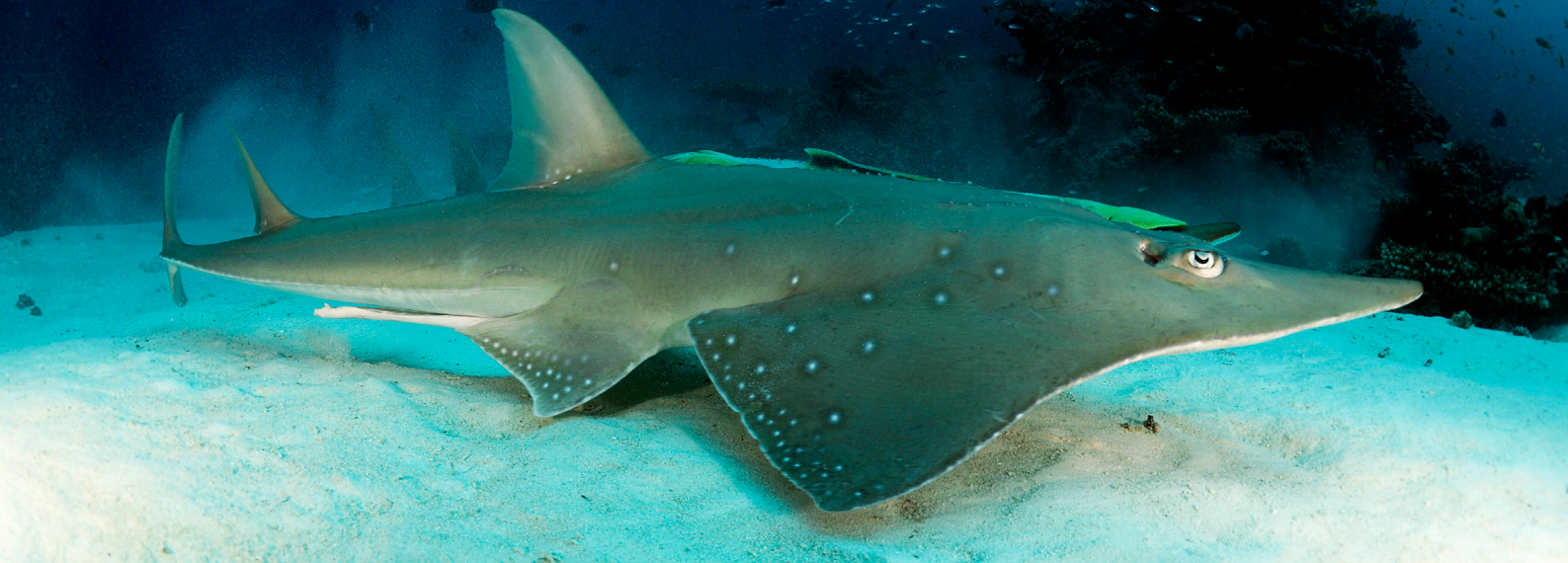


Wedgefishes and Giant Guitarfishes



Wedgefishes and Giant Guitarfishes

A Guide to Species Identification

2019

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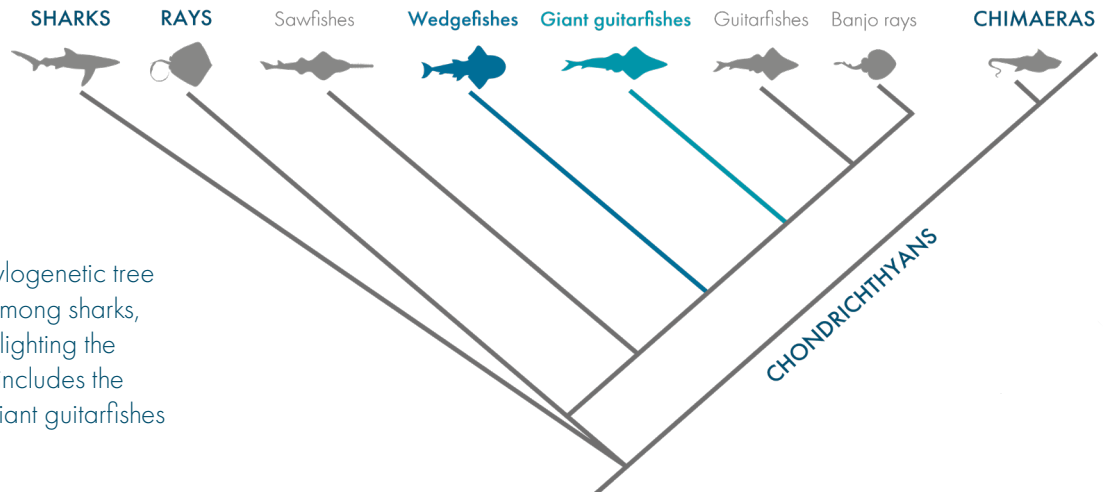
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Cover photo: © Guy Stevens -- Manta Trust -- Bottlenose Wedgefish (*Rhynchobatus australiae*), Maldives.

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What are 'shark-like rays'?

The term 'shark-like rays' refers to 63 species from five families in the order Rhinopristiformes: the sawfishes (Pristidae), wedgefishes (Rhinidae), giant guitarfishes (Glaucostegidae), guitarfishes (Rhinobatidae), and banjo rays (Trygonorrhinidae). Their flattened body is perfectly adapted for life on the seabed, either swimming close to the bottom or resting and lying concealed within the sediments. All species are characterized by a life-history of slow growth, late maturity, and low fecundity, making them extremely susceptible to population decline from overexploitation. In fact, except for the banjo rays, the remaining four families are considered amongst the top shark and ray families most at risk of extinction. Specifically, all but one species of sawfishes, wedgefishes, and giant guitarfishes that have been assessed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species are considered threatened (Critically Endangered). Despite this elevated extinction risk, little to almost no management has been put in place for these species.



Schematic chondrichthyan phylogenetic tree representing the relationship among sharks, rays, and chimaeras, and highlighting the order Rhinopristiformes which includes the wedgefishes (Rhinidae) and giant guitarfishes (Glaucostegidae).

Threats and population declines

Wedgefishes and giant guitarfishes are shallow-water inshore and coastal species with much of their distributional range overlapping with areas of high fishing pressure on the continental shelf. They are susceptible to capture in commercial and artisanal fisheries using various types of gears including nets, trawls, longlines, and handlines. Species are either targeted or retained when caught as bycatch, with the primary driver for retention being their fins. Indeed, while their meat is often consumed locally, unprocessed and processed fins enter the international shark fin trade and are considered the most valuable on the market due to their high ceratotrichia content ('fin needles' used in shark fin soup). Due to their quality and texture, dried fins labelled as *Qun chi* (meaning 'king of shark fins' in Cantonese), can be sold for up to USD\$964/kg in Hong Kong, one of the world's most important trade hubs and consumer markets for shark fins.

Currently, little is known at the species-specific level on wedgefishes and giant guitarfishes. Much of the available literature is incomplete with often inaccurate information due to frequent species misidentification and limited research effort. However, the available family-level catch and landings data from across their range in the Indo-Pacific and West Africa suggest severe population declines and localized extinctions highlighting the need for immediate conservation measures. For example, a recent assessment of the conservation status of sharks and rays in the Arabian Sea and adjacent waters concluded that the Bottlenose Wedgefish (*Rhynchobatus australiae*) and Whitespotted Wedgefish (*R. djiddensis*) have suffered significant population declines estimated between 50-80% over the last three decades. In Pakistan, wedgefishes and guitarfishes used to be abundant in commercial landings, however, catches of these species have considerably dropped, with almost all wedgefishes having disappeared from landings and are now rarely recorded. In Indonesia, landings data indicate significant declines (over 80%) in the target gillnet fisheries for wedgefishes that began in the mid-1970s and reached a peak in 1987. Similar declines are noted throughout the range of all wedgefish and giant guitarfish species.

