Biological Oceanographic Survey

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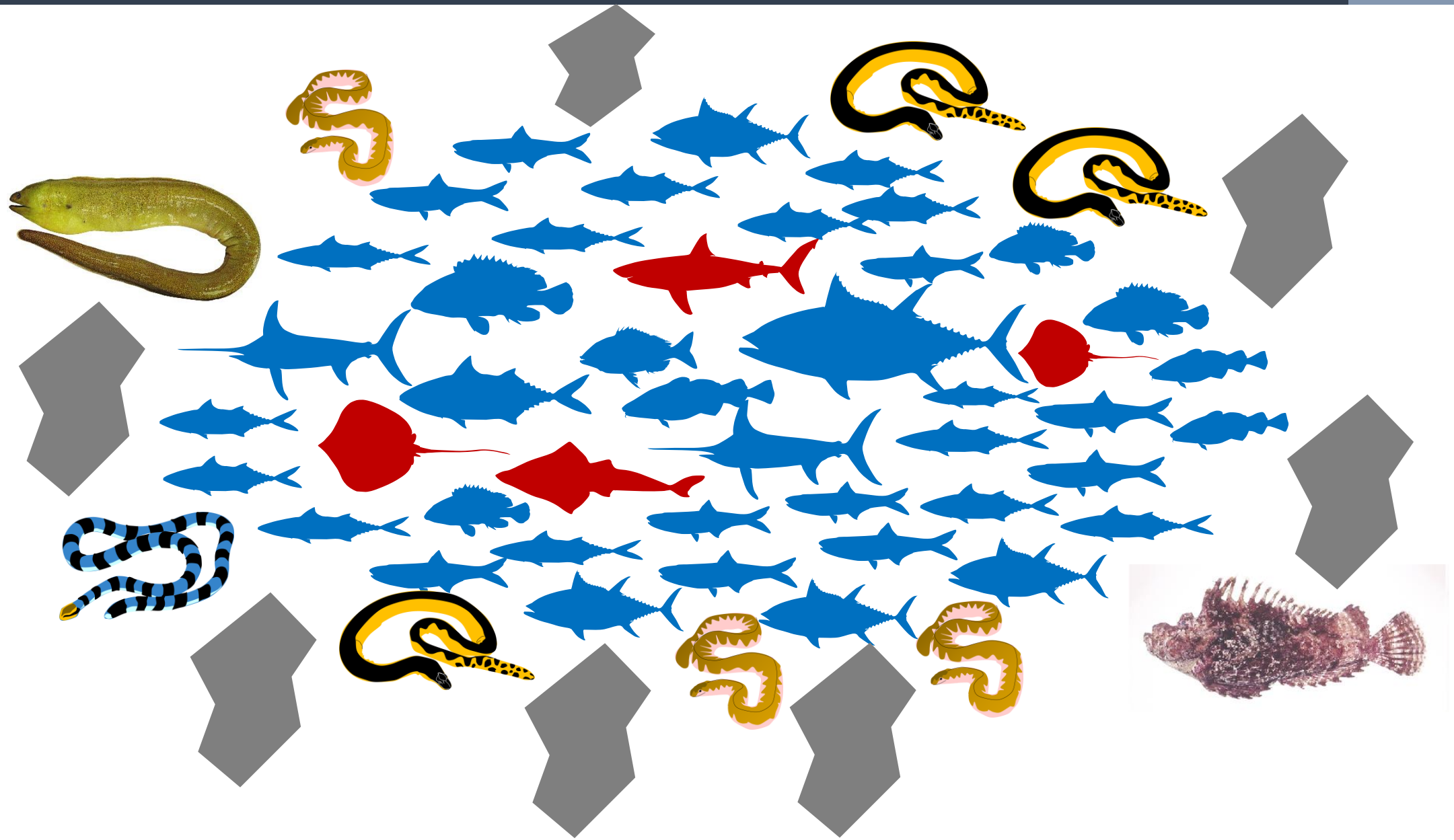
Fishery Oceanographer

