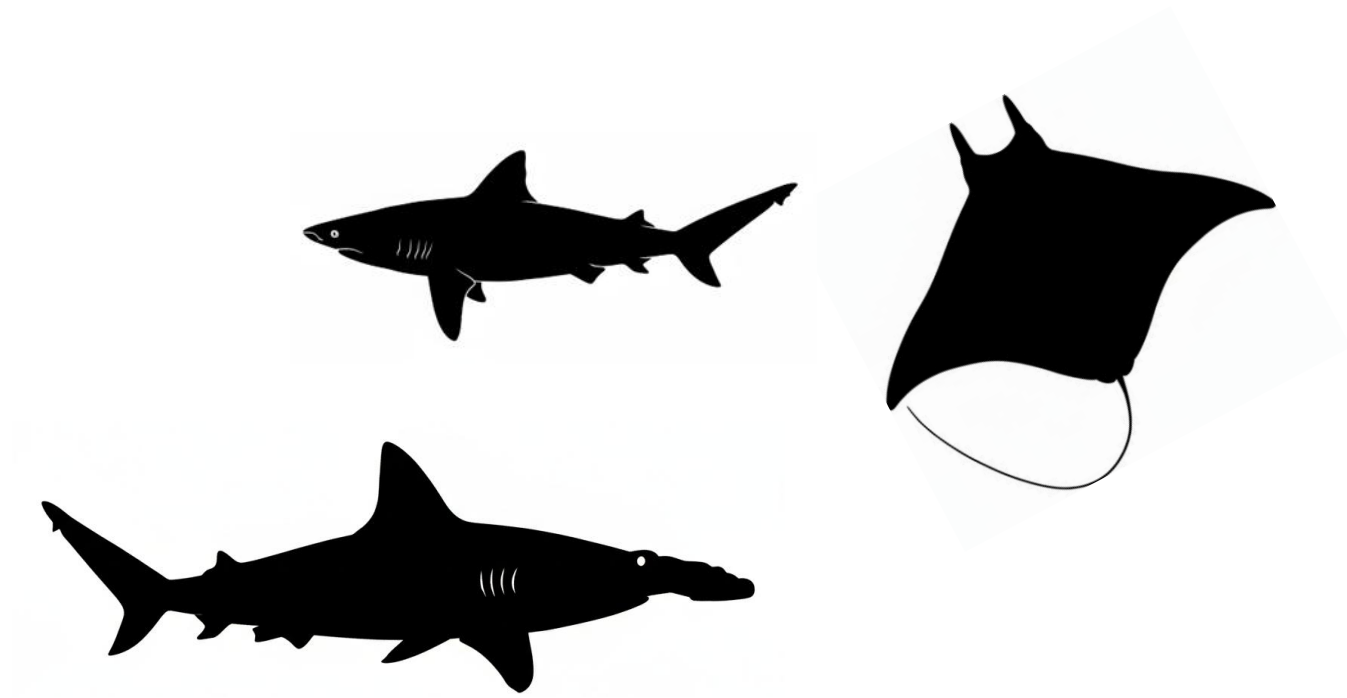


IDENTIFICATION OF Sharks & Batoids



Dr. Akhilesh K.V et al.,
ICAR- Central Marine Fisheries Research Institute, India



FSI-IOTC Species identification workshop_ Kochi, India – September 29th to October 4th 2025

Central Marine Fisheries Research Institute



Since 1947

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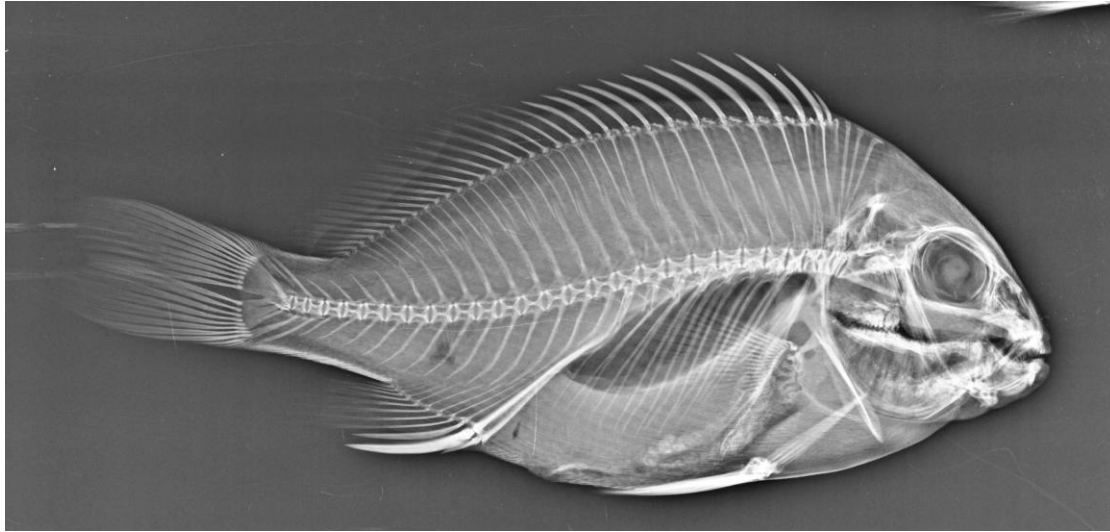
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Fish ?



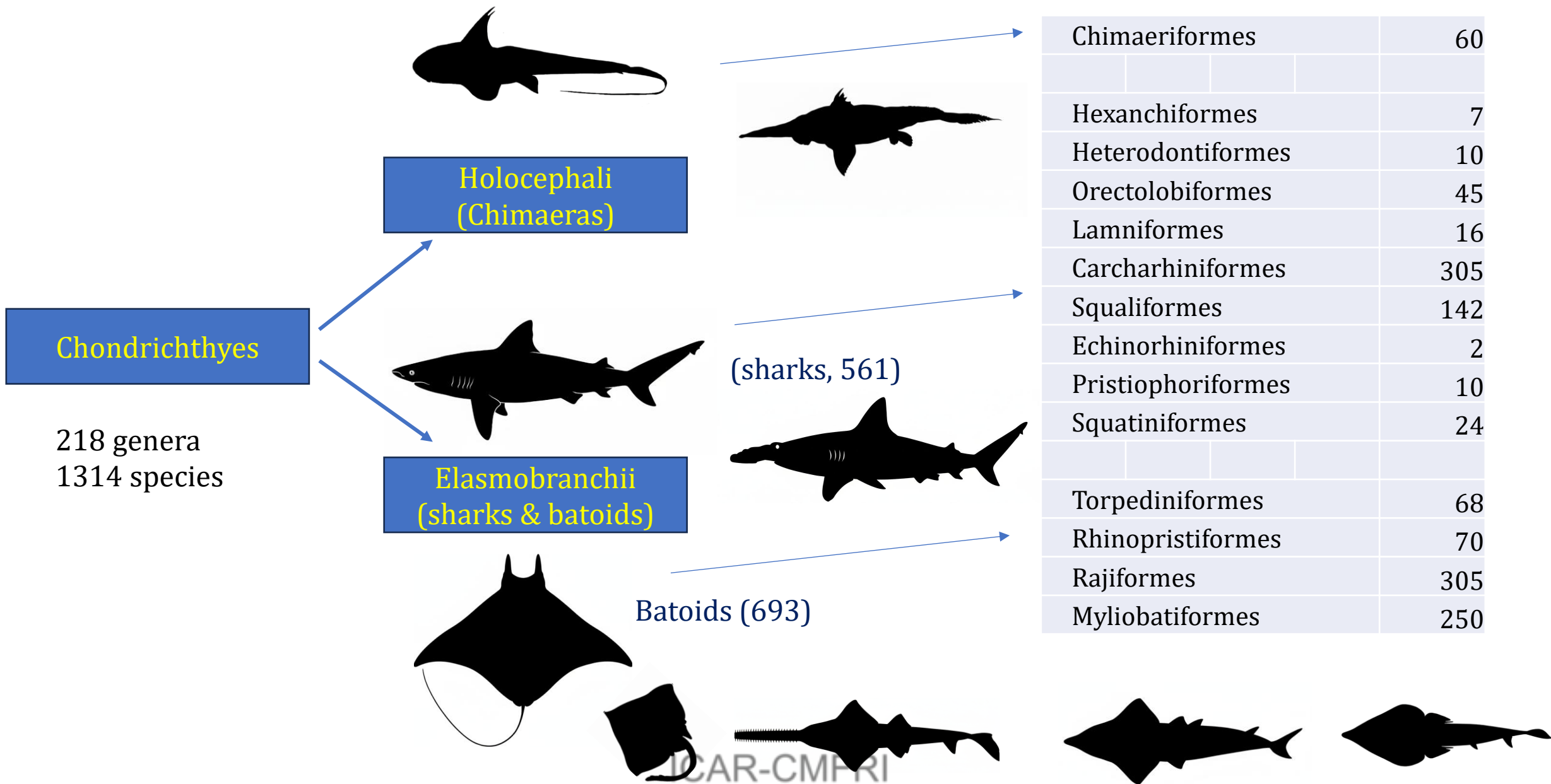
Chondrichthyes



Terms- Explanation

- **Chondrichthyan**: all species within the Class Chondrichthyes –**comprising all sharks, batoids and chimaeras** [cartilaginous skeleton].
 - There are **two subclasses** within the Chondrichthyes: **Holocephalans and Elasmobranchs**.
 - **Holocephali**: **all chimaera species**.
 - The chimaeras differ from shark and batoid species by having a single gill slit and rubbery skin which lacks denticles
 - **Elasmobranchii**: includes **all sharks and batoids (rays, skates, and sawfish)**.
 - **Shark**: within Chondrichthyes that covers **all true shark species**
 - **Batoid**: Within Chondrichthyes, characterized by **having flattened bodies and pectoral fins fused to the head**
 - including rays (stingrays, manta rays and eagle rays), skates and “shark-like rays”. somewhat resembling sharks – this group includes the sawfishes, wedgefishes, guitarfishes and giant guitarfishes

- Generalised usage of term, “shark” includes all Chondrichthyes- depending on context.
- Many institutions (e.g., FAO, IOTC and IUCN Shark Specialist Group) use the term “shark” in a broad sense to refer to the entire class Chondrichthyes. While this may simplify the preparation and reading of text, this usage can be misleading and has tended to reduce the importance of the batoids in the “shark” conservation endeavour.
- Use of the terms “sharks and rays” to refer to all chondrichthyans excludes the 1) chimaeras and ii) skates and shark-like rays which are not “rays” by definition, but rather batoids.
- The use of the terms **“sharks,” “batoids,” and “chimaeras”** to refer individually to these three groups will be better



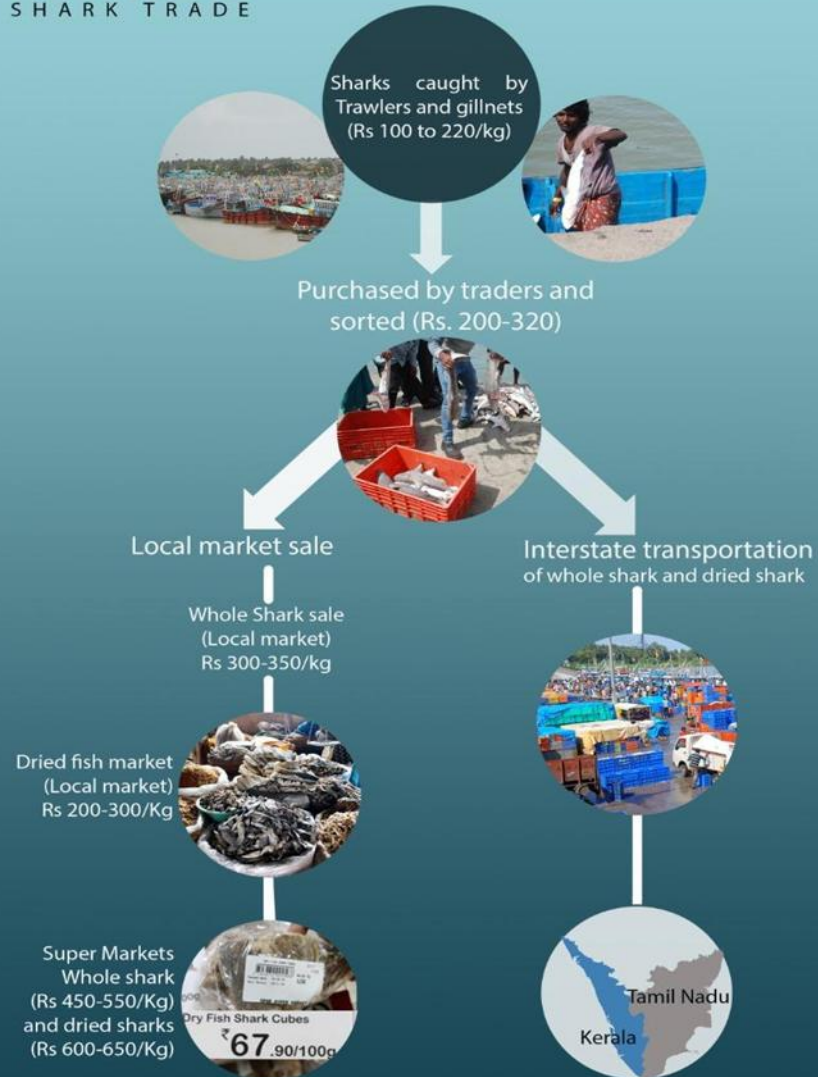


- Chondrichthyans are apex predators, vital in ecosystem for maintaining the health and balance of the marine ecosystem.
- caught as bycatch in fisheries and, in some cases, are directly targeted.
- Grow slowly, mature late, and have few offspring, making them highly susceptible to overfishing.
- Indian Ocean is a significant region for Chondrichthyans fisheries and bycatch

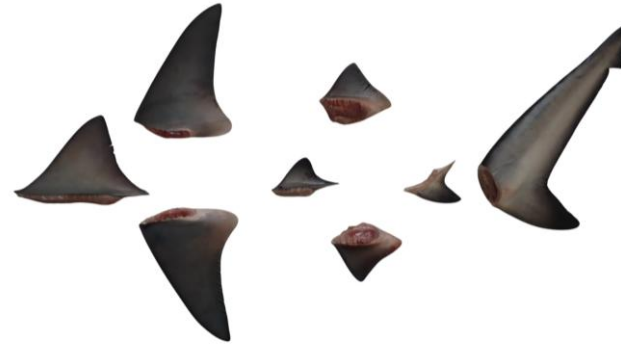


Taxon	Species number (% of 1,199)	Number threatened (% of 391)	Number threatened (% of group)	CR (%)	EN (%)	VU (%)	NT (%)	LC (%)	DD (%)
Raysa	611 (51.0)	220/391 (56.3)	220/611 (36.0)	55 (9.0)	65 (10.6)	100 (16.4)	70 (11.5)	246 (40.3)	75 (12.3)
Sharks	536 (44.7)	167/391 (42.7)	167/536 (31.2)	35 (6.5)	56 (10.5)	76 (14.2)	50 (9.3)	248 (46.3)	71 (13.2)
Chimeras	52 (4.3)	4/391 (1.0)	4/52 (7.7)	0 (0.0)	0 (0.0)	4 (7.7)	4 (7.7)	35 (67.3)	9 (17.3)
Total	1,199		391 (32.6)	90 (7.5)	121 (10.1)	180 (15.0)	124 (10.4)	529 (44.1)	155 (12.9)

KARNATAKA SHARK TRADE



Utilization





In India all chondrichthyans landed are utilized completely part of culture, livelihood and, there is no “finning” or “livering” as the entire shark has economic value in terms of meat (fresh, dried, salted), jaws, skin, oil and cartilage

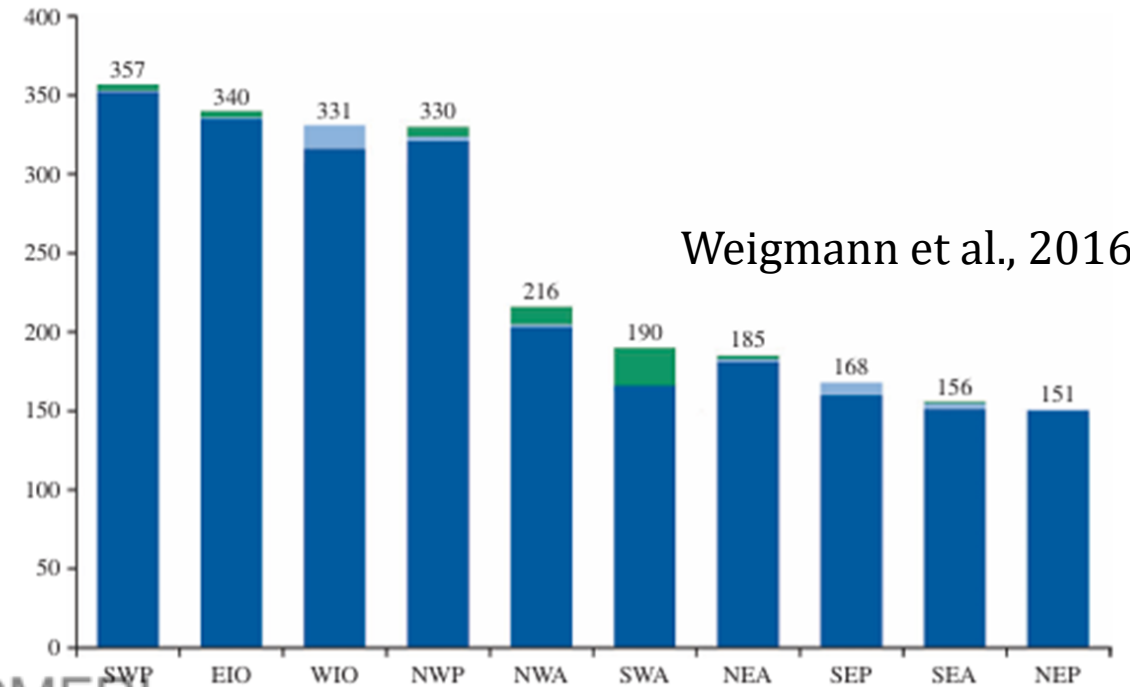
The Indian Ocean - **biodiversity rich** region holding one of the most diverse Chondrichthyan fauna globally with >400 species, with several new species have been described since 2016.

The region also has a high degree of endemism, with 60+ species, many of which have very restricted geographic ranges.

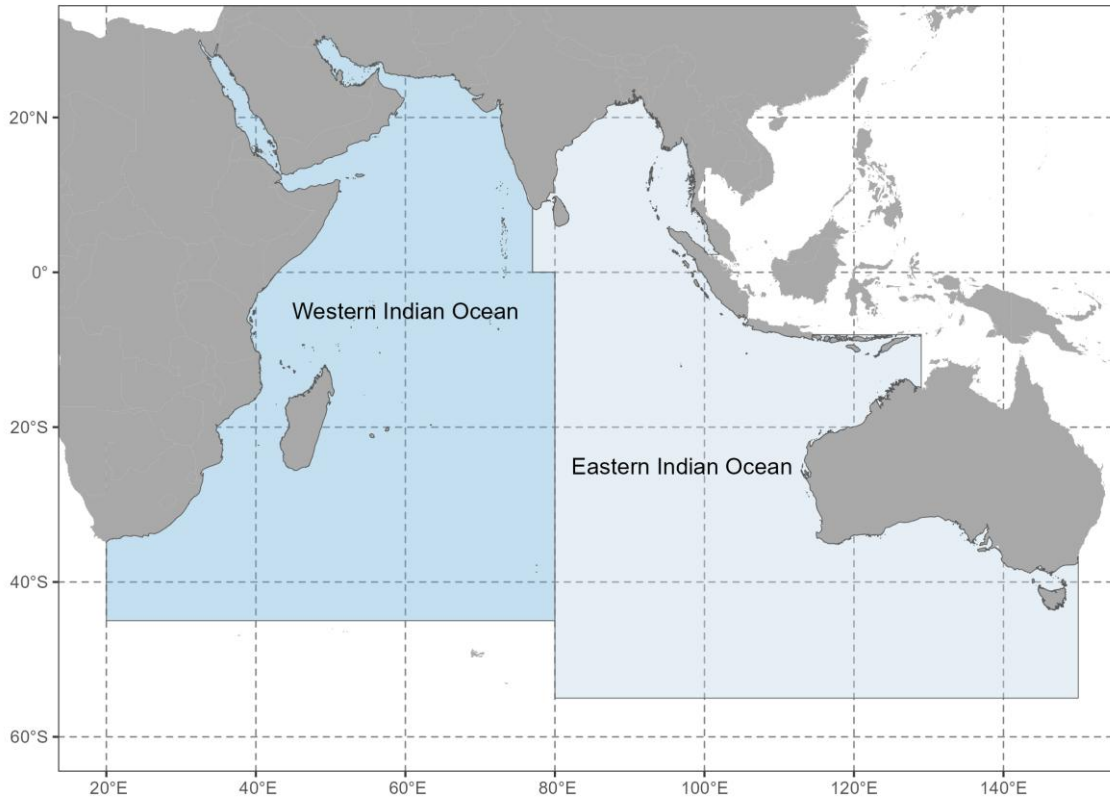
New species from the Indian Ocean are being discovered



Iago gopalakrishnani Bineesh, Beura & Akhilesh 2025



Indian Ocean Tuna Commission (IOTC)









IOTC Area of Competence. Source: www.iotc.org

1. WP on Neritic Tunas (WPNT)
2. WP on Temperate Tunas (WPTmT)
3. WP on Tropical Tunas (WPTT)
4. WP on Billfish (WPB)
5. WP on Ecosystems and Bycatch (WPEB)
6. WP on Methods (WPM)
7. WP on Data Collection and Statistics (WPDCS)



As of 2022, there are 29 Contracting Parties and 1 Cooperating Non-Contracting Parties (including the Liberia) collectively called CPCs) to the IOTC (FAO. 2025.).

Agency	Year adopted	Title	IOTC Resolutions	Mitigation Techniques	Species Groups	Fishing Gear	PDF
IOTC	2019	Resolution 19/03 Resolution On The Conservation Of Mobulid Rays Caught In Association With Fisheries In The IOTC Area Of Competence		Safe handling & release, Spatial & temporal measures	SHK	GN, LL, PS	 PDF
IOTC	2017	Resolution 17-05 Resolution on the Conservation of Sharks Caught in Association With Fisheries Managed by IOTC		Monofilament / Wire Leaders, Safe handling & release, Spatial & temporal measures	SHK	LL, PS, GN	 PDF
IOTC	2013	Resolution 13/06 Resolution On A Scientific And Management Framework On The Conservation Of Shark Species Caught In Association With IOTC Managed Fisheries		Safe handling & release, Spatial & temporal measures	SHK	LL, PS, GN	 PDF
IOTC	2012	Resolution 12/09 Resolution on the Conservation of Thresher Sharks (Family Alopiidae) Caught in Association with Fisheries in the IOTC Area of Competence		Safe handling & release, Spatial & temporal measures	SHK	LL, PS, GN	 PDF
IOTC	2013	Resolution 13/05 Resolution On The Conservation Of Whale Sharks (Rhincodon typus)		FAD design & management, Safe handling & release	SHK	PS	 PDF
IOTC	2024	Resolution 24/02 Resolution on Management of Drifting Fish Aggregating Devices (FADS) in the IOTC Area of Competence		ALDFG - management of abandoned, lost, discarded fishing gear, FAD design & management	SHK, TTX, MAM, BRD	PS	 PDF

IOTC	2023	Resolution 23/02 Resolution on Management of Drifting Fish Aggregating Devices (DFADs) in the IOTC Area of Competence	ALDFG - management of abandoned, lost, discarded fishing gear, FAD design & management, Spatial & temporal measures	TTX, SHK, MAM, BRD	PS	 PDF
IOTC	2018	Resolution 18/02 Resolution on Management Measures For The Conservation of Blue Shark Caught in Association With IOTC Fisheries	Monofilament / Wire Leaders, Safe handling & release, Spatial & temporal measures	SHK	LL, GN	 PDF
IOTC	2015	Resolution 15/09 On a Fish Aggregating Devices (FADs) Working Group	ALDFG - management of abandoned, lost, discarded fishing gear, FAD design & management, Spatial & temporal measures	SHK, TTX	PS	 PDF
IOTC	2016	Resolution 16/07 On the Use of Artificial Lights to Attract Fish	ALDFG - management of abandoned, lost, discarded fishing gear, FAD design & management	SHK, TTX	PS	 PDF
IOTC	2023	Resolution 23/09 Resolution on a Fish Aggregating Devices (FADs) Working Group	ALDFG - management of abandoned, lost, discarded fishing gear, FAD design & management	BRD, SHK, MAM, TTX	PS	 PDF
IOTC	2024	Recommendation 24/11 Recommendation on Marine Pollution	ALDFG - management of abandoned, lost, discarded fishing gear	BRD, MAM, TTX, SHK	LL, PS	 PDF
IOTC	2017	Resolution 17/07 Resolution to Prohibit the Use of Large-Scale Driftnets on the High Seas in the IOTC Area	ALDFG - management of abandoned, lost, discarded fishing gear	MAM, TTX, SHK, BRD	GN	 PDF
IOTC	2021	Resolution 21/01 Resolution on an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	Gear configuration - other, Sub-surface gillnets	MAM, SHK, TTX, BRD	GN	 PDF

- Elasmobranchs are not part of the 16 tuna and tuna-like species directly under the IOTC mandate; they are frequently caught in association with fisheries targeting IOTC species.
- Some fleets are known to actively target elasmobranchs and IOTC species simultaneously
- Several elasmobranch species are likely to interact with these fisheries.
- **CPCs are required to report information on priority species at the same level of detail as for the 16 species directly under the IOTC mandate.**
- CPCs have reported at least an additional 40 species that reside in the Indian Ocean and may interact with IOTC fisheries.