Wedgefishes and giant guitarfishes are morphologically similar and experience the same level of fishing pressure that has driven sawfishes (family Pristidae) to near extinction over the past few decades. Sawfishes have now been afforded



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species-specific protections in a number of countries and have been listed on international agreements including Appendix I of the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), effectively banning all commercial trade. However, wedgefishes and giant guitarfishes are largely unmanaged and it is highly likely that without regulations to ensure sustainable trade, the exceptionally high value of their fins will drive additional declines globally, thus threatening the survival of wild populations.

Benefits of listing wedgefishes and giant guitarfishes on CITES

Current CITES proposals are for the inclusion of *R. australiae* and *R. djiddensis* from the family Rhinidae as well as the Blackchin Guitarfish (*Glaucostegus cemiculus*) and the Sharpnose Guitarfish (*Glaucostegus granulatus*) from the family Glaucostegidae in Appendix II. These proposals include the listing of all look-alike and putative species from the family Rhinidae: Clown Wedgefish (*R. cooki*), Taiwanese Wedgefish (*R. immaculatus*), Smoothnose Wedgefish (*R. laevis*), African Wedgefish (*R. luebberti*), Eyebrow Wedgefish (*R. palpebratus*), Broadnose Wedgefish (*R. springeri*), False Shark Ray (*Rhynchorhina mauritaniensis*), Bowmouth Guitarfish (*Rhina ancylostoma*), as well as the family Glaucostegidae: Halavi Guitarfish (*G. halavi*), Giant Guitarfish (*G. typus*), Clubnose Guitarfish (*G. thovin*), Widenose Guitarfish (*G. obtusus*).

In 2017, Parties to the Convention on the Conservation of Migratory Species of Wild Animals (CMS) listed *R. australiae* on Appendix II of the Convention, recognizing that this species is in need of collaborative international conservation action. In 2018, the CMS Sharks Memorandum of Understanding (MoU) also listed this species on its Annex along with two look-alike species (*R. djiddensis* and *R. laevis*). Given the recent nature of these listings, no collaborative measures have yet been taken and a listing on CITES Appendix II would represent a strong commitment towards cooperative and global action by those CITES Parties that are also signatories to CMS and the Sharks MoU. It is clear that coordinated and comprehensive action is needed and a listing in Appendix II of CITES would encourage sustainable trade and management of these species while preventing international trade in their high value fins from driving them to extinction.

Objectives of this guide

The primary objectives of this guide are to illustrate and provide a tool for the identification of all known species of wedgefishes and giant guitarfishes. The inability to adequately identify wedgefishes and giant guitarfishes has been a widespread and common problem for fisheries managers with catches of these species often going unmonitored. Also, the taxonomic status of several species remains unclear with some species challenging to identify due to similar body shape, colour, and overlapping distributions. Essential to our understanding of the status of wedgefishes and giant guitarfishes, and the successful implementation of CITES listings, is accurate species identification along with the strict enforcement of fishing, trade, and protection measures. This guide will support and assist field biologists, researchers, fisheries enumerators, and customs officials to rapidly and accurately identify wedgefishes and giant guitarfishes as whole animals or from their fresh or dried unprocessed fins.

How to use this guide

For each known species of wedgefish and giant guitarfish, information on the key features used in their identification is provided. Key features for each species should be used in conjunction with the more general family characteristics provided on **page 11**. Common names used here follow Last *et al.* (2016) or the most commonly accepted name across the majority of their range (e.g., Bowmouth Guitarfish is used instead of the Australian name Shark Ray for *Rhina ancylostoma*).

Key features and illustrations

The key features presented are those by which a species can be most easily identified in the field. These characteristics include body shape, fin positions, and colour patterns. It is important to note that typical of many chondrichthyan fishes, wedgefishes and giant guitarfishes undergo ontogenetic changes (as they develop from juveniles to adults) in fin shape that typify development. Specifically, dorsal fins change shape to become taller and more erect as they develop. The illustrations of each species in this guide are re-creations based on available photographs (mostly from the Northwest Indian

Ocean region and West Africa) and available illustrations. It is however important to note that body coloration can vary depending on the state of the animal (i.e., fresh, frozen, dried, preserved, etc.). Furthermore, many of these illustrations are based on morphological characteristics exhibited by adults and some features, colours, patterns might differ in juveniles and are therefore mentioned in the identifying features. Species within each family are arranged based on their closest morphological species or 'look-alike'.

Finally, it is important to note while the identification features presented here are based on the best available information, the taxonomy of many of these species (especially wedgefishes) is currently being revised and it is possible that specimens observed at landing sites might have differing features. If readers encounter specimens that are rare, not identifiable by using this guide, or are unsure of their identifications, it is recommended to retain them for further investigation and take appropriate photographs and tissue samples. Readers can also contact the author for assistance on info@elasmoproject.com.

Distribution

Species distributions are mapped as overlays of individual distributions to show species richness for each family. These have been mapped based on Last *et al.* (2016) (except for the Clubnose Guitarfish that is not considered to occur in the Red Sea), Jabado *et al.* (2017), and confirmed photographic records.

IUCN Categories

The IUCN Red List of Threatened Species is the most comprehensive framework for assessing the extinction risk of the world's plant and animal species. The current conservation status of each species is indicated by a logo under each species name. Abbreviations for these categories in order of decreasing threat are: EX, Extinct; EW, Extinct in the Wild; CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; and DD, Data Deficient.



Key terms

base – part of a projection (e.g. fin) connected to body
blotch – variably sized area or patch that is different in colour to adjacent areas

bulbous – a shape, swollen or bulging

denticle – a small, tooth-like structure on the skin

dorsal – pertaining to the upper part or surface of back

indentation – notch or concavity on the surface of something

margin – edge or rim

ocellated – having eye-like markings

posterior – relating to back of or tail end of an animal

rostral – on upper part of the snout

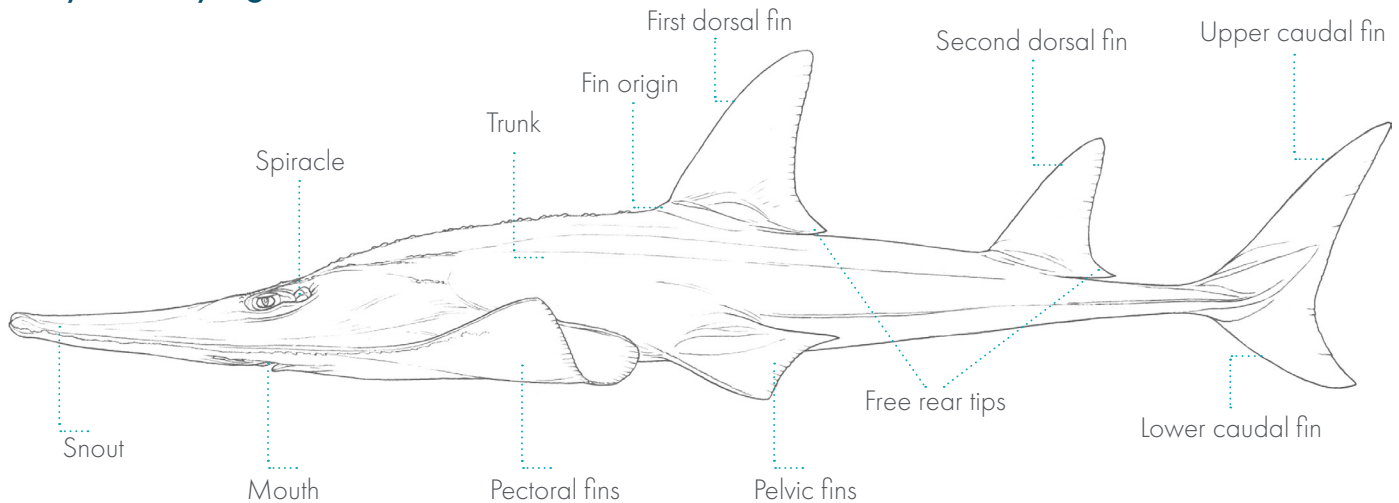
spiracle – a respiratory opening behind the eyes

