

Key for shark and ray species identification

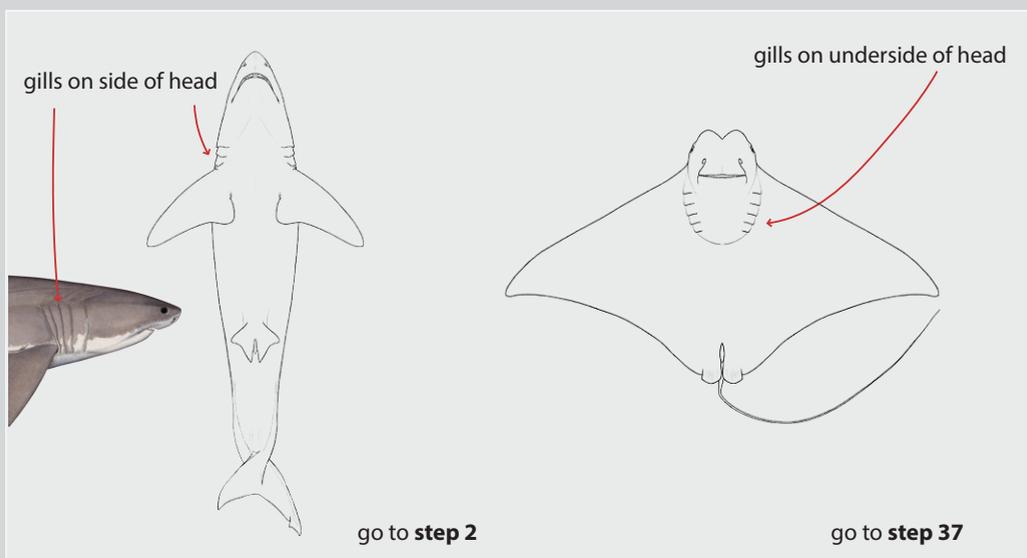
To improve identification of the shark and ray species a dichotomous key based on readily seen external features has been developed for field use and observer training.

A dichotomous key relies on a pathway of steps of paired alternative descriptions (mutually exclusive couplets) identifying or contrasting features that are reliable (are always found in live and dead forms and both sexes of the species), consistent (are present throughout the year and across the range) and clear or measurable. Each couplet is a branch that either removes a selection of species or identifies one from the rest (e.g. key step 1, below, used to separate sharks and rays).

This key has been developed to provide a simple standardised process for identifying sharks and rays that are either not already known, or to help distinguish among similar looking species. The key features used in the couplets have been identified and verified as standardised key features by shark scientific experts.

The key couplets identify clear features for identification and so reflect the systematics of sharks, and the identification groups the species in their families. The use of key features also affects the number of steps to identify a species. Where there is only one species of a family, the key quickly identifies the species from the others. Where there are many similar species, such as in the family Carcharhinidae, identification takes up to 26 steps of couplets to distinguish the final species pair.

The key for shark and ray identification has 43 couplet pairs that identify 44 species of pelagic sharks and rays. The key should be used routinely to identify species and the detailed illustrations in the following section can then be used to confirm identification. The use of this key in training will standardise the process followed by observers to identify sharks and rays.



1

2

6 gill openings on each side of head

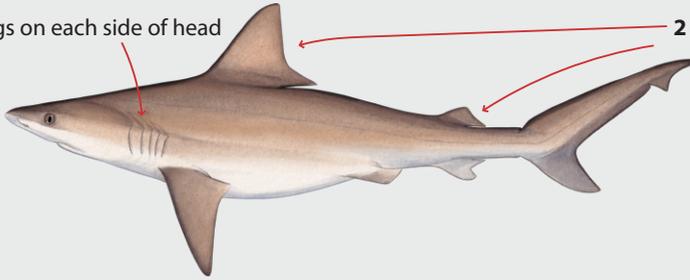
1 dorsal fin



Hexanchus griseus (Bluntnose sixgill shark) p. 24

5 gill openings on each side of head

2 dorsal fins



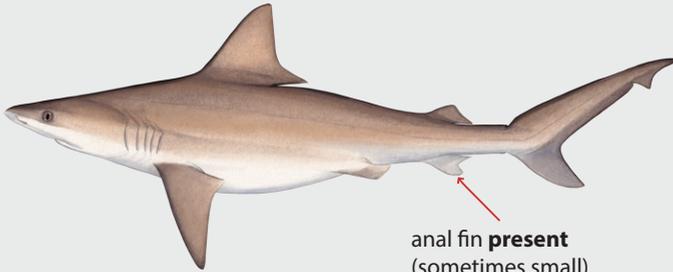
go to **step 3**

3



anal fin **absent**

go to **step 4**



anal fin **present**
(sometimes small)

go to **step 6**

4

dorsal fins **without** spines



go to **step 5**

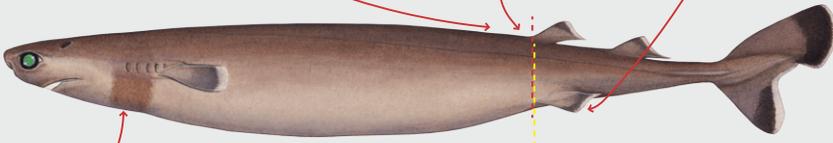
dorsal fins **with** small spines



Zameus squamulosus (Velvet dogfish) p. 25

dorsal fins located well back on body

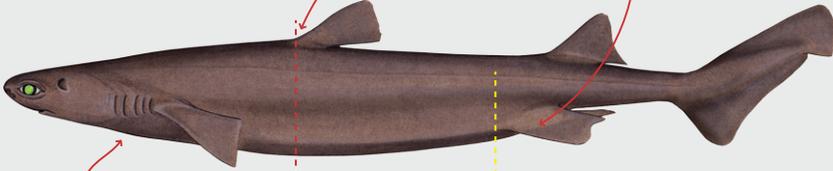
first dorsal over pelvic fins



dark collar around head at gill region

Isistius brasiliensis (Cookie-cutter shark) p. 26

first dorsal well in front of pelvic fin

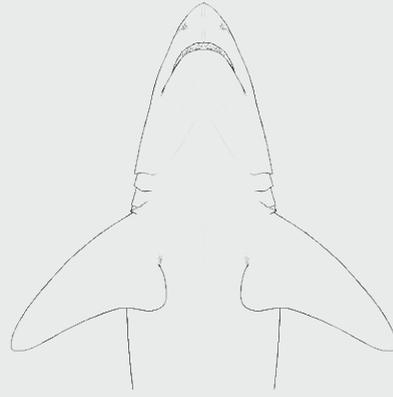
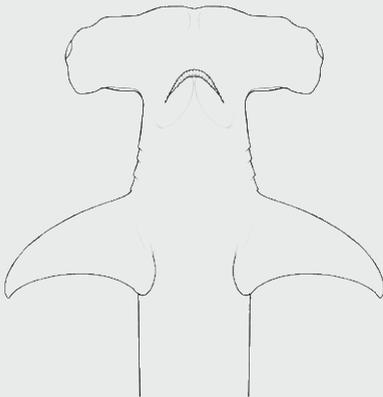


