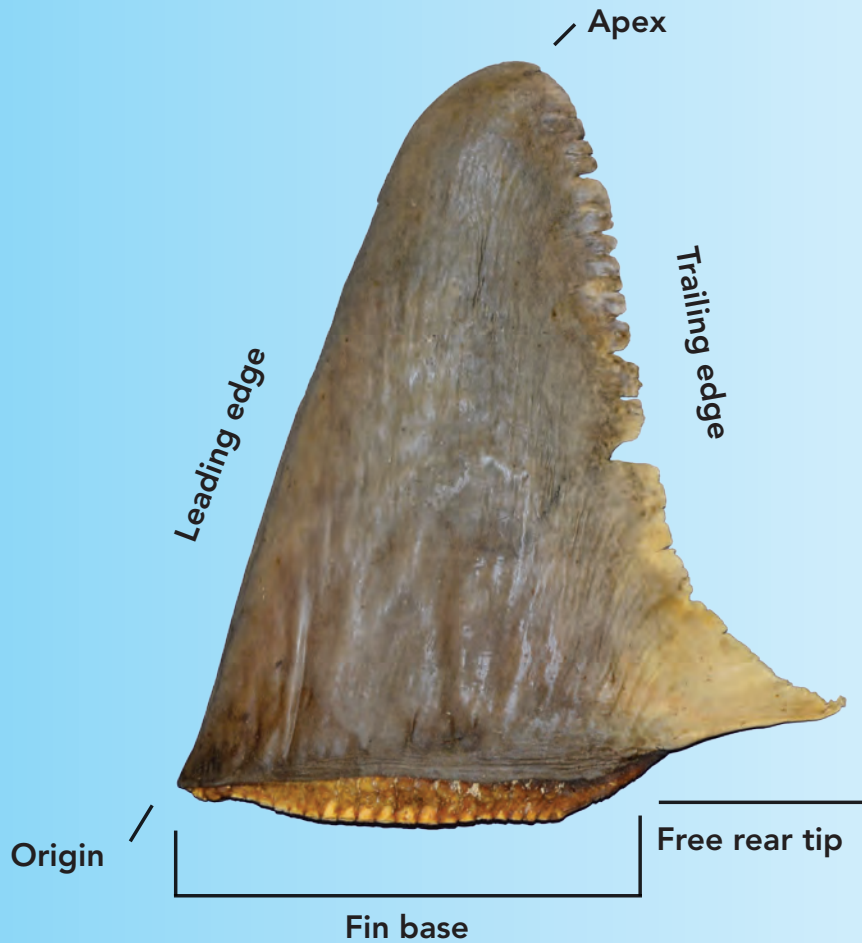


Identifying Shark Fins: Silky and Threshers

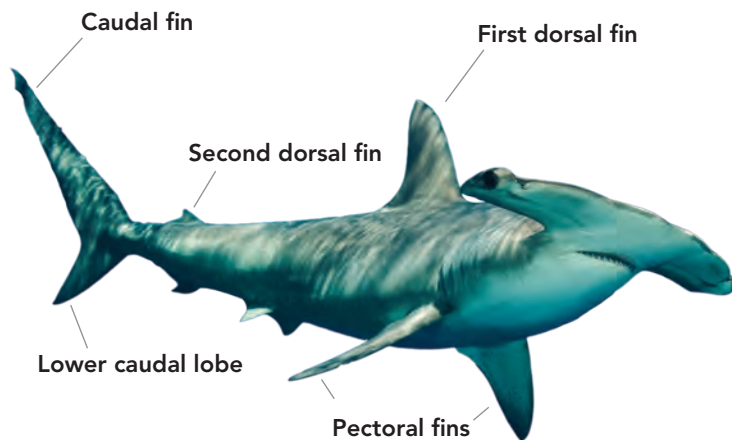


Fin landmarks used in this guide



Shark fins

This image shows the positions of the fin types that are highly prized in trade: the first dorsal, paired pectoral fins and the lower lobe of the caudal fin. The lower lobe is the only part of the caudal fin that is valuable in trade (the upper lobe is usually discarded). Second dorsal fins, paired pelvic fins and anal fins, though less valuable, also occur in trade.