snout – part of head in front of eyes

translucent – allows light in but not totally transparent

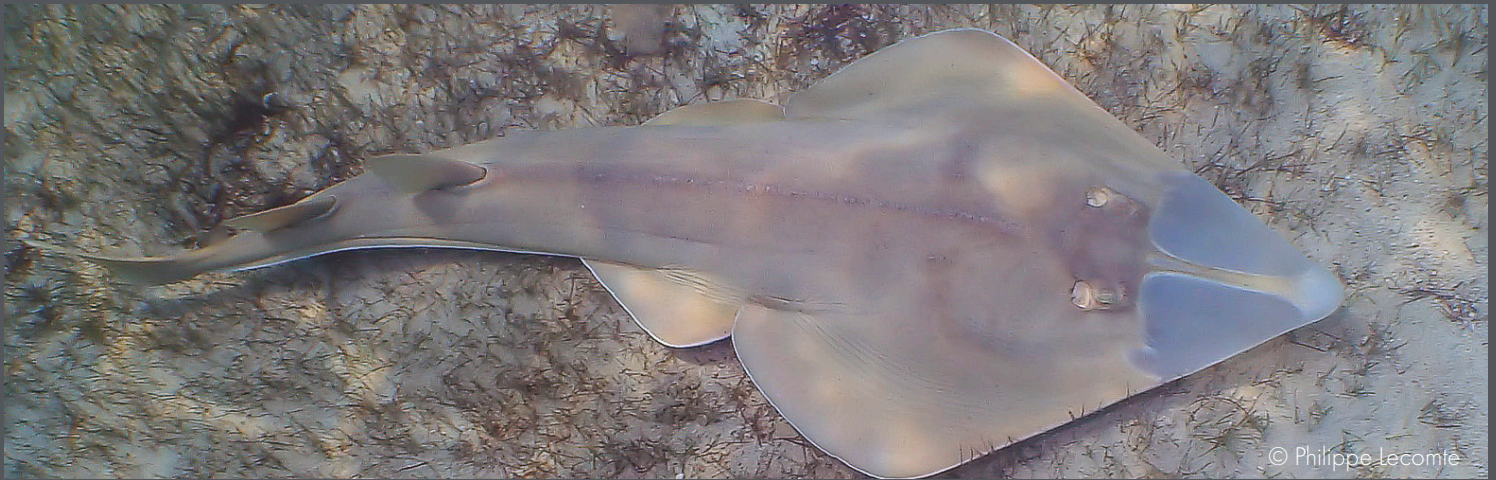
ventral – pertaining to the lower part or surface

Key identifying features





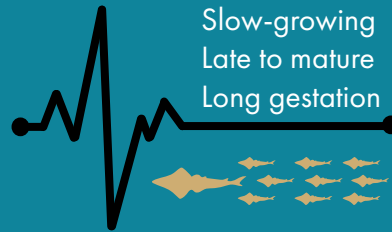
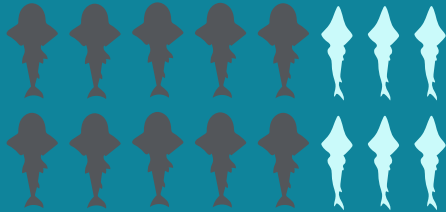
© Andy Murch



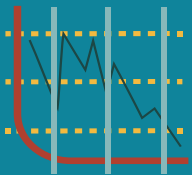
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THE FACTS

16 species



Live in coastal and inshore areas

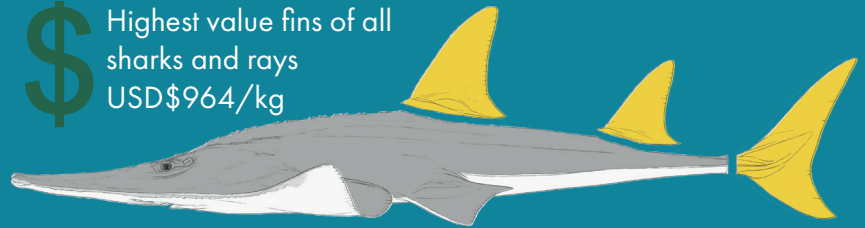


80%

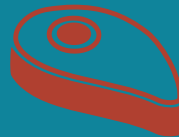
decline in the population of most species



Highest value fins of all sharks and rays
USD\$964/kg



Sold for shark fin soup in Hong Kong and China as *Qun Chi*



Meat often consumed by coastal communities

Visual identification of dried unprocessed fins possible



WEDGEFISHES - Family Rhinidae

The family Rhinidae includes 10 valid species from three genera: *Rhina*, *Rhynchobatus*, and *Rhynchorhina*. Wedgefishes are medium to large rays (reaching up to 3.1 m total length as adults) that are mostly found in warm temperate to tropical inshore continental seas, and rarely occur deeper than 400 m. They have a primarily Indo-Pacific distribution with only two species occurring in the eastern Atlantic. Most species have rows of white spots or ocelli on their bodies, and often a black marking on each pectoral fin that is variably surrounded by white spots. This black marking is generally most obvious in young and can fade or disappear in adults.



Species richness =

1	2	3	4	5
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GIANT GUITARFISHES - Family Glaucostegidae

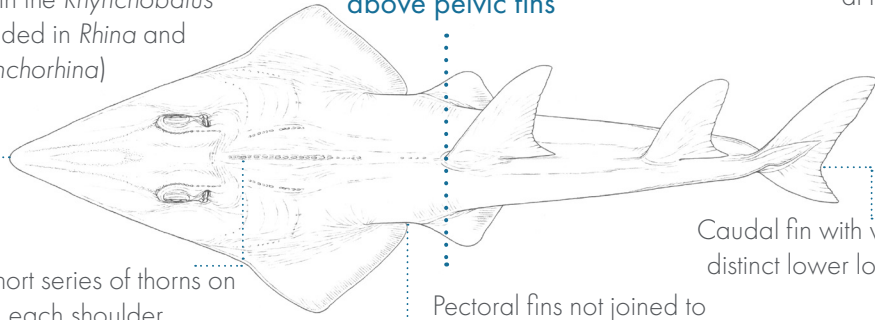
The family Glaucostegidae includes six valid species from one genus: *Glaucostegus*. Giant guitarfishes are medium-sized to large rays (adults of most species exceed 3 m total length) that primarily inhabit subtropical and tropical inshore continental and insular seas across the Indo-Pacific and eastern Atlantic, including the Mediterranean Sea. They occur at depths up to 100-120 m but are mostly found in intertidal habitats with some species having been recorded in fresh and brackish waters. Most species have no spots, stripes, or blotches.