Key Species List

- **Bigeye Thresher (*Alopias superciliosus*)**
- **Pelagic Thresher (*Alopias pelagicus*)**
- **Common Thresher (*Alopias vulpinus*)**
- **Shortfin Mako (*Isurus oxyrinchus*)**
- **Longfin Mako (*Isurus paucus*)**
- **Porbeagle (*Lamna nasus*)**
- **White Shark (*Carcharodon carcharias*)**
- **Silky Shark (*Carcharhinus falciformis*)**
- **Oceanic Whitetip Shark (*Carcharhinus longimanus*),**
- **Tiger Shark (*Galeocerdo cuvier*)**
- **Blue Shark (*Prionace glauca*)**
- **Crocodile Shark (*Pseudocarcharias kamoharai*)**
- **Whale Shark (*Rhincodon typus*)**
- **Scalloped Hammerhead (*Sphyrna lewini*),**
- **other hammerheads (*Sphyrna* spp.),**
- **Pelagic Stingray (*Pteroplatytrygon violacea*),**
- **mobulids (*Mobula* spp.)**

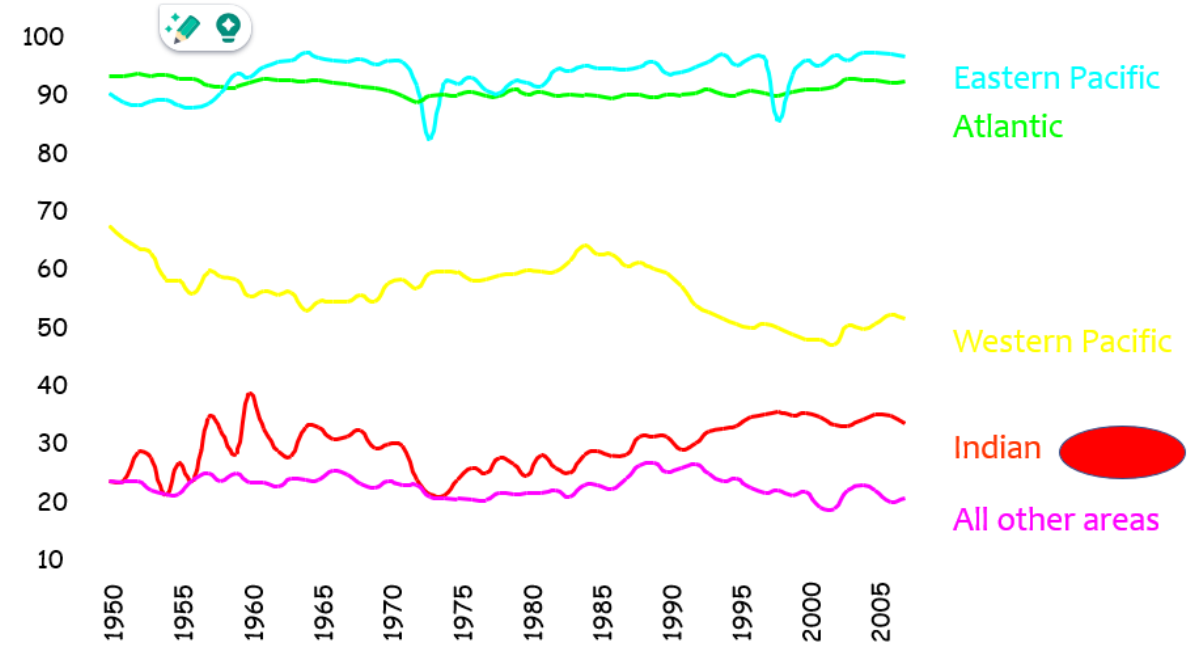
(IOTC, 2022).

IOTC

- **Most shark catch reported** between 2000–2021 IOTC was recorded **under the generic ‘Selachimorpha** (Pleurotremata)’ code with 971,664 mt, followed by Blue Shark (527,578 mt), Silky Shark (106,582 mt), and thresher sharks (*Alopias* spp., 84,648 mt).
- Most ray catch reported during this time period was recorded under the **generic ‘Rajiformes’** code with 6,919 mt, followed by Spinetail Devil Ray under its former ‘*Mobula japonica*’ (3,556 mt) and current name ‘*Mobula mobular*’ (3,334 mt), Oceanic Manta Ray (*Mobula birostris*, 2,634 mt), other mobulids (Mobulidae, 1,643 mt), and others (131 mt; IOTC, 2022b).

Fish identification in FAO statistics

Regional catch reported by species



"Taxonomic clarity is a fundamental requirement as it forms the foundation of all other life sciences."

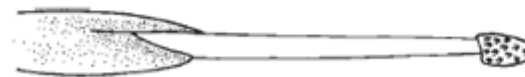
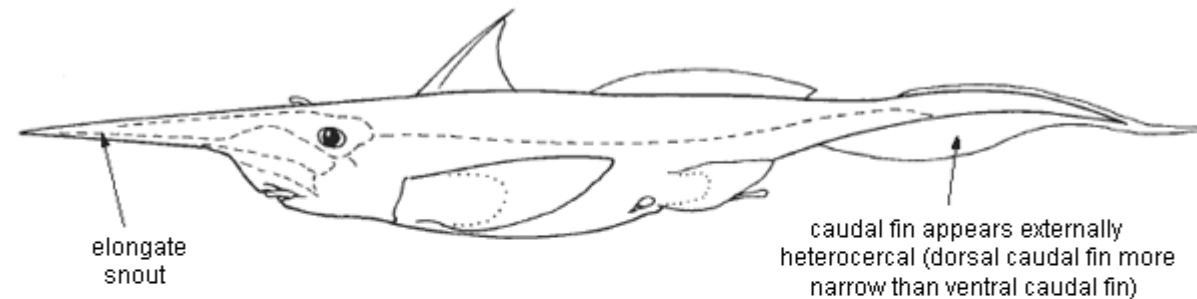
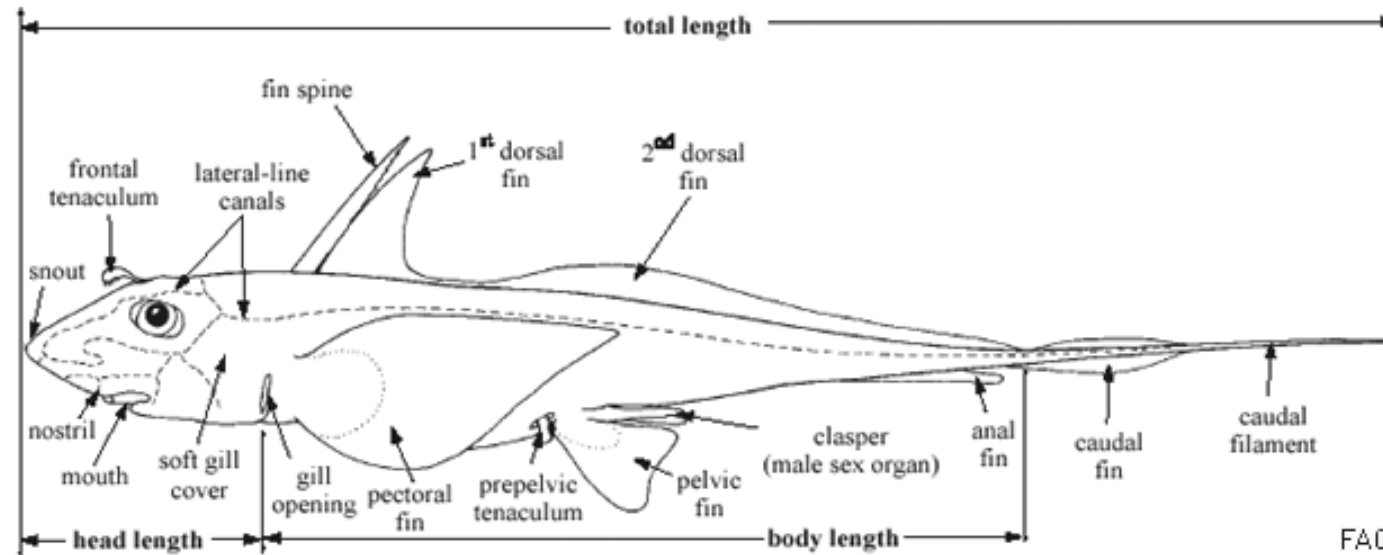
We need to,

- **Improve knowledge on shark and ray species and their fisheries, to inform conservation and management.**
- **Ensure that directed fisheries are sustainable and properly managed.**
- **Improve the conservation status of sharks and rays in the region**
- **Increase public awareness of threats to sharks and rays and their habitats.**

We cannot effectively study, manage, conserve, or monitor a species or group of species (like sharks and rays) without first knowing exactly what species you are dealing with—which is the purpose of taxonomic clarity or species identification.

CHIMAERIFORMES

TECHNICAL TERMS AND MEASUREMENTS



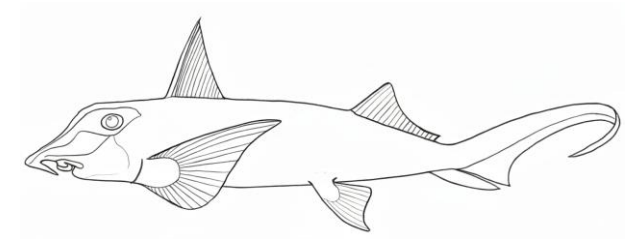
rod-like pelvic clasper

ICAR-CMFRI

Order CHIMAERIFORMES

Key to families

Plow shaped snout, flexible; snout plow shaped , flexible; Lateral Line (LL) canals closed; eyes small



Callorhynchidae

Snout (rostrum) long, fleshy and pointed; LL canals appearing as open grooves



Rhinochimaeridae

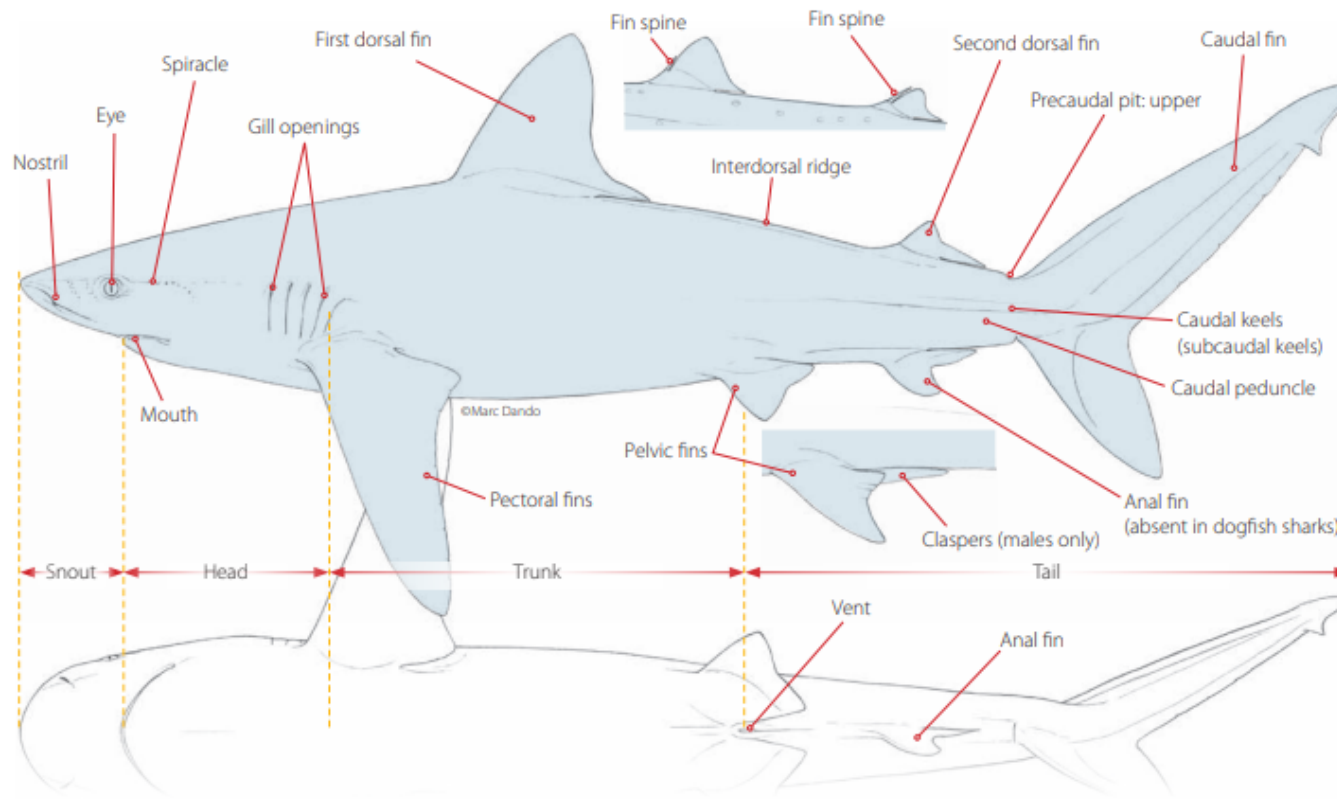
Snout (rostrum) short and rounded; LL canals open and that on snout widened



