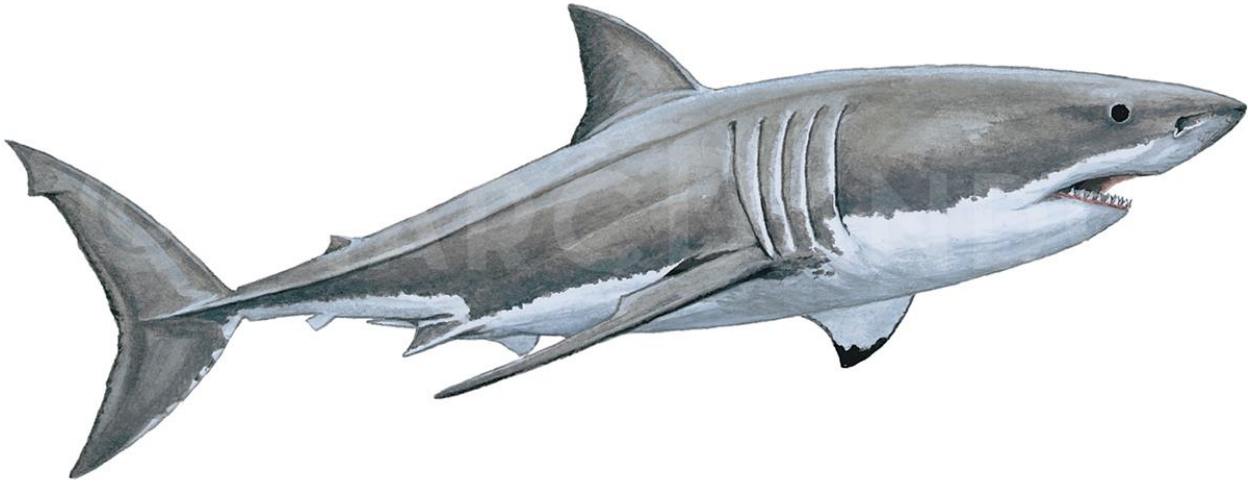


Memorandum of Understanding on the Conservation of Migratory Sharks

Great White Shark Fact Sheet



Class:	Chondrichthyes	Great White shark
Order:	Lamniformes	Grand requin blanc
Family:	Lamnidae	Jaquetón blanco
Species:	<i>Carcharodon carcharias</i>	Illustration: © Marc Dando

1. BIOLOGY

Carcharodon carcharias (Great white shark) inhabit coastal waters of subtropical and temperate seas. Female age at maturity is uncertain ranging between 9 and 17 years (Smith et al. 1998, Mollet and Cailliet (2002)). Reported litter size ranges between 2- 17 pups per female (Bruce, 2008). Von Bertalanffy growth estimates of white shark range from a k value = $0.159 y^{-1}$ for female sharks from Japan whereas Cailliet et al. (1985) and Wintner and Cliff (1999) reported k values of $0.058 y^{-1}$ and $0.065 y^{-1}$ (sexes combined) for individuals collected in California and South Africa, respectively. Based on bomb radio-carbon signatures, the maximum age of white sharks is up to 73 years (Hamady et al., 2014).

2. DISTRIBUTION

The white shark is distributed throughout all oceans, with concentrations in temperate coastal areas (Compagno 2001), including inter alia California, USA to Baja California, Mexico (Ainley et al. 1985, Klimley 1985, Domeier and Nasby-Lucas 2007, Lowe et al. 2012, Onate-Gonzalez et al. 2017), North West Atlantic (Casey and Pratt 1985, Curtis et al. 2014), Australia (Bruce 1992, Bruce and Bradford 2012, McAuley et al. 2017), and South Africa (Ferreira & Ferreira 1996, Dudley 2012). The Mediterranean Sea is thought to host a fairly isolated population with little or no contemporary immigration from the Atlantic (Gubili et al. 2010).

