

Scalloped Hammerhead Shark

Sphyrna lewini

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Introduction

The Scalloped Hammerhead Shark is a coastal pelagic species with a circumglobal distribution in warm temperate and tropical coastal areas between 45°N and 34°S. They are known to form large migratory schools and in Australia tend to move south during the warmer months. Scalloped Hammerheads may be found throughout the seas around northern Australia as far south as Sydney NSW (34°S) and Geographe Bay WA (33°S).

Scalloped Hammerheads are quite timid and not considered dangerous to humans. They have been targeted for their meat and valuable fins and have suffered serious declines in abundance in many geographic regions around the world.

Scalloped Hammerhead Shark. Photo: Frederic Buyle

The Scalloped Hammerhead Shark is listed as an **endangered species** in NSW. Heavy penalties are imposed for harming, possessing, buying or selling Scalloped Hammerhead Sharks, or for harming the species' habitat (see 'Legal implications').

Description

Hammerhead sharks can be readily recognized by the prominent flattened keels that form the characteristic 'hammer' shaped head; termed a cephalofoil. The exact purpose of the cephalofoil is debated with various theories proposed that it provides hydrodynamic lift, improves vision and manoeuvrability, increases the area and spatial

arrangement of sensory organs and can be used for prey manipulation.

The Scalloped Hammerhead's cephalofoil curves rearwards and has a prominent central indentation (or scallop). The eyes are positioned at either end of the hammer with the mouth below.

The distinctive head is equipped with highly specialized sensory organs (called ampullae of Lorenzini) which assist in sensing weak electrical emissions emitted by their prey.

The Scalloped Hammerhead has a tapered body which is typically light brown, bronze or olive on the upper surfaces fading to a lighter counter shade below. The underside of the pectoral fin tips has a dusky colouration.

They have a moderately high first dorsal fin followed by a small second dorsal fin with a long free rear tip that almost touches the tail fin.

The Scalloped Hammerhead grows to a maximum size of approximately 3.5 m in length.

Scalloped Hammerheads may be confused with the other two species of hammerhead sharks that occur in NSW waters, the Great and the Smooth Hammerhead. On Scalloped Hammerheads the narial groove that occurs on the under-surface of the frontal margin of the cephalofoil is shorter and less developed, while the central scallop is more prominent and well developed than on the Smooth Hammerhead.

Habitat and ecology

Adult Scalloped Hammerheads inhabit deep waters adjacent to continental shelves, in water depths ranging from the surface to at least 275 m in depth, while juveniles are found close to shore in nursery habitats. Adult females are thought to occupy deeper water and move into shallower waters to mate and give birth.



Large school of Scalloped Hammerheads
Photo: Alex Hearn

Juveniles often occur in large migratory schools while adults may be seen alone, in pairs or in small schools.

Scalloped Hammerheads are pelagic foragers. Their diet mainly comprises of fish, crustaceans, and cephalopods (squid, octopus and cuttlefish). Juveniles generally feed on fish and nocturnally active crustaceans.

In temperate waters males reach sexual maturity at approximately 2 m and 9 years of age. The size and age at sexual maturity of females is not well understood but is likely to occur later and at a larger size than the males (up to 15 years old).

Scalloped Hammerheads give birth to live young. This occurs around October – January in Australia after a gestation period of 9 – 10 months with litters of 13 - 41 pups (averaging 25). The size of litters tends to increase with the size of the female.

Juveniles are born at 46 - 56 cm and remain in nursery environments such as inshore estuaries or bays for up to a year or more. Scalloped Hammerheads have been recorded over 30 years old and some studies have estimated they may live as long as 50 years; making them a long-lived fish.



Scalloped Hammerhead silhouette
Photo: Frederic Buyle

Why is the Scalloped Hammerhead Shark threatened?

- Commercial, recreational and shark meshing bather protection fisheries are the primary threats to the Scalloped Hammerhead.
- Globally, adults are susceptible to long lining and gillnetting operations due to their pelagic nature, while juveniles are susceptible to most fishing methods in inshore waters and pups are impacted by prawn trawling and recreational fishing in nursery areas.
- Genetic analysis indicates the east coast Australian population is genetically contiguous with Indonesian populations.

