

Review of the pelagic sharks known or likely to occur in the Convention Area of the North Pacific Fisheries Commission

by

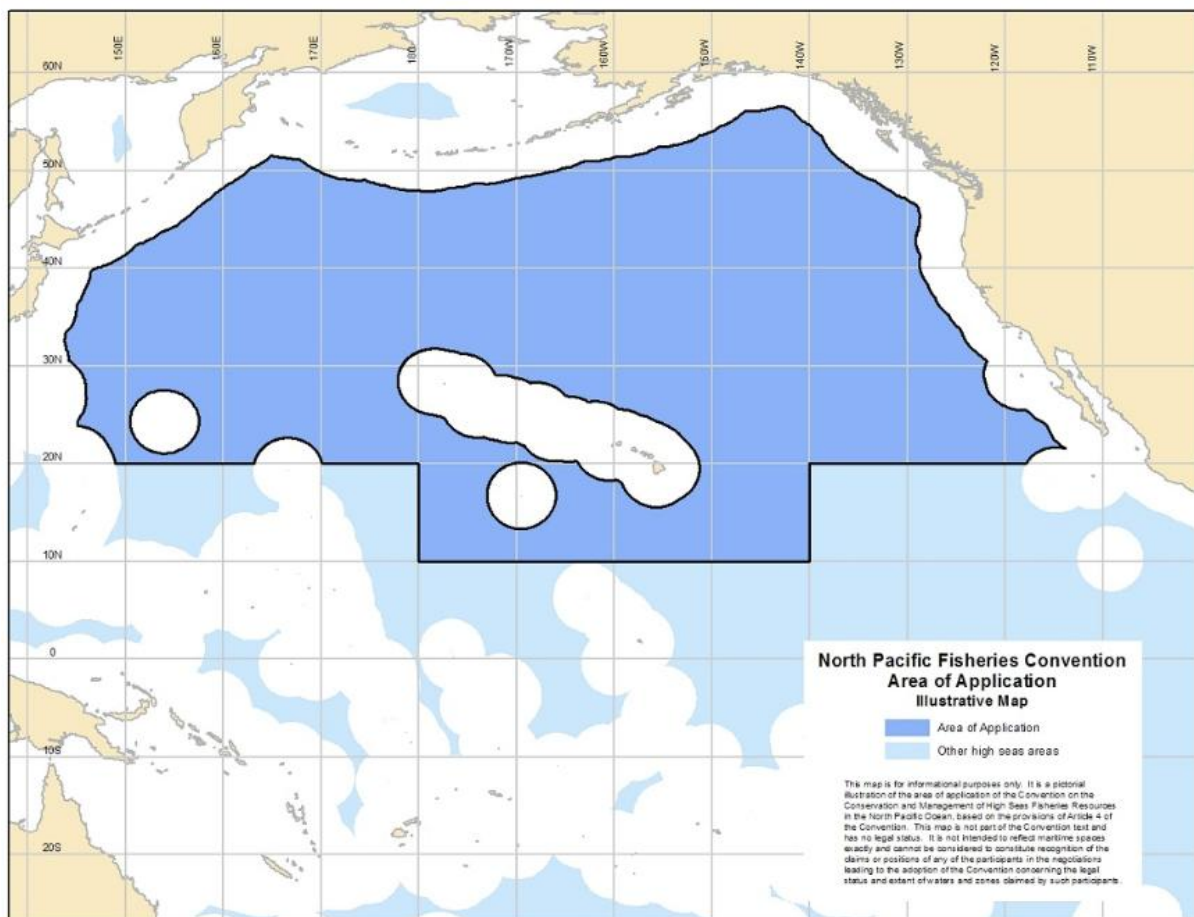
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Note: This current document on pelagic sharks was requested at SC09 to help implement CMM 2023-14. The following document covers demersal sharks: Mostarda, E. 2024. A review of deep-water shark species (superorder Selachimorpha) known or likely to occur within the North Pacific Fisheries Commission's Convention Area, including preliminary identification keys. NPFC-2024-SC09-OP05. 91 pp. (Available at www.npfc.int)

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Review of the pelagic sharks known or likely to occur in the Convention Area of the North Pacific Fisheries Commission

The North Pacific Ocean is one of the world's most expansive and dynamic oceanic regions, covering a vast area bounded by Asia to the west, North America to the east and the Aleutian Island chain and Bering Sea to the north (Figure 1).



The region includes a variety of ecosystems influenced by a complex system of currents, including the powerful Kuroshio Current, the Oyashio Current, and the North Pacific Gyre. These currents shape the distribution of heat, nutrients, and organisms across the basin. Upwelling zones, particularly along the eastern boundary near California and Mexico, are highly productive and support some of the world's most important fisheries.

Although the Western and Central Pacific are crucial habitats for migratory stocks, North Pacific fisheries operating in the ABNJ also target highly valued species such as skipjack and yellowfin tuna, as well as species like neon flying squid and Pacific saury, which are heavily exploited by distant-water fishing fleets.

The NPFC supports the importance of sustainable fishing practices and species management in this ecologically sensitive region. Its adoption of Conservation and Management Measure 2023-14 on sharks reflects a growing recognition of the need to protect vulnerable species, particularly in areas fished for commercially valuable species. This measure emphasizes the necessity for fishing vessels to record and maintain logs of shark catches, identifying species whenever possible, to ensure effective monitoring and conservation efforts.

Recognizing this critical need, the Deep-sea Fisheries Project (DSF) has proposed to assist the NPFC in developing robust identification tools for shark species in the region. As a key partner in this initiative, the DSF aims to enhance the ability of fishers to accurately identify and report shark species, thereby contributing to more informed management decisions and conservation strategies.

Following the preparation of a comprehensive report on deep-water shark species, which includes user-friendly identification keys, this report specifically focuses on pelagic sharks, referring to members of the superorder Selachimorpha, excluding rays and chimaeras. These groups are not included due to the assumption that their catches are relatively low.

Moreover, although all pelagic sharks have been considered and listed here, the identification keys focus on oceanic pelagic sharks, which live in the open ocean, far from coastal areas, typically in deeper waters of the oceanic zone. These sharks are adapted to life in the high seas, where they often travel long distances across vast expanses of the ocean.

As for deep-water sharks, given the scarcity of confirmed records of shark species in the Convention Area (CA), it was necessary to make informed assumptions about their potential presence. The main assumption concerned their known ecology—species with a known preference for coastal areas and infrequent occurrence in oceanic waters were deemed less likely to occur within the CA.

This report presents a summary of the work conducted to obtain the species list, which served as the basis for the preparation of the identification tools. Each species account includes information on geographical and depth distribution, a distribution map, and notes on identification for fishery observers or non-experts. These notes indicate expected identification difficulty and provide recommendations on the appropriate taxonomic level for inclusion.

Species lists are provided by area of occurrence, along with a list of taxa selected for inclusion in the identification keys.

Finally, preliminary identification keys are provided at the end of the document. The most suitable type of identification tool—whether printed or electronic, incorporating photos or illustrations, and designed for use by both experts and non-experts—will be discussed in collaboration with the Deep-sea Fisheries Programme to best meet the needs of the NPFC.

Results

The table below presents an overview of the pelagic shark orders, families, and species documented in the North Pacific. For each family, the number of species is indicated based on available records from the Global Biodiversity Information Facility. These records encompass the North Pacific region, including the Exclusive Economic Zones (EEZs) of bordering countries, the NPFC Convention Area (Areas Beyond National Jurisdiction), and other oceans.

	Pelagic species in the North Pacific	Oceanic pelagic species in the North Pacific	Pelagic species in the NPFC CA	Species Worldwide
Orectolobiformes				
Rhincodontidae	1	1	0	1
Lamniformes				
Megachasmidae	1	1	0	1
Cetorhinidae	1	1	0	1
Alopiidae	3	3	0	3
Lamnidae	4	4	2	5
Pseudocarchariidae	1	1	1	1
Odontaspidae	2	1	0	2
Carcharhiniformes				
Carcharhinidae	~15	3	3	59
Galeocerdonidae	1	1	1	1
Sphyrnidae	2	0	0	12
TOTAL	31	16	7	86

Overall, 16 species of oceanic pelagic sharks occur in the North Pacific, of which 7 have records from the Convention Area of the NPFC.

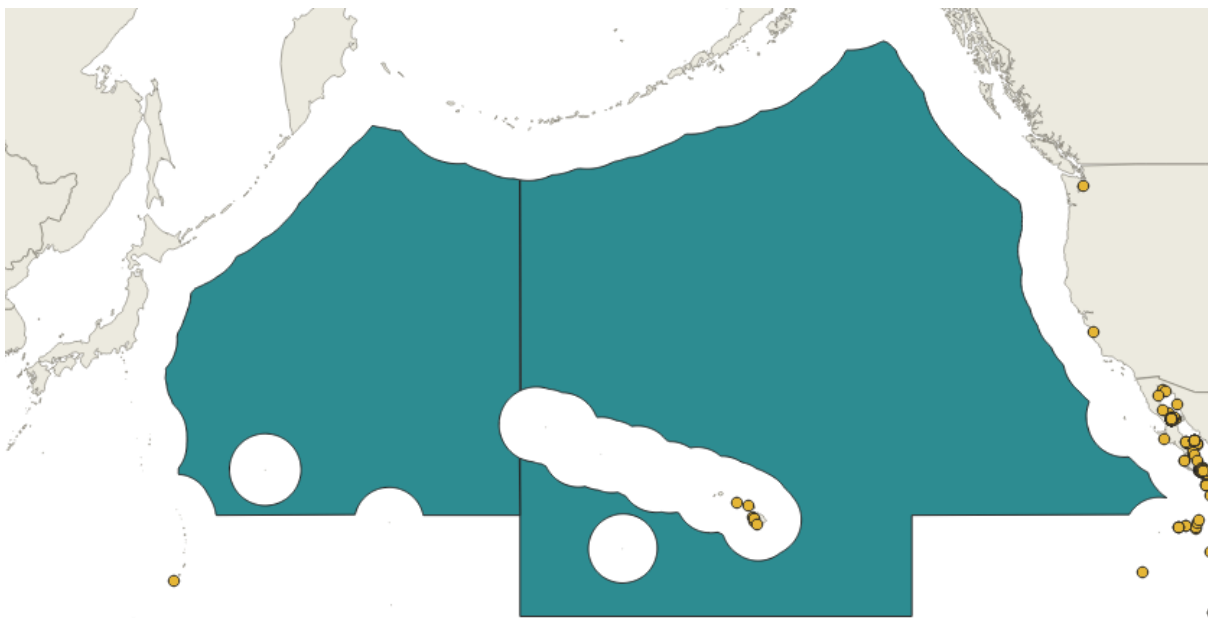
Orectolobiformes

Rhincodontidae

The Rhincodontidae family is monotypic, consisting of only one species, *Rhincodon typus*, commonly known as the Whale Shark. It is the largest fish species in the world, reaching lengths of up to 18 meters or more.

Rhincodon typus

The Whale Shark is widely distributed in tropical and warm-temperate oceans worldwide, often found in coastal and open-water habitats, including feeding aggregations in specific hotspots. Its presence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is plausible, given its wide-ranging movements and known migratory behaviour.



Notes on Species Identification by Fishery Observers or Non-Experts

Identifying the Whale Shark is straightforward due to its highly distinctive features, including size and shape, coloration, and mouth position. However, young Whale Sharks, which are smaller and more elusive, might be overlooked by non-experts or misidentified as other large filter-feeding sharks, such as basking sharks (Cetorhinidae).

Overall, the likelihood of accurate species identification is high and the species should be included in an ID tool at the species level.

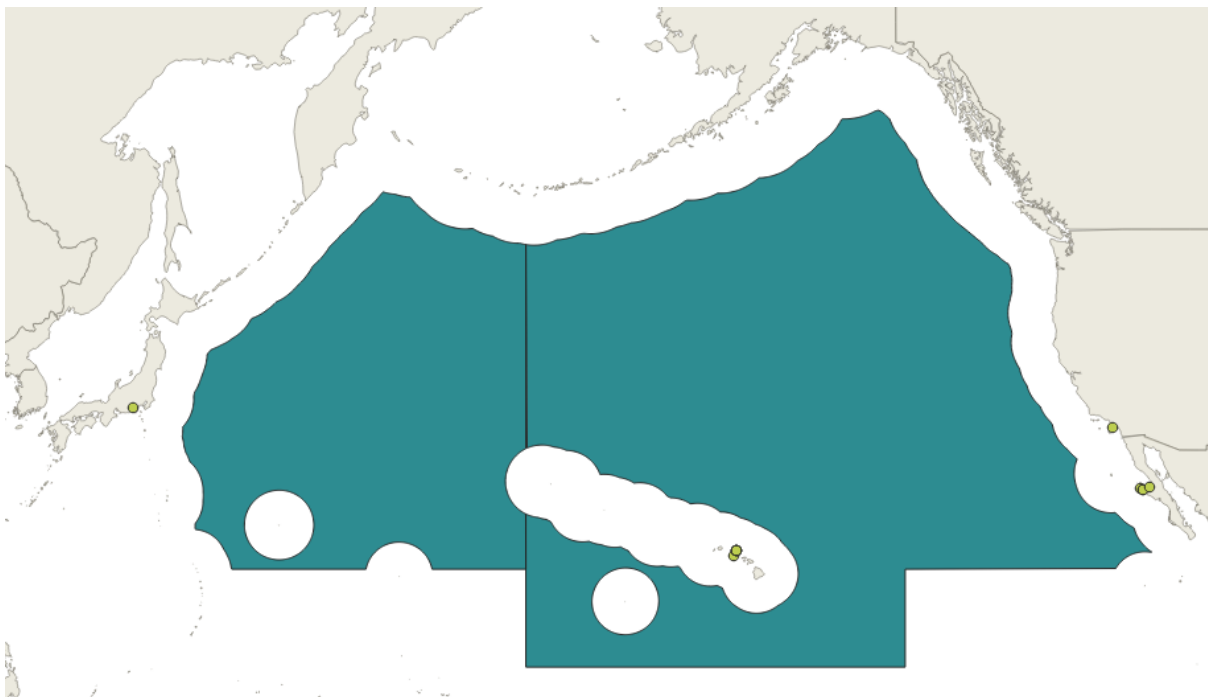
LAMNIFORMES

Megachasmidae

The Megachasmidae family is represented by a single species, *Megachasma pelagios*, commonly known as the Megamouth Shark. This rare and elusive species is a large filter-feeding shark, reaching lengths of up to 7 meters. It inhabits tropical and temperate oceans worldwide, with records in the Atlantic, Indian, and Pacific Oceans.

Megachasma pelagios

The Megamouth Shark has a patchy and poorly understood distribution, with confirmed records from Japan, Taiwan, the Philippines, and off the coasts of California and Mexico in the Pacific. Its presence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is possible but unconfirmed.



Notes on Species Identification by Fishery Observers or Non-Experts

Identifying the Megamouth Shark is moderately straightforward due to its unique features, such as the disproportionately large, rounded head and broad terminal mouth, soft, flabby body, and long, tapered fins. Despite its distinctive morphology, it may be confused with basking sharks (Cetorhinidae) or juvenile Whale Sharks (Rhincodontidae), though its mouth structure and body proportions are unique.

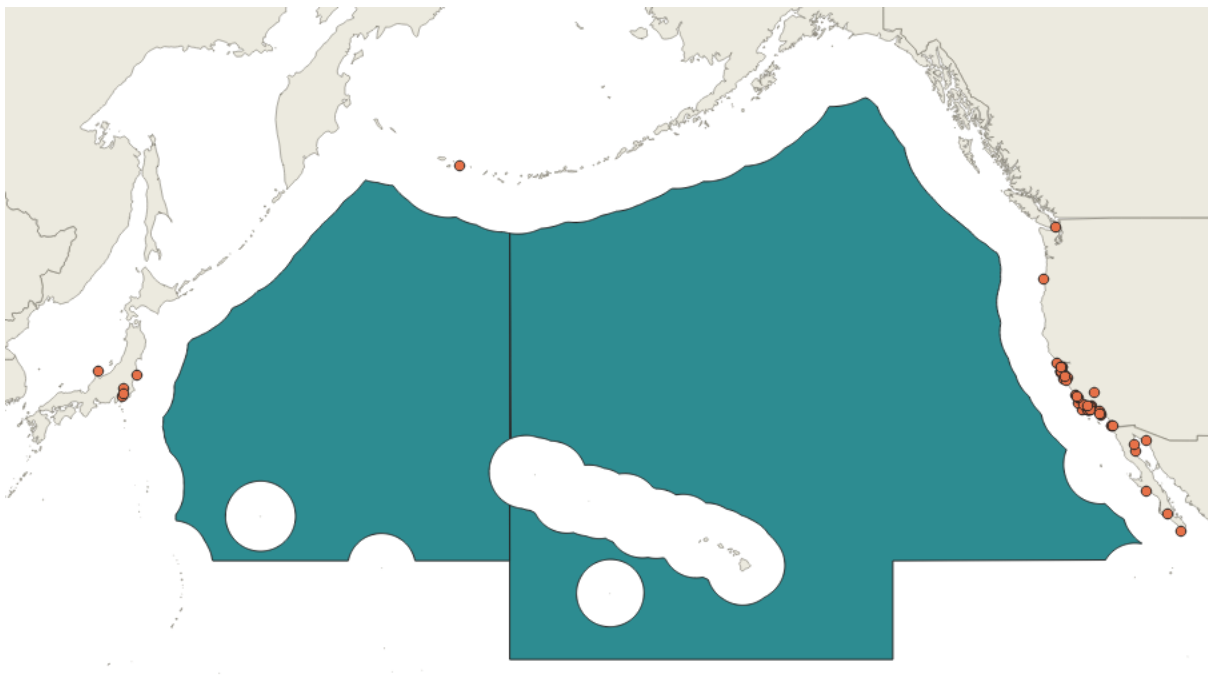
Overall, the likelihood of accurate species identification is high and the species should be included in an ID tool at the species level.

