

Student Information Sheet 6

The Great White Shark

Great white sharks (*Carcharodon carcharias*) are top order predators that may reach lengths of almost 7 metres.

Where are they found?

Great white sharks have been recorded in **temperate** and **sub-tropical** coastal waters almost world wide. They are found in the Atlantic, Pacific, Indian and Southern Oceans and the Mediterranean Sea. White sharks of all sizes have been recorded from all Australian states except the Northern Territory. In general white sharks are not common, although there are particular areas in Australian waters where encounters are more frequent.



The great white shark, *Carcharodon carcharias*
(© Ken Hoppen, oceannotions@primus.com.au).

White shark populations may separate according to size, **gender** and for reproduction. However, the **ratio** of males to females changes depending on location, season and over time. **Juveniles** are most commonly encountered in inshore areas, often in the vicinity of open coast beaches. The Great Australian Bight, Victor Harbour to Coorong region (South Australia), areas off Portland and Ninety Mile Beach (Victoria), Garie beach to Wattamolla and Port Stephens to Newcastle (New South Wales) and some areas off southern Queensland appear to be seasonally important for juvenile white sharks. The areas where juveniles are mostly found may represent white shark **pupping grounds**.

What do they eat?

White sharks have few natural predators and do not feed continuously. A large meal (e.g. a seal) may last a medium size shark for as long as a week. They appear to eat different foods as they get larger, with smaller ones (less than 2.7 metres) feeding on a variety of fish, **cephalopods** and **crustaceans**. As they increase in size, their diet expands to include marine mammals. They are also scavengers and will feed on the bodies of large dead cetaceans when available. Larger white sharks (>3 metres) are frequently found near seal or sea lion colonies in Australia.

How do they reproduce?

There is little information on the reproductive cycle of white sharks because examination of mature adult specimens (in particular females) is rare. Adults are large, fairly uncommon and when captured, their size makes preservation and examination difficult. However, it has been established that white sharks display **oophagy**.

White shark pups are 120–150 cm long and up to 32 kg at birth and **litter** sizes vary from 2–10. It is not known how long it takes for an embryo to mature, but it may take about 18 months, with females breeding only once every 2–3 years. It is suggested that the birth period occurs between December and June. Nursery areas (pupping grounds) are located in inshore coastal waters.

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How big do they grow?

In general white sharks will reach a length of 2 metres in about 3 years; 3 metres in 5–8 years; and 5 metres in 16–23 years. Male white sharks **mature** at about 3.6m, when they are thought to be at least 10 years old. Females mature at about 4.5–5 metres when they are thought to be around 18 years old. The lifespan of these sharks is thought to be more than 30 years.

What kind of environment are they found in?

The white shark is mainly found in **continental shelf** waters, often occurring close inshore near the **surf zone**. They can swim long distances. They have been recorded moving about 190 km in 2.5 days at an average speed of 3.2 km/hr, and **satellite tracking** has confirmed migrations of almost 6000 km in 200 days. However, there have been several reports of individual white sharks revisiting the same place year after year. Sharks in southern Australia have shown a wide range of swimming behaviours including:

- Regular dives and ascents between the surface and the bottom;
- Swimming deep at night and in shallow water during the day; and
- Spending long periods at the surface or at the bottom.

Movements are mainly restricted to shelf and coastal waters in depths down to 100 metres.

Do they migrate?

Although some populations of white sharks stay in the same area for a long time or for at least part of the year, they are known to be highly **migratory**. Tagged sharks have moved across open ocean areas, such as Australia to New Zealand and California to Hawaii. This means that protection in Australian waters may not be enough to ensure the safety of sharks that migrate out of Australian ocean territory.

There is evidence of **genetic** exchange between white sharks in South Africa and Australia, suggesting movement of some white sharks between these areas.

