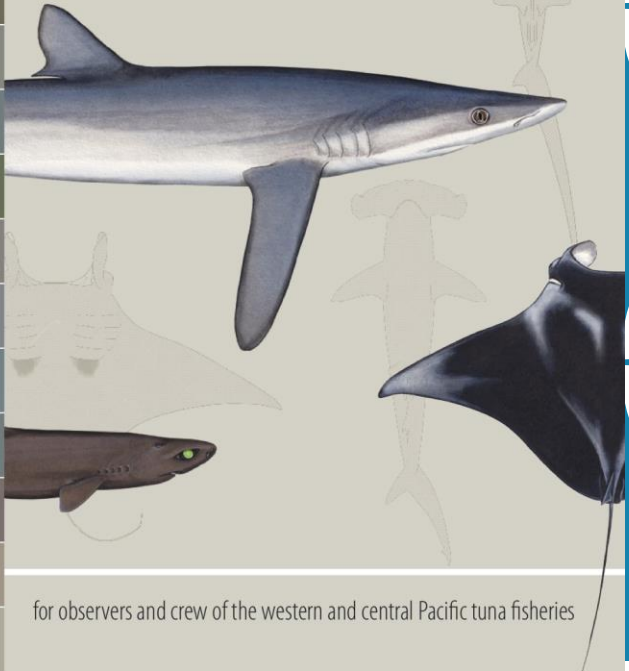


Shark and ray identification manual



for observers and crew of the western and central Pacific tuna fisheries

SHARK KEYS IDENTIFICATION GUIDE

Dr Lindsay Marshall

SPC SHARK AND RAY IDENTIFICATION MANUAL

44 shark and ray species (36 sharks 8 rays)

Key only works for the list of species found in the guide.

SPC SHARK AND RAY IDENTIFICATION MANUAL

This guide is organised in three tools:

1. The first provides a pathway of 43 identification key steps. It is preceded by illustrated definitions of shark and ray key external features.
2. The second consists of detailed illustrations of the 44 species of sharks and rays to show key features and their natural colouration when alive.
3. The third details the WCPFC best handling guidelines for the safe release of whale sharks and mobulids (since 2018), and other sharks (since 2019) incidentally caught during fishing operations. Reference sources are also provided.

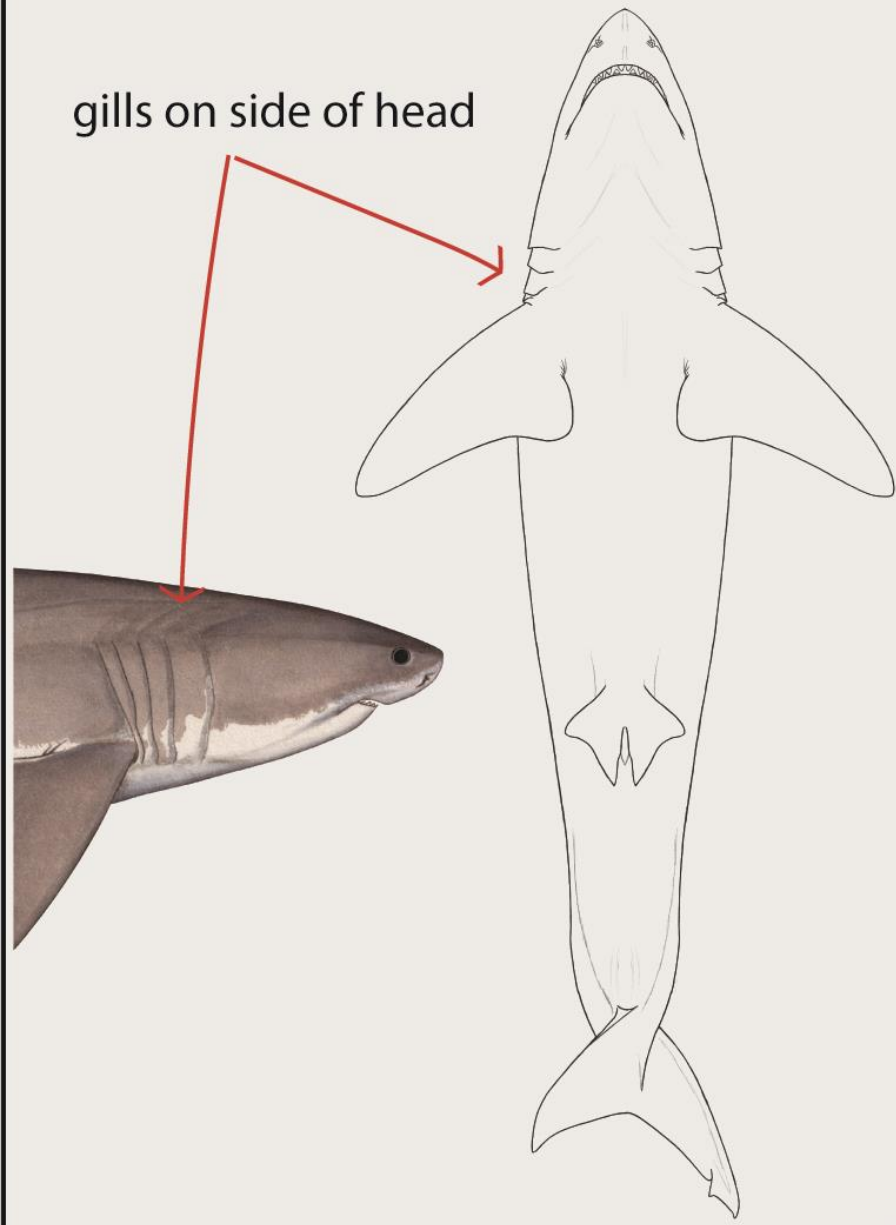
HOW TO USE THE GUIDE

- Familiarize yourself with the main shark and ray external features (p4 and 5)
- Work through the dichotomous key on page (starting on Page 1)
- if you don't understand the terms, check the glossary
- when you get to the end of the key, read the species description page to see if it matches. Look at other photos of the species to see if it fits.
- It is hard at first, but it will get easier!

TIPS FOR USING DICHOTOMOUS KEYS

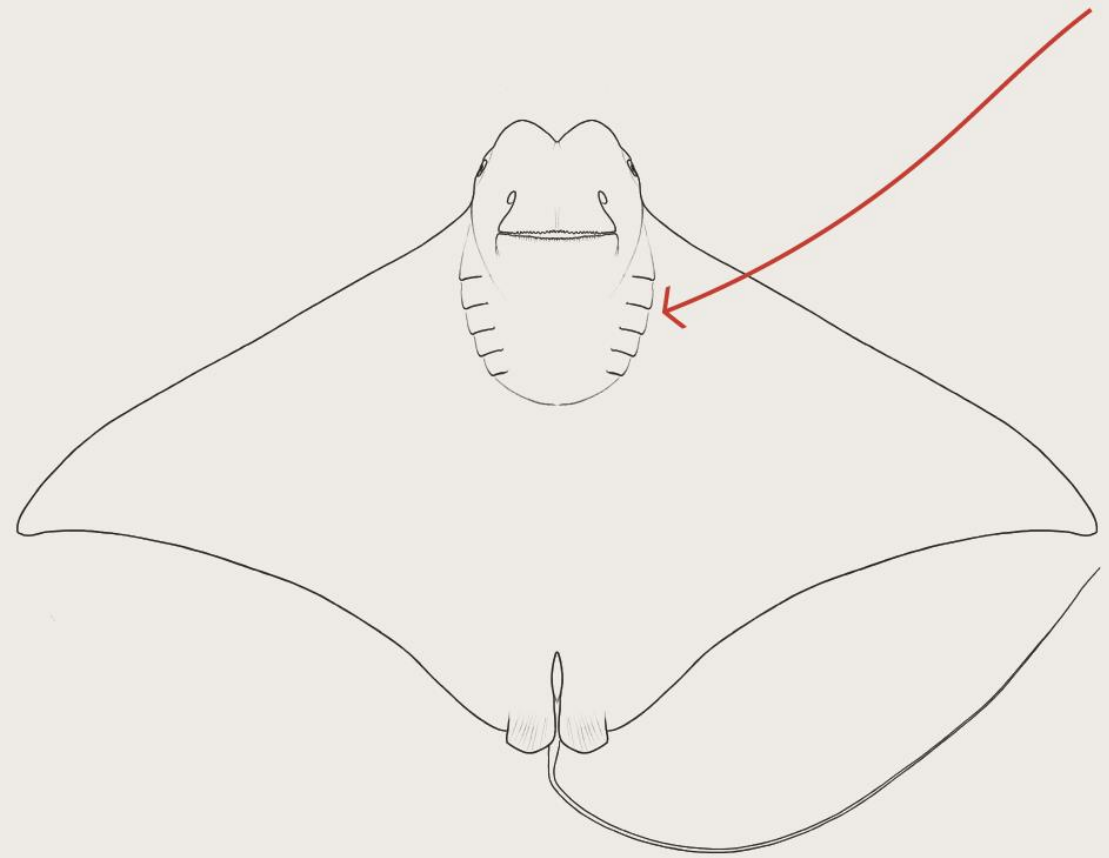
- Work from the start to the finish. Don't jump in in the middle.
- Read both choices carefully. It will fit either one choice or the other.
- keep notes on the steps you took to get there.
- if you are unsure of a choice, follow both forks at one time. It may become clear that one does not fit.
- work with more than one sample if possible.
- once you have keyed out your specimen, double check. Compare with the description and other photos.
- make sure you understand all of the terms used (check the glossary)

gills on side of head



...go to **step 2.**

gills on underside of head



...go to **step 37.**

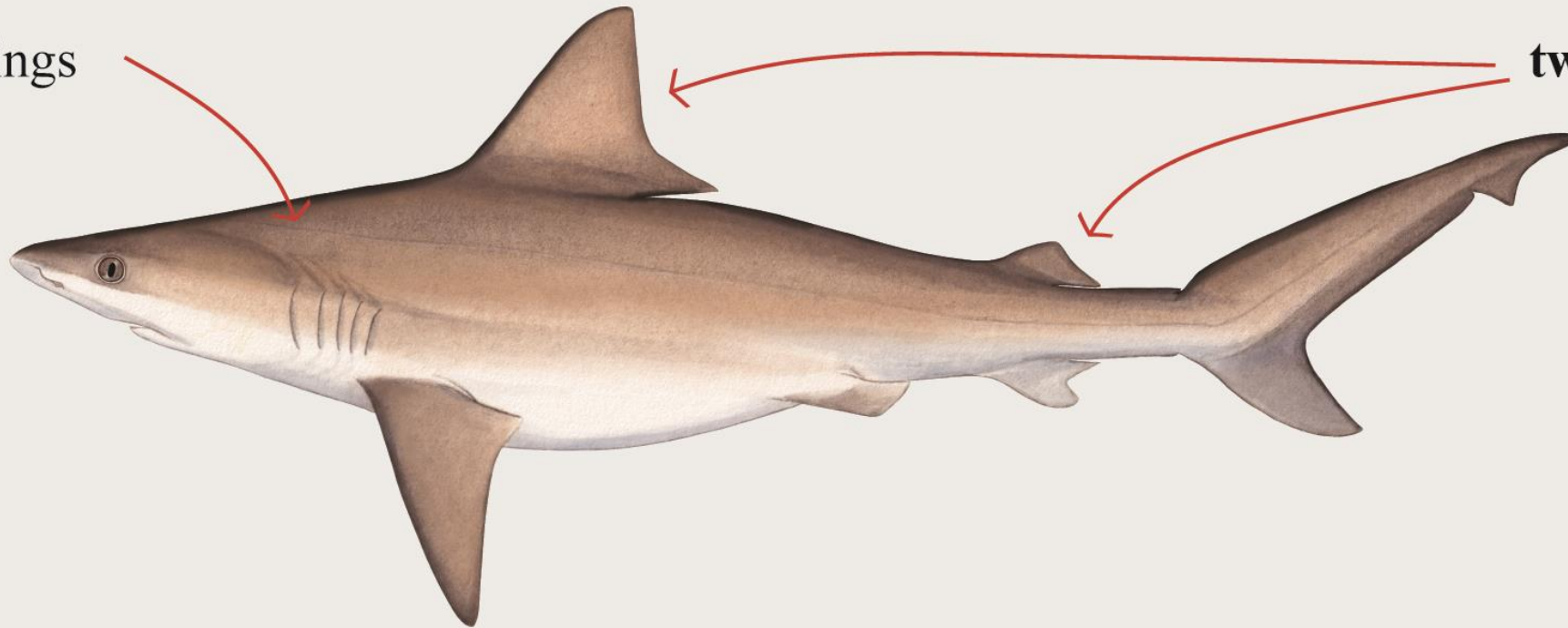
six gill openings



one dorsal fin

Hexanchus griseus (Bluntnose Sixgill Shark).

five gill openings



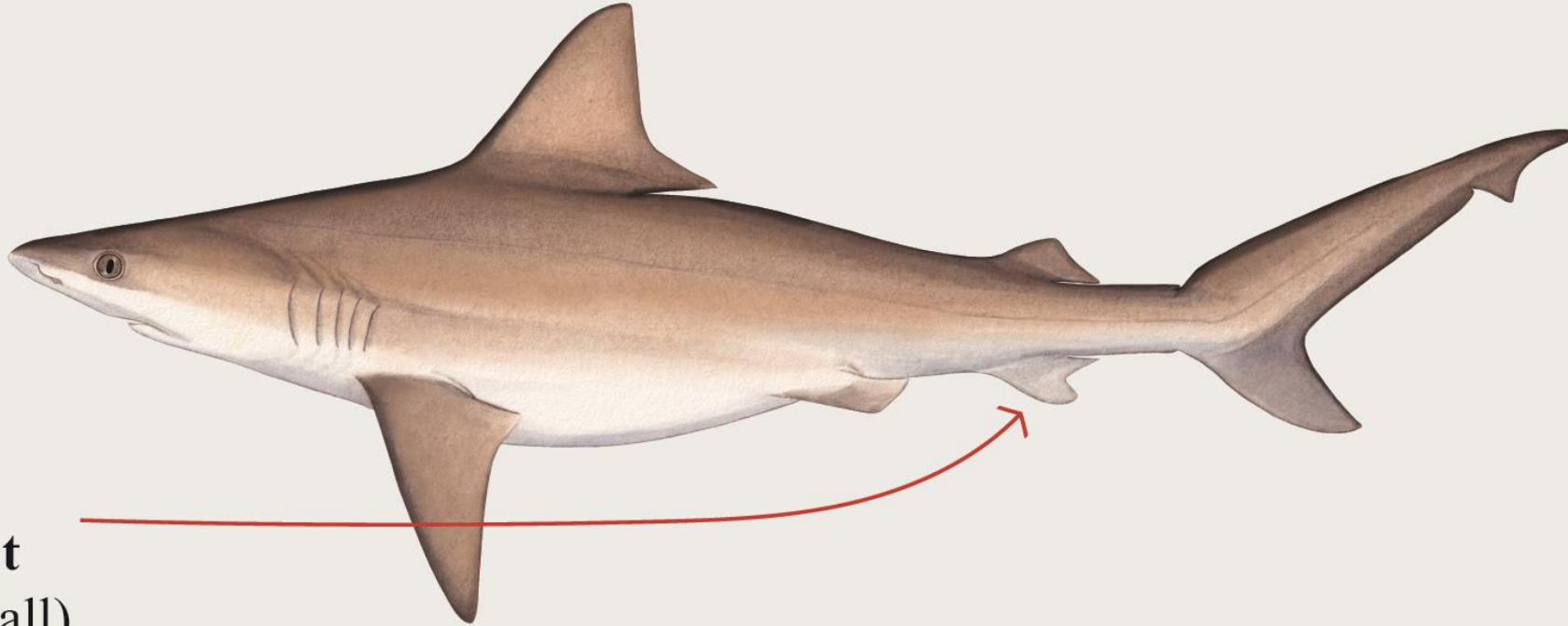
two dorsal fins

go to step 3.



anal fin **absent**

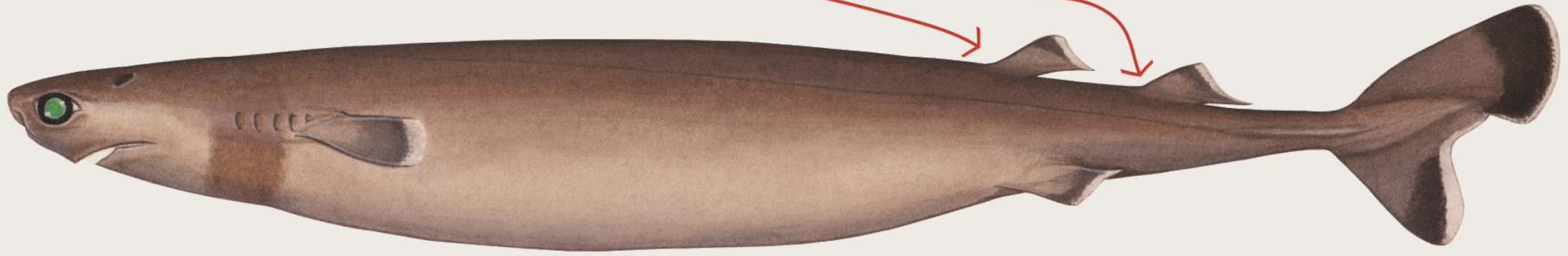
go to **step 4.**



anal fin **present**
(sometimes small)

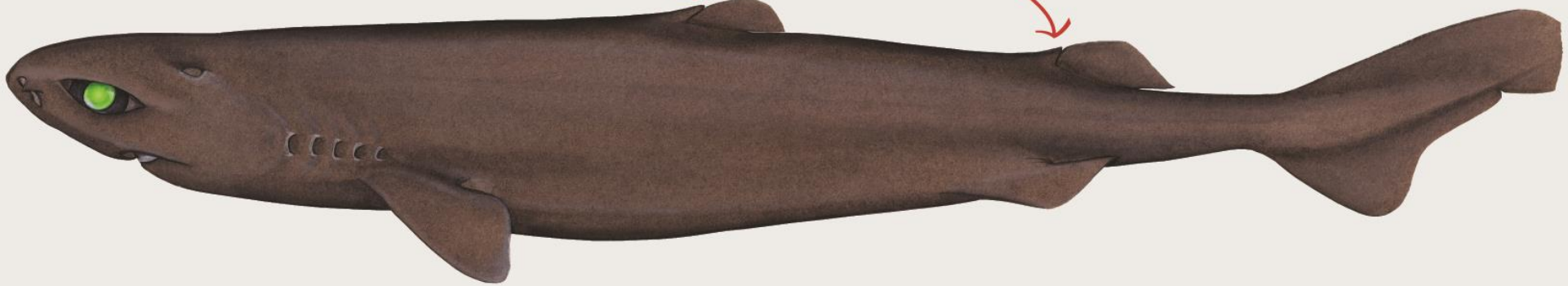
go to **step 6.**

dorsal fins **without** spines



go to **step 5.**

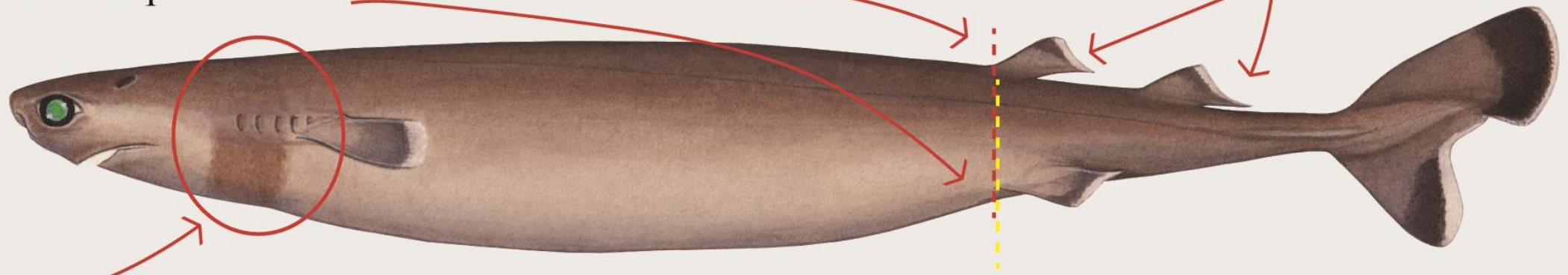
dorsal fins **with** small spines



Zameus squamulosus (Velvet Dogfish).

first dorsal over pelvic fins

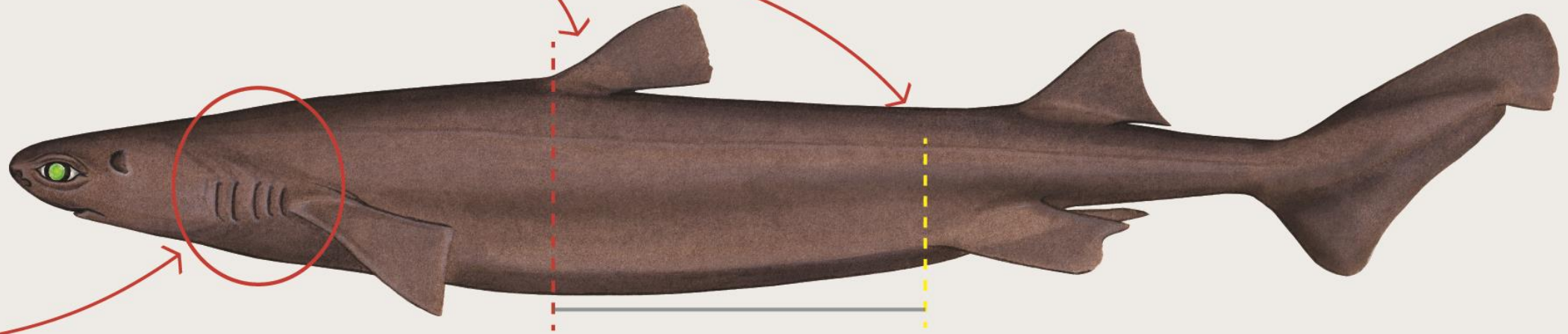
dorsal fins located well back on body



dark collar around head at gill region

Isistius brasiliensis (Cookie-cutter Shark).

first dorsal well in front of pelvic fin

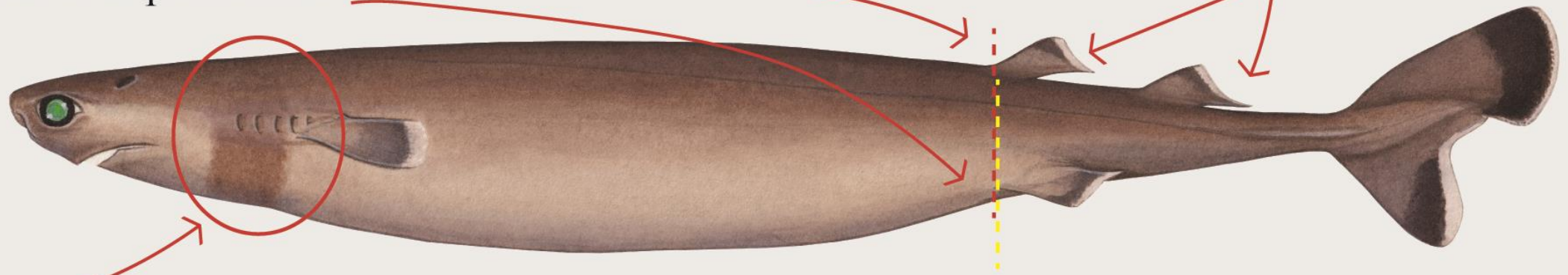


no dark collar around head

Dalatias licha (Black Shark, Kitefin shark).

first dorsal over pelvic fins

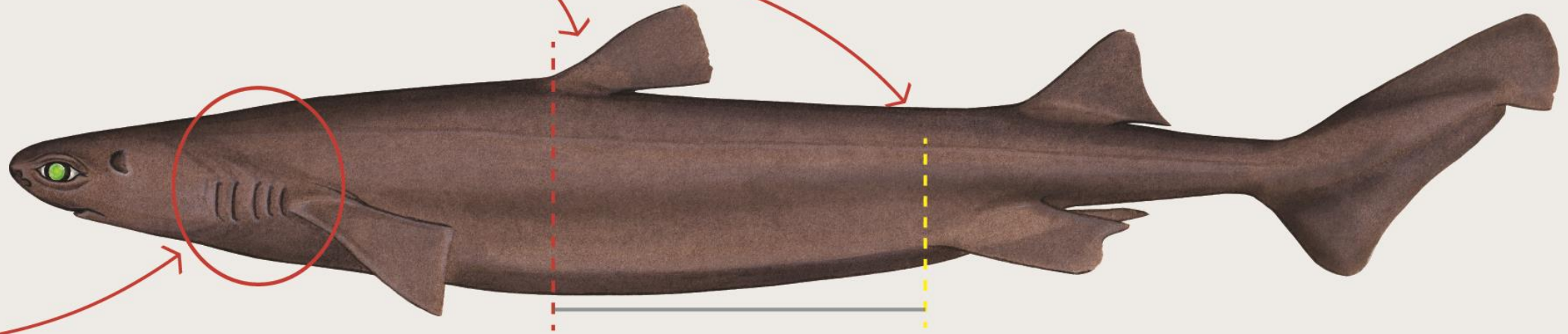
dorsal fins located well back on body



dark collar around head at gill region

Isistius brasiliensis (Cookie-cutter Shark).

