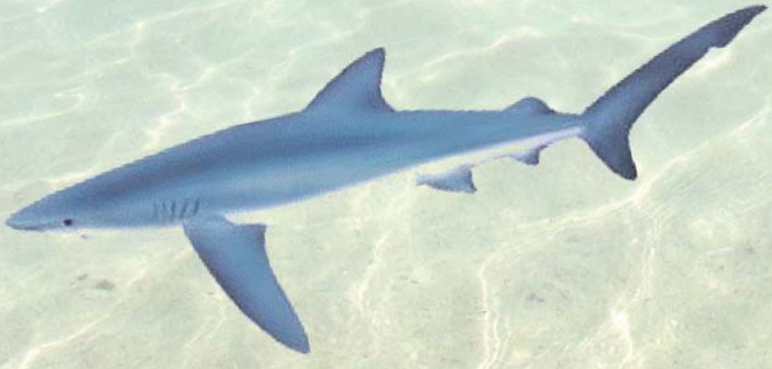
A handbook on Sharks Caught in SBT Fishing Grounds

2nd Edition



Ecologically Related Species Working Groupe

Commission for the Coservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

Introduction

The Ecologically Related Species Working Group (ERS WG) has been established under the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) to investigate the nature and extent of the interaction of species that are ecologically linked to southern bluefin tuna (SBT) in the fishery. The ERS WG also provides information and advice on issues relating to species associated with southern bluefin tuna (SBT). This work will assist the CCSBT to achieve its objectives of the conservation and optimum utilization of SBT.

The ERS WG is carefully monitoring the trends in shark resources caught as by-catch, or secondary products in SBT fisheries. There is concern over the increase of shark catches and the consequences that this has for the populations of some shark species in several areas of the world's oceans.

The purpose of this pamphlet is to raise awareness of the issues associated with shark conservation, management and sustainable use and to encourage SBT fishers to collect and submit accurate data and information on their shark catch. Accordingly, sections on reporting/data collection, shark biology, shark resources, and shark identification have been included.

In 1998, the Food and Agriculture Organization developed an "International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks)". The objective of the IPOA-Sharks is to ensure the conservation and management of sharks and their long-term sustainable use. All members of CCSBT, who contribute to fishing mortality of shark resources, should participate in the management of shark resources consistent with the IPOA-Sharks. For the plan's objectives to be realized, the collection of relevant and consistent data, including commercial data and data leading to improved species identification and ultimately, the establishment of abundance indices is necessary. This information can then be used as the basis for the conservation, management and sustainable use of shark resources.

SBT fishermen are therefore requested to collect and submit data / information on shark resources according to their respective competent authority's instructions.

Sharks and Fisheries

Shark Resources

Historically, humans have used sharks as a food resource and, over time, entire industries have evolved from this enterprise.

Shark meat is widely used and distributed in both dried and fresh forms in many parts of the world. Other shark parts are also utilised for medicinal, decorative and cultural purposes. For example, gelatin found between vertebral joints is used as a food source, teeth are used for jewelry and skin has been used as sandpaper to work timber. Shark liver oil is known for its pharmaceutical benefits. Recently, chondroitin sulfuric acid extracted from shark cartilage has been utilised for treating ailments such as arthritis. Sharks have also become important to some diving and sport fishing operations and some species, such as the spiny dogfish are used extensively for medical dissection and scientific experiments.

Sustainable Management of Sharks in Fisheries

According to statistics released by the United Nations Food and Agriculture Organization (FAO), about one million tons of cartilaginous fishes (the group of fishes to which sharks belong) are used as fishery resources throughout the world. Sharks are often caught by longline fishers targeting species such as tuna, but they are often reported as unidentified shark catch (Walker 2000).

The FAO IPOA on Sharks notes concern over the increase of shark catches and the consequence which this has for the populations of some shark species in several areas of the world's oceans. This is because sharks often have low levels of productivity, long recovery times in response to over-fishing and complex spatial structures. Consequently, the intensive harvesting of sharks has the potential to cause the depletion of stocks and to result in a slow stock recovery.

