Student Information Sheet 5

The Whale Shark

What do they look like?

The whale shark (*Rhincodon typus*) is the largest shark in the ocean, reaching lengths of 20 metres and a weight of 20 tonnes. Whale sharks are closely related to the bottom-dwelling sharks, which include the wobbegongs.

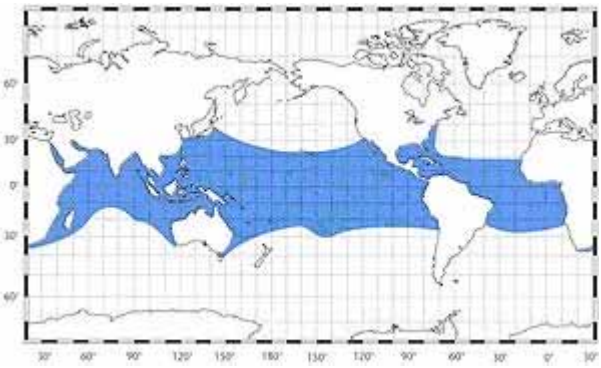
The whale shark, *Rhincodon typus* (© Brad Norman)

There is a pattern of lines and spots on the skin of each shark that enables them to blend into their surroundings. The unique pattern does not appear to change over time and can be used to identify individual sharks. (See photoid.whaleshark.org).

Where are they found?

Whale sharks (*Rhincodon typus*) have a broad distribution in **tropical** and warm **temperate** seas. They are thought to prefer surface sea-water temperatures between 21° – 25°C. Sightings at Ningaloo Marine Park (NMP), however, are most common in water temperatures around 27°C.

They are known to live in both deep and shallow coastal waters and the lagoons of coral atolls and reefs.



The whale shark is widely distributed through tropical seas. (© CSIRO)

Australia is one of the most reliable locations to find whale sharks. They have been seen in India, the Maldives, South Africa, Belize, Mexico, the Galapagos Islands, Southeast Asia and Indonesia.

Whale sharks are widely distributed in Australian waters. They are most common in Ningaloo Marine Park, but have been seen at Christmas Island, off Queensland and near Eden, New South Wales.

What do they eat?

One of only three **filter-feeding** sharks (the other two being the basking and megamouth sharks), whale sharks feed on minute organisms including krill, crab larvae, jellyfish etc., and has been known to feed on larger prey such as sardines, anchovies, mackerels, small tunas and squid.

Juvenile crabs are eaten by whale sharks (© Brad Norman)

Although they have about 3 000 tiny teeth (each less than 6mm in length), these teeth are not used while feeding.

Instead, the whale shark can sieve prey items as small as 1mm through the fine mesh of the **gill-rakers**.

They are able to open their mouth wider than 1m to improve feeding and are occasionally sighted hanging vertically in the water to allow baitfish and other food items to be 'sucked' in.

Copepods are eaten by whale sharks (© Brad Norman)

How do they reproduce?

Whale sharks have internal fertilisation and produce live young (**ovoviviparity**). They have the highest number of young of any shark – producing litters of around 300 pups, although these are very small at an average length of around 55 cm. The length of **gestation**, how often and where they breed remains unknown. The only pregnant female whale shark ever recorded was found off the coast of Taiwan. There have been very few **juvenile** whale sharks seen at any location in their range.

Studies of the whale sharks at NMP have established that male whale sharks do not usually **mature** before they reach a length of around 8–9 metres. Males can be distinguished by the presence of two **claspers** near the pelvic fin (absent in females). The size at maturity of female whale sharks cannot be determined through external observation.

What kind of environment do they live in?

Although whale sharks are most often seen swimming at the surface during 'seasonal' gatherings, evidence from research has shown that whale sharks can dive to great depths (about 700 metres). They also remain away from the surface for long periods.
They regularly appear at locations where seasonal food 'pulses' are known to occur. The predictable annual whale shark gathering at NMP is closely linked with an increase in **productivity** of the region associated with a mass coral spawn that occurs around March/April each year. It is likely that this represents a critical event in the life cycle of this species.

Acoustic-tracking studies at NMP have revealed that individual whale sharks sometimes stay close to Ningaloo Reef over day/night periods. In addition, using the *ECOCEAN Whale Shark Photo-identification Library*, it has been possible to record many sharks returning to Ningaloo in different years and staying there over long periods. As an example, one individual was sighted at Ningaloo Marine Park on 14 separate days over a 28-day period within a small area.

Are they migratory?

Whale sharks are highly migratory, but little is known about their migration patterns. Research at NMP has shown that at least some sharks take a northerly route when leaving the area. Satellite tracking has shown that they can travel great distances.

What threatens the survival of Whale Sharks?