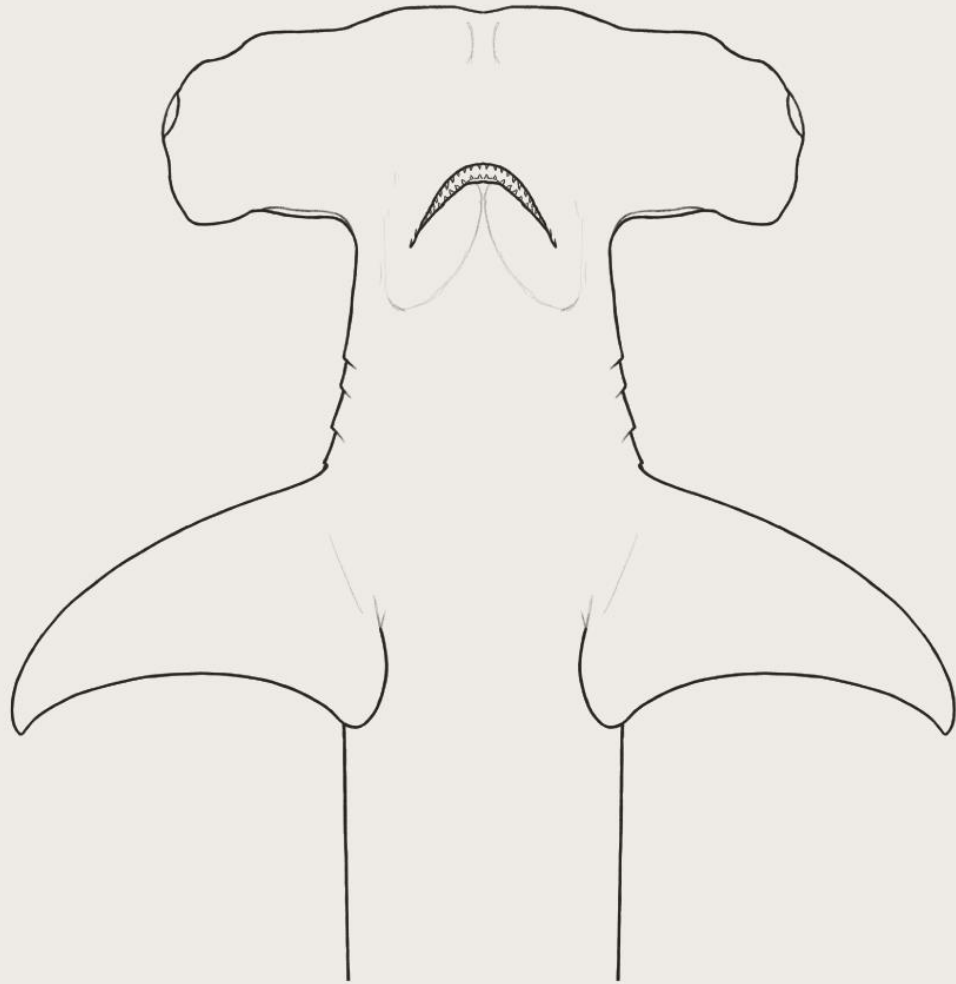
first dorsal well in front of pelvic fin



no dark collar around head

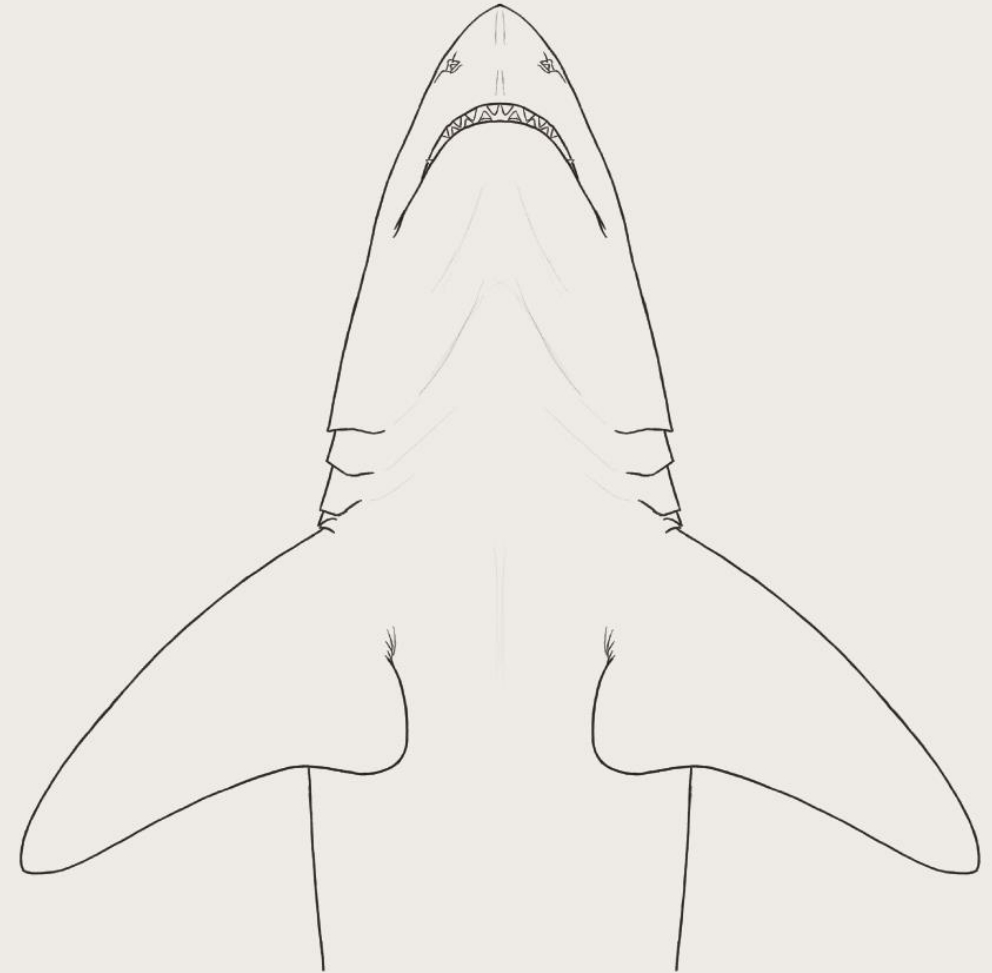
Dalatias licha (Black Shark, Kitefin shark).

head **hammer-shaped**



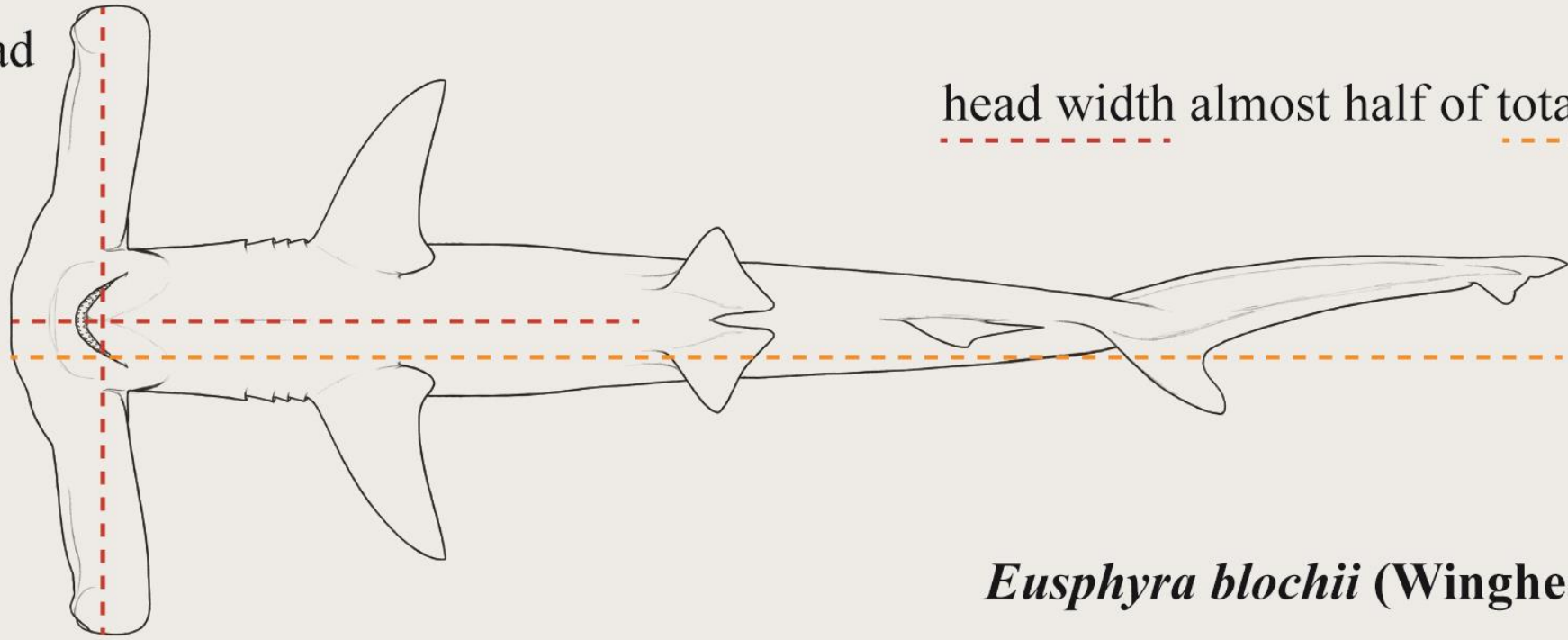
...go to **step 7.**

head **not hammer-shaped**



...go to **step 10.**

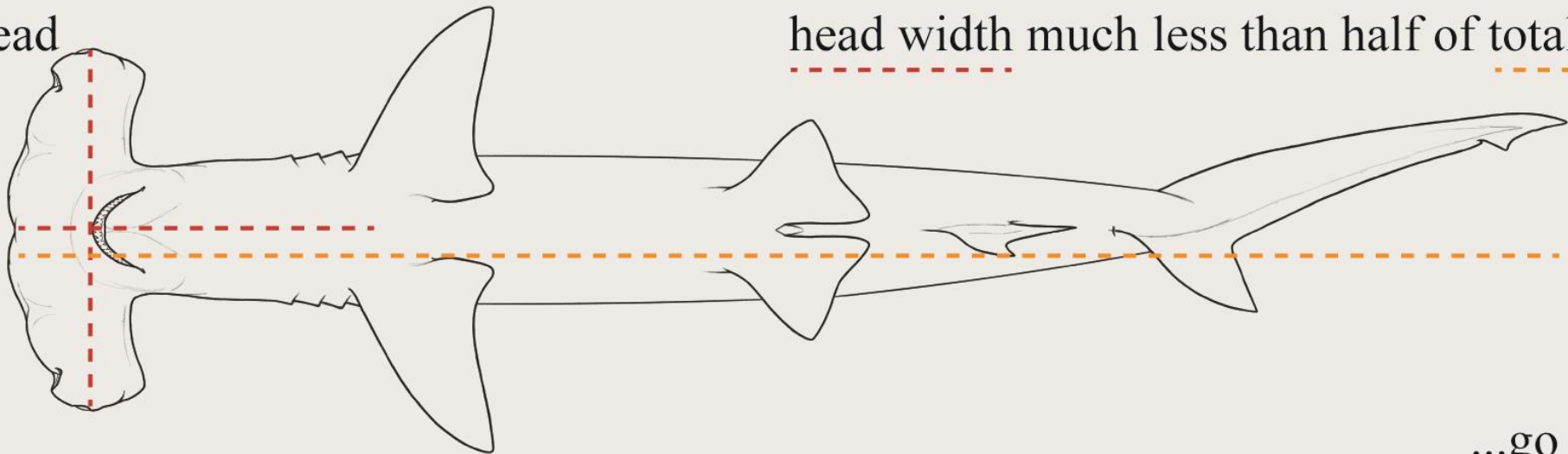
lateral blades of head
very long, narrow
and wing-like



head width almost half of total length

Eusphyra blochii (Winghead Shark).

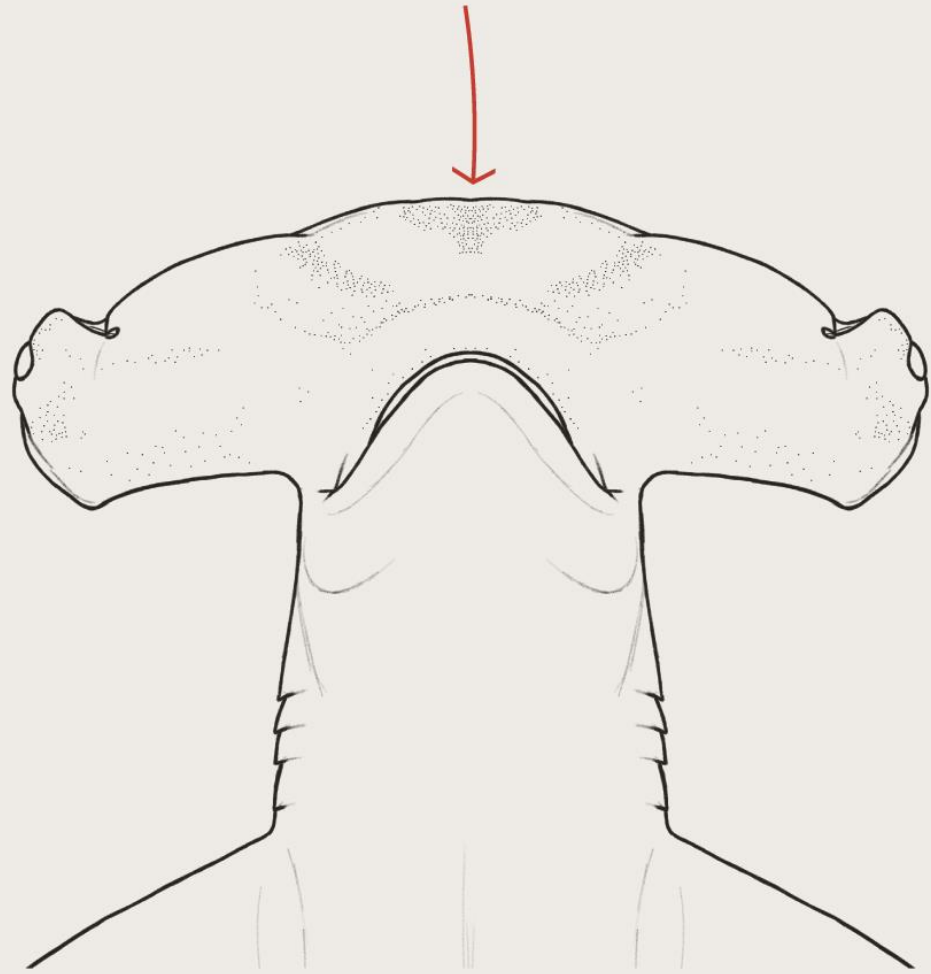
lateral blades of head
relatively broad,
shorter and
not wing-like



head width much less than half of total length

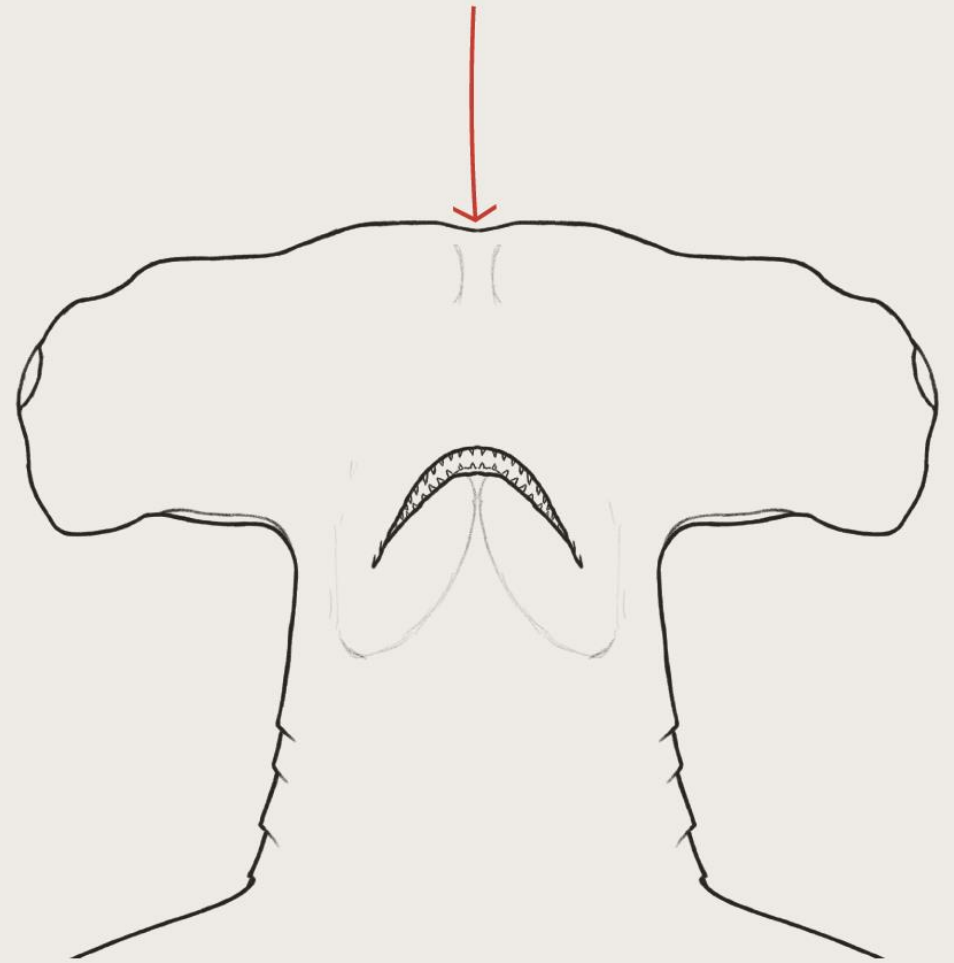
...go to **step 8.**

Anterior profile of head
without a median indentation



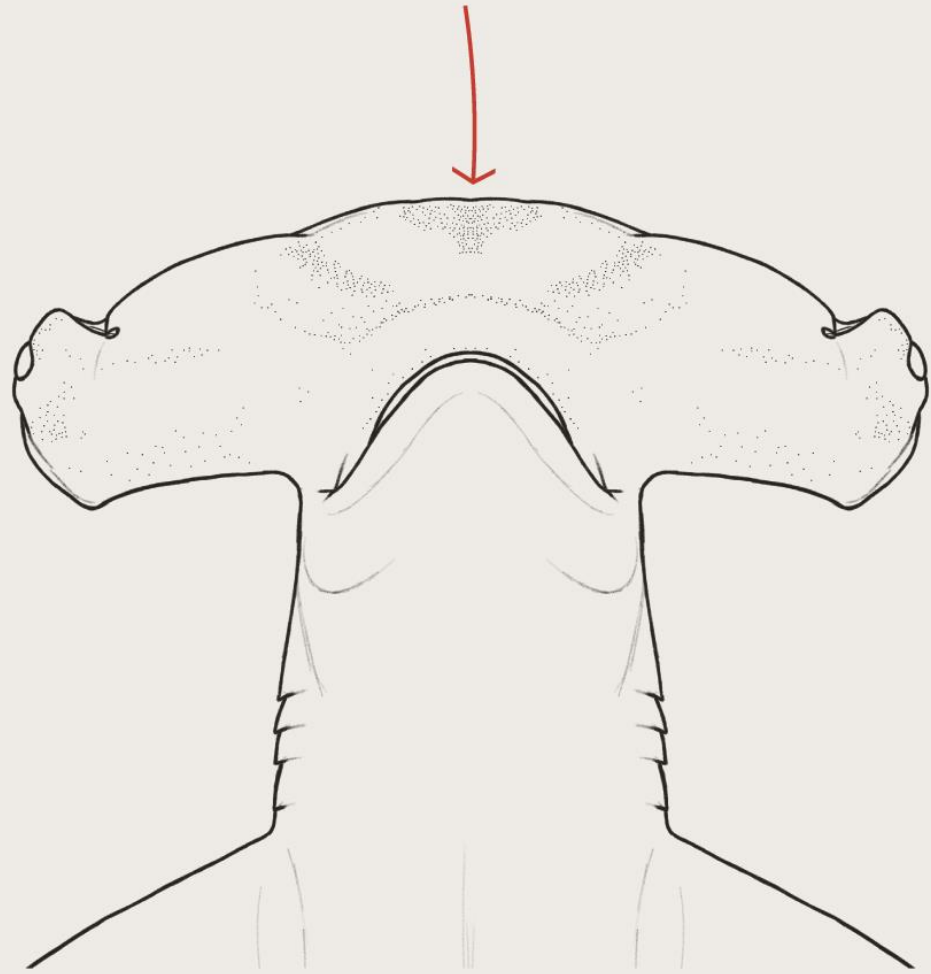
Sphyrna zygaena (Smooth Hammerhead).

anterior profile of head
with a median indentation



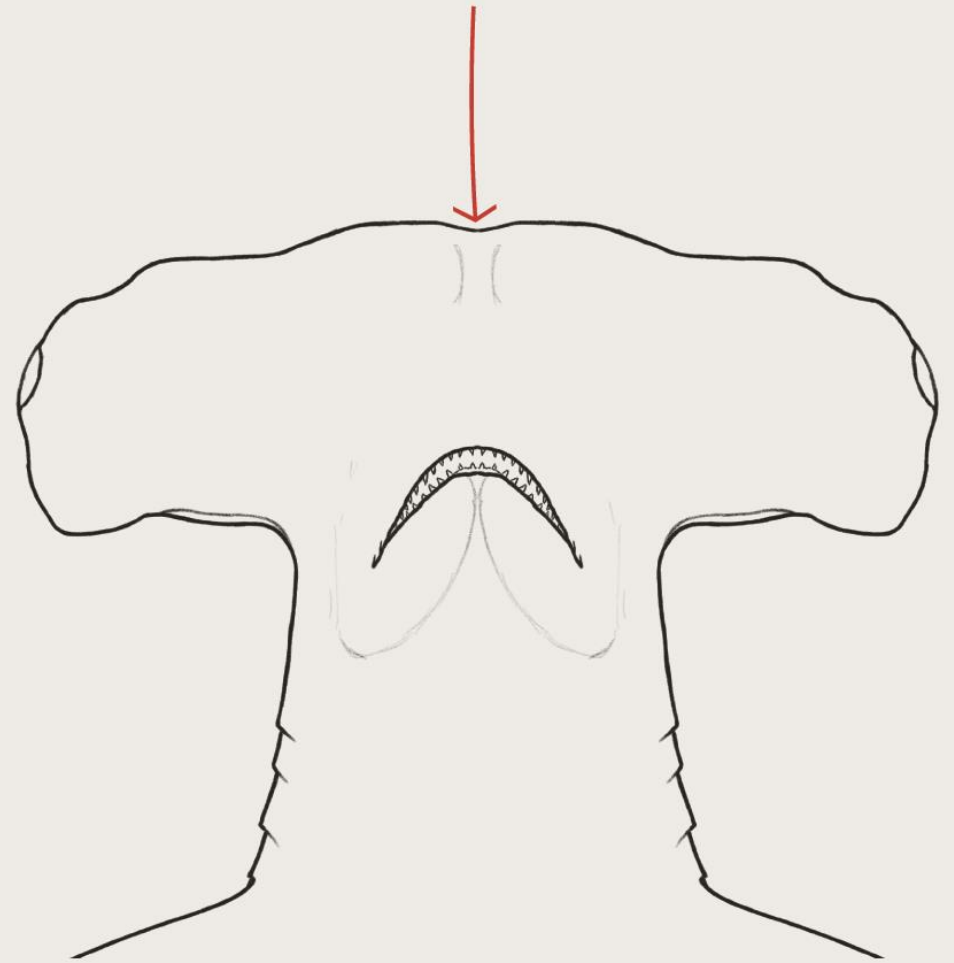
...go to **step 9**.

Anterior profile of head
without a median indentation



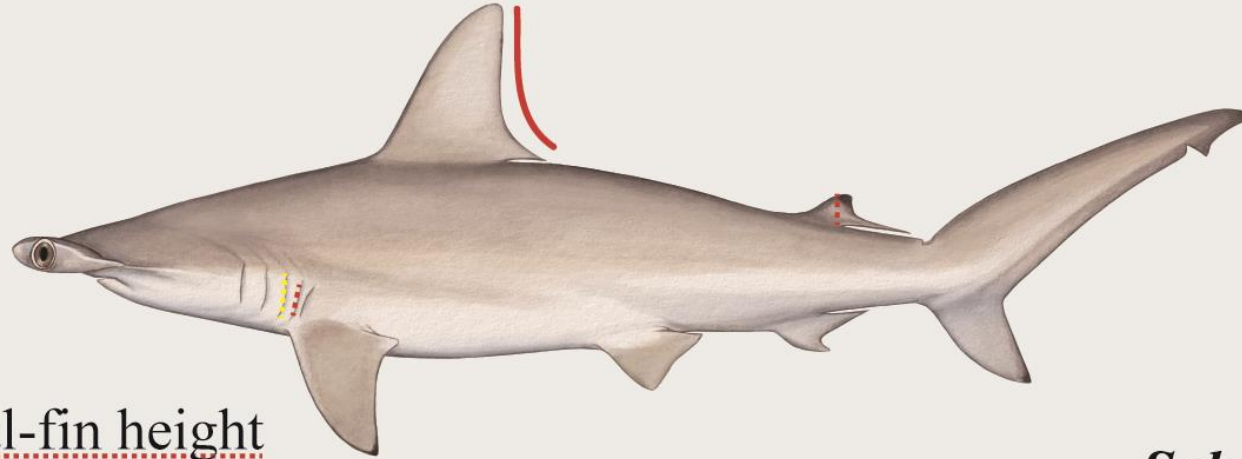
Sphyrna zygaena (Smooth Hammerhead).

anterior profile of head
with a median indentation



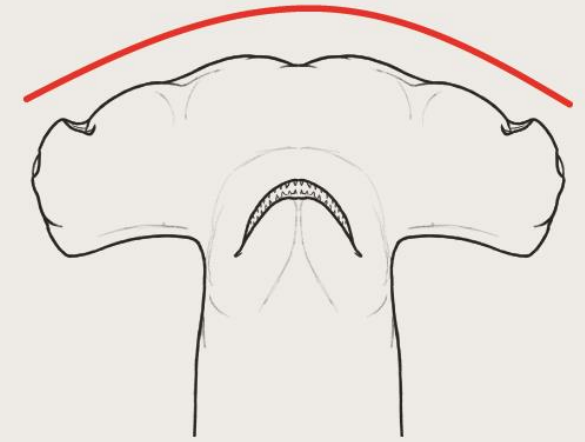
...go to **step 9**.

first dorsal fin semi-falcate, only moderately high



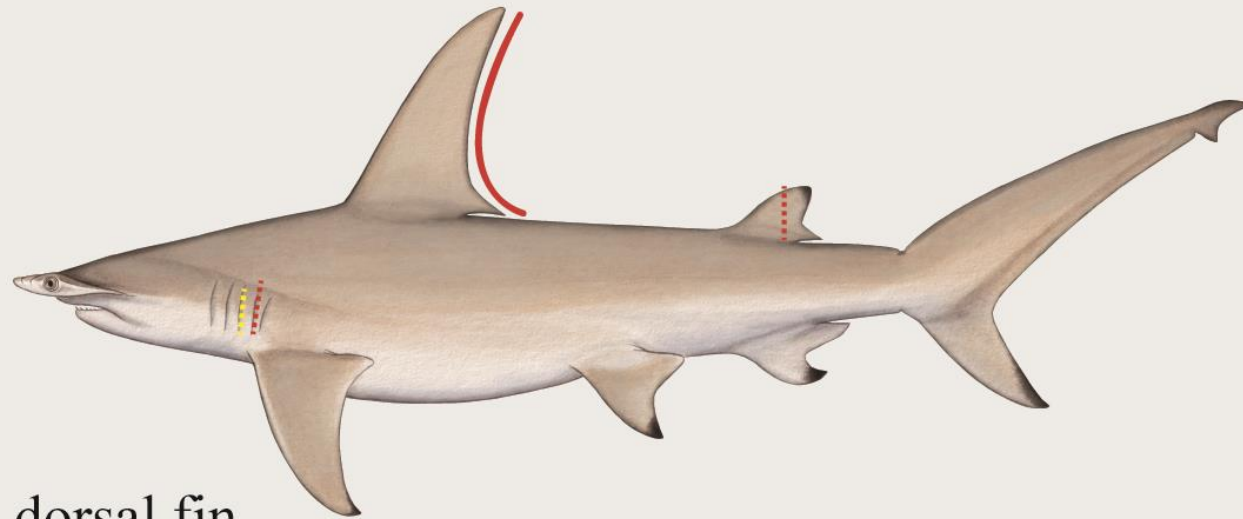
second dorsal-fin height
less than or equal to the length of the third gill slit

anterior profile of head convex



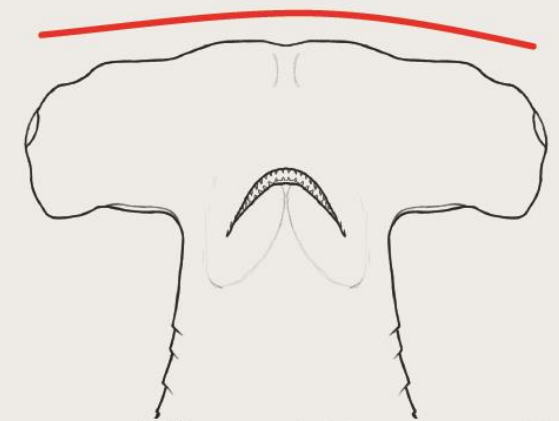
Sphyrna lewini (Scalloped Hammerhead).

first dorsal fin falcate, very tall in adults



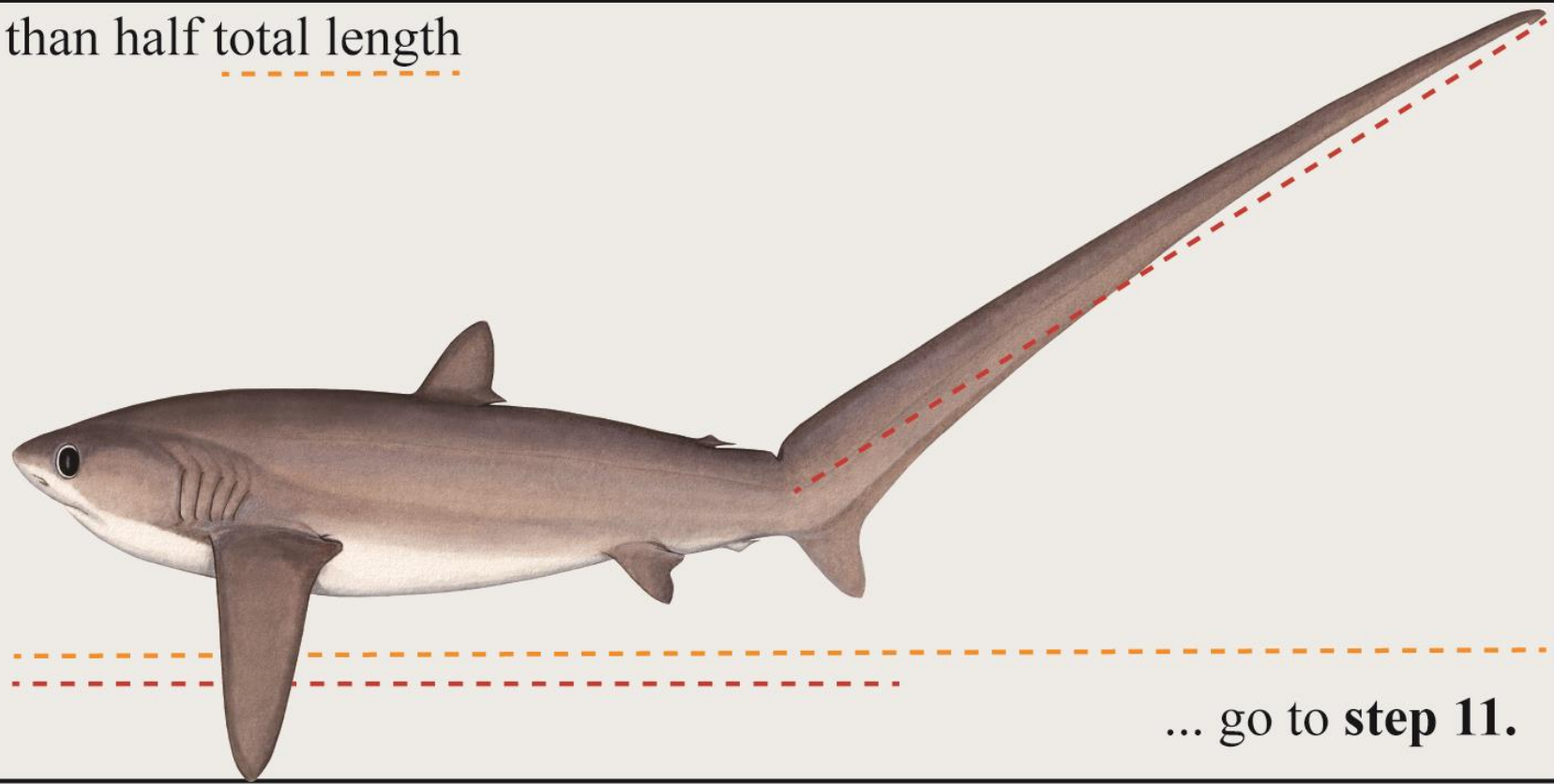
second dorsal fin
height greater than length of the third gill slit

anterior profile of head nearly straight
(slightly convex in small juveniles)