no dark collar around head

Dalatias licha (Black shark, Kitefin shark) p. 27

head **hammer-shaped**

head **not hammer-shaped**

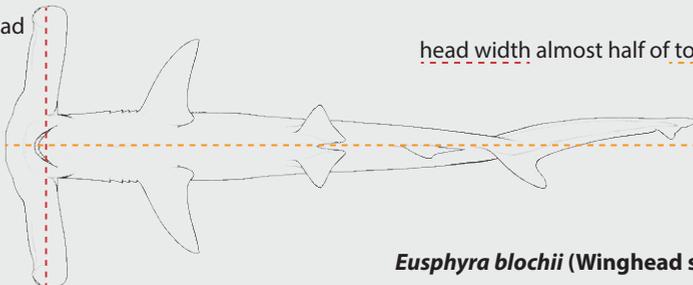


go to **step 7**

go to **step 10**

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

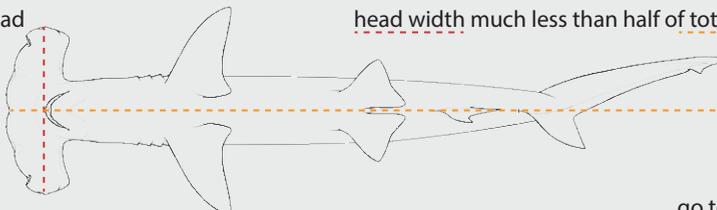
head width almost half of total length



Eusphyra blochii (Winghead shark) p. 28

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

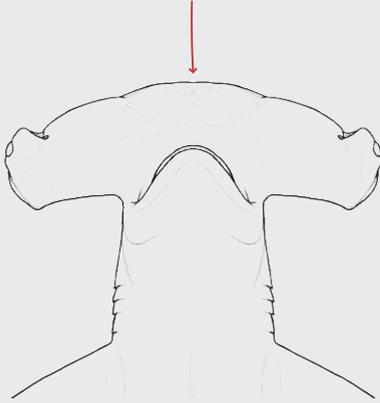
head width much less than half of total length



go to **step 8**

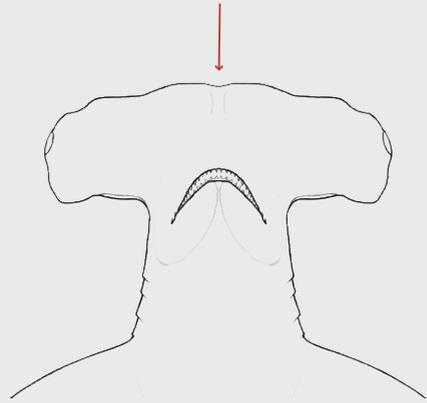
8

anterior profile of head **without** a median indentation



Sphyrna zygaena (Smooth hammerhead) p. 29

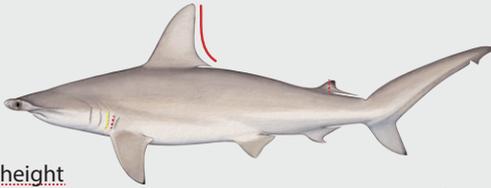
anterior profile of head **with** a median indentation



go to **step 9**

9

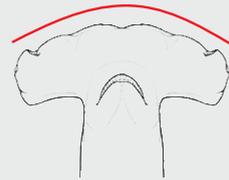
first dorsal fin semi-falcate, only moderately high



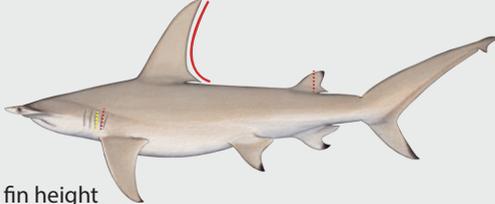
2nd dorsal fin height
smaller than or equal to the length of the 3rd gill slit

Sphyrna lewini (Scalloped hammerhead) p. 30

anterior profile of head convex



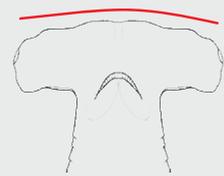
first dorsal falcate, very tall in adults



2nd dorsal fin height
greater than the length of the 3rd gill slit

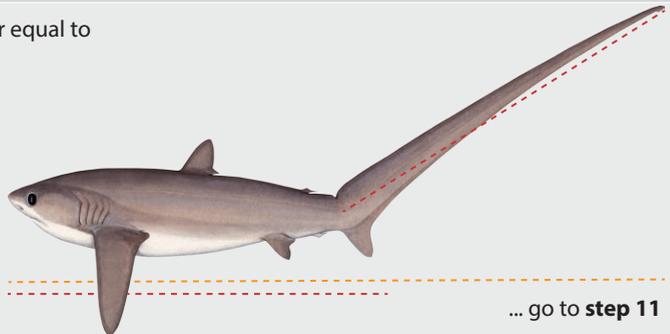
Sphyrna mokarran (Great hammerhead) p. 31