Careful and accurate monitoring of shark catch data is vital to ensure the conservation and management of sharks and their long-term sustainable use. This monitoring cannot be achieved without the assistance of the SBT fishing industry.

The guide attached to this pamphlet contains a list of shark species commonly caught in SBT fisheries to assist fishers to identify and accurately record shark catch.

Shark Tagging and Recording

A number of tagging programmes are being carried out on shark species to increase our knowledge including aspects of movements, age structure, reproduction and longevity. It is vitally important to ensure that information is recorded about the catch of any tagged sharks. In particular, please record the species and length of any tagged sharks that you catch. Also record the tag number and when and where the shark was caught. Recording additional information, such as weight, is certainly appreciated. Please provide this information to the address on the tag or to your national fisheries organization.

Biology of Sharks

Taxonomy, distribution and migration

Sharks, rays, skates and chimaeras belong to the cartilaginous fishes (Chondrichthyes) rather than the bony fishes. There are approximately 400 species of sharks and about 500 species of rays. Of these, approximately 20 species of shark and one ray are caught in tuna longline fisheries, with blue shark, shortfin mako shark, porbeagle and thresher sharks caught most frequently.

Sharks have evolved and adapted to live in a diverse range of environments including the deep sea, open oceans and coastal zones. Sharks may also occupy various depths of the water column between surface and deep water. Some species are known to migrate between coastal and oceanic environments at night and may move between the surface and depths of several hundred metres during the day. Sharks usually segregate by sex and age and some studies have shown that pelagic species, such as blue and shortfin mako sharks undertake large-scale migrations throughout their life history.

Behavior

Sharks are predatory animals and are an integral part of the marine ecosystem. For example, salmon sharks hunt salmon and spiny dogfish hunt herring. Sharks can also be drawn to certain fisheries and preferred prey species. For example tunas caught on hooks can be attacked by some shark species.

Sharks are known to occasionally damage human-made installations such as underwater cables, oceanographic observation equipment and fishing gear. This damage often occurs when equipment emits electromagnetic fields that attract or aggravate sharks.

Growth and reproduction

It is difficult to generalize about how fast shark species grow, as there are wide differences between species. Although many sharks are not fast growing (unlike most bony fishes) some species of pelagic sharks exhibit fast annual growth rate much like tuna and billfish. Blue sharks mature at 4-6 years for males and 5-7 years for females and are thought to live for about 20 years. Shortfin mako sharks are mature at 7-9 years for males and 18-21 years for females and may live to at least 29 years.

Unlike the reproduction strategy of bony fishes, many shark species give birth to a few large-sized offspring. The number of viable embryos per shark differs widely. For example, blue sharks may produce 30 embryos whereas shortfin mako, grey nurse and thresher sharks produce between 2-4 embryos. For many species, the gestation period is about one year and the reproductive cycles last 1-3 years.

In summary, shark species are often characterized as long-lived, slow growing, and produce few offspring. These features make them particularly vulnerable to the effects of overfishing as their recovery from fishing pressure will also be slow. Therefore, careful monitoring, such as the collection of catch data, is needed for the management and conservation of shark resources.

When Sharks Are Caught...

Guidelines for handling sharks

Sharks caught on longlines are often alive and have a good chance of survival if handled correctly and returned to the sea. General guidelines to handling sharks caught on or entangled in longlines are:

- If possible leave the shark in the water. Hauling them on deck causes stress which reduces the chances of the shark surviving.
- Using a linecutter, cut the line as close to the hook as possible when freeing the shark. This will reduce the amount of line the shark will trail behind it.
- If the shark must be brought on deck, minimise the time it is out of the water.