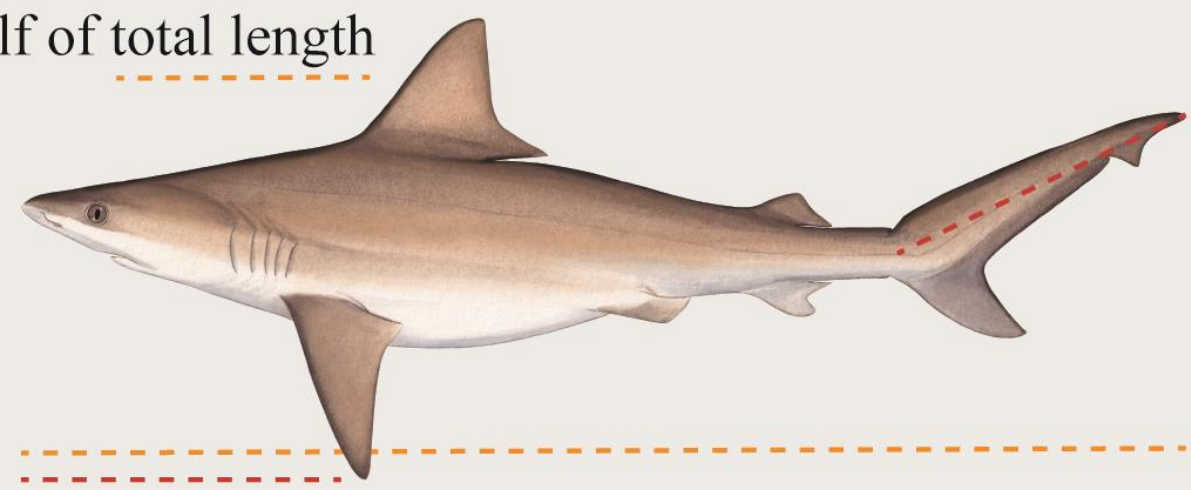
Sphyrna mokarran (Great Hammerhead).

length of caudal fin equal to or more than half total length



... go to **step 11.**

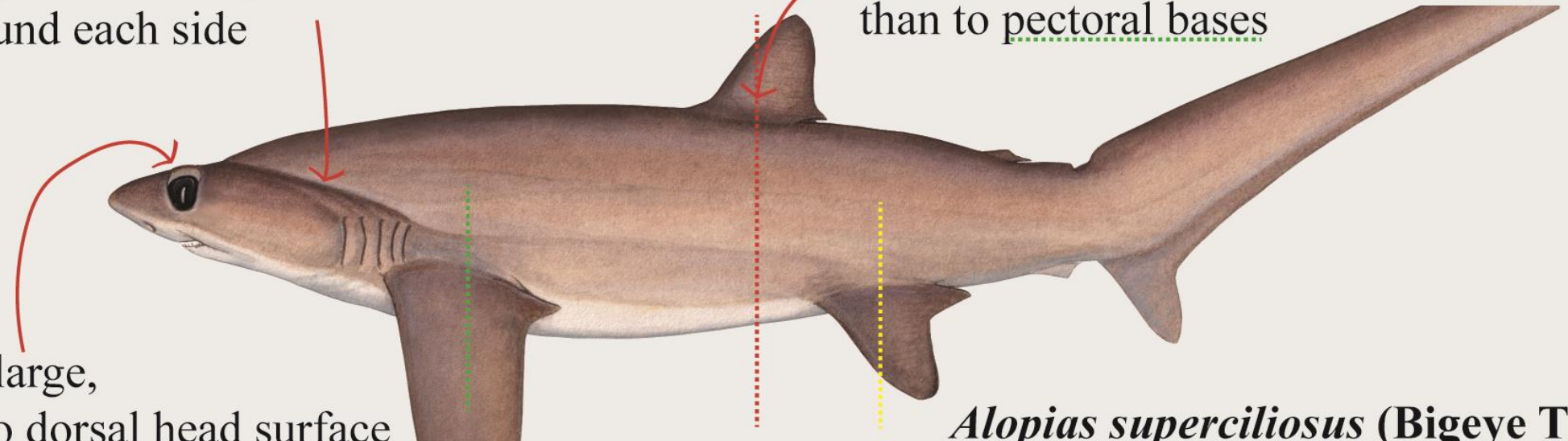
length of caudal fin much less than half of total length



... go to **step 13.**

head with deep horizontal groove
extending around each side

base of first dorsal fin closer to pelvic bases
than to pectoral bases

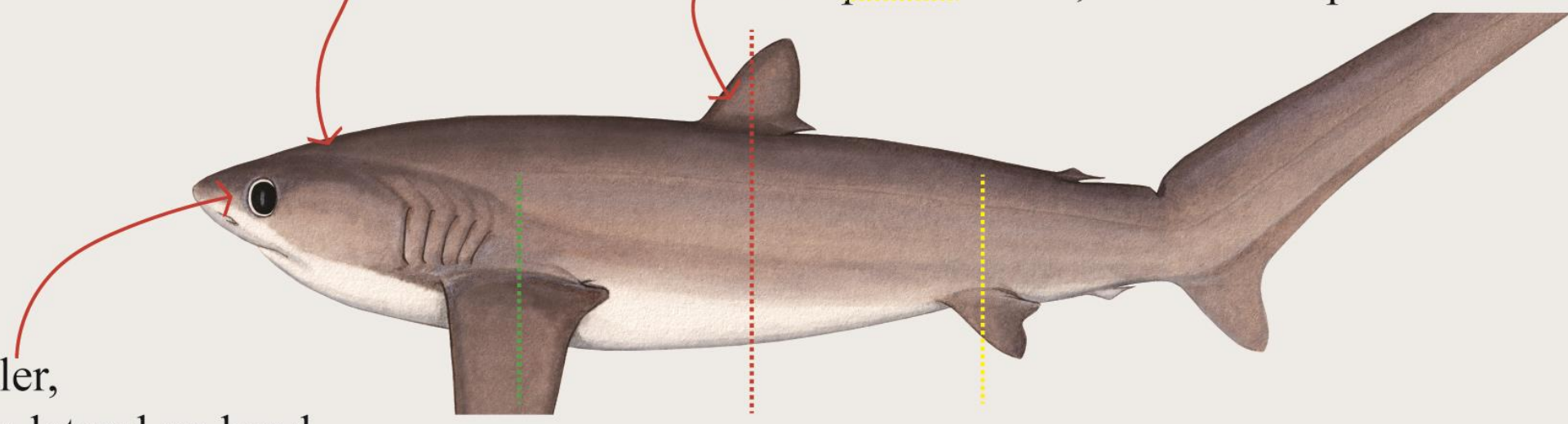


eyes are very large,
extending onto dorsal head surface

Alopias superciliosus (Bigeye Thresher).

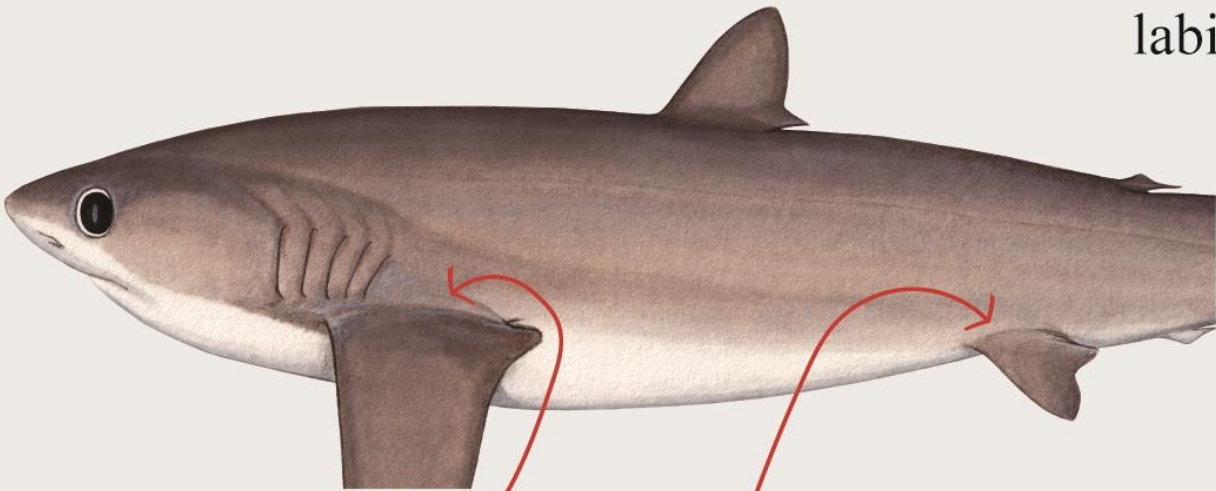
head without a deep groove

base of first dorsal fin about equidistant between pectoral
and pelvic bases, or closer to pectoral fin bases



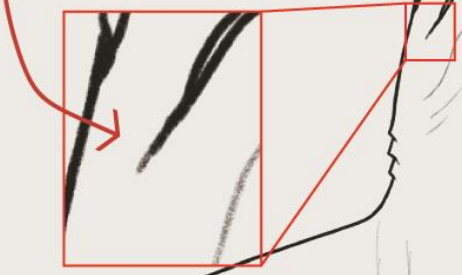
eyes smaller,
with orbits lateral on head

...go to **step 12.**

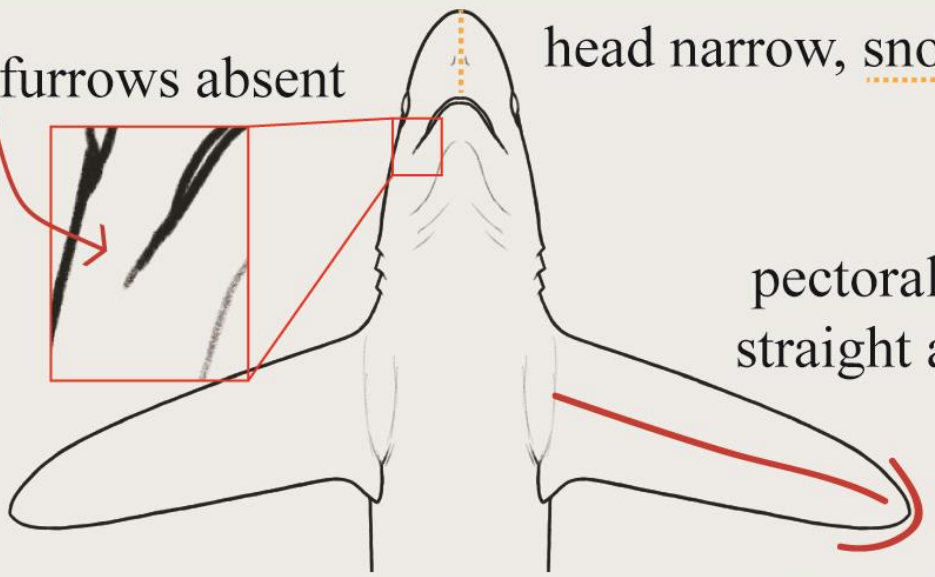


flanks above pectoral and pelvic fins not white

labial furrows absent

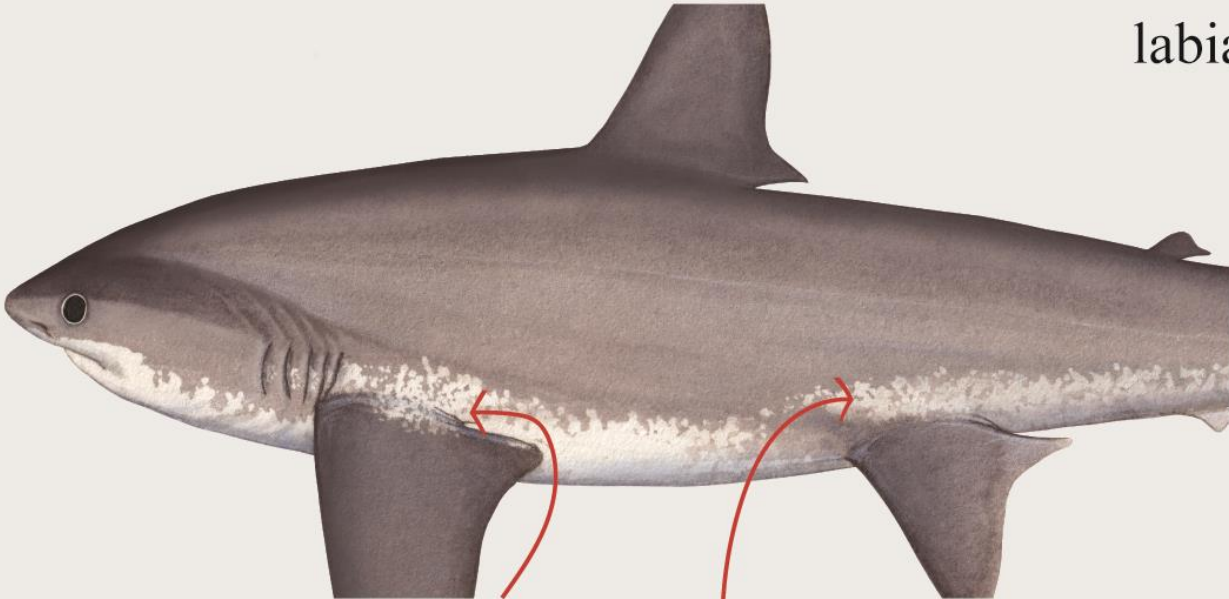


head narrow, snout elongated



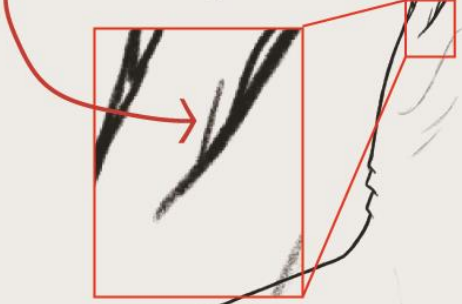
pectoral fins nearly straight and broadly pointed

Alopias pelagicus (Pelagic thresher).

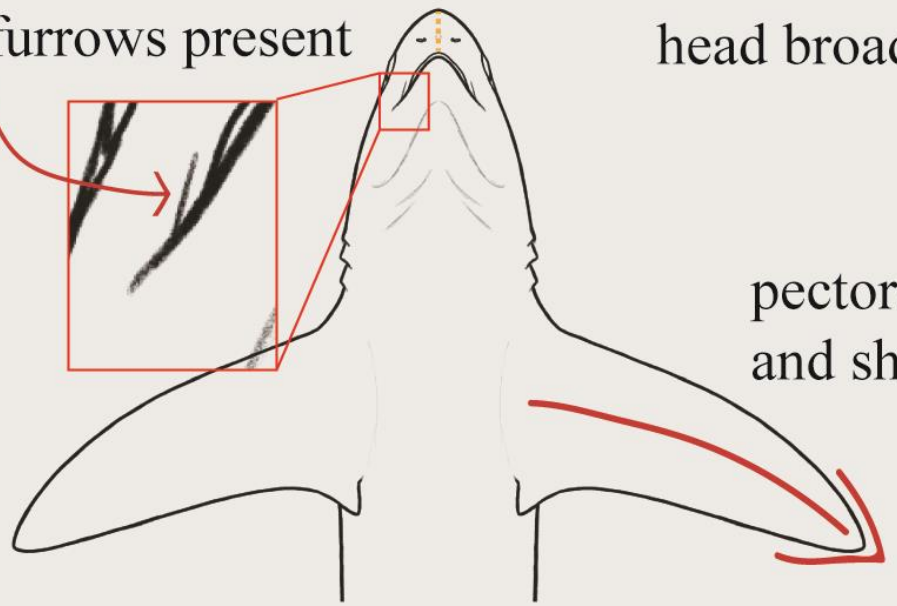


flanks above pectoral and pelvic fins white

labial furrows present



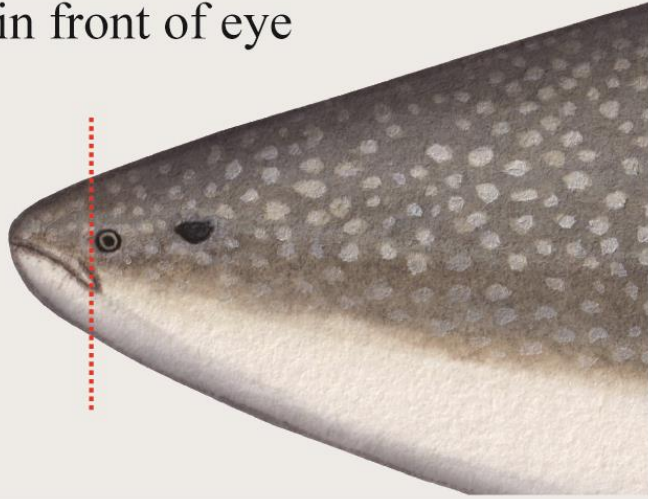
head broad, snout short



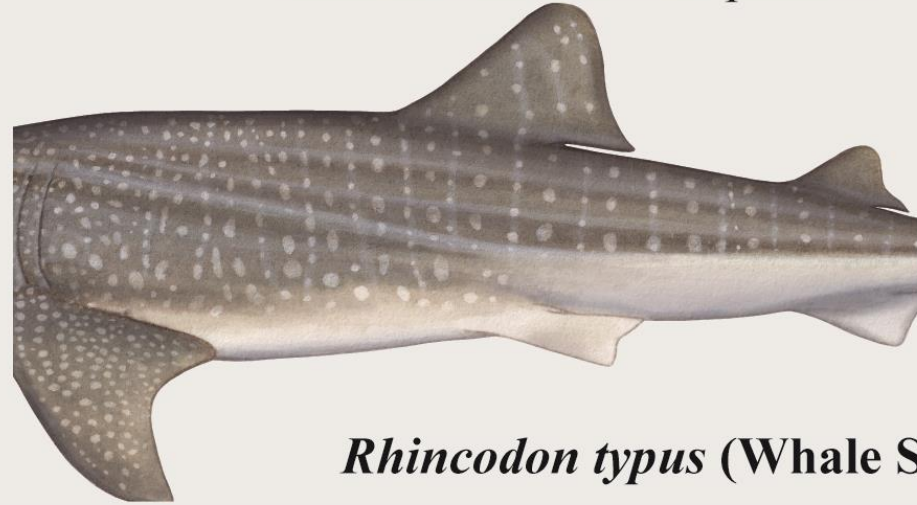
pectoral fins curved and sharply pointed

Alopias vulpinus (Thresher Shark).

mouth at front of head
ending in front of eye

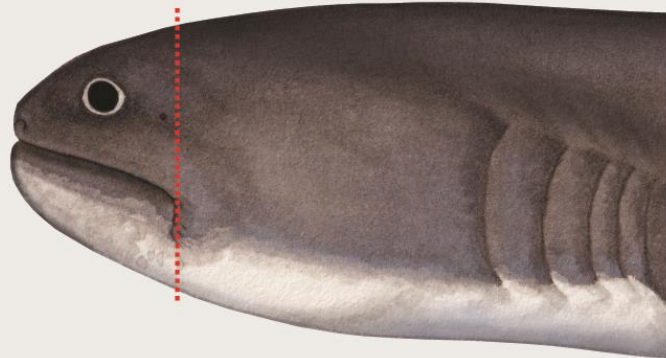


checkerboard colour pattern



Rhincodon typus (Whale Shark).

mouth not at front of head
ending below or behind eye



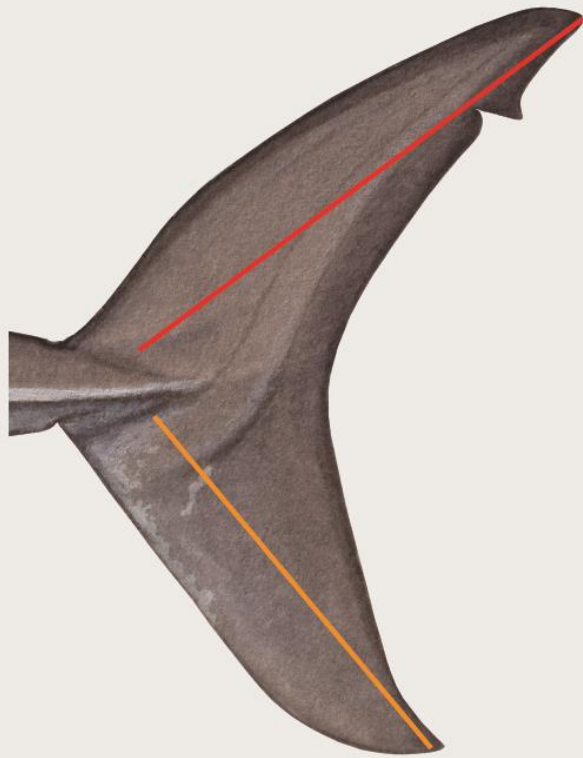
no checkerboard colour pattern



...go to step 14.

caudal fin lunate

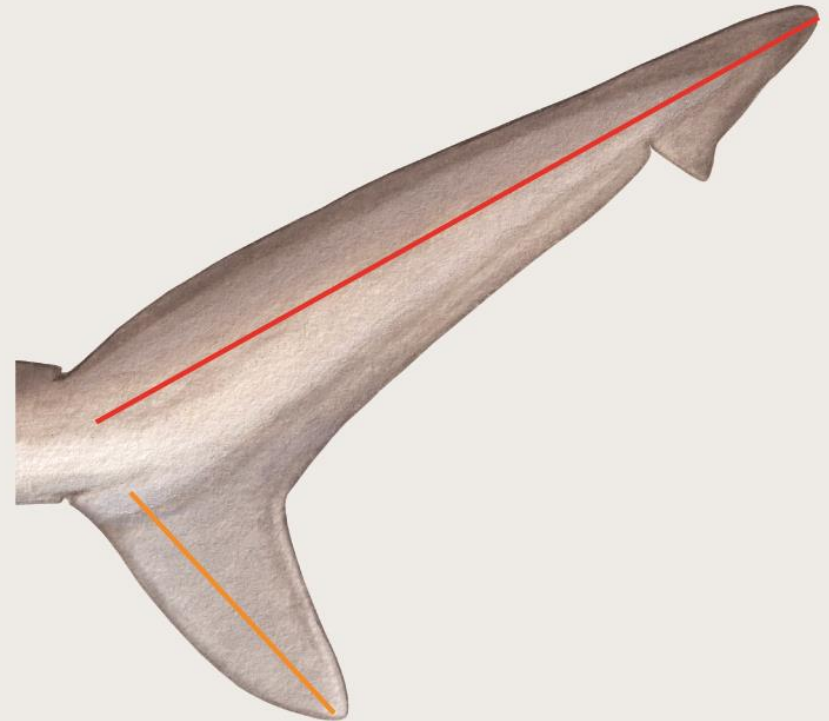
upper lobe < 1.5 times longer than lower lobe



...go to **step 15.**

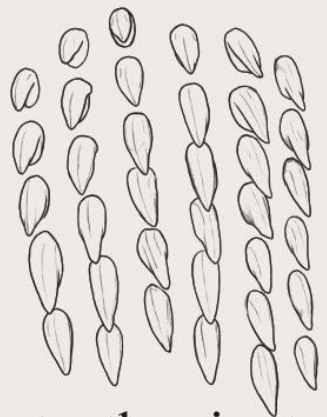
caudal fin heterocercal

upper lobe > 1.5 times longer than lower lobe

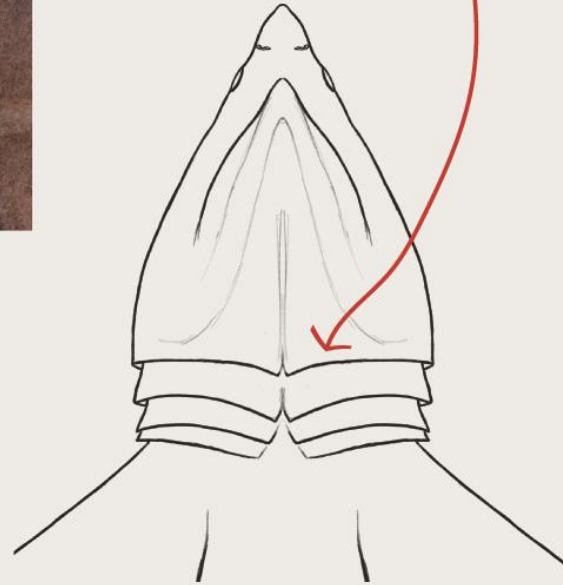


...go to **step 19.**

very large gills
extend onto surface of the head and ventral surface

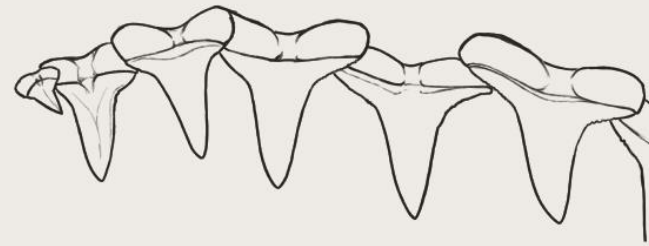
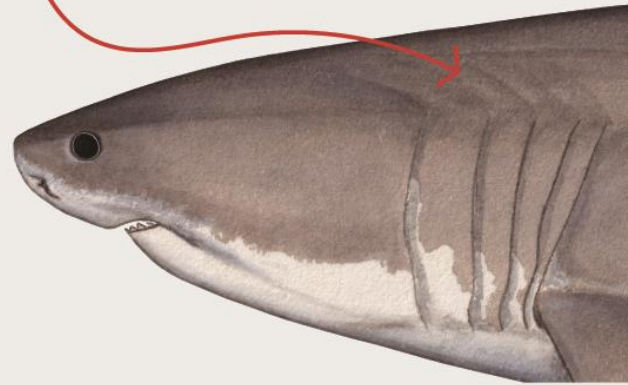


teeth minute

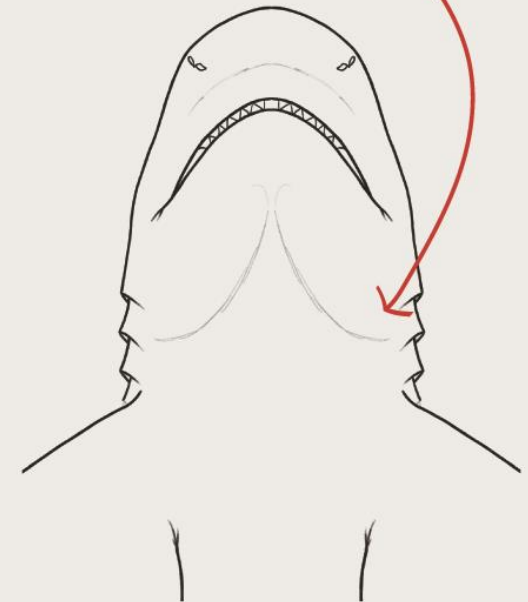


Cetorhinus maximus (Basking Shark).

gills do not extend onto surface of the head
or ventral surface



teeth blade-like, much larger



...go to step 16.

upper teeth broadly triangular,
flattened and strongly serrated

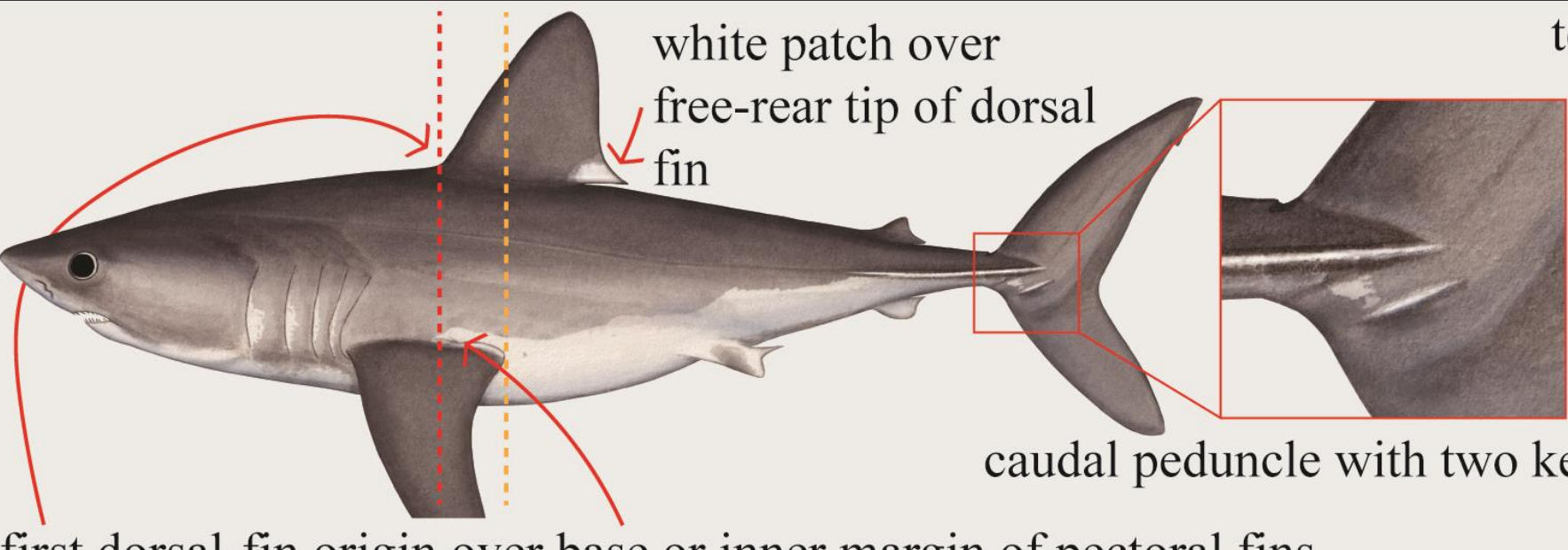


Carcharodon carcharias (White Shark).

upper teeth long, narrow, and without serrations



...go to step 17.

