

Great White Shark Ecology & Conservation

Conservation: What threats face sharks?

Worldwide there are an estimated 100,000,000 sharks slaughtered annually. Their biggest threat is man and the way man utilizes the ocean. Long liners, trawlers and heavily destructive fishing gear destroys essential fish habitat and take sharks as by-catch. Shark fin soup sells for a high price in China and by-catch sharks have their fins removed specifically for this delicacy. Trophy fishing and shark nets also accelerate the problem.

Shark cage diving and ecotourism

Providing operators follow permit requirements carefully shark cage ecotourism provides numerous benefits to white shark conservation. For example:

- Promoting awareness and education
- Keeps the shark worth more alive than dead - the cage diving industry creates an estimated annual revenue in SA of 74M ZAR
- Creates local employment
- Provides excellent research opportunities and funding
- Daily monitoring of the species



Most shark species are believed to be over 90% in decline.

SA was the world's first country to fully protect Great White sharks in 1991.

GWS Conservation status:
IUCN red list (1996)
CITES appendix II (2004)

CERTIFICATE

GREAT WHITE SHARK CAGE DIVING



This is to certify that

went cage diving with Great White Shark Tours^{cc}
and lived to tell about the experience.



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Date

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Great White Shark Biology

Morphology

The Great White Shark, more accurately known as *Carcharodon Carcharias*, belongs to the family *Lamnidae*. These sharks share similar characteristics such as conical shaped snouts, large circular eyes, and powerful tails with equal symmetry between the upper and lower lobes. They are strong powerful swimmers capable of reaching speeds of 60 km p/h in pursuit of their prey.

Senses and special adaptations

White sharks have incredibly fine tuned senses. They can detect the electro magnetic field of other animals in the water column from kilometres away by tiny gel filled pores located on their snout. These sensors are known as *ampullae of Lorenzini* and can detect as little as *0.005* of a *volt*. They are believed to assist in the sharks' long distance migrations by detecting the earth's magnetic field.

Another biological adaptation is the shark's ability to regulate its own body temperature through networks of arteries and capillaries along the lateral sides of their bodies known as *rete mirabile*. In turn the overlapping design of these blood vessels supply the shark's core body muscles and brain with heat enabling it to make rapid bursts of speed whilst hunting. In fact, the Great White shark can regulate its internal body temperature to 14°C above ambient sea water temperature. This biologically classifies the Great White Shark as an *endothermic poikilotherm*.

Reproduction

Although breeding has never been observed in Great White Sharks, it is believed they are *oviparous*. This means they give birth to live young which hatch inside the uterus and nourish directly inside the mother.



Length at birth	1.2 - 1.5m
Maximum length	6.0 - 6.5m
Maturity	15-20 years
Gestation period	12-18 months
No. of pups per litter	2-10
Maximum weight	2000 kg
Number of teeth replaced in a life time	3000

The term for a juvenile White shark is a pup and as soon as the pup leaves its mother there is no nurturing. It swims off to hunt for itself. Inside the womb *intrauterine cannibalism* is thought to occur where dominant pups consume the weaker ones.

Within the first month in the womb a White shark's jaws begin to develop and are specialised for hunting fish. A Great White must be around twenty years old before it reaches maturity and it has a life expectancy of anywhere from 30-60 years. Some biologists predict the species can live longer than 100 years. To age the animal accurately one has to count the growth rings within the vertebrae which means the shark would have to be dead.

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Distribution

Great White Sharks are found in most temperate and sub tropical oceans worldwide. They commonly patrol shelf and coastal seas however they will readily make voyages across vast ocean basins. Specific hot spots for Great White sharks globally are South Africa, Australia, Isla de Guadeloupe and California. The North Atlantic and Mediterranean used to be before heavy fishing pressure diminished populations.

How can one identify between Great White Sharks?

Photographic identification is a commonly accepted method for fingerprinting individuals. The dorsal fin has a serrated trailing edge which can be recognised by computer software. Sub surface photo id can be used by selecting three key focal points of the shark's body, primarily the gill slits, pelvic fins and tail.

Why do Great White Sharks visit Gansbaai?

The species migrations are believed to be heavily driven by environmental cues and prey sources. The Western Cape of South Africa, and specifically Gansbaai, boasts a banquet of food to interest this shark. In winter months (May-September) Cape fur seal pups become available at offshore colonies such as Geyser Rocks and Dyer Island. Year round however there is a wide-range of fish species and smaller sharks, skates and rays.

How do you monitor Great White Sharks?

Telemetry (tagging) of Great White Sharks is one way scientists can anticipate where this shark migrates to. There are many different types of tags although most commonly acoustic tags are used for tracking small scale movements (i.e. around seal colonies or in bays) and satellite tags for larger scale movements such as trans-oceanic or coastline migrations.