The purpose of this guide

In 2012, researchers in collaboration with Stony Brook University and The Pew Charitable Trusts developed a comprehensive guide to help wildlife inspectors, customs agents, and fisheries personnel provisionally identify the highly distinctive first dorsal fins of five shark species recently listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): the oceanic whitetip, three species of hammerhead, and the porbeagle. Since then, over 500 officials from dozens of countries have been trained on how to use key morphological characteristics outlined in the guide to quickly distinguish fins from these CITES listed species amongst fins of non-CITES listed species during routine inspections. The ability to quickly and reliably identify fins in their most commonly traded form (frozen and/or dried and unprocessed) to the species level provides governments with a means to successfully implement the CITES listing of these shark species and allow for legal, sustainable trade.

Four additional shark species suffering significant population declines have been identified as conservation and management priorities in need of international protection: three species of thresher sharks (*Alopias superciliosus*, *A. vulpinus* and *A. pelagicus*) and the silky shark (*Carcharhinus falciformis*). These four species also have fins that are traded internationally in large numbers, are highly distinctive and can be visually identified in the most commonly traded form (frozen or dried and unprocessed).

Thresher sharks are considered the most threatened shark family (Dulvy et al., 2014), with population declines of over 80% almost everywhere they are found. The meat of thresher sharks is of high quality, consumed locally as well as traded internationally. The international shark fin trade is also a significant driver of exploitation for this family, which make up approximately 2% of the Hong Kong retail market collectively (D. Chapman, unpublished data).

The silky shark is one of the most commonly caught sharks by pelagic longline and purse seine fishing gear in tropical and subtropical oceans. The silky shark is listed by the International Union for the Conservation of Nature (IUCN) as 'Near Threatened' globally, with population declines of over 70% almost everywhere they are found. Significant population declines of 90% have been observed in the Indian Ocean and the Gulf of Mexico. While meat is consumed locally in some regions, the international shark fin trade is the significant driver of silky shark landings. A recent survey indicates that silky shark fins are the second most common fin type in the Hong Kong retail market (D. Chapman, unpublished data).

Regulatory measures have been put in place to protect these epipelagic sharks throughout the respective distributions due to population declines and continued demand for their fins. For example, all four species are prohibited from retention onboard, transshipping, or landings by one or more regional fisheries management organization, and all are listed on Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS). In addition, all four species have been proposed for inclusion in Appendix II of CITES, which would require that international trade in these species come from sustainable populations. Provisional identification of the shark species in this guide leads to reasonable or probable cause to detain cargo from a vessel suspected of catching thresher or silky sharks in prohibition areas, as well as shipment of fins that do not have the proper CITES permits required for international trade, should they be listed.

This guide is intended to help wildlife inspectors, customs agents, and fisheries personnel provisionally identify these species **based on morphological characteristics of their most distinctive fins**. The highly distinctive first dorsal and pectoral fins of the silky shark, as well as the pectoral fins of the three recognized species of thresher sharks in their most commonly traded form (frozen or dried and unprocessed) are highlighted in this text. This guide focuses only on the pectoral fins of the three thresher species because they are extremely distinctive, and there are very few species with pectoral fins of similar size, shape, and/or color. Shark fins are typically traded as a set (dorsal fin, paired pectoral fin, and lower caudal) are likely to be in the same shipment. Being able to identify only one fin type will still allow officials to detain a shipment for further inspection.

The key characteristics identified in this document can be used to quickly and easily separate the first dorsal fins from silky sharks, and the pectoral fins of all four species from the fins of sharks found in international trade. When combined with the previous fin ID guide, this guide will help key personnel visually identify a significant proportion (nearly 20%) of the fins traded based on species composition of the Hong Kong market (D. Chapman, unpublished data).