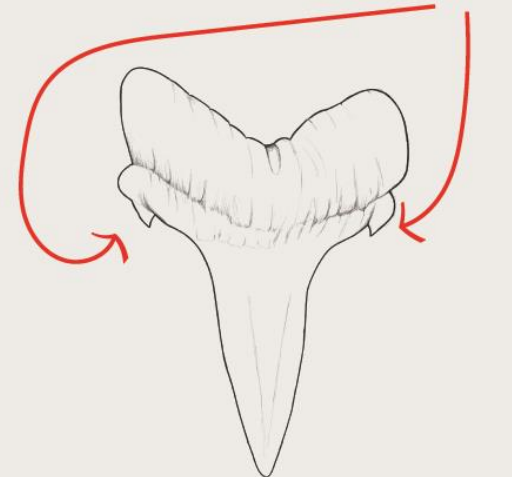


white patch over free-rear tip of dorsal fin

teeth with small lateral cusplets


caudal peduncle with two keels

first dorsal-fin origin over base or inner margin of pectoral fins



Lamna nasus (Porbeagle).

Detailed description: This panel illustrates the characteristics of a shark with a white patch over the free-rear tip of the dorsal fin. The main illustration shows a shark in profile with a red arrow pointing to the white patch on the dorsal fin and a red arrow pointing to the first dorsal-fin origin. A red dashed vertical line is positioned at the first dorsal-fin origin, and a yellow dashed vertical line is positioned at the base of the pectoral fins. An inset image shows a close-up of the caudal peduncle with two keels. A diagram of a tooth shows small lateral cusplets. The text 'teeth with small lateral cusplets' is positioned above the tooth diagram. The text 'caudal peduncle with two keels' is positioned below the inset image. The text 'white patch over free-rear tip of dorsal fin' is positioned above the dorsal fin. The text 'first dorsal-fin origin over base or inner margin of pectoral fins' is positioned below the main illustration. The text 'Lamna nasus (Porbeagle)' is positioned to the right of the main illustration.



no white patch over free-rear tip of dorsal fin

teeth without small lateral cusplets

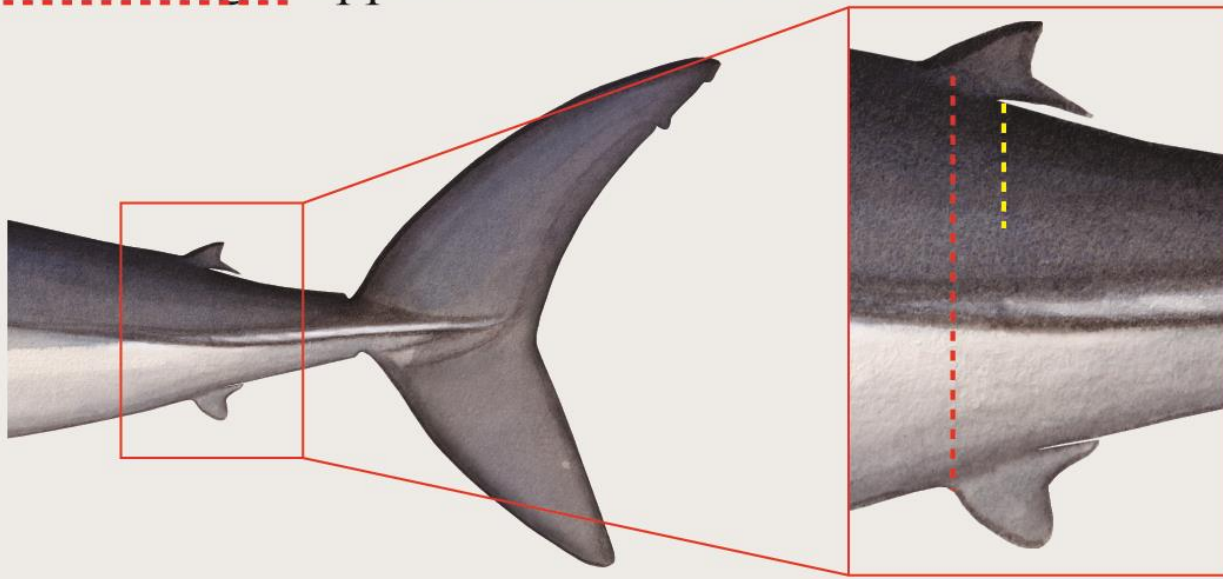
no secondary keel on caudal peduncle

first dorsal-fin origin posterior to pectoral fins

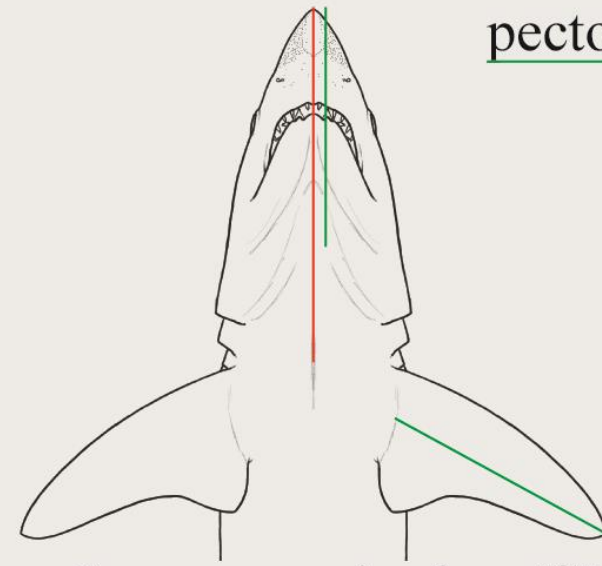
...go to **step 18.**

Detailed description: This panel illustrates the characteristics of a shark with no white patch over the free-rear tip of the dorsal fin. The main illustration shows a shark in profile with a red arrow pointing to the dorsal fin. A red dashed vertical line is positioned at the first dorsal-fin origin, and a yellow dashed vertical line is positioned at the base of the pectoral fins. An inset image shows a close-up of the caudal peduncle with no secondary keel. A diagram of a tooth shows no small lateral cusplets. The text 'teeth without small lateral cusplets' is positioned above the tooth diagram. The text 'no secondary keel on caudal peduncle' is positioned below the inset image. The text 'no white patch over free-rear tip of dorsal fin' is positioned above the dorsal fin. The text 'first dorsal-fin origin posterior to pectoral fins' is positioned below the main illustration. The text '...go to step 18.' is positioned to the right of the main illustration.

anal-fin origin opposite middle of second dorsal fin

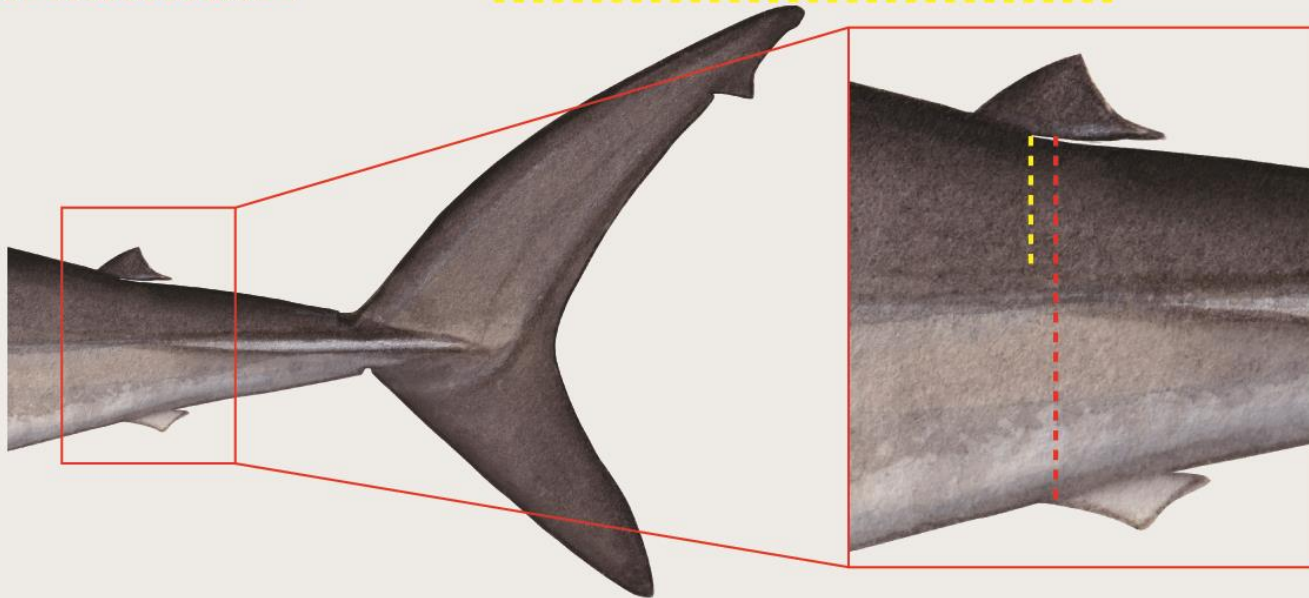


pectoral fins much shorter than head length

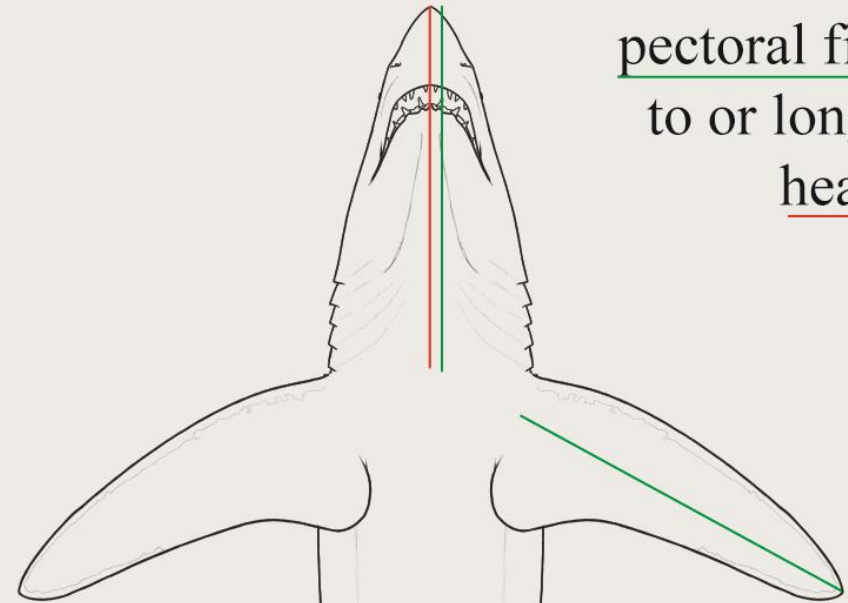


Isurus oxyrinchus (Shortfin Mako).

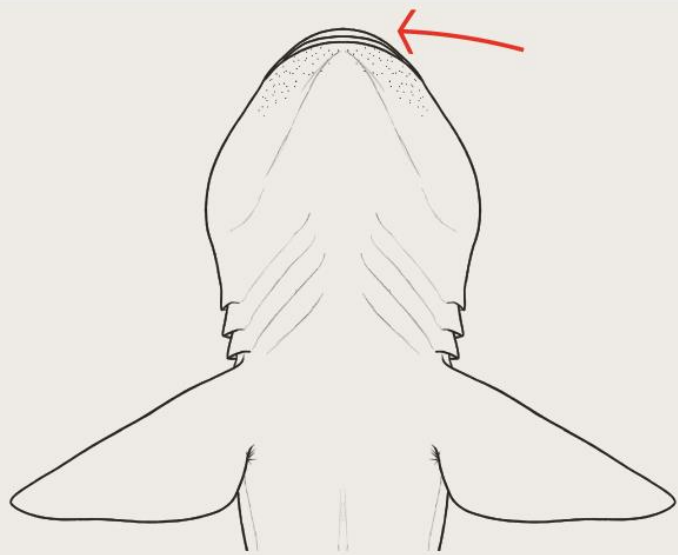
anal-fin origin behind second dorsal-fin insertion



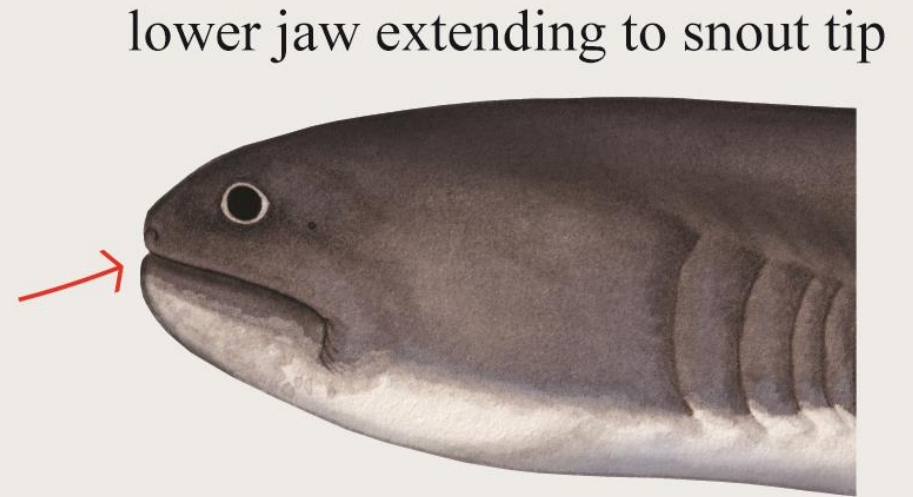
pectoral fins equal to or longer than head length



Isurus paucus (Longfin Mako).

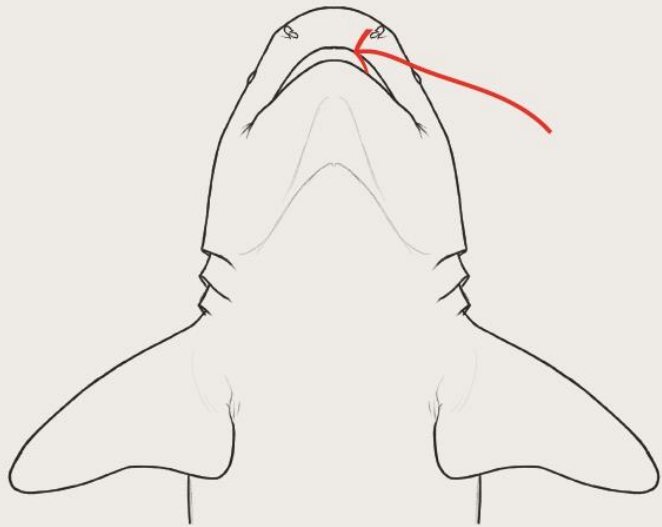


mouth huge and terminal



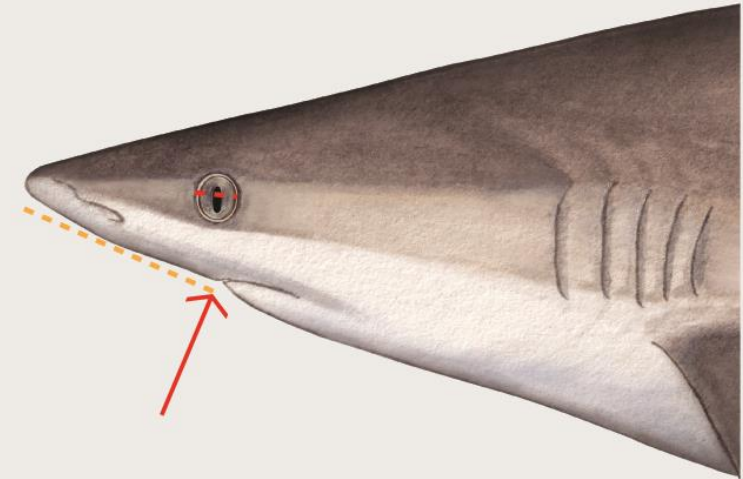
lower jaw extending to snout tip

Megachasma pelagios (Megamouth Shark).



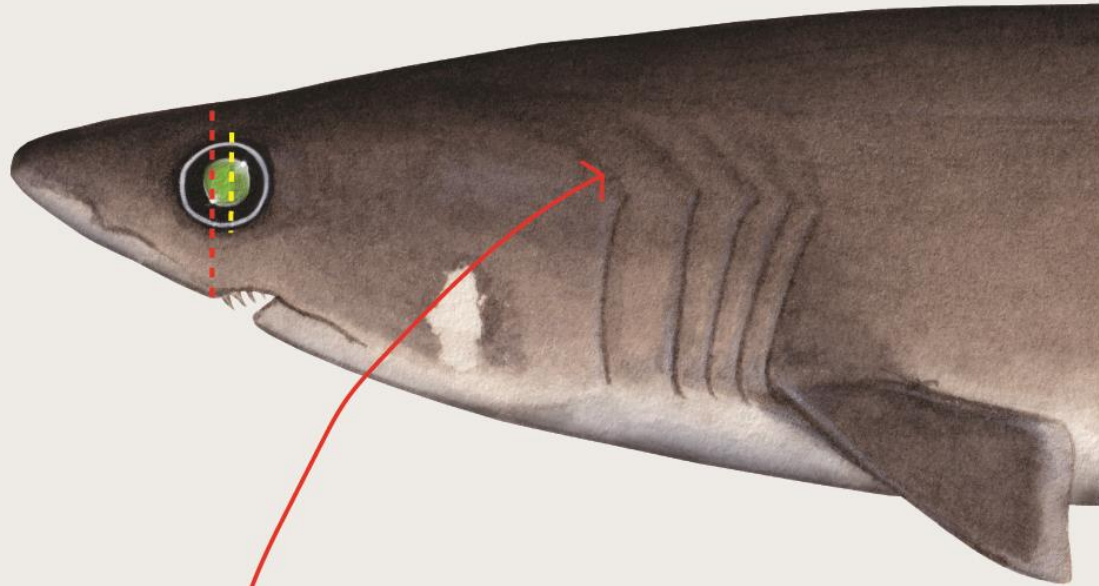
mouth located on undersurface of the head
(subterminal)

preoral distance distinctly longer than eye diameter



...go to **step 20.**

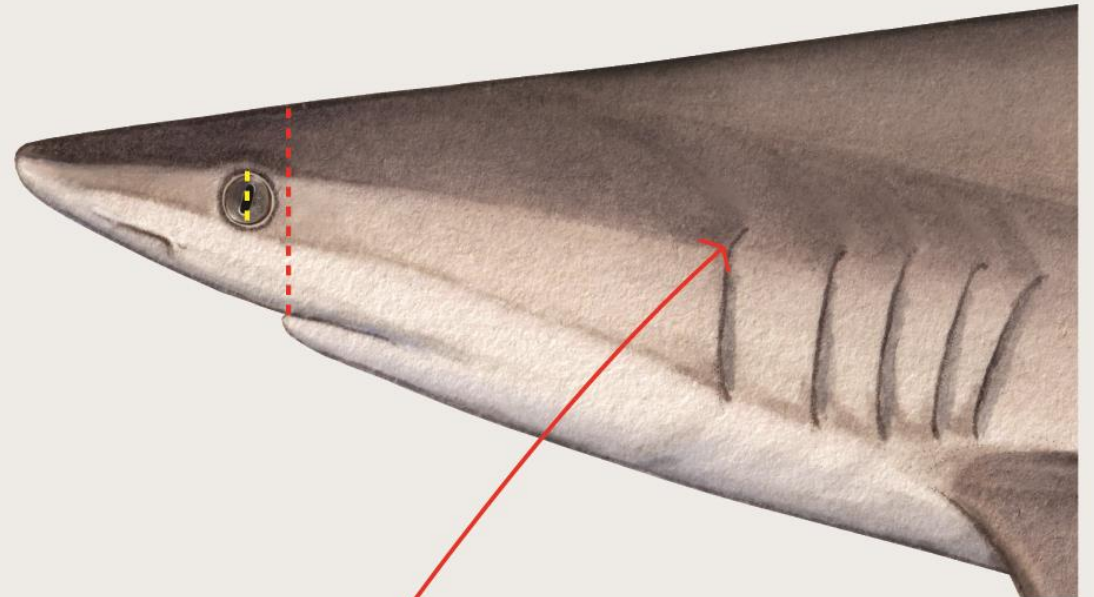
eyes very large,
more than half the greatest height of snout



gill openings extending onto
dorsal surface of head

Pseudocarcharias kamoharai (Crocodile Shark).

eyes smaller,
less than half the greatest height of snout



gill openings **not** extending onto
dorsal surface of head

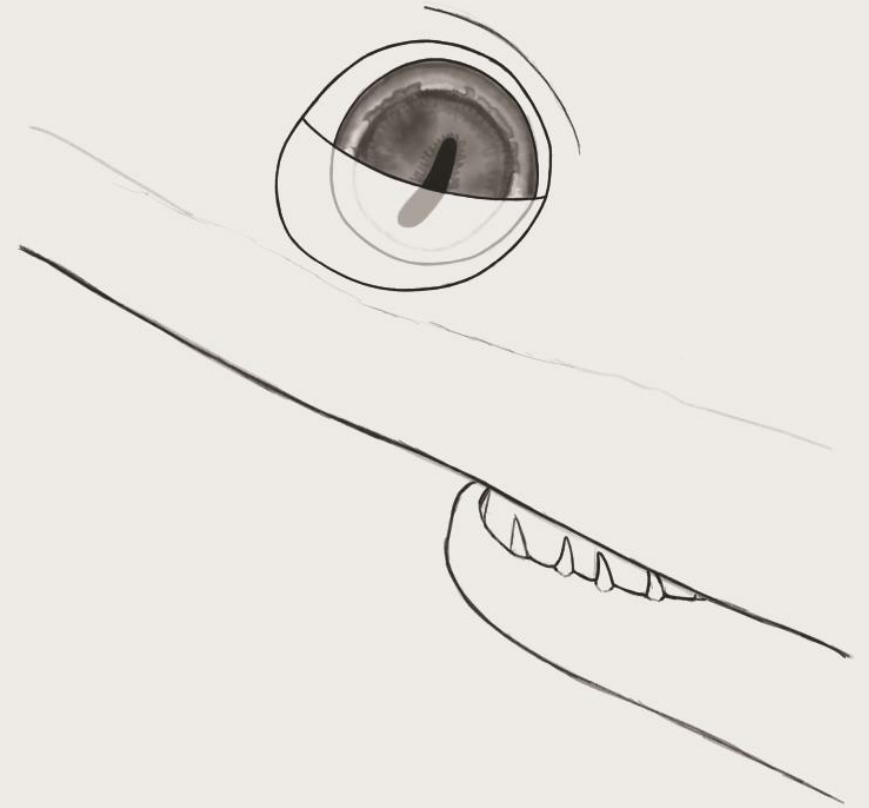
...go to **step 21**.

eyelids fixed, not capable of closing over eyes



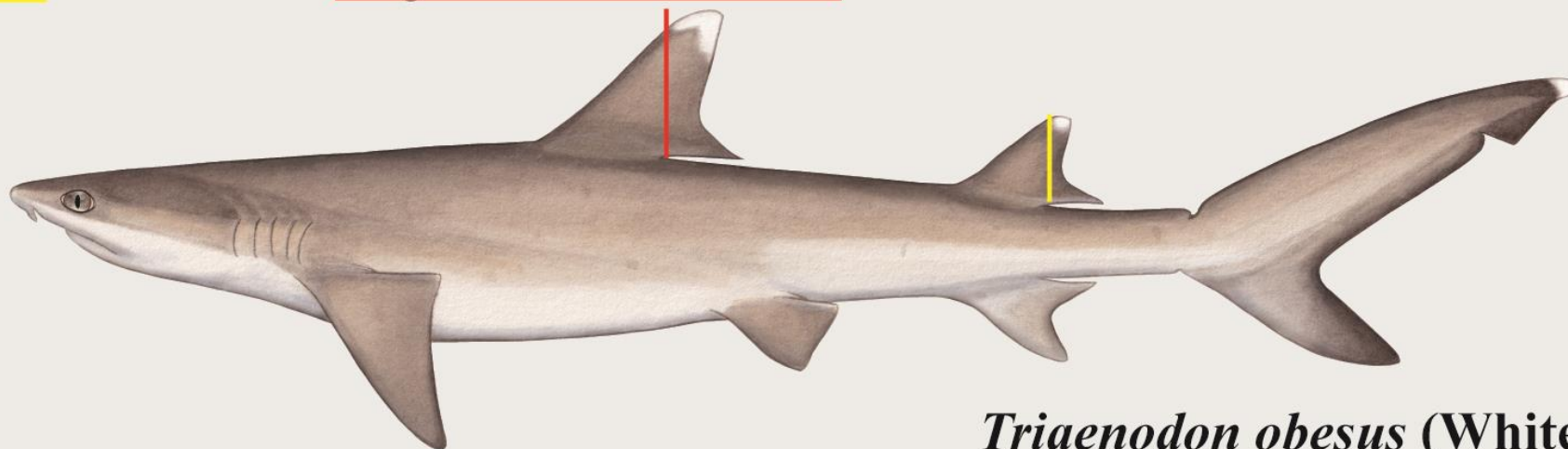
Odontaspis noronhai (Bigeye Sand Tiger).

eyelids capable of closing over eye (nictitating)