A Comparative Table in Five Languages on Names of Sharks Caught in SBT Fishing Ground

ID	Scientific Name	English	Japanese	Korean	Mandarin	Indonesian
1	Pseudocarcharias kamoharai	Crocodile shark	ミズワニ	강남상어	蒲原氏擬錐齒鯊	Cucut buaya
2	Alopias vulpinus	Thresher shark	マオナガ	진환도상어	狐鮫 , 狐形長尾鯊	Cucut tikus
3	Alopias superciliosus	Bigeye thresher	ハチワレ	큰눈환도상어	深海狐鮫 , 深海長尾鯊	hiu monyet, hiu lancur (Bali), hiu tikus (Lombok), paitan (Central Java)
4	Alopias pelagicus	Pelagic thresher	ニタリ	환도상어	淺海狐鮫 , 淺海長尾鯊	hiu monyet, hiu lancur (Bali), hiu tikus (Lombok), cucut pedang (Jakarta), Tikusan (Central Java)
5	Carcharodon carcharias	Great white shark	ホホジロザメ	백상아리	食人鮫 , 噬人鯊	Cucut koboi
6	Isurus oxyrinchus	Shortfin mako	アオザメ	청상아리	灰鯖鮫 , 尖吻鯖鯊	hiu tenggiri, hiu anjing, hiu mako, hiu kakap
7	Isurus paucus	Longfin mako	バケアオザメ	단순청상아리	長臂灰鯖鮫 , 波卡鯖鯊	hiu tenggiri, hiu mako bersirip panjang, hiu anjing
8	Lamna nasus	Porbeagle	ニシネズミザメ	비악상어	鼠鯊（中國）	Mako
9	Prionace glauca	Blue shark	ヨシキリザメ	청새리상어	鋸峰齒鮫 , 大青鯊	Cucut lalaek, cucut selendang, cucut karet
10	Galeocerdo cuvier	Tiger shark	イタチザメ	뱀상어	鼬鮫 , 居氏鼬鯊	Cucut omas, cucut macan
11	Carcharhinus galapagensis	Galapagos shark	ガラパゴスザメ	갈라파고스상어	直翅真鯊	-
12	Carcharhinus plumbeus	Sandbar shark	ヤジブカ	흉상어	高鰭白眼鮫	Cucut lanjaman(Central Java), hiu teteri (Lombok)
13	Carcharhinus obscurus	Dusky shark	ドタブカ	흑상어	灰色白眼鮫	merak bulu (Lombok), cucut lanjaman, hiu lanyam (Central Java)
14	Carcharhinus longimanus	Oceanic whitetip shark	ヨゴレ	장완흉상어	污斑白眼鮫	Cucut koboi
15	Carcharhinus falciformis	Silky shark	クロトガリザメ	미흑점상어	平滑白眼鮫	mungsing (Bali), hiu lonjor (Lombok), cucut lanjaman, hiu lanyam (Central Java)
16	Carcharhinus brachyurus	Bronze whaler	クロヘリメジロザメ	무태상어	短尾白眼鮫	
17	Sphyrna lewini	Scalloped hammerhead	アカシュモクザメ	홍살귀상어	紅肉丫髻鮫 , 路氏雙髻鯊	Cucut martil, cucut capingan
18	Sphyrna zygaena	Smooth hammerhead	シロシュモクザメ	귀상어	丫髻鮫 , 槌頭雙髻鯊	Cucut martil
19	Galeorhinus galeus	School shark	イコクエイラクブカ	행락상어	翅鯊	-
20	Zameus squamulosus	Velvet dogfish	ビロウドザメ	우단상어	鱗鎧鯊 (中國)	Cucut botol
21	Dasyatis violacea	Pelagic stingray	カラスエイ	보라색가오리	紫魟 (中國)	Pari kembang, pari macan

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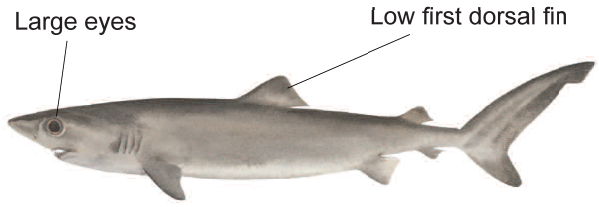
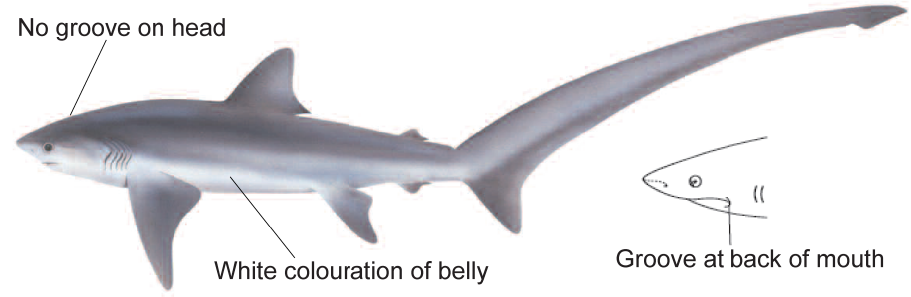
Image on the front cover(Blue shark) by Les Hata, ©Hawaii Division of Aqutic Resources