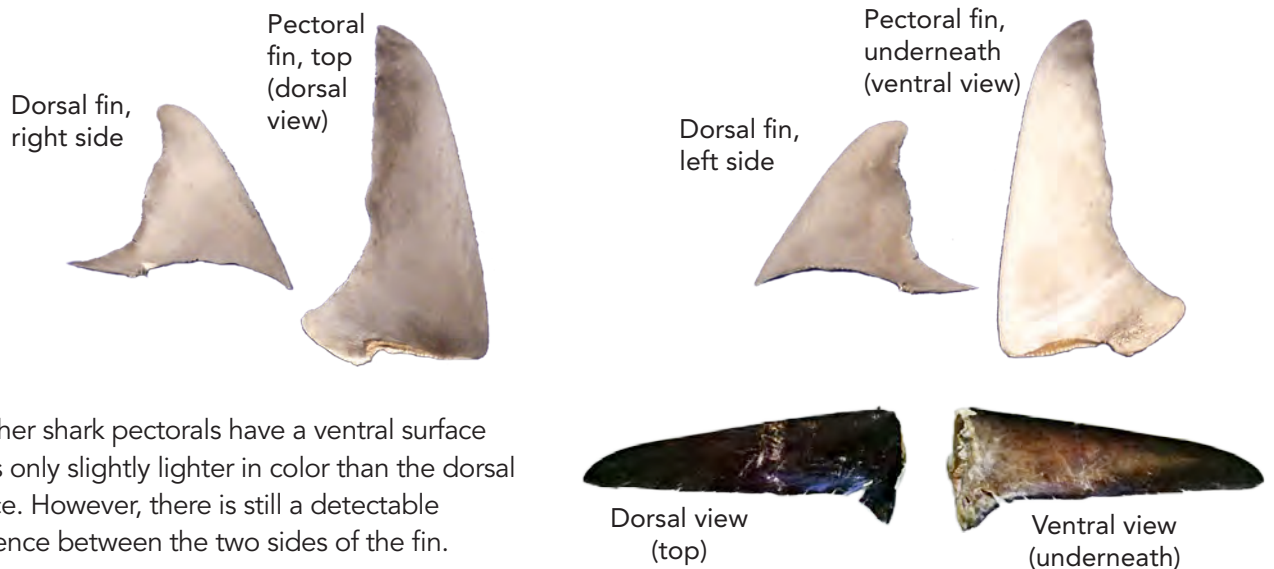
Three steps to using this guide

- Step 1. Distinguish between first dorsal fins from other highly-valued traded fins: pectoral fins and lower caudal lobes (see below). **If it is a dorsal fin, proceed to step 2. If it is a pectoral fin, proceed to step 3.**
- Step 2. To distinguish silky first dorsal fins from species with first dorsal fins of similar size, shape, and color, look for short, broad fins that are uniform in color (no white or black markings) with a moderately rounded apex. Use the flowchart on page 3 to exclude other similar looking species.
- Step 3. To distinguish silky and thresher pectorals from species with pectorals with similar size, shape, and color, use the flowchart on page 6 to determine species.

Step 1: Distinguish 1st dorsal fins from pectoral fins and lower caudal lobes

a. Check the fin color on each side

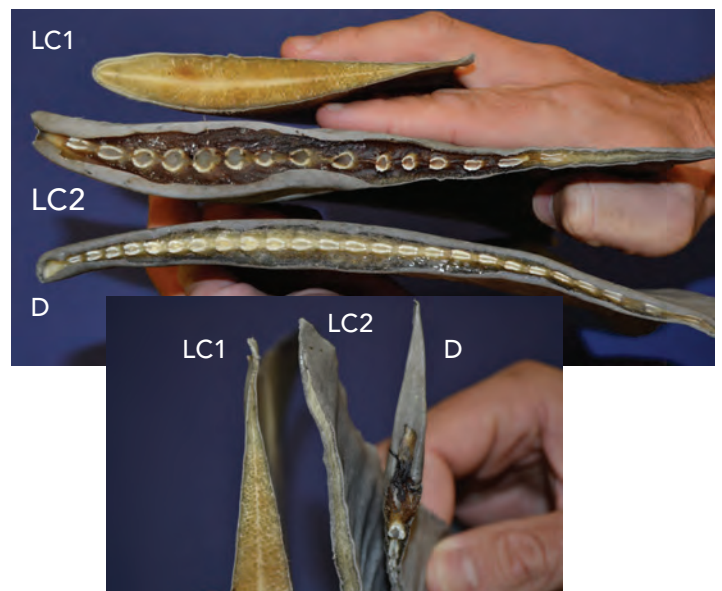
Dorsal fins are the same color on both sides (see right and left side views below). In contrast, pectoral fins are darker on the top side (dorsal view) and lighter underneath (ventral view) also known as counter shading; (see both views below).