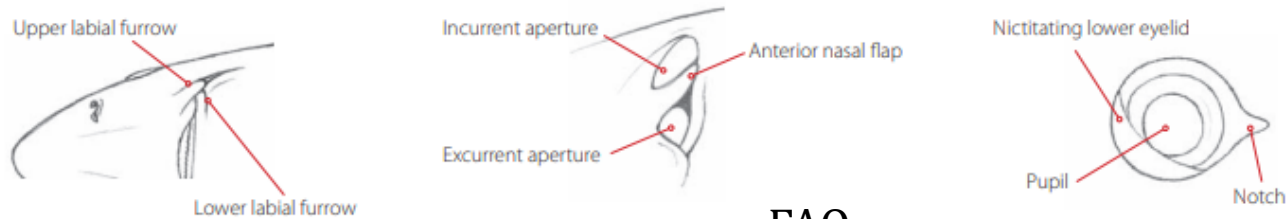
Chimaeridae

EXTERNAL TERMINOLOGY FOR SHARKS

Lateral view



Ventral view



Mouth corner

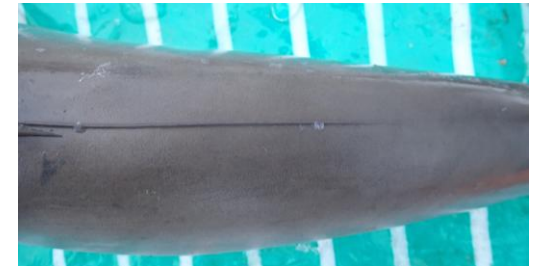
Detail of nostril

Detail of eye

FAO

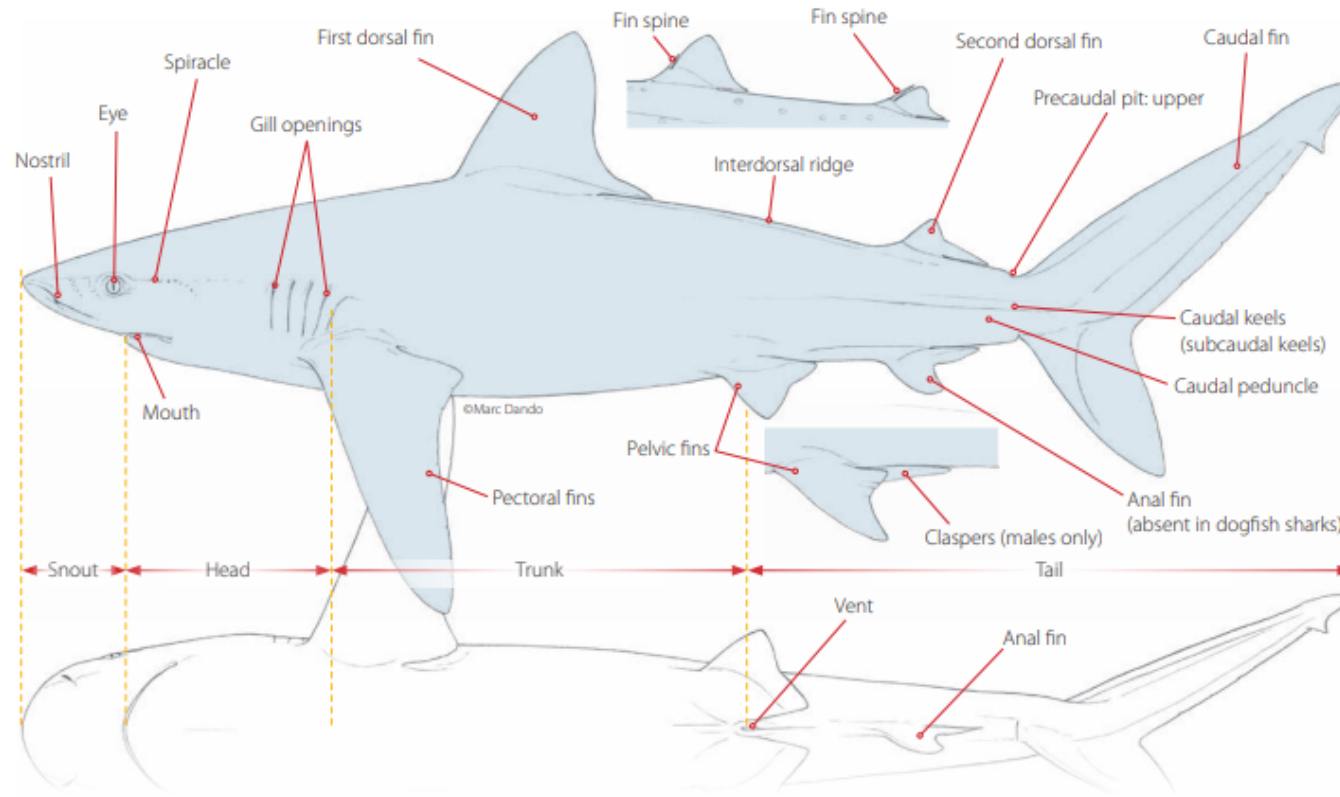
ICAR-CMFRI

Sharks

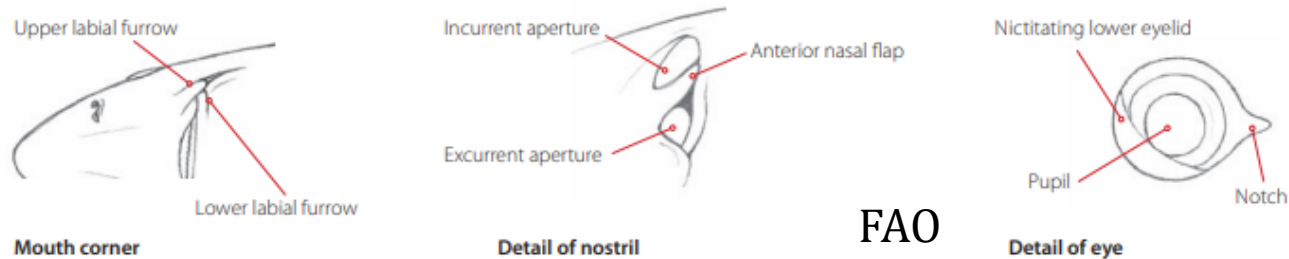


EXTERNAL TERMINOLOGY FOR SHARKS

Lateral view



Ventral view

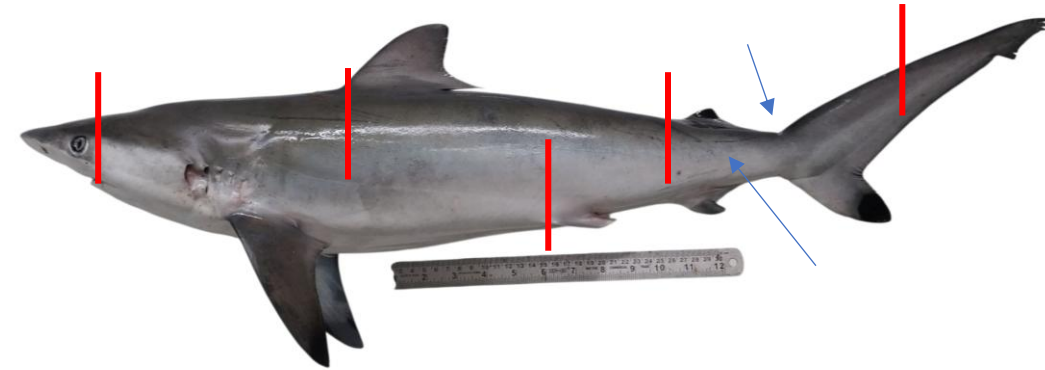


FAO

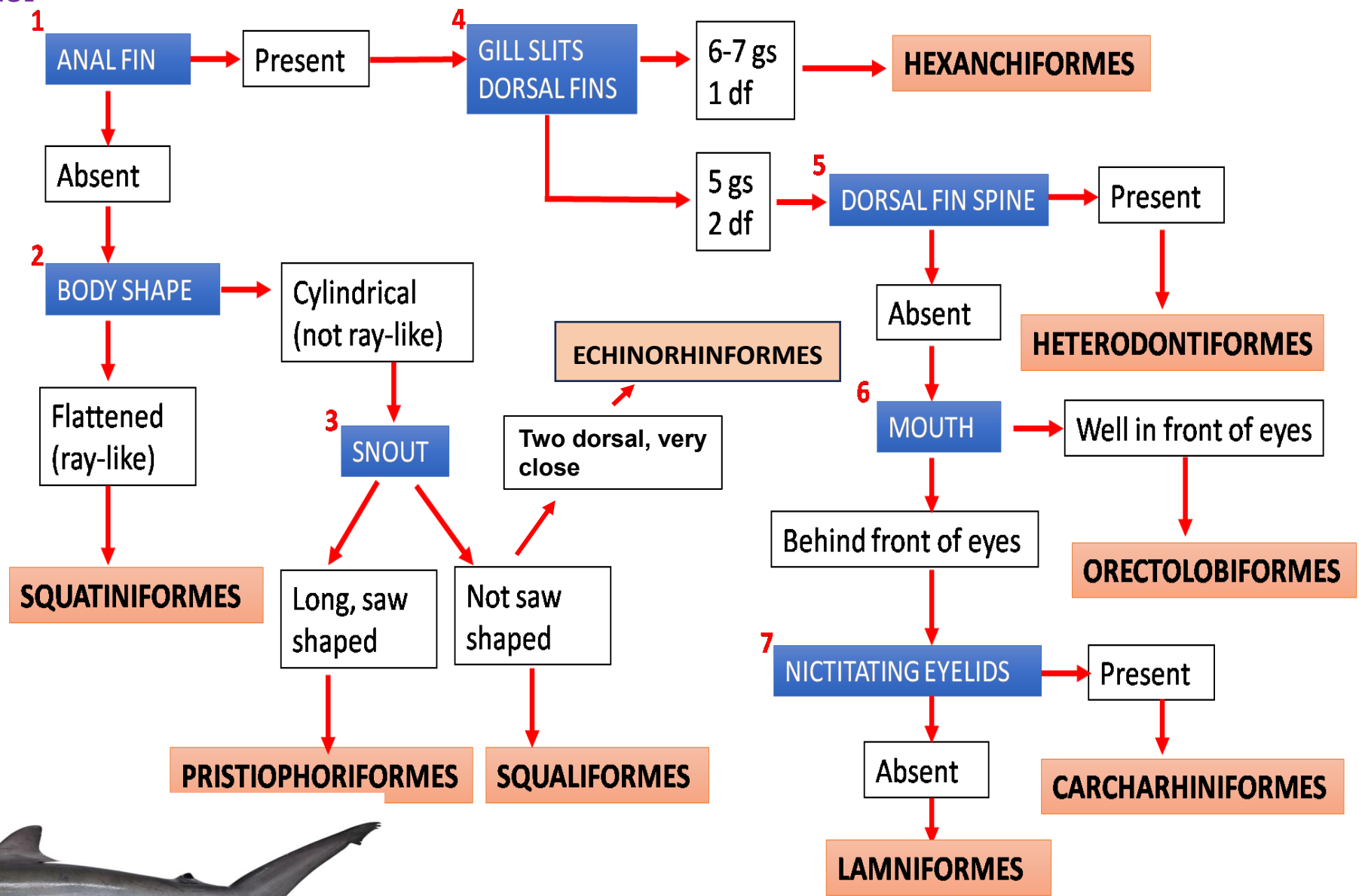
Detail of eye

ICAR-CMERI

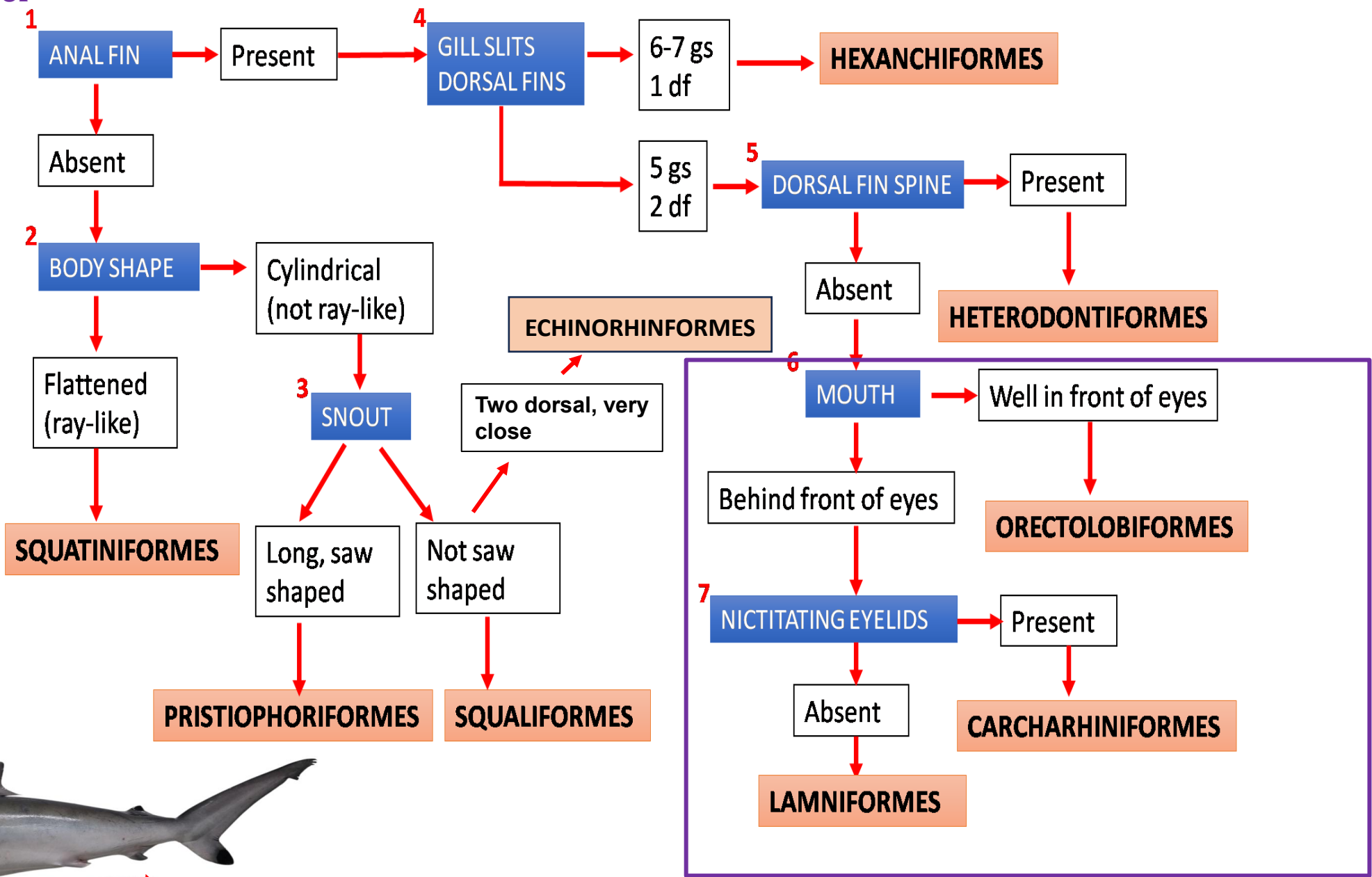
Sharks



Key to Shark order



Key to Shark order



Sharks

9 orders & 39 families (according to their distinctive characters)

Hexanchiformes (frilled and cow sharks)

1. Chlamydoselachidae
2. Hexanchidae

Squaliformes (dogfish sharks)

1. Squalidae
2. Centrophoridae
3. Etmopteridae
4. Somniosidae
5. Oxynotidae
6. Dalatiidae

Pristiophoriformes (saw sharks)

Pristiophoridae

Squatiniformes (angel sharks)

Squatinidae

Heterodontiformes (bullhead sharks)

Heterodontidae

Orectolobiformes (carpet sharks)

1. Parascylliidae
2. Brachaeluridae
3. Orectolobidae
4. Hemiscylliidae
5. Ginglystomatidae
6. Stegostomatidae
7. Rhincodontidae

Sharks

Contd.

Lamniformes (mackerel sharks)

1. Odontaspidae
2. Pseudocarchariidae
3. Mitsukurinidae
4. Megachasmidae
5. Alopiidae
6. Cetorhinidae
7. Carchariidae
8. Lamnidae

Echinorhiniformes (bramble and prickly sharks)

Echinorhinidae

Carcharhiniformes (ground sharks)

1. Pentanchidae
2. Scyliorhinidae
3. Proscylliidae
4. Pseudotriakidae
5. Leptochariidae
6. Triakidae
7. Hemigaleidae
8. Carcharhinidae
9. Galeocerdonidae
10. Sphyrnidae

Order ECHINORHINIFORMES

(Bramble sharks)

No anal fin, short snout,
five pairs of gill slits;
2 similar sized dorsal
fins closely located.
Pelvic larger than dorsal
fins



Echinorhinidae

Order SQUALIFORMES

(Dogfish sharks)

No anal fin,

Five pairs of gill slits, 2
dorsal fins,

Spined dorsal fin-Absent
or present



Centrophoridae Dalatiidae Etmopteridae Oxynotidae
Somniosidae Squalidae

Order SQUATINIFORMES

(Angel sharks)

Body flat and ray-like;
eyes on top of head; gill
slits on sides of head; very
large pectoral fins with
triangular anterior lobes;
caudal fin with base
slanted ventrally

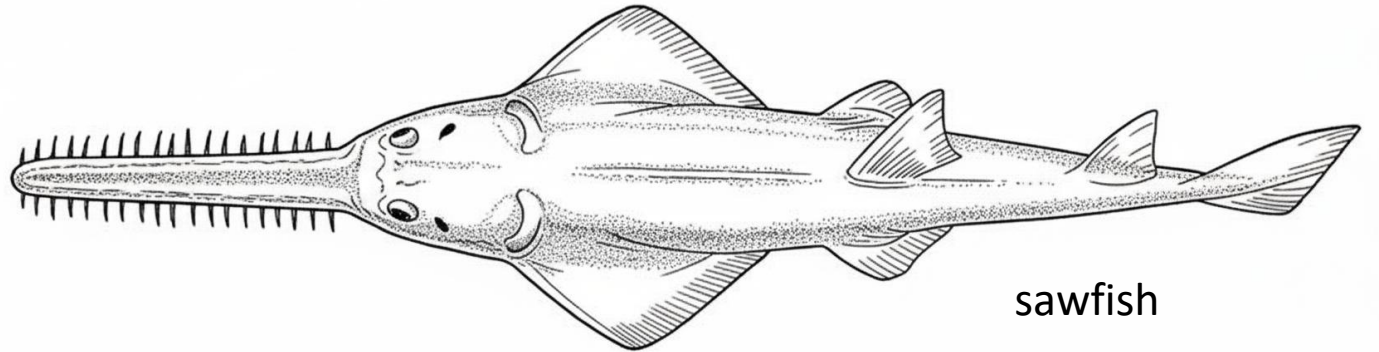
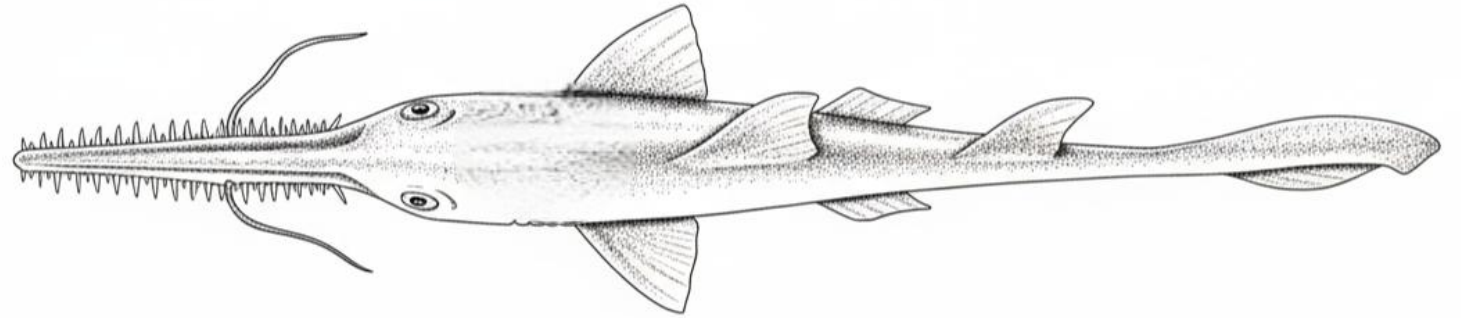
No anal fin



Squatinidae

Order PRISTIOPHORIFORMES (Saw sharks)

Body sharklike; snout produced in a long flat blade with teeth on each side, one pair of long barbels; no dorsal fin spines, **anal fin absent**, gill slits on sides of head



sawfish

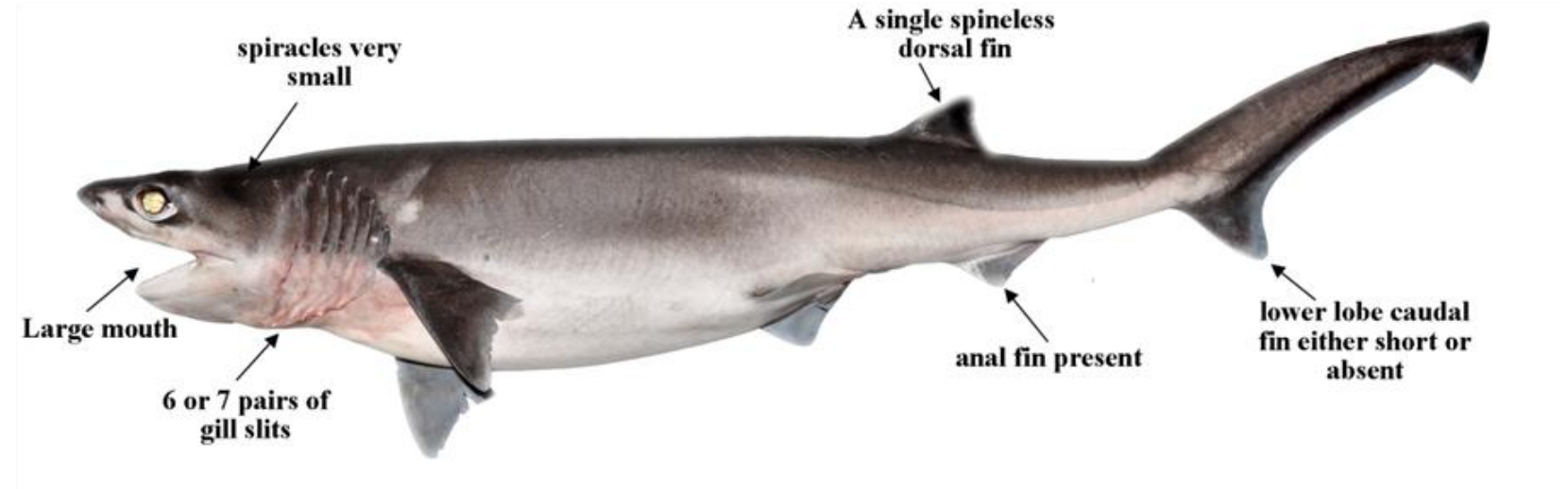
Pristiophoridae

Order HEXANCHIFORMES

(frilled and cow sharks)

Spineless **single dorsal fin** origin far back on the body, no precaudal pits
Anal fin present

Heptranchias perlo
Sharpnose sevengill shark



Hexanchus griseus
Bluntnose sixgill shark

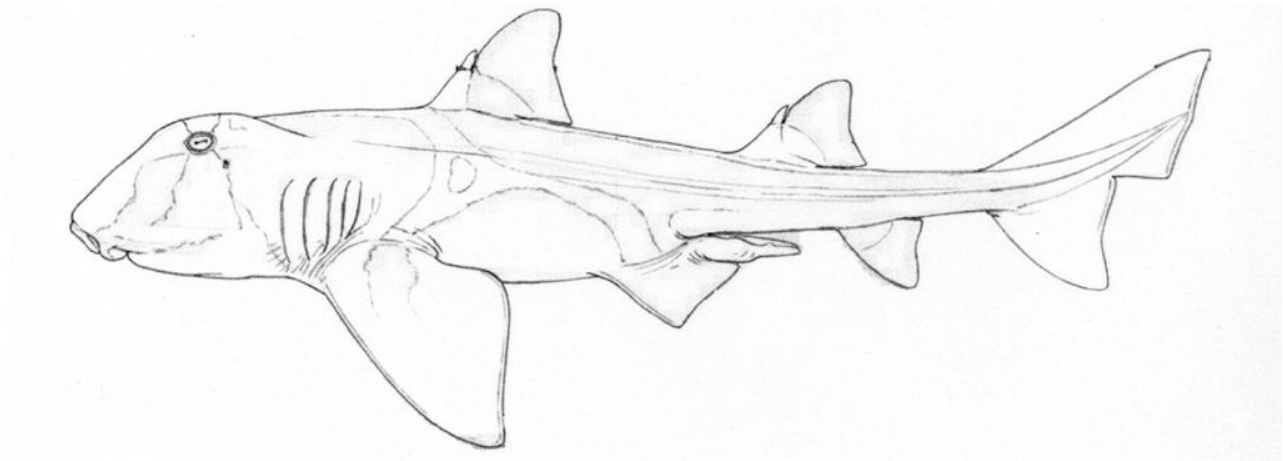


1. Chlamydoselachidae
2. Hexanchidae

Order HETERODONTIFORMES (bullhead sharks)

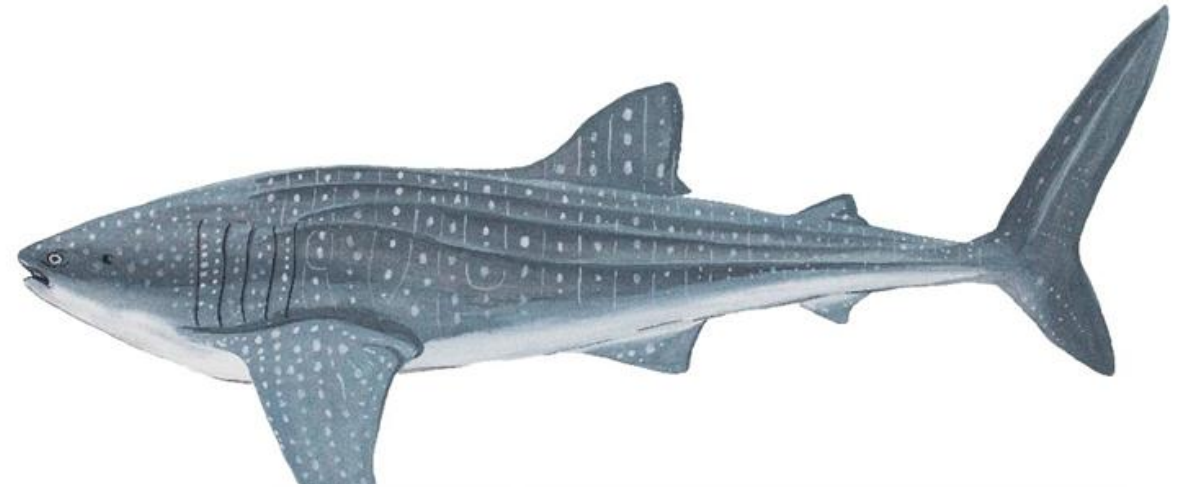
Blunt snouts, small mouths in front of the eyes, enlarged first gill slits, prominent eye ridges, rough skin and paddle-like paired fins.

Anal fin present, 2 dorsals with spines



Order ORECTOLOBIFORMES (carpet sharks)

- **Two dorsal fins without spines, eyes behind mouth;** deep nasoral grooves connecting nostrils and mouth; nostrils with barbels, nictitating eyelids absent.
- **Anal fin present**

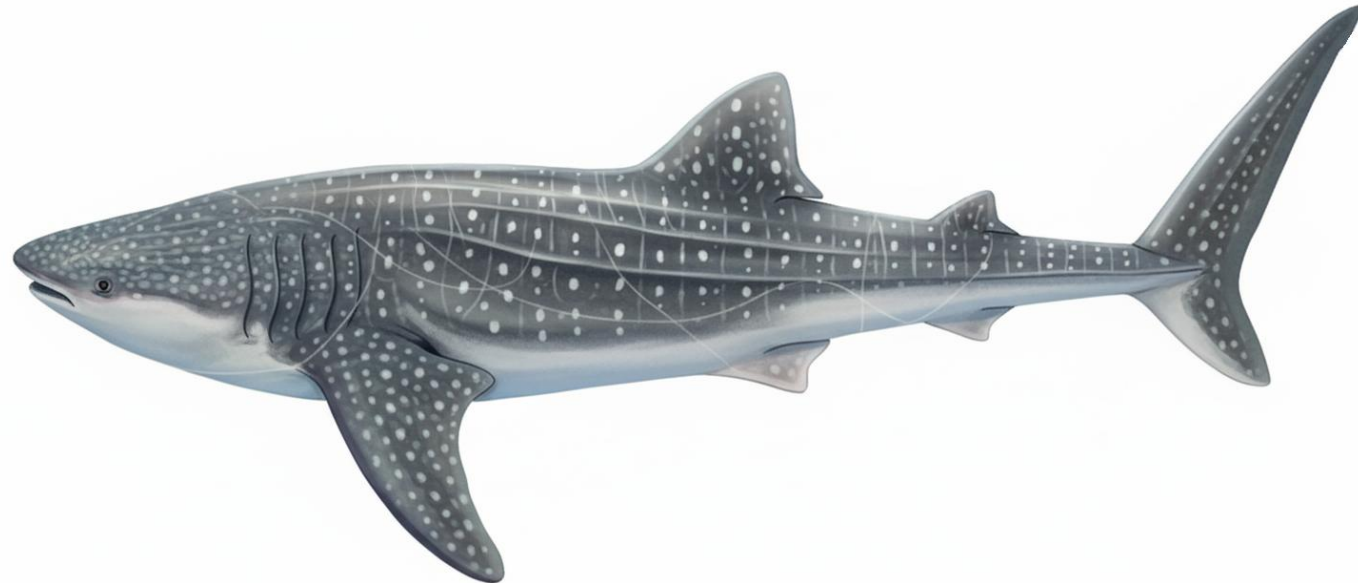


Whale shark *Rhincodon typus*

Rhincodontidae

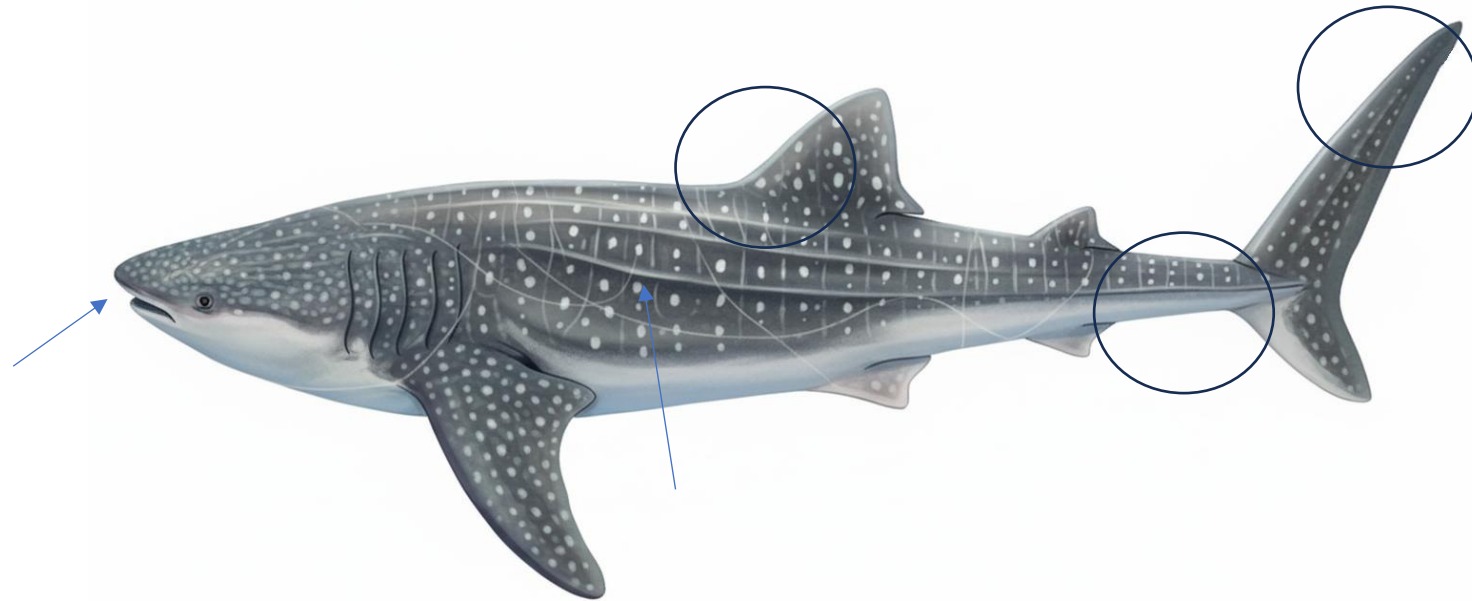
RHN

- Distinctive 'checkerboard' patterning, gill slits long, four above pectoral fins
- First dorsal fin set well back, partly over pelvic fins
- Teeth minute never obvious
- No interdorsal ridge
- Large keel on caudal peduncle