Head angular and wedge-shaped (only in the *Rhynchobatus* genus; rounded in *Rhina* and *Rhynchorhina*)

2-3 short series of thorns on each shoulder

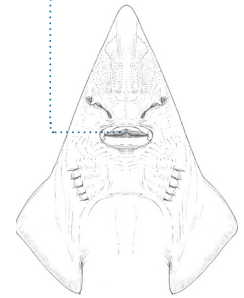
Origin of first dorsal fin above pelvic fins



Caudal fin with very distinct lower lobe

Pectoral fins not joined to the body to form a disc

Upper jaw of mouth with at least one indentation in the middle

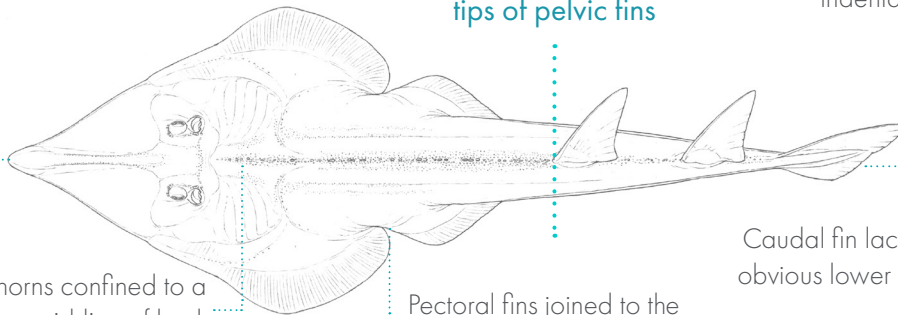


Underside of head

Head spade-like to wedge-shaped with translucent snout

Small thorns confined to a row along mid-line of body

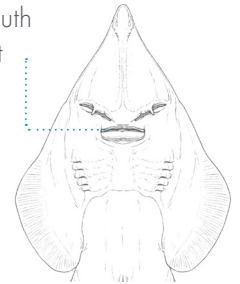
Origin of first dorsal fin well behind the tips of pelvic fins



Pectoral fins joined to the body to form a disc

Upper jaw of mouth straight without indentations

Caudal fin lacking obvious lower lobe

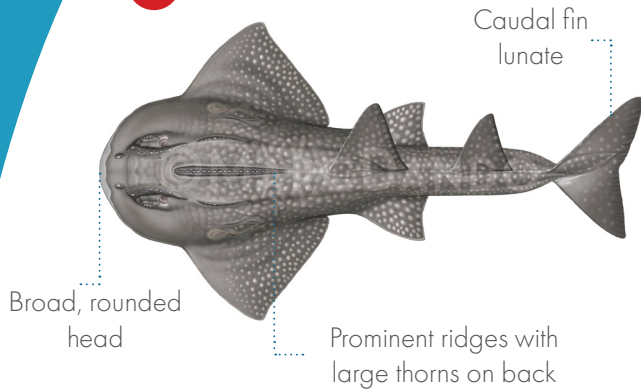


WEDGEFISHES - Family Rhinidae

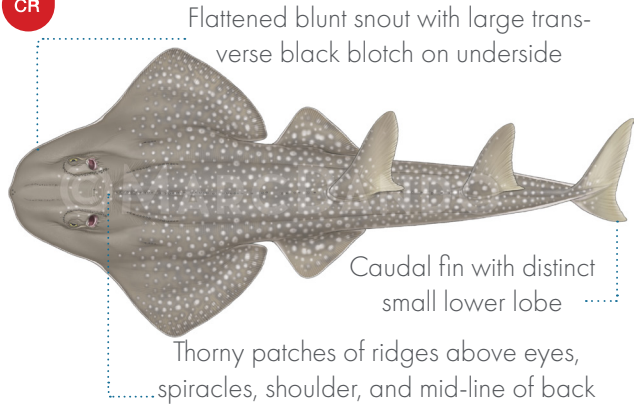


© Elke Bojanowski -- Red Sea Sharks

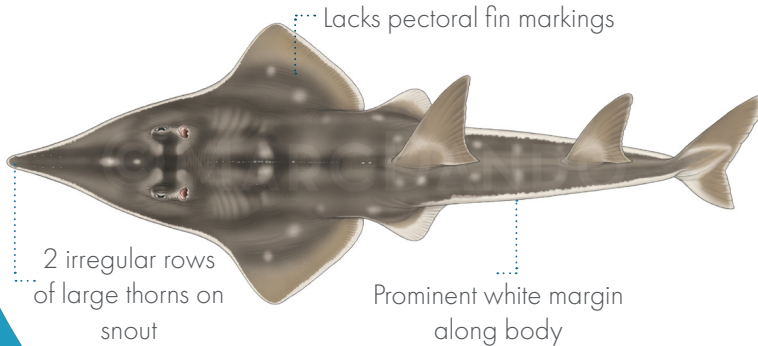
Bowmouth Guitarfish - *Rhina ancylostoma*



False Shark Ray - *Rhynchorhina mauritaniensis*



Clown Wedgefish - *Rhynchobatus cooki*

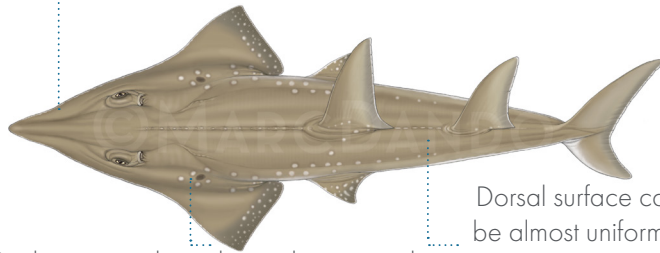


The Clown Wedgefish is the smallest of the wedgefishes and reaches 82 cm total length. It is known from less than 20 specimens and has not been recorded since 1996, despite extensive fish market surveys across Southeast Asia.

Bottlenose Wedgefish - *Rhynchobatus australiae*



Bottle-shaped snout slightly constricted near tip



3 white spots aligned over the pectoral marking (usually 2 spots below)

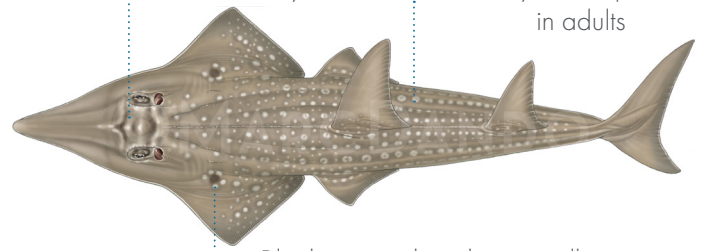
Dorsal surface can be almost uniformly blackish with no markings in some adults

Whitespotted Wedgefish - *Rhynchobatus djiddensis*



Prominent black bars between eyes

Spots with ring-like dusky colour pattern in adults

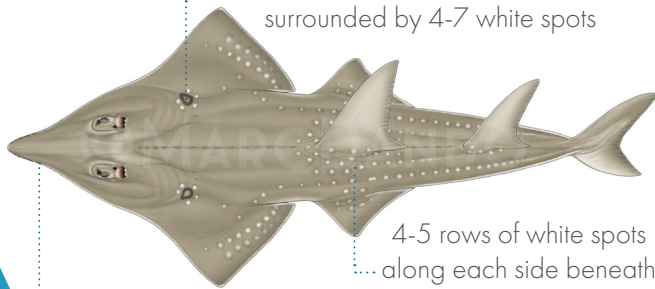


Black pectoral marking usually surrounded by 4 or more white spots

Smoothnose Wedgefish - *Rhynchobatus laevis*



Pectoral marking often ocellated, surrounded by 4-7 white spots



Snout underside usually with dark blotch

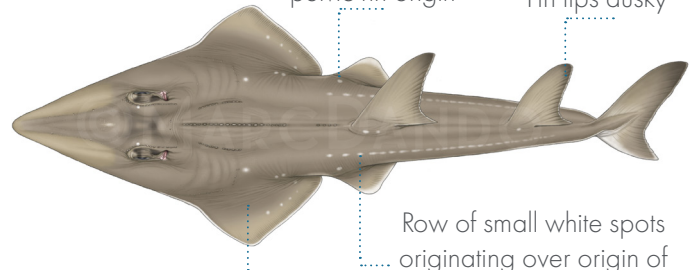
4-5 rows of white spots along each side beneath first dorsal fin