Fisheries

- In one fishery in India, as many as 1000 whale sharks were believed to be killed in 1999 and 2000. Their habit of swimming at the surface makes the whale shark easy to catch. Previously, the fins of whale sharks were sold for high prices on the Asian market, but demand for whale shark fins has declined. There is still a market for whale shark meat in several countries including Taiwan and China.
- In Taiwan, there is a quota of 120 whale sharks for capture per year, although this may be unsustainable. Of great concern is the reduction in size (length) of individuals caught in the Taiwanese fishery today compared with the early 1980s.

Natural predators

- There are very few known predators of the whale shark. In nature, the most dangerous period in their life cycle appears to be when the sharks are very young. The skin of an adult whale shark provides their main protection. The thickness of the skin on the dorsal surface of adult whale sharks is 12–15 cm (thicker than any other living animal), but in young whale sharks this 'protection' is not fully developed.

- Very few juvenile whale sharks (less than 1–2 metres) have been reported, although it is known that small individuals are sometimes preyed upon by blue marlin and blue sharks. There is also a record of an adult whale shark taken by a killer whale in Mexican waters and evidence of a whale shark being attacked by a larger shark off Australia.

a) A-076 photographed in 1999 with dorsal fin intact

b) A-076 photographed in 2003 with dorsal fin damaged from attack (© www.shepherdproject.org/sharks.jsp?shark=A-076)

Vessel contact

- Because of their habit of swimming slowly at or near the surface, whale sharks are particularly susceptible to boat strike. In the 19th century, there were occasional reports of whale sharks being impaled on the bow of steamships. Today, in some parts of the world, many sharks are sighted near ecotourism activities showing propeller wounds, which are evidence of vessel contact.

Ecotourism

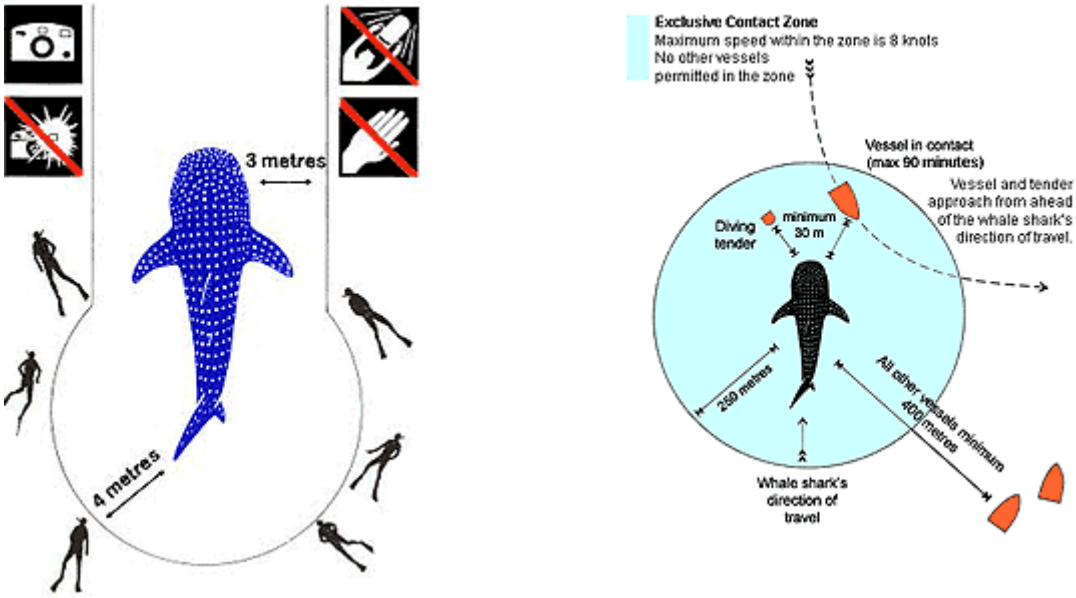
- Australian ecotourism is well-managed through a shared approach between industry and government. At other locations around the world, ecotourism is developing and it is important that any activity is well-regulated to minimise any impacts on whale sharks.

- Whale sharks have shown a reaction to SCUBA bubbles, touching and flash photography and these activities are not permitted during whale shark ecotours in Australia.

Whale sharks move slowly enabling ecotourists to swim alongside
(© www.ecocean.org)

Are Whale Sharks protected?

Whale sharks are protected in Australia, the Philippines, India, the Maldives, Honduras and some American waters. However, these are only a few of the 100 countries where whale sharks are known to visit.



CALM / Industry management guidelines to minimise impacts on sharks from ecotourism activities
(© http://www.calm.wa.gov.au/tourism/whalesharks_swimming.html).

Alex Gaut (MESA) adapted this information sheet for children (which is suitable for primary school students) from the information sheet compiled for the general public by © Brad Norman (ECOCEAN) [info@whaleshark.org]