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



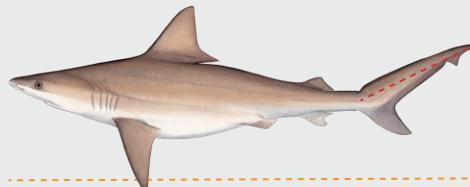
10

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



... go to **step 11**

length of caudal fin much less than half of total length

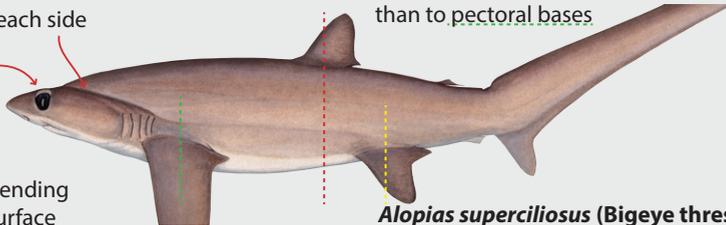


... go to **step 13**

head with deep groove extending around each side

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

eyes very large, extending onto dorsal head surface

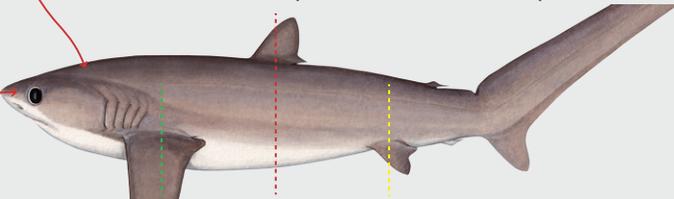


***Alopias superciliosus* (Bigeye thresher)** p. 33

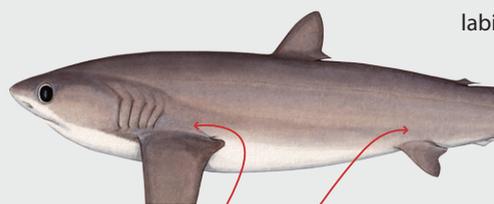
head without a deep groove

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

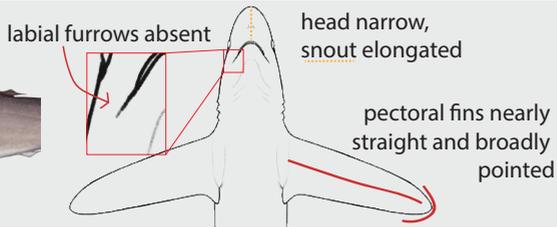
eyes smaller, with orbits lateral on head



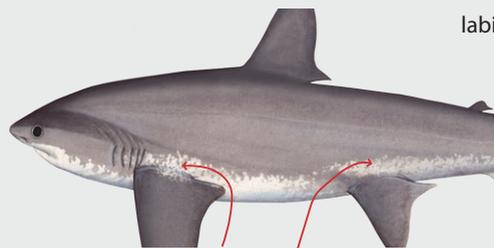
go to **step 12**



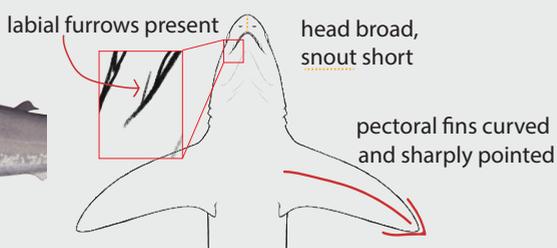
flanks above pectoral and pelvic fins not white



***Alopias pelagicus* (Pelagic thresher)** p. 34

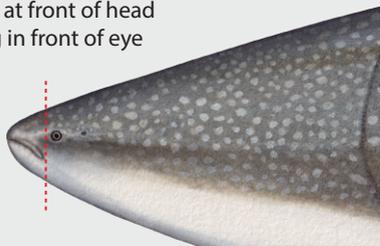


flanks above pectoral and pelvic fins white



***Alopias vulpinus* (Thresher shark)** p. 35

mouth at front of head ending in front of eye

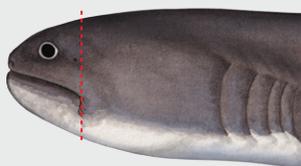


checkerboard colour pattern

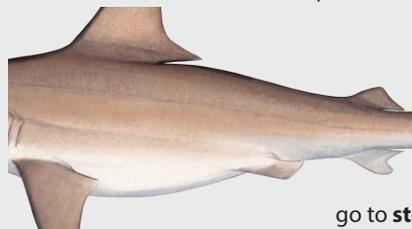


***Rhincodon typus* (Whale shark)** p. 36

mouth not at front of head ending below or behind eye



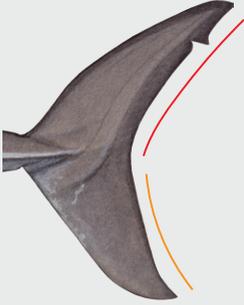
no checkerboard colour pattern



go to **step 14**

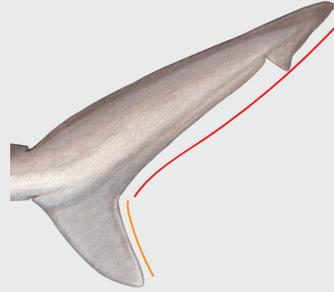
14

caudal fin lunate
upper lobe less than 1.5 times
longer than lower lobe



go to **step 15**

caudal fin heterocercal
upper lobe more than 1.5 times
longer than lower lobe



go to **step 19**

15

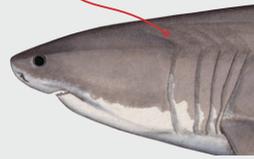
very large gills
extend onto surface of the head
and ventral surface