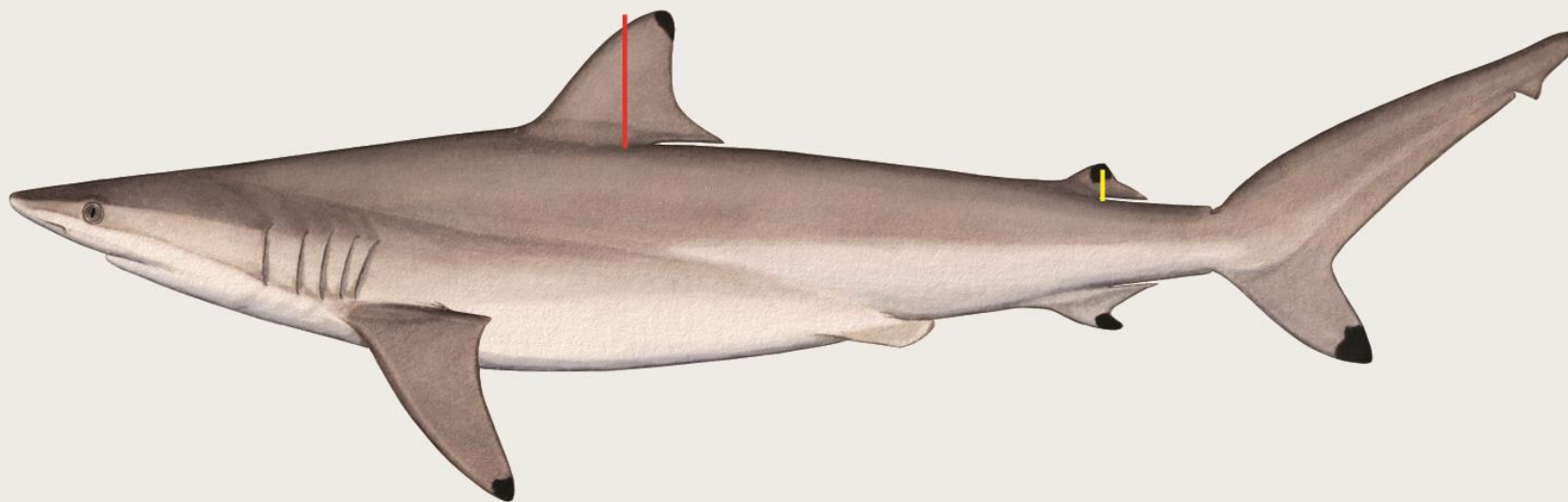
...go to step 22.

second dorsal fin half or more height of first dorsal fin



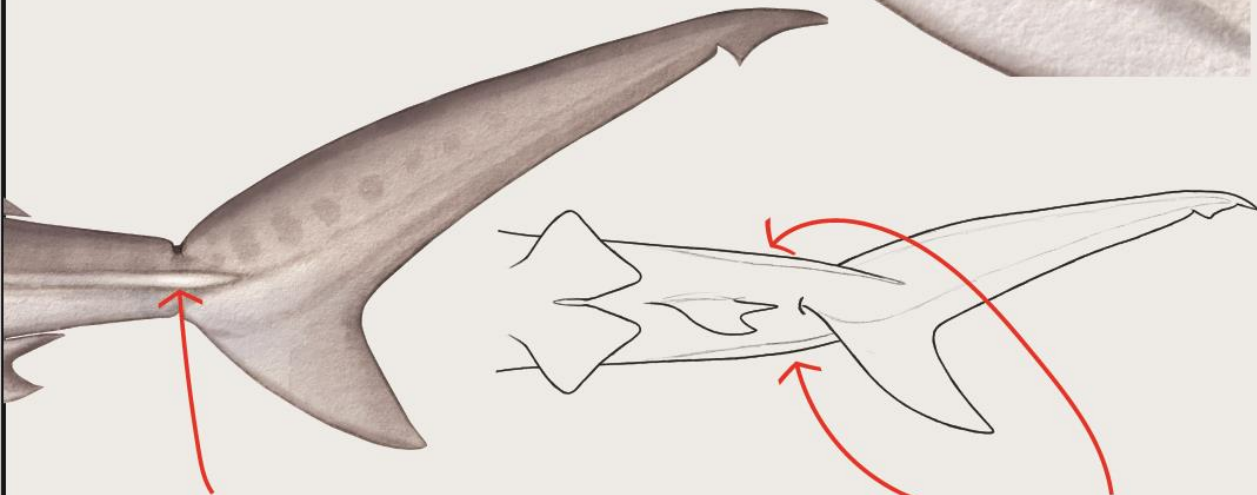
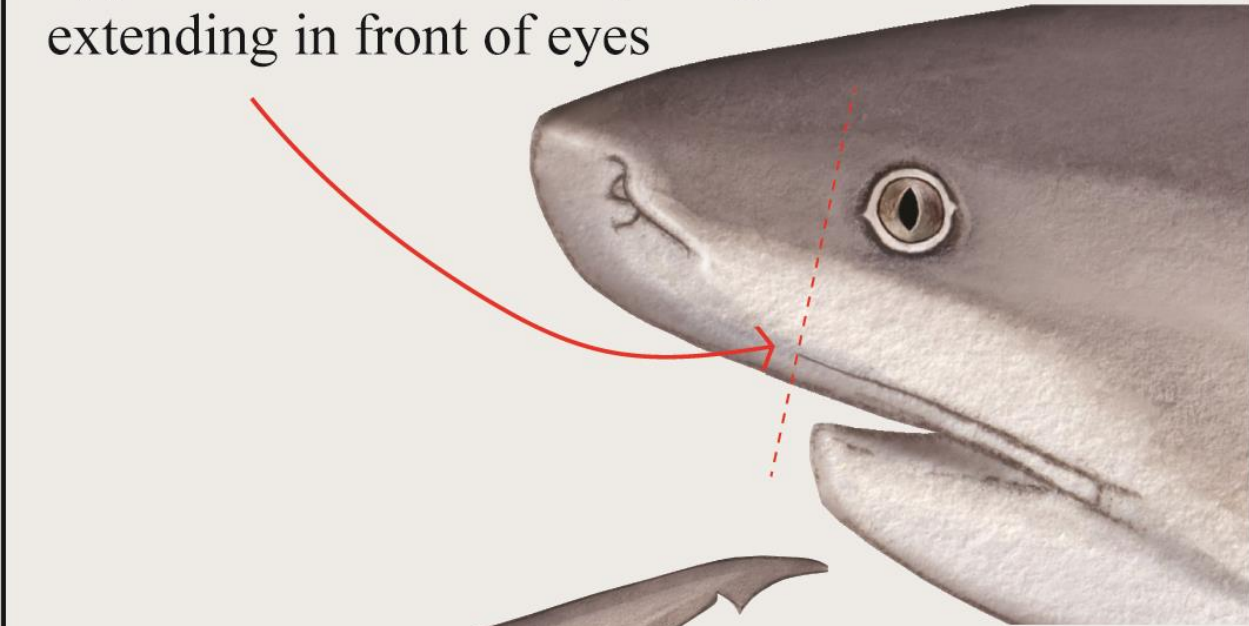
Triaenodon obesus (White tip reef shark).

second dorsal fin less than half height of first dorsal fin



...go to **step 23.**

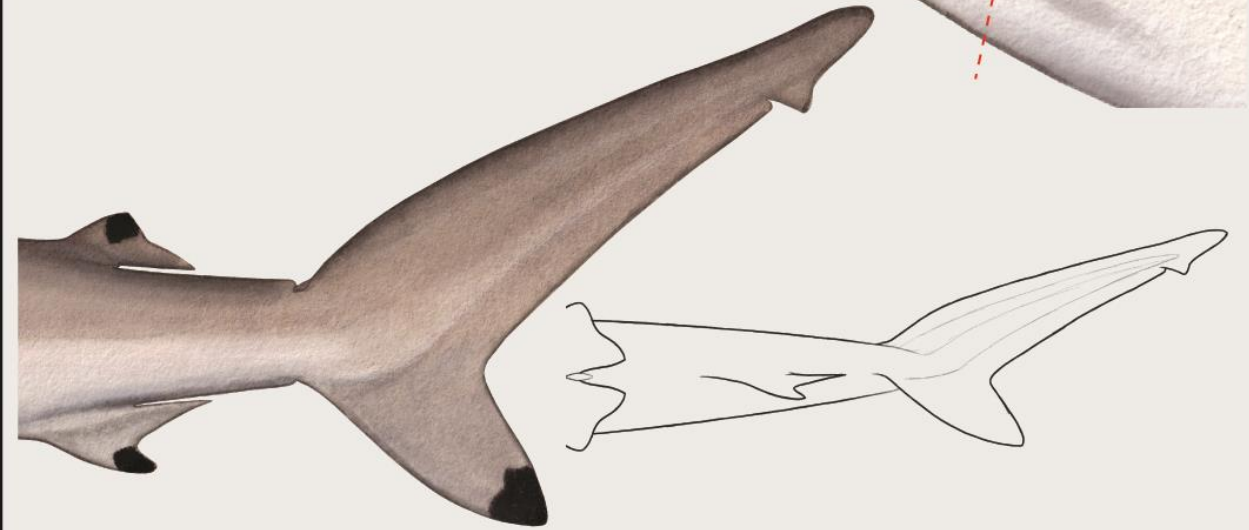
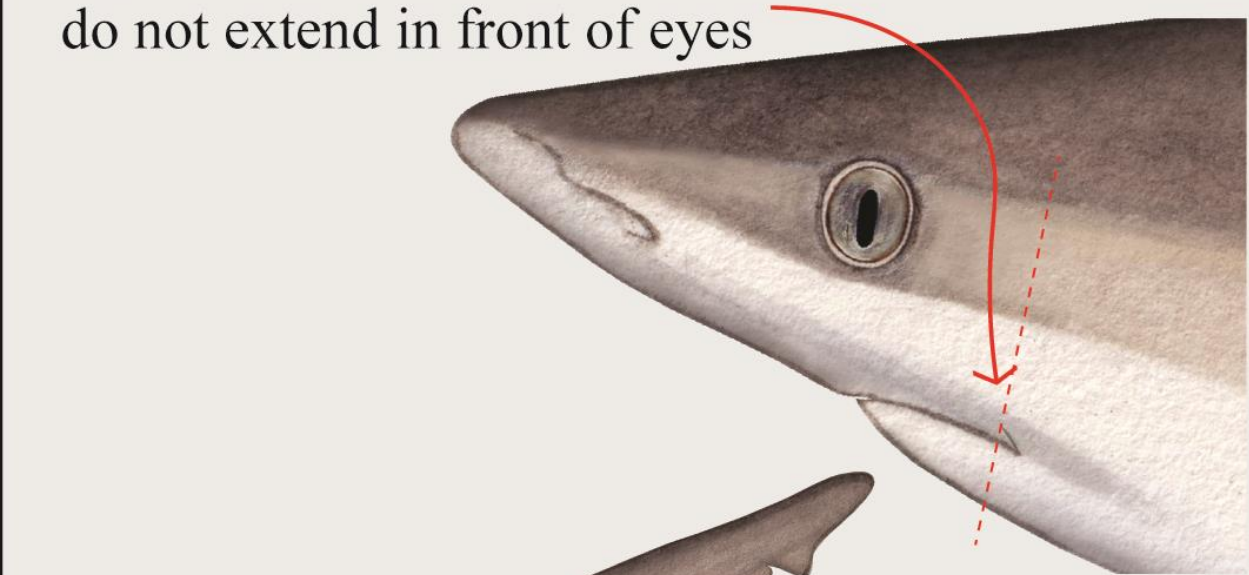
upper labial furrows very long,
extending in front of eyes



prominent lateral keels present on caudal peduncle

***Galeocerdo cuvier* (Tiger Shark).**

upper labial furrows
do not extend in front of eyes

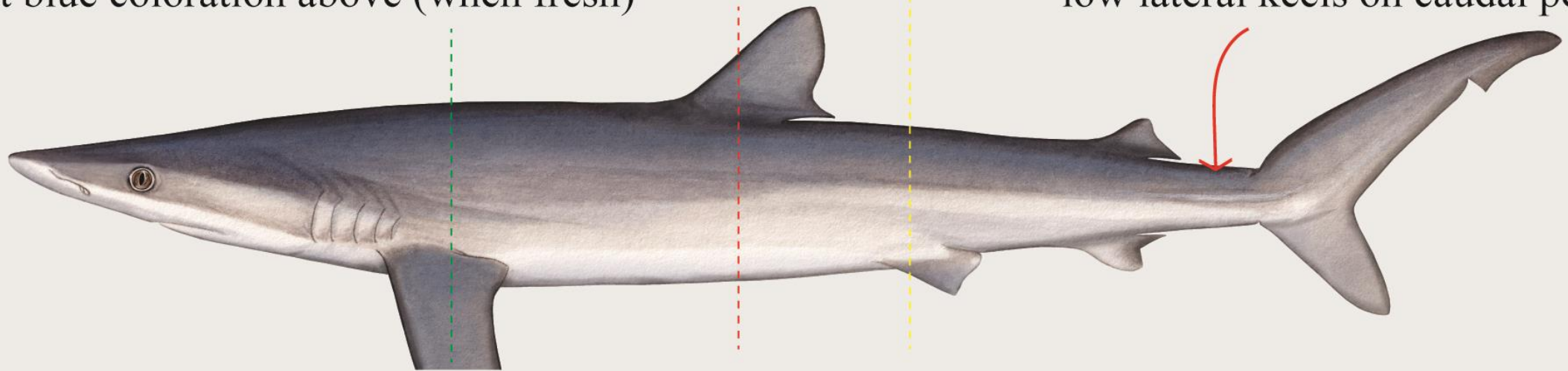


lateral keels absent from caudal peduncle
(weak keels present in Blue Sharks)

...go to step 24.

brilliant blue coloration above (when fresh)

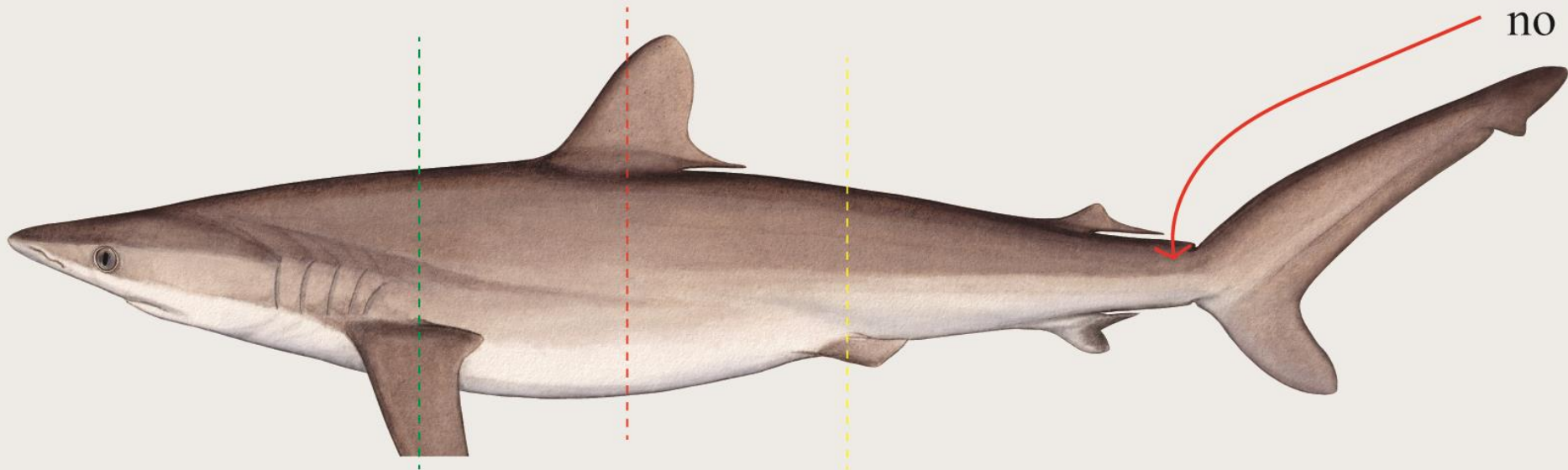
low lateral keels on caudal peduncle



first dorsal fin much closer to pelvic fins than pectoral fins

Prionace glauca (Blue Shark).

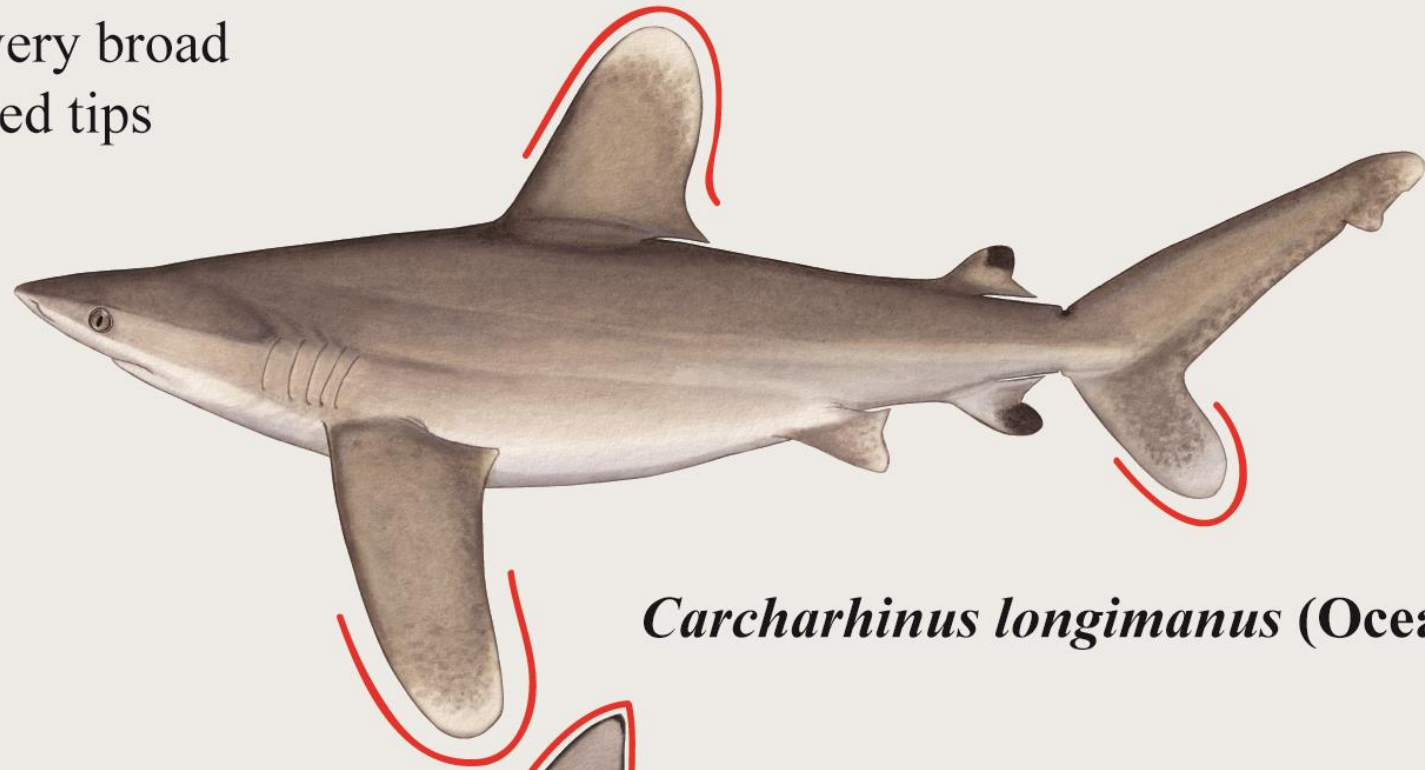
no lateral keels



first dorsal fin midway between pectoral and pelvic fins or closer to pectoral fins

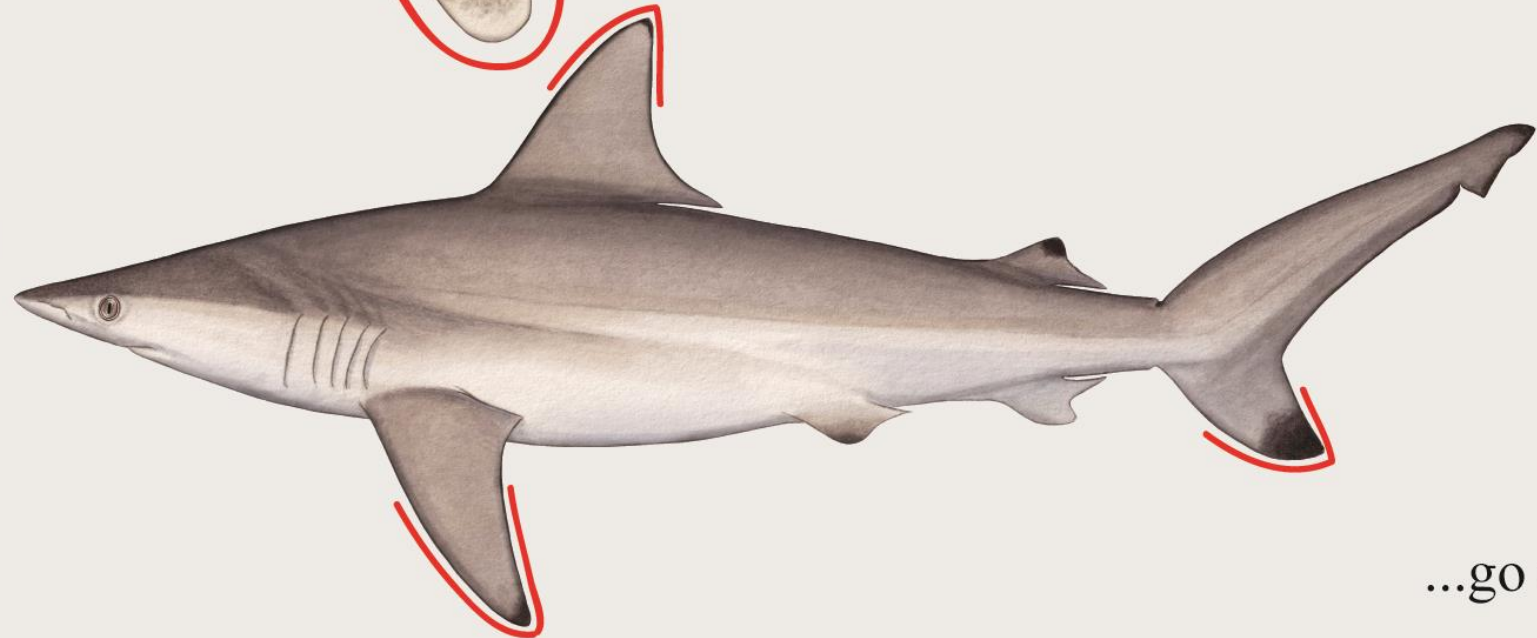
...go to **step 25.**

first dorsal and pectoral fins very broad
with rounded and white mottled tips



Carcharhinus longimanus (Oceanic Whitetip).

fins not mottled white;
first dorsal and pectoral fins
tapering with pointed tips



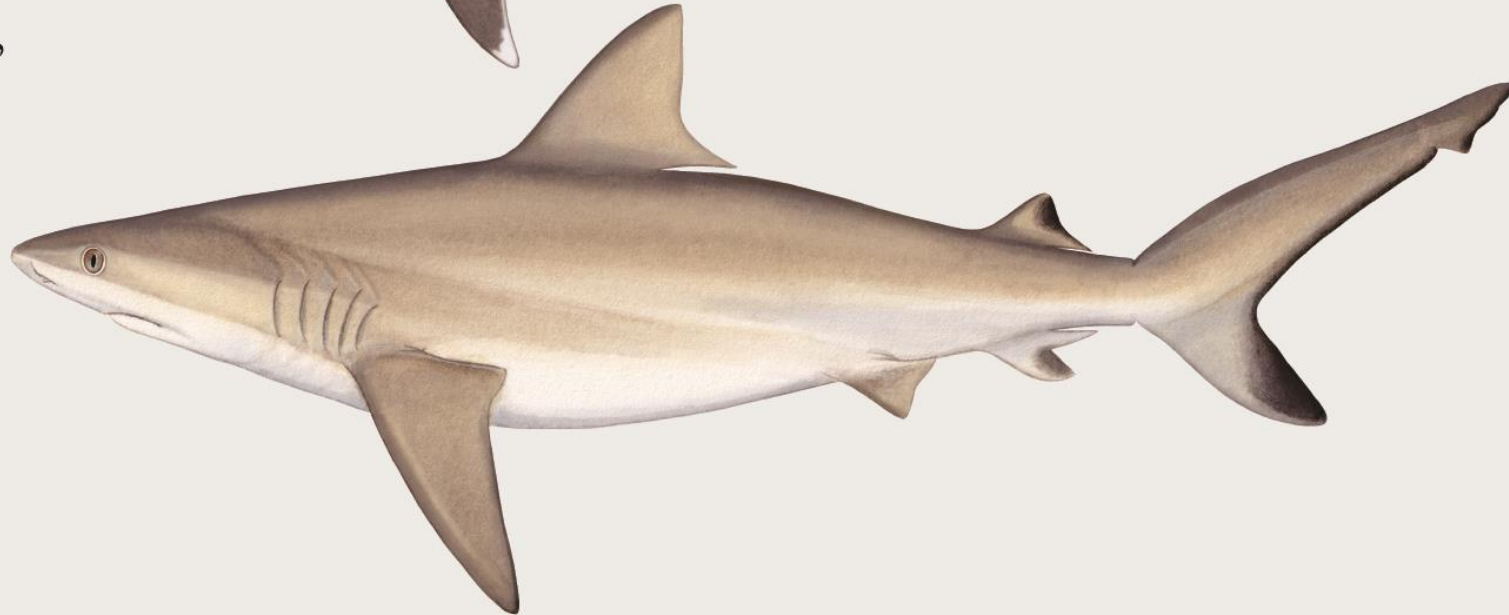
...go to step 26.

first dorsal fin, pectoral,
pelvic and caudal fins **with** conspicuous white tips



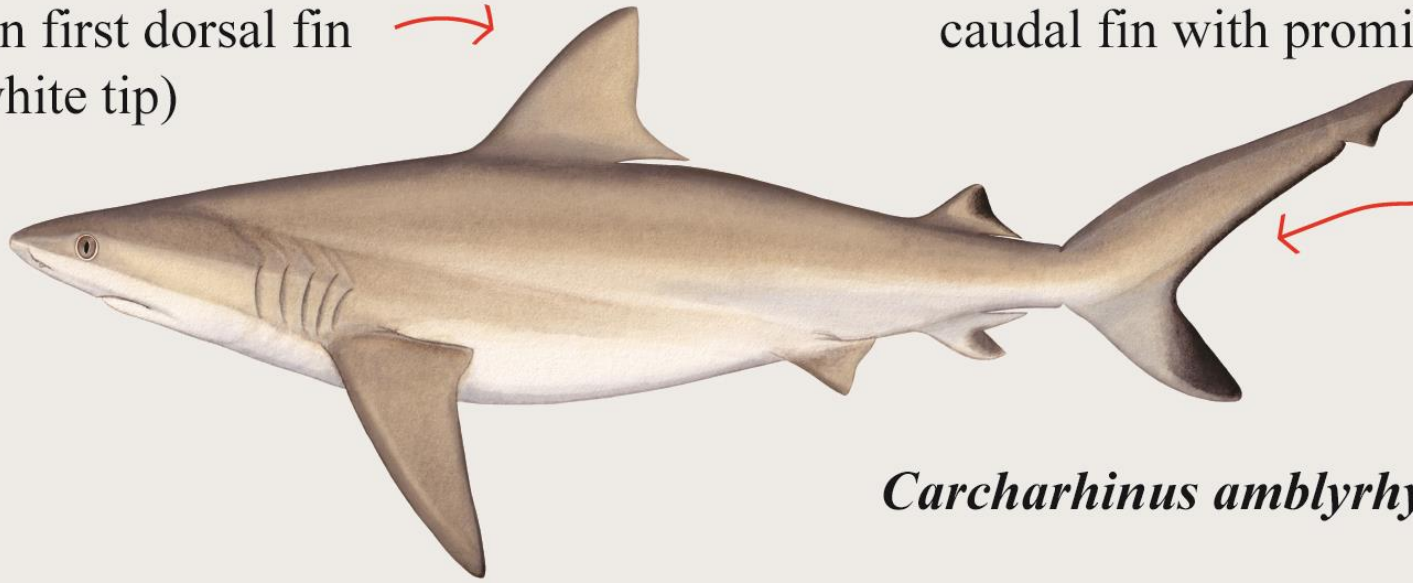
Carcharhinus albimarginatus (Silvertip Shark).

first dorsal fin, pectoral,
pelvic and caudal fins
without white tips



...go to step 27.