Cetorhinidae

The Cetorhinidae family consists of a single species, *Cetorhinus maximus*, commonly known as the Basking Shark. It is the second-largest fish in the world, reaching lengths of up to 10 meters, widely distributed in temperate and boreal oceans, with seasonal movements driven by prey availability.

Cetorhinus maximus

The Basking Shark is found in both coastal and open-ocean habitats of the Atlantic and Pacific Oceans. In the North Pacific, it has been recorded off the coasts of Japan, California, and Canada. Its presence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is plausible, especially during its migratory periods.



Notes on Species Identification by Fishery Observers or Non-Experts

The Basking Shark is easily recognized by its massive size, torpedo-shaped body, large gaping mouth adapted for filter feeding, and five exceptionally long gill slits that nearly encircle its head. Its prominent triangular dorsal fin is often visible above the water surface. While it may be confused with Whale Sharks (Rhincodontidae), differences in body proportions, gill slit size, and coloration make it distinct.

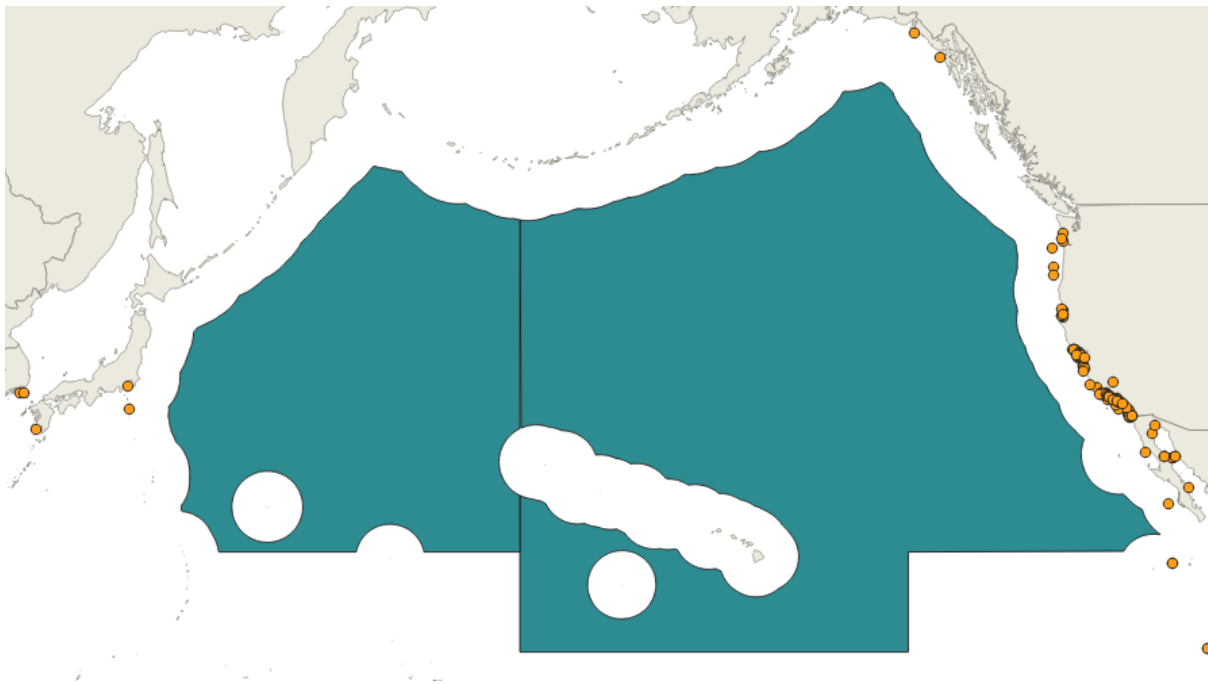
Overall, the likelihood of accurate species identification is high and the species should be included in an ID tool at the species level.

Alopiidae

The Alopiidae family comprises three recognized species: *Alopias vulpinus* (Common Thresher Shark), *Alopias superciliosus* (Bigeye Thresher Shark), and *Alopias pelagicus* (Pelagic Thresher Shark). These sharks are known for their distinctive long, scythe-like caudal fins, which can be as long as their bodies. Found in tropical and temperate oceans worldwide, Thresher Sharks are highly migratory and occur in both coastal and pelagic zones.

Alopias vulpinus

The Common Thresher Shark is widely distributed in temperate and tropical oceans, inhabiting both coastal and offshore waters. It is found in the North Pacific, including off the coasts of Japan, California, and Canada. Its presence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very likely.



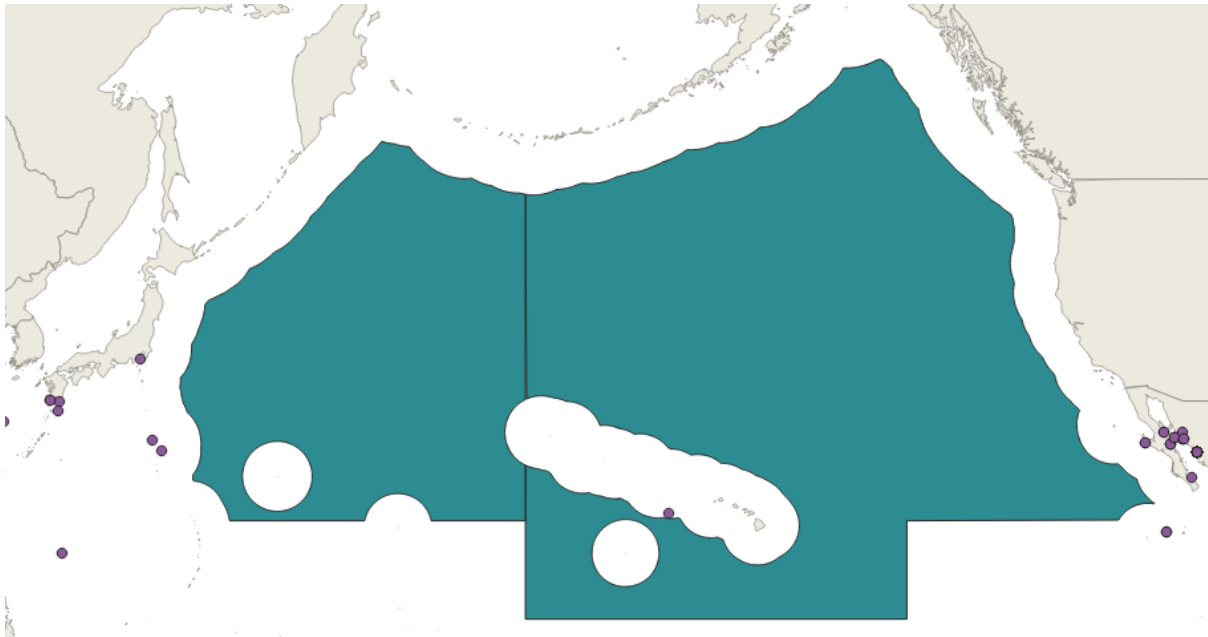
Notes on Species Identification by Fishery Observers or Non-Experts

The Common Thresher Shark is easily identified by its extremely long upper caudal fin lobe, which can be as long as its body. It has a robust, torpedo-shaped body, small eyes, and a moderately pointed snout. While the tail is its most distinctive feature, observers should also note the position of the dorsal fins, coloration, and snout length to distinguish it from other species within the family.

Overall, the likelihood of accurate species identification is high and the species should be included in an ID tool at the species level.

Alopias pelagicus

The Pelagic Thresher Shark is primarily found in tropical and subtropical waters, favouring open-ocean habitats. It is widely distributed in the Indo-Pacific region, including the central and western Pacific. Its presence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very likely.



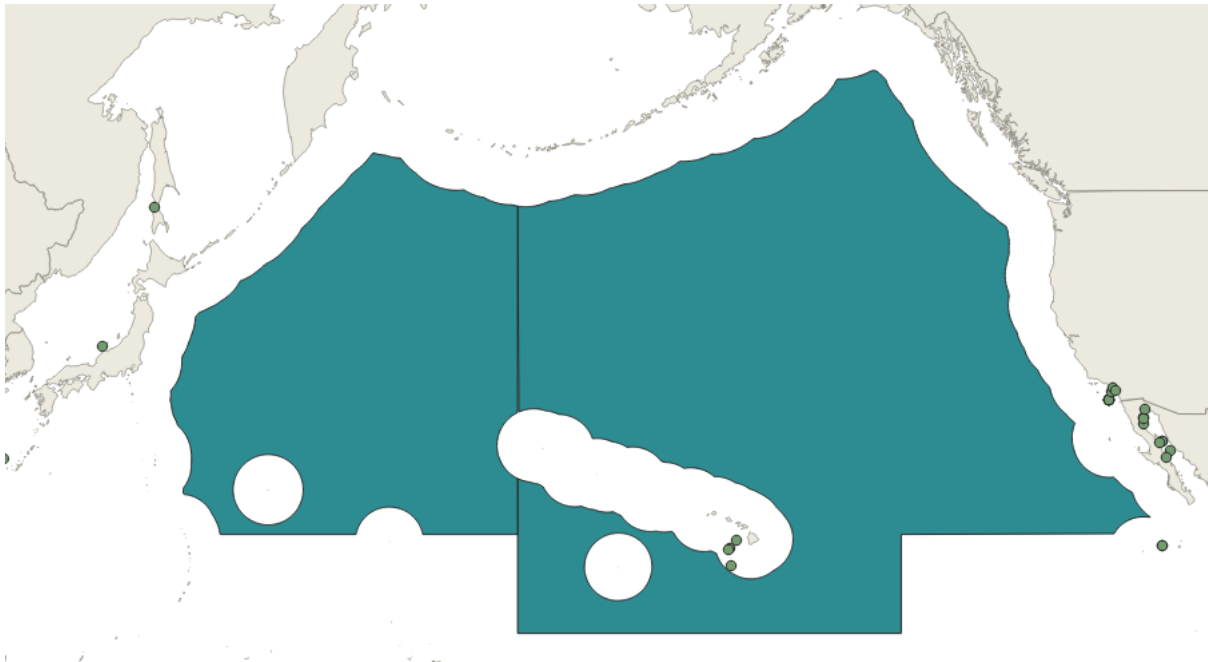
Notes on Species Identification by Fishery Observers or Non-Experts

The Pelagic Thresher Shark is characterized by its slender, streamlined body and long upper caudal fin lobe, which is slightly shorter and more proportionate than that of the Common Thresher Shark. It has a relatively narrow head with a pointed snout and moderately sized eyes. Its coloration is metallic blue dorsally and white ventrally, with a noticeable demarcation between the two. While the tail is its most distinctive feature, observers should also note the position of the dorsal fins, coloration, and snout length to distinguish it from other species within the family.

Overall, the likelihood of accurate species identification is high and the species should be included in an ID tool at the species level.

Alopias superciliosus

The Bigeye Thresher Shark is widely distributed in tropical and temperate oceans, occurring in both coastal and pelagic waters. In the North Pacific, it has been recorded off the coasts of Japan, Hawaii and California. Its presence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very likely.



Notes on Species Identification by Fishery Observers or Non-Experts

The Bigeye Thresher Shark is characterized by its large eyes, deep horizontal groove that extends along each side of the head from behind the eyes to above the gill openings. This groove is a distinctive trait of the species and sets it apart from other Thresher Sharks.

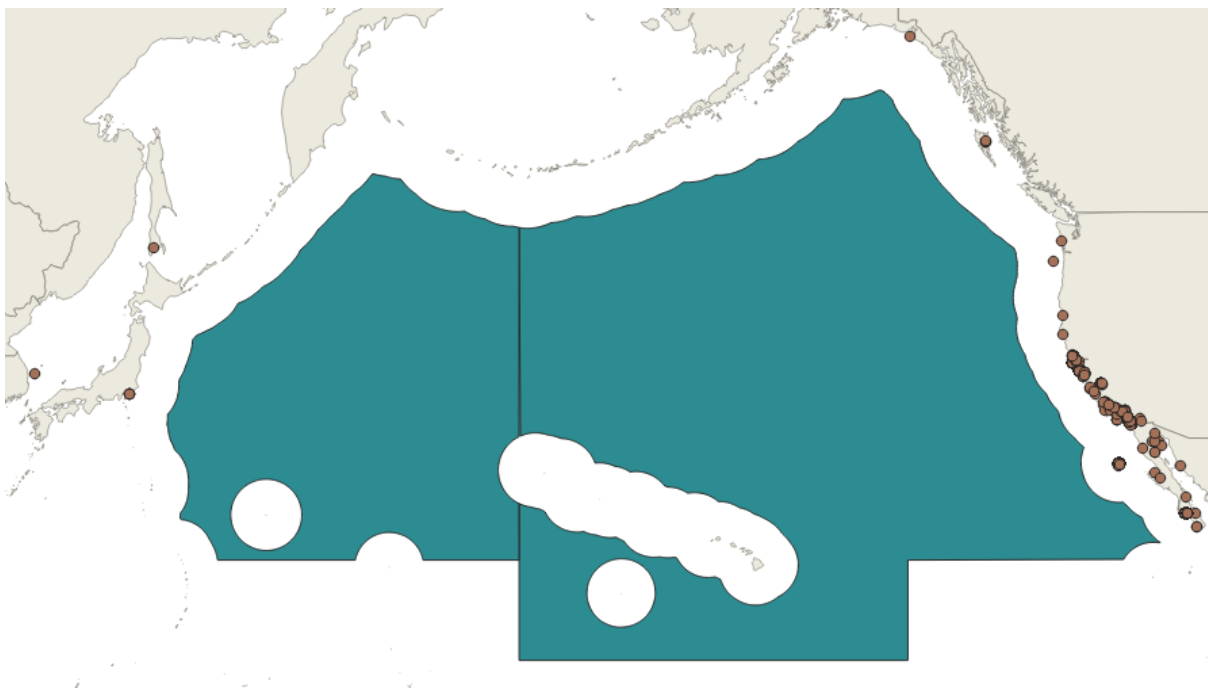
Overall, the likelihood of accurate species identification is high and the species should be included in an ID tool at the species level.

Lamnidae

The family Lamnidae comprises large, fast-swimming, apex predatory sharks. This group includes some of the most iconic shark species: the White Shark (*Carcharodon carcharias*), the Shortfin Mako Shark (*Isurus oxyrinchus*), the Longfin Mako Shark (*Isurus paucus*), the Salmon Shark (*Lamna ditropis*), and the Porbeagle Shark (*Lamna nasus*). Lamnid sharks are characterized by their robust, fusiform bodies; conical snouts; and large gill slits. Key characters are the teeth, which can be triangular and serrated (*C. carcharias*) or smooth-edged in *Isurus* spp. and *Lamna* spp..

Carcharodon carcharias

The White Shark is a cosmopolitan species found in temperate and subtropical oceans worldwide. In the North Pacific, it is recorded along the coasts of California, Mexico, and Japan, as well as around offshore islands. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very likely.