teeth minute

Cetorhinus maximus (Basking shark) p. 37

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



teeth blade-like, much larger

go to **step 16**

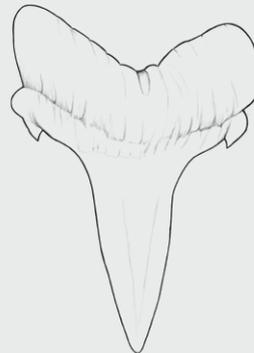
16

upper teeth broadly triangular,
flattened and strongly serrated

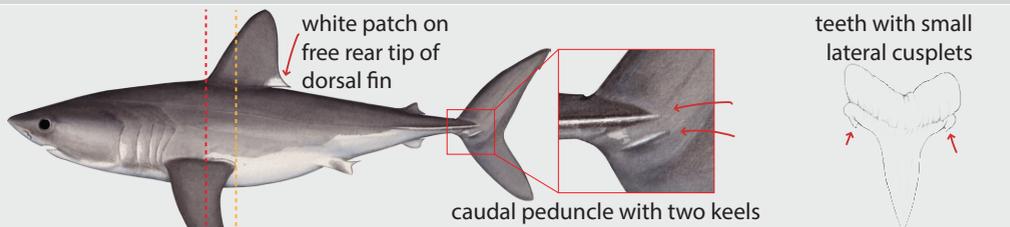


Carcharodon carcharias (White shark) p. 38

upper teeth long, narrow, and
without serrations

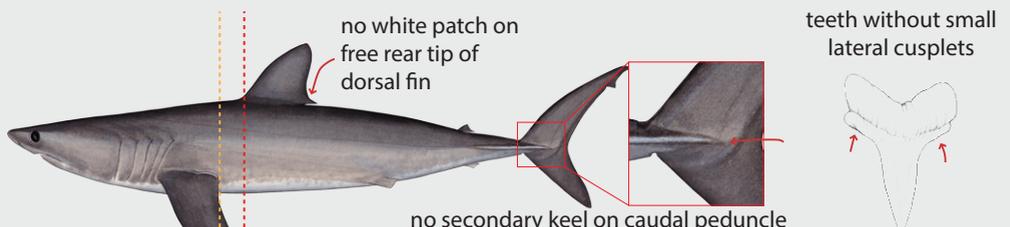


go to **step 17**



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

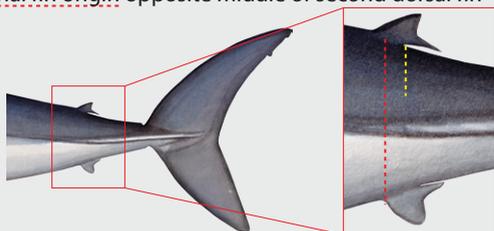
Lamna nasus (Porbeagle) p. 39



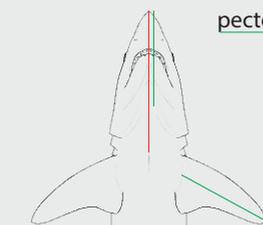
first dorsal-fin origin posterior to pectoral fins

go to **step 18**

anal fin origin opposite middle of second dorsal fin

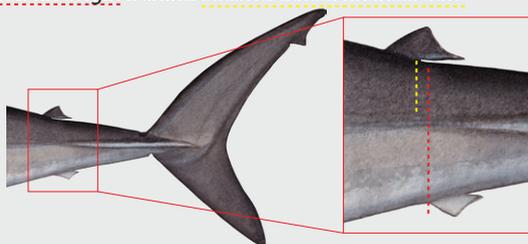


pectoral fins much shorter than head length

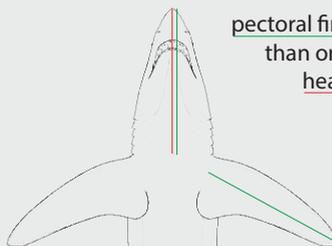


Isurus oxyrinchus (Shortfin mako) p. 40

anal fin origin behind second dorsal fin insertion

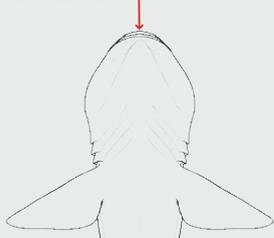


pectoral fins longer than or equal to head length

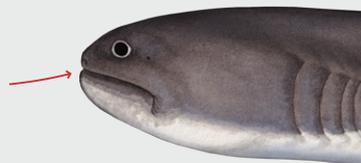


Isurus paucus (Longfin mako) p. 41

mouth huge and terminal

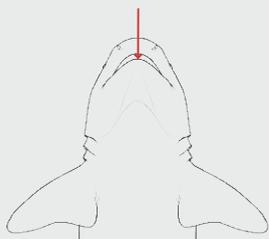


lower jaw extending to snout tip

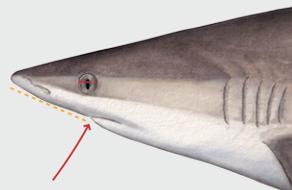


Megachasma pelagios (Megamouth shark) p. 42

mouth located on undersurface of the head (subterminal)



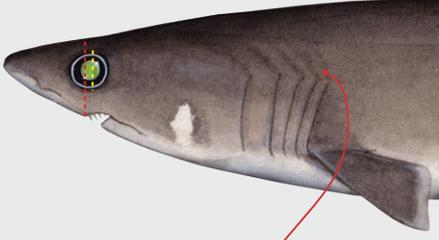
preoral distance distinctly longer than eye diameter



go to **step 20**

20

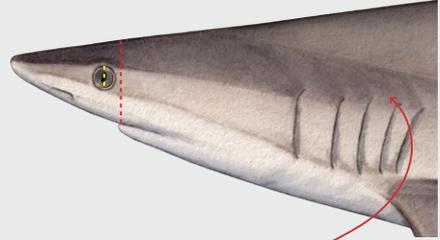
eyes very large,
more than half the greatest height of snout



gill openings extending onto dorsal surface of head

Pseudocarcharias kamoharai
(Crocodile shark) p. 43

eyes smaller,
less than half the greatest height of snout

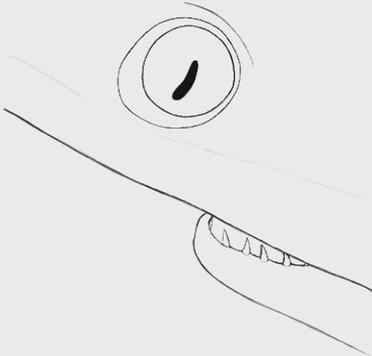


gill openings **not** extending onto dorsal surface of head

go to **step 21**

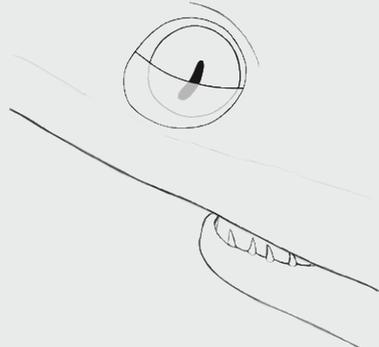
21

eyelids fixed, not capable of closing over eyes



Odontaspis noronhai (Bigeye sand tiger) p. 44

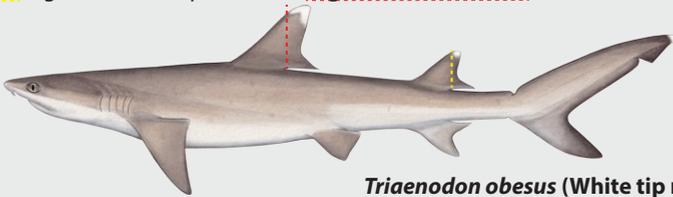
eyelids capable of closing over eye (nictitating)



