

= Smooth hammerhead =

The smooth hammerhead (*Sphyrna zygaena*) is a species of hammerhead shark , and part of the family Sphyrnidae . This species is named " smooth hammerhead " because of the distinctive shape of the head , which is flattened and laterally extended into a hammer shape (called the " cephalofoil ") , without an indentation in the middle of the front margin (hence " smooth ") . Unlike other hammerheads , this species prefers temperate waters and occurs worldwide at medium latitudes . In the summer , these sharks migrate towards the poles following cool water masses , sometimes forming schools numbering in the hundreds to thousands .

The second @-@ largest hammerhead shark after the great hammerhead shark , the smooth hammerhead can measure up to 5 m (16 ft) long . It is an active predator that takes a wide variety of bony fishes and invertebrates , with larger individuals also feeding on sharks and rays . As in the rest of its family , this shark is viviparous and gives birth to litters of 20 ? 40 pups . A relatively common shark , it is captured , intentionally or otherwise , by many commercial fisheries throughout its range ; its fins are extremely valuable for use in shark fin soup . This shark is potentially dangerous and has likely been responsible for a few attacks on humans , though it is less likely to encounter swimmers than other large hammerhead species due to its temperate habitat .

= = Taxonomy and phylogeny = =

The Swedish natural historian Carl Linnaeus , known as the " father of taxonomy " , originally described the smooth hammerhead as *Squalus zygaena* in the 1758 tenth edition of *Systema Naturae* , without designating a type specimen . The name was later changed to *Sphyrna zygaena* . The specific epithet *zygaena* originates from the Greek word *zygòn* , meaning " yoke " , referring to the shape of its head . The Greek name *zýgaina* had already been used for the hammerhead shark by Aristotle in the second book of his *History of Animals* . Other common names for this species include common hammerhead , common smooth hammerhead , round @-@ headed hammerhead , or simply hammerhead .

Studies based on morphology have generally regarded the smooth hammerhead as one of the more derived members of its family , grouped together with the scalloped hammerhead (*S. lewini*) and the great hammerhead (*S. mokarran*) . Phylogenetic analyses based on nuclear and mitochondrial DNA have concluded differently : while the smooth and great hammerheads are closely related , they are not as closely related to the scalloped hammerhead as the other *Sphyrna* species . Furthermore , the smooth hammerhead is among the more basal hammerhead species , indicating that the first hammerheads to evolve had large cephalofoils .

= = Description = =

The second @-@ largest hammerhead next to the great hammerhead , the smooth hammerhead typically measures 2 @. @ 5 ? 3 @. @ 5 m (8 @. @ 2 ? 11 @. @ 5 ft) long , with a maximum recorded length and weight of 5 m (16 ft) and 400 kg (880 lb) respectively . The smooth hammerhead differs from other large hammerheads in the shape of its cephalofoil , which has a curved front margin without an indentation in the center . The cephalofoil is wide but short , measuring 26 ? 29 % of the body length across . The nostrils are located near the ends of the cephalofoil , with long grooves running towards the center . There are 26 ? 32 tooth rows in the upper jaw and 25 ? 30 tooth rows in the lower jaw . Each tooth is triangular in shape , with smooth to weakly serrated edges .

The body is streamlined , without a dorsal ridge between the two dorsal fins . The first dorsal fin is moderately tall and falcate (sickle @-@ like) in shape , with a rounded tip . The pectoral and pelvic fins are not falcate , rather having nearly straight rear margins . The anal fin is larger than the second dorsal fin , with long free rear tip and a strong notch in the rear margin . The dermal denticles are densely packed , each with 5 ? 7 horizontal ridges (3 in juveniles) leading to a W @-@ shaped rear margin . The back is dark brownish gray to olive in color , in contrast to the simple

brown of most other hammerheads , becoming lighter on the flanks . The belly is white , and sometimes the pectoral fins have dark edges underneath .

= = Distribution and habitat = =

Of the hammerhead sharks , the smooth hammerhead is the species most tolerant of temperate water , and occurs worldwide to higher latitudes than any other species . In the Atlantic , it occurs from Nova Scotia to the Virgin Islands and from Brazil to southern Argentina in the west , and from the British Isles to Côte d'Ivoire , including the Mediterranean Sea , in the east . In the Indian Ocean , it is found off South Africa , India , and Sri Lanka . In the western Pacific , it occurs from the Gulf of Tonkin to southern Japan and Siberia , as well as off Australia and New Zealand . In the central and eastern Pacific , it occurs off the Hawaiian Islands , California , Panama , the Galapagos Islands , Ecuador , and Chile . This species is usually considered to be amphitemperate (absent from the tropics) in distribution , though there are rare reports from tropical waters such as in the Gulf of Mannar off India , and off southern Mozambique . Its presence in the tropics is difficult to determine due to confusion with other hammerhead species .