Taiwanese Wedgefish - *Rhynchobatus immaculatus*



Single white spot above pelvic fin origin

Fin tips dusky



No black pectoral marking

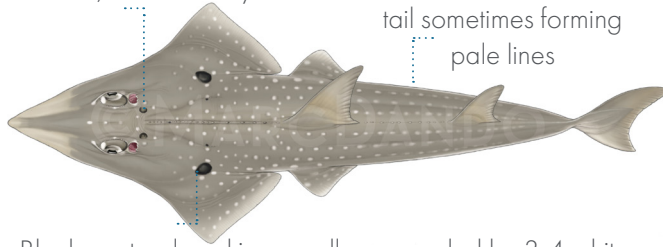
Row of small white spots originating over origin of pelvic fin and coalescing to form a line on tail

Broadnose Wedgefish - *Rhynchobatus springeri*



Usually dark markings on and/or behind eyes

3-4 rows of spots on each side extending along the tail sometimes forming pale lines

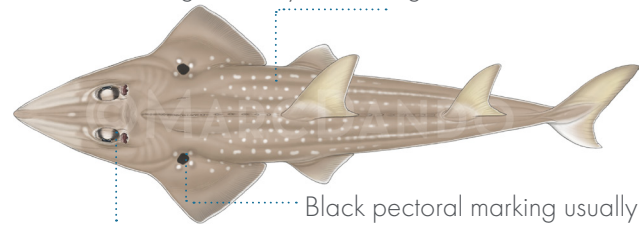


Black pectoral marking usually surrounded by 3-4 white spots with outermost pair closer together than inner pair

Eyebrow Wedgefish - *Rhynchobatus palpebratus*



2-4 rows of spots on each side under 1st dorsal fin forming a pale faint line continuing along the body but ending before tail



2 eyebrow-like black markings often present

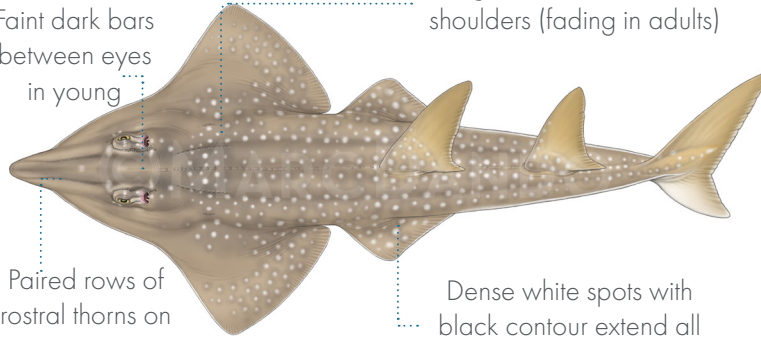
Black pectoral marking usually surrounded by 3-4 equally spaced white spots

African Wedgefish - *Rhynchobatus luebberti*



Faint dark bars between eyes in young

2 large blackish blotches on shoulders (fading in adults)



Paired rows of rostral thorns on the snout

Dense white spots with black contour extend all the way to the tail

The African Wedgefish is the only *Rhynchobatus* species to occur in the Atlantic Ocean. It is endemic to West Africa and has been recorded from Mauritania to Congo. It has already disappeared from much of its former range.

GIANT GUITARFISHES - Family Glaucostegidae

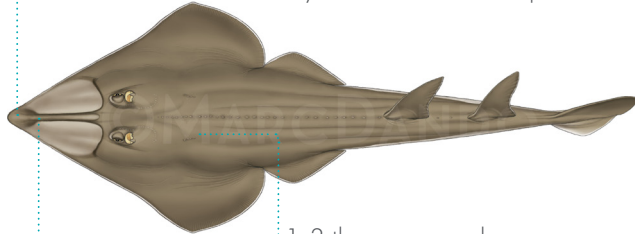


© Danny Copeland

Blackchin Guitarfish - *Glaucostegus cemiculus*

CR

Snout underside usually with dark blotch in juveniles



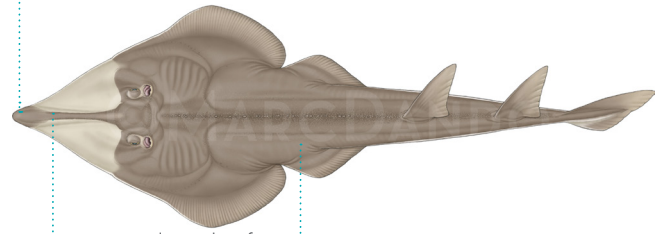
Rostral ridges separated at the back

1-3 thorns on each shoulder

Giant Guitarfish - *Glaucostegus typus*

CR

Snout underside usually with dark blotch

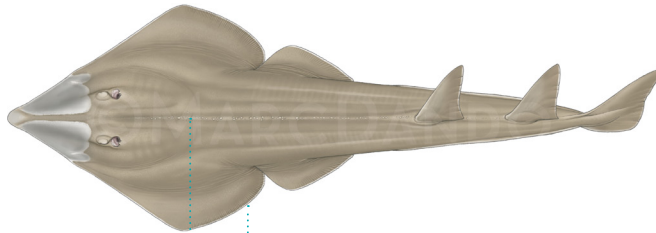


Entire length of rostral ridges almost joined

Dorsal surface sometimes with irregular dark-greyish blotches

Halavi Guitarfish - *Glaucostegus halavi*

CR



Single large thorn on each shoulder

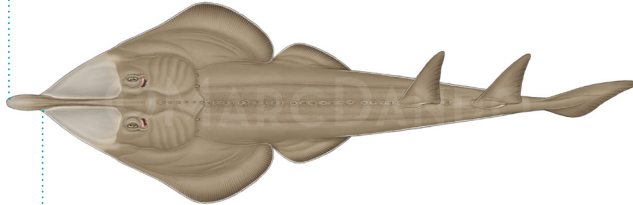
Ventral surface entirely white

The fins of giant guitarfishes are smaller than those of wedgefishes but are also extremely valuable. In several African countries, pups are removed from pregnant females so their fins can also be traded internationally.

Clubnose Guitarfish - *Glaucostegus thouin*



Bulbous snout tip projecting forward

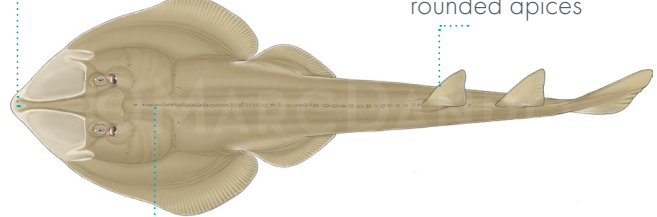


Lacks dark blotch on snout

Widenose Guitarfish - *Glaucostegus obtusus*



Very short and obtuse snout



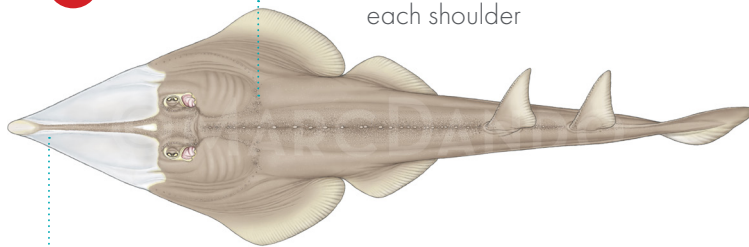
Dorsal fins short with rounded apices

Thorns along mid-line of body can be enlarged and irregular

Sharpnose Guitarfish - *Glaucostegus granulatus*



Pair of 2-3 large thorns on each shoulder



Very long, narrow, translucent, and triangular snout

The six valid species of giant guitarfishes were only recently recognized as a separate family and genus. Genetic analyses indicate that they are more closely related to sawfishes than other species of guitarfishes.