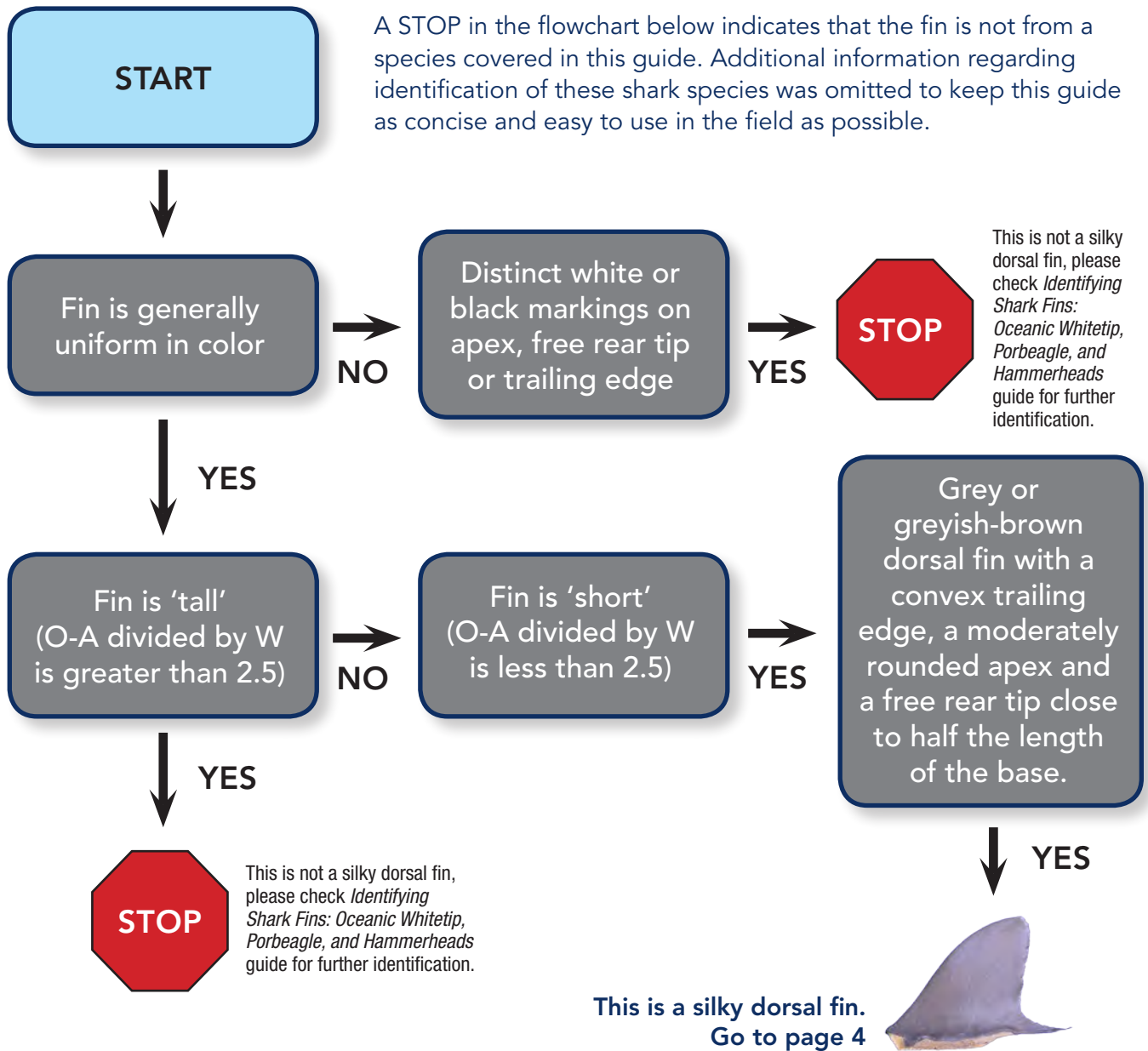
Thresher shark pectorals have a ventral surface that is only slightly lighter in color than the dorsal surface. However, there is still a detectable difference between the two sides of the fin.

b. Check the base of the fin

Dorsal fins (D) have a continuous row of closely spaced cartilaginous blocks running along almost the entire fin base. When looking at a cross section of the base of a lower caudal lobe (LC1), there is typically only a yellow, "spongy" material called ceratotrichia, which is the valuable part of the lower caudal lobe. In some lower caudal lobes (LC2) there may be a small number of the cartilaginous blocks, but they are usually widely spaced and/or occur only along part of the fin base. Usually the lower caudal lobe has been cut along its entire base when removed from the shark; in contrast, dorsal fins frequently have a free rear tip that is fully intact.