go to **step 22**

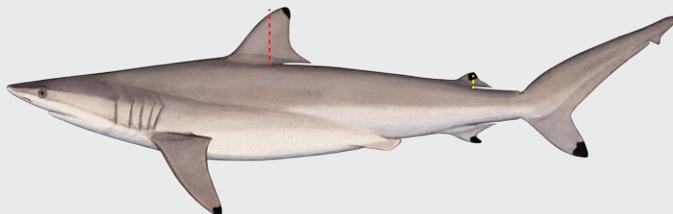
22

second dorsal fin higher than or equal to half height of first dorsal fin



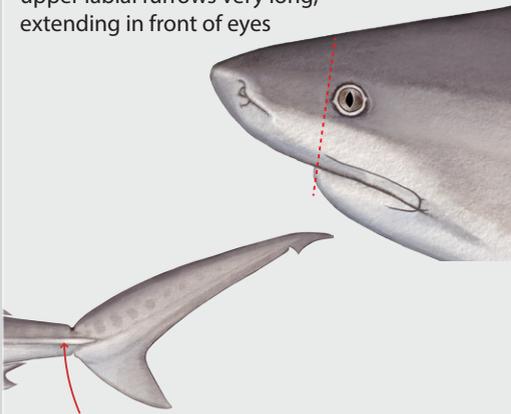
Triaenodon obesus (White tip reef shark) p. 45

second dorsal fin smaller than half height of first dorsal fin



go to **step 23**

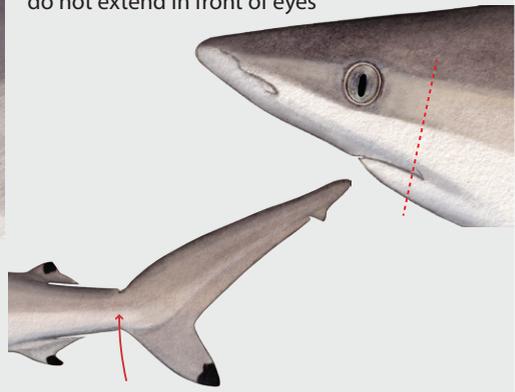
upper labial furrows very long, extending in front of eyes



prominent lateral keels present on caudal peduncle

***Galeocerdo cuvier* (Tiger shark)** p. 46

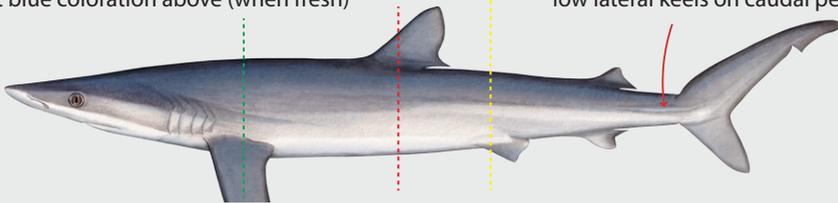
upper labial furrows do not extend in front of eyes



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

go to **step 24**

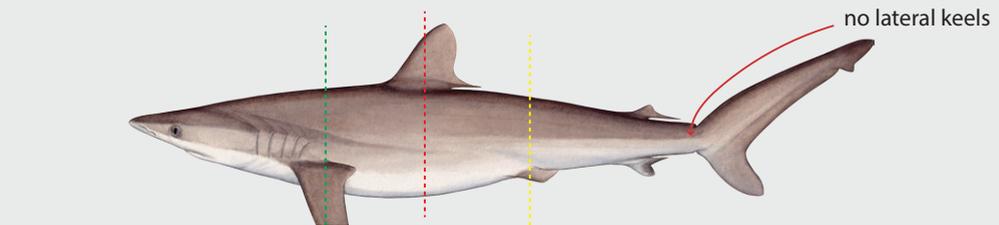
brilliant blue coloration above (when fresh)



low lateral keels on caudal peduncle

first dorsal fin much closer to pelvic fins than pectoral fins

***Prionace glauca* (Blue shark)** p. 47

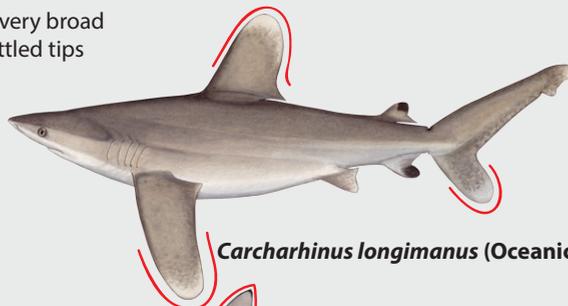


first dorsal fin midway between pectoral and pelvic fins or closer to pectoral fins

no lateral keels

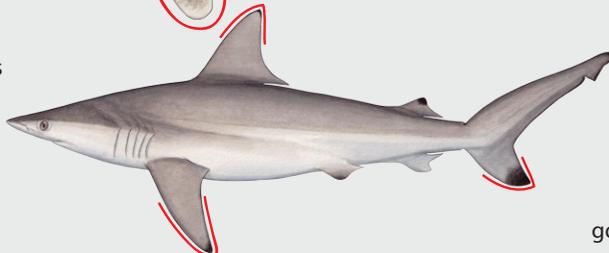
go to **step 25**

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



***Carcharhinus longimanus* (Oceanic whitetip)** p. 48

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



go to **step 26**

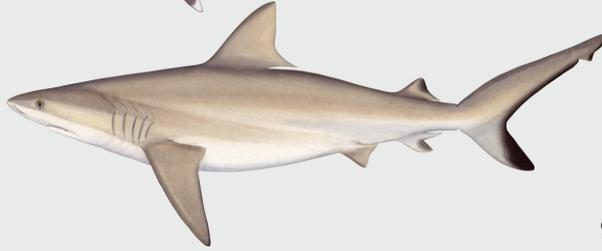
26

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



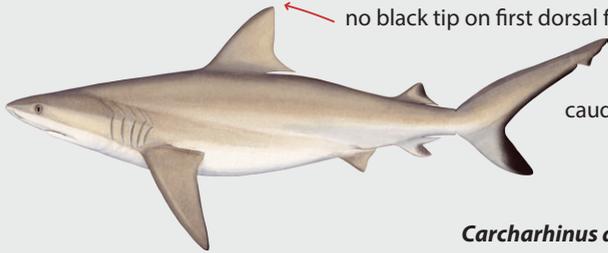
Carcharhinus albimarginatus (Silvertip shark) p. 49