Overview of fin identification

This quick overview of wedgefsh and giant guitarfish fin identification covers fins that are likely to be encountered dried for sale at landing sites or fishing ports, sold by fin traders, or packed as batches destined for the international trade. Batches of dried fins usually include all the different fins of sharks and shark-like rays and are most easily identified when dried and unprocessed (skin on). Fins from wedgefishes and giant guitarfishes are distinctive when compared to shark fins. Furthermore, dried and unprocessed fins can easily be visually identified because of their size, shape, colour, and texture. On the other hand, wedgefsh fins are morphologically similar to those from giant guitarfishes once removed from the whole animals making identification to a species-level challenging. However, visual fin ID is possible at the family level (Rhinidae vs Glaucostegidae). This ability to visually identify the primary product in trade will aid in the implementation and enforcement of these proposed CITES Appendix II listings.

In general, the primary fins derived from wedgefishes and giant guitarfishes that are traded internationally for shark fin soup are the **two dorsal fins** and the **entire caudal fins**. This overview provides a breakdown of the main characteristics that can be used to quickly and easily separate dorsal fins from other types of fins (i.e., pectoral fins) as well as caudal fins to the family and sometimes genus level for the family Rhinidae. Visually distinguishing unprocessed dorsal fins of wedgefishes from those of morphologically similar hammerhead shark species (Scalloped Hammerhead *Sphyrna lewini*, Smooth Hammerhead *S. zygaena*, and Great Hammerhead *S. mokarran*) is described in more detail in Abercrombie & Hernandez (2017).

Dorsal fins

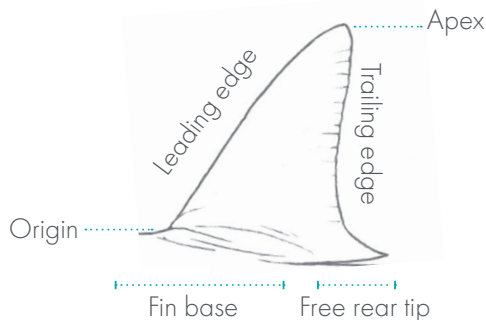
Unlike many shark species that have a second dorsal fin that is much smaller than the first, the first and second dorsal fins of wedgefishes and giant guitarfishes are large and tall, often very similar in height and shape. They are usually sold as a set and every two dorsal fins found in fin batches can be considered to represent one individual.

Caudal fin

The whole caudal fin of wedgefishes and giant guitarfishes is typically retained and dried. In comparison, for sharks, the lower lobe of the caudal fin is the most valuable and retained separately to the upper lobe (which is sometimes discarded). When whole, caudal fins are distinctive and easily distinguished by the presence or absence of distinct upper and lower lobes.

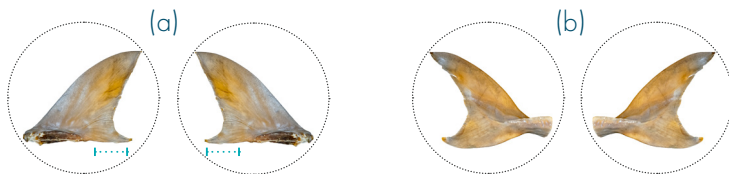
Below are some guidelines to help distinguish between dorsal and caudal fins of wedgefishes and giant guitarfishes.

The landmarks used to describe key features of fins are the same for sharks and rays and are presented here for dorsal fins:

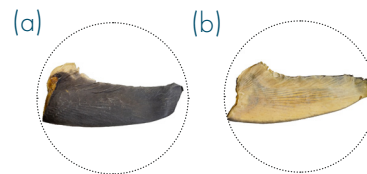


Step 1. Find dorsal fins and caudal fins from batches of fins and distinguish them from other fins such as pectoral fins. *It is important to note that pectoral fins found in the trade will usually **only** belong to sharks and **not** wedgefishes or giant guitarfishes.*

Dorsal (a) and caudal fins (b) are the same colour on both sides. Dorsal fins (a) also have a free rear tip

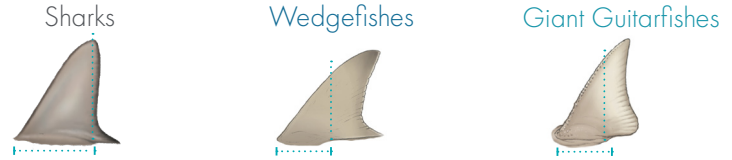


Pectoral fins are usually darker on the top side/dorsal view (a) and lighter underneath/ventral view (b)

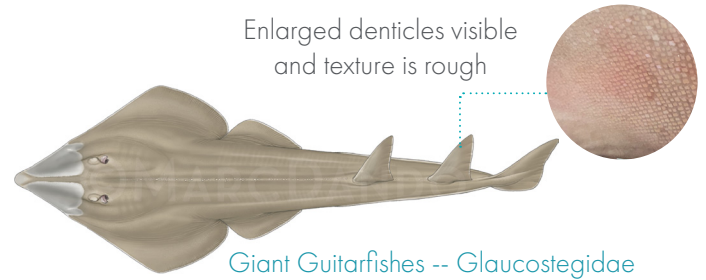
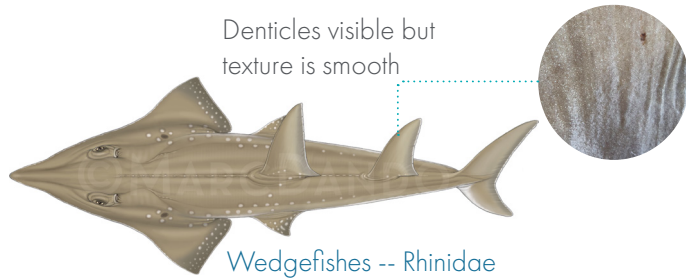


Step 2. Distinguish between shark and wedgefish and giant guitarfish dorsal fins

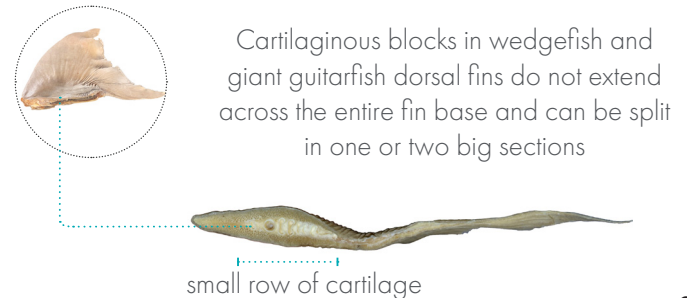
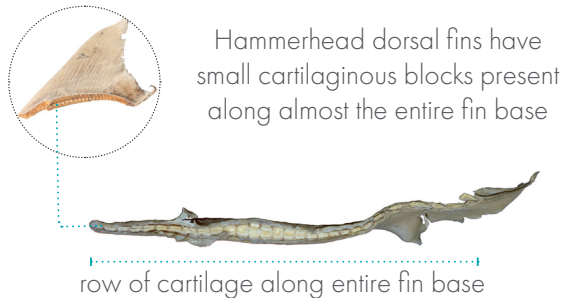
Dorsal fins of wedgefishes and giant guitarfishes have a free rear tip that starts anterior or before the apex and which is moderately longer when compared to the fin base.