Whale shark *Rhincodon typus*

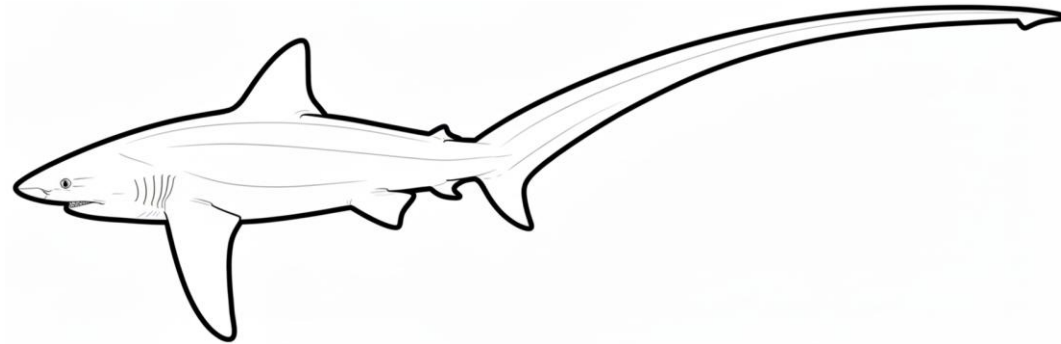
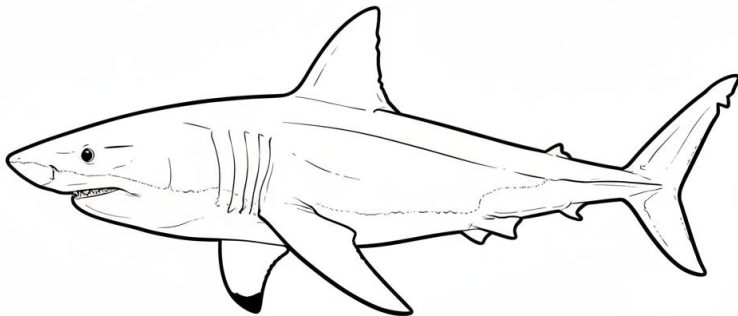
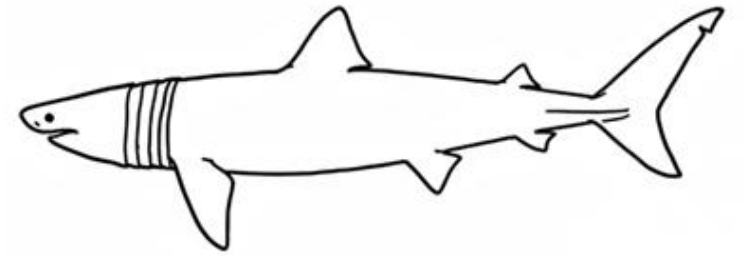
- Distinctive 'checkerboard' patterning, gill slits long, four above pectoral fins
- first dorsal fin set well back, partly over pelvic fins
- teeth minute never obvious
- no interdorsal ridge
- large keel on caudal peduncle



RHN

Order LAMNIFORMES

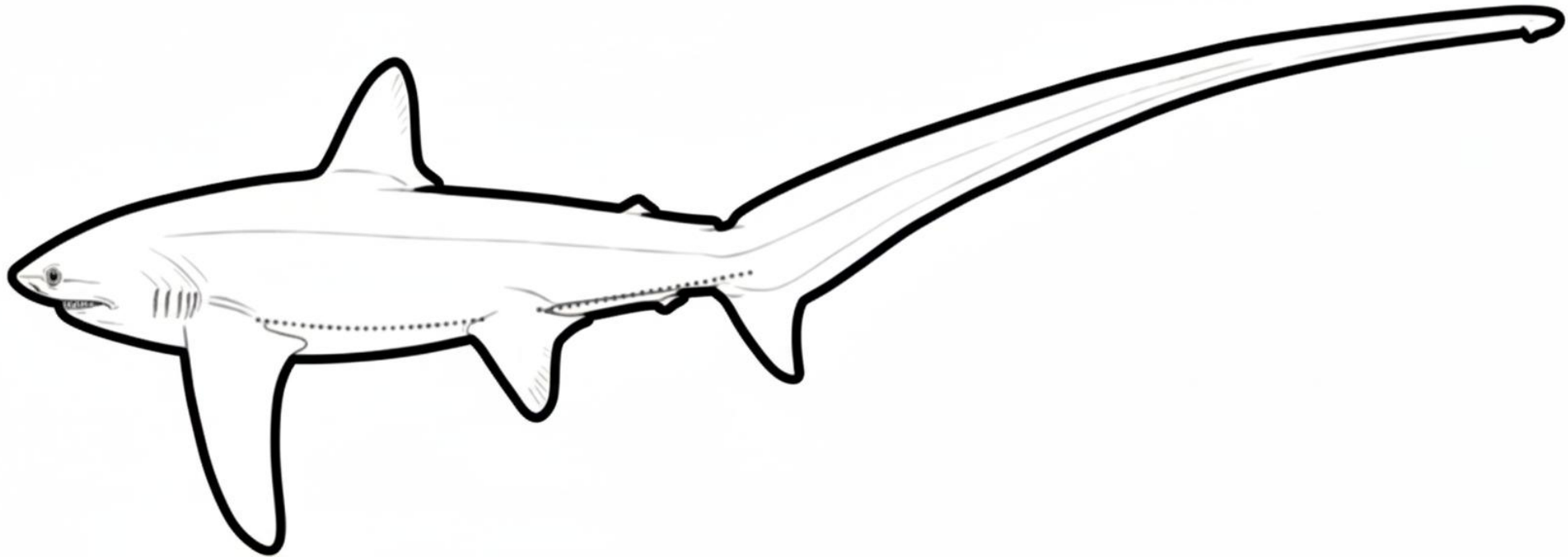
- Cylindrical body, conical head, fairly short snout
- Five gill slits on each side of the head
- No nictitating eyelid
- Small anal fin present
- Two dorsal fins without spines, 1st in front pelvic
- Mouth behind eyes



Family: Alopiidae (Thresher Shark)

THR

Large-eyed sharks with small mouths, large pectoral, pelvic, and first dorsal fins, tiny second dorsal and anal fins, and elongated, **curved whip-like caudal fins almost as long as their body length.**

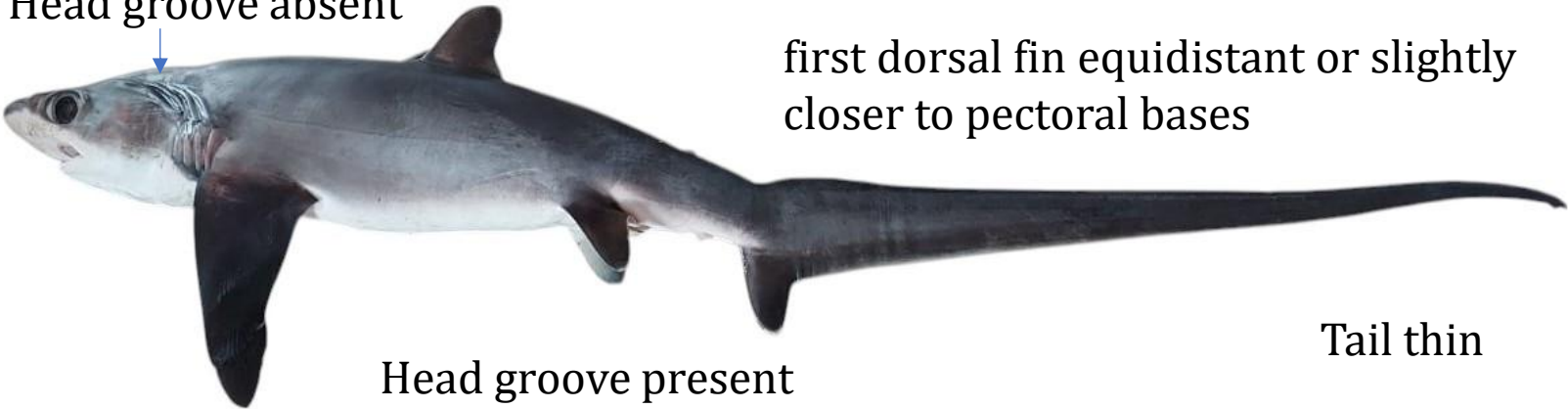


Family: Alopiidae (Thresher Shark)

Alopias pelagicus-Pelagic thresher

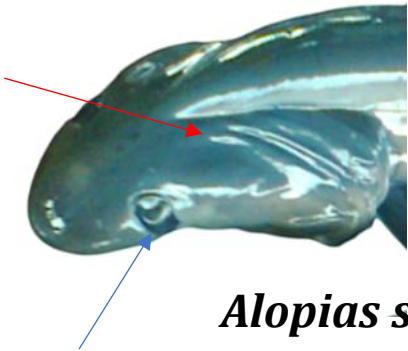
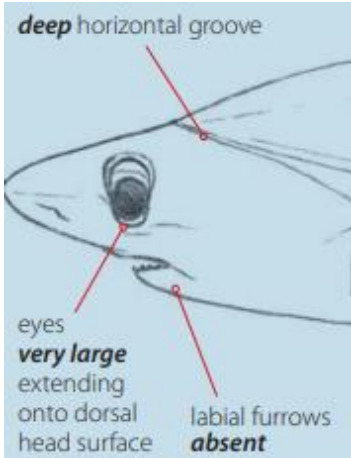


Head groove absent



first dorsal fin equidistant or slightly closer to pectoral bases

Tail thin



Alopias superciliosus- Bigeye thresher

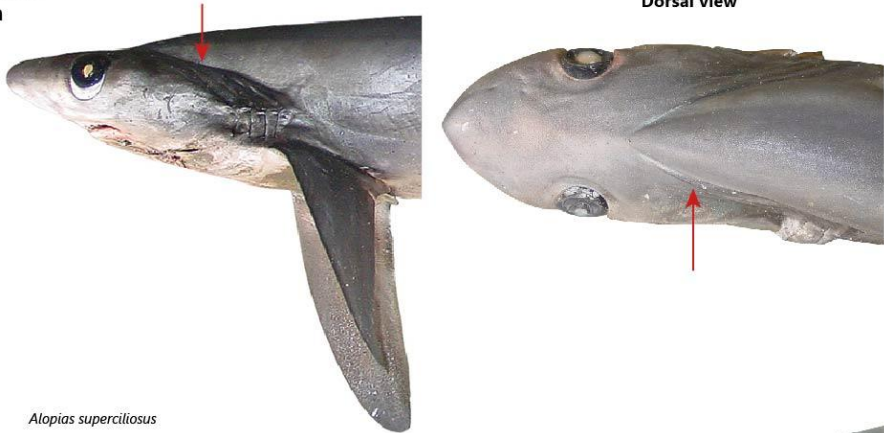


Tail broad at tip

first dorsal fin much nearer to pelvic than pectoral base

Alopiidae

Fig. 3
a

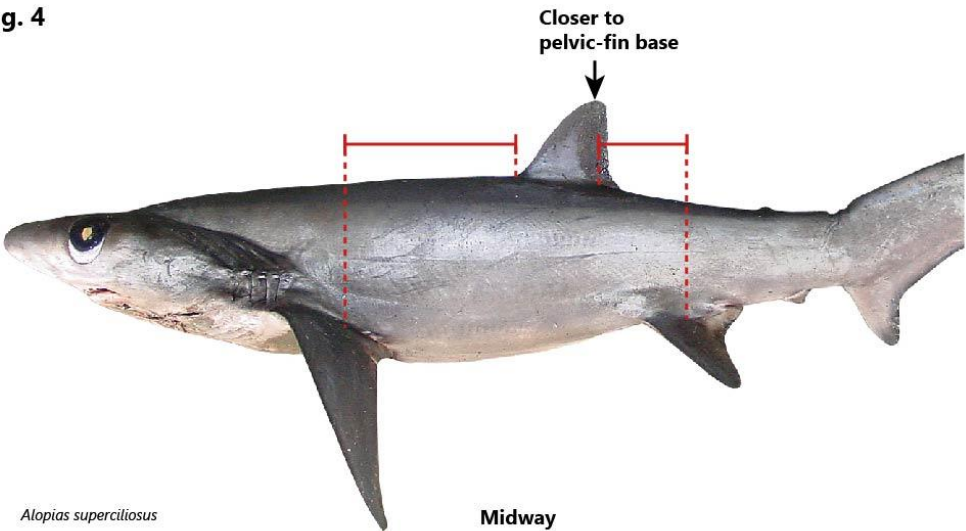


b

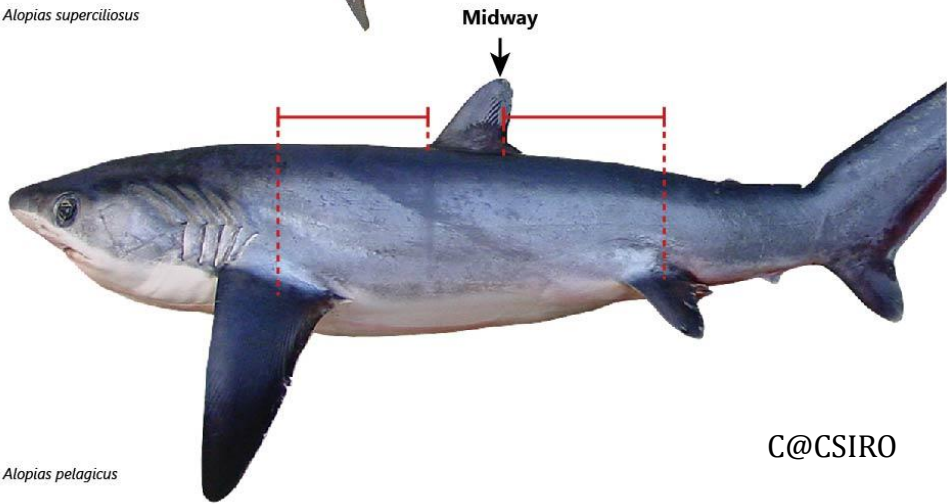


Alopias superciliosus

Fig. 4
a



b



Alopias pelagicus

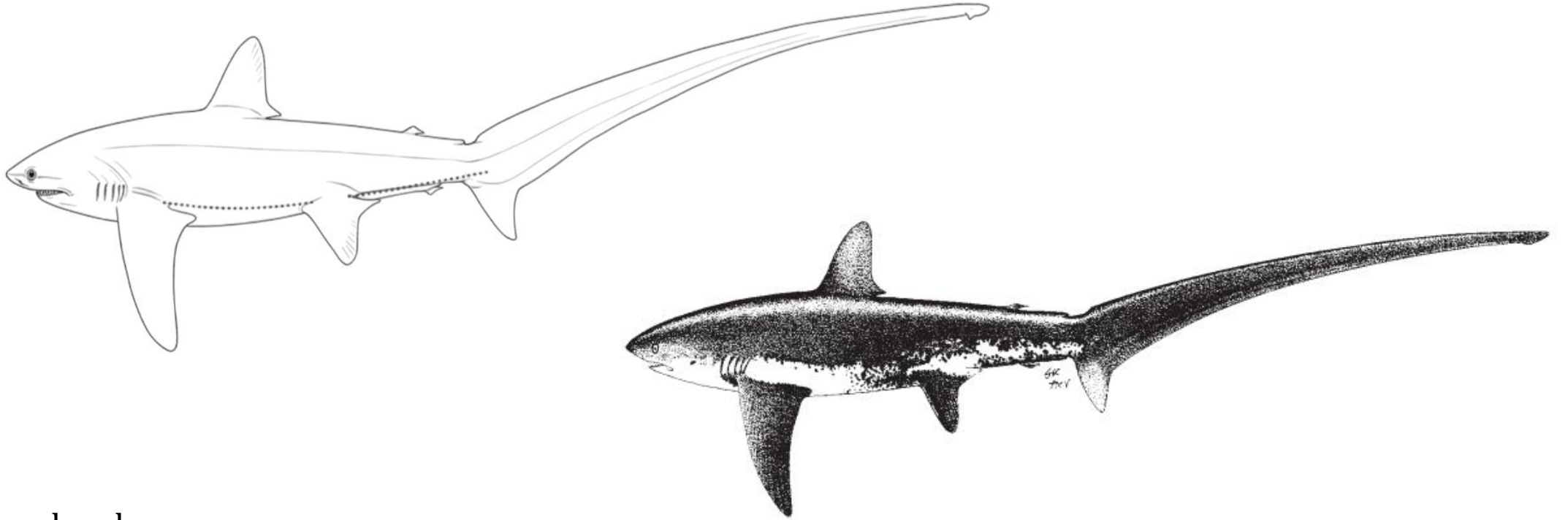
BTH

PTH

C@CSIRO

Family: Alopiidae (Thresher Shark)

Alopias vulpinus -



- No groove on head
- Short, snout with **small eyes** and mouth with **labial furrows**.
- White spots sometimes present on belly above pectoral and pelvic fins white

ALV

Family: Lamnidae (Mackerel sharks)

MAK

Isurus oxyrinchus Shortfin mako

- **Brilliant blue**, underside of snout and mouth white
- Snout usually acutely pointed,
- **pectoral fins considerably shorter than head**
- **Origin of anal fin about under midbase of second dorsal fin;**



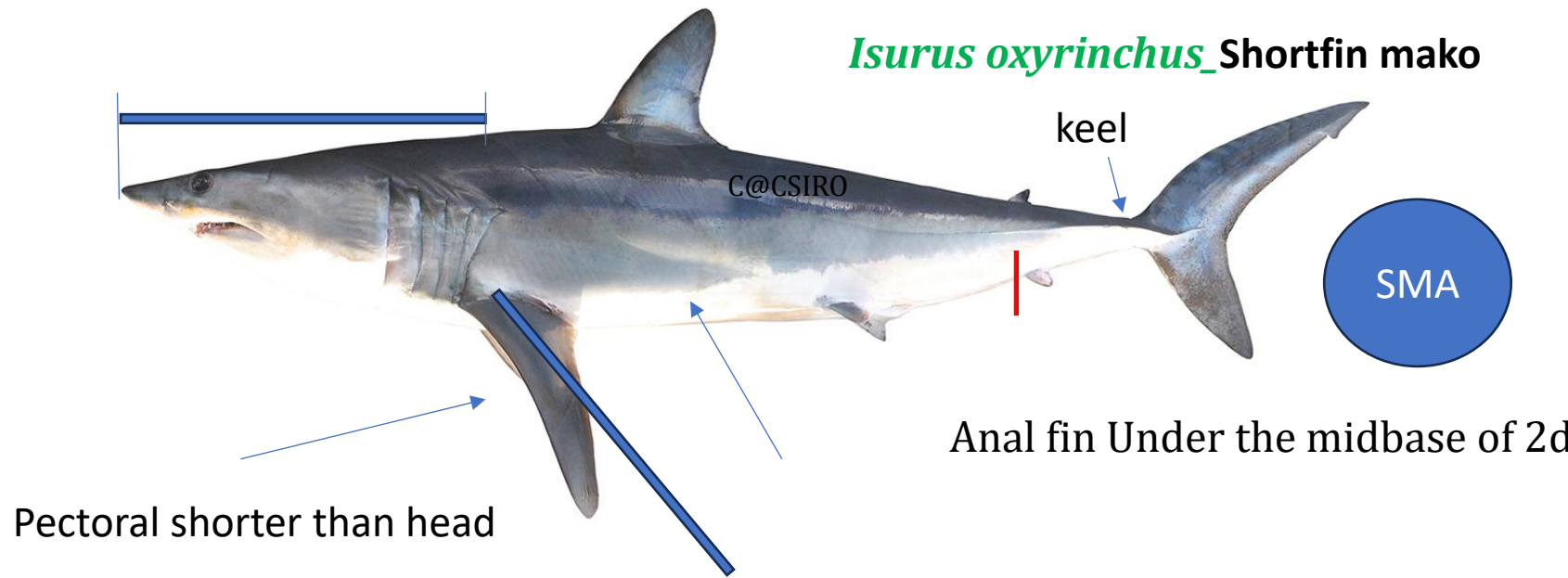
Isurus paucus Longfin mako

- Snout narrowly to bluntly (usually not acutely)
- **Pectoral fins about as long as head**, relatively broad-tipped in young and adults.
- **Origin of anal fin about under insertion of second dorsal fin;**
- Underside of snout and mouth dusky
- Pectoral ventral black bordered



LMA

Snout pointed



Isurus oxyrinchus Shortfin mako

Pectoral shorter than head

Anal fin Under the midbase of 2d

SMA



Pectorals long HL, broad tipped



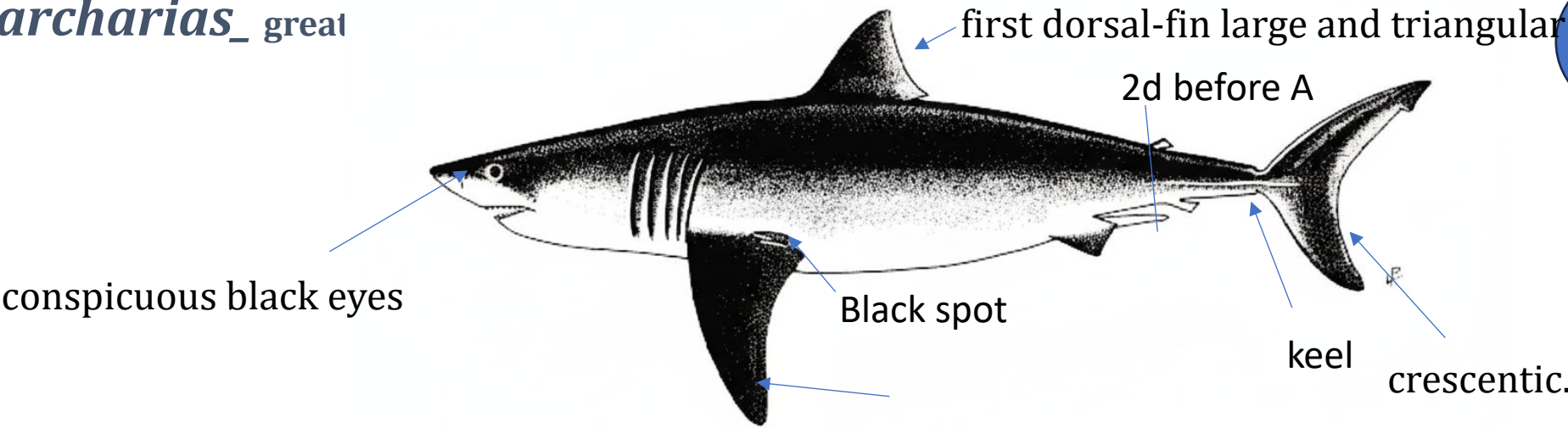
Isurus paucus Longfin mako

Colour

Anal fin under 2 dorsal inserti

LMA

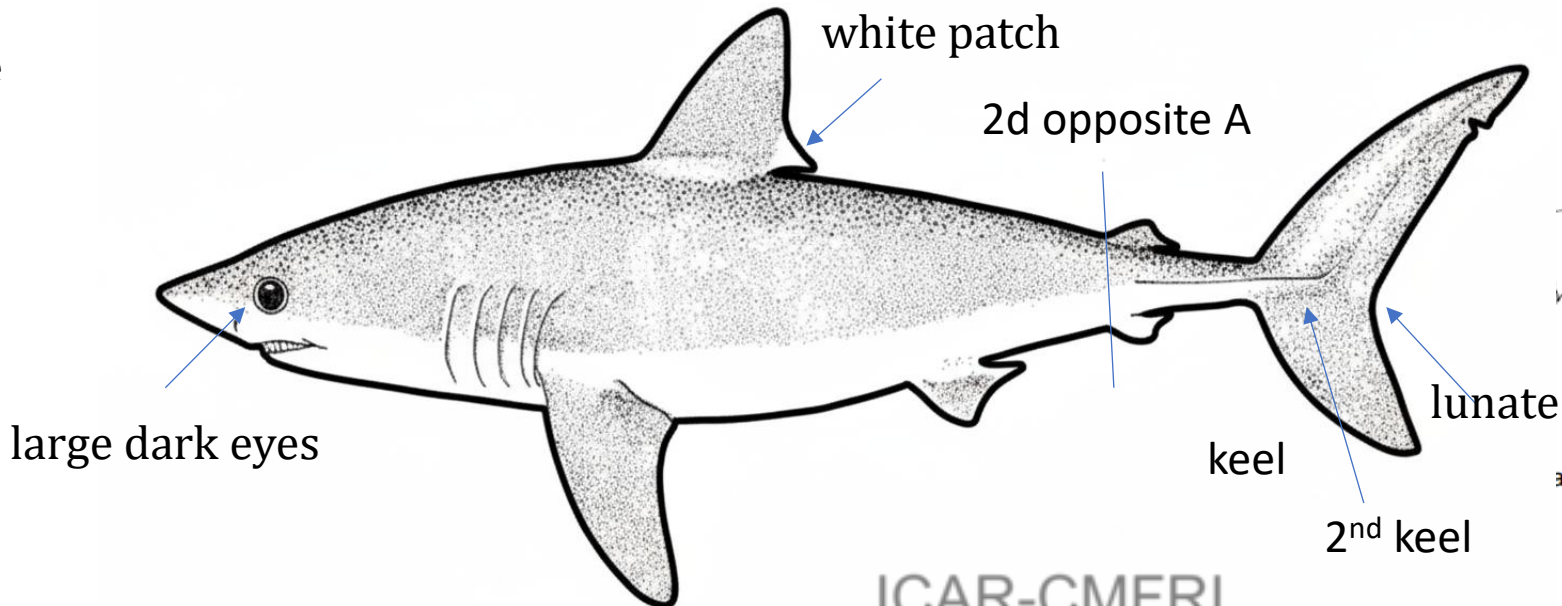
*Carcharodon carcharias*_ great
Lamnidae