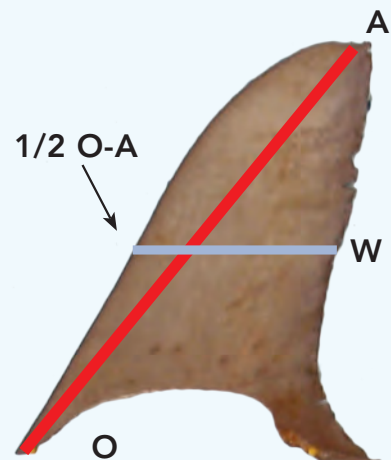
Step 2: Identify silky first dorsal fins.



Take fin measurements

- 1) Measure fin origin to apex (O-A) with a flexible tape measure.
- 2) Measure the fin width (W) at the halfway point of O-A (i.e., if O-A is 10 cm, measure W at 5 cm along O-A).
- 3) Divide O-A by W (O-A/W).

Origin, apex, and fin width (measured from leading edge to trailing edge) are landmarks found to be the most useful for species identification purposes, as measurements based on fin height, fin base, and free rear tip were often too variable and dependent on cut and condition of the fin.



Distinguishing silky first dorsal fins from first dorsal fins of similar size, shape, and color.



Silky first dorsal fin



Blue first dorsal fin



Dusky first dorsal fin



Night first dorsal fin

Silky shark (*Carcharhinus falciformis*) first dorsal fins are uniform in color, with a sloping leading edge, a moderately rounded (as opposed to pointed) apex, and a strongly convex (outwardly rounded) trailing edge. The free rear tip is close to half the length of the base. The color is grey or greyish-brown.

Blue shark (*Prionace glauca*) first dorsal fins, while slightly similar in shape, are noticeably darker in color, have a low angular leading edge, a much more strongly convex trailing edge, and a shorter free rear tip than silky shark first dorsal fins.

Dusky shark (*Carcharhinus obscurus*) first dorsal fins are similar in shape and color and have moderately long free rear tips. However, they are narrowly rounded at the apex and the trailing edge is not strongly convex (outwardly rounded) as the silky first dorsal fin.

Night shark (*Carcharhinus signatus*) first dorsal fins are similar in shape and color and have a moderately long free rear tip. However, the apex is not as rounded, and the trailing edge is more convex (outwardly rounded) than the silky first dorsal fin.

A note on thresher dorsal fins:

The first dorsal fins of the three thresher shark species are similar in size, shape, and color to other lamniforme shark species found in trade, including shortfin mako (*Isurus oxyrinchus*), longfin mako (*Isurus paucus*), and salmon shark (*Lamna ditropis*).

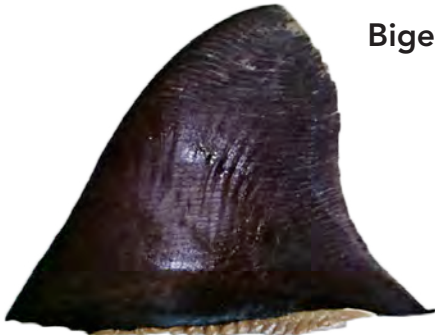
The fin base of the thresher shark is much thicker than those of other shark species, and the basal cartilage is compressed into an oblong shape as opposed to other species.

However, **the key diagnostic character is that the ventral surface of the pectoral fin has little to no counter shading** as outlined previously in this guide and will be the easiest way to identify thresher species during inspections.