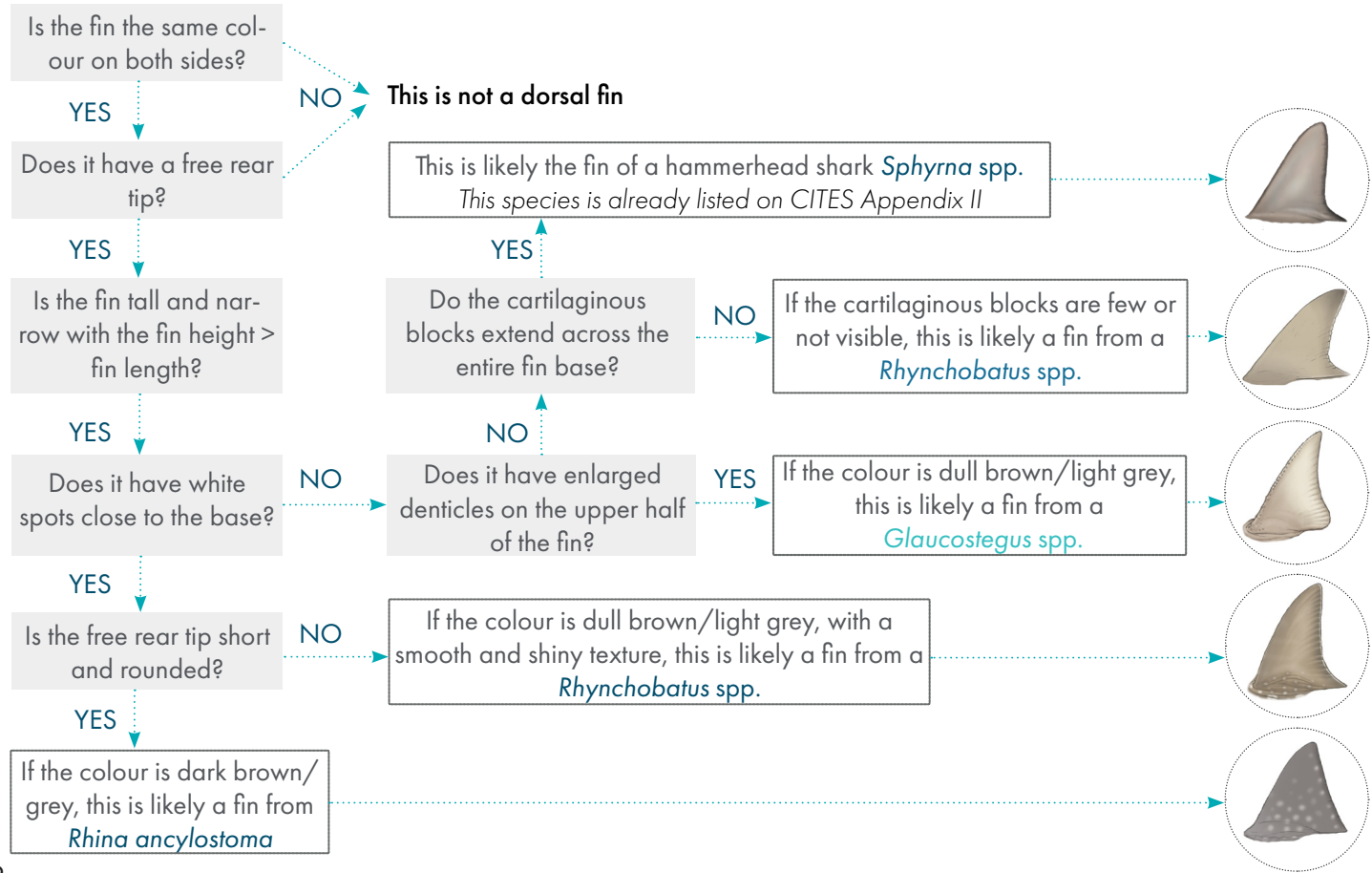
Step 3. Check the texture of the fins to determine if they are smooth and shiny or have enlarged denticles



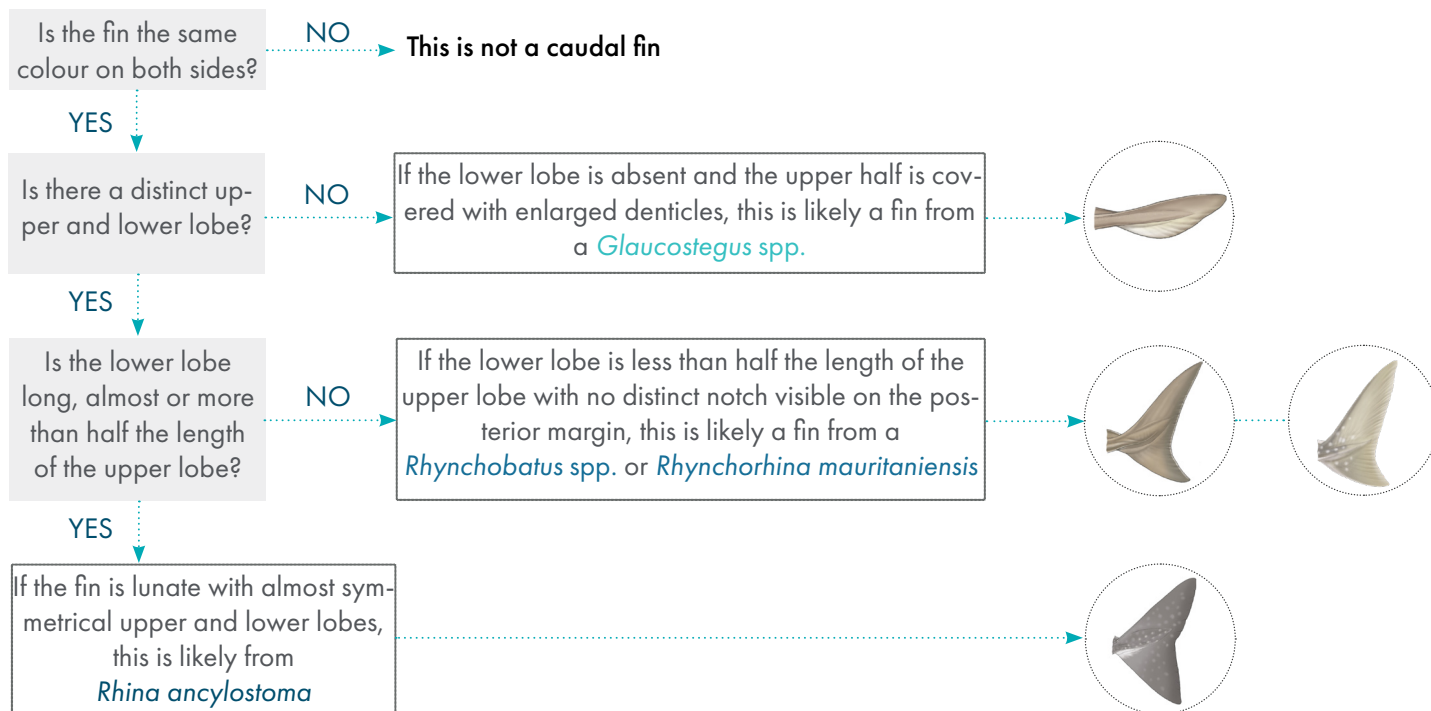
Step 4. For dull brown or light grey tall fins (fin height > fin length), check and confirm that they do not belong to hammerhead sharks



Key to identification based on dorsal fins



Key to identification based on caudal fins



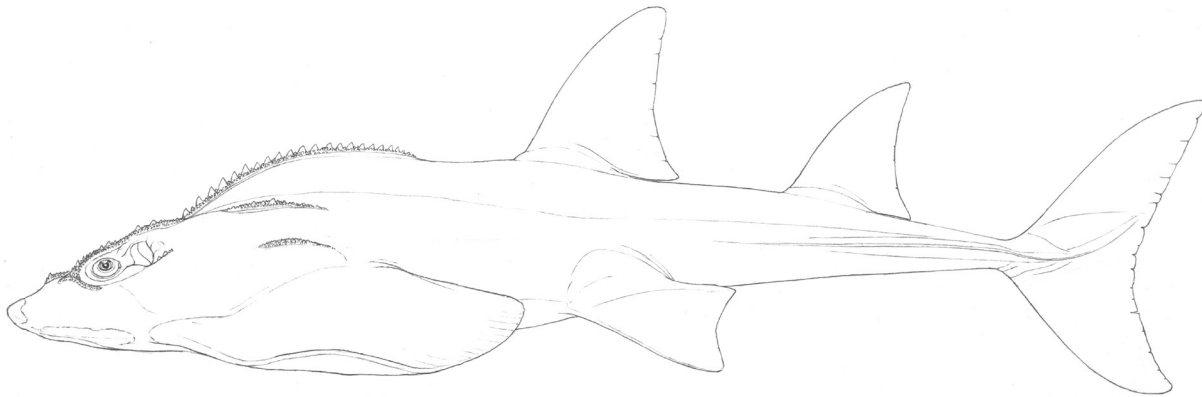
Note -- This fin identification overview was compiled to highlight that it is possible to visually identify fins from wedgesharks and giant guitarfishes. Several other key characteristics have been omitted including the differences between these fins and those of other CITES listed species such as the Whale Shark (*Rhincodon typus*) and sawfishes (Pristidae). A comprehensive guide to fin identification will be developed if these species are listed on CITES.