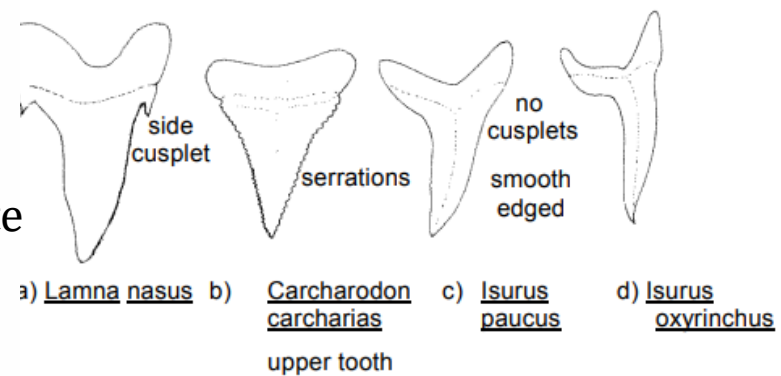
WSH

*Lamna nasus*_porbeagle shark

Lamnidae



POR



Crocodile shark *Pseudocarcharias kamoharai*

Pseudocarchariidae

PSK

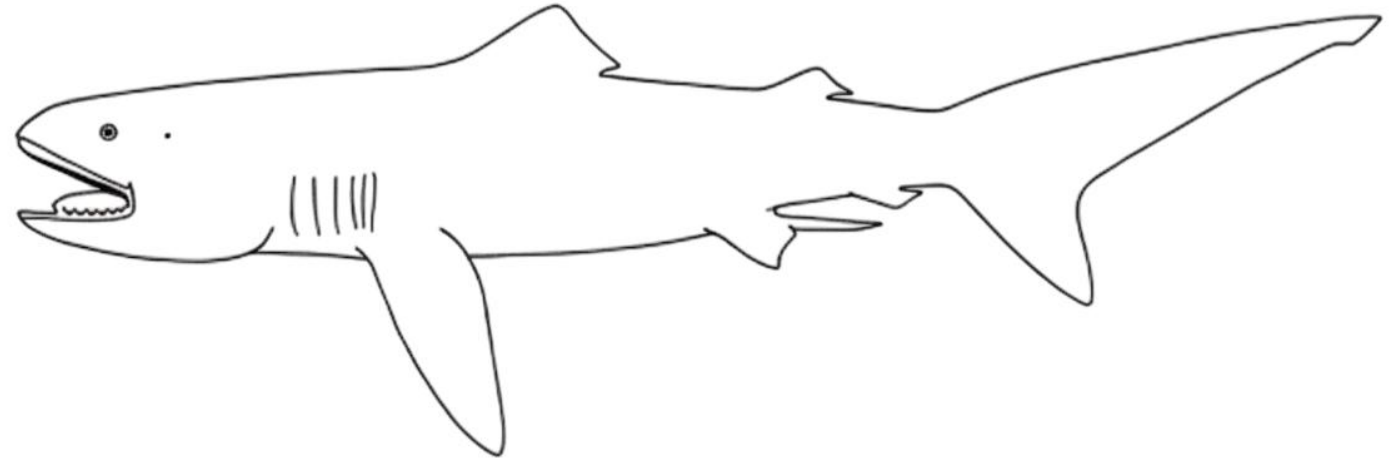


Megamouth shark *Megachasma pelagios*

LMP

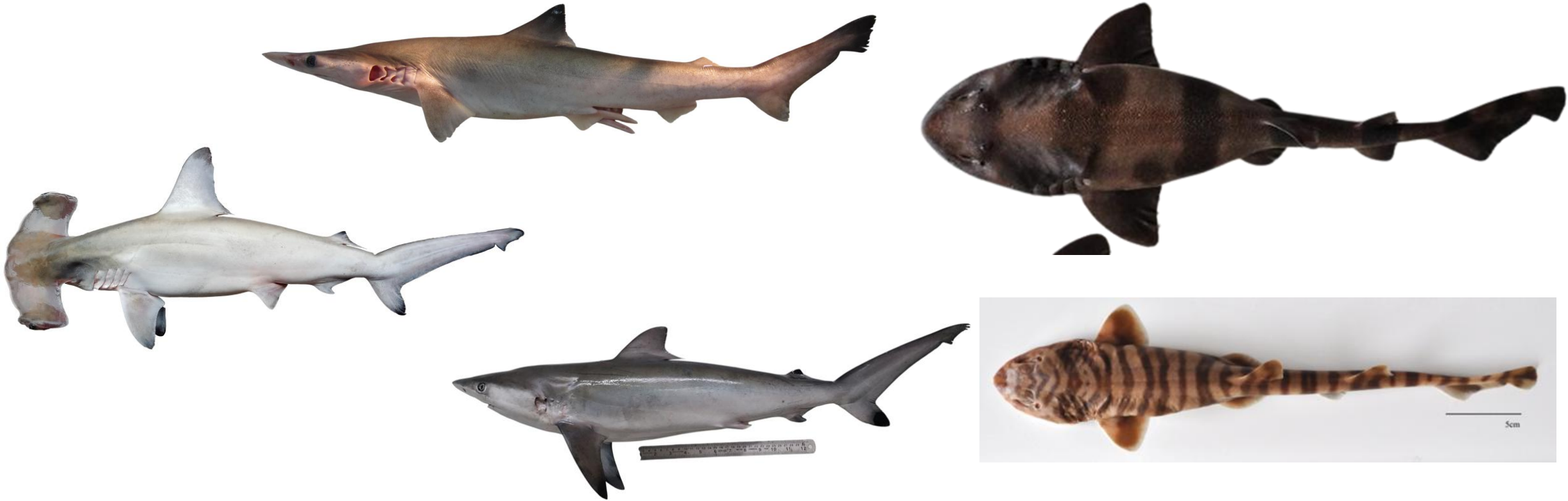
Megachasmidae

- Large terminal mouth that extends behind the eyes,
- Long and narrow pectoral fins
- globulous head with thick lips, caudal peduncle without keels,



ICAR-CMFRI

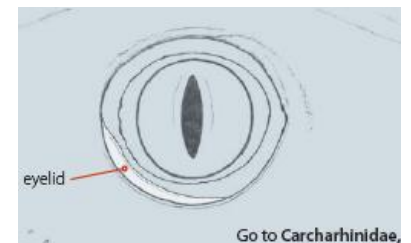
Order CARCHARHINIFORMES



Atelomycteridae **Carcharhinidae** Dichichthyidae
Galeocerdonidae Hemigaleidae Leptochariidae Pentanchidae
Proscylliidae Pseudotriakidae Scyliorhinidae **Sphyrnidae**
Triakidae

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FSI-IOTC Species identification workshop_Kochi, India – September 29th to October 4th 2025

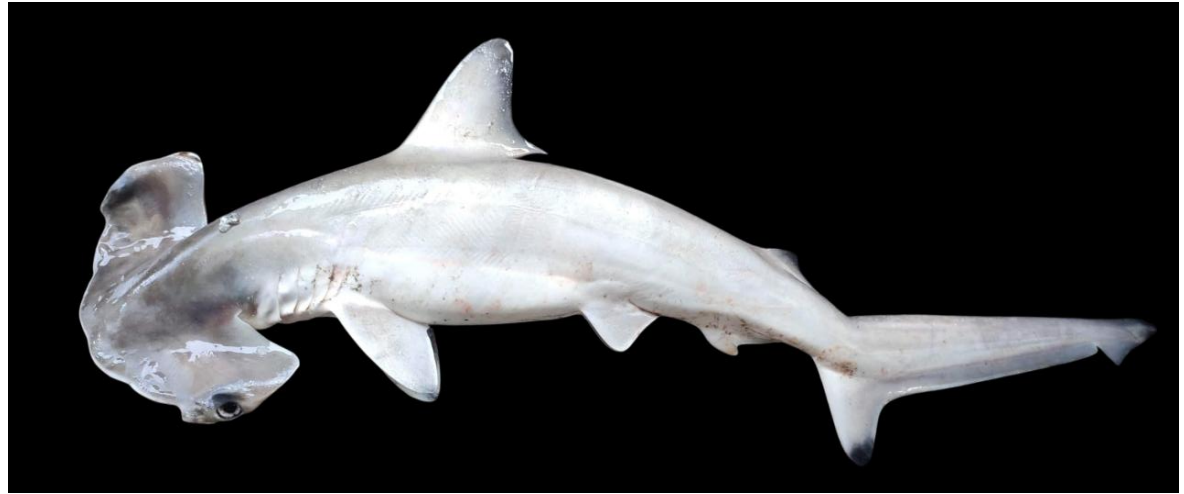


Go to Carcharhinidae,

Family: SPHYRNIDAE

Hammerhead Sharks

SPY



sharks with eyes at the lateral ends of their unique 'hammer-shaped' heads

Sphyrna spp

SPN

ICAR-CMFRI

Sphyrnidae

No median indentation in frontal contour of head, **Origin of second dorsal fin over middle of anal fin base** -

Sphyrna zygaena Smooth hammerhead

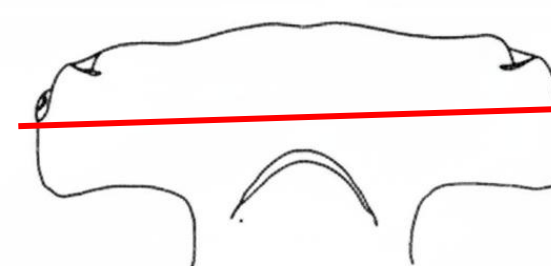


S. zygaena

SPZ

Anterior margin of head nearly straight, with a small indentation, **posterior margins of eyes well anterior to mouth**, origin of second dorsal fin over origin of anal fin-

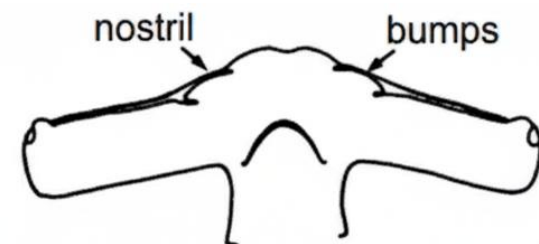
Sphyrna mokarran Great hammerhead



S. mokarran

SPK

Head long, wing-like, with a series of small bumps along edges in front of nostrils- *Eusphyrna blochii*
Winghead shark

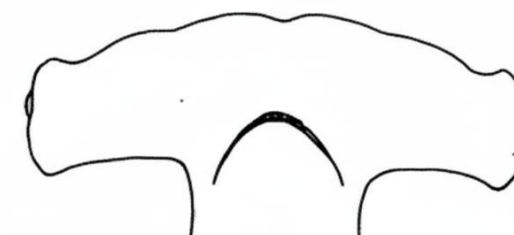


E. blochii

EUB

Median indentation present on the anterior margin of head and 2 more at front of head, Origin of second **dorsal fin over middle of anal fin** base- *Sphyrna lewini*

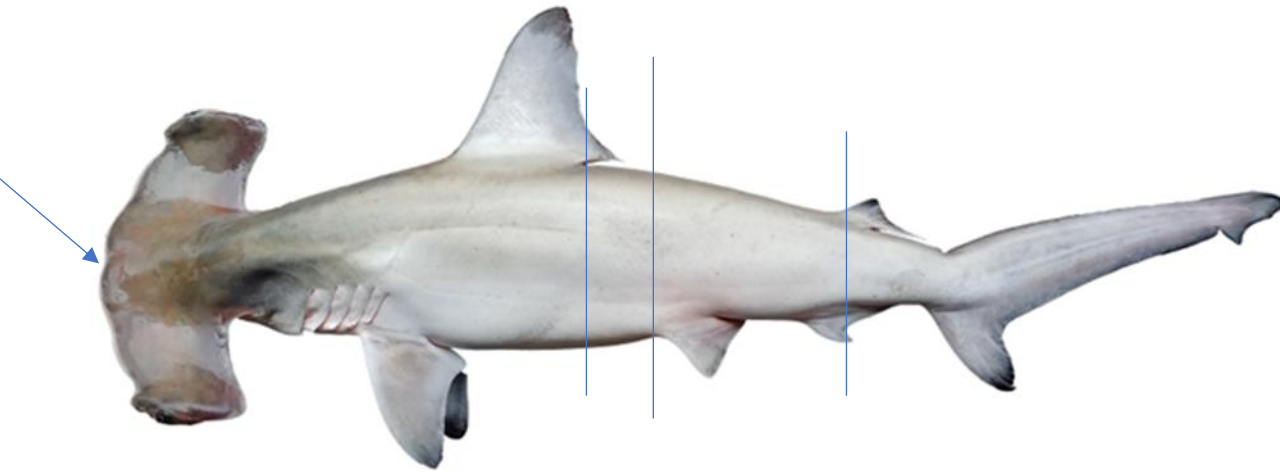
Scalloped hammerhead



Sphyrna lewini

SPL

Sphyrnidae



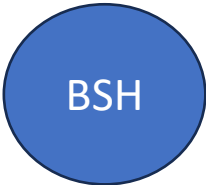
Sphyrna lewini
Scalloped hammerhead



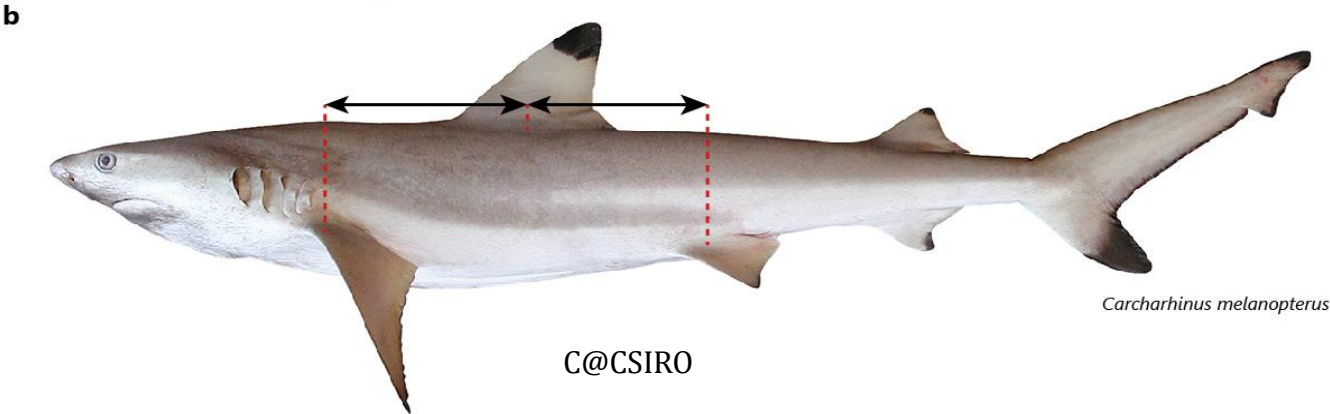
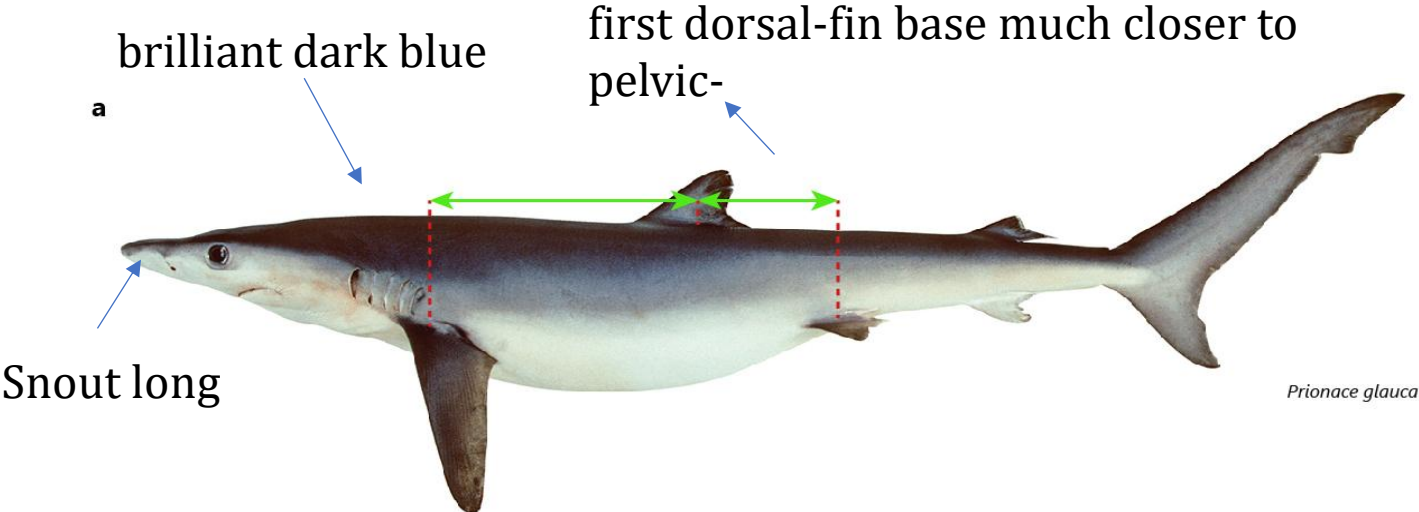
Sphyrna zygaena Smooth hammerhead



Blue shark *Prionace glauca*

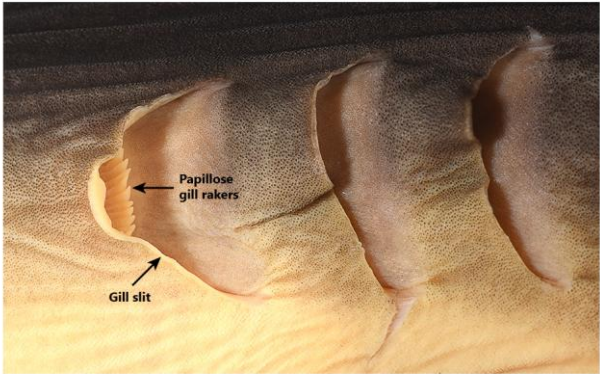
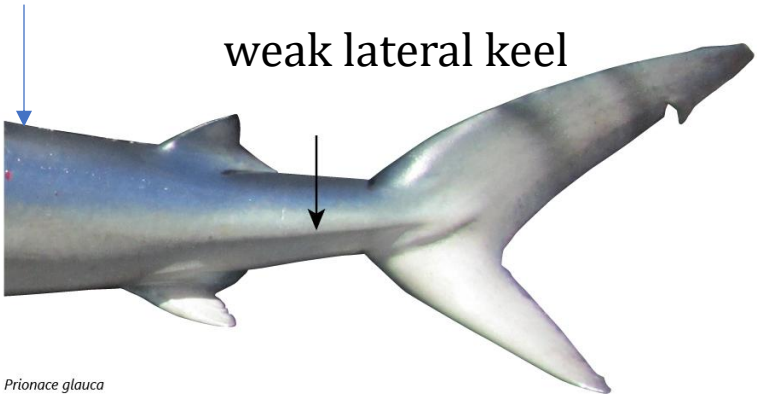