IDENTIFICATION SHEET ON SHARK SPECIES CAUGHT IN SBT FISHING GROUNDS



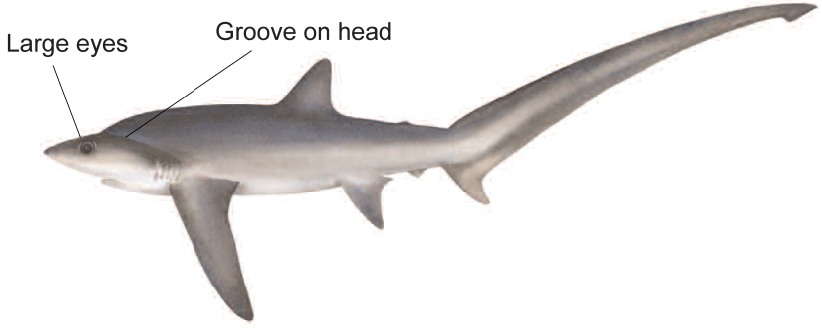
1 Crocodile shark

Oceanic (to 590 m) and in tropical and subtropical waters. The body is slender and spindle-shaped with large eyes without a nictitating membrane and long gill slits, which extend onto the top of the head. Grows to ~1.1 m.



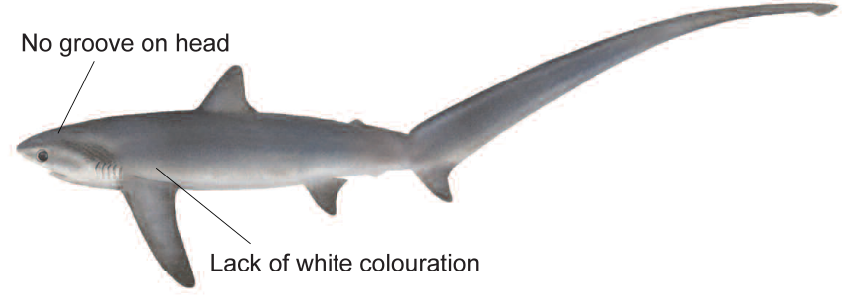
2 Thresher shark

All the thresher sharks have an extremely long upper lobe of the caudal fin. Cosmopolitan in tropical and warm temperate seas (to 650 m). This species can be recognised by its pointed, pectoral fins and the white colouration above the pectoral and pelvic fins. Grows to 5.7 m.



3 Bigeye thresher

Similar distribution to thresher shark but oceanic (to 700 m). Can be recognised by the long upper lobe of the caudal fin and the very large eyes that extend onto the top of the head. Grows to about 4.8 m.

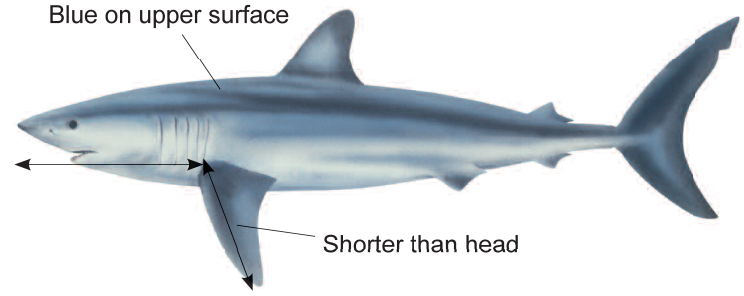


4 Pelagic thresher

Restricted to the Indo-Pacific (to 150 m). Can be distinguished by the extremely long upper lobe of the caudal fin (longer than other threshers) and the lack of white colouration above the pectoral and pelvic fins. The eyes do not extend on top of the head. Smaller than the other threshers, it grows to 3.9 m.