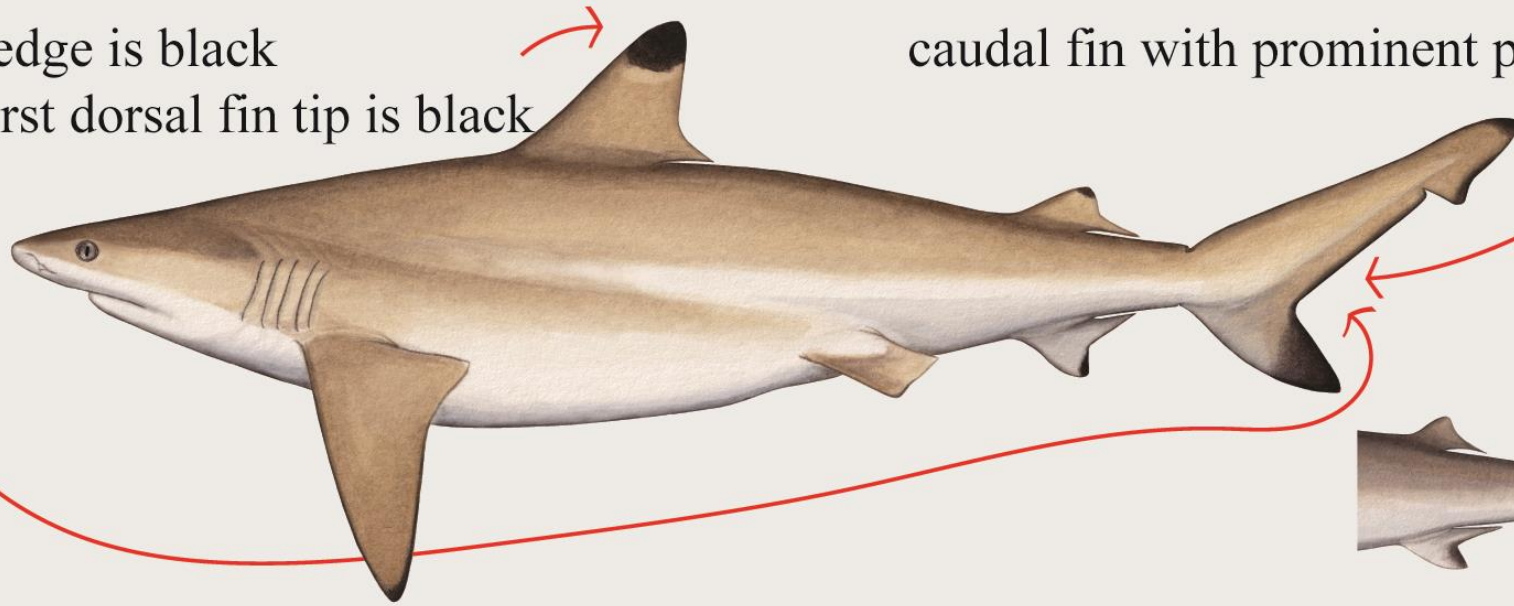
no black tip on first dorsal fin
(sometimes white tip)



caudal fin with prominent posterior black edges

Carcharhinus amblyrhynchos (Grey Reef Shark).

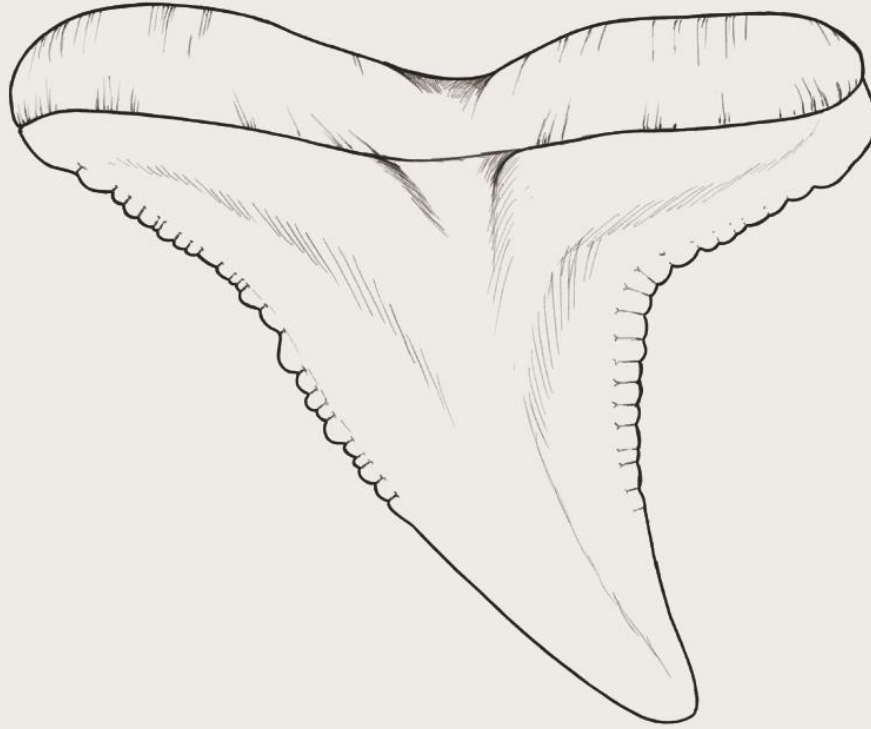
but if edge is black
then first dorsal fin tip is black



caudal fin with prominent posterior black edges or plain

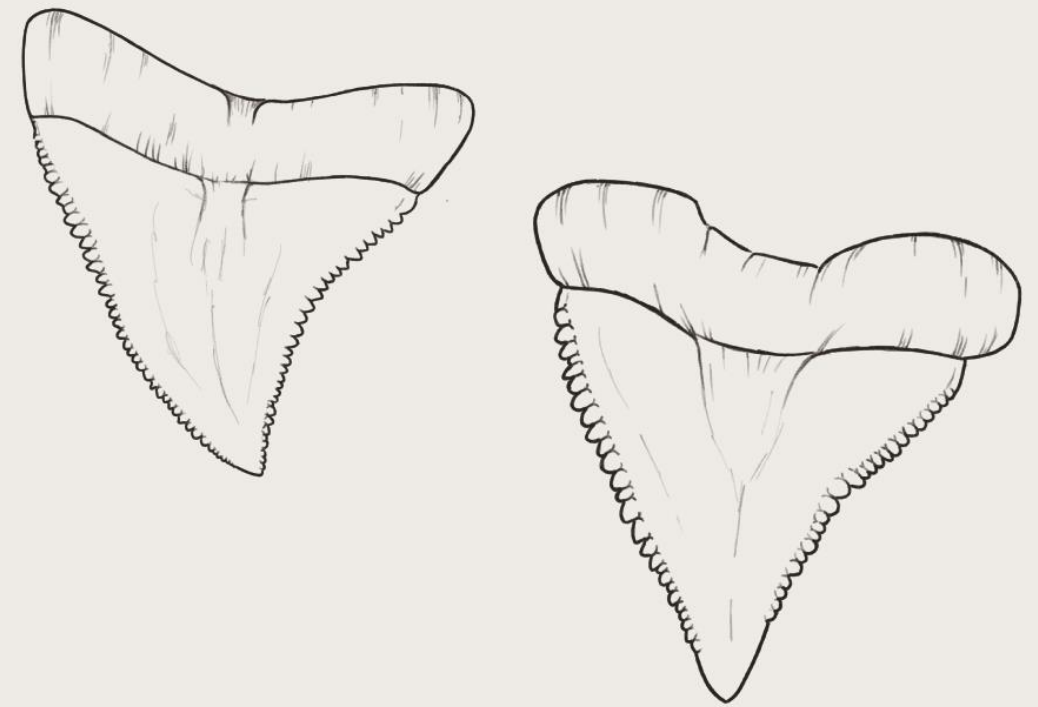
...go to **step 28.**

upper anterolateral teeth with bent, hooked, narrow cusps



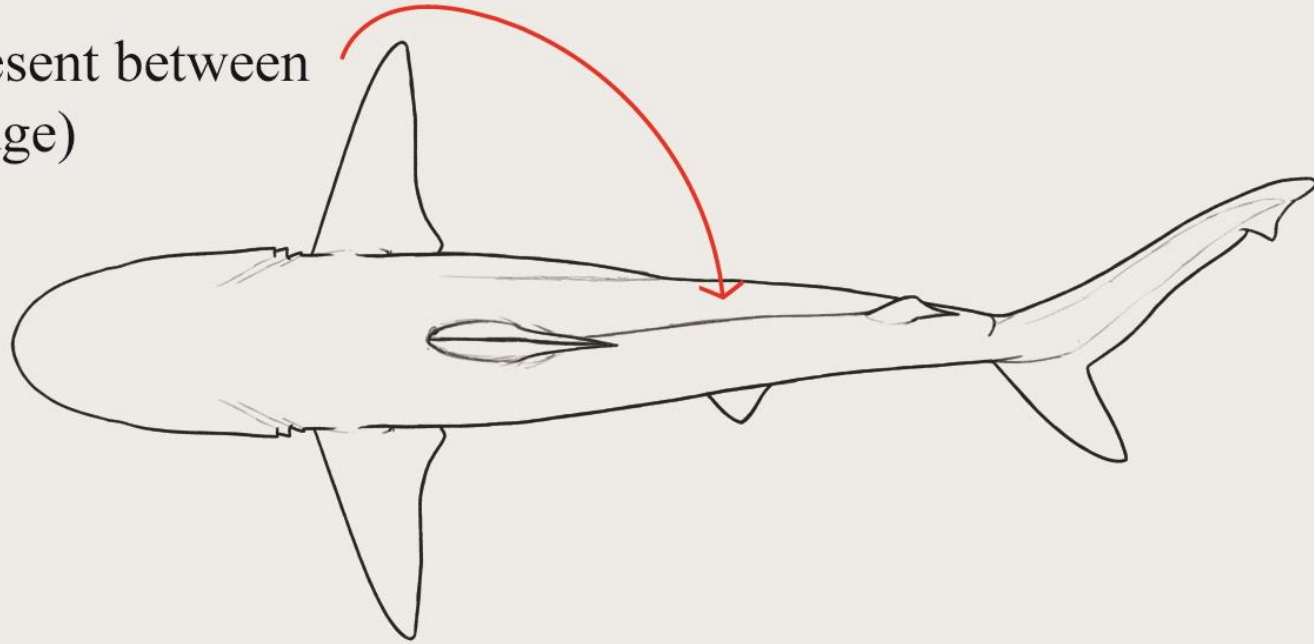
Carcharhinus brachyurus (Bronze Whaler).

upper anterolateral teeth variably shaped but never with bent, hooked cusps



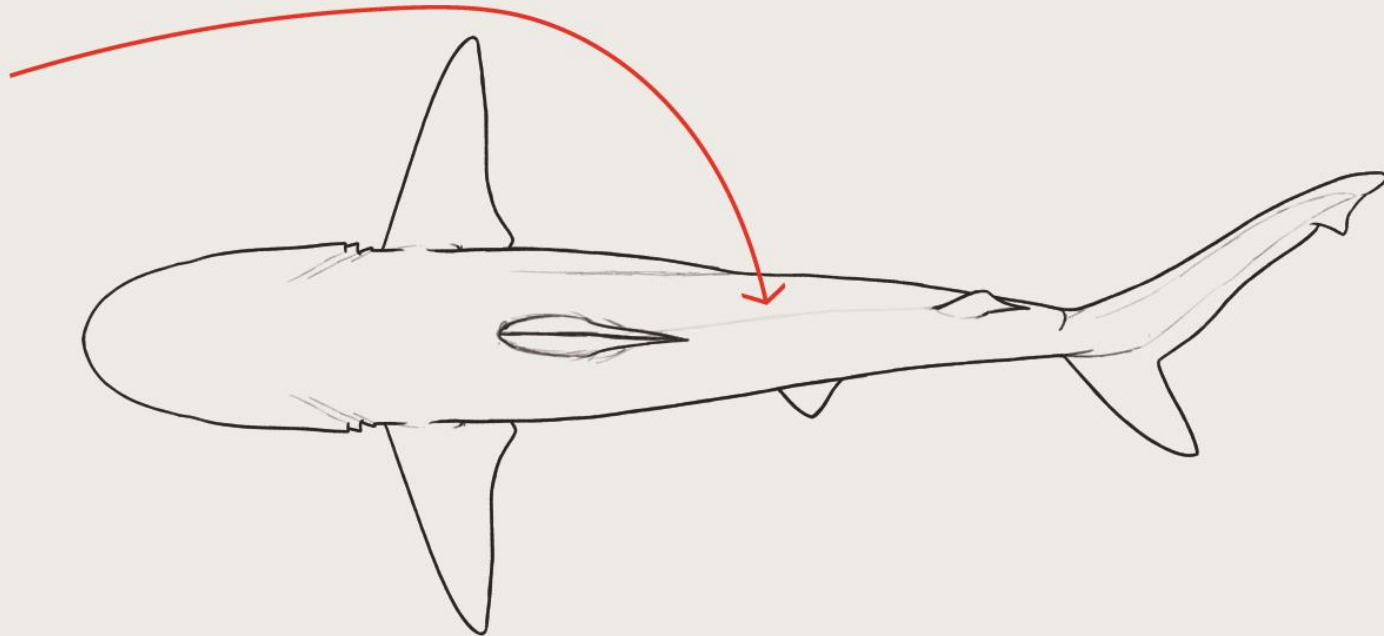
...go to step 29.

a distinct ridge of skin present between dorsal fins (interdorsal ridge)



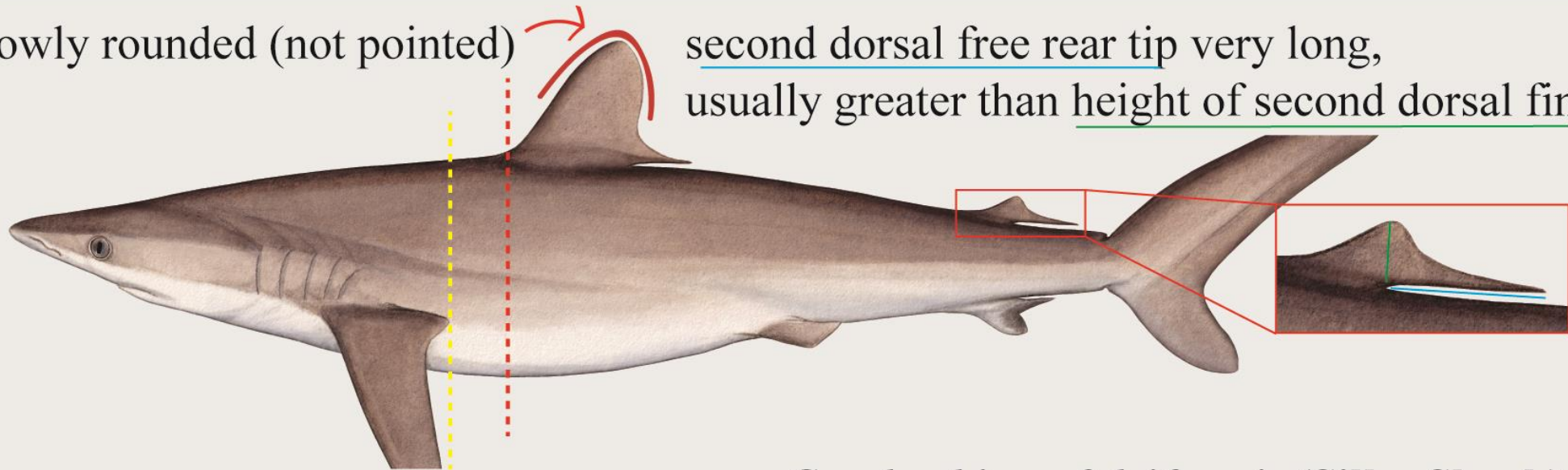
...go to **step 30.**

no interdorsal ridge



...go to **step 34.**

first dorsal-fin tip narrowly rounded (not pointed)

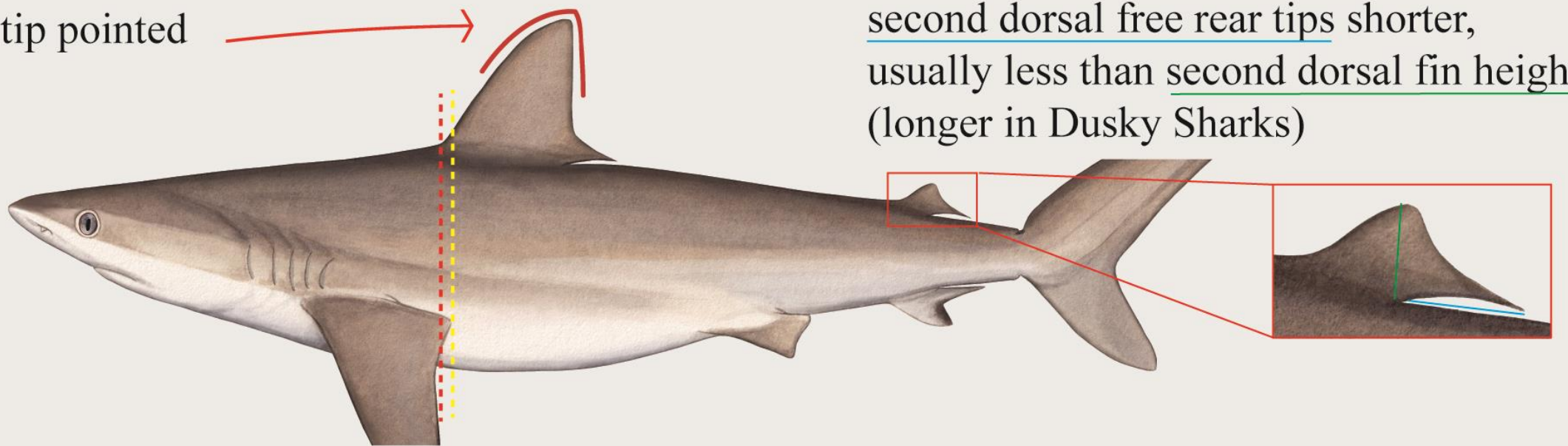


second dorsal free rear tip very long, usually greater than height of second dorsal fin

first dorsal-fin origin well behind pectoral free rear tips

Carcharhinus falciformis (Silky Shark).

first dorsal-fin tip pointed

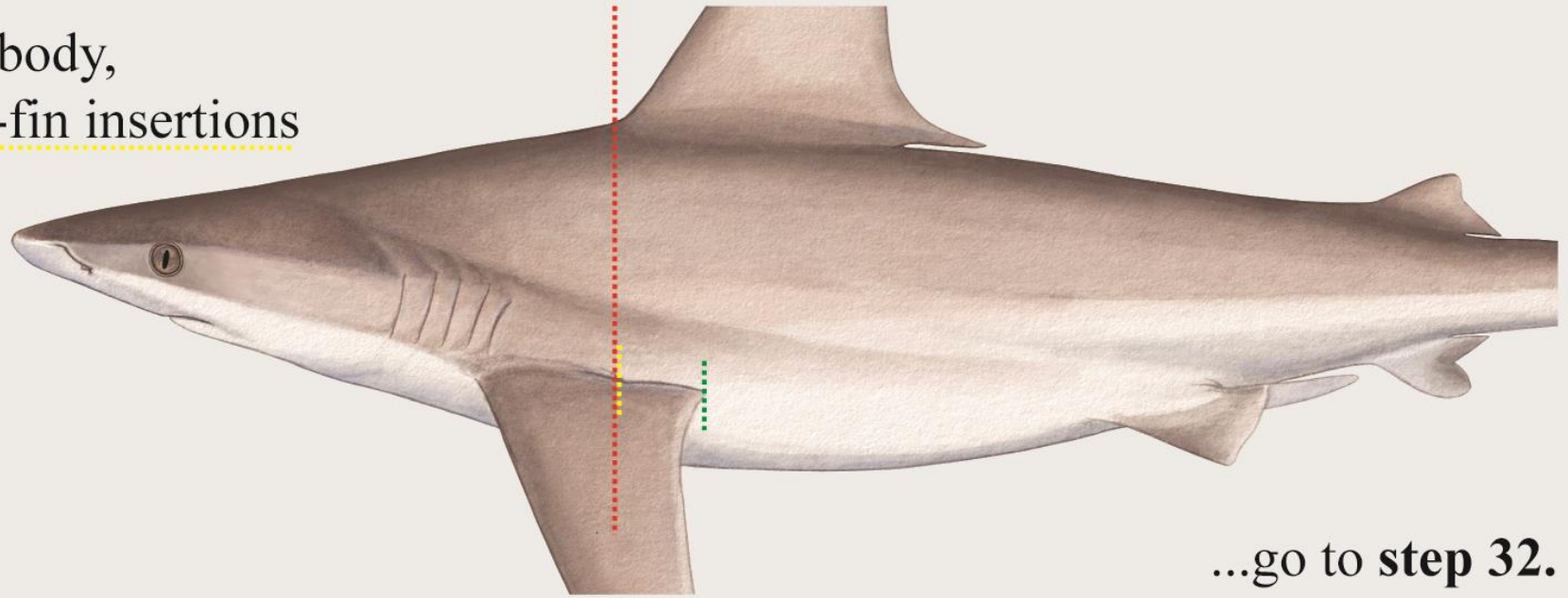


second dorsal free rear tips shorter, usually less than second dorsal fin height (longer in Dusky Sharks)

first dorsal-fin origin in front of or over pectoral free rear tips

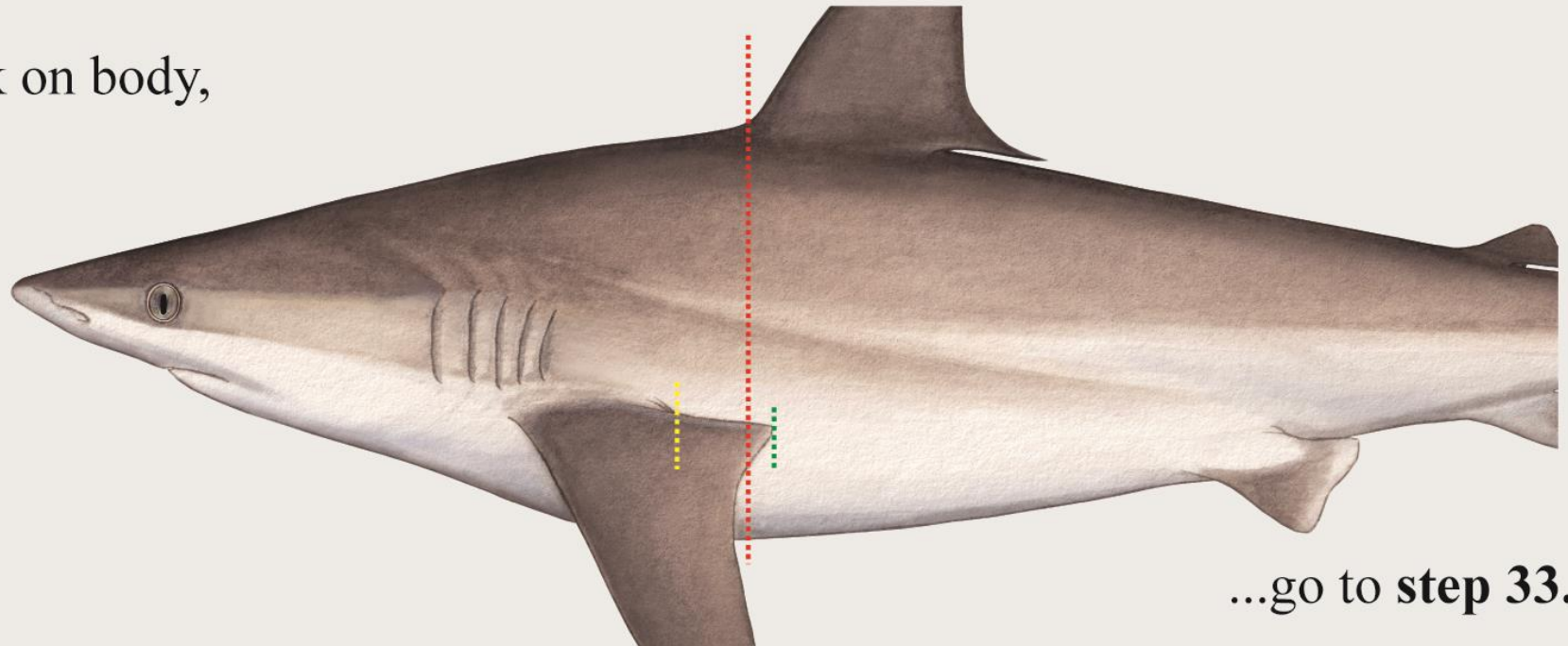
...go to **step 31.**

first dorsal fin located forward on body,
its origin almost opposite pectoral-fin insertions



...go to **step 32.**

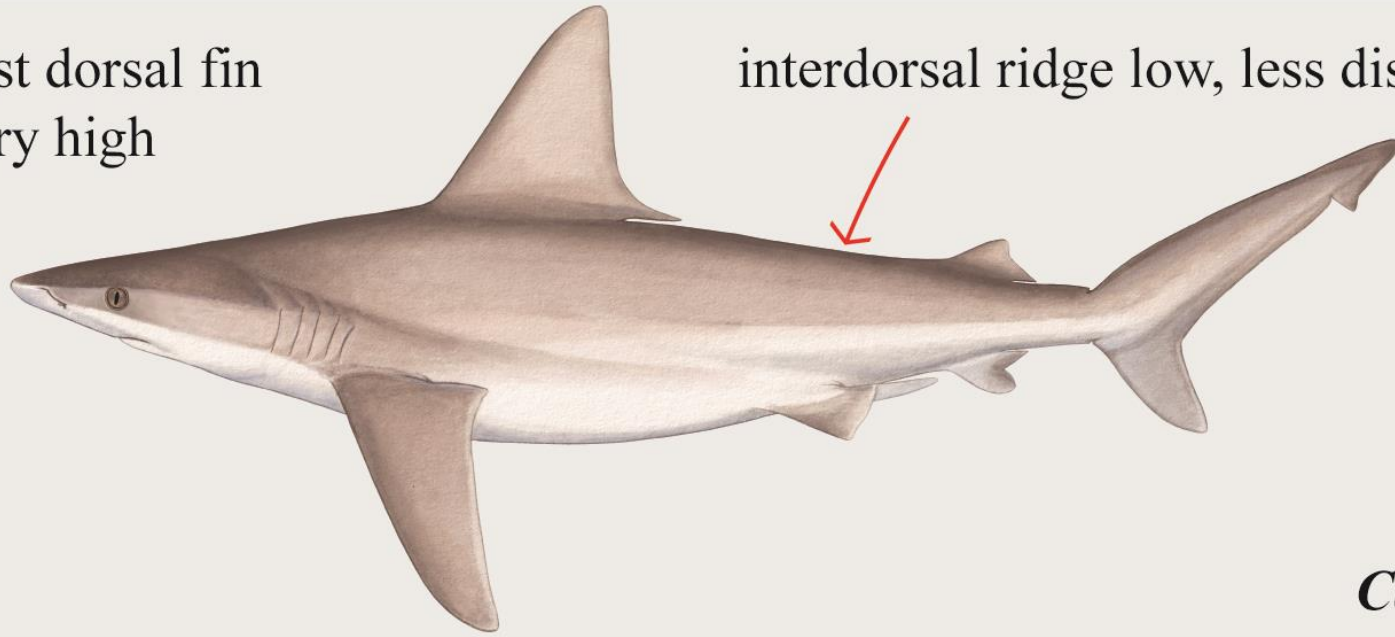
first dorsal fin located further back on body,
its origin closer to
pectoral fin free rear tips
than to insertions