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



go to **step 27**

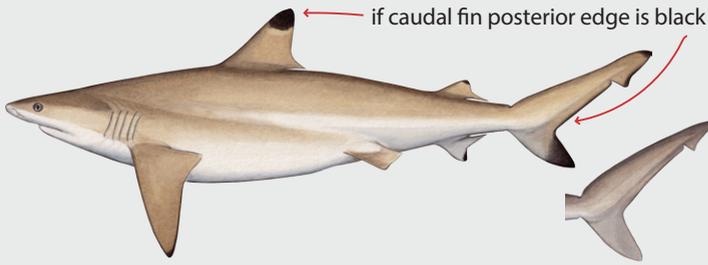
27



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

caudal fin with prominent posterior black edge

Carcharhinus amblyrhynchos (Grey reef shark) p. 51



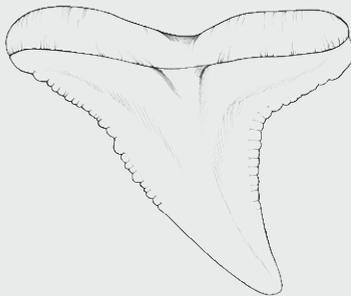
if caudal fin posterior edge is black then first dorsal fin tip is black

caudal fin with prominent posterior black edges or plain

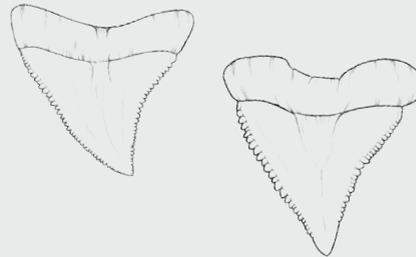
go to **step 28**

28

largest upper teeth with bent, hooked, narrow cusps

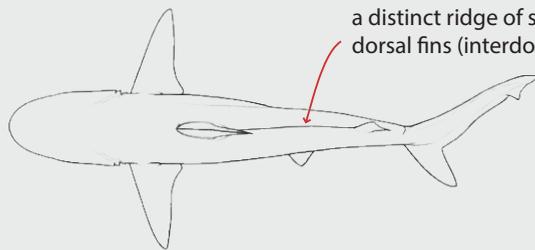


largest upper teeth variably shaped but never with bent, hooked cusps

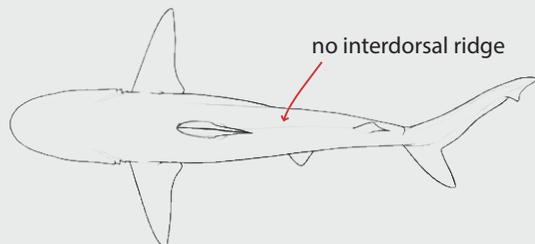


Carcharhinus brachyurus (Bronze whaler) p. 52

go to **step 29**



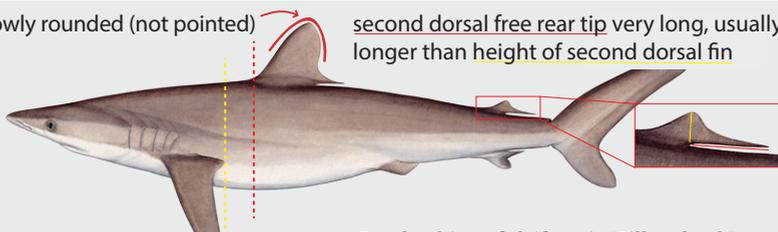
go to **step 30**



go to **step 34**

first dorsal fin tip narrowly rounded (not pointed)

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

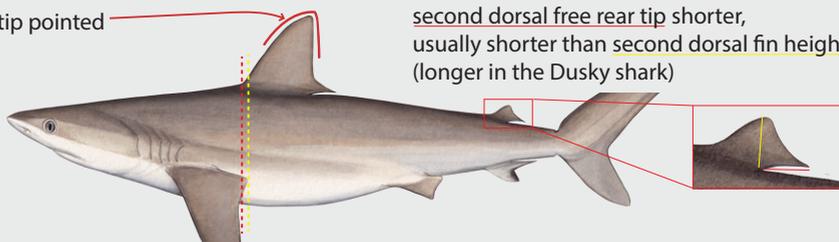


first dorsal fin origin well behind pectoral free rear tips

Carcharhinus falciformis (Silky shark) p. 53

first dorsal-fin tip pointed

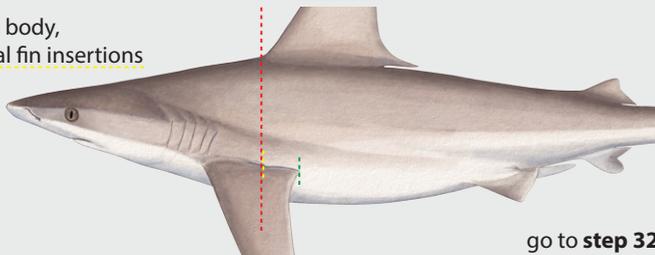
second dorsal free rear tip shorter, usually shorter than second dorsal fin height (longer in the Dusky shark)



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

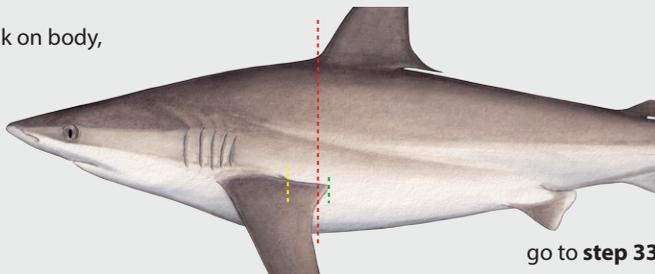
go to **step 31**

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



go to **step 32**

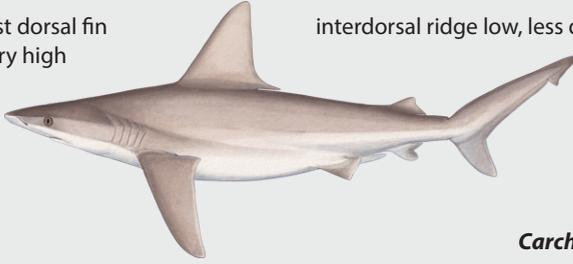
first dorsal fin located further back on body, its origin closer to pectoral fin free rear tips than to insertions



go to **step 33**

32

first dorsal fin very high



interdorsal ridge low, less distinct

anterior nasal flaps low and inconspicuous



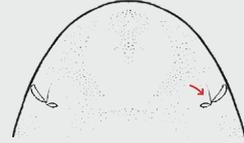
***Carcharhinus plumbeus* (Sandbar shark)** p. 54

first dorsal fin lower



interdorsal ridge high, very distinct

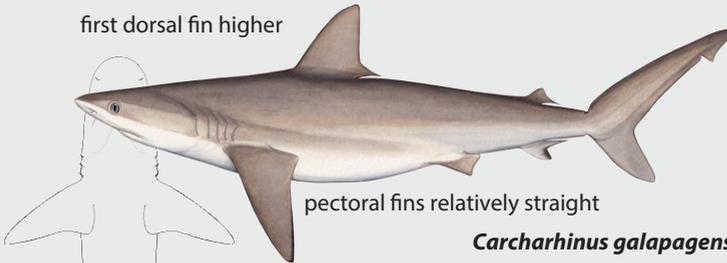
anterior nasal flaps high and triangular