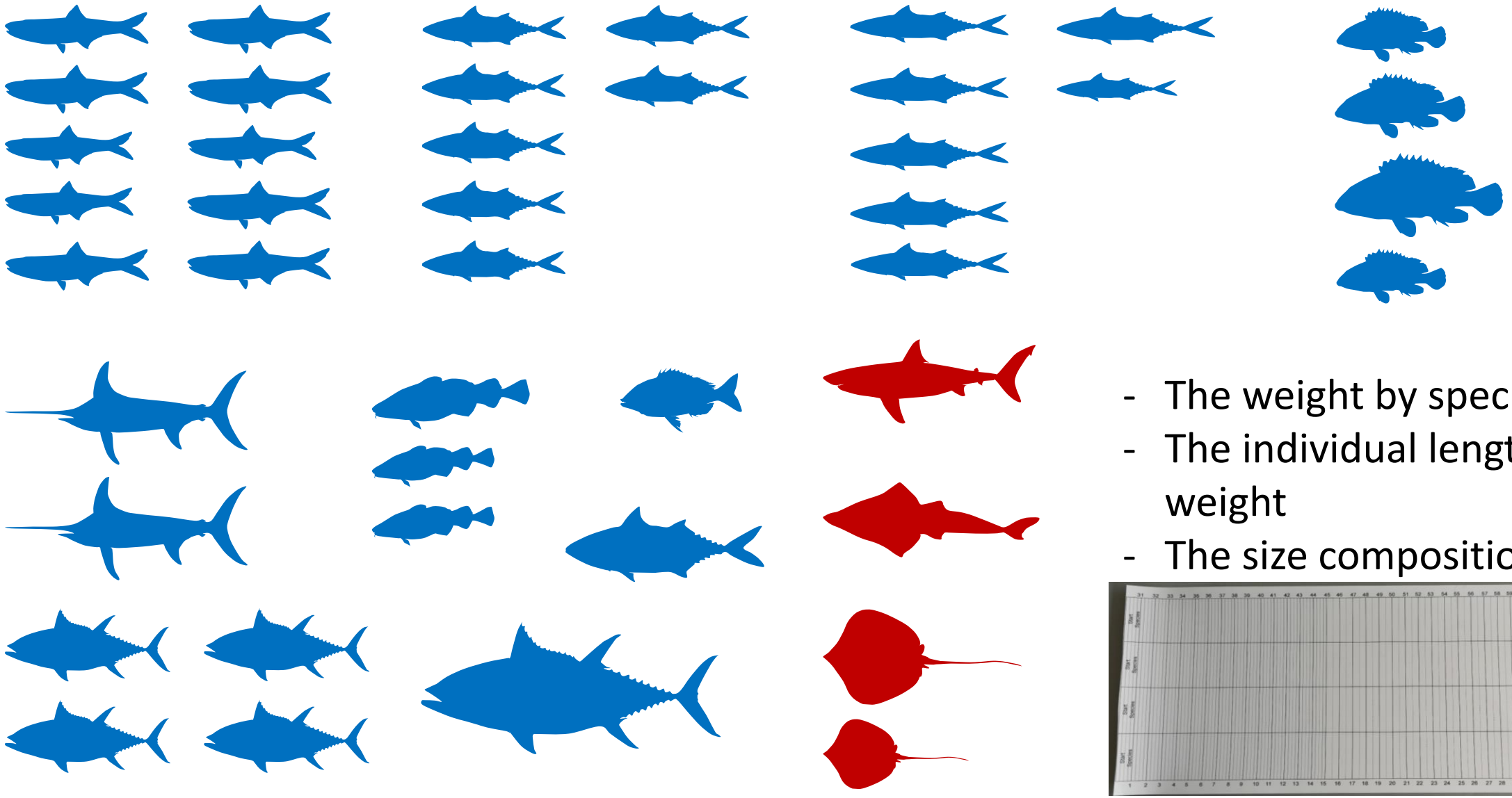
Fishing Ground and Oceanographic Section

Southeast Asian Fishery Development Center, Training Department (SEAFDEC/TD)