Family: Carcharhinidae
Requiem sharks



No interdorsal ridge

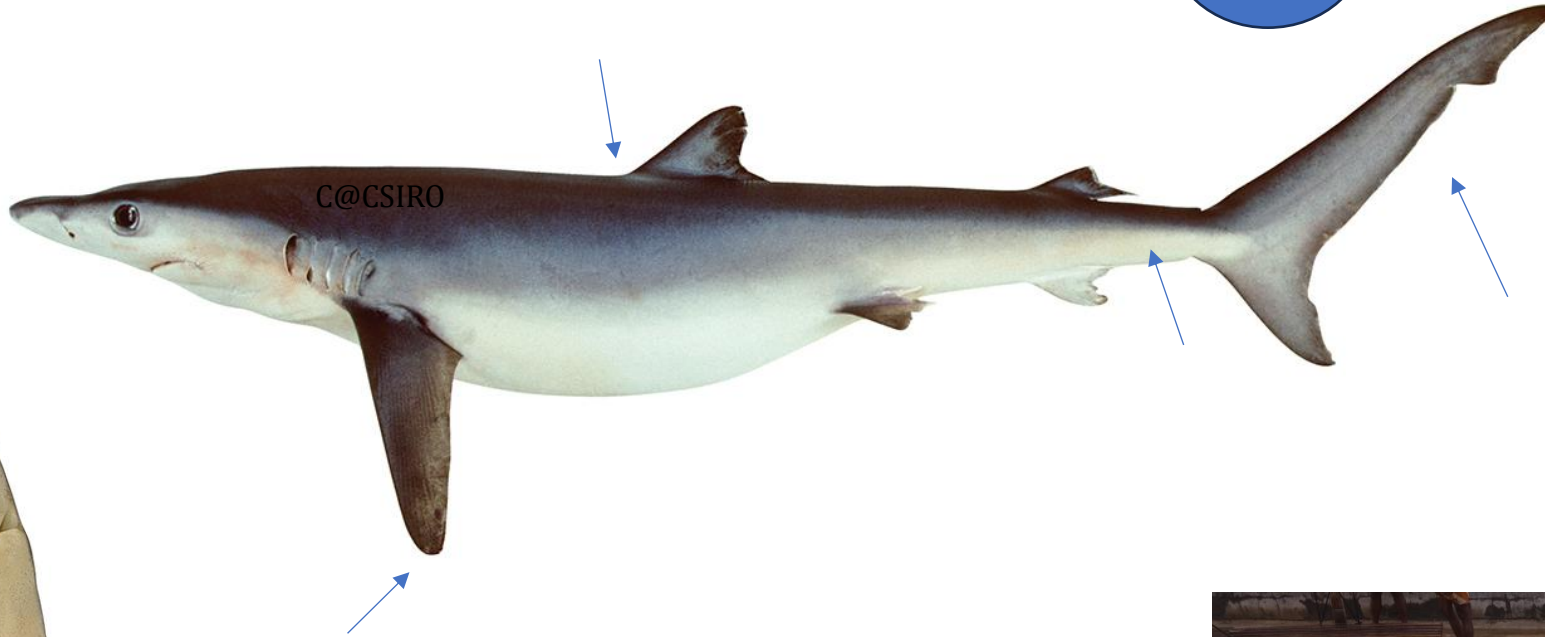
weak lateral keel



Blue shark *Prionace glauca*

BSH

Family: Carcharhinidae
Requiem sharks



ICAR-CMFRI

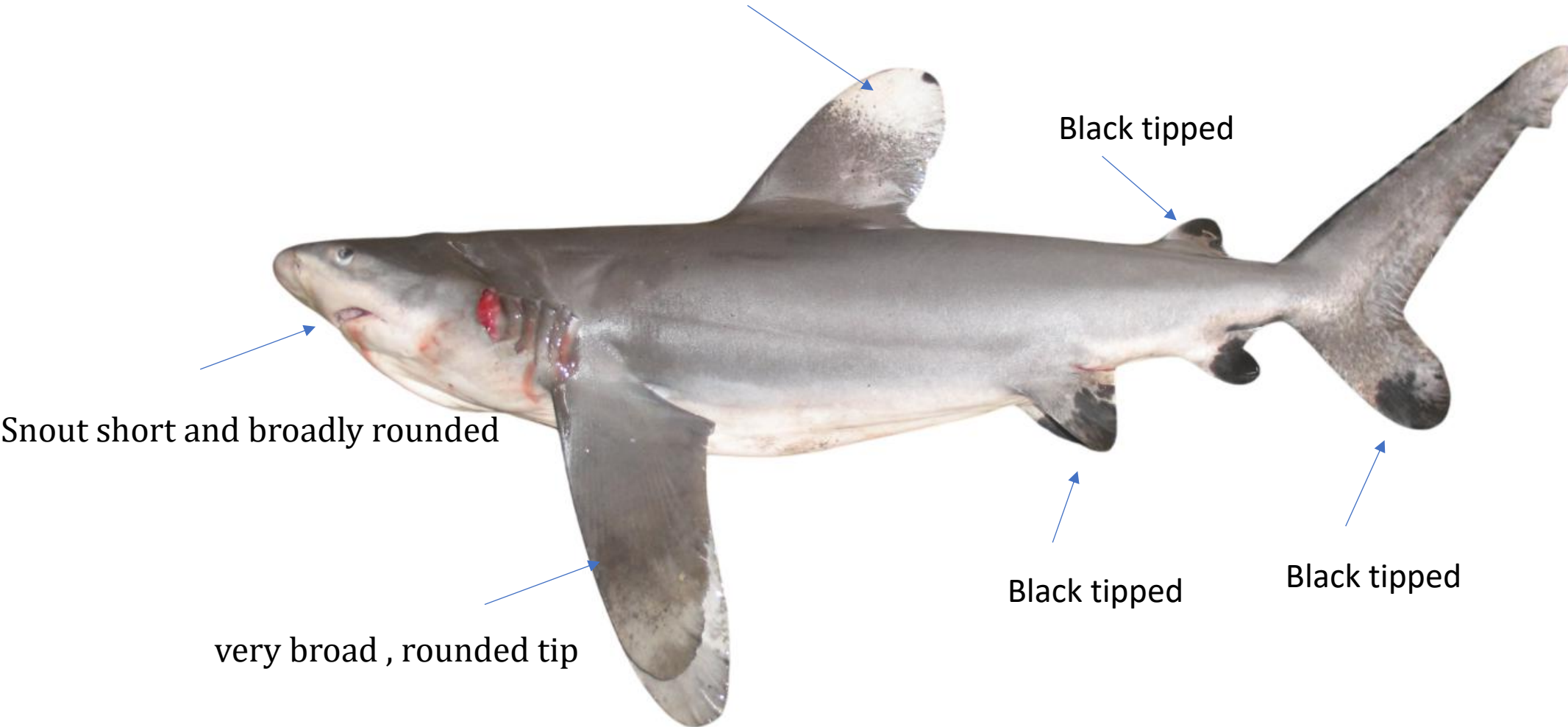
Carcharhinus longimanus

Oceanic whitetip shark

very broad , rounded
tip, with white patches

OCS

Family: Carcharhinidae
Requiem sharks



ICAR-CMERI

Carcharhinus falciformis

Silky shark

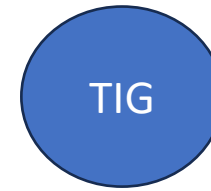


Family: Carcharhinidae
Requiem sharks

- 1st dorsal fin low with moderately rounded apex
- First dorsal origin well behind pectoral free rear tips
- Interdorsal ridge present
- Ventral side paler than upper part
- Fintips without markings, often dusky



Tiger shark *Galeocerdo cuvier*



Family: Galeoceridae
Tiger shark

- Big-head, very short, blunt-snouted, large-mouth
- **Interdorsal ridge present and very prominent**
- Slender caudal fin with an acutely pointed tip
- Very long upper labial furrows that reach the eyes.
- Low keels on caudal peduncle
- Distinctive dark, vertical tiger-stripe markings, faded or obsolete in large adults



QUIZ



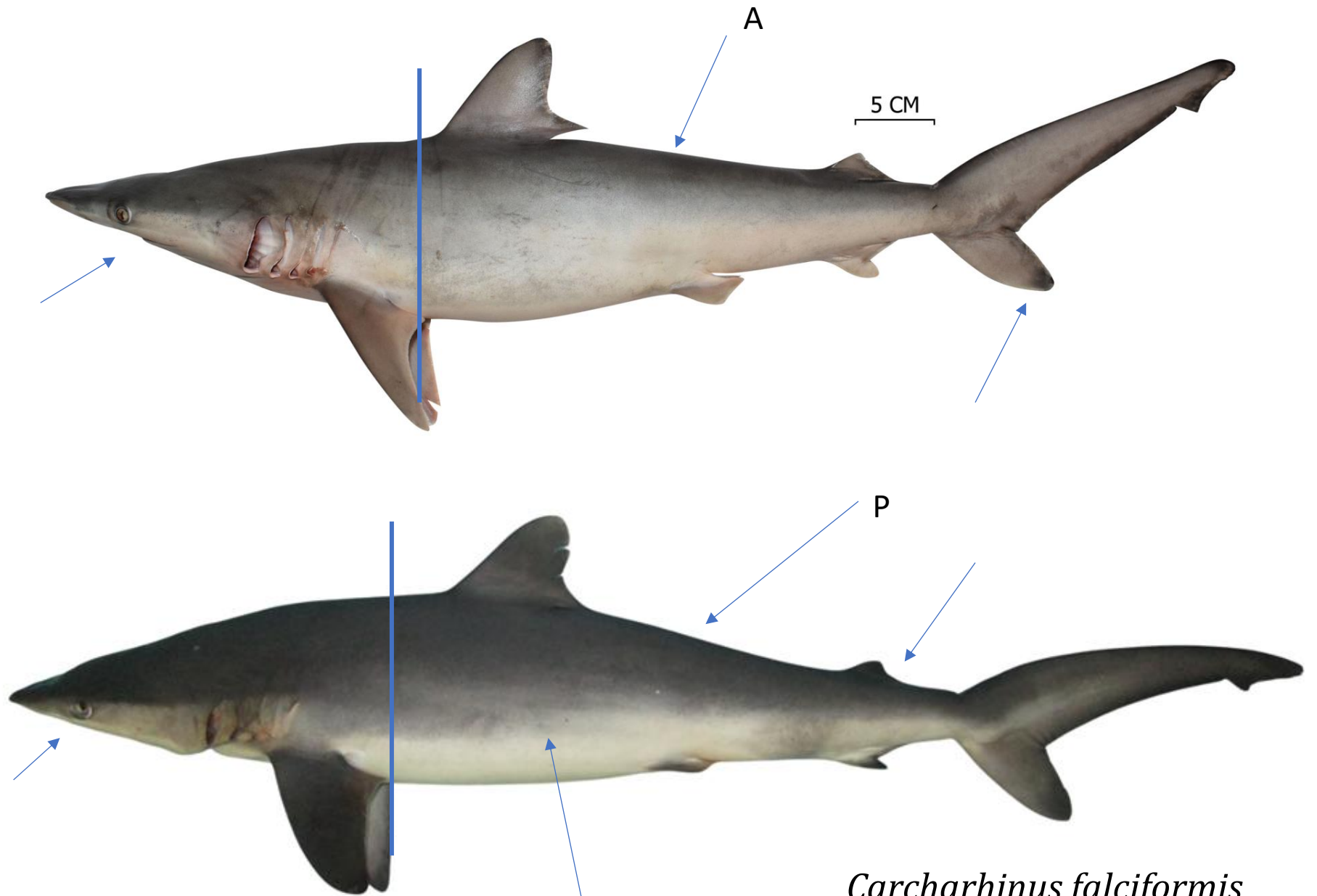
1



2

ICAR-CMFRI

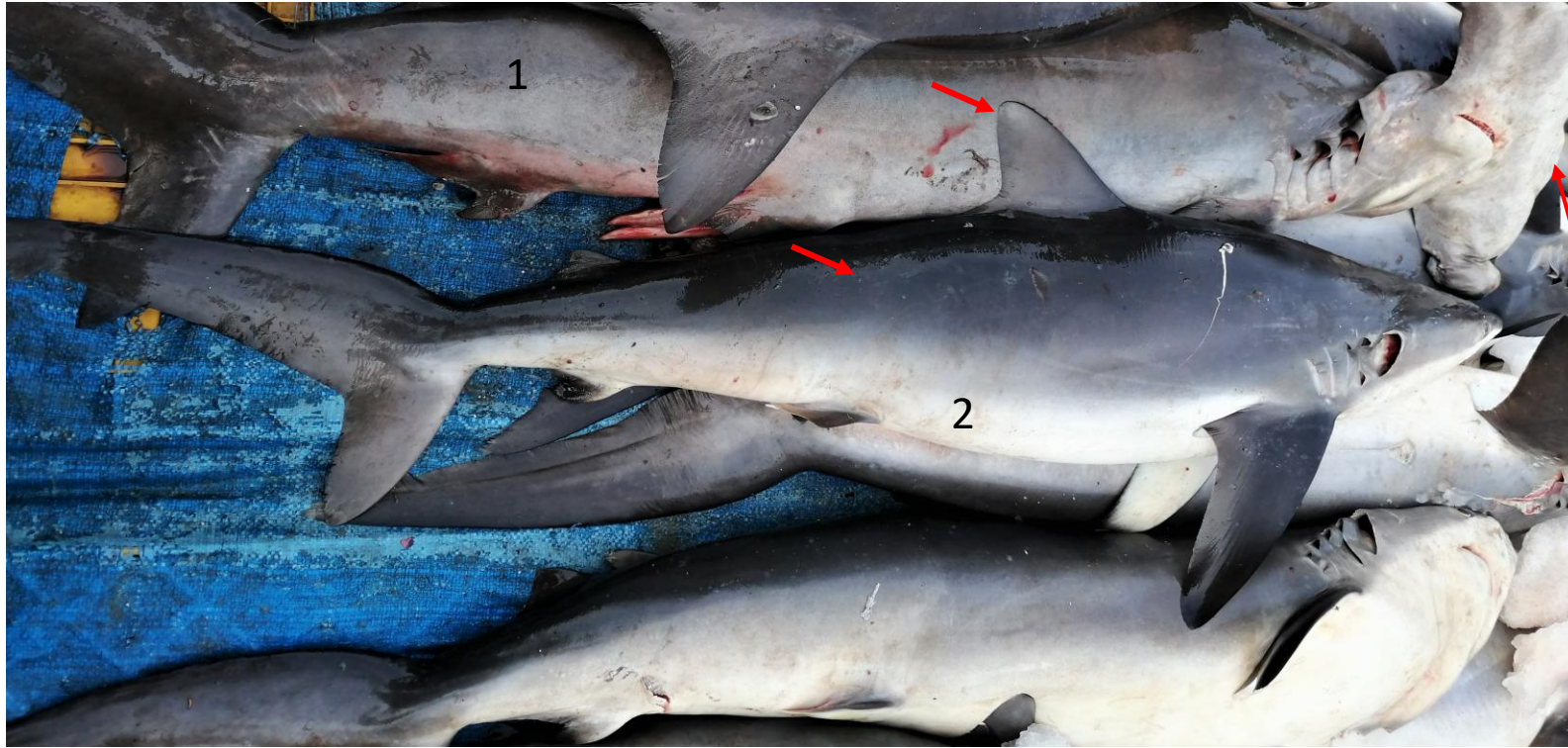
FAL



Carcharhinus falciformis
Silky shark

ICAR-CMFRI





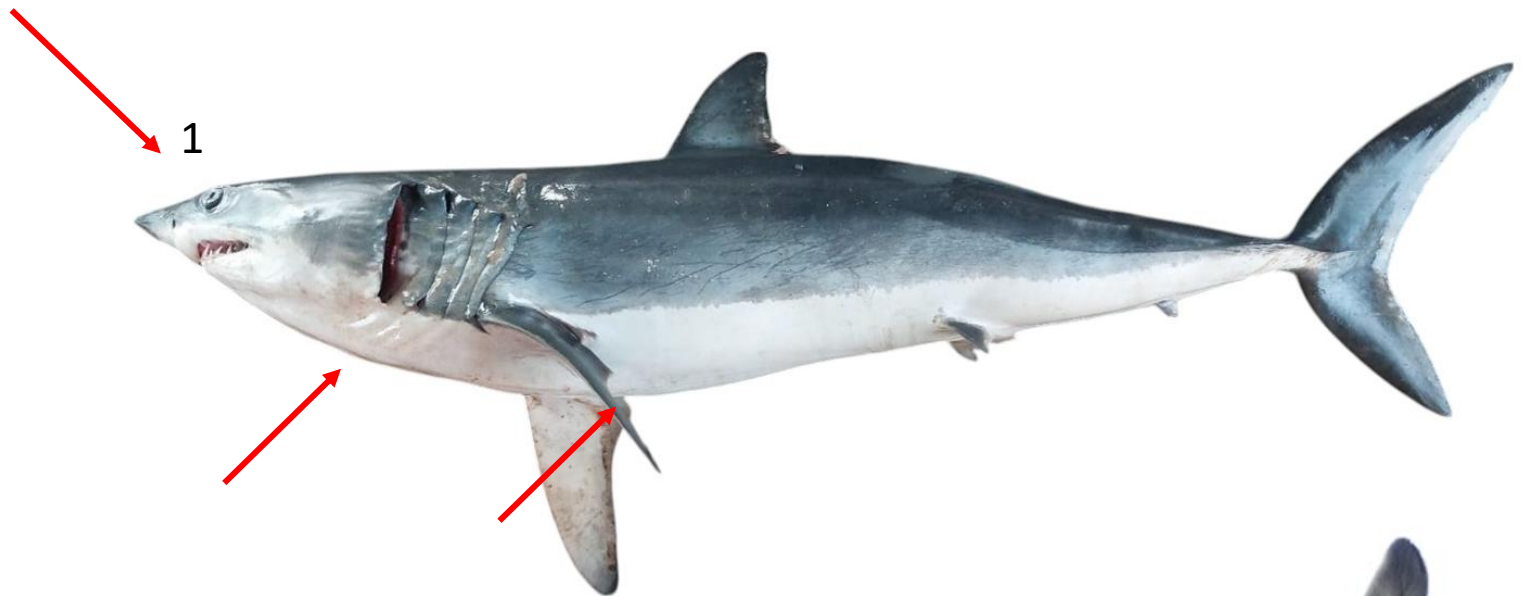
Carcharhinus falciformis
Silky shark



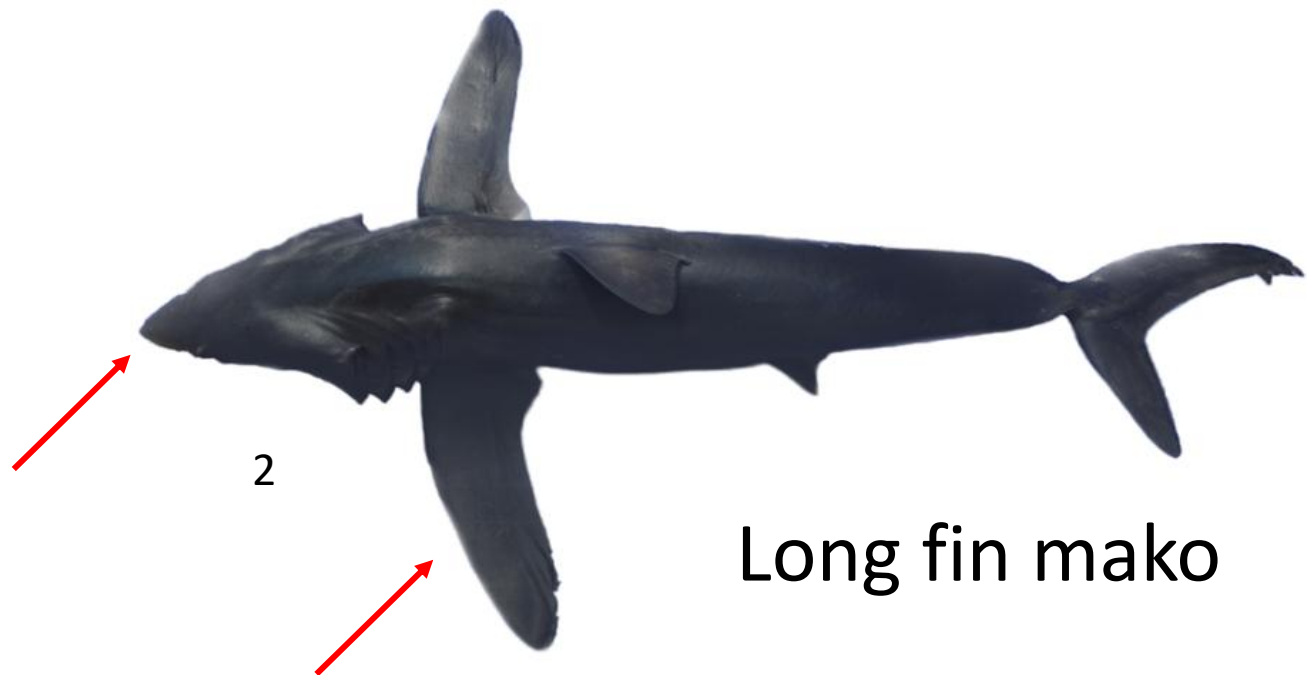


Carcharhinus longimanus
Oceanic whitetip shark





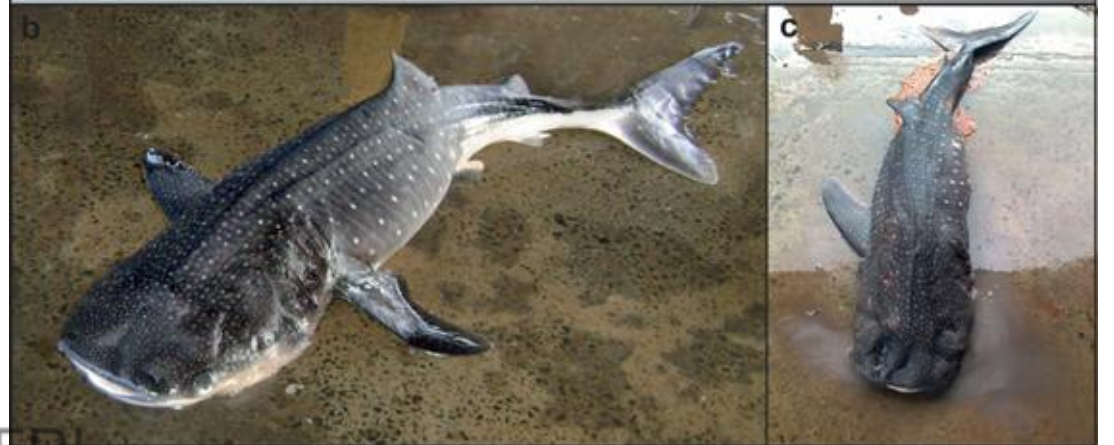
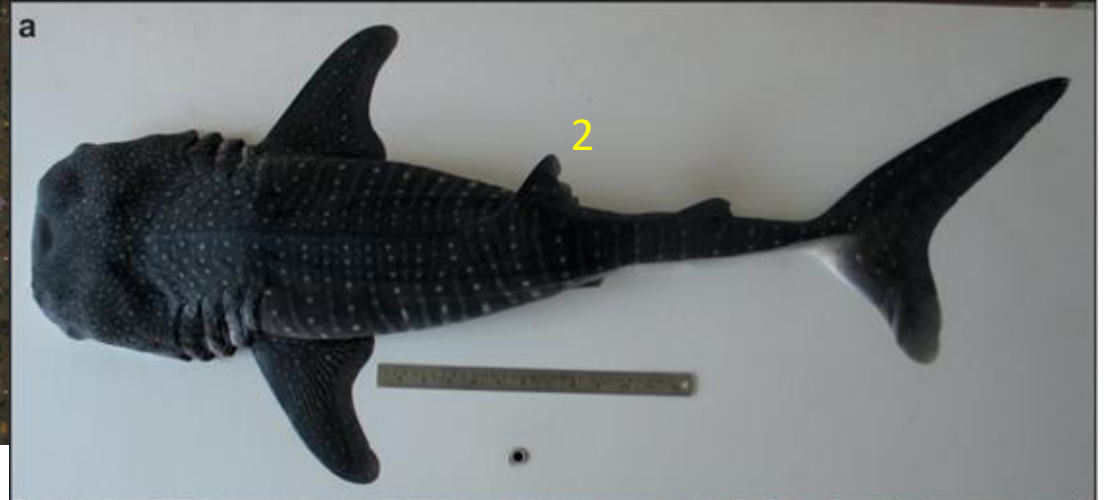
Short fin mako