Pelagic thresher first dorsal fin



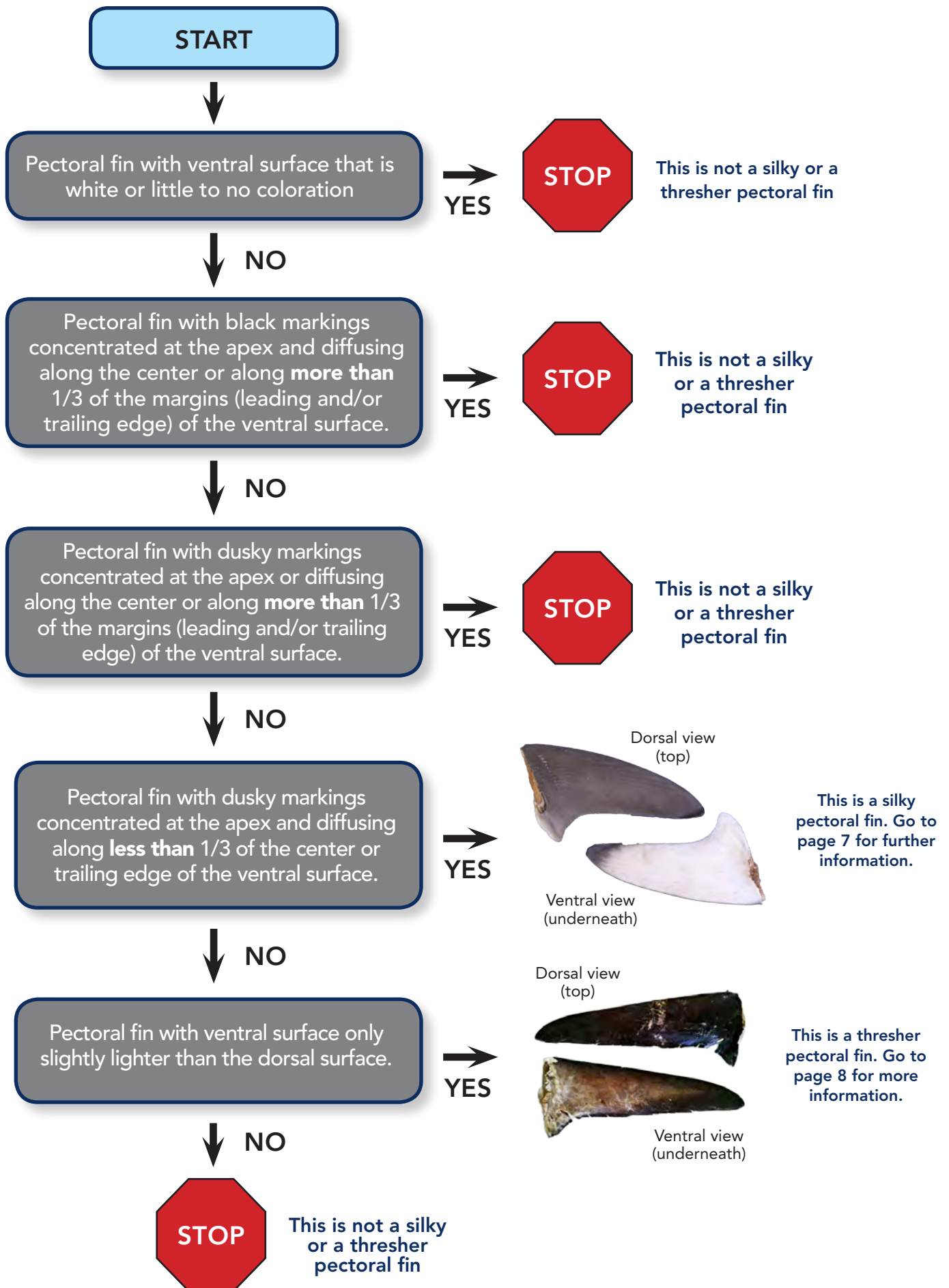
Bigeye thresher first dorsal fin



Common thresher first dorsal fin

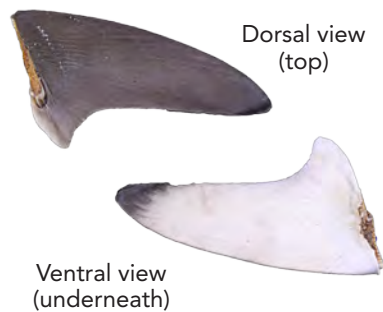


Step 3: Identify silky and thresher pectoral fins.