The trawl catch management

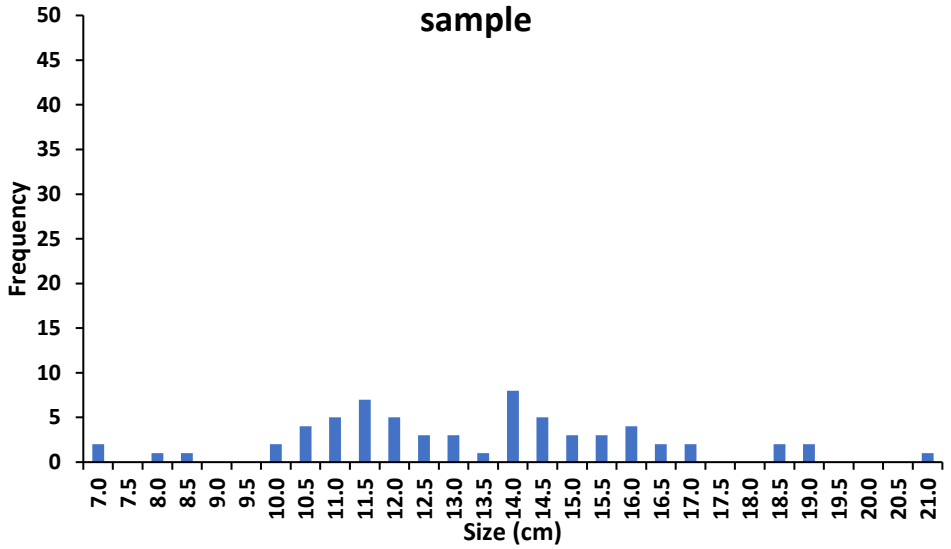


The trawl catch management

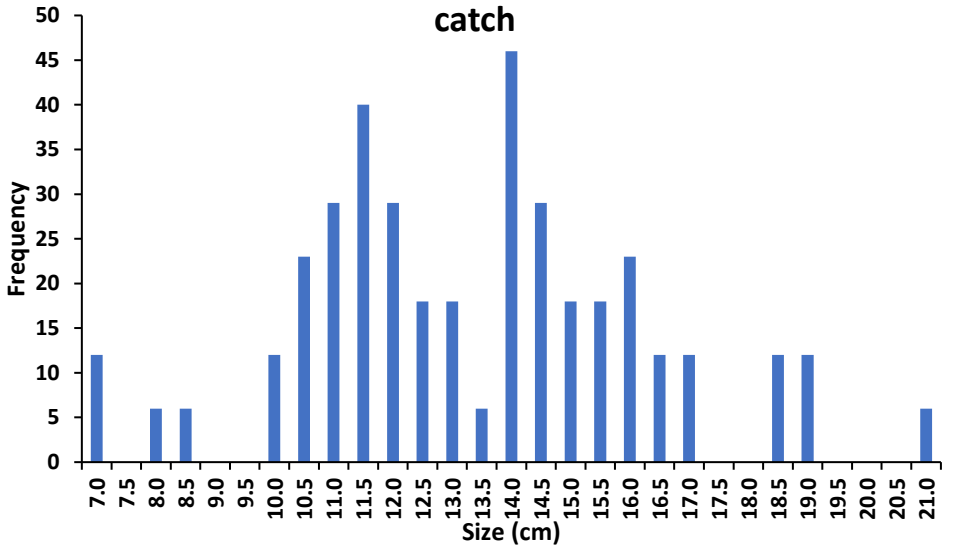


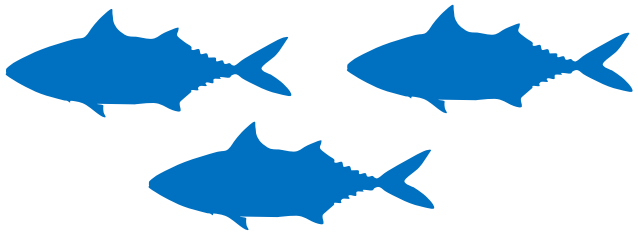
- The weight by species
- The individual length and weight
- The size composition