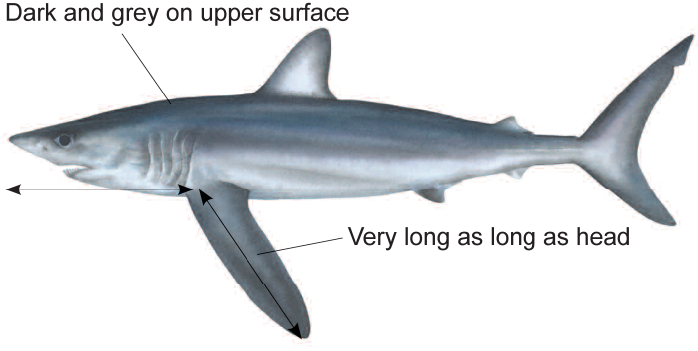
5 Great white shark

Widely distributed throughout temperate and sub-tropical regions in the northern and southern hemispheres (to 1280 m). Large shark with serrated, triangular teeth and very small second dorsal and anal fins. Grows up to 6 m.



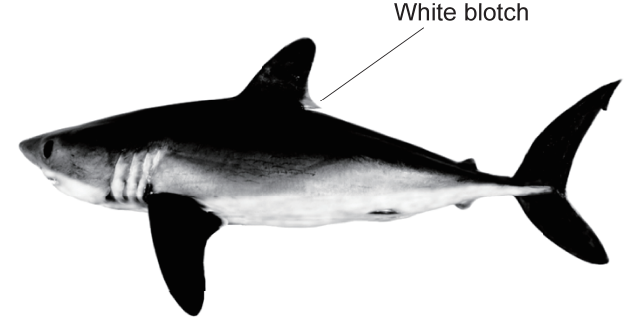
6 Shortfin mako

Widely distributed in temperate and tropical seas (to 650 m). Has slender, pointed teeth that protrude from the mouth and very small second dorsal and anal fins. Blue in colour on upper surface of the body. Can grow to ~ 4 m.



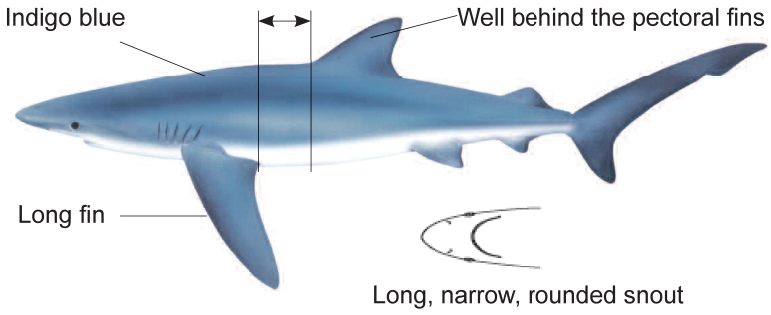
7 Longfin mako

Similar distribution to the shortfin mako and similar in appearance but with longer pectoral fins. Darker and more grey in colour than the shortfin. Grows to ~4 m.



8 Porbeagle

Widely distributed in cold and temperate seas of the North Atrantic and Southern Hemisphere (to 1,360 m). The most distinctive feature is the white blotch on the back of its first dorsalfin. Grows to ~ 2.5 m.