- Scalloped Hammerheads have been taken for their meat and high value fins, and have been subject to illegal, unregulated and unreported fishing in northern Australia over the last decade.
- They are not considered dangerous to humans and are not a target species in the NSW Shark Meshing (Bather Protection) Program, however the program takes significant numbers of hammerheads as bycatch and catch rates suggest there have been major declines in abundance of hammerheads over the last two decades.
- Slow growth and late maturation reduces the potential for quick recovery of the species. The Scalloped Hammerhead has been assessed as having one of the lowest population rebound potentials of 26 species of Pacific Ocean sharks assessed.

Conservation and recovery actions

- Conduct further research into the distribution, biology and ecology of the species.
- Manage fishing and the NSW Shark Meshing (Bather Protection) Program activities to mitigate impacts on the species.
- Develop cooperative management and research partnerships with other jurisdictions to

ensure the sustainable management of Scalloped Hammerheads across their range.

- Develop educational and advisory materials to improve species identification of Scalloped Hammerheads and to raise community awareness of their threatened status.
- Implement the Commercial Fisheries Threatened and Protected Species Interaction Reporting arrangements.
- Develop advisory materials on the best ways to release any incidentally caught Scalloped Hammerheads with least possible harm.
- Report any sightings of the species on the NSW DPI 24 hour automated message-taking service by calling (02) 4916 3877.**

Legal implications

It is illegal to catch and keep, buy, sell, possess or harm the Scalloped Hammerhead Shark (or any other threatened species in NSW) without a specific permit, licence or other appropriate approval, and significant penalties apply.

For endangered species these penalties can include fines/imprisonment of up to \$220,000/2yrs.

There can also be significant penalties for causing damage to the habitat of a threatened species without approval.

Hammerhead Sharks

1. Scalloped Hammerhead

Medium to large size (up to 3m). Hammer broadly arched and narrow, with notches at either end.

2. Great Hammerhead

Grows very large (over 5m). Tall and distinctive sail-like dorsal fin. Hammer straight and wide. Rear edge of pelvic fin strongly concave.



Comparison of Scalloped and Great Hammerhead Sharks.

Photos and comparison by Alastair Harry, Fishing & Fisheries Research Centre, James Cook University

The impacts of developments or activities that require consent or approval in accordance with the *Environmental Planning and Assessment Act 1979* must be assessed and considered by consent or determining authorities. Where such actions are likely to result in a significant impact on a threatened species or its habitat, a detailed species impact statement must be prepared.

Strategies to be adopted for promoting the recovery of the Scalloped Hammerhead to a position of viability in nature must be set out in the NSW DPI Priorities Action Statement.

A recovery plan may be prepared in accordance with the provisions of the *Fisheries Management Act 1994* to promote the recovery of the species to a position of viability in nature.

Bibliography and further reading

Duncan, K.M., Martin, A.P., Bowen, B.W. and De Couet, H.G., 2006. Global phylogeography of the Scalloped Hammerhead Shark (*Sphyrna lewini*). *Molecular Ecology* 15: 2239-2251.

Fisheries Scientific Committee., 2011. Final Determination: The Scalloped Hammerhead – *Sphyrna lewini* as an Endangered Species.

Harry, A.V., Macbeth, W.G., Gutteridge, A.N. & Simpfendorfer, C.A., 2011a. The life histories of endangered hammerhead sharks (Carcharhiniformes, Sphyrnidae) from the east coast of Australia. *Journal of Fish Biology* 78: 2026-2051.

Last P.R. & Stevens, J.D., 2009. *Sharks and Rays of Australia. Second Edition*. CSIRO, Australia.

NSW DPI. 2008. *Identifying sharks and rays – A guide for NSW commercial fishers*. NSW DPI, Cronulla. 71 pp.

Smith, S.E., Au, D.W. & Show, C. 1998. Intrinsic rebound potentials of 26 species of Pacific sharks. *Marine and Freshwater Research* 49:663 – 678.

Stevens, J.D. and Lyle, J.M., 1989. Biology of three hammerhead sharks (*Eusphyra blochii*, *Sphyrna mokarran* and *S. lewini*) from Northern Australia. *Australian Journal of Marine and Freshwater Research* 40: 129 - 146.

For further information

NSW DPI has produced an identification guide for sharks and rays for use by commercial fishers that provides additional information on identifying the different species of hammerheads in NSW waters. This publication is available on-line at the NSW DPI website: www.dpi.nsw.gov.au

Contact the NSW DPI Threatened Species Section:

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Scalloped Hammerheads are not considered dangerous to humans. Photo: Frederic Buyle