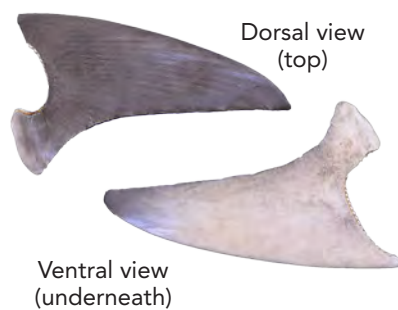


Distinguishing silky pectoral fins from species with pectoral fins of similar size, shape, and/or color

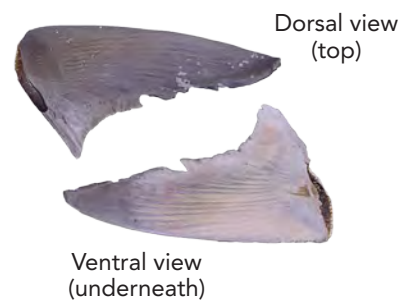
Silky pectoral fins



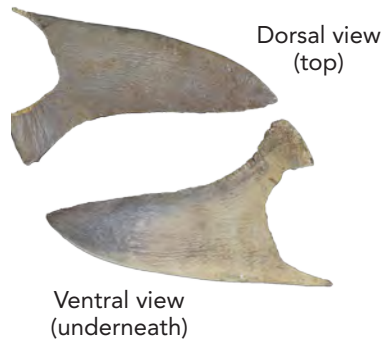
Dusky pectoral fins



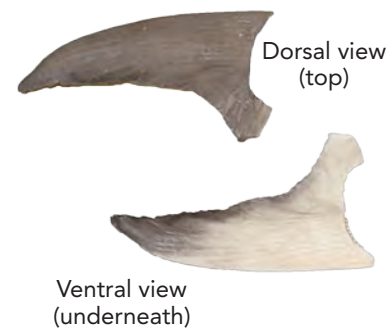
Night pectoral fins



Bull pectoral fins



Caribbean reef pectoral fins



Differentiating silky pectoral fins from those of other shark species requires examination of both the dorsal and ventral surfaces. Silky pectorals are long, with nearly straight trailing edge, and narrowly rounded at the apex. The fin has a smooth texture with small dermal denticles. The dorsal surface is greyish-brown and the ventral surface is white with a visible dusky coloration concentrated at the apex, extending along less than 1/3 of the margin of the trailing edge.

Night and Dusky shark pectoral fins are similar in that they have dusky markings at the apex on the ventral surface. However, silky shark pectoral fins can be easily differentiated from the pectoral fins of these species because the dusky coloration visible at the apex of dusky and night shark pectoral fins is less concentrated (or obvious), typically diffusing over more of the ventral surface. Also, the apex itself is more pointed in the dusky and night shark pectoral fins.

Bull shark (*Carcharhinus leucas*) and Caribbean reef shark (*Carcharhinus perezi*) pectoral fins (and Grey reef shark (*Carcharhinus amblyrhynchos*) pectoral fins examined from photos taken in aquaria and published online) also have a distinctive dusky coloration at the apex on the ventral surface. However, this coloration extends further into the middle of the ventral surface and further along the trailing edge.

Distinguishing thresher pectoral fins from longfin mako fins

Thresher pectoral fins are easily differentiated from those of other species due to the similar coloration on both the dorsal and ventral surfaces of the fin.

Longfin mako ventral surface is mostly white or light in color with dark markings at the apex and along the margins of the leading and trailing edges. Additionally, the apex is rounded, not curved as in thresher species.

Bigeye pectoral fins



Longfin Mako pectoral fins



Silky *Carcharhinus falciformis*

IUCN Red List
Designation

NEAR
THREATENED

IUCN Red List Designations: Vulnerable in the eastern central and southeast Pacific; Vulnerable in the northwest Atlantic and western central Atlantic; Near Threatened in the southwest Atlantic; and Near Threatened in the Indian Ocean and western central Pacific.



1st dorsal fin: Uniform grey to greyish-brown in color with a sloping leading edge, a moderately rounded (as opposed to pointed) apex, and a strongly convex (outwardly rounded) trailing edge. The free rear tip is close to half the length of the base.



Courtesy of NOAA Fisheries Service



Dorsal view
(top)



Ventral view
(underneath)

Pectoral fins: long, nearly straight trailing edge, narrowly rounded at the apex. The dorsal surface is grey or greyish-brown and the ventral surface is white with a visible dusky coloration concentrated at the apex, extending along less than 1/3 of the margin of the trailing edge.

Bigeye Thresher *Alopias superciliosus*

IUCN Red List
Designation

VULNERABLE

IUCN Red List Designations: Vulnerable in the eastern central Pacific; Endangered in the northwest Atlantic and western central Atlantic; Near Threatened in the southwest Atlantic; Data Deficient in the Mediterranean Sea; and Vulnerable in the Indo-west Pacific.