Compared to the scalloped and great hammerheads , the smooth hammerhead stays closer to the surface , in water less than 20 m (66 ft) deep . However , it has been recorded diving to a depth of 200 m (660 ft) . It prefers inshore waters such as bays and estuaries , but is sometimes found in the open ocean over the continental shelf , and around oceanic islands . This shark has also been reported entering freshwater habitats , such as the Indian River in Florida . In the summer , smooth hammerheads migrate poleward to stay in cooler water , heading back towards the equator in winter .

= = Biology and ecology = =

Adult smooth hammerheads are either solitary or form small groups . They may come together in great numbers during their annual migrations ; schools of over a hundred juveniles under 1 m (4 ft) long have been observed off the eastern Cape of South Africa , and schools thousands strong have been reported off California . During hot summer weather , they can be seen swimming just below the surface with their dorsal fins exposed . Young smooth hammerheads are preyed upon by larger sharks such as the dusky shark (*Carcharhinus obscurus*) ; adults have been observed being consumed by killer whales (*Orcinus orca*) off New Zealand . Known parasites of the smooth hammerhead include the nematodes *Parascaphostomum* spp. and *Contracaecum* spp .

The smooth hammerhead is an active swimming predator that feeds on bony fishes , rays , sharks (including of its own species) , cephalopods , and to a lesser extent crustaceans such as shrimp , crabs , and barnacles . They readily scavenge from fishing lines . In some areas , stingrays are a favored prey and comprise a majority of its diet . The venomous barbs of stingrays are often found lodged in and around the mouths of these sharks ; one specimen examined contained 95 such spines . In northern Europe , the smooth hammerhead feeds on herring and seabass , while in North America it takes Spanish mackerel and menhaden . Off South Africa , smooth hammerheads feed on squid such as *Loligo vulgaris* and small schooling fish such as pilchard over the deep coral reefs at the edge of the continental shelf , with individuals over 2 m (6 ft) long taking increasing numbers of smaller sharks and rays . Off Australia , squid are the most important prey , followed by bony fish .

Like other hammerheads , the smooth hammerhead is viviparous : once the young exhaust their supply of yolk , the empty yolk sac is converted into a placental connection through which the mother delivers nourishment . Females bear relatively large litters of 20 ? 50 pups after a gestation period of 10 ? 11 months . Birthing occurs in shallow coastal nurseries , such as Bulls Bay in North Carolina . The pups measure 50 ? 61 cm (20 ? 24 in) long at birth ; females reach maturity at 2 m (8 ft) long and males at 2 m (6 ft) long , depending upon locality . Off South Africa , newly mated females have been caught in February and females with full term embryos in November ; off the east coast of Australia , birthing takes

place between January and March , with ovulation taking place around the same time . This shark is thought to live for 20 years or more .

= = Human interactions = =

The smooth hammerhead is potentially dangerous to humans . As of 2008 , the International Shark Attack File lists 34 attacks attributable to large hammerhead sharks , 17 of them unprovoked (1 fatal) . However , due to the smooth hammerhead 's occurrence in temperate regions where people are less likely to enter the water , it was likely responsible for a minority of these attacks . Off southern California , this species has been reported to steal catches from sport fishers and divers .

Smooth hammerheads are caught by commercial fisheries throughout the world , including those off the United States (East and West Coasts) , Brazil , Spain , Taiwan , the Philippines , southwestern Australia , and western Africa , primarily using gillnets and longlines . Fishery catches of smooth hammerheads are difficult to quantify due to a frequent lack of distinction between them and other large hammerheads . The meat is sold fresh , dried and salted , or smoked , though in most markets it is considered undesirable and there are reports of poisoning . Much more valuable are the fins , which have the highest rating for use in shark fin soup and often leads to captured sharks being finned at sea . Additionally , the liver oil is used for vitamins , the skin for leather , and the offal for fishmeal . This shark is also used in Chinese medicine .

Many other fisheries from every ocean also take smooth hammerheads as bycatch , and they are caught in some numbers by recreational anglers . Smooth hammerheads are also killed by entanglement in shark nets used to protect beaches . Fewer than 10 smooth hammerheads were caught annually in the nets off KwaZulu @-@ Natal , South Africa , from 1978 ? 1990 . In contrast , in the nets off New South Wales , Australia , smooth hammerheads comprised 50 % of the 4 @,@ 715 sharks captured from 1972 ? 1990 . At present , this species remains relatively common and has been assessed as " Vulnerable (VU) " by the World Conservation Union . Off New Zealand , it is a prohibited target species and is the most abundant shark along the northwest coast . It also does not appear to have been negatively impacted by fishing off southern Australia . Off the eastern United States , catches of this species are regulated by the National Marine Fisheries Service (NMFS) Atlantic shark Fishery Management Plan (FMP) , under which it is classified as a Large Coastal Shark (LCS) . In 2013 smooth hammerhead and other great elasmobranchs were added to Appendix 2 of CITES , bringing shark fishing and commerce of these species under licensing and regulation .