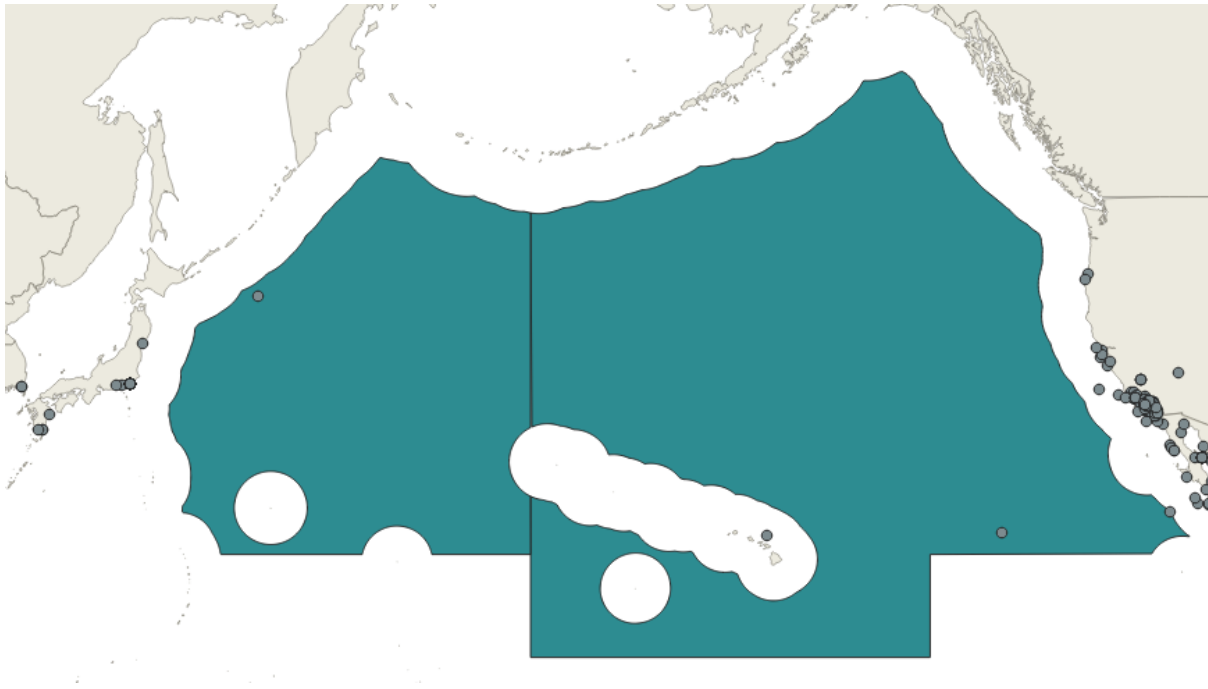
Notes on Species Identification by Fishery Observers or Non-Experts

The White Shark is unmistakable due to its robust, fusiform body; conical snout; and large, serrated triangular teeth. Its coloration features a stark counter-shading pattern, with a dark grey to brown dorsal surface and a white ventral side. Juveniles can sometimes be confused with other large sharks like Mako Sharks (*Isurus* spp.). Accurate identification to genus in the Lamnids relies on checking the shape of the teeth, but it is feasible. As this is the only species of the genus *Carcharodon*, identification to species is accordingly feasible.

Overall, the likelihood of accurate species identification is moderate, but the species should be included in an ID tool at the species level.

Isurus oxyrinchus

The Shortfin Mako Shark is a globally distributed species, found in tropical and temperate oceans. In the North Pacific, it occurs along the coasts of North America and Asia, as well as in the open ocean. Its presence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is well-documented, as it is frequently caught in pelagic fisheries targeting tunas and billfish.



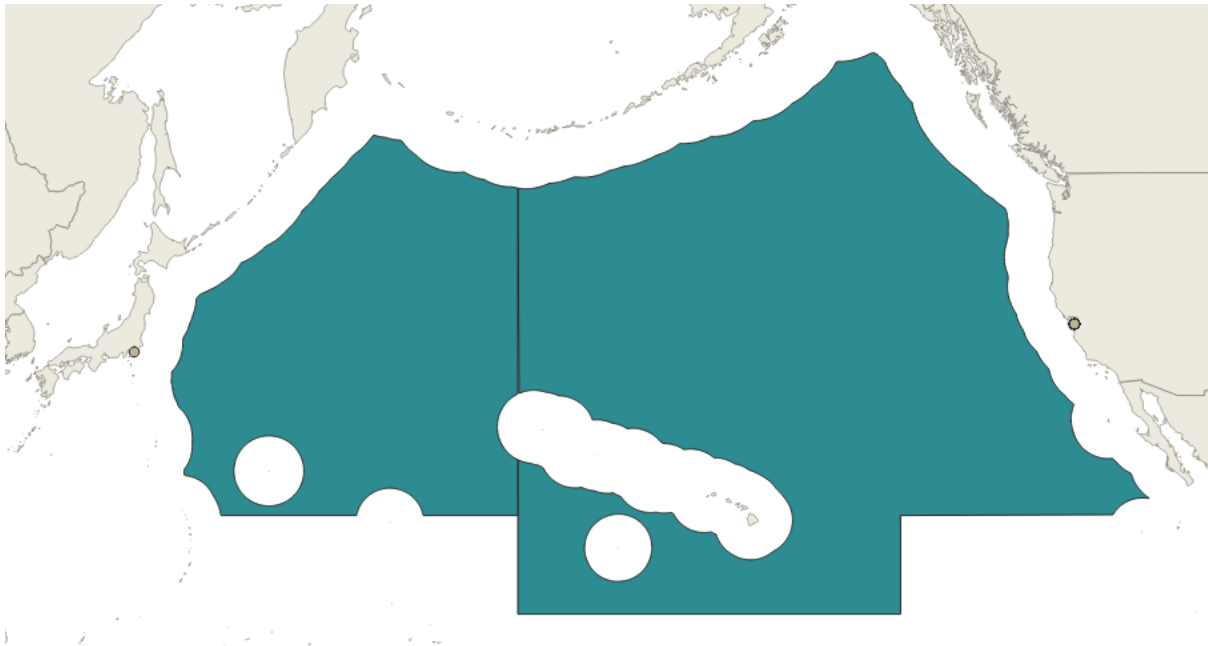
Notes on Species Identification by Fishery Observers or Non-Experts

The Shortfin Mako Shark is distinguished by its streamlined, torpedo-shaped body, pointed snout, and long, narrow teeth without serrations and lateral cusplets. It has a brilliant blue dorsal coloration and a white ventral side, with a sharp demarcation between the two. Unlike the Longfin Mako Shark (*I. paucus*), it has smaller, more pointed pectoral fins and a more robust build. Accurate identification to genus in the Lamnids relies on checking the shape of the teeth, but it is feasible. Once reached the genus level, Identification to species is easy.

Overall, the likelihood of accurate genus identification is moderate, to species high, and the species should be included in an ID tool at the species level.

Isurus paucus

The Longfin Mako Shark is a rare, globally distributed species primarily found in tropical and subtropical oceans. Its presence in the North Pacific is less common compared to the Shortfin Mako, with sporadic records primarily from off Japan and California. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is possible but infrequent.



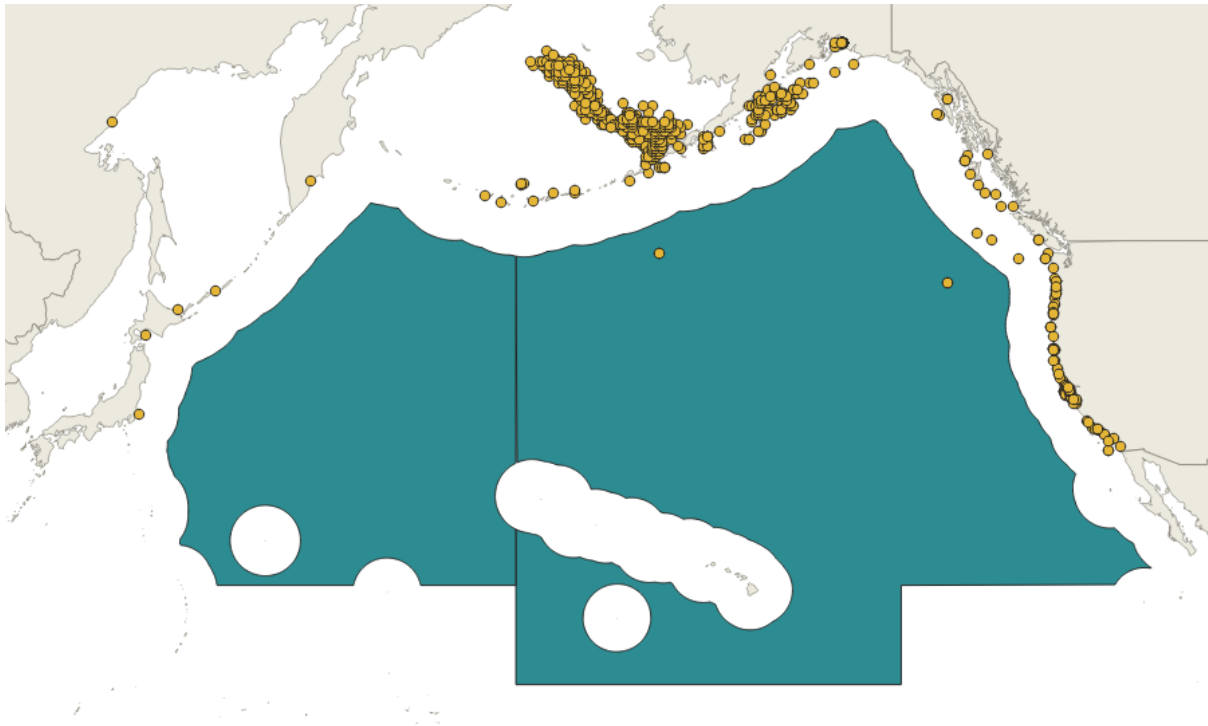
Notes on Species Identification by Fishery Observers or Non-Experts

The Longfin Mako Shark can be distinguished from the Shortfin Mako by its proportionally longer pectoral fins, which are about as long as or longer than the distance from the snout to the first gill slit. Accurate identification to genus in the Lamnids relies on checking the shape of the teeth, but it is feasible. Once reached the genus level, Identification to species is relatively easy.

Overall, the likelihood of accurate genus identification is moderate, to species high, and the species should be included in an ID tool at the species level.

Lamna ditropis

The Salmon Shark is a cold-water species found in the North Pacific Ocean, primarily in temperate and subarctic waters. It ranges from the western coasts of North America (from Alaska to California) to the coasts of eastern Asia, including Japan and Russia. This species is common in the Convention Area of the North Pacific Fisheries Commission (NPFC), particularly in association with productive continental shelf and slope regions.



Notes on Species Identification by Fishery Observers or Non-Experts

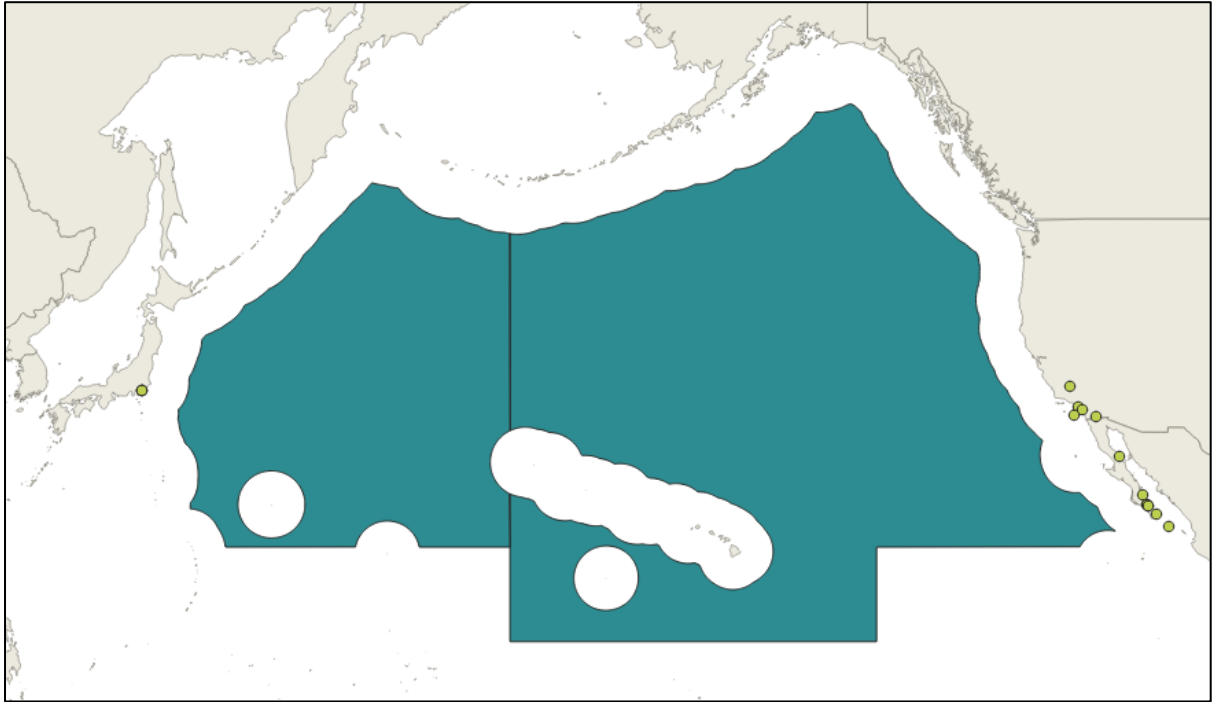
The Salmon Shark is characterized by its robust, fusiform body, conical snout, and long, narrow teeth without serrations but with lateral cusplets. Moreover, species of *Lamna* have two keels on caudal peduncle. As for the other taxa in the Lamnidae, accurate identification to genus relies on checking the shape of the teeth, but it is feasible. Once reached the genus level, identification to species is relatively easy.

Overall, the likelihood of accurate genus identification is moderate, to species high, and the species should be included in an ID tool at the species level.

Odontaspidae

Odontaspis ferox

The Smalltooth sand tiger shark (*Odontaspis ferox*) has records in the North Pacific along both the western and eastern coasts, but none from the NPFC's CA.



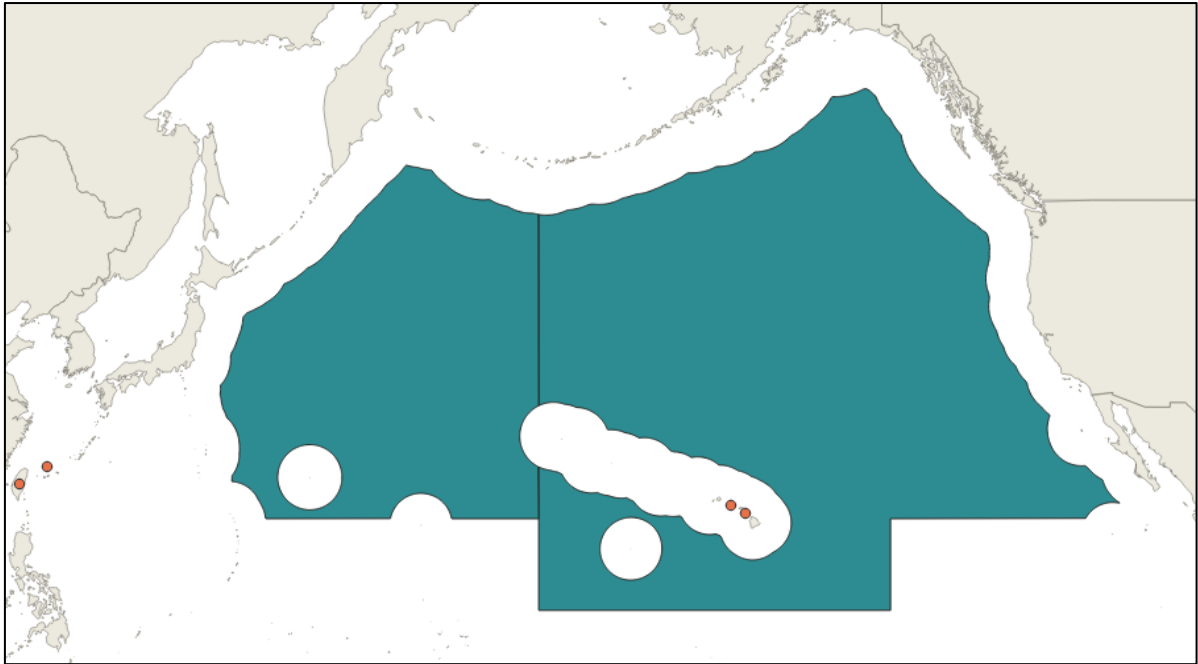
Notes on Species Identification by Fishery Observers or Non-Experts

The identification of this shark to the genus level is relatively straightforward due to its stout-bodied appearance. However, distinguishing it at the species level is more challenging, as the only notable difference between it and the other *Odontaspis* species in the region is a characteristic visible on the teeth. While its presence in the area is likely, it is an uncommon species, so encounters are expected to be infrequent. No records from the ABNJ.

Overall, the likelihood of accurate genus identification is high, and both species should be included in an ID tool at the genus level.

Odontaspis noronhai

The Bigeye sandtiger shark (*Odontaspis noronhai*) has records in the North Pacific off the coast of Hawaii and Taiwan, Province of China.



