**CARTILAGINOUS FISHES**

**SHARKS**

Only about 500 species of sharks are known in the world, compared to over 28,000 bony fishes. In spite of their low number of species, sharks play a major role in the seas of the world. Many are the top predators in the various food chains in the sea and serve to keep Nature in balance.

Sharks differ in many ways from bony fishes. Their skeleton is cartilage. Although the jaws of sharks may seem like bone, they are calcified cartilage. There are 5 to 7 gill openings on each side of the head of sharks, compared to a single one for bony fishes. Most sharks have a spiracle, which is a rudimentary gill opening found behind or below the eye. In bottom-dwelling sharks (and rays), it is functional as the incumbent opening for respiratory water. The skin of shark is rough to the touch, due to the presence of numerous, small, dermal denticles (called placoid scales). The mouth of most sharks is ventral on the head, thus the snout is overhanging. The teeth are modified, enlarged dermal denticles with a pulp cavity, dentine and a thin layer of hard, enamel-like vitrodentine. Some are sharp and blade-like, with or without serrations; others long and raptorial. Still others molariform for crushing mollusks and other hard-shelled invertebrates. When teeth are broken or worn, they are replaced from intact rows behind. Sharks lack a swimbladder, the hydrostatic organ that provides buoyancy in bony fishes. To partially offset the greater density of their bodies than seawater, sharks have a very large liver containing much oil. Also they swim with pectoral fins outstretched and angled to give them lift. All sharks have internal fertilization; the intromittent organ of the male is the pair of claspers, one developing along the medial edge of each pelvic fin.

Some sharks are oviparous, depositing eggs in leathery cases. Most are ovoviviparous, meaning their eggs develop within the uterus, and fully formed embryos are released as juveniles (called pups). The requiem sharks (Carcharhinidae, except the Tiger Shark) and the hammerheads (Sphyrnidae) are viviparous; the embryos are nourished by a placenta-like organ of the female. Most sharks have very few young at one time, often only one or two. The Tiger Shark and the Blue Shark are exceptional in giving birth to as many as 80 and 135 pups, respectively. The intestine of sharks is very different from that of other vertebrates. It contains a scroll valve, much like an enclosed spiral staircase. Indigestible items like squid beaks cannot easily pass through such an intestine. Therefore, from time to time, a shark will regurgitate such items from its stomach.

Ten species of sharks are recorded from Easter Island, but only three are definitely known from inshore waters, the Tiger Shark, the Galapagos Shark, and a hammerhead. The much-feared White Shark (*Carcharodon carcharias*) is primarily pelagic, and its species account is not included in this book. However, an underwater photograph taken in South Australia is shown here. This species of shark ranges inshore in temperate areas where there are colonies of seals or sea lions. We have a positive record for Easter Island from a frightening experience of four Rapanui fishermen in 1952. They were catching *nānue*...
(Kyphosus sandwicensis) and cleaning them in the sea while anchored off the small bay at Vai Atare. A large shark struck the boat from below on the starboard side and capsized it. The fishermen climbed onto the overturned boat and remained there for about a half hour before daring to swim ashore. The boat was recovered, and the triangular serrate teeth of the White Shark were found embedded in the planks. The largest intact tooth was about 6 cm long. A tooth of that size would have been from a shark of about 5 m in total length (Randall, 1973). Three attacks by C. carcharias in Chilean waters, two of which were fatal, were documented by Cea & McCosker (1984). An open-ocean attack by this shark on two swimmers from the NOAA research vessel Discoverer took place in March, 1994 near Salas y Gómez, resulting in the left leg of a 19-year old woman being severed above the knee. Both victims survived.

Other pelagic sharks known from Easter Island are the Shortfin Mako (Isurus oxyrinchus), Blue Shark (Prionace glauca), Thresher Shark (Alopias vulpinus), and the Whale Shark (Rhincodon typus).

We have two specimens of a new species of dogfish shark of the genus Squalus that were caught in 200–400 m from the seamount Pukao 8 miles SW of Easter Island. Rapanui fishermen sometimes fish on this seamount and have the name māngō tara for this shark. The word tara refers to the stout spine at the front of each dorsal fin of species of this genus.

Fishermen on Easter Island have described a shark over 3 m in length to the second author that has been caught in 50–100 m. It is most likely the Bluntnose Sixgill Shark (Hexanchus griseus). Having not seen a specimen or a photograph, we refrain from making this a positive record.

Because sharks produce few young and are slow-growing, their populations are easily reduced by fishing. Such is obviously the case for the sharks at Easter Island. In three visits to the island, the first author sighted only one shark underwater, probably the Galapagos Shark. However, this shark was common at that time at uninhabited Isla Salas y Gómez.
REQUIEM SHARKS (CARCHARHINIDAE)

This large family of 12 genera and 50 valid described species is the most important in abundance, impact on marine communities, commercial value, and for a few such as the Tiger Shark, as a threat to humans who venture into the sea. Most species are found in tropical or subtropical seas. They are characterized by five gill slits, no nasal barbels, a large mouth, the dorsal fin near the center of the body, a distinct pit at the origin of the upper lobe of the caudal fin; and teeth which are compressed, obliquely triangular, serrate, and in one functional row (except in Triaenodon obesus); the spiracle is usually absent. Requiem sharks feed mainly on bony fishes, but also on octopuses, squids, crustaceans, and sea birds. The larger species also prey on sharks, rays, sea turtles, and marine mammals. Two species of this family are known inshore at Easter Island; both are rare.

GALAPAGOS SHARK māngo *Carcharhinus galapagensis* (Snodgrass & Heller, 1905)
Precaudal vertebrae 103–109; total vertebrae 200–215; snout moderately long, the preoral length 6.0–8.2% total length; eyes 1.3–2.4% total length; first dorsal fin moderately large and somewhat acute, its height 9.5–11.1% total length, its origin over middle of inner margin of pectoral fin; height of second dorsal fin 2.6–2.8% total length; interdorsal ridge present; gray to brownish gray, shading to whitish ventrally; no conspicuous markings on fins (fin tips and edges, especially of the pectorals, may be blackish). Reported to 3.7 m.

**Distribution:** Circumglobal, generally around oceanic islands, mainly in subtropical seas. As the species name indicates, the type locality is Islas Galápagos.

**Remarks:** Occurs principally in clear water to depths of at least 100 m; more oriented to the bottom than the surface, but readily takes fish being caught on hook and line at the surface. A tagged individual traveled about 50 km over deep water to the next island in the Tuamotu Archipelago (Johnson, 1978). Feeds mainly on bony fishes, occasionally on small sharks, squids, octopuses, and crabs. The number of pups range from 1 to 16, the size at birth from 57–80 cm; females mature at a length of about 235 cm. When common, sometimes seen