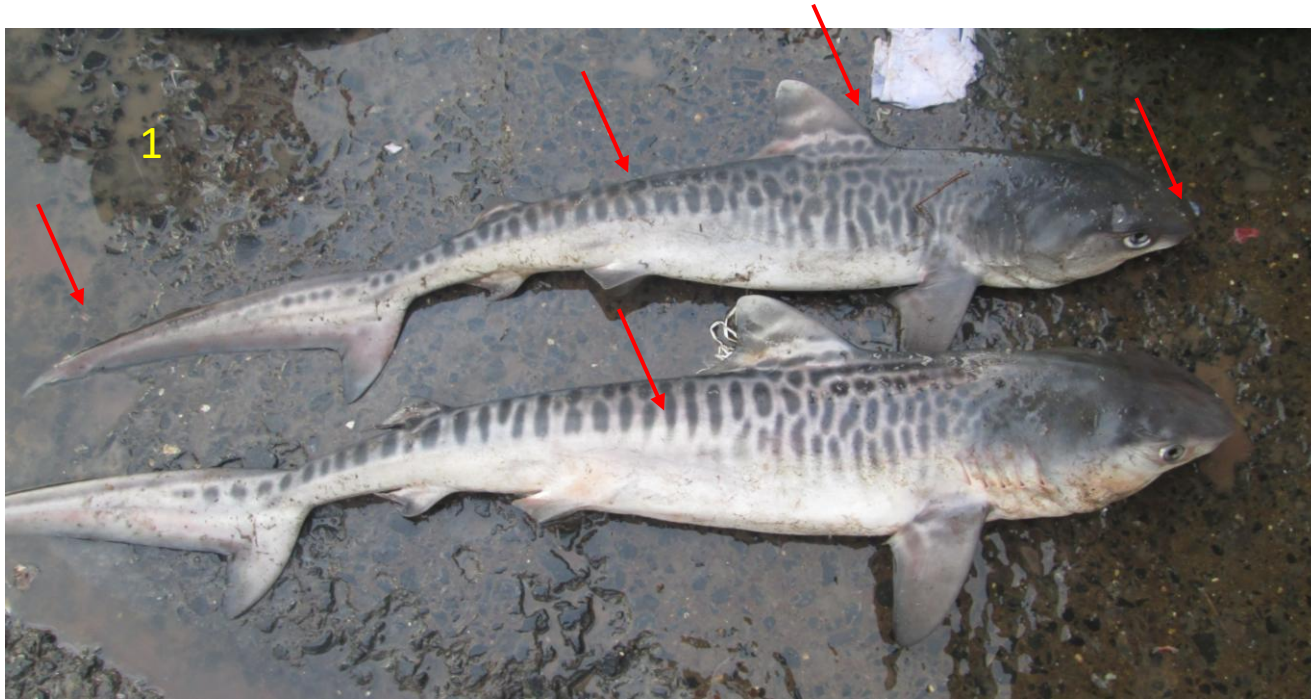


Long fin mako









Tiger shark



Whale shark

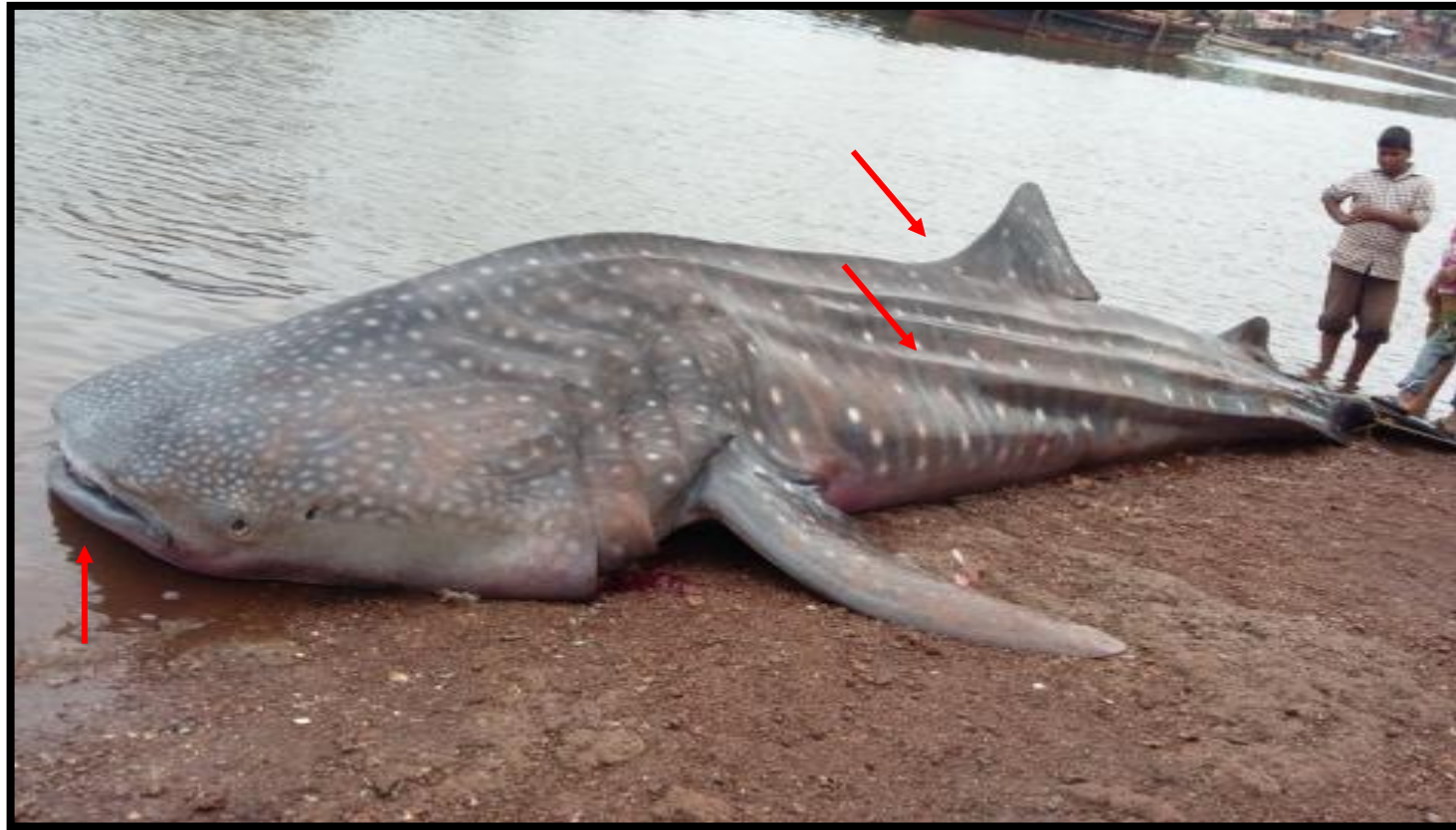




Smooth



Scalloped

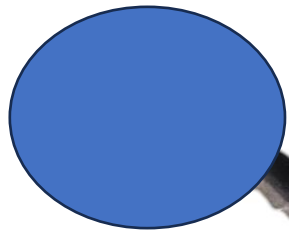


Whale shark



ICAR-CMFRI

FSI-IOTC Species identification workshop_Kochi, India – September 29th to October 4th 2025



Short fin mako



Long fin mako



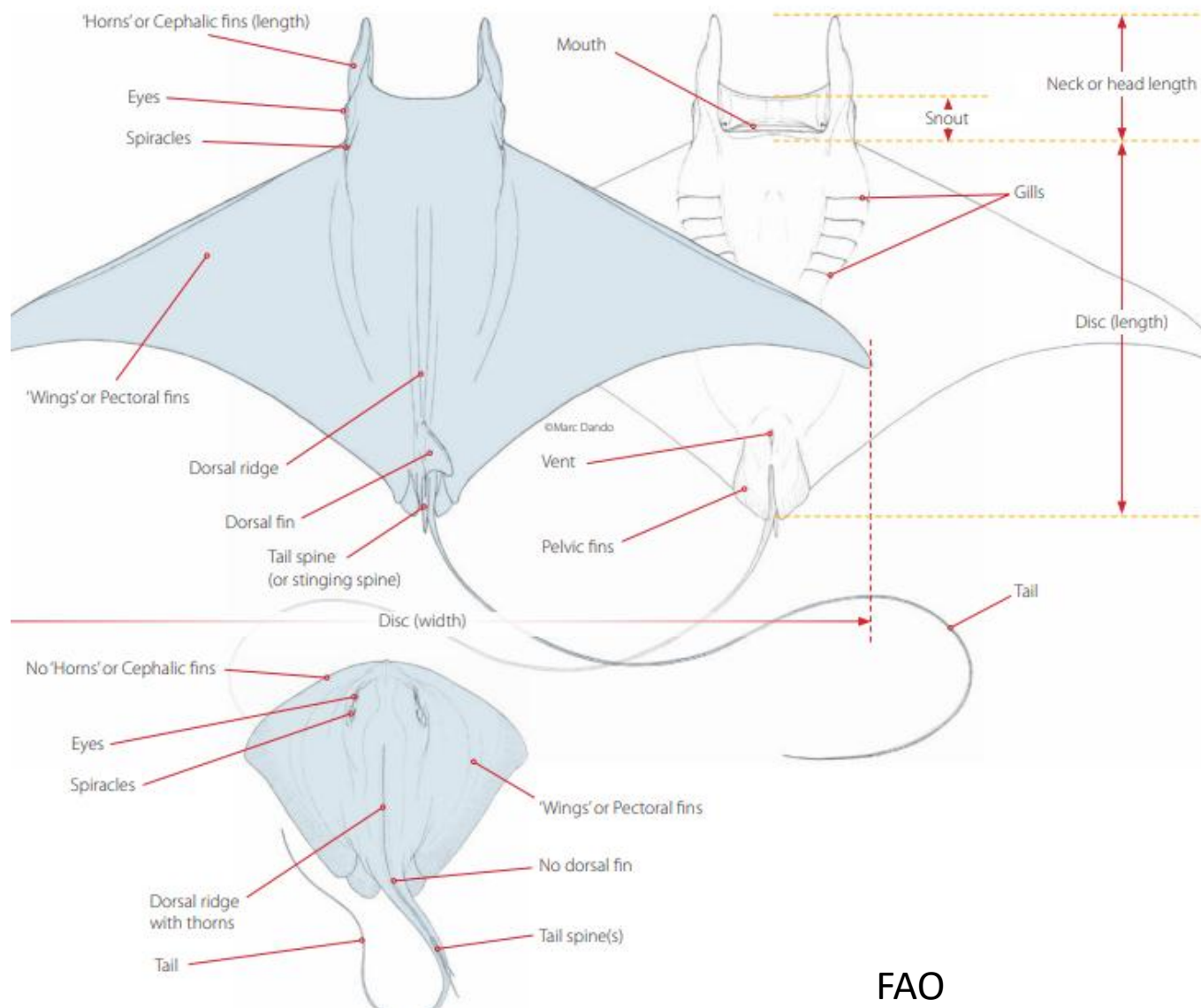


Pelagic thresher



Bigeye thresher

EXTERNAL TERMINOLOGY FOR RAYS



FAO

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FSI-IOTC Species identification workshop_Kochi, India – September 29th to October 4th 2025

Batoids

BATOIDEA

Sawfishes, wedgefishes & guitarfishes

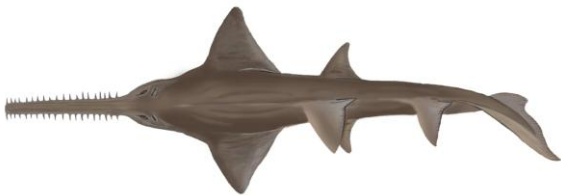
Rhinopristiformes

Pristidae

Rhinidae

Rhinobatidae

Glaucostegidae



Electric rays & numbfishes

Torpediniformes

Narcinidae

Narkidae

Torpedinidae



Skates

Rajiformes

Rajidae

Gurgesiellidae



Rays

Myliobatiformes

Hexatrygonidae

Gymnuridae

Dasyatidae

Plesiobatidae

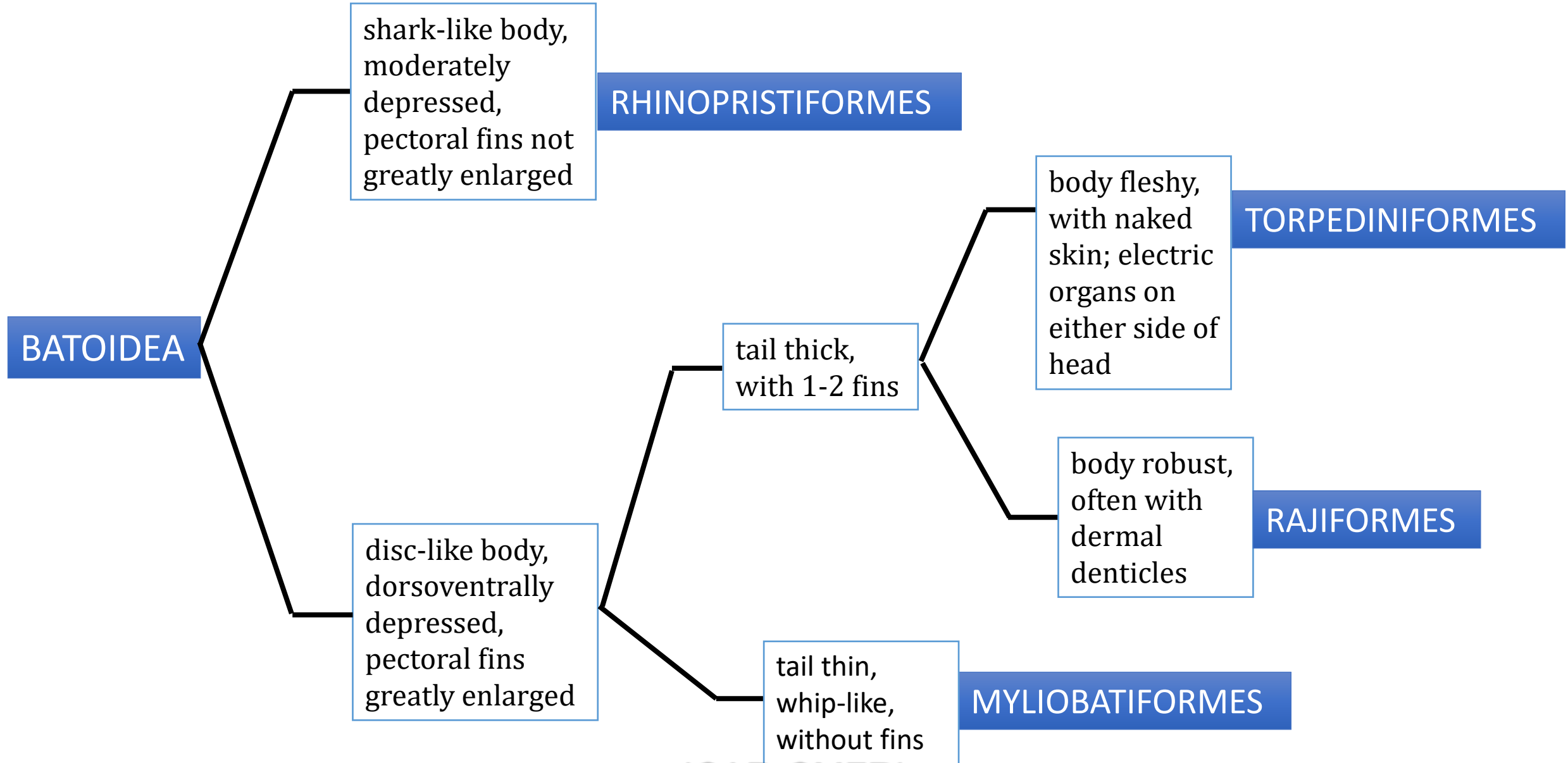
Myliobatidae

Aetobatidae

Rhinopteridae

Mobulidae

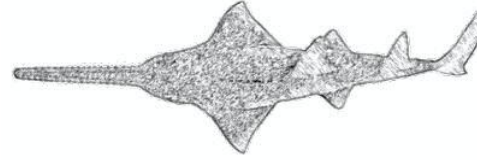
ICAR-CMFRI



RHINOPRISTIFORMES

snout extremely elongated like a saw-like rostrum with lateral teeth

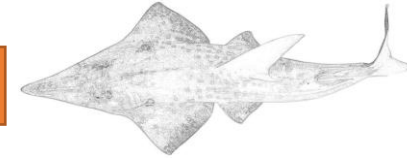
Pristidae



snout moderately to greatly elongated forming a wedge shaped profile; pectoral fins expanded and fused with head and trunk

trunk not depressed; first dorsal fin placed slightly anterior or posterior to pelvic fin origin

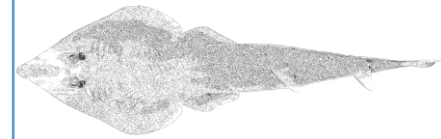
Rhinidae



trunk greatly depressed; first dorsal fin placed well behind pelvic fin insertion

nostrils not greatly elongated, exceeding internasal; nasal opening broadly rounded/oval

Rhinobatidae



nostrils long and narrow, greatly exceeding internasal; anterior nasal opening broadly rectangular

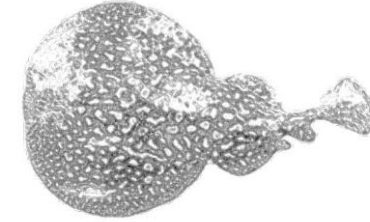
Glaucostegidae



TORPEDINIFORMES

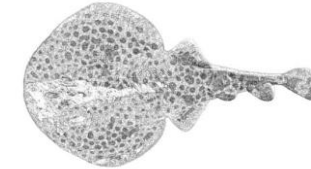
thick fleshy margins; mouth strongly arched, wide without labial folds or a peripheral groove; jaws not bounded by cartilage

Torpedinidae



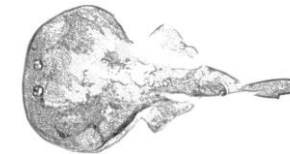
mouth transverse with prominent groove; snout supported by a broad, trough-shaped rostral cartilage; nasal curtain usually broader and shorter

Narcinidae



1-2 dorsal fins or no dorsal fin; mouth transverse, narrow with upper and lower grooves; head flattened, without spiracle lamellae except *Electrolux*

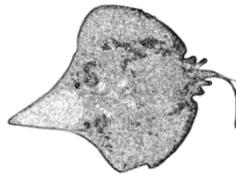
Narkidae



MYLIOBATIFORMES

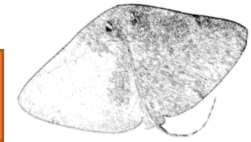
greatly elongated thick snout; body soft, flabby, 6 pairs of gill openings; spiracles widely separated behind eyes

Hexatrygonidae



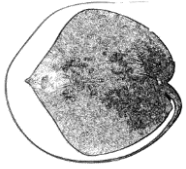
disc much broader than long (lozenge shaped, 1.6 times wide as long); 5 pairs of gill slits, tail very thin and short

Gymnuridae



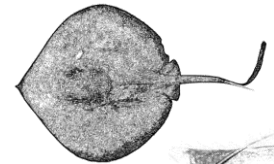
oval, circular or rhomboidal discs, with moderately stout to slender, more or less elongated, whip-like tails mostly longer than disc length; no ridge like skin folds on tail

Dasyatidae



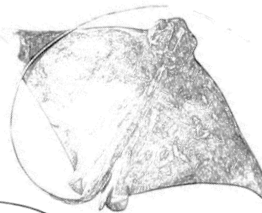
snout elongated (over 6 times orbit diameter); broadly angular, fleshy body; dorsal surface uniformly covered with fine denticles; short tail

Plesiobatidae



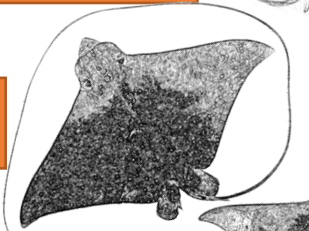
head distinct from rest of disc; internasal curtain not notched

Myliobatidae



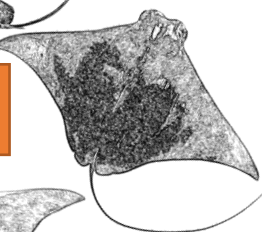
snout with single convex rostral lobe; internasal flap deeply notched, "v" shaped

Aetobatidae



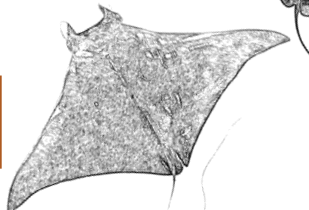
snout with a pair of low rounded broad lobes, deeply notched medially

Rhinopteridae



snout formed into paired elongated lobes, mouth broad without nasal curtain

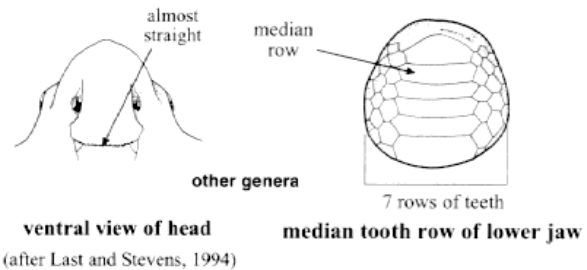
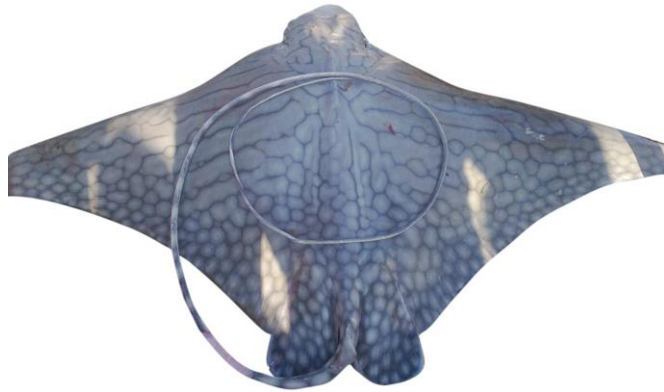
Mobulidae



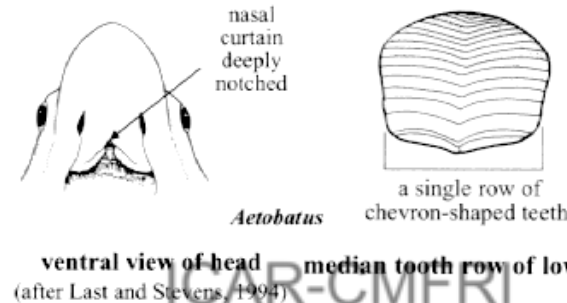
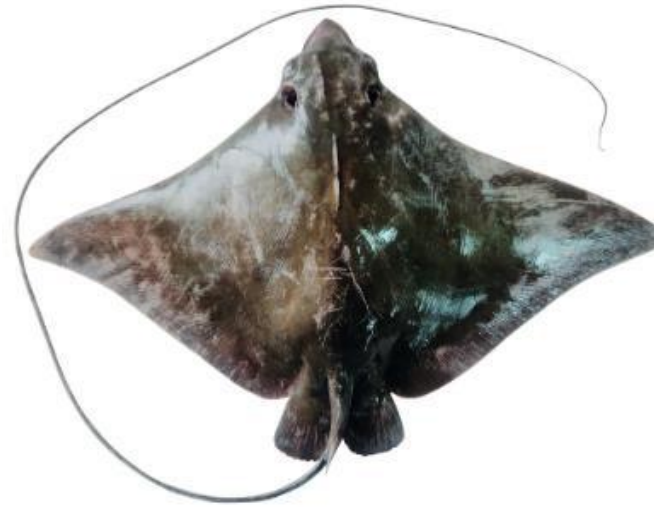


Stingray

Myliobatidae



Aetobatidae



Rhinopteridae



+Mobulidae

Mobulidae- Manta and devil rays

RMV



Indian Ocean

1. *Mobula birostris* – Oceanic Manta Ray
2. *Mobula alfredi*- Reef Manta

3. *Mobula mobular*– Spinetail Devil Ray
4. *Mobula tarapacana* – Sicklefins Devil Ray
5. *Mobula thurstoni* – Bentfin Devil Ray
6. *Mobula kuhlii* – Shorhorn Pygmy Devil Ray
7. *Mobula eregoodoo* – Longhorned Pygmy Devil Ray



Mobula birostris –Giant Oceanic Manta

Long head fins

Disctinctive
black marking
on 5th gill slits

Usualy black shaded
trailing edge

Knob-like bulge at the base of the tail

RMB

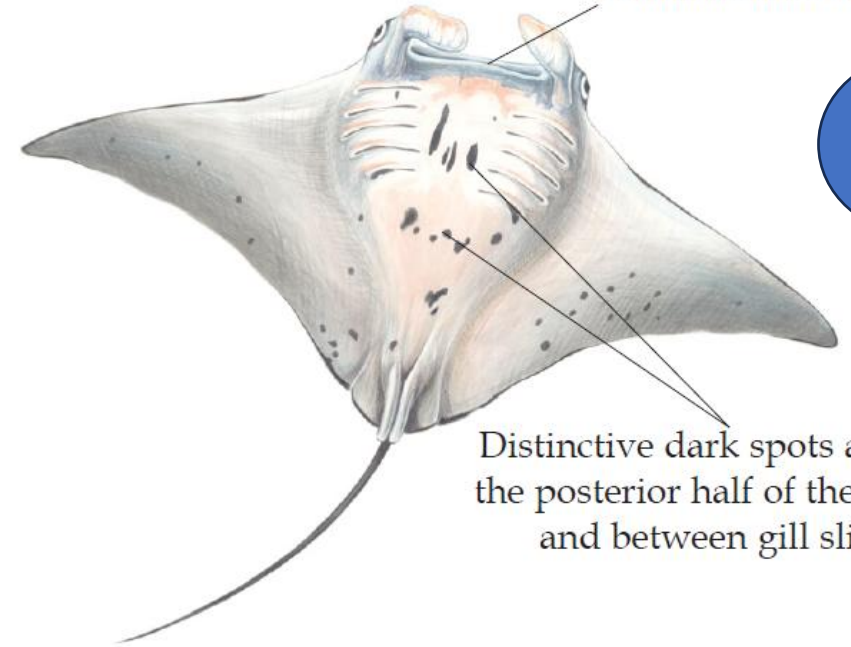


Mobula alfredi- Reef Manta

Terminal mouth

Distinctive dark spots across
the posterior half of the body
and between gill slits