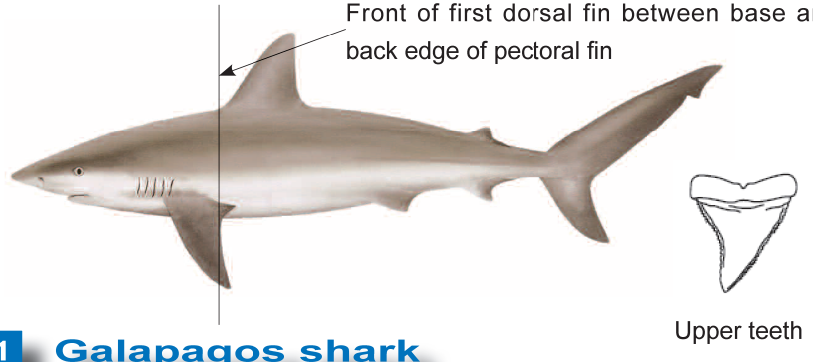


9 Blue shark

Found worldwide in temperate and tropical waters (to 1000 m). Has a slender, sleek-looking body with a long, narrow snout. The first dorsal fin originates well behind the pectoral fins. Indigo blue colour on the upper surface of the body. Grow to 3.8 m.

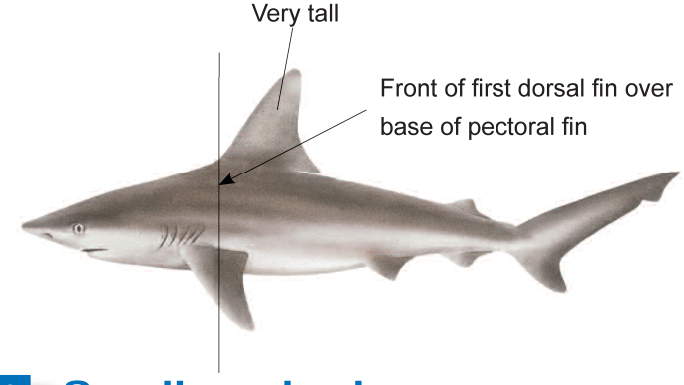
10 Tiger shark

Found in tropical waters but can migrate to warm temperate seas (to 150 m). A very large whaler with dark black spots and vertical bars which run the length of the body (may be absent in larger animals). Broad, blunt head with broad, serrated teeth. Grows to 6 m.



11 Galapagos shark

Generally found around oceanic islands in tropical and temperate waters (to 285 m). Large, grey whaler with dusky tips on fins (may be indistinct in larger animals). Can be distinguished from Bronze whalers by a ridge of thickened skin extending between the dorsal fin (interdorsal ridge) and broad triangular upper teeth. Found in large numbers where it occurs. Grows to 3 m.

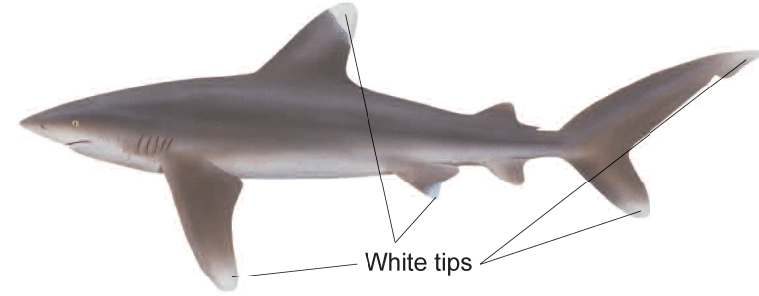


12 Sandbar shark

Patchy cosmopolitan species that inhabits warm temperate and tropical waters (to 280 m). Can be distinguished by the very tall first dorsal fin that originates over or just behind where the pectoral fins attach to the body. Grows to 2.4m.

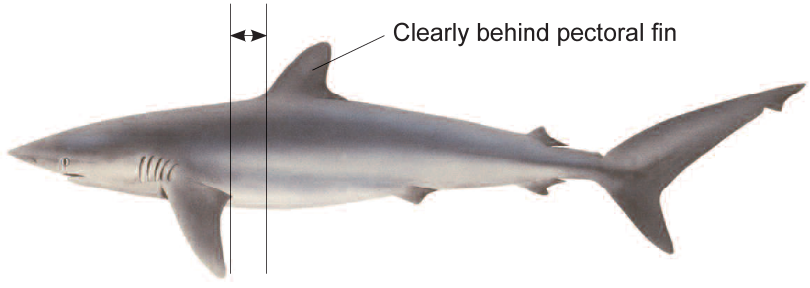
13 Dusky shark

Occurs along continental coastlines in tropical and temperate waters (to 400 m). Sometimes confused with the sandbar shark but can easily be distinguished by its smaller and more posterior first dorsal fin. Can be distinguished from Bronze whalers by a ridge of thickened skin extending between the dorsal fin (interdorsal ridge) and broad triangular upper teeth . Grows to 3.6 m.