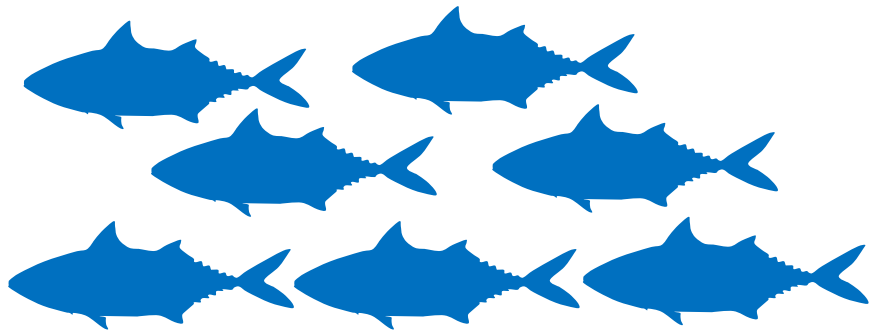
The length-frequency data



Raising with the total catch

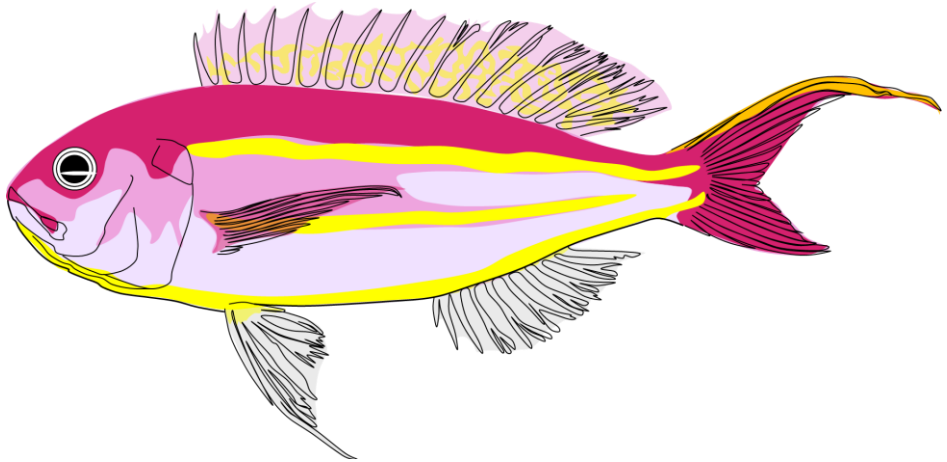


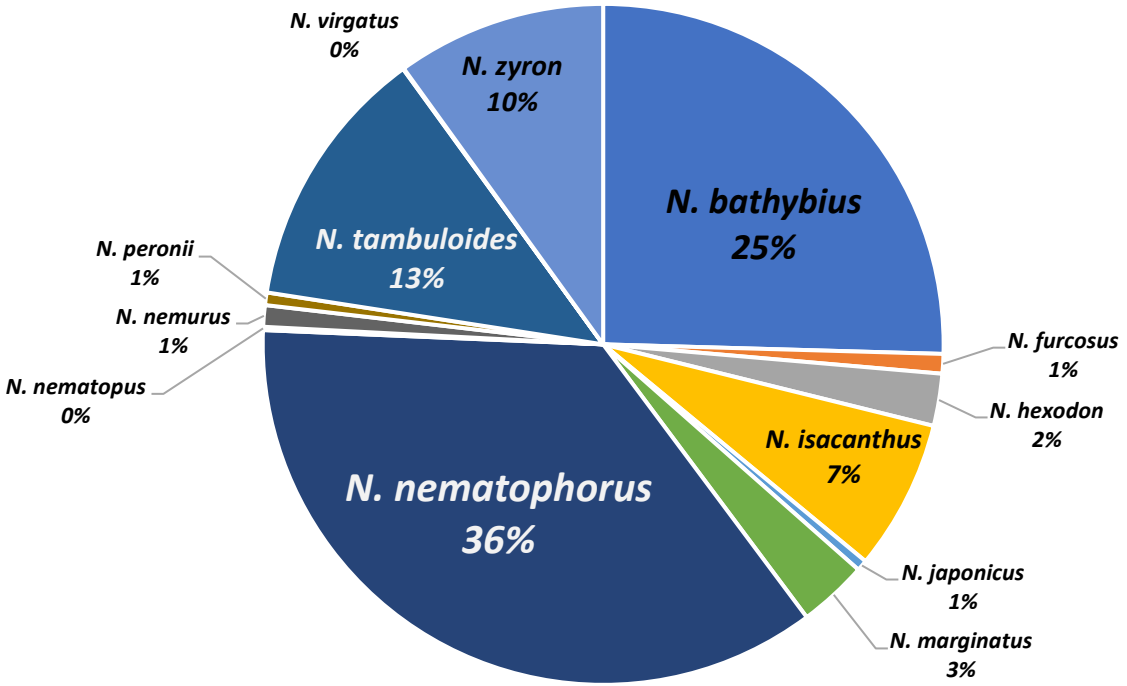




Example, red sea bream (*Nemipterus* spp.)

- Benthic fish
- Schooling
- High biodiversity
- Approximately 13 spp. were found

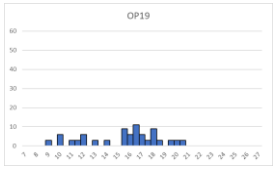
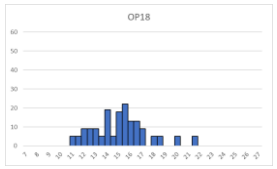
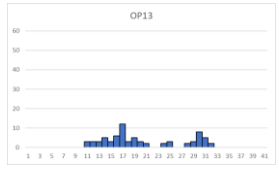
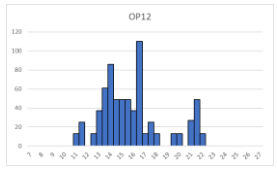
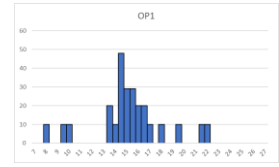
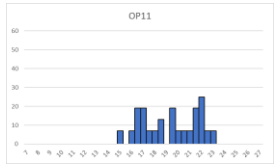
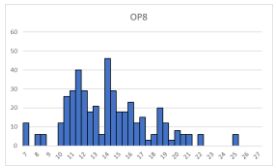
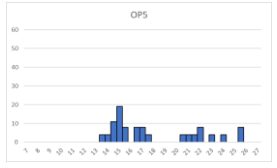
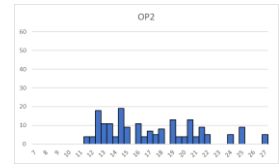
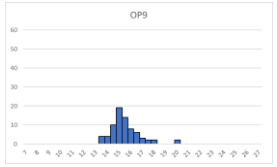
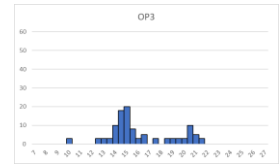




Example, red sea bream (*Nemipterus* spp.)