In Australia two sharks were tagged in 2000 and 2001 in Victorian waters. 'Heather' migrated 880 km over 46 days and 'Neale' migrated 2946 km over 113 days. Movements have also been recorded from South Australia to southern Queensland and north-west Western Australia.



CSIRO-tagged white shark 'Heather' in 2000 (from <http://www.marine.csiro.au/research/pelagic/tagging/heather/index.htm>)
(© CSIRO)

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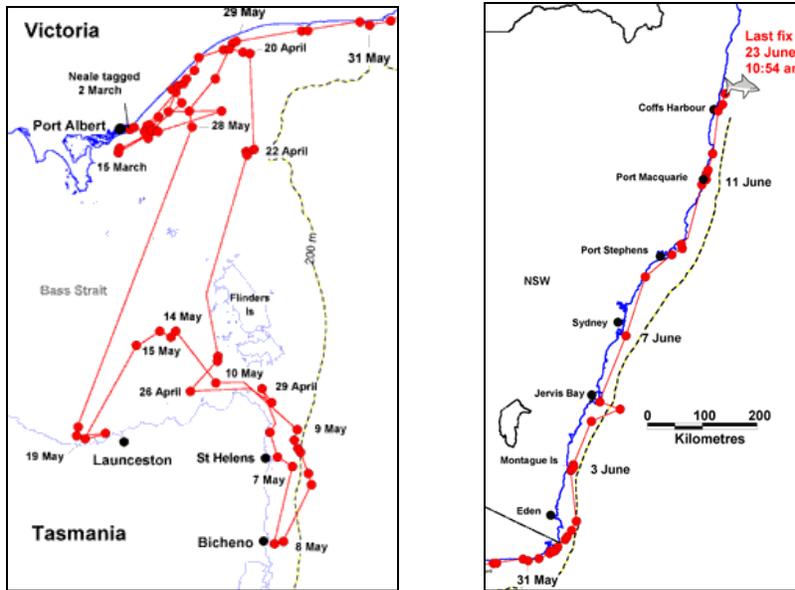


Figure 3. CSIRO-tagged white shark 'Neale' in 2001
(from www.marine.csiro.au/research/pelagic/tagging/neale/index.htm)
(© CSIRO).

What threatens the survival of Great White Sharks?

Commercial fishing

- Although not targeted, white sharks are caught as **bycatch** on longlines and in the nets of **commercial fishers** and in fish farm cages such as tuna farms. The estimated number of great white sharks caught by commercial and **recreational fisheries** is between 100 and 440 each year in Australia.

White shark products

- Traded products that come from white sharks include fins, jaws, teeth and meat (fresh, frozen or salted for human consumption), **cartilage** (used as a health food), and skin for leather. The liver is used to make oil used in medicines and the carcass can be used for fish-meal and fertilizer.
- The international shark fin trade increased a lot between 1980 and 1990, with demand increasing more during the 1990s. Prices for dried fin in Australia reached \$275/kg, making it one of the most expensive fishery products. Jaws and teeth are the most valuable products and are available for up to US\$425 per tooth and up to US\$50,000 for a set of large jaws.



International trade in white shark jaws and individual teeth are closely monitored as a result of listing on CITES (© Kate Rodda, PIRSA SARDI).



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Beach netting

- There are currently 49 meshed beaches between Newcastle and Wollongong in New South Wales. White sharks caught by beach meshing programs are usually small (less than 3 metres), and in many cases are smaller than 2 metres. Between 1950 and 2000, a total of 517 white sharks were captured in shark mesh nets in NSW. More than 670 white sharks have been caught in the Queensland Shark Control Program since 1962.

Are they protected?

The World Conservation Union considers the great white shark as 'vulnerable to extinction'. White sharks are listed on at least 3 international conservation agreements and are fully protected in Australia, South Africa, Namibia, Maldives and Malta, and in California and Florida.

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 from © Brad Norman (ECOCEAN) [info@whaleshark.org]. This information sheet may be copied for educational purposes.

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