1st dorsal fin: Broad, erect fins with a steep angled leading edge, slightly convex trailing edge and a short free rear tip. The dorsal fin is very thick across the base with thick basal cartilage that is compressed and elongated laterally (see page 5). Not as tall as the first dorsal fin of the common thresher.



Courtesy of NOAA Fisheries Service



Dorsal view
(top)



Ventral view
(underneath)

Pectoral fins: long and slender from the leading edge to the trailing edge, curving slightly at the rounded apex. The dorsal surface is a dark grey to dark greyish-brown, with the ventral surface being almost as dark with a visible light coloration at the base, extending into the middle of the fin, diffusing into the darker margins of the leading and trailing edges.

Common Thresher *Alopias vulpinus*

IUCN Red List
Designation

VULNERABLE

IUCN Red List Designations: Near Threatened in the eastern central Pacific; Vulnerable in the northwest Atlantic and western central Atlantic; Vulnerable in the Mediterranean Sea; and Data Deficient in the Indo-west Pacific.



1st dorsal fin: Tall, erect with a steep angled leading edge, slightly convex trailing edge, a narrowly rounded apex and a short free rear tip. The dorsal fin is very thick along the base, and the thick basal cartilage that is compressed and elongated laterally (see page 5). Some fins will have a small, visible white patch at the apex.



Courtesy of NOAA Fisheries Service



Dorsal view
(top)



Ventral view
(underneath)

Pectoral fins: long and slender from the leading edge to the trailing edge, curving slightly at the rounded apex. The dorsal surface is a dark grey to dark greyish-brown, with the ventral surface being as dark with a mottled white coloration at the base, often with a very small white spot visible at the tip of the apex (on both dorsal and ventral surfaces).

Pelagic Thresher *Alopias pelagicus*

IUCN Red List
Designation

VULNERABLE

IUCN Red List Designations: Vulnerable in the eastern central Pacific; Endangered in the northwest Atlantic and western central Atlantic; Near Threatened in the southwest Atlantic; Data Deficient in the Mediterranean Sea; and Vulnerable in the Indo-west Pacific.



1st dorsal fin: Broad, erect with a steep angled leading edge, slightly convex trailing edge and a short free rear tip. The dorsal fin is very thick across the base with thick basal cartilage that is compressed and elongated laterally (see page 5). Not as tall as the first dorsal fin of the common thresher.



Courtesy of NOAA Fisheries Service



Dorsal view
(top)



Ventral view
(underneath)

Pectoral fins: long and slender from the leading edge to the trailing edge, curving slightly at the rounded apex.

The dorsal surface is a dark grey to dark greyish-brown, with the ventral surface being almost as dark along the margins of the leading and trailing edges, diffusing into the middle of the fin, with a visible white coloration along the base.

About the guide

This guide is based on data collected during the examination of more than 2,000 dorsal and pectoral fins from over 50 shark species, including all of the dominant species or species groups in the international fin trade reported in Clarke et al. (2006). Conspicuous fin markings were also assessed for pattern and consistency within species using photographs published in the literature and online. Fins used in this study originated from the US, South Africa, Belize, Costa Rica, Chile, Colombia, Fiji, New Zealand and Sri Lanka, and included a wide size range for each species. Fins examined in this study were provided by fishermen, fin traders, and scientists. No sharks were sacrificed for this project. Bigeye thresher, pelagic thresher, and longfin mako fin photos were provided by Diego Cardenosa. Cover photos were provided by Shawn Heinrichs and Alex Hofford/Greenpeace. This fin ID work is ongoing, and would greatly benefit from collaborations from around the world. If you would like to contribute information to be used in materials that are currently in development, please contact Debra Abercrombie.

We would like to thank the Kwa-Zulu Natal Sharks Board, the New Zealand Department of Conservation, the Fiji Department of Fisheries, the US National Marine Fisheries Service, the Florida Fish and Wildlife Conservation Commission, and the Belize Department of Fisheries for Assistance.

This work was supported by The Pew Charitable Trusts, and compiled by Debra L. Abercrombie, Abercrombie & Fish, Miller Place, NY (USA), and Demian D. Chapman, PhD, School of Marine and Atmospheric Sciences and the Institute for Ocean Conservation Science, Stony Brook University, Stony Brook, NY (USA)

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