Deep sea

Coastal

A24					A7	A6	
A23							
	A21					A4	

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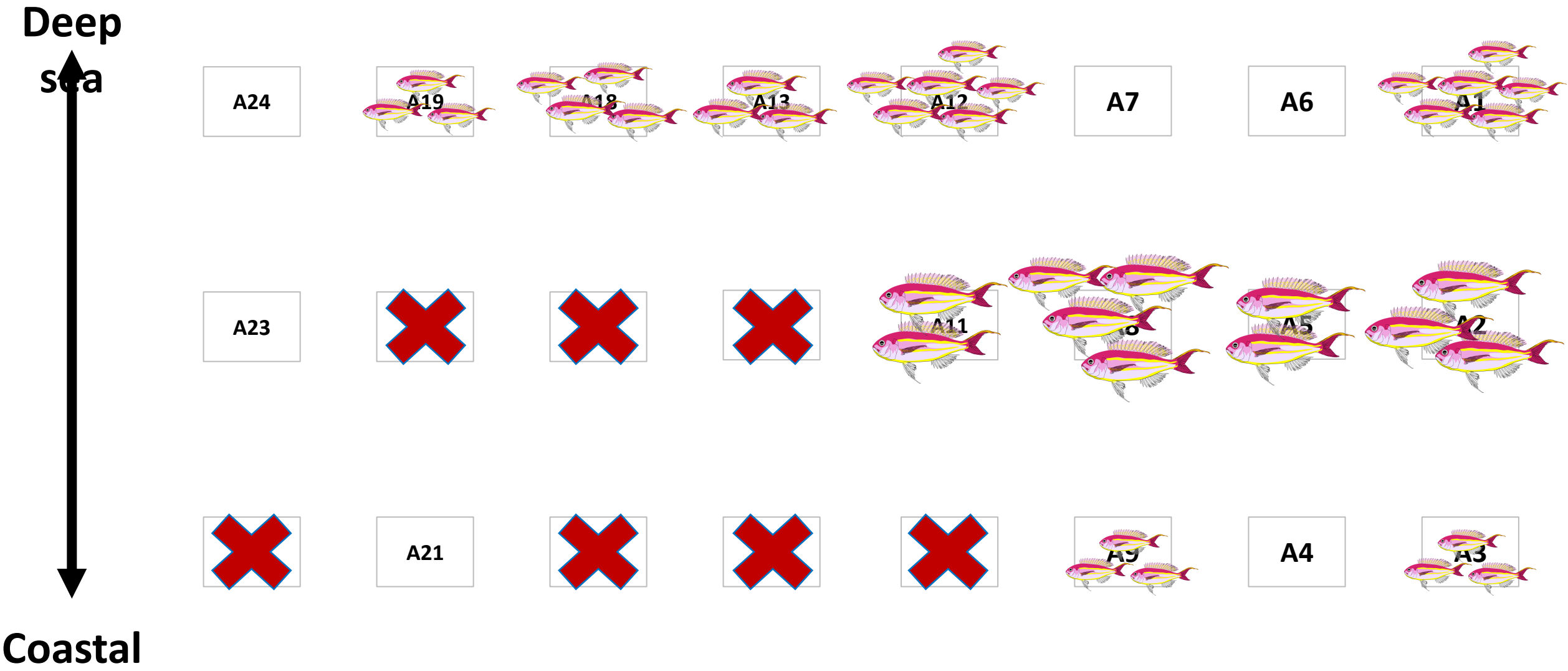