RMA



Mobula mobular– Spinetail Devil Ray

- Deep-blue to black dorsal surface
- White ventral surface
- **Fintip white**
- **Spine at tail base**
- All gill slit covers are white
- **Spiracle** is slightly elongated, **above the margin of the pectoral fin where the fin meets the body.**
- White above eye-level



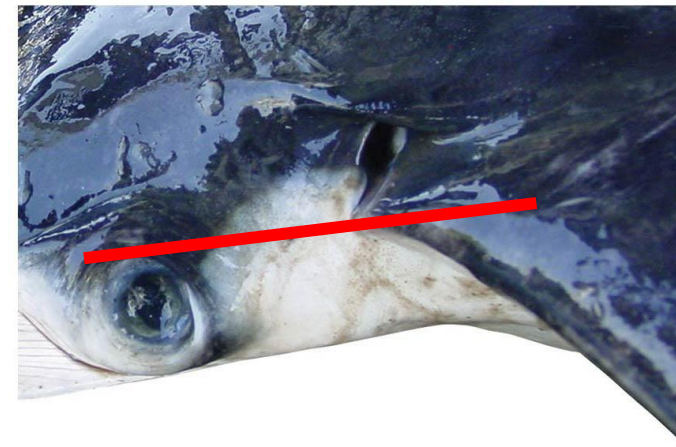
RMM



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Mobula mobular– Spinetail Devil Ray

RMM



C@CSIRO

ICAR-CMFRI

Mobula thurstoni – Bentfin Devil Ray

RMO

- Deep blue-black dorsal surface
- Ventral surface is mostly white, with dark shading along anterior margin, becoming broad and very distinctive at level of concavity
- **anterior margins of disc with distinct median concavity**
- White shading does not extend above eye-level
- Dorsal fin white tipped
- Sting absent
- Spiracles circular, located below pectoral fin origin

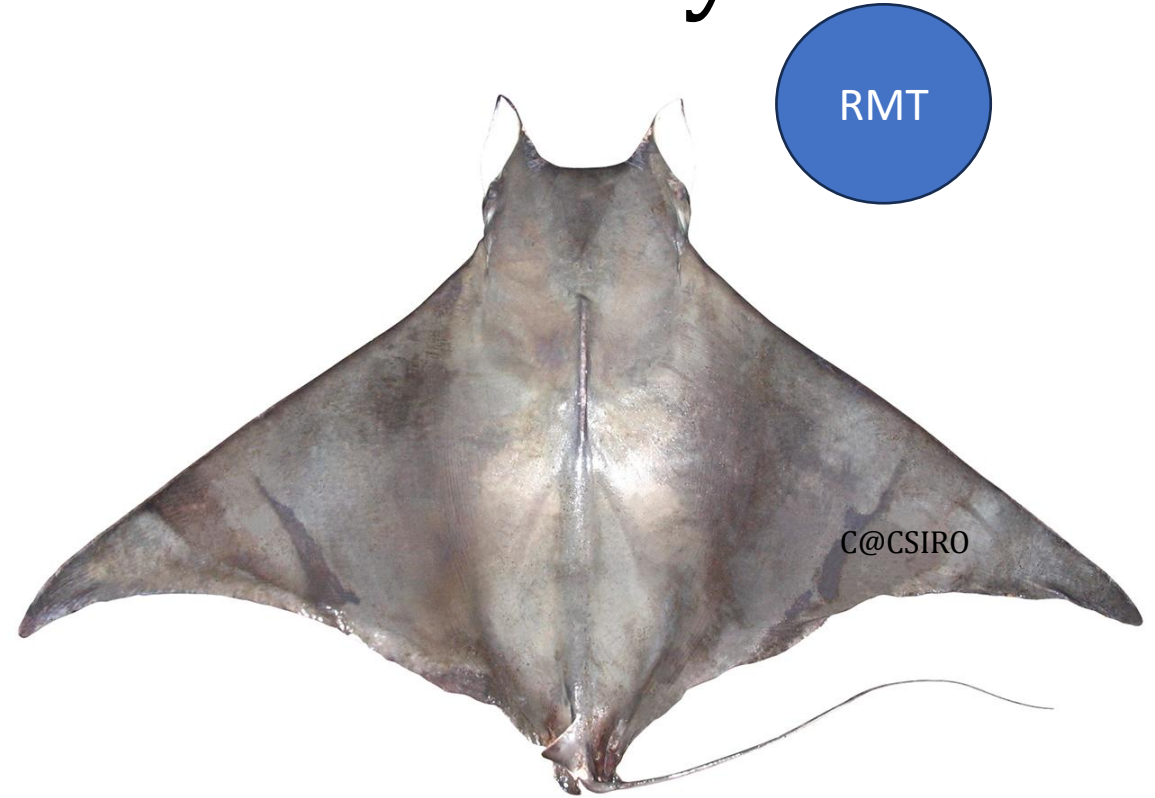


ICAR-CMFRI



Mobula tarapacana – Sicklefin Devil Ray

- Uniform olive-green/grey dorsal surface
- Disc elongate and **strongly falcate**
- **Dorsal fin plain, not white-tipped**
- No white shading above eye-level
- **Distinctive bony ridge along the dorsal midline**
- **Anterior ventral surface is white, while the posterior region is grey** with a zigzagged margin
- **Dark shading along 1st gill slit cover**
- No sting on tail
- Spiracles slit-like and elliptical, **located above disc edge**



Mobula tarapacana – Sicklefin Devil Ray

RMT



Mobula kuhlii – Short horned Pygmy Devil Ray

RMK

- Dark grey to light grey dorsal surface
- Complete white ventral surface or with a **dark grey silvery sheen on the distal ends of the pectorals.**
- **No spine, dorsal fin plain.**
- **Short tail.**
- White shading does not extend above eye level
- Head lobes short
- Spiracles subcircular, located beneath disc edge



Mobula eregoodoo –

Longhorned Pygmy Devil Ray

RME

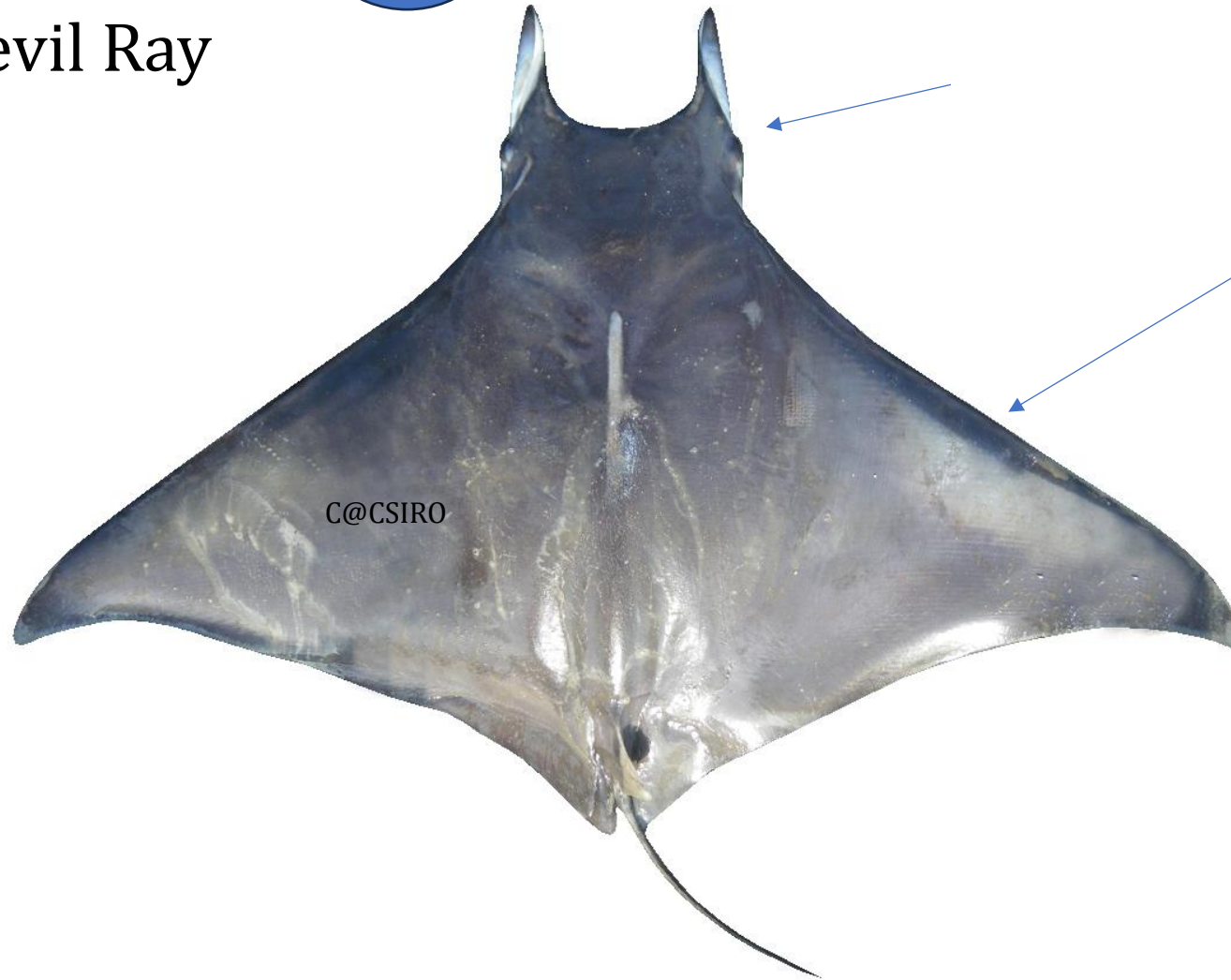
- Brown to light grey dorsal surface.
- White ventral surface with **distinct triangular-shaped black or dark grey shading at leading edge of pectoral fins.**
- Small, round spiracle **below margin of the pectoral fin where the fin meets the body**
- White markings do not extend above eye.
- **Long-neck appearance.**
- Long cephalic fins, >16% DW
- No spine.
- Dorsal fin often **white-tipped**
- **Tail less than DW**



Mobula eregoodoo – Longhorned Pygmy Devil Ray

RME

Family: Mobulidae



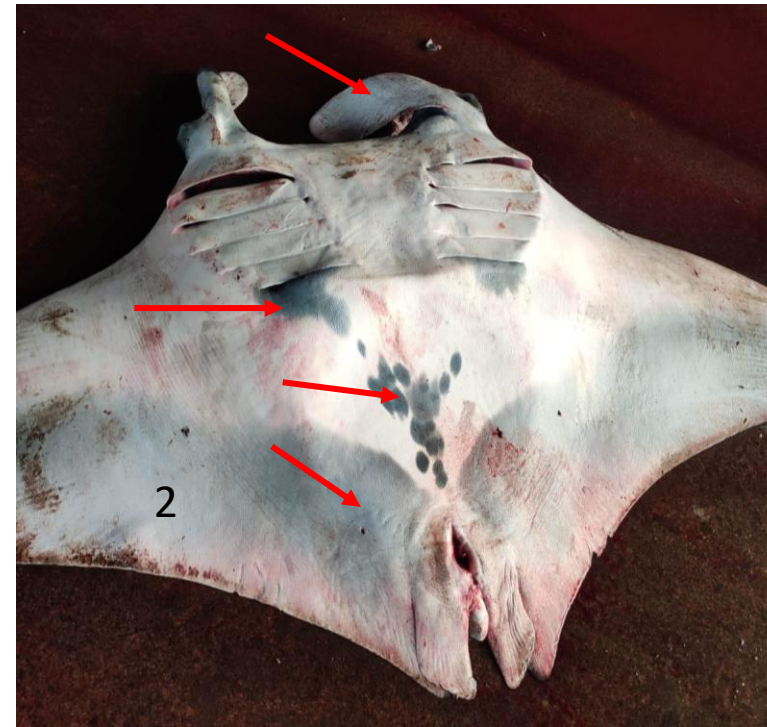
Family: Mobulidae



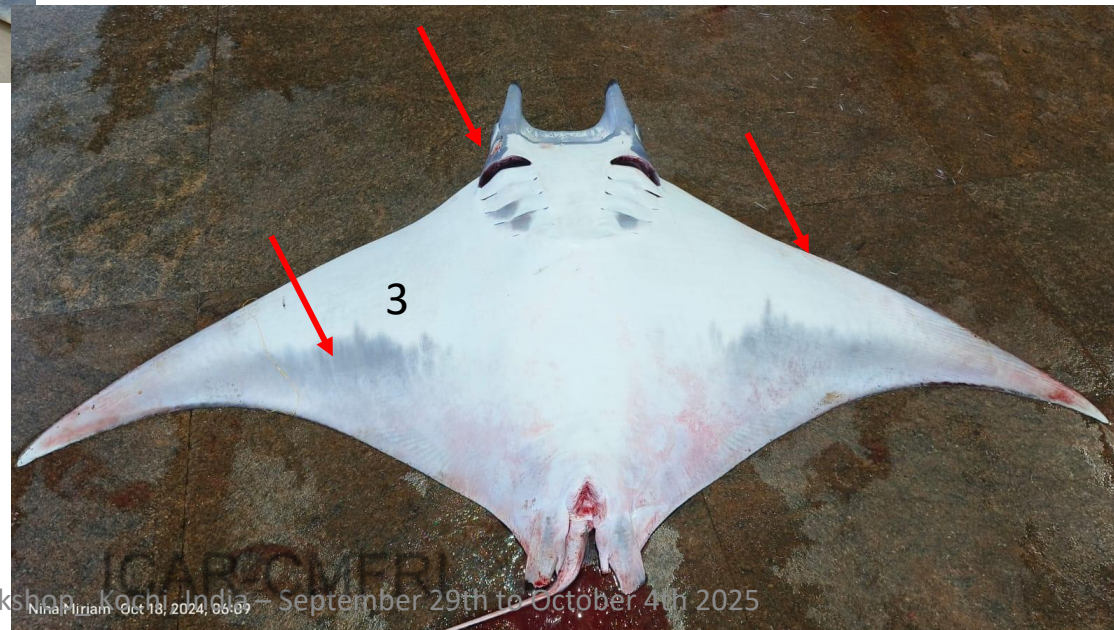
Family: Mobulidae



M.mobular



M.birostris



M.tarpacana





Pteroplatytrygon violacea pelagic stingray

PLS

- A thick, dark stingray with a broadly rounded snout and an angular pectoral disc



ICAR-CMERI

Megatrygon microps

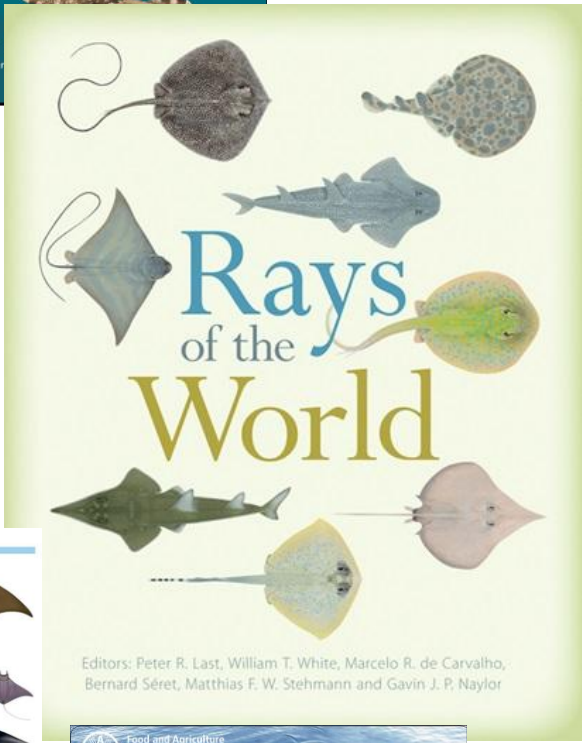
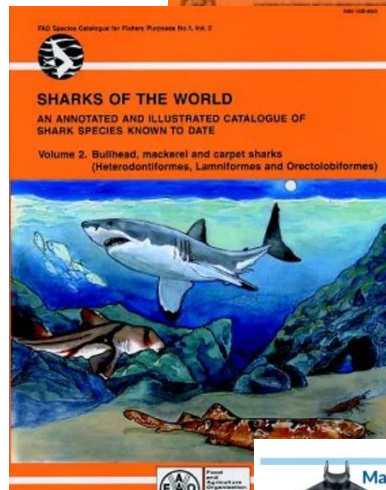
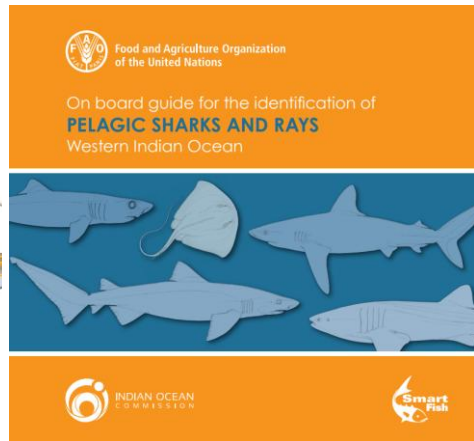
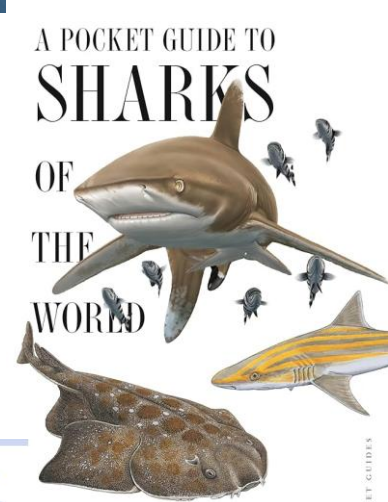
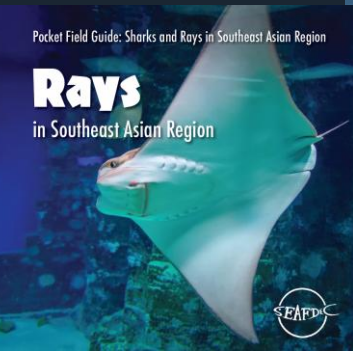
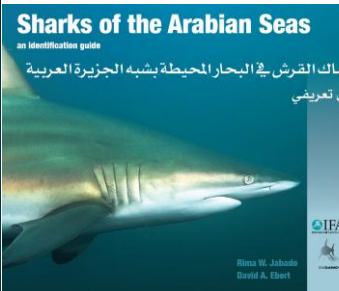
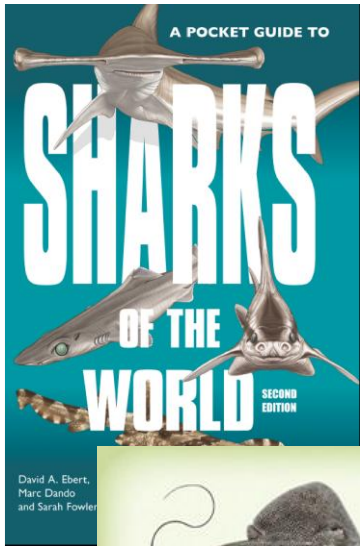
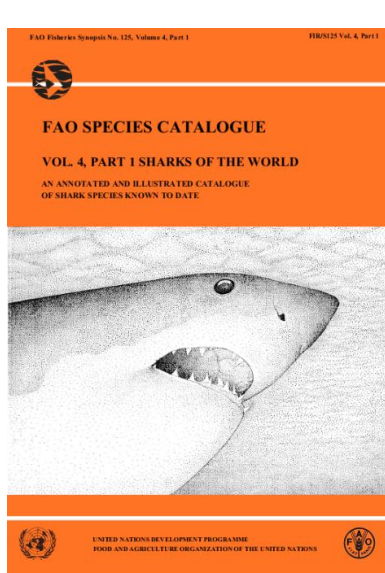
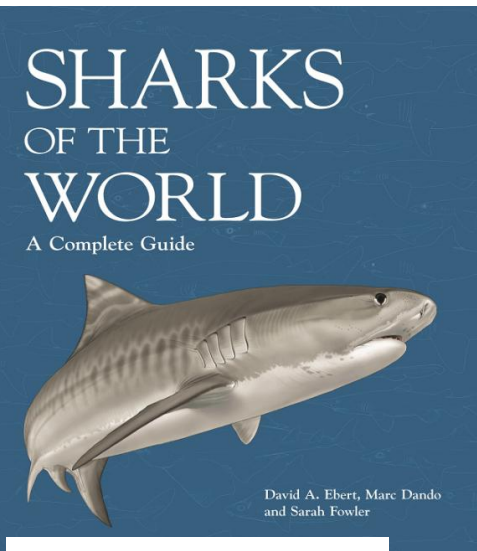
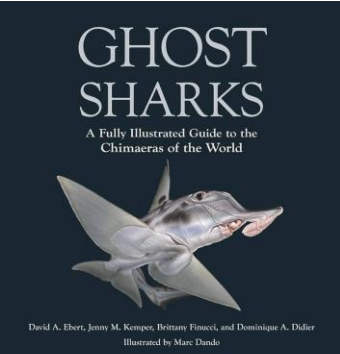
Smalleye stingray

RDP

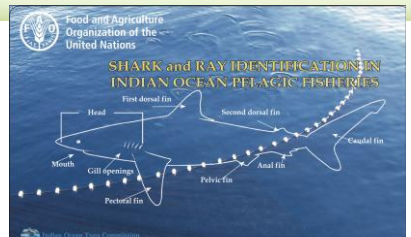
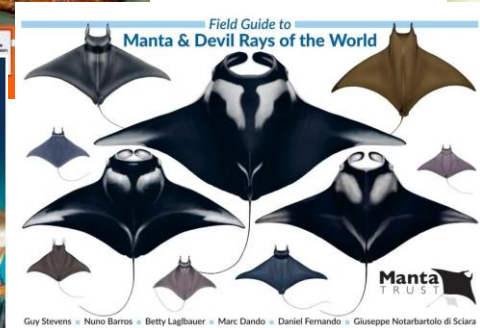
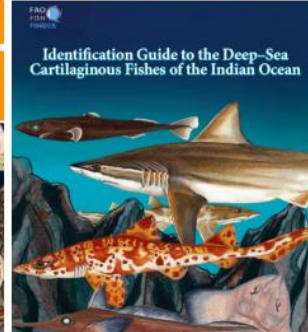
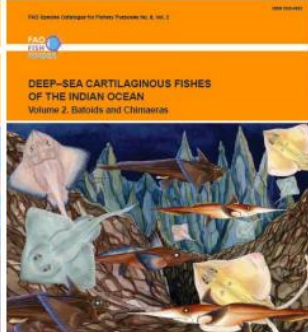
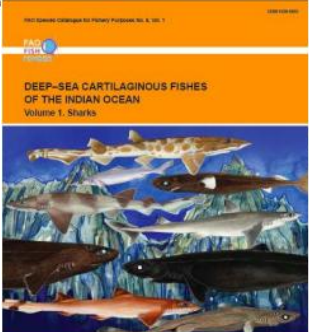
- A very large stingray , rhomboid shape
- Disc pink, brown to reddish-brown above, white below, with large white spots
- Tail broad till spine



References



David A. Ebert, Sarah Fowler and Marc Dando



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Contents from “ Draft Field Identification of Sharks & Chimaeras– a guide to Indian species_ CMFRI

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Thank you