Notes on Species Identification by Fishery Observers or Non-Experts

The identification of this shark to the genus level is relatively straightforward due to its stout-bodied appearance. However, distinguishing it at the species level is more challenging, as the only notable difference between it and the other *Odontaspis* species in the region is a characteristic visible on the teeth. While its presence in the area is likely, it is a rare species, so encounters are expected to be infrequent.

Overall, the likelihood of accurate genus identification is high, and the species could be included in an ID tool at the genus level.

Pseudocarchariidae

Pseudocarcharias kamoharai

The crocodile shark has scattered records in the North Pacific off the coast of Hawaii, the USA, and south of Taiwan, Province of China.



Notes on Species Identification by Fishery Observers or Non-Experts

The identification of this shark to the species level is relatively straightforward, thanks to its morphology and unique features. Its presence in the area is confirmed. This species is not demersal, and it is often caught by pelagic longline fisheries. Catches are expected to be sporadic.

Overall, the likelihood of accurate species identification is high, and this species should be included in an ID tool at the species level.

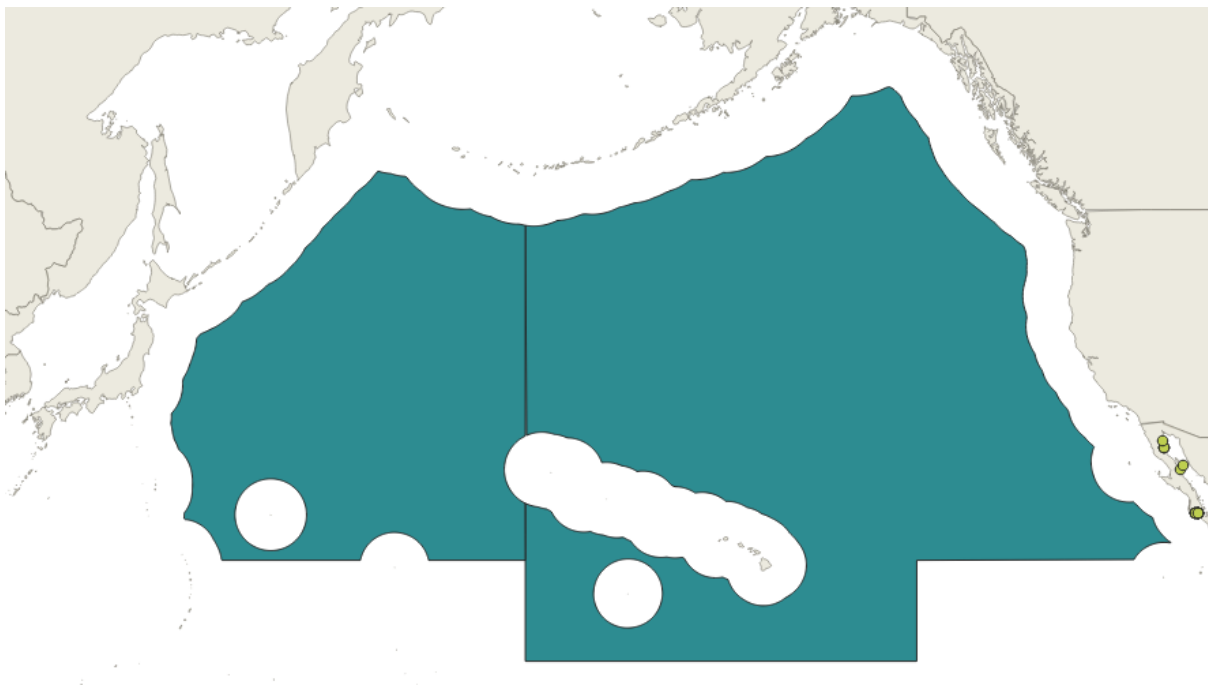
CARCHARHINIFORMES

Carcharhinidae

The Requiem sharks are among the largest and most widespread shark families, with over 50 species. They inhabit both tropical and temperate waters worldwide, ranging from coastal areas to the open ocean, and include some of the most iconic and ecologically important species, such as the tiger shark (*Galeocerdo cuvier*), bull shark (*Carcharhinus leucas*), and blacktip shark (*Carcharhinus limbatus*). Most *Carcharhinus* species are commonly found near coastal areas or around islands, rather than in open oceanic environments. Therefore, their presence in oceanic waters, far from landmasses is unlikely. The species that can be found well offshore are *Carcharhinus longimanus* and *C. falciformis*.

Carcharhinus altimus

The Bignose Shark is a deepwater species with a patchy distribution in tropical and warm-temperate waters worldwide. In the North Pacific, it has been documented off the coasts of Japan, Taiwan, and Hawaii, typically occurring over continental and insular slopes. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is possible but very unlikely.



Notes on Species Identification by Fishery Observers or Non-Experts

A distinguishing feature is the presence of pronounced nasal grooves that give it its common name. Moreover, this shark has the dorsal fin more anteriorly located than in other *Carcharhinus* species. Identification to genus is feasible, to species rather difficult.

Overall, the likelihood of accurate genus identification is moderate, to species low; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus albimarginatus

The Silvertip Shark is primarily a tropical and subtropical species, with its core distribution centered in the Indo-Pacific. However, occasional records in the North Pacific indicate its presence in warmer, offshore waters near island chains and continental margins. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely, especially in the northern section.



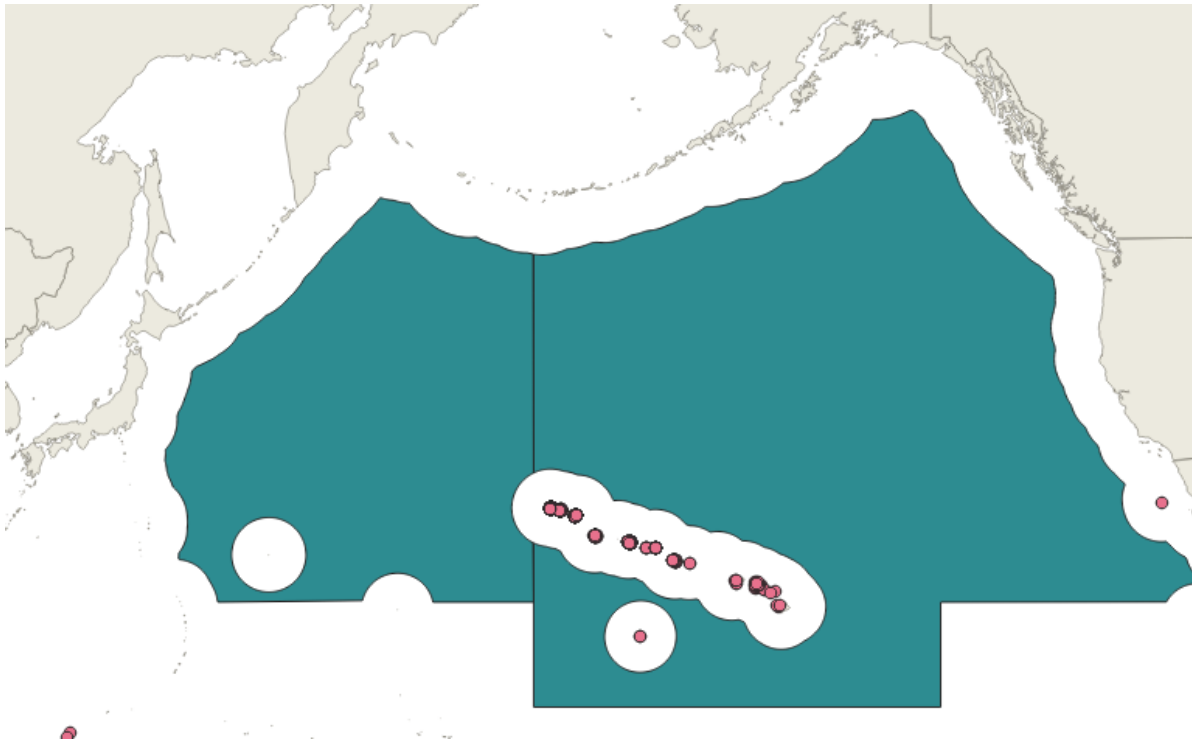
Notes on Species Identification by Fishery Observers or Non-Experts

The Silvertip Shark is easily recognized by the distinctive white margins on its fins—especially on the pectoral, dorsal, and occasionally the caudal fins—which give the species its common name. Although identification to species is generally straightforward, it is unlikely that this shark occurs in the area.

Overall, the likelihood of accurate species identification is moderate to high; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus amblyrhynchos

The Grey Reef Shark is primarily found throughout the coral reef systems of the Indo-Pacific, where it patrols outer reef slopes, drop-offs, and adjacent areas, typically at depths of 3–30 meters. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely,



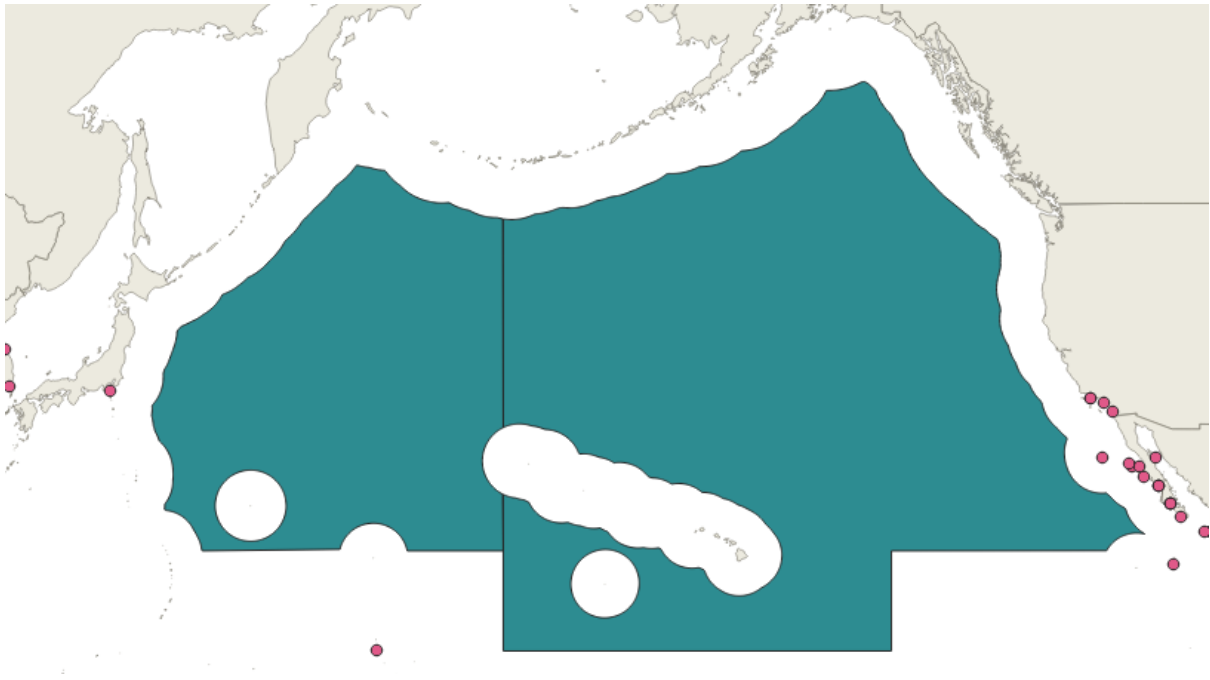
Notes on Species Identification by Fishery Observers or Non-Experts

A distinguishing feature is its caudal fin with prominent black edges. Identification to genus is feasible, to species rather difficult. Although identification to species is generally straightforward, it is unlikely that this shark occurs in the area.

Overall, the likelihood of accurate species identification is moderate to high; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus brachyurus

The Copper Shark is primarily found in temperate and subtropical waters worldwide, with occasional records in the North Pacific. In this region, it typically inhabits coastal and offshore areas, often near continental shelves and bays. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely,



Notes on Species Identification by Fishery Observers or Non-Experts

This species is characterized by its robust, elongated body and moderately pointed snout. Its dorsal coloration is a distinctive copper to bronze shade that contrasts with a lighter ventral surface. Identification to genus is feasible, to species rather difficult.

Overall, the likelihood of accurate genus identification is moderate, to species low; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus brevipinna

The Spinner Shark is widely distributed in tropical and subtropical waters worldwide, including the North Pacific, but available records are from Japan only. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely.



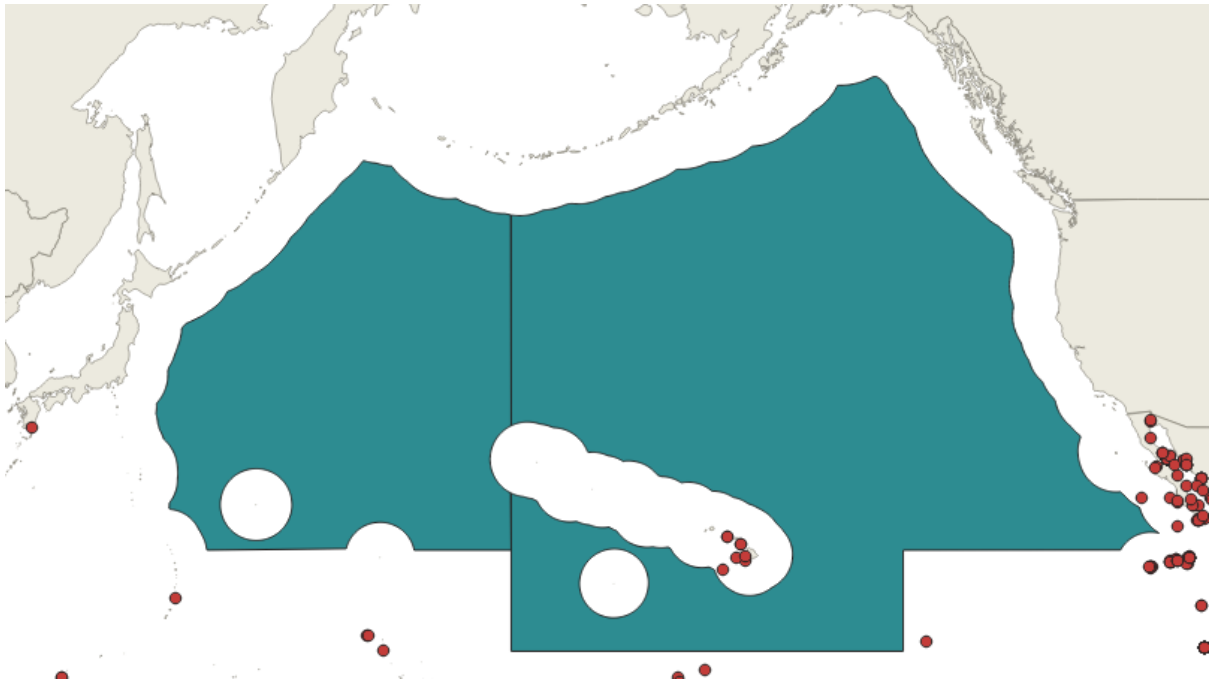
Notes on Species Identification by Fishery Observers or Non-Experts

This species is characterized by a number of features, including coloration, lack of an interdorsal ridge, and position of second dorsal fin. Identification to genus is feasible, to species rather difficult.

Overall, the likelihood of accurate genus identification is moderate, to species low; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus falciformis

The Silky Shark is a pelagic species found in tropical and subtropical waters worldwide, including the North Pacific. It is often associated with areas of high productivity, such as tuna aggregations. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is possible.