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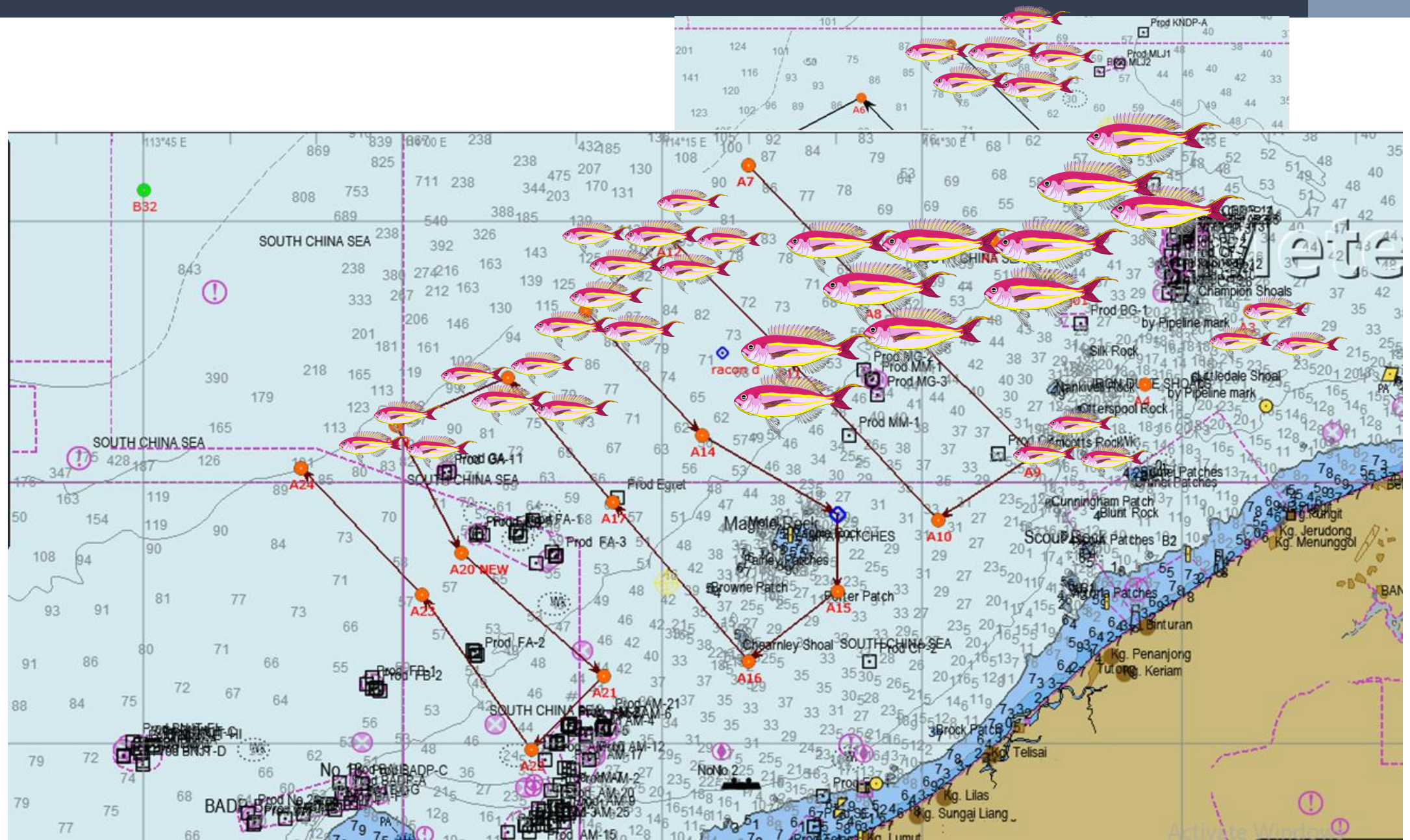
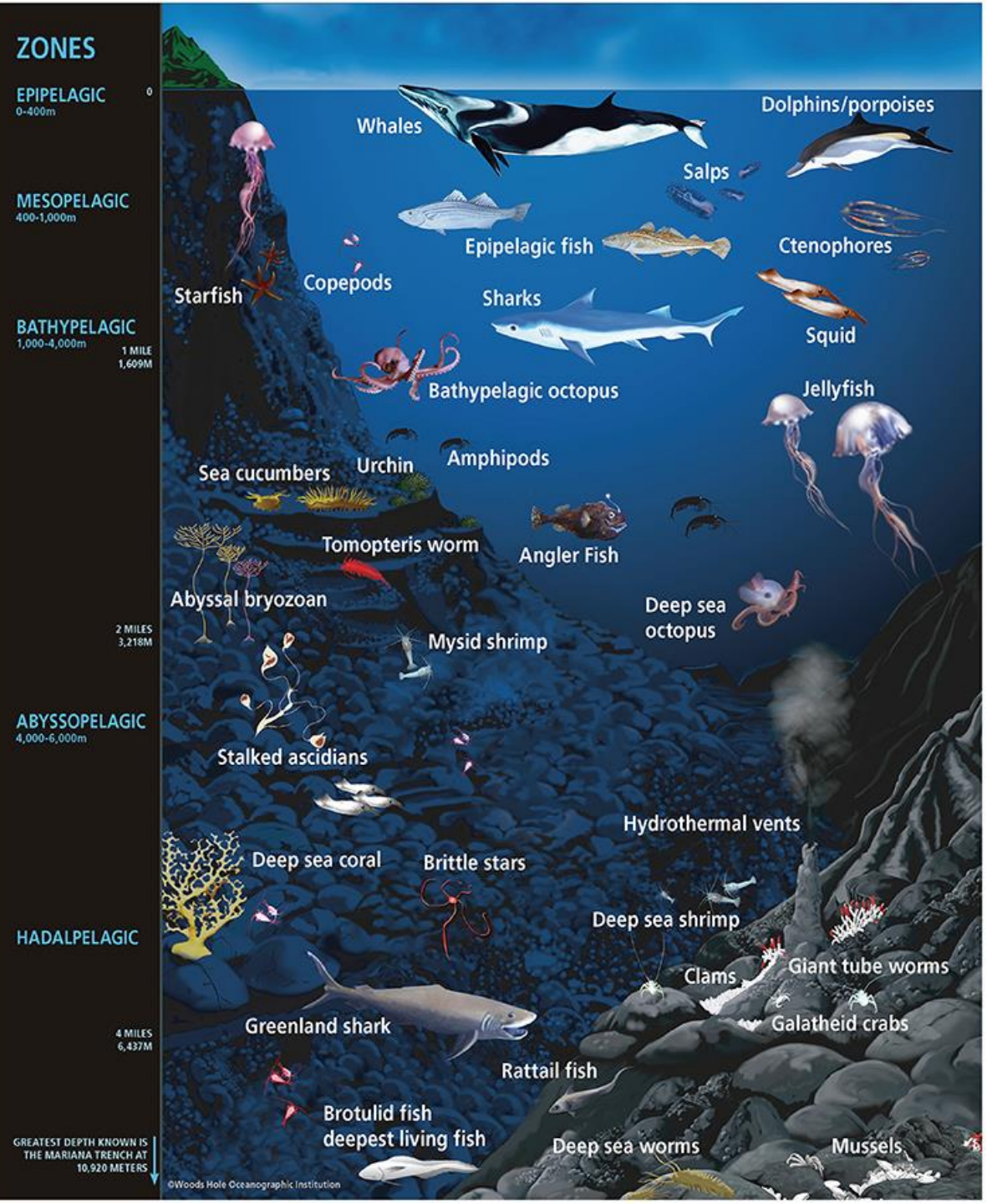