Species checklist

FAMILY	COMMON NAME	SCIENTIFIC NAME	AUTHORITY	IUCN STATUS
Rhinidae -- Wedgefishes				
	Bowmouth Guitarfish	<i>Rhina ancylostoma</i>	Bloch & Schneider, 1801	Critically Endangered
	Bottlenose Wedgefish	<i>Rhynchobatus australiae</i>	Whitley, 1939	Critically Endangered
	Clown Wedgefish	<i>Rhynchobatus cooki</i>	Last, Kyne & Compagno, 2016	Critically Endangered
	Whitespotted Wedgefish	<i>Rhynchobatus djiddensis</i>	(Forsskål, 1775)	Critically Endangered
	Taiwanese Wedgefish	<i>Rhynchobatus immaculatus</i>	Last, Ho & Chen, 2013	Critically Endangered
	Smoothnose Wedgefish	<i>Rhynchobatus laevis</i>	(Bloch & Schneider, 1801)	Critically Endangered
	African Wedgefish	<i>Rhynchobatus luebberti</i>	Ehrenbaum, 1915	Critically Endangered
	Eyebrow Wedgefish	<i>Rhynchobatus palpebratus</i>	Compagno & Last, 2008	Near Threatened
	Broadnose Wedgefish	<i>Rhynchobatus springeri</i>	Campagno & Last, 2010	Critically Endangered
	False Shark Ray	<i>Rhynchorhina mauritaniensis</i>	Séret & Naylor, 2016	Critically Endangered
Glaucostegidae -- Giant Guitarfishes				
	Blackchin Guitarfish	<i>Glaucostegus cemiculus</i>	(Geoffroy St Hilaire, 1817)	Critically Endangered
	Sharpnose Guitarfish	<i>Glaucostegus granulatus</i>	(Cuvier, 1829)	Critically Endangered
	Halavi Guitarfish	<i>Glaucostegus halavi</i>	(Forsskål, 1775)	Critically Endangered
	Widenose Guitarfish	<i>Glaucostegus obtusus</i>	(Müller & Henle, 1841)	Critically Endangered
	Clubnose Guitarfish	<i>Glaucostegus thouin</i>	(Anonymous, 1798)	Critically Endangered
	Giant Guitarfish	<i>Glaucostegus typus</i>	(Bennett, 1830)	Critically Endangered

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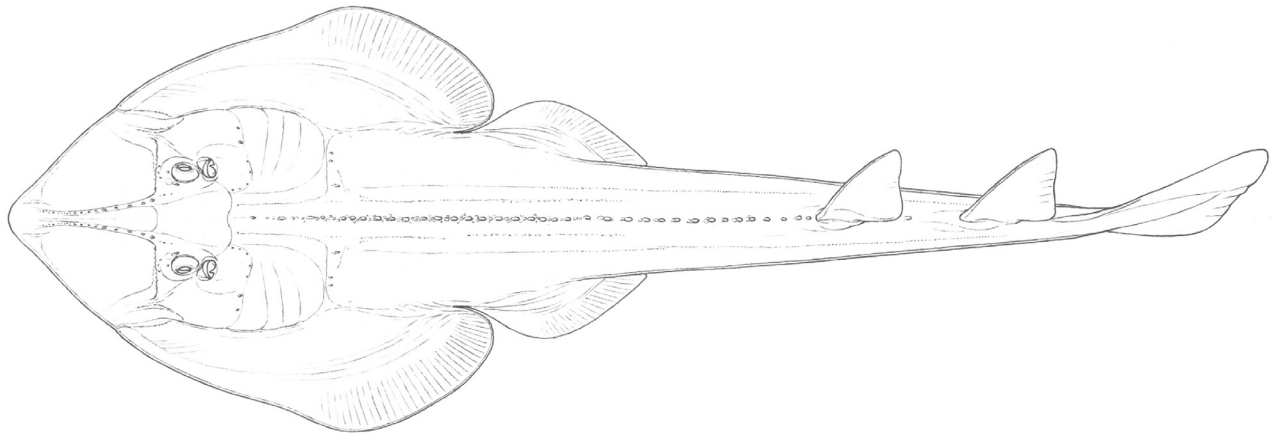
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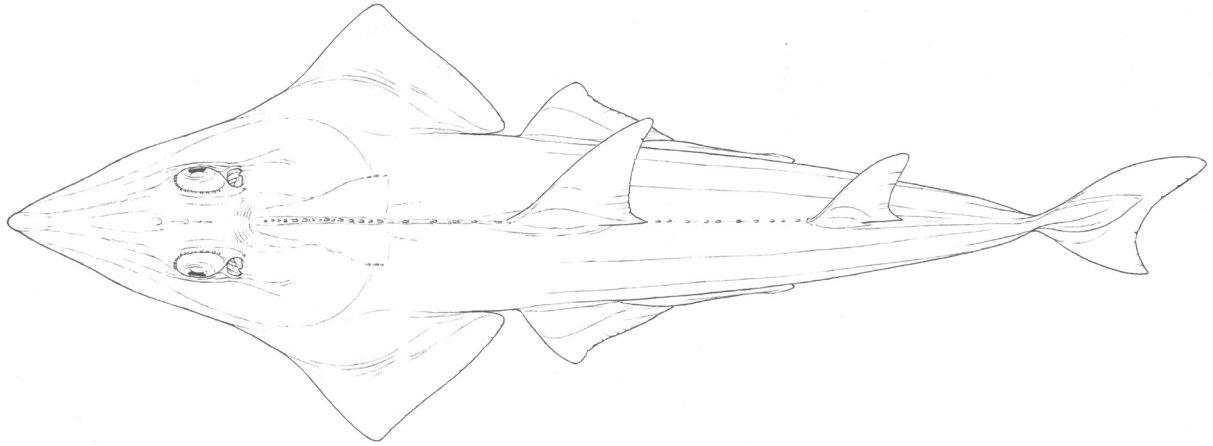
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A lack of management action for wedgefishes and giant guitarfishes has contributed to their current threatened status. Some populations have collapsed globally, with declines of more than 80% in many regions. Action is needed now to halt declines and secure a future for these species.

The objective of this guide is to provide a tool for the identification of 16 species of wedgefish and giant guitarfish (order Rhinopristiformes: families Rhinidae and Glaucostegidae) being proposed for listing on the Convention on International Trade in Endangered Species of Flora and Fauna (CITES). It can be used in the identification of species for fisheries purposes or for the implementation of CITES listings (if these species are listed). The content is divided into three sections: (1) an overview of the status of species around the world, (2) information on each species and key identification features that allow these species to be visually separated in the field, and (3) an overview of fin identification showcasing how to visually identify fins of wedgefishes and giant guitarfishes to the family level.

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