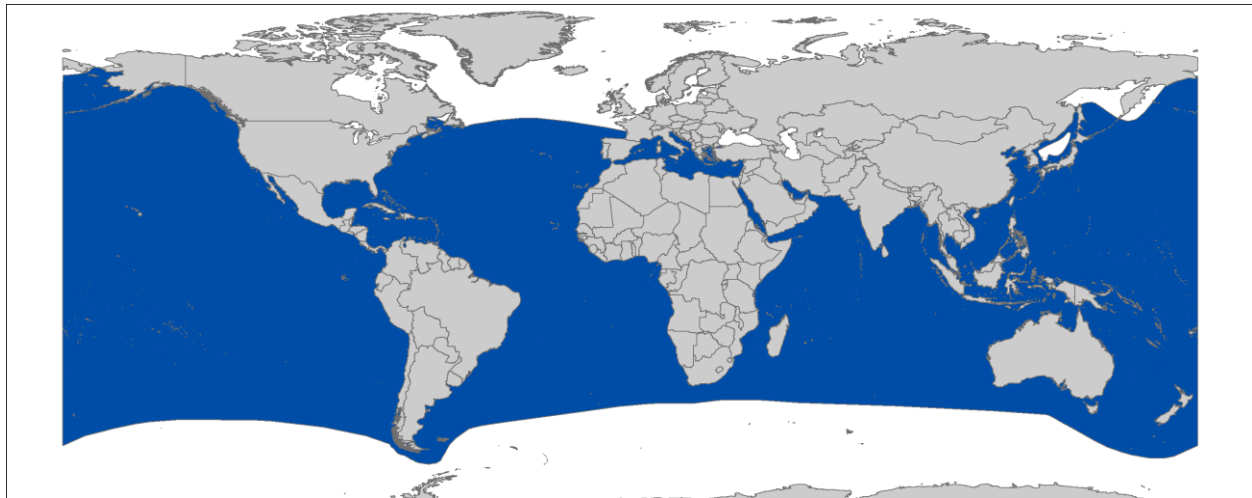


Figure 1: Distribution of *Carcharodon carcharias*, courtesy of IUCN.¹

Additionally, there is a seasonal offshore aggregation region in the subtropical northeastern Pacific (Weng et al. 2007, Domeier and Nasby-Lucas 2008, Jorgensen et al. 2009).

3. CRITICAL SITES

Critical sites are those habitats that may have a key role for the conservation status of a shark population, and may include feeding, mating, pupping, overwintering grounds and other aggregation sites, as well as corridors between these sites such as migration routes. Critical sites have not been accurately defined for these species in all areas, but some potentially important grounds have been proposed for Australia.

4. POPULATION STATUS AND TRENDS

There are no stock assessments for white shark. However, population modelling has been undertaken within Australian waters (Bruce et al. 2018; Hillary et al. 2018) and information on population trends are available for some populations and areas. The current IUCN Red List status for the global population of white sharks is Vulnerable (Fergusson et al. 2009)².

Region	Population trend	Time Period	Reference
ATLANTIC	Increase	1993-2010	Curtis et al. 2014
INDO-PACIFIC	Relatively stable	1951–2011	Christiansen et al. 2014
Southeast Australia	Declines 1950-1990, Increases since 1990 in shark mesh programs	1950-2010	Reid et al. 2011
Eastern Australia and New Zealand	Total population 2,500-6,750; juvenile survival rate ~70-75%, adult survival rate ~ 90%	1984 - 2013	Hillary et al. 2018
Eastern Australasian total population	Total population 5,460 (2,909-12,802). Trend in abundance not significantly different to zero (ie stable), evidence of slight decline	1984 - 2016	Bruce et al. 2018

¹ Map requires updating: The species is not present in the Red Sea and Arabian/Persian Gulf.

² See the IUCN website for further details on the population assessment: <http://www.iucnredlist.org/details/3855/0>.

		over the 2000s.		
Southern-western adult population	Australian	Adult population 1,460 (760 – 2,250). Trend in abundance not significantly different to zero (ie stable), evidence of slight decline over the 2000s.	1980 - 2014	Bruce et al. 2018
Northeast Pacific		Increase in fishery-dependent CPUE otters	Since 2000	(Lowe et al. 2012, Dewar et al. 2013, Tinker et al. 2015)
KwaZulu-Natal, South Africa		Stable trend in beach net CPUE	1978-2003	(Dudley and Simpfendorfer 2006)

5. THREATS

- **Fisheries:** The majority of annual captures is assumed to occur incidentally in commercial fisheries operating longlines, setlines, gillnets, trawls, fish-traps and other gear. Besides, white sharks are caught in recreational fishing and shark culling (Compagno 2001, Fergusson et al. 2009).
- **International trade:** Shivji et al. (2005) demonstrated that white shark fins of various sizes are illegally traded, indicating their utilization as both, food and trophies.
- **Habitat degradation:** The degradation caused by coastal development, pollution, and prey depletion in inshore habitats utilised by white sharks might have negative impacts on the health, range, and abundance of white sharks (Fergusson et al. 2009).
- **Shark Meshing (Bather Protection):** Bather protection nets or Shark Meshing is used to protect humans on some popular coastal areas from shark attacks. Drum lining (Australia) and protective nets (Australia and South Africa) do result in shark mortality, but whether this is at levels that impact white shark population growth is uncertain (Dudley and Simpfendorfer 2006, Reid et al. 2011). Shark nets or drum lines are primarily not deployed in white shark aggregation sites, likely reducing their population-level impacts (Curtis et al. 2012).