14 Oceanic whitetip shark

Distributed worldwide in tropical and subtropical waters (to 150 m). Large whaler with very large, rounded first dorsal fin. White tips on the first dorsal, pectoral, pelvic, and caudal fins. Grow to 3 m.

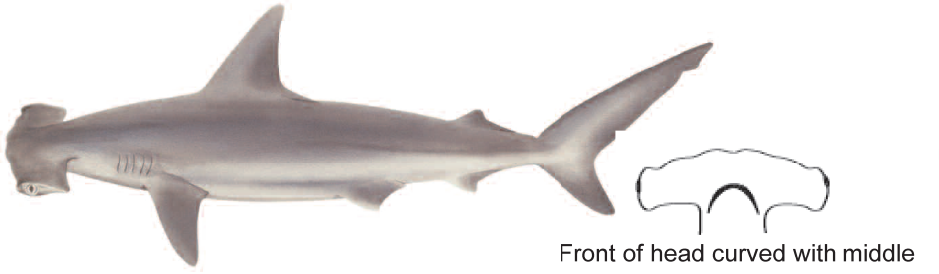


15 Silky shark

Found in tropical waters and can migrate to warm temperate waters (to 500 m). Small silky sharks are commonly associated with schools of tuna. Large, darkly coloured whaler. First dorsal fin plain, but other fins may have dusky tips. Grow to 3.3 m.

16 Bronze whaler

Occurs from surf zone to slightly beyond the continental shelf(to 100m) in temperate waters. Plain bronze coloration. Front of first dorsal fin slightly behind pectoral fin. Has narrow curved upper teeth and lacks an interdorsal ridge. Grow to 3.3 m.



Front of head curved with middle dent and a distinct lobe at each end

17 Scalloped hammerhead

Cosmopolitan in tropical and warm temperate seas (to 275 m). Distinguished from other hammerheads by an indentation located centrally on the front margin of the broadly arched head. Two more indentations flank the main central indentation, giving this hammerhead a “scalloped” appearance. Grows to 1.6–2.2 m.

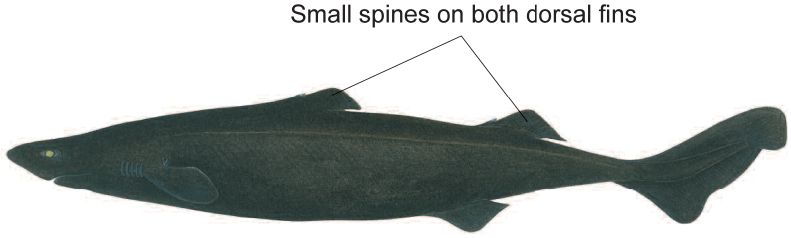
Front of head curved with no middle dent

18 Smooth hammerhead

Found in all tropical and warm temperate waters (to 80 m). The head is broad and flattened with a broadly rounded, unnotched anterior margin. Grows to 2.5 m.

19 School shark

Distributed world-wide in temperate waters, mainly demersal in coastal waters, but can be found offshore (to 600 m). Slender shark of a bronze/grey colour with a large lower lobe of the caudal fin, giving it a ‘double-tailed’ appearance. Often occurs in small schools. Attains up to 1.75 m.



20 Velvet dogfish

Widespread species that can be demersal or pelagic and can associate with seamounts (to 2000 m). This species is black or dark brown in colour with small dorsal fin spines, rounded pectoral fins and an asymmetrical caudal fin. Grows to ~80 cm.

21 Pelagic stingray

Widely distributed in tropical and temperate seas. Usually found in depths less than 100 m. A darkly coloured stingray with an evenly rounded anterior edge. Row of thorns along the back and a long whip-like tail. Grows to at least 1.3 m in length and ~60 cm in disc width.