***Carcharhinus altimus* (Bignose shark)** p. 55

33

first dorsal fin higher



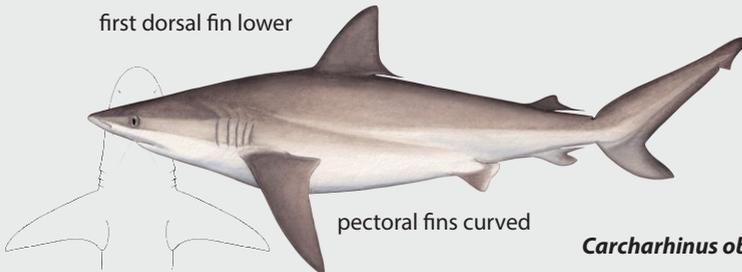
pectoral fins relatively straight

upper teeth relatively narrow



***Carcharhinus galapagensis* (Galapagos shark)** p. 56

first dorsal fin lower



pectoral fins curved

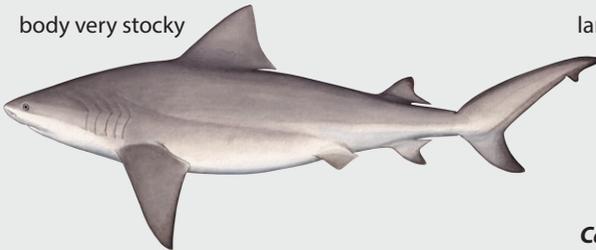
upper teeth relatively broad and oblique



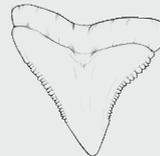
***Carcharhinus obscurus* (Dusky shark)** p. 57

34

body very stocky

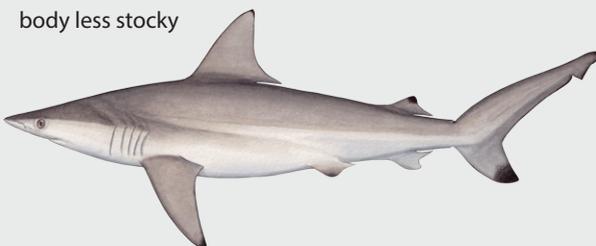


largest upper teeth broad, triangular and serrated

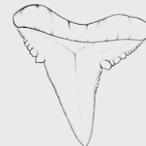


***Carcharhinus leucas* (Bull shark)** p. 58

body less stocky

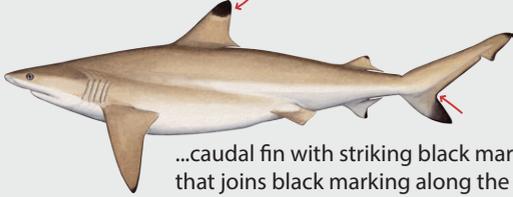


largest upper teeth narrow and sometimes serrated



go to **step 35**

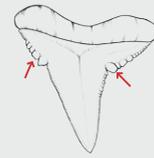
first dorsal fin with a very distinct black tip AND



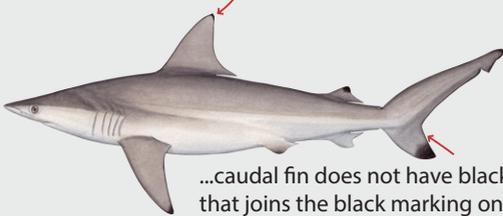
...caudal fin with striking black marking on lower lobe that joins black marking along the posterior margin

Carcharhinus melanopterus (Blacktip reef shark) p. 59

largest upper teeth with coarse basal serrations

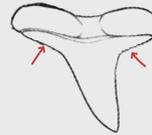


first dorsal fin may or may not have black tip AND



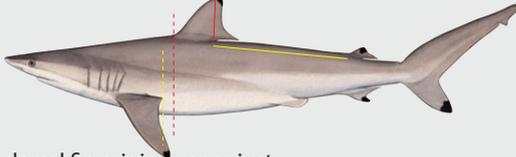
...caudal fin does not have black posterior margin that joins the black marking on the lower lobe

largest upper teeth without coarse basal serrations



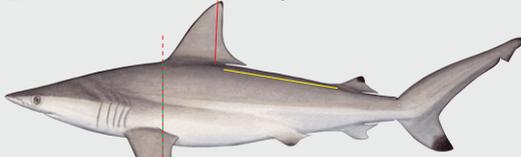
go to **step 36**

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



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

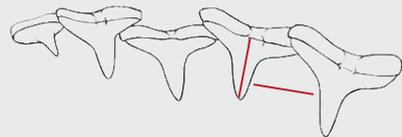
first dorsal fin taller (height <2.2 times in interdorsal space)



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

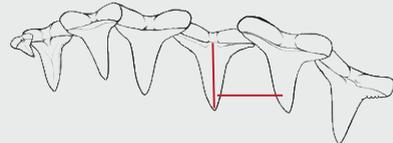
Carcharhinus limbatus (Common blacktip shark) p. 61

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

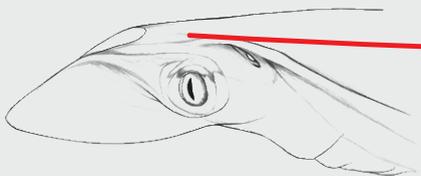


Carcharhinus brevipinna (Spinner shark) p. 60

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



head not elevated above disc

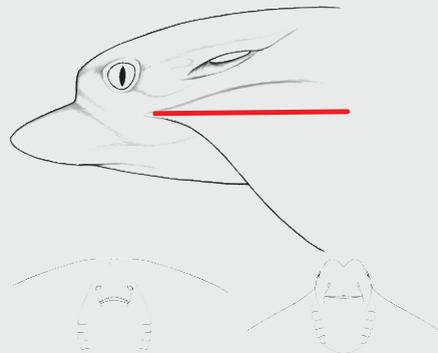


snout modified into a pair of elongate lobes on each side of head



go to **step 38**

head elevated above disc

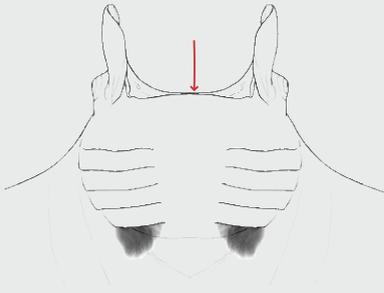


snout formed as a single, convex, lobe-like process or pair of rounded lobes

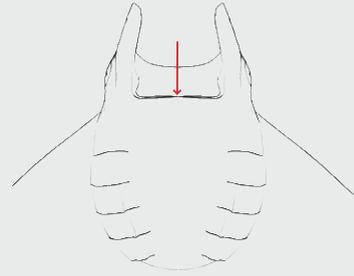
go to **step 43**

38

mouth terminal on head

go to **step 39**

mouth subterminal on ventral surface of head

go to **step 40**

39

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



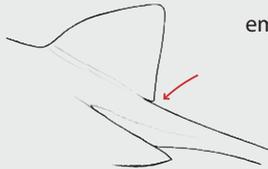
calcified mass containing an embedded spine present behind dorsal fin