6. KEY KNOWLEDGE GAPS

- Data is needed on population estimates and trends, and the delineation of critical habitats
- Understanding the potential impacts of protective beach meshing and drum line programs

7. KEY MANAGEMENT AND CONSERVATION GAPS

- Critical habitats have not been identified and delineated.
- Population dynamics modelling of the effects of protective beach meshing and drum line programs.

8. RECOMMENDATIONS FOR CONSERVATION AND MANAGEMENT ACTION

A multifaceted approach is required to address the management and conservation gaps for white sharks. Sharks MOU Signatories and other Range States are encouraged:

- I. **Incorporate conservation measures for white sharks into national legislation of all Parties/Signatories** (in line with CMS Appendix II & the Objective of the Sharks MOU)
 - Evaluate & revise the current implementation/compliance with CITES Appendix I and CMS Appendix I obligations.
- II. **Improve the understanding of white sharks through strategic research, monitoring and information exchange**
 - Identify new white shark critical sites

- Focus on key habitats & oceanic movements for future research to support development of spatial fisheries management
- Undertake genetic studies to determine population structures
- Undertake research to better quantify the potential impacts of protective beach meshing and drum line programs on white shark populations, and mitigate those impacts if necessary
- Share research results and expertise with other stakeholders/Range States/Sharks MOU Secretariat

III. Improve multilateral cooperation among regions & RFBs

- Identify synergies with other Range States/stakeholders to support coordinated and resource-effective research & conservation programs
- Establish a working group on shark bycatch mitigation techniques with other affected Range States
- Share methodological and technological advancements between Range States, with a focus on improving baseline population information collection from data-poor regions.

IV. Minimize interactions between fisheries and white sharks

- Relevant organizations concerned with the management of fisheries should improve the collection and reporting of standardized data
- Review fishing gears to evaluate potential modifications for reducing bycatch mortality of white sharks
- Consider gear restrictions in white shark critical sites that would help minimize bycatch mortality

V. Eco-tourism

- Establishment of ecotourism in aggregation sites to support acceptance of white sharks by local communities through generation of economic benefits
- Promote best practice guidelines for white shark tourism (cage diving, boat based breaching tours)

VI. Spatial management

- Include critical sites in marine and coastal spatial planning activities
- Undertake stakeholder consultations to ensure ownership and equitable access to resources
- Involve local communities in the management of coastal fisheries

VII. Raise awareness about the threats to White sharks

- Inform the public about the need of white shark conservation via educational, social media and local outreach campaigns
- Where shark attack mitigation programs are deemed necessary for public safety, encourage the use of non-invasive methods, and training of the public on best behavior to handle threats to humans from entering the marine environment

10. LEGAL INSTRUMENTS

Instrument	Description
Barcelona Convention Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean	Annex II: Endangered or threatened species; Parties shall ensure the maximum possible protection and recovery of, while prohibiting the damage to and destruction of, these species.
CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora	Appendix I: Species threatened with extinction; trade in specimens of these species is permitted only in exceptional circumstances.
CMS Convention on the Conservation of Migratory Species of Wild Animals	Appendix I: Migratory species threatened with extinction; CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them.
	Appendix II: Migratory species that have an unfavourable conservation status and need or would significantly benefit from international cooperation; CMS Parties shall endeavour to conclude global or regional agreements to benefit these species.
EU European Union	Council Regulation (EC) No 1185/2003: establishes a general prohibition of the practice of 'shark finning', whereby a shark's fins are removed, and the remainder of the shark is discarded at sea. Council Regulation (EU) 2018/120: prohibits for Union vessels to fish for, to retain on board, to transship or to land Great White Shark in all waters. The regulation also prohibits third-country vessels to fish for, to retain on board, and to transship Great White Sharks in Union waters.
FAO Food and Agriculture Organization	IPOA Sharks: International Plan of Action for Conservation and Management of Sharks based on which states should adopt and implement a national plan of action for conservation and management of shark stocks (NPO Sharks) if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries.
GFCM General Fisheries Commission for the Mediterranean	The GFCM adopted Recommendation GFCM/36/2012/3: under which shark species listed under Annex II of the Barcelona Convention cannot be retained on board, transhipped, landed, transferred, stored, sold or displayed or offered for sale and must be released unharmed and alive to the extent possible.
Sharks MOU Memorandum of Understanding on the Conservation of Migratory Sharks	Annex 1: Signatories should endeavour to achieve and maintain a favourable conservation status for these species based on the best available scientific information and taking into account their socio-economic value.
SPRFMO The South Pacific Regional Fisheries Management Organisation	Standards for trawl fishing activities to collect data on species of concern, including white sharks, were introduced in 2017.

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