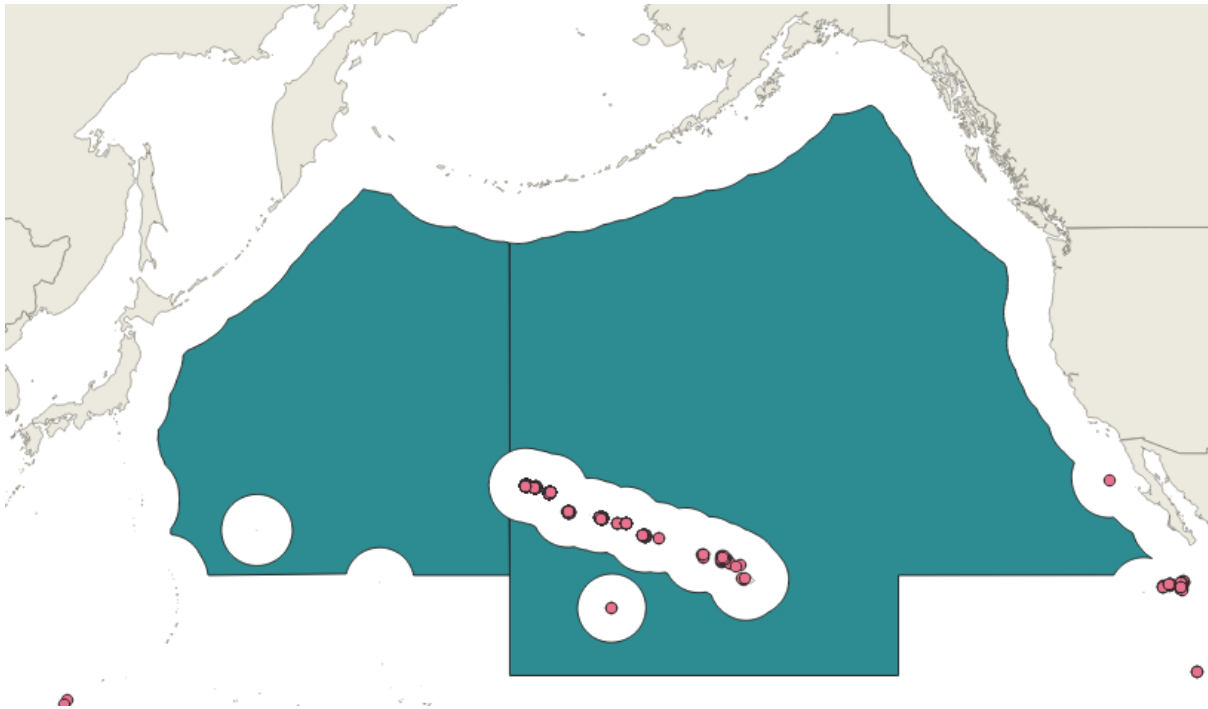
Notes on Species Identification by Fishery Observers or Non-Experts

This species is characterized by a number of features, including coloration, presence of an interdorsal ridge, and position of first dorsal fin. Skin is smooth, which contribute to its "silky" appearance. Identification to genus is feasible, to species possible, given the low number of *Carcharhinus* species likely to enter the catches in the region.

Overall, the likelihood of accurate genus identification is moderate to high, to species low to moderate. It should be featured at the species level in an ID tool.

Carcharhinus galapagensis

The Galapagos Shark is primarily found in tropical and subtropical waters of the Eastern Pacific. It is most commonly associated with oceanic islands, seamounts, and coral reef habitats. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely.



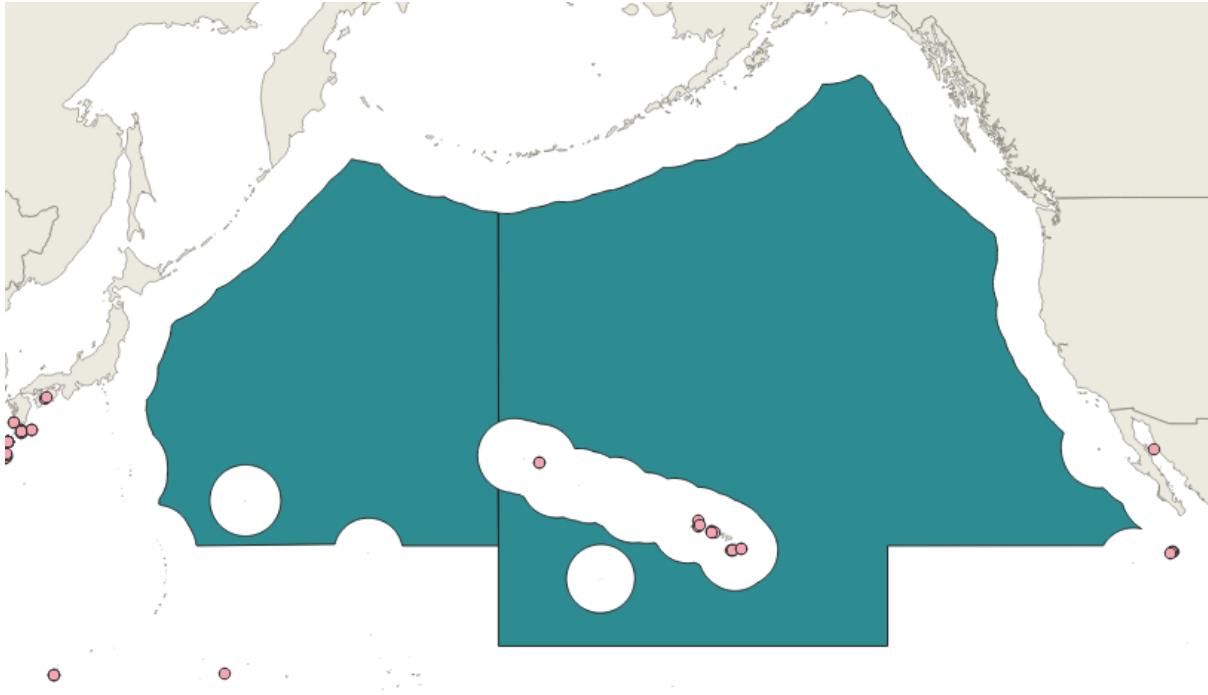
Notes on Species Identification by Fishery Observers or Non-Experts

This species is characterized by a number of features, including the presence of an interdorsal ridge, and position of first dorsal fin. Identification to genus is feasible, to species is rather difficult.

Overall, the likelihood of accurate genus identification is moderate, to species low; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus limbatus

The Blacktip Shark is widely distributed in tropical and subtropical coastal and continental shelf waters worldwide, including the North Pacific. In this region, it is commonly found off Hawaii, and Japan. It inhabits shallow coastal waters, estuaries, bays, and coral reefs, though it also occurs in nearshore open ocean environments. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely.



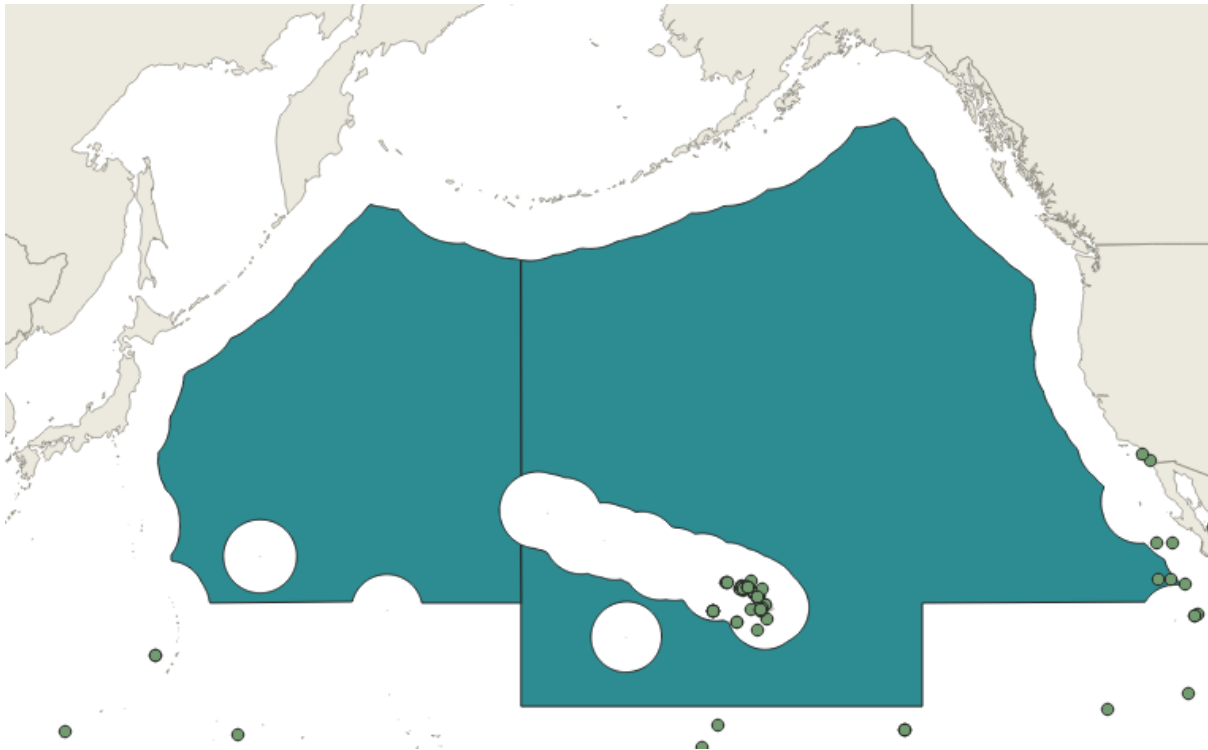
Notes on Species Identification by Fishery Observers or Non-Experts

This species is characterized by the distinct black markings on the tips of its pectoral, dorsal, and often caudal fins. However, other species share this feature. Therefore, while identification to genus is feasible, to species is still rather difficult.

Overall, the likelihood of accurate genus identification is moderate, to species low; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus longimanus

The Oceanic Whitetip Shark is a widespread pelagic species found in tropical and subtropical waters globally, including the North Pacific. In this region, it inhabits offshore open-ocean environments, often near seamounts, oceanic islands, and areas with significant prey availability. It is highly mobile, often encountered in surface waters of the open ocean. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) has been confirmed.



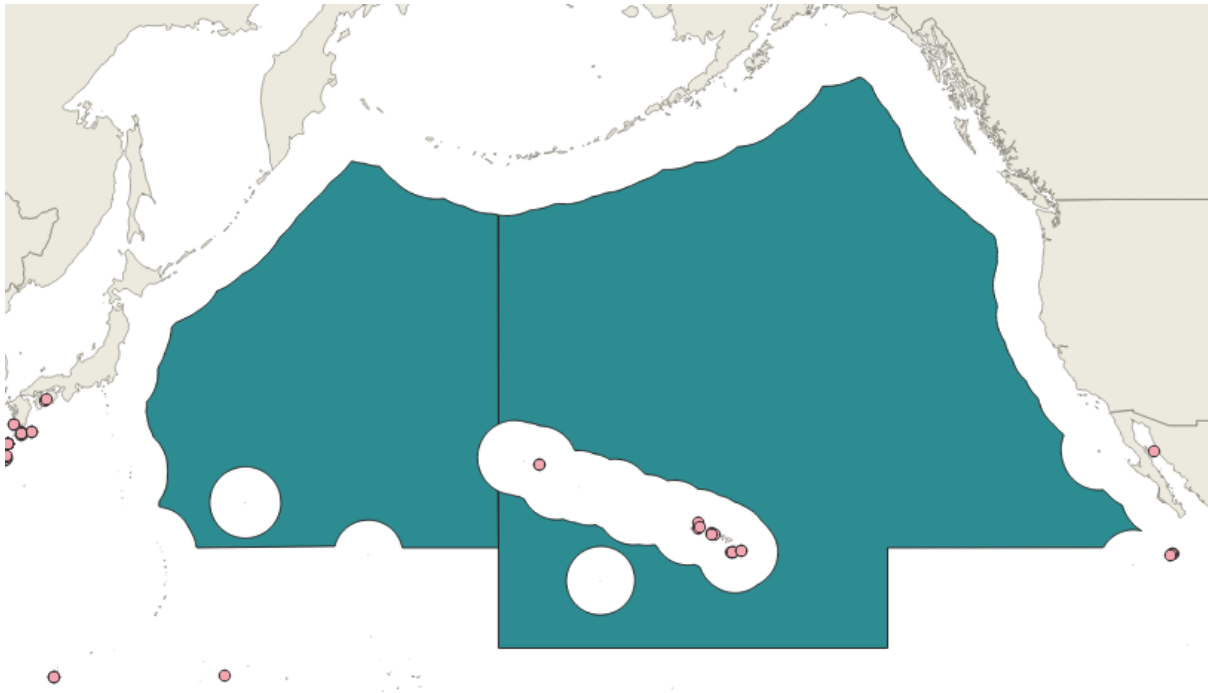
Notes on Species Identification by Fishery Observers or Non-Experts

This species is easily identified by its distinctive large, rounded pectoral fins and dorsal fin, both of which are marked with prominent white tips. Identification to genus and species is rather easy.

Overall, the likelihood of accurate species identification is high, and it should be featured at the species level in an ID tool.

Carcharhinus melanopterus

The Blacktip Reef Shark is widely distributed in tropical and subtropical coastal waters, particularly around coral reefs, lagoons, and shallow bays. It predominantly inhabits shallow reef environments, often seen patrolling reef edges, sand flats, and lagoons. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely.



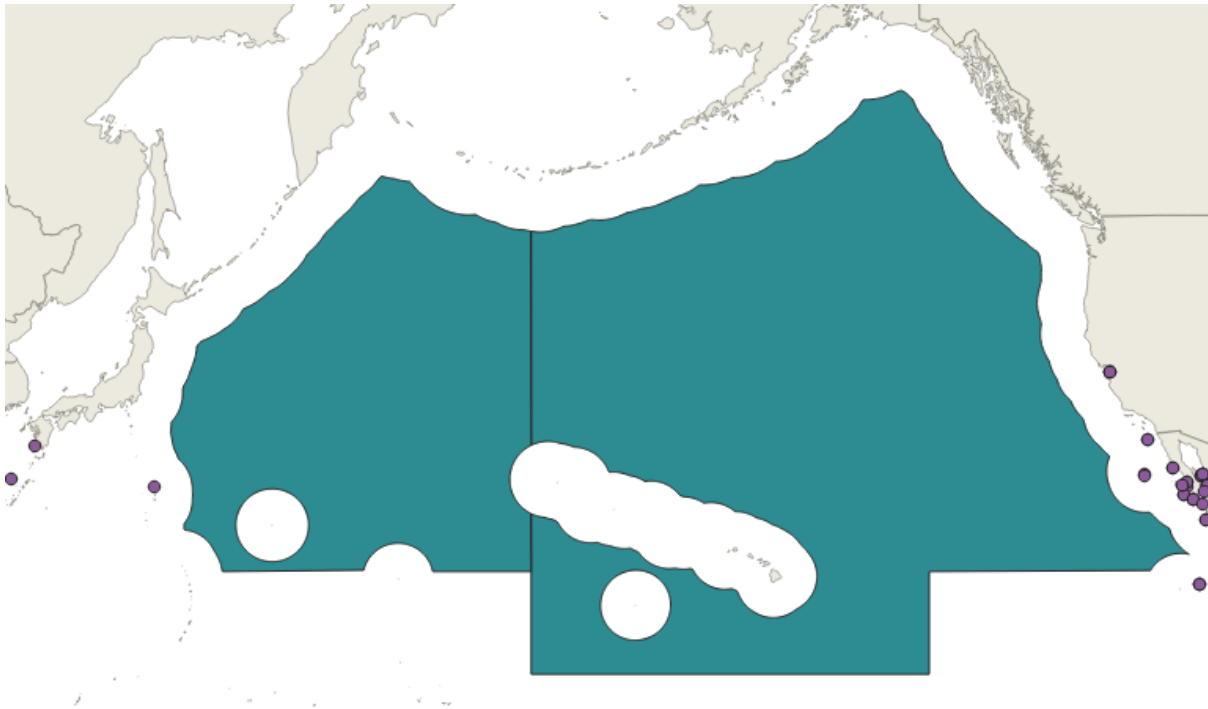
Notes on Species Identification by Fishery Observers or Non-Experts

This species is easily identified by its coloration, with the entire dorsal and ventral caudal margin with narrow but obvious black edge; 1st dorsal fin and caudal-fin lower lobe with obvious black tips, and smaller black tips to all other fins. Identification to genus and species is rather easy.

Overall, the likelihood of accurate species identification is high; however, given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus obscurus

The Dusky Shark is a widely distributed coastal and pelagic species found in tropical and warm-temperate waters. In the North Pacific, it occurs along the coasts of North America and Asia, particularly over continental shelves and slopes, as well as in offshore waters. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is unlikely.



Notes on Species Identification by Fishery Observers or Non-Experts

This species is characterized by a number of features, including large, falcate, pectoral fins, low interdorsal ridge low and moderate-sized, semifalcate dorsal fin. Identification to genus is feasible, to species is rather difficult.

Overall, the likelihood of accurate genus identification is moderate, to species low; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Carcharhinus plumbeus

The Sandbar Shark is a coastal species found in tropical and warm-temperate waters worldwide. In the North Pacific, it is commonly observed along continental shelves and slopes. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is very unlikely.



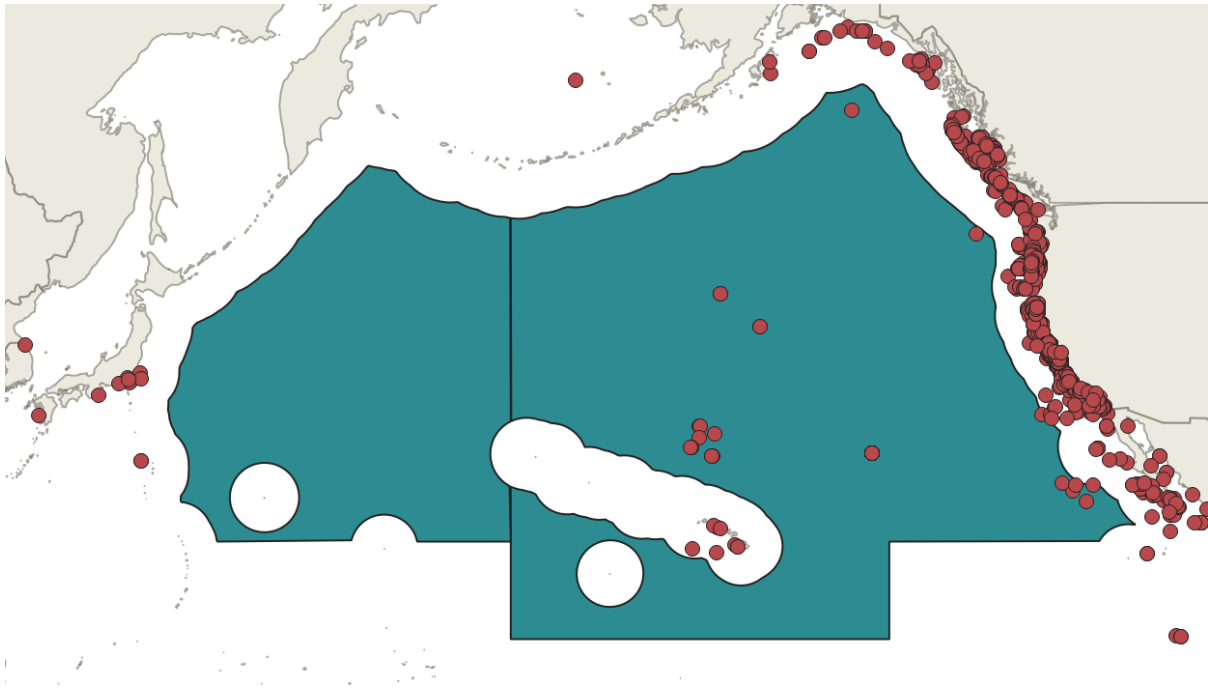
Notes on Species Identification by Fishery Observers or Non-Experts

The Sandbar Shark is distinguished by its high, triangular first dorsal fin and relatively short, blunt snout. Its body is a uniform gray to brownish-gray dorsally, with a lighter ventral surface. Unlike other similar species, its pectoral fins are long and broad. Identification to genus is feasible, to species is rather difficult.

Overall, the likelihood of accurate genus identification is moderate, to species low; given its unlikely presence in the NPFC CA, it should not be included in the ID tool.

Prionace glauca

The Blue Shark is a pelagic species found in temperate and tropical waters worldwide. It is one of the most common shark species in the open ocean, and widely distributed across the North Pacific. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) has been widely confirmed.



Notes on Species Identification by Fishery Observers or Non-Experts

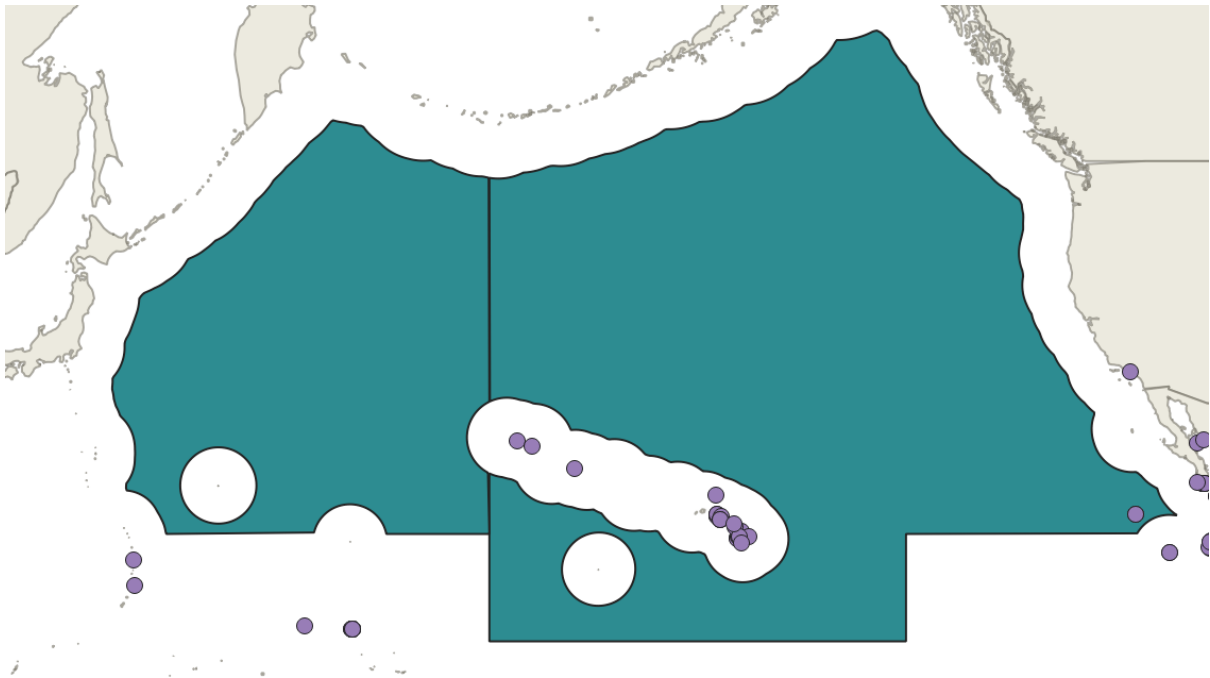
The Blue Shark is easily identified by its slender, elongated body and characteristic coloration. Its smooth, metallic blue dorsal surface contrasts with a pale, white underside.

Overall, the likelihood of accurate species identification is high, and it should be featured at the species level in an ID tool.

Galeocerdonidae

Galeocerdo cuvier

The Tiger Shark is a cosmopolitan species found in tropical and warm-temperate waters worldwide. In the North Pacific, it is commonly found around coastal and offshore areas, including Hawaii and along the coasts of East Asia and North America. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) has been confirmed.



Notes on Species Identification by Fishery Observers or Non-Experts

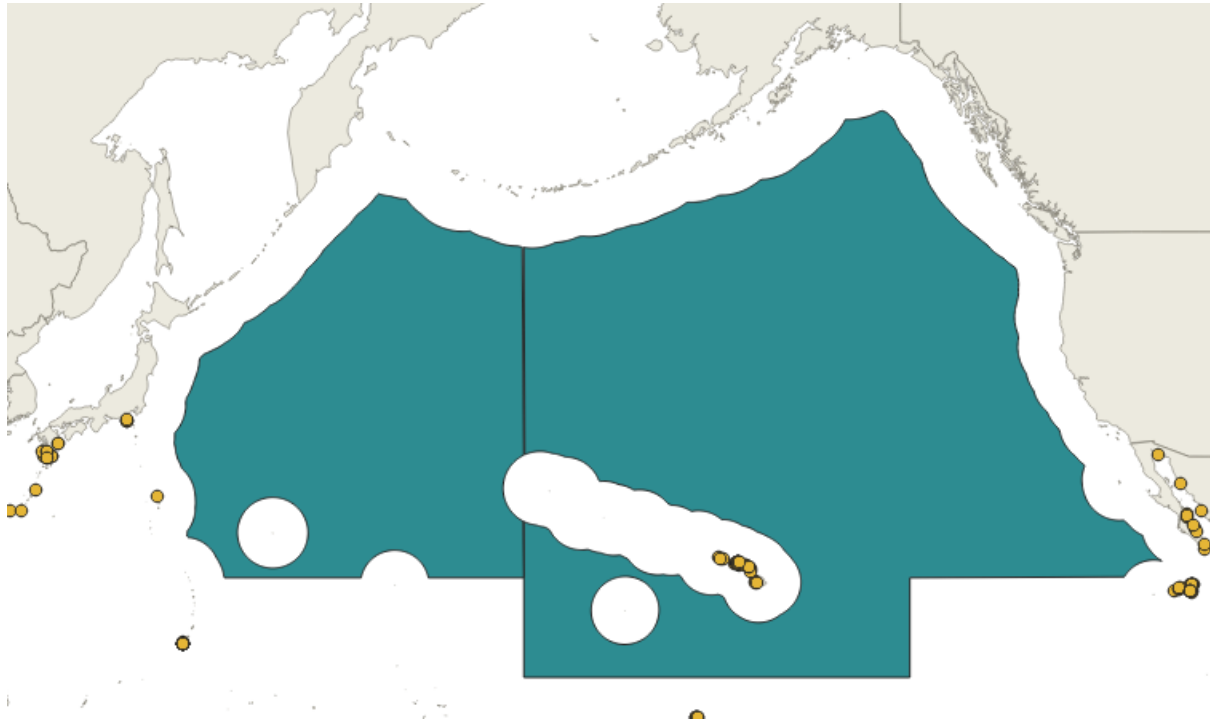
The Tiger Shark is easily recognized by its blunt, broad snout, large size, and unique vertical dark stripes on its grayish body, which are more prominent in juveniles and fade with age.

Overall, the likelihood of accurate species identification is high, and it should be featured at the species level in an ID tool.

Sphyrnidae

Sphyrna lewini

The Scalloped Hammerhead is widely distributed in tropical and warm-temperate waters. It is coastal pelagic and semioceanic, over continental and insular shelves and in adjacent deep water. In the North Pacific, it is found along the coasts of Central and North America, across the eastern Pacific to Hawaii, and around the western Pacific coasts of Asia. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is possible, but unlikely.



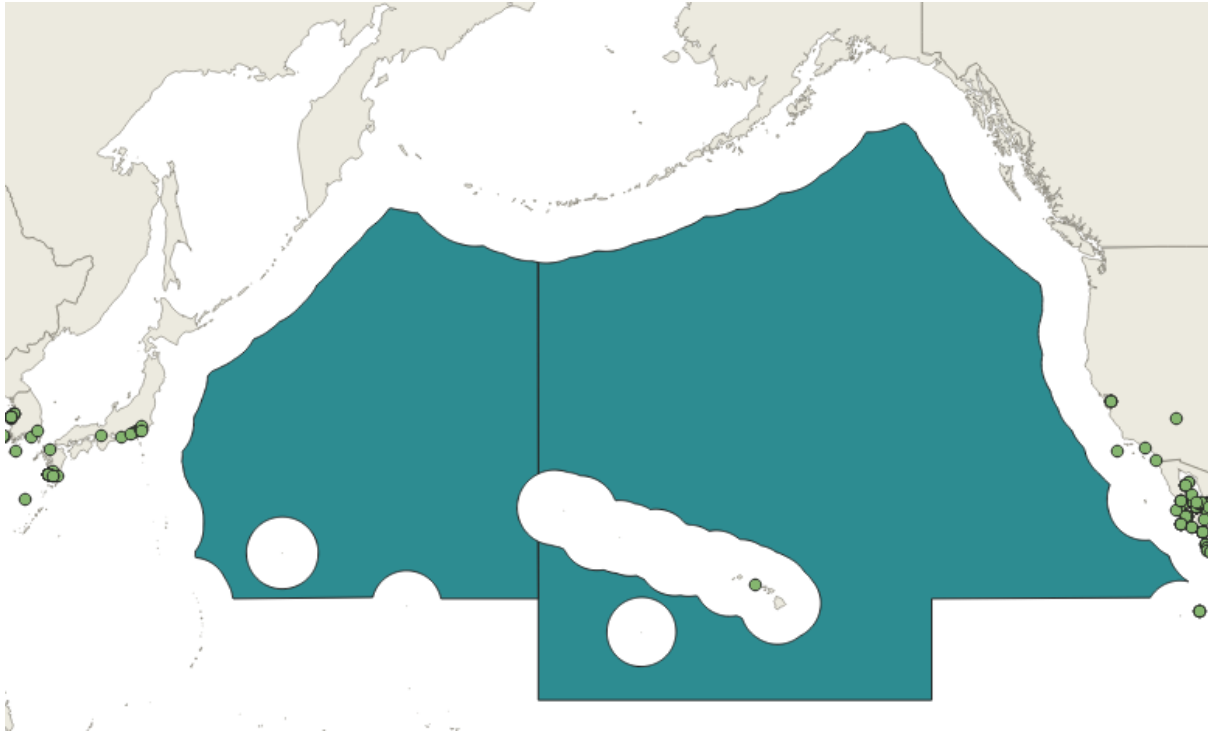
Notes on Species Identification by Fishery Observers or Non-Experts

The Scalloped Hammerhead is easily identified by its unique head shape, which has a distinct central indentation flanked by two smaller indentations, giving it a scalloped appearance.

Overall, the likelihood of accurate species identification is high, and it should be featured at the species level in an ID tool.

Sphyrna zygaena

The Smooth Hammerhead is a cosmopolitan species found in temperate and tropical waters worldwide. This species is highly migratory, found in a wide range of habitats, from shallow coastal areas to the open ocean. It is known to venture into cooler waters compared to other hammerhead species. Its occurrence in the Convention Area of the North Pacific Fisheries Commission (NPFC) is possible, but unlikely.



Notes on Species Identification by Fishery Observers or Non-Experts

The Smooth Hammerhead is characterized by its broad, flat, and smooth-edged head without the central indentation seen in the Scalloped Hammerhead.

Overall, the likelihood of accurate species identification is high, and it should be featured at the species level in an ID tool.

TAXONOMIC LIST OF PELAGIC SHARK SPECIES OF THE NORTH PACIFIC

	West Pacific	East Pacific	Convention Area
ORECTOLOBIFORMES			
Rhincodontidae			
<i>Rhincodon typus</i>	x	x	
LAMNIFORMES			
Megachasmidae			
<i>Megachasma pelagios</i>	x	x	
Cetorhinidae			
<i>Cetorhinus maximus</i>	x	x	
Alopiidae			
<i>Alopias superciliosus</i>	x	x	
<i>Alopias pelagicus</i>	x	x	
<i>Alopias vulpinus</i>	x	x	
Lamnidae			
<i>Carcharodon carcharias</i>	x	x	
<i>Isurus oxyrinchus</i>	x	x	x
<i>Isurus paucus</i>	x	x	
<i>Lamna ditropis</i>	x	x	x
Odontaspidae			
<i>Odontaspis ferox</i>	x	x	
<i>Odontaspis noronhai</i>	x	x	
Pseudocarchariidae			
<i>Pseudocarcharias kamoharai</i>	x	x	x
CARCHARHINIFORMES			
Carcharhinidae			
<i>Carcharhinus altimus</i>		x	
<i>Carcharhinus albimarginatus</i>	x	x	
<i>Carcharhinus amblyrhynchos</i>	x	x	
<i>Carcharhinus brachyurus</i>	x	x	
<i>Carcharhinus brevipinna</i>	x		
<i>Carcharhinus falciformis</i>	x	x	x
<i>Carcharhinus galapagensis</i>	x	x	
<i>Carcharhinus limbatus</i>	x	x	
<i>Carcharhinus longimanus</i>	x	x	x
<i>Carcharhinus melanopterus</i>	x	x	
<i>Carcharhinus obscurus</i>	x	x	
<i>Carcharhinus plumbeus</i>		x	
<i>Prionace glauca</i>	x	x	x
Galeocerdonidae			
<i>Galeocerdo cuvier</i>	x	x	x
Sphyrnidae			
<i>Sphyrna lewini</i>	x	x	
<i>Sphyrna zygaena</i>	x	x	

Taxa selected for inclusion in the identification keys

ORECTOLOBIFORMES

Rhincodontidae

Rhincodon typus

LAMNIFORMES

Megachasmidae

Megachasma pelagios

Cetorhinidae

Cetorhinus maximus

Alopiidae

Alopias superciliosus

Alopias pelagicus

Alopias vulpinus

Lamnidae

Carcharodon carcharias

Isurus oxyrinchus

Isurus paucus

Lamna ditropis

Odontaspidae

Odontaspis sp.

Pseudocarchariidae

Pseudocarcharias kamoharai

CARCHARHINIFORMES

Carcharhinidae

Carcharhinus falciformis

Carcharhinus longimanus

Prionace glauca

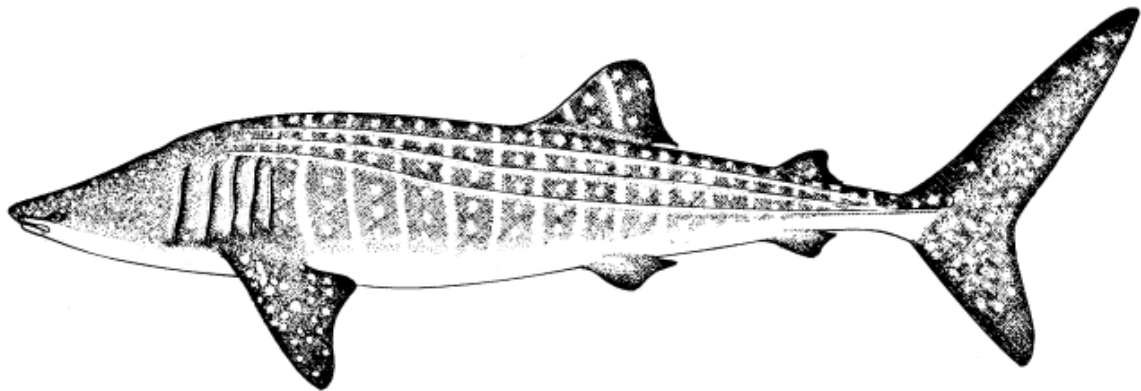
Galeocerdonidae

Galeocerdo cuvier

Identification key to oceanic pelagic shark orders of the North Pacific

Key to Orders (classical key for taxonomists or trained scientists/observers)

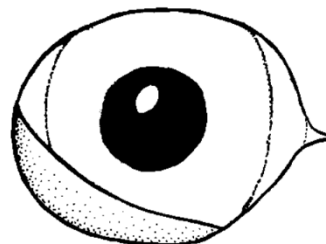
1a. Mouth broad and terminal, does not extend behind eyes..... **Orectolobiformes** (*Rhincodon typus*)



1b. Mouth extends behind eyes.....2

2a. No nictitating eyelids.....**Lamniformes**

2b. Nictitating eyelids present.....**Carcharhiniformes**

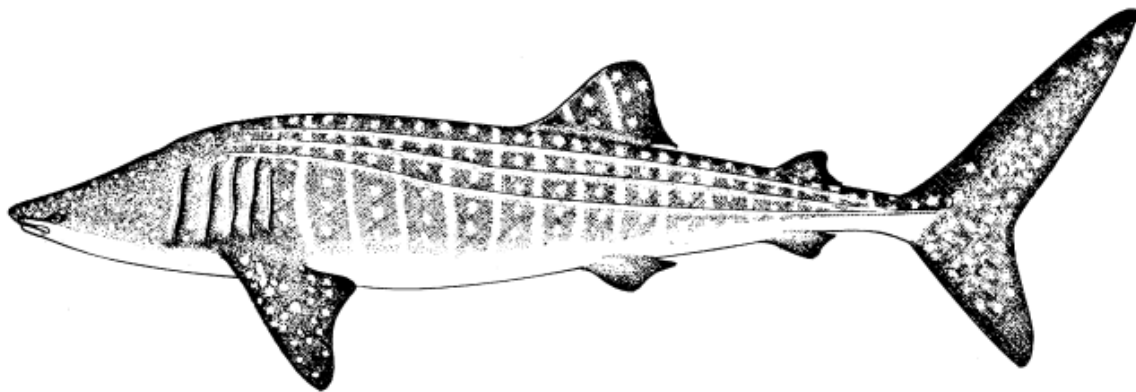


Comments: There are only three orders of oceanic pelagic sharks. While it is easy to identify the Whale Shark *Rhincodon typus*, differentiating between the Lamniformes and Carcharhiniformes can be challenging as the nictitating eyelid is not easy to see. Therefore, it is not possible to simplify this key.

The best approach is to avoid starting from the order level, but from the family level.

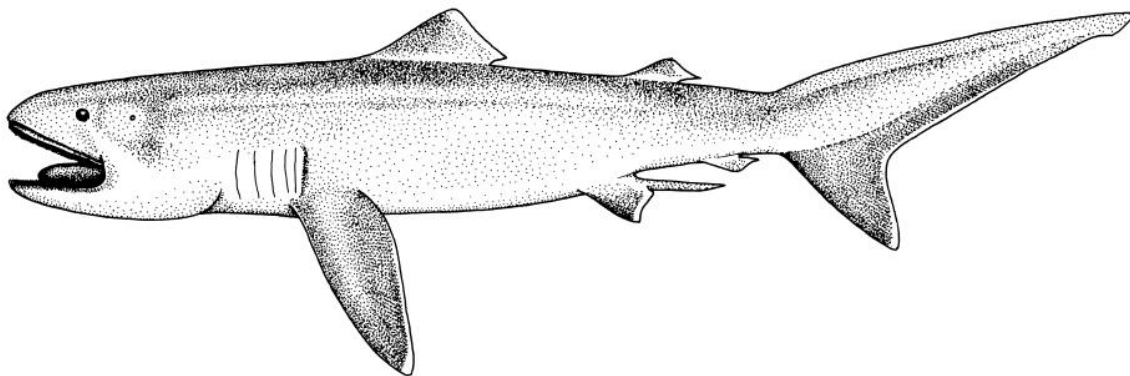
Key to oceanic pelagic shark families, genera and species that occur or are likely to occur in the CA of NPFC (adjusted for users with limited training)

1a. Mouth broad and terminal, does not extend behind eyes..... **Rhincodontidae**
(*Rhincodon typus*)



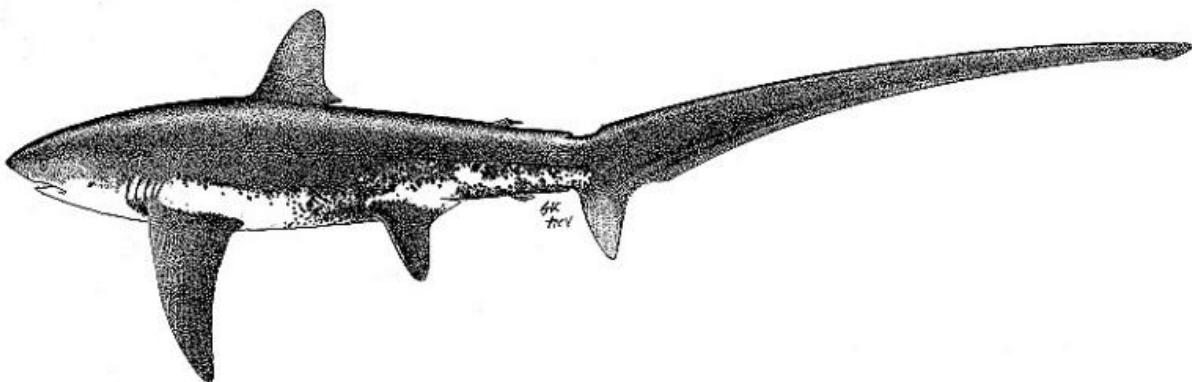
1b. Mouth extends behind eyes.....**2**

2a. Snout short and mouth terminal..... **Megachasmidae**
(*Megacasma pelagios*)

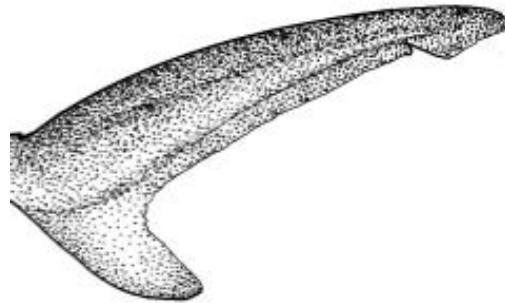
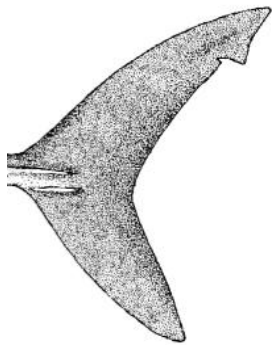


2b. Snout relatively long and mouth subterminal..... **3**

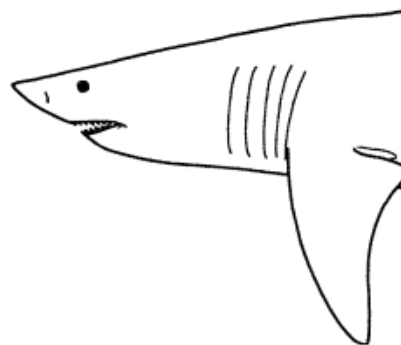
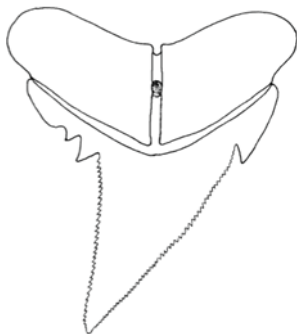
3a. Caudal fin about as long as trunk of body..... **Alopiidae** (*Alopias* sp.)



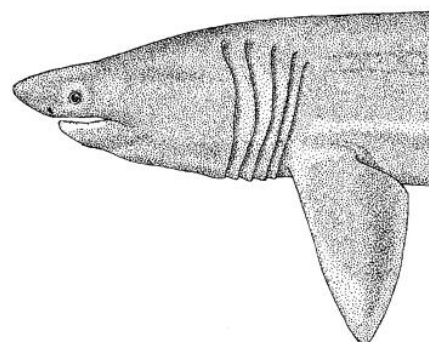
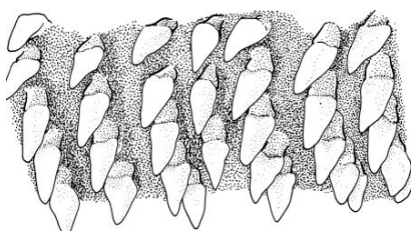
- 3b.** Caudal fin much shorter than trunk of body..... **4**
- 4a.** Caudal fin C-shaped.....**5**
- 4b.** Caudal fin not C-shaped.....**6**



- 5a.** Teeth large, triangular, blade-like; gill slits large, but not extending onto dorsal surface of head..... **Lamnidae**

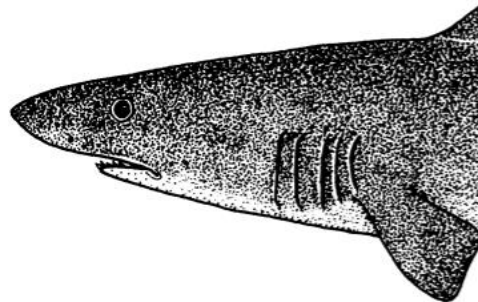
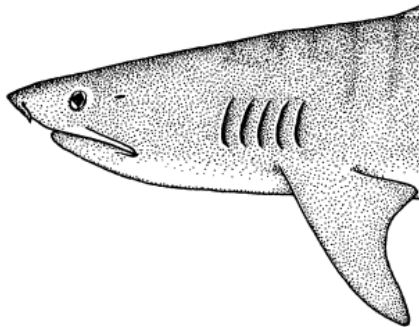


- 5b.** Teeth minute, hook-shaped, and not blade-like; gill slits extremely large, extending onto surface of head.....**Cetorhinidae** (*Cetorhinus maximus*)

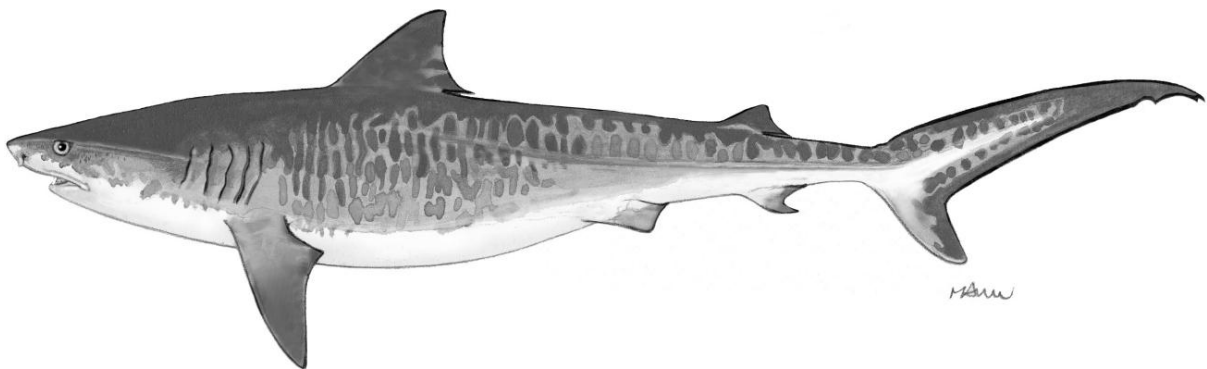


6a. Origin of pectoral fins under 4th to 5th gill slit..... **7**

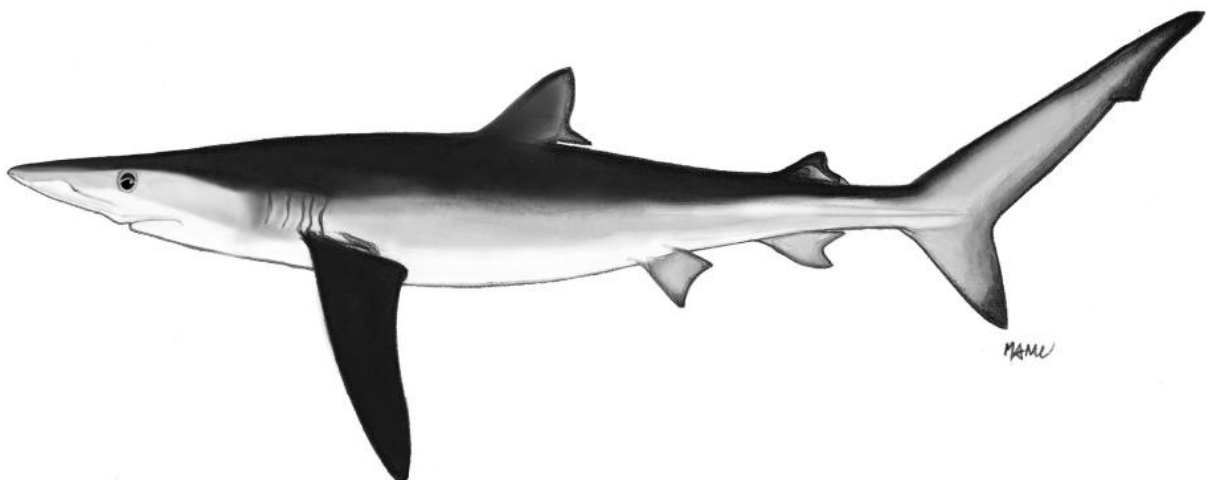
6b. Origin of pectoral fins behind 5th gill slit..... **8**



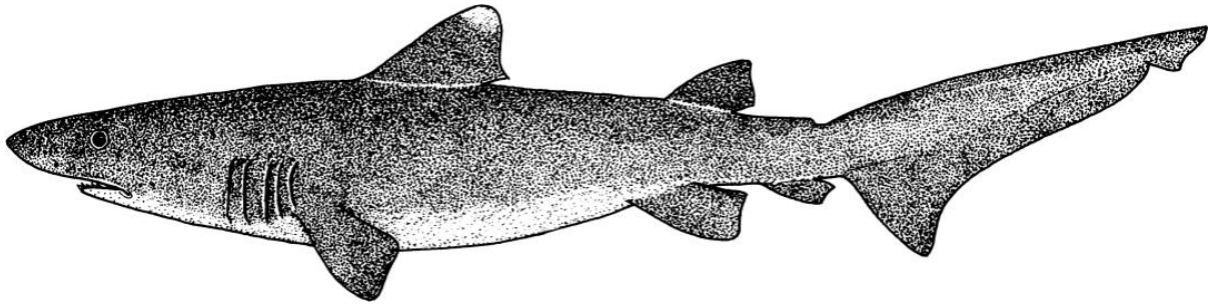
7a. Spiracles present; dark vertical stripes on body usually present.....**Galeocerdonidae**



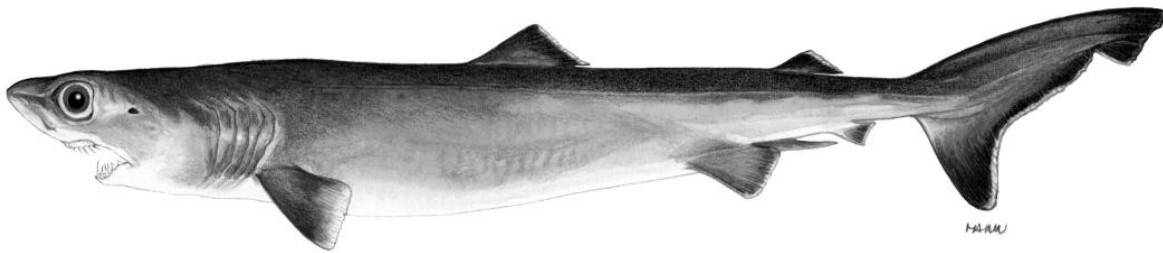
7b. Spiracles absent; no dark stripes on body.....**Carcharhinidae**



8a. Body stout; eyes relatively small peduncle with upper precaudal pit, but without lower pit and lateral keels..... **Odontaspidae** (*Odontaspis* sp.)