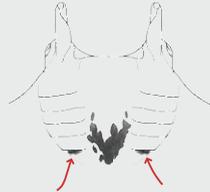
anterior margin of white shoulder patches parallel with front of head

***Mobula birostris* (Giant manta)** p. 62

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



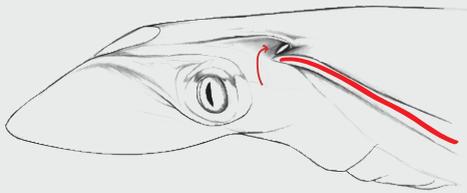
no calcified mass of spine present behind dorsal fin



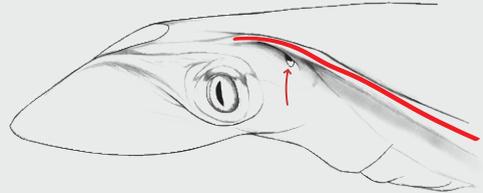
anterior margin of white shoulder patches curving posteriorly

***Mobula alfredi* (Reef manta)** p. 63

40

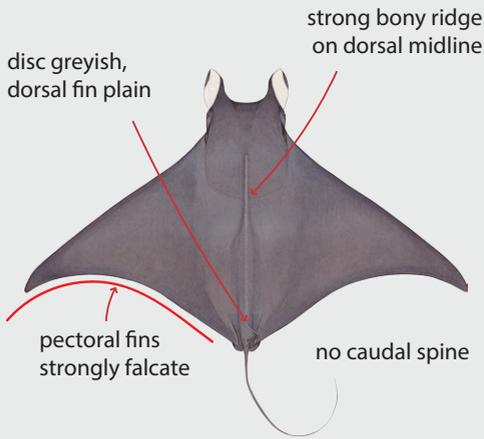
spiracles long, slit-like and dorsal to the plane of the pectoral fins

large animals, reaching well over 2 m disc width

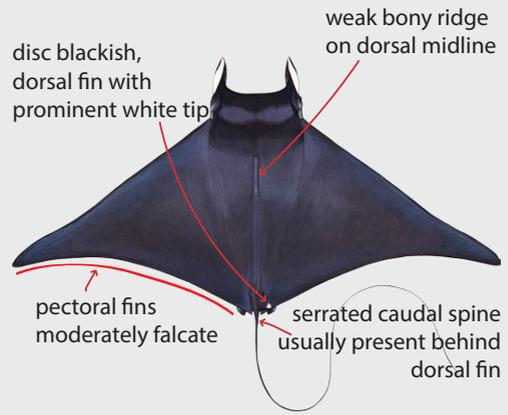
go to **step 41**spiracles small, subcircular and ventral to the plane of the pectoral fins

small animals, not reaching 2 m disc width

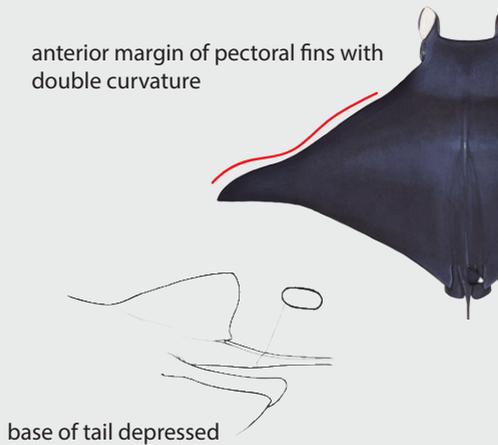
go to **step 42**



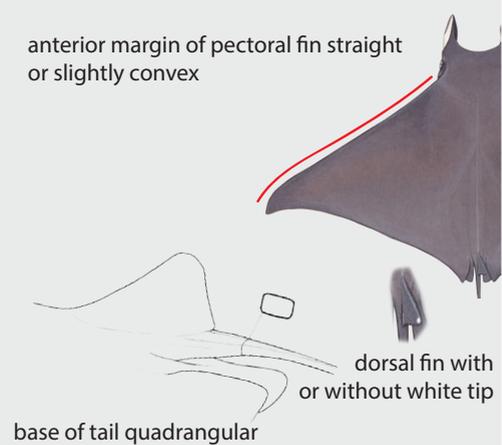
***Mobula tarapacana* (Chilean devilray)** p. 64



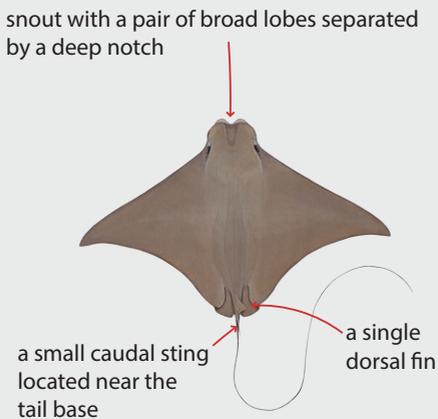
***Mobula mobular* (Giant devilray)** p. 65



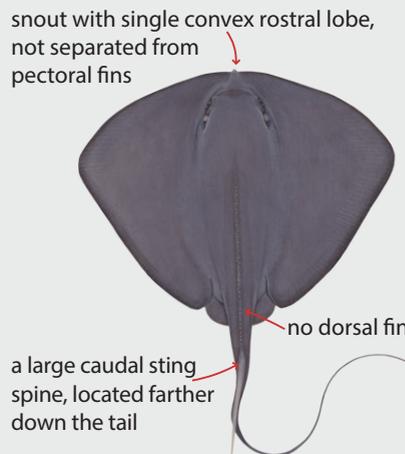
***Mobula thurstoni* (Bentfin devilray)** p. 66



***Mobula kuhlii* (Shortfin devilray)** p. 67



***Rhinoptera javanica* (Javan cownose ray)** p. 68



***Pteroplatytrygon violacea* (Pelagic stingray)** p. 69