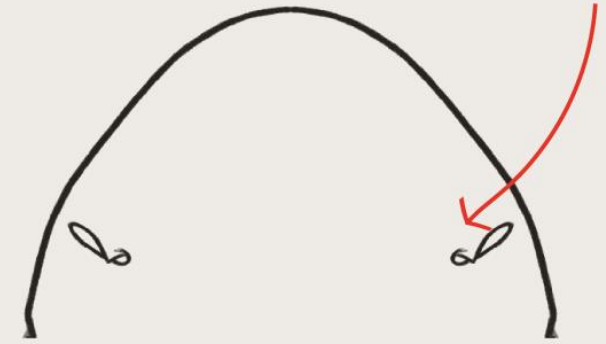
...go to **step 33.**

first dorsal fin
very high

interdorsal ridge low, less distinct



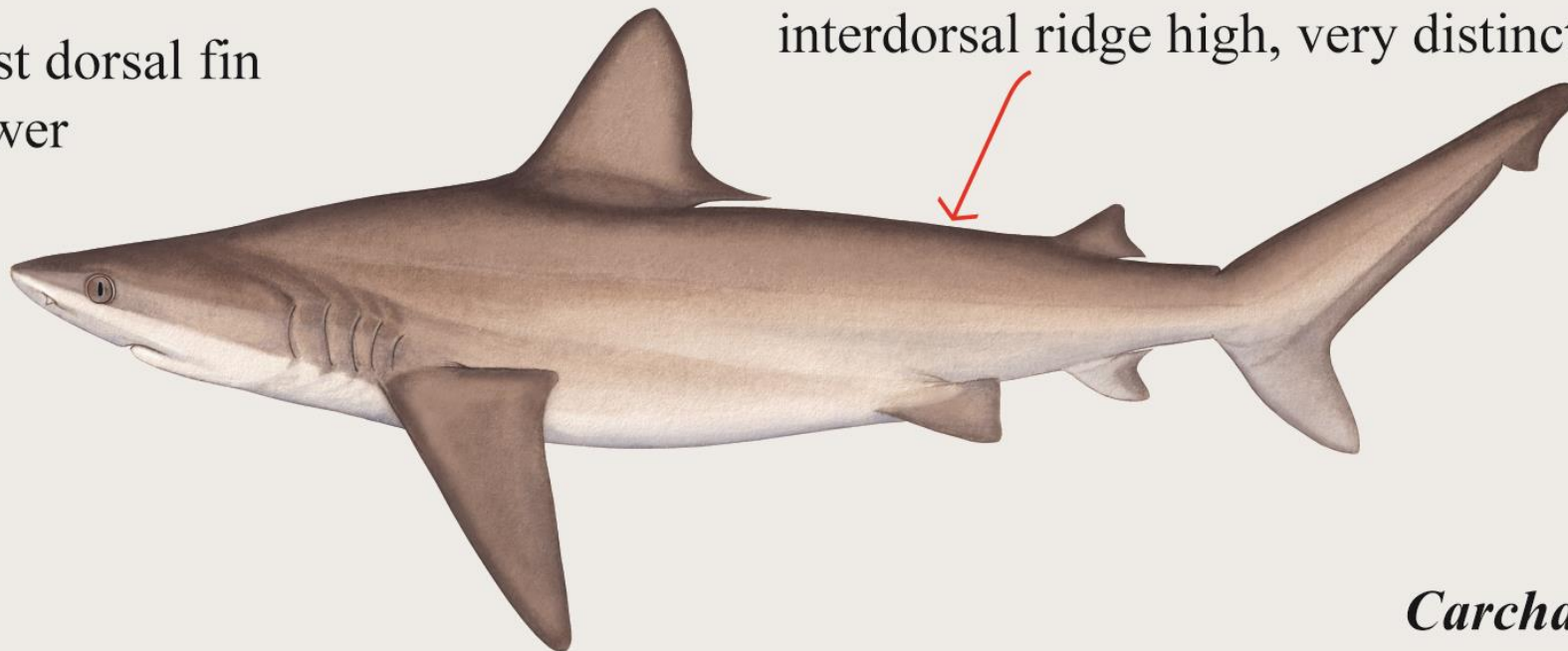
anterior nasal flaps
low and inconspicuous



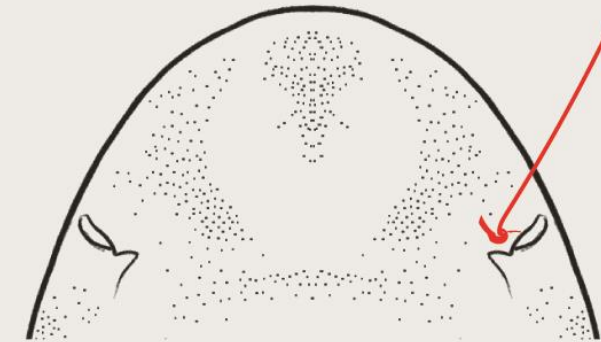
Carcharhinus plumbeus (Sandbar Shark).

first dorsal fin
lower

interdorsal ridge high, very distinct



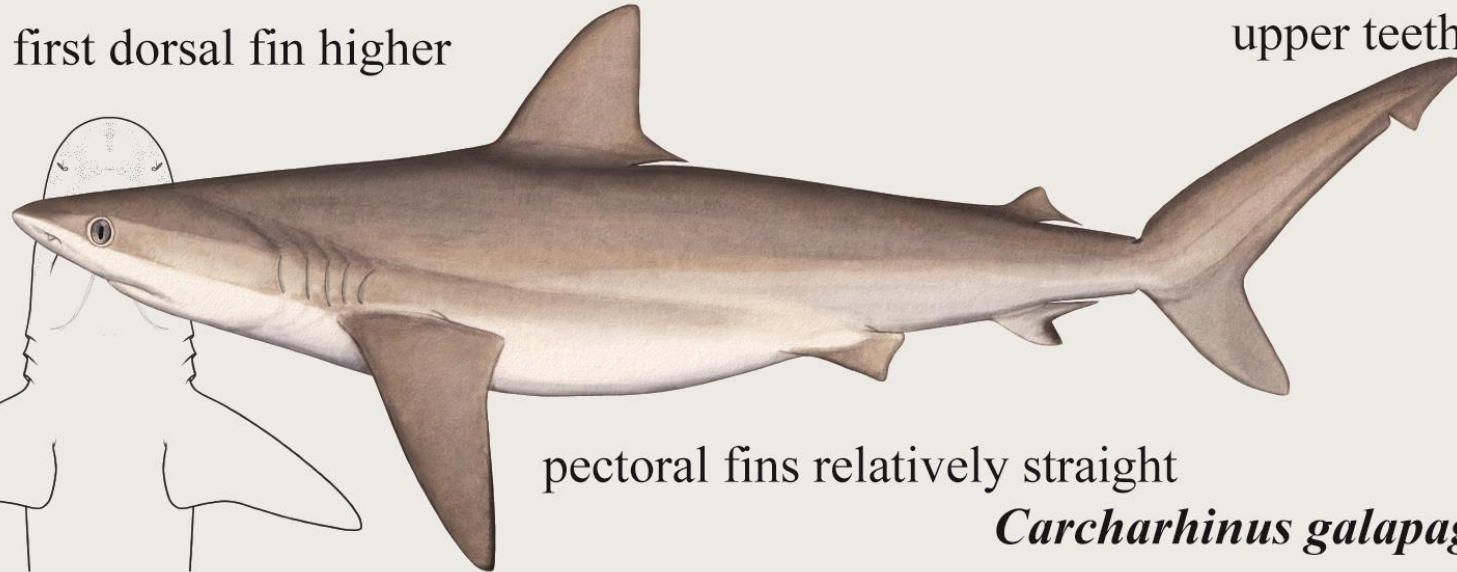
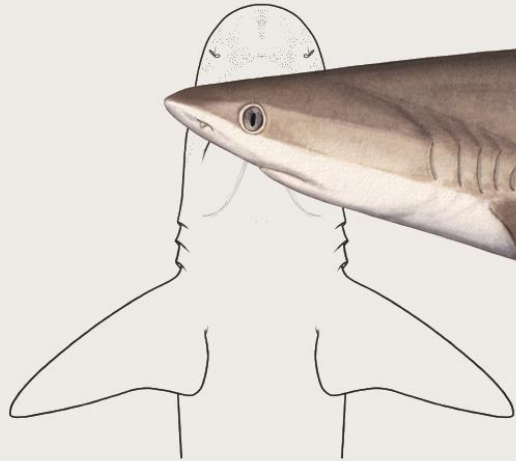
anterior nasal flaps
high and triangular



Carcharhinus altimus (Bignose Shark).

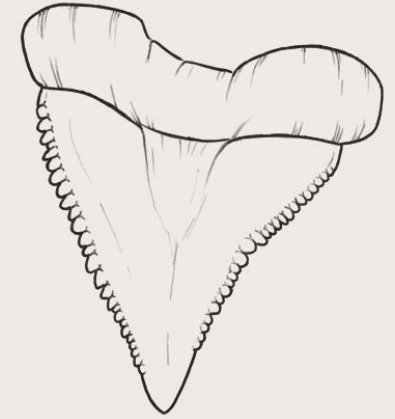
first dorsal fin higher

upper teeth relatively high and narrow



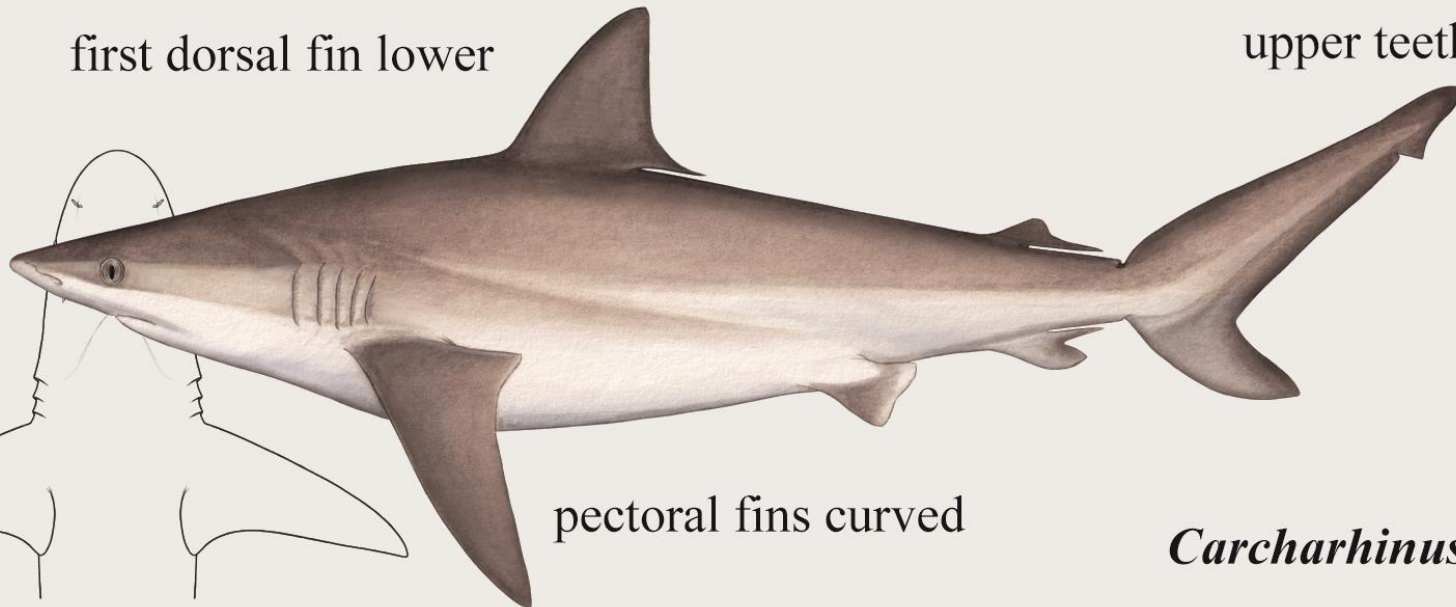
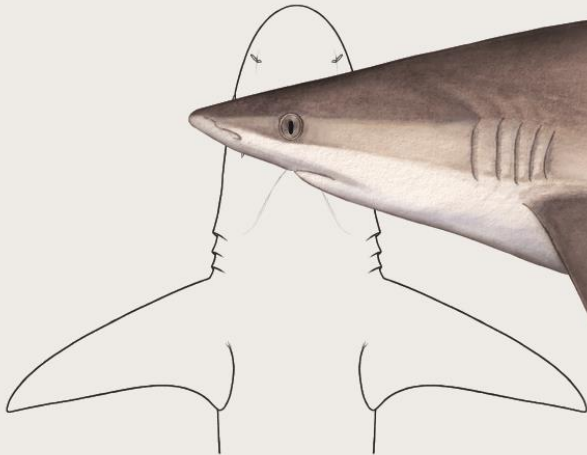
pectoral fins relatively straight

Carcharhinus galapagensis (Galapagos Shark).



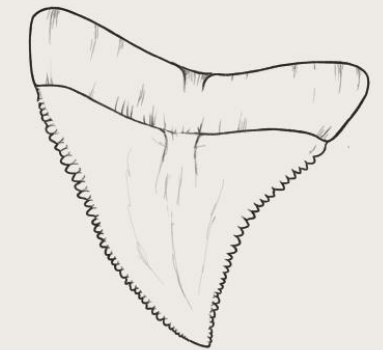
first dorsal fin lower

upper teeth relatively low and broad

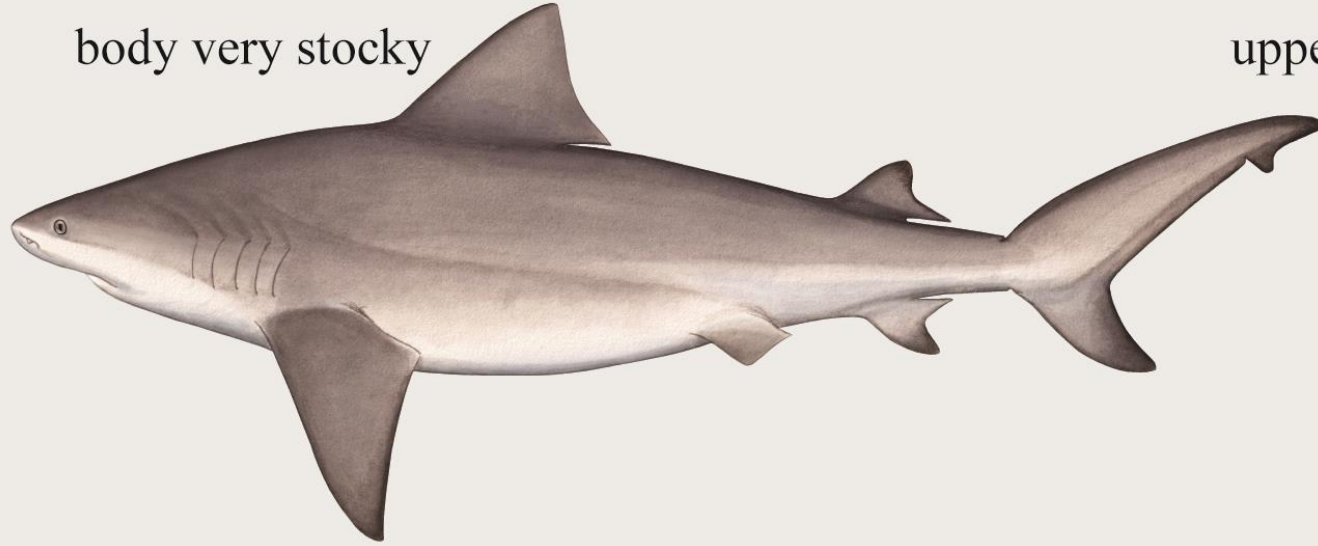


pectoral fins curved

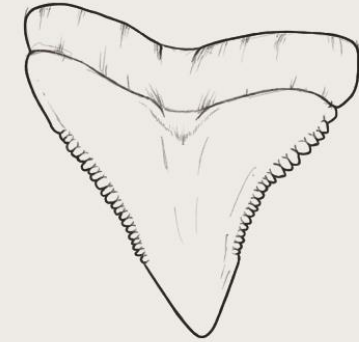
Carcharhinus obscurus (Dusky Shark).



body very stocky

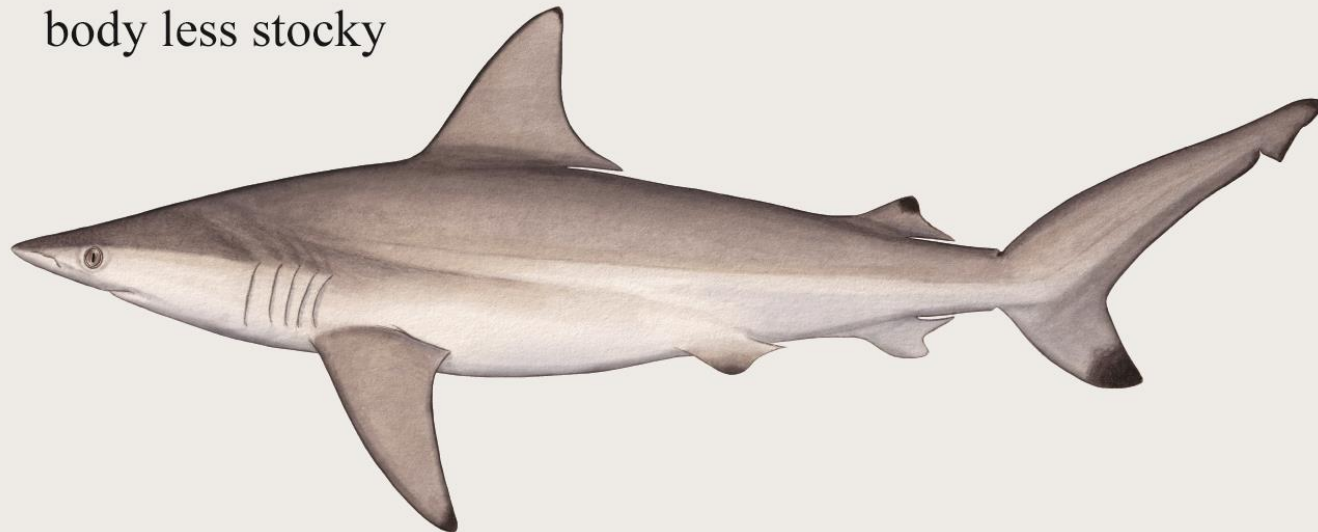


upper anterolateral teeth broad, triangular and serrated

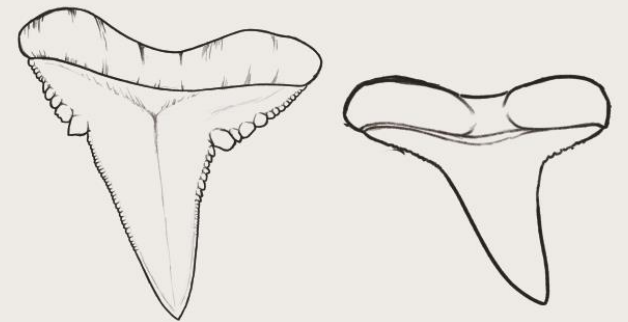


Carcharhinus leucas (Bull Shark).

body less stocky

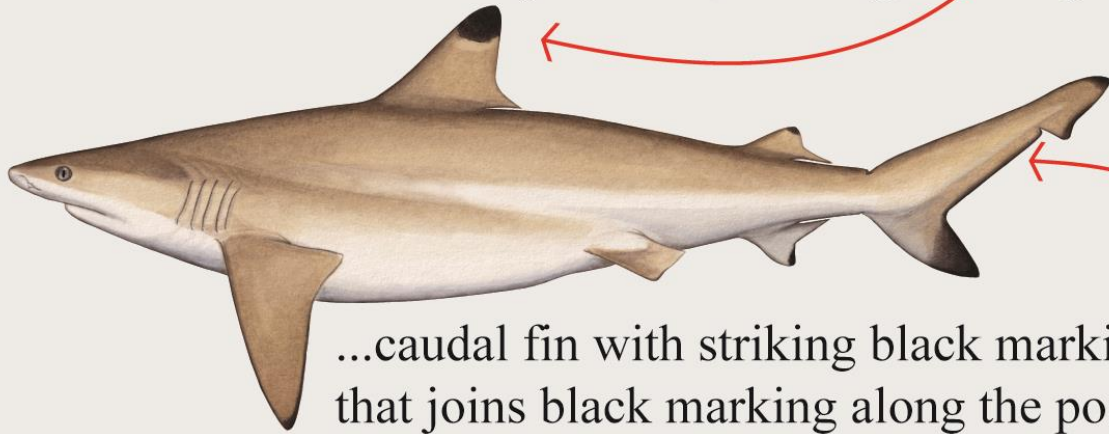


upper anterolateral teeth narrow and sometimes serrated



...go to step 35.

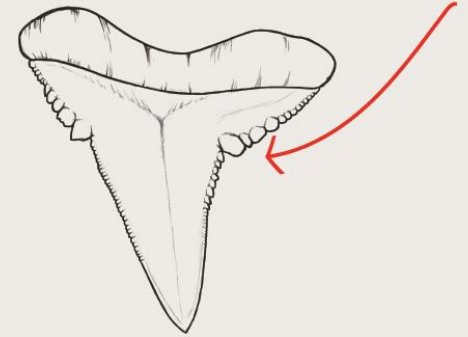
first dorsal fin with a very distinct, striking black tip AND



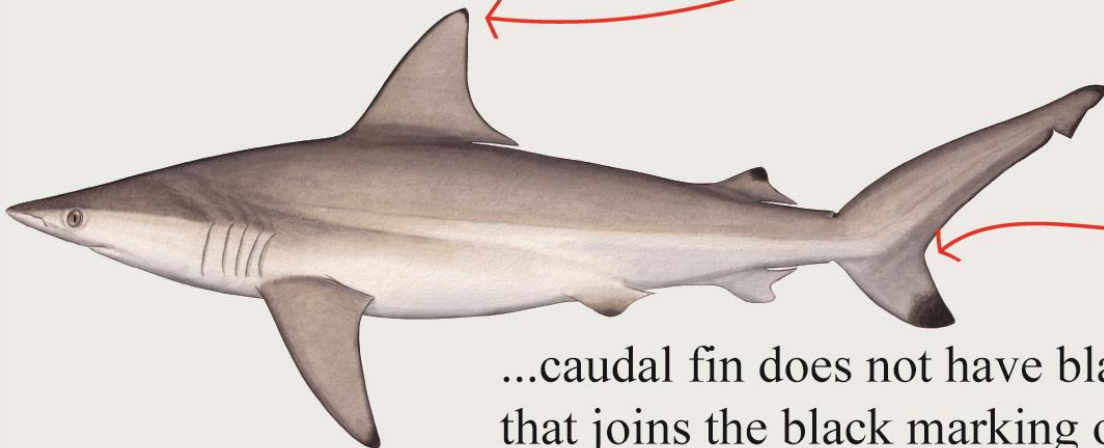
...caudal fin with striking black marking on lower lobe that joins black marking along the posterior margin

Carcharhinus melanopterus (Blacktip Reef Shark).

upper anterolateral teeth with coarse basal serrations

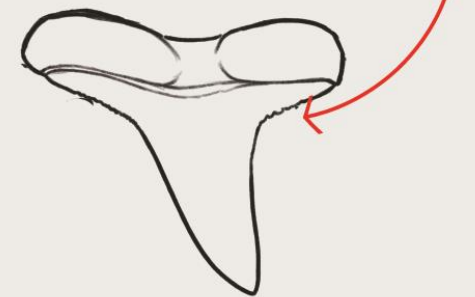


first dorsal fin may or may not have black tip AND



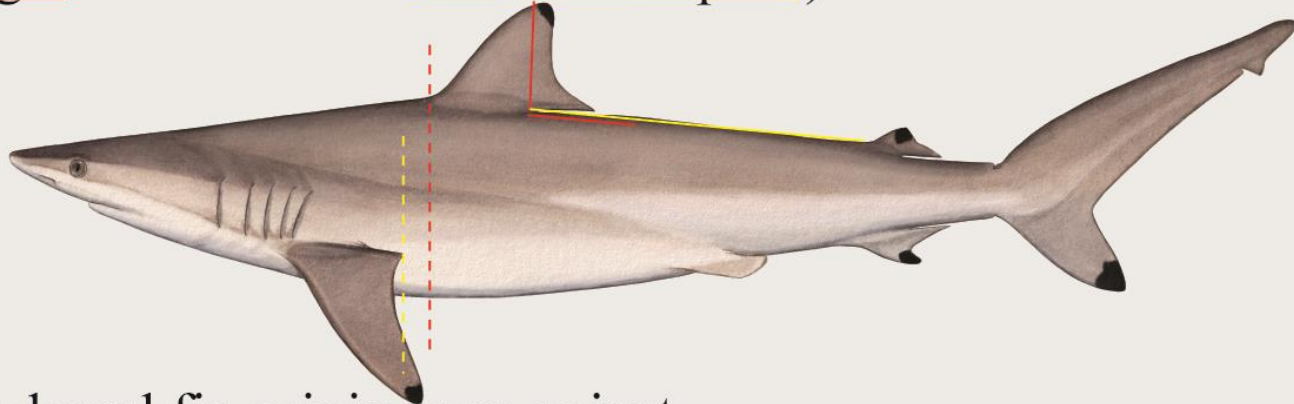
...caudal fin does not have black posterior margin that joins the black marking on the lower lobe

upper anterolateral teeth without coarse basal serrations



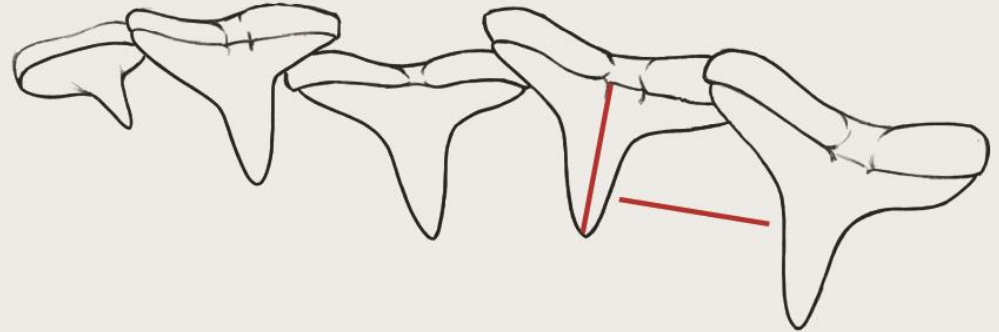
...go to **step 36**.

first dorsal fin relatively low
(height >2.2 times in interdorsal space)



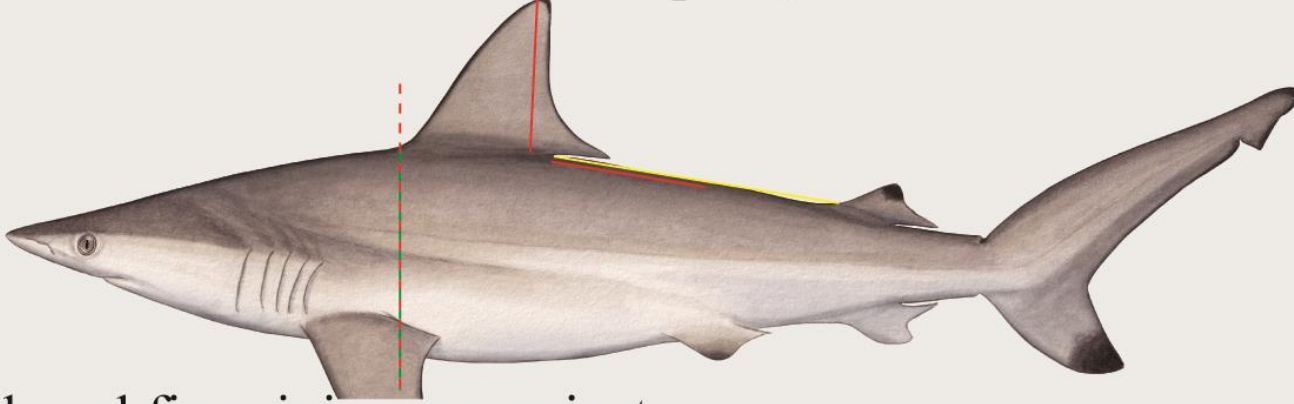
first dorsal fin origin over or just
behind pectoral fin rear tips

teeth very short, teeth in middle rows
usually shorter than distance between teeth



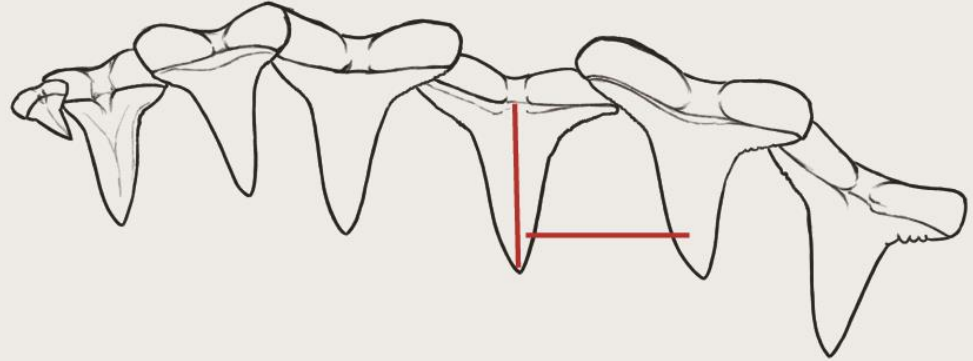
Carcharhinus brevipinna (Spinner Shark).

first dorsal fin taller
(height <2.2 times in interdorsal space)



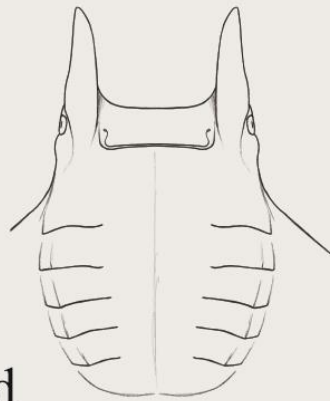
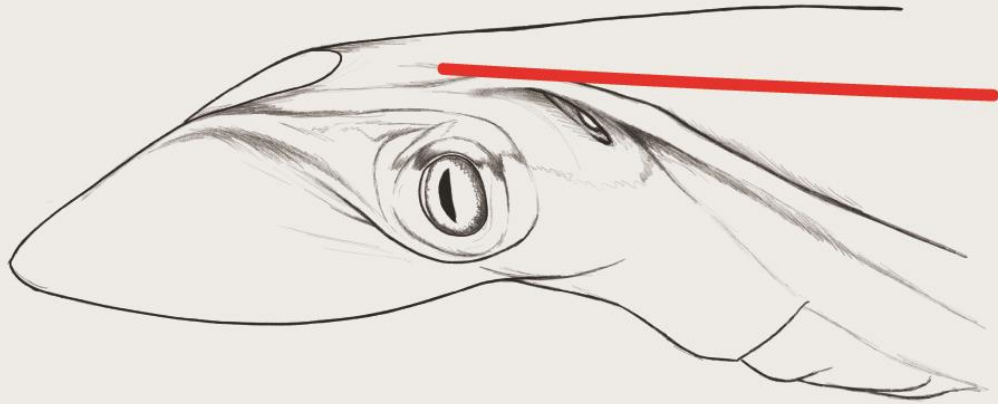
first dorsal fin origin over or just
forward of pectoral fin insertions

teeth of normal size, teeth in middle rows
usually taller than distance between teeth



Carcharhinus limbatus (Common Blacktip Shark).