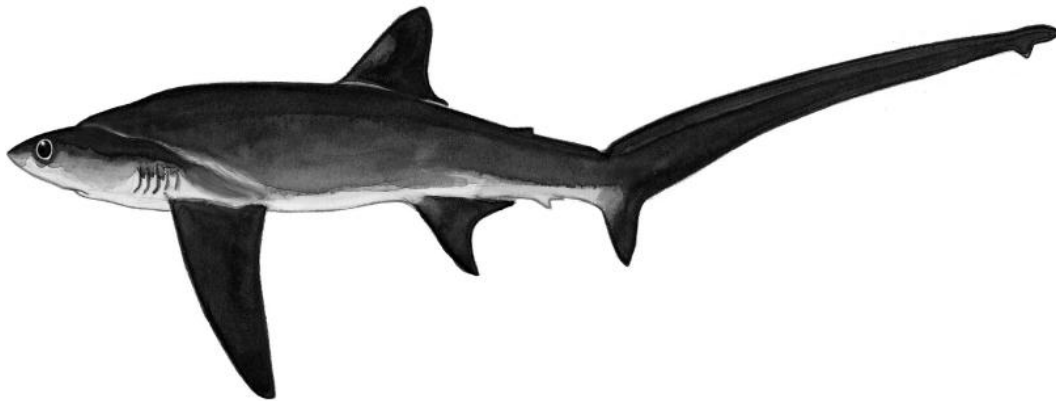


8b. Body slender; eyes relatively large; peduncle with upper and lower precaudal pits, and with weak lateral keels..... **Pseudocarchariidae** (*Pseudocarcharias kamoharai*)



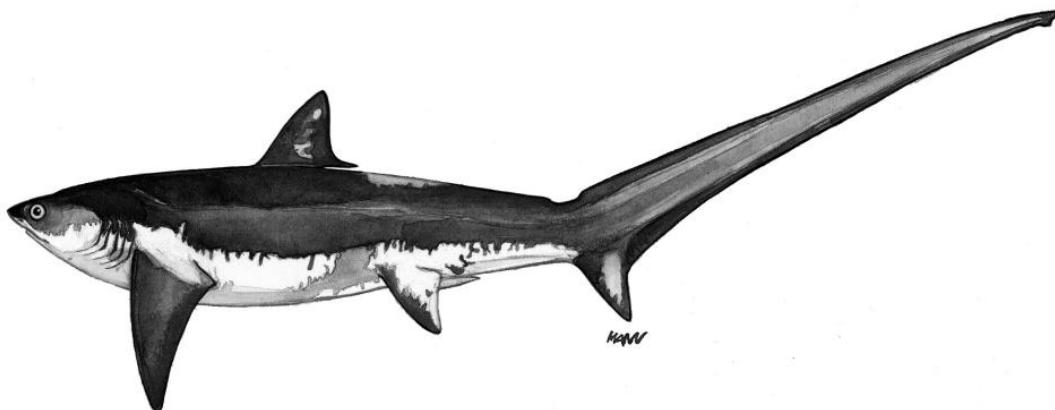
Key to the species of Alopiidae that occur or are likely to occur in the CA of NPFC

1a. Deep nuchal groove from above eye to over gill slits; eyes huge. *A. superciliosus*

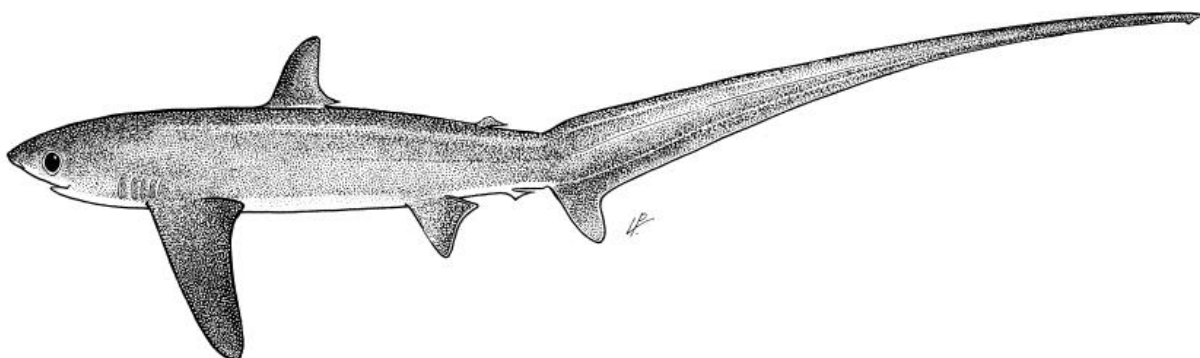


1b. Nuchal groove rudimentary or absent. **2**

2a. Pectoral fins falcate and sharply pointed; lip folds present; teeth elongate and unicuspid *A. vulpinus*



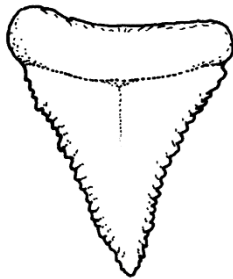
2b. Pectoral fins nearly straight and narrowly rounded; no lip folds; teeth oblique with secondary cusp *A. pelagicus*



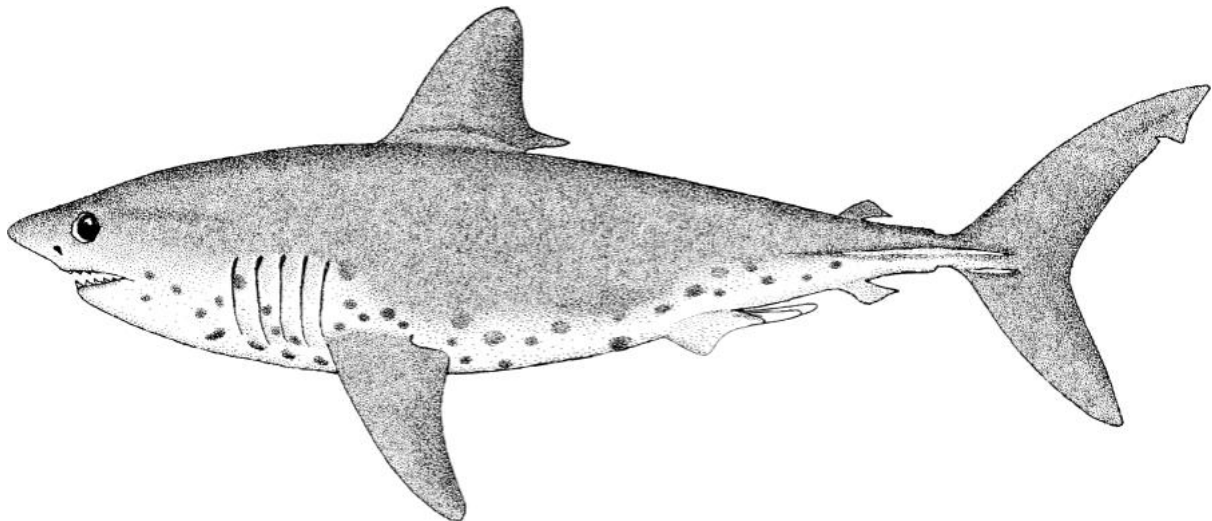
Key to the species of Lamnidae that occur or are likely to occur in the CA of NPFC

1a. Teeth broadly triangular and serrated *Carcharodon carcharias*

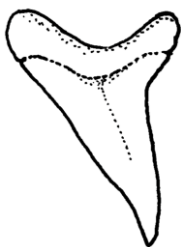
1b. Teeth long, narrow, and without serrations..... **2**



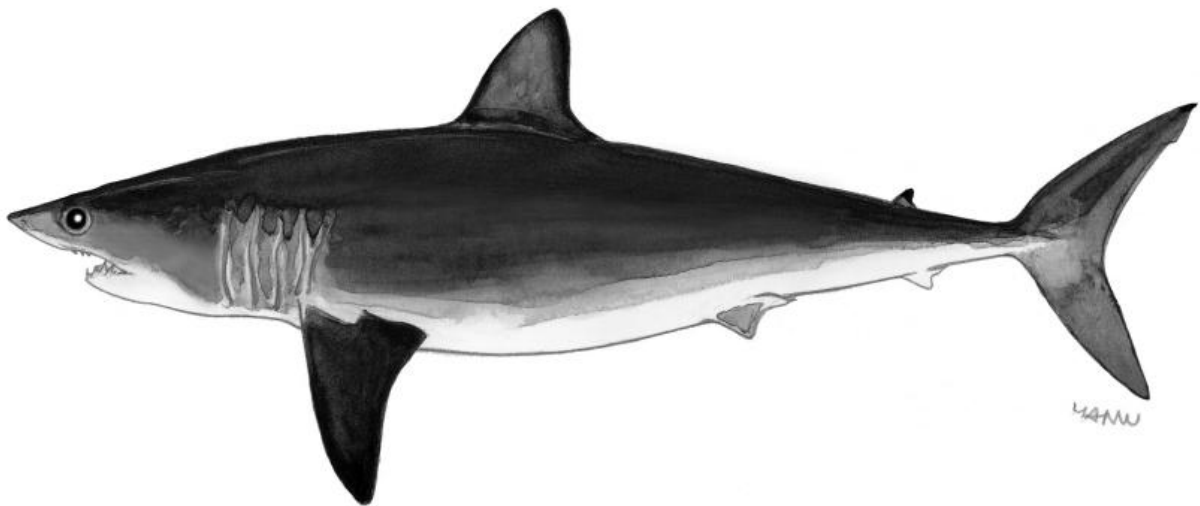
2a. Teeth with small lateral cusplets; 1st dorsal-fin origin over pectoral-fin bases or inner margins; secondary keel on caudal fin..... *Lamna ditropis*



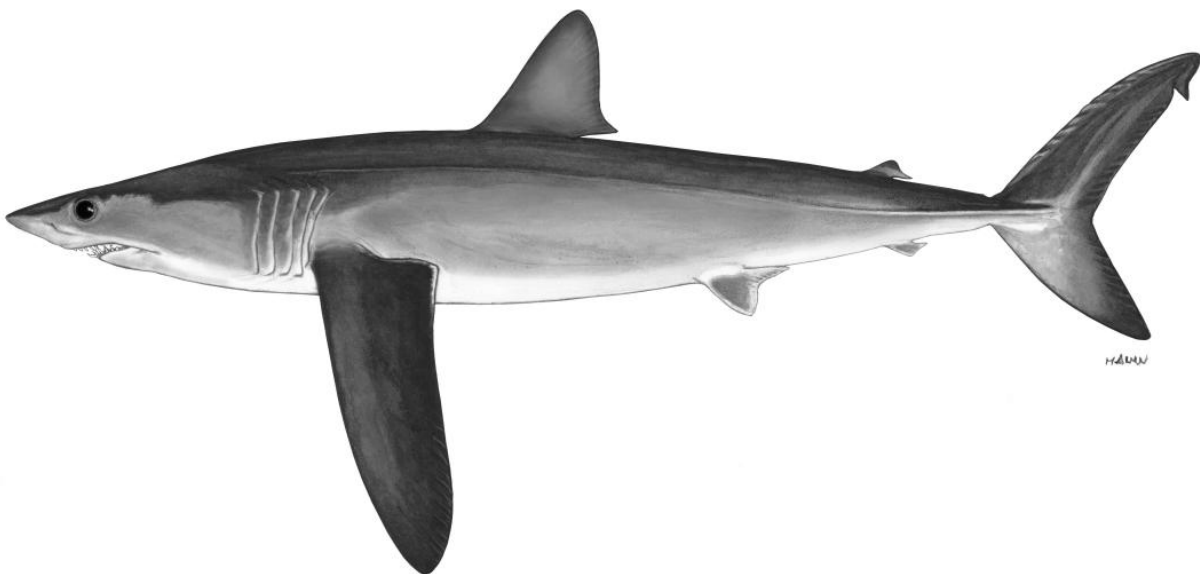
2b. Teeth without small lateral cusplets; 1st dorsal-fin origin behind pectoral-fin free rear tips; no secondary keel on caudal fin.....**3**



3a. Ventral surface of snout and mouth white; anterior tooth cusps recurved forward; pectoral fins much shorter than HL; anal-fin origin below 2nd dorsal-fin base *Isurus oxyrinchus*

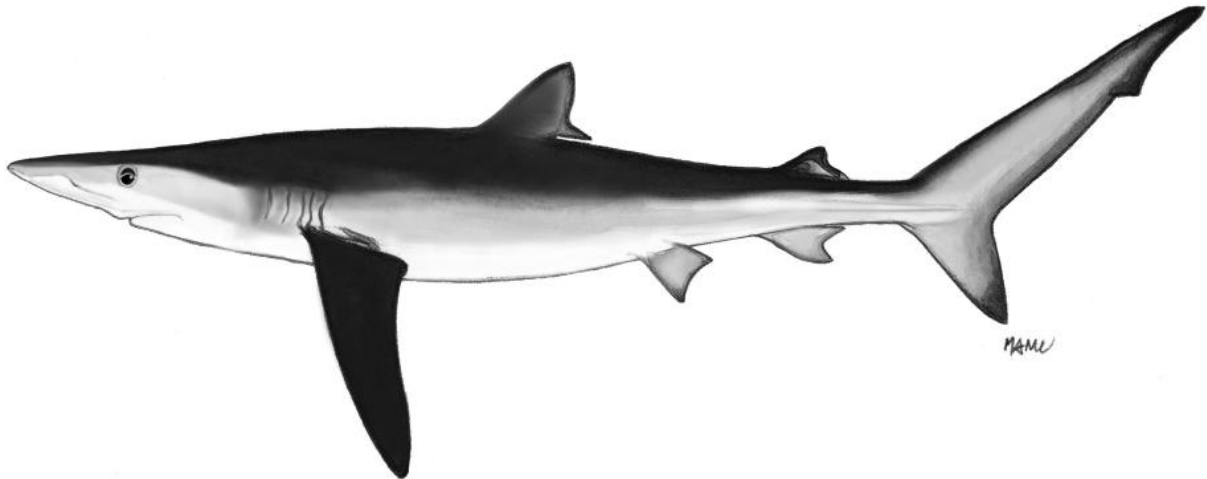


3b. Ventral surface of snout and mouth dusky; anterior tooth cusps straight; pectoral fins long, about equal to HL; anal-fin origin below or behind 2nd dorsal-fin insertion *Isurus paucus*



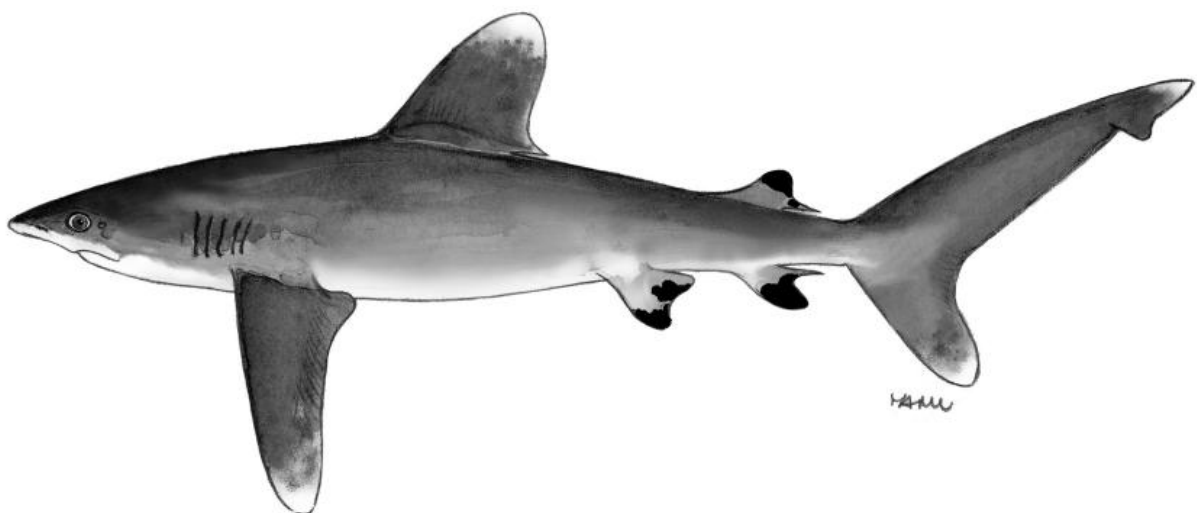
Key to the species of Carcharhinidae that occur or are likely to occur in the CA of NPFC

1a. 1st dorsal-fin base closer to pelvic-fin bases than to pectoral-fin bases; body brilliant dark blue dorsally..... *Prionace glauca*



1b. 1st dorsal-fin base usually closer to pectoral fins, or equidistant between pectoral- and pelvic-fin bases; body pale to dark grey, grey-brown, brown or grey-black dorsally..... **2**

2a. Pectoral fins and 1st dorsal fin very broad and rounded, tapering slightly only towards apices; most fin tips conspicuously mottled white in adults, and some fins black-tipped in juveniles... *Carcharhinus longimanus*



2b. Pectoral fins and 1st dorsal fin tapering and pointed or narrowly rounded; fins not mottled white *Carcharhinus falciformis*