Biodiversity

Genetic Diversity

Population Dynamics

Bio-Chemistry

Habitat Usage/Specification

Laval Distribution

Resilience

Distribution

Evolution and Adaptation

Stock Assessment

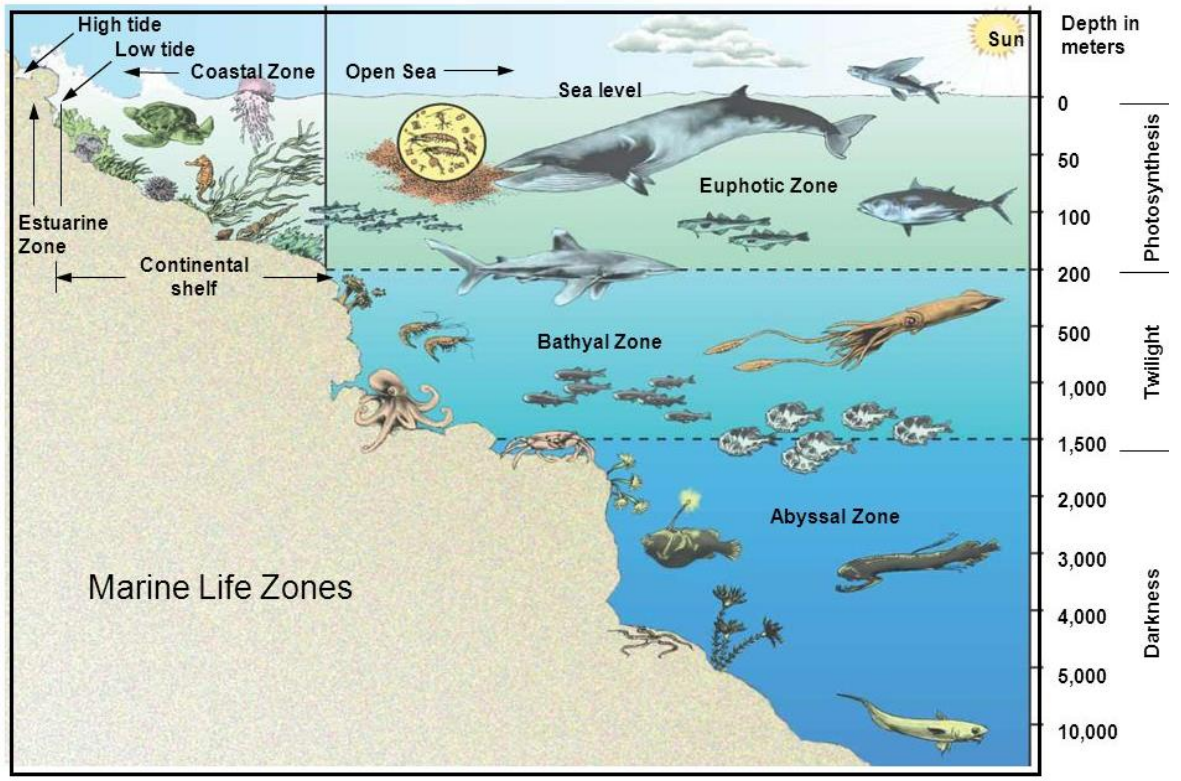
Comparative Physiology

Deepsea Ecology

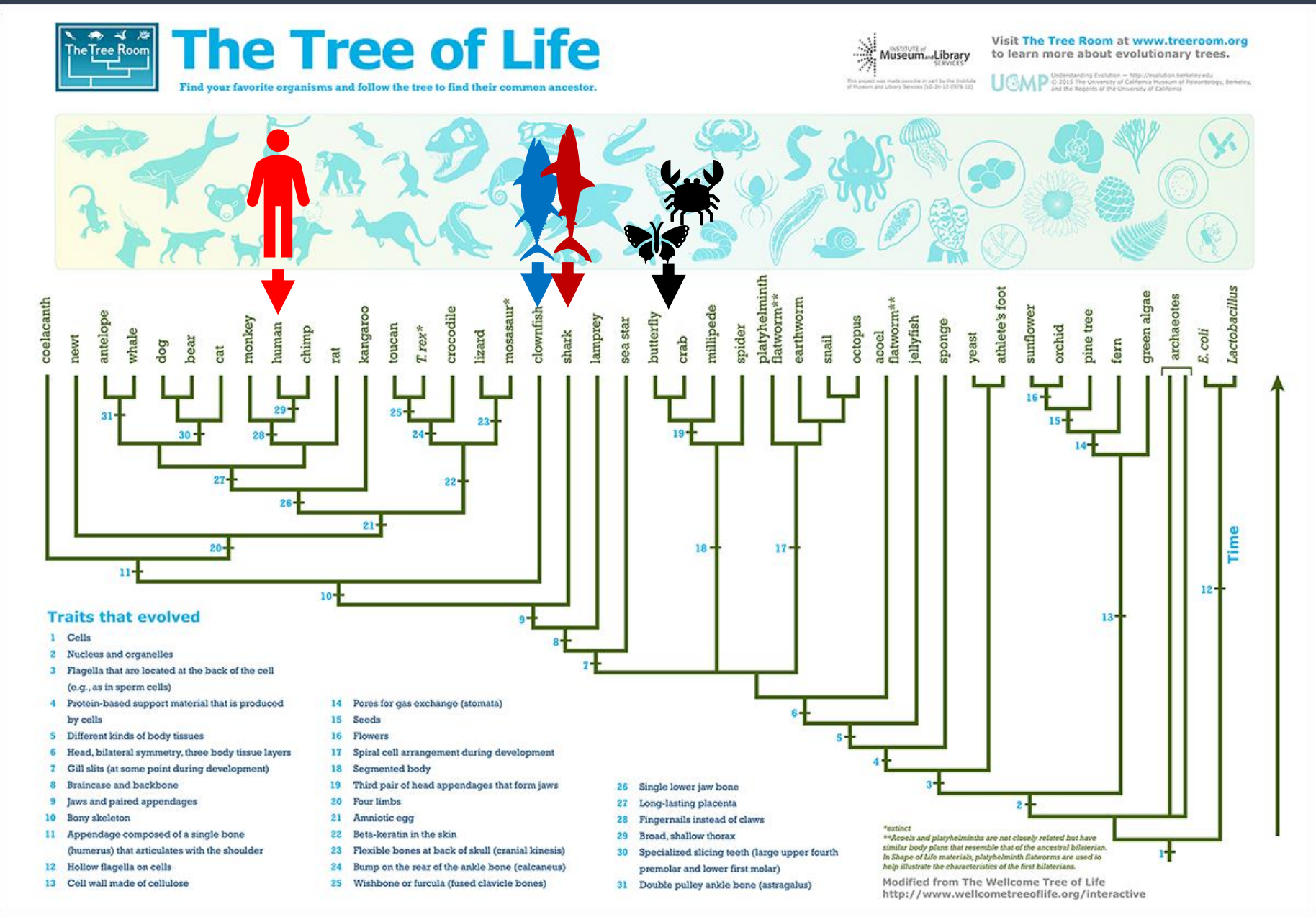
Hydrothermal vent

Biological Oceanography: Overview

- To study on the marine organism
- Including the biological process
- Topics such as
  - Taxonomy
  - Ecology
  - Distribution
  - Migratory pattern
  - Etc.
- Be the base line information for
  - Fish stock assessment
  - Fishery management