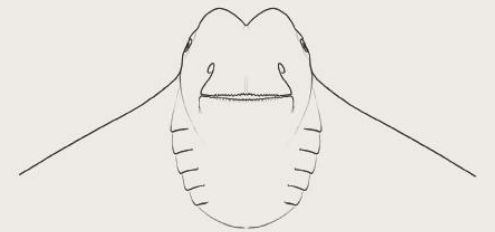
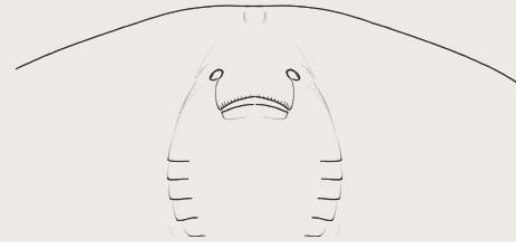
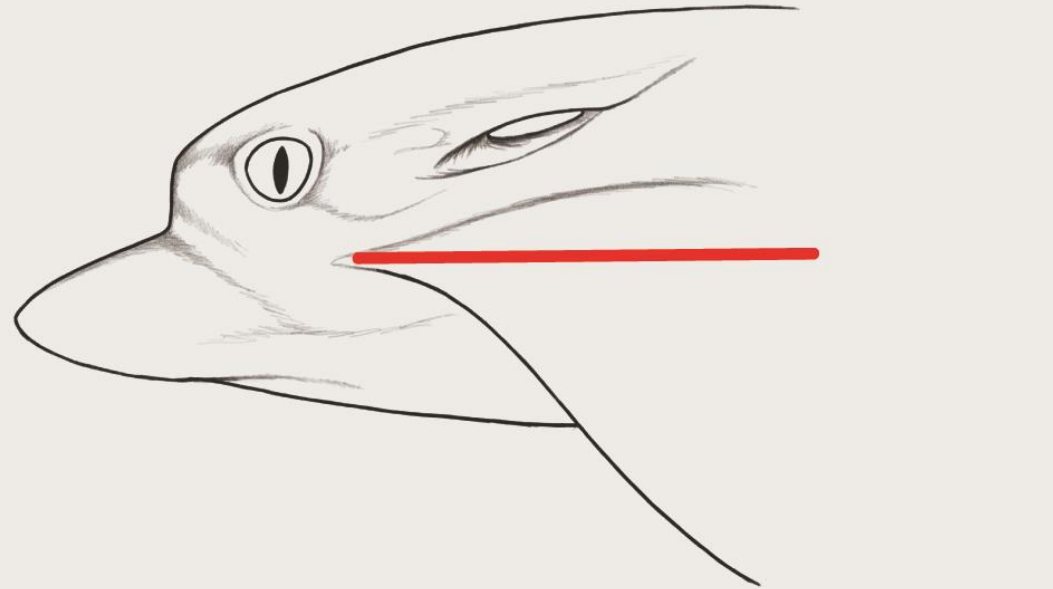
head not elevated above disc



snout modified into a pair of elongate lobes on each side of head

...go to **step 38.**

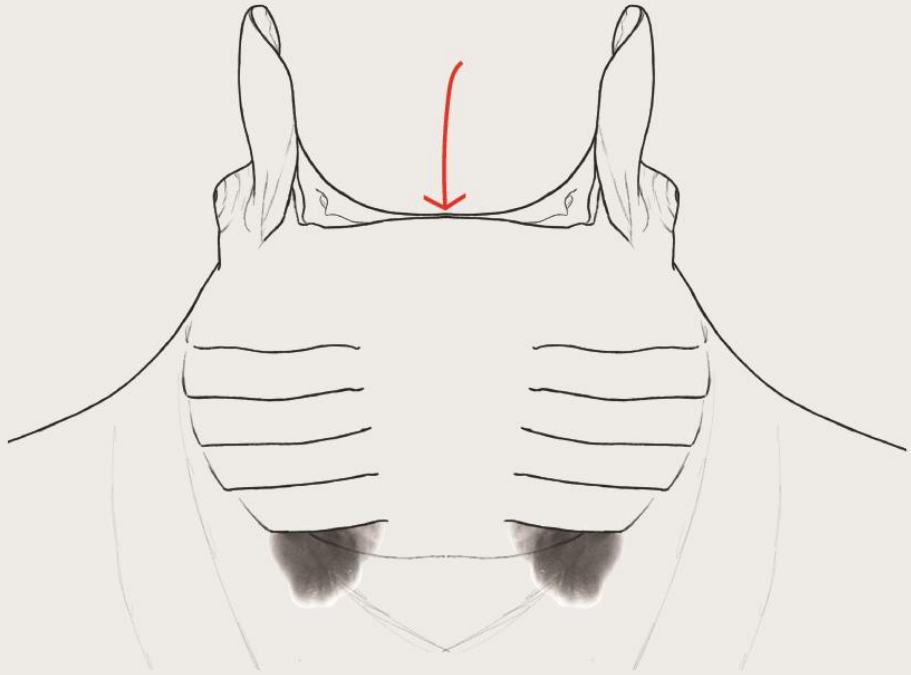
head elevated above disc



snout formed as a single, convex, lobe-like process or pair of rounded lobes

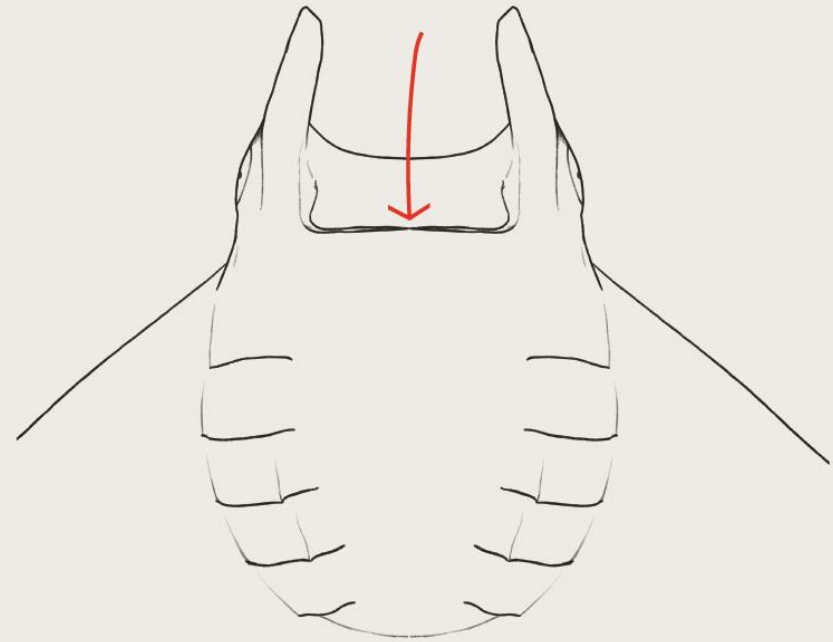
...go to **step 43.**

mouth terminal on head



...go to **step 39.**

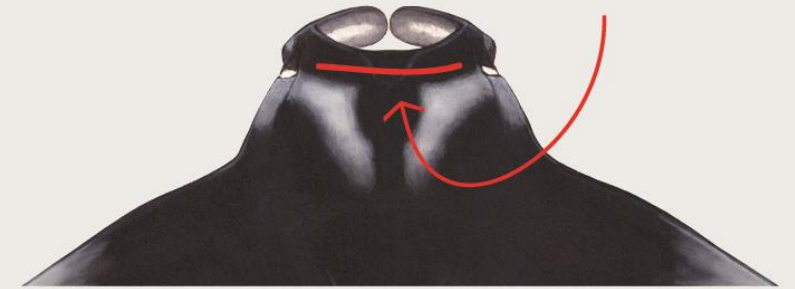
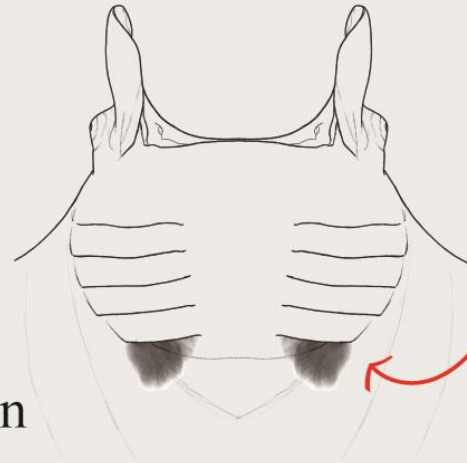
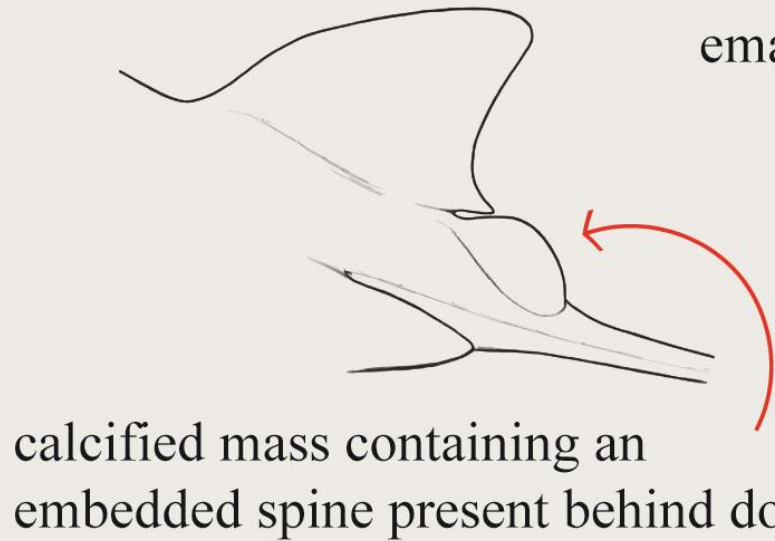
mouth subterminal on ventral surface of head



...go to **step 40.**

a large, black, semi-circular spot
emanating from both of the fifth gill slits

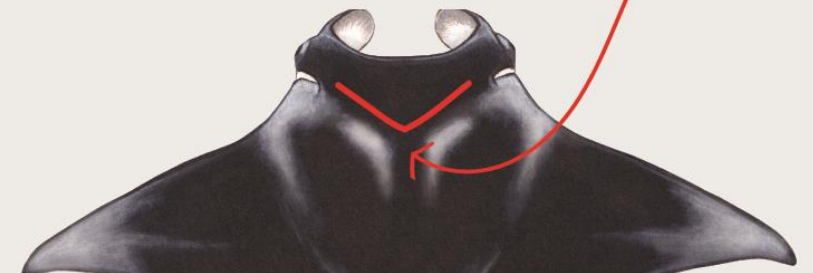
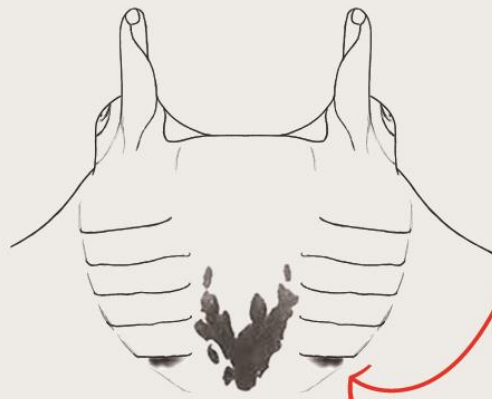
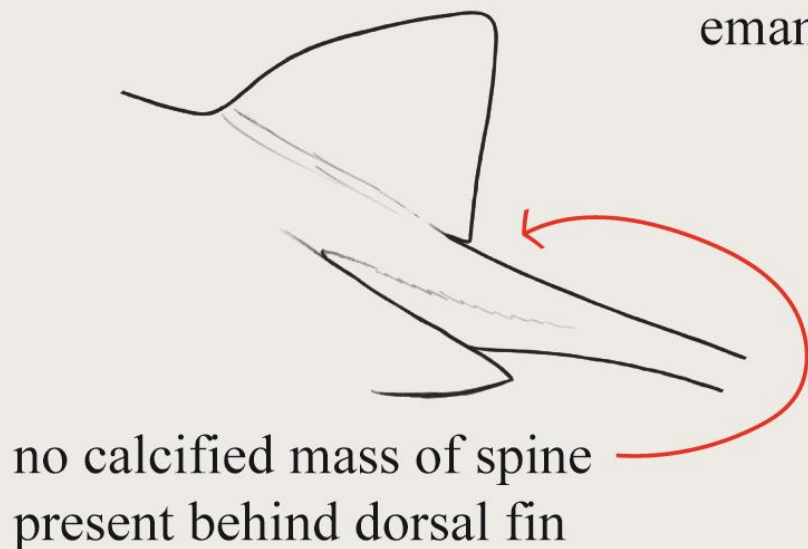
anterior margin of white
shoulder patches parallel
with front of head



***Mobula birostris* (Giant Manta).**

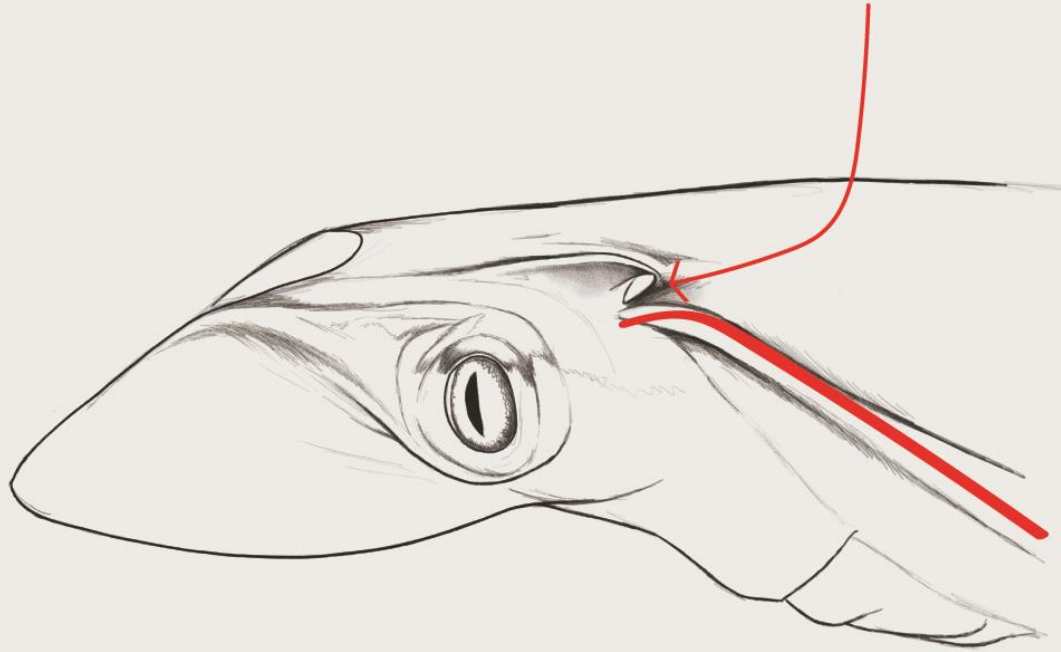
a small black semi-circular spot
emanating from both of the fifth gill slits

anterior margin of white
shoulder patches
curving posteriorly



***Mobula alfredi* (Reef Manta).**

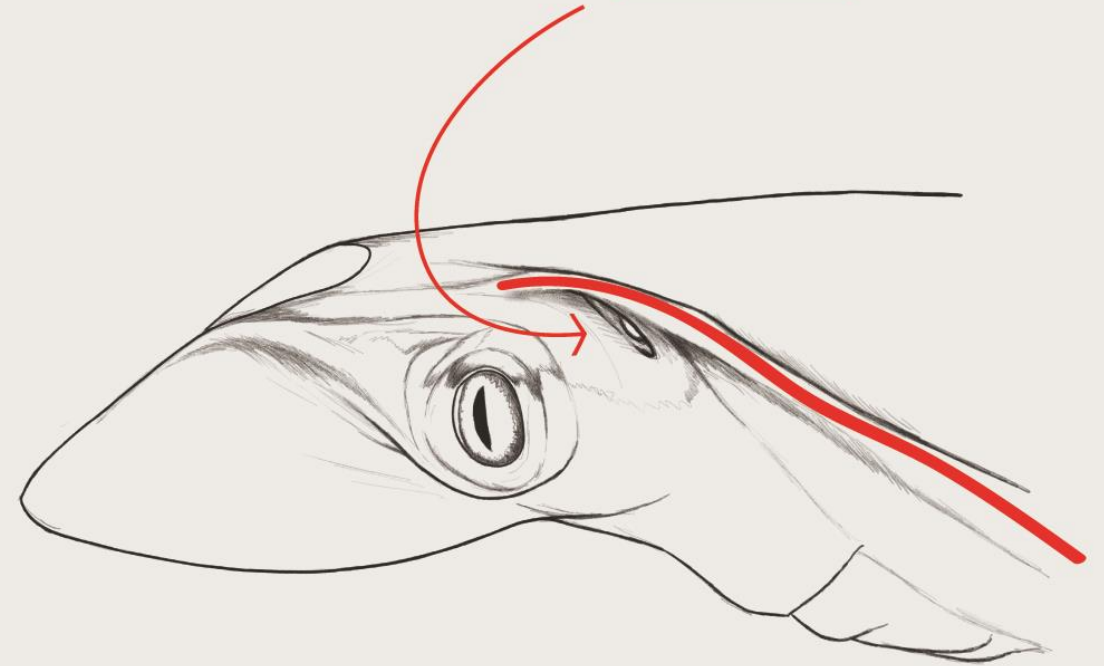
spiracles long, slit-like and dorsal to the plane of the pectoral fins



large animals, reaching well over 2 m disc width

...go to **step 41.**

spiracles small, subcircular and ventral to the plane of the pectoral fins



small animals, not reaching 2 m disc width

...go to **step 42.**

pectoral fins
strongly falcate

strong bony ridge
on dorsal midline

no caudal spine

disc greyish,
dorsal fin plain

***Mobula tarapacana* (Chilean Devilray).**

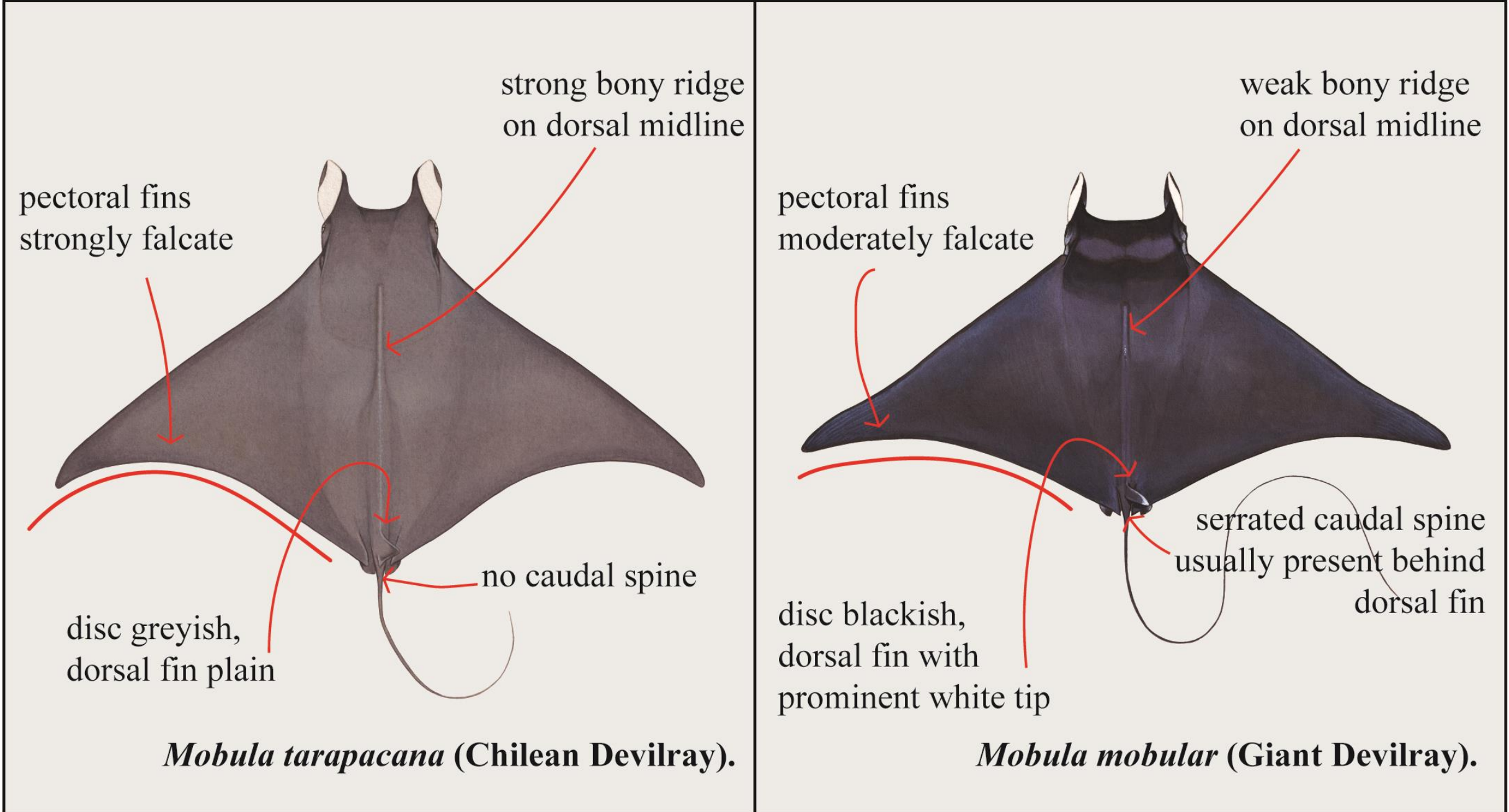
pectoral fins
moderately falcate

weak bony ridge
on dorsal midline

serrated caudal spine
usually present behind
dorsal fin

disc blackish,
dorsal fin with
prominent white tip

***Mobula mobular* (Giant Devilray).**



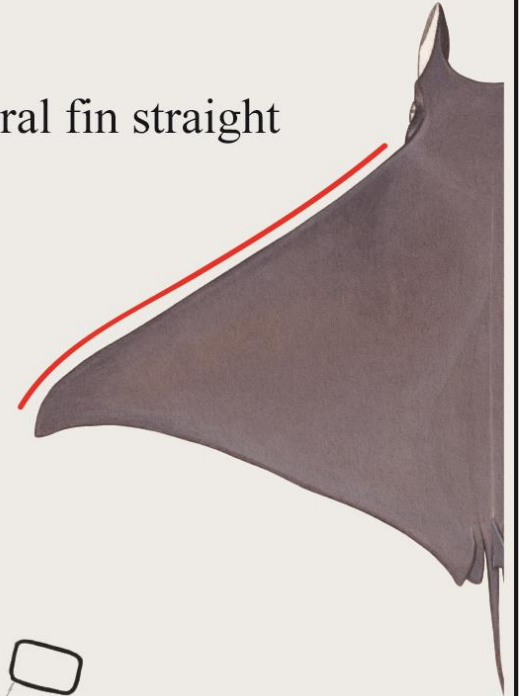
anterior margin of pectoral fins with double curvature



base of tail depressed

***Mobula thurstoni* (Bentfin Devilray).**

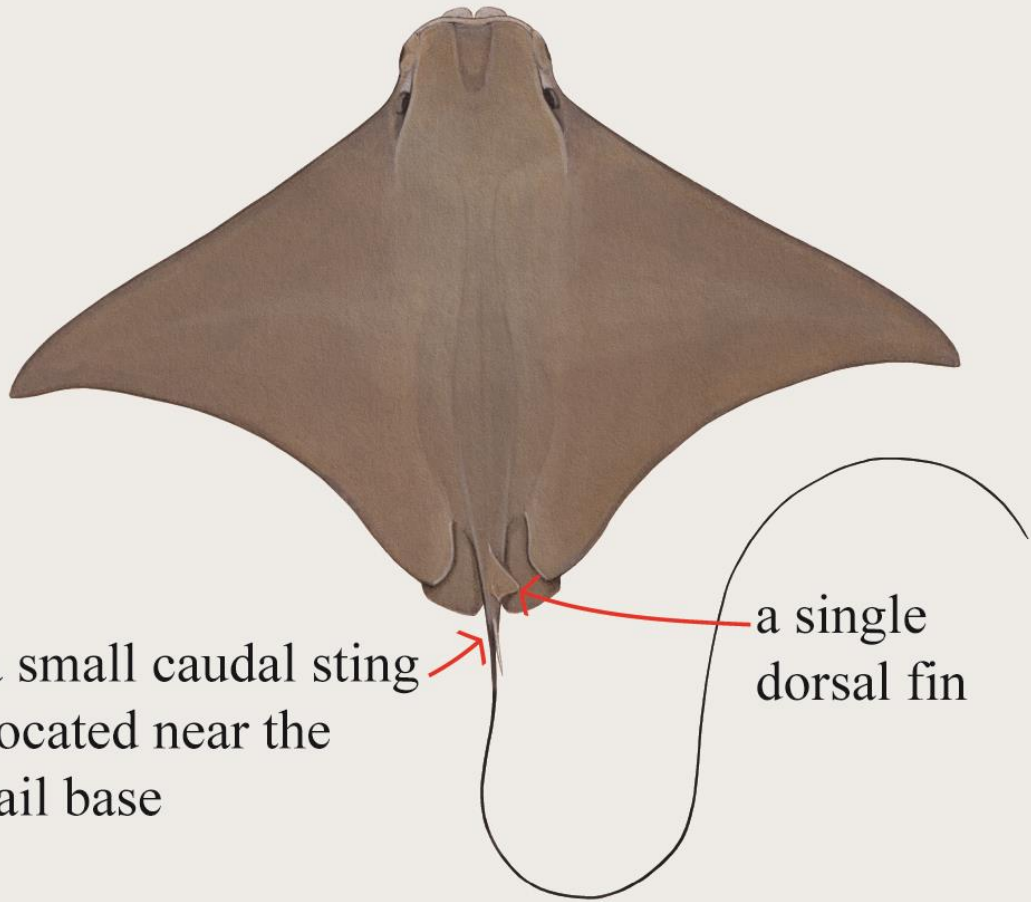
anterior margin of pectoral fin straight or slightly convex



base of tail quadrangular

***Mobula kuhlii* (Shortfin Devilray).**

snout with a pair of broad lobes separated by a deep notch



a small caudal sting located near the tail base

a single dorsal fin

Rhinoptera javanica (Javan Cownose Ray).

snout with single convex rostral lobe, not separated from pectoral fins



a large caudal sting spine, located farther down the tail

no dorsal fin

Pteroplatytrygon violacea (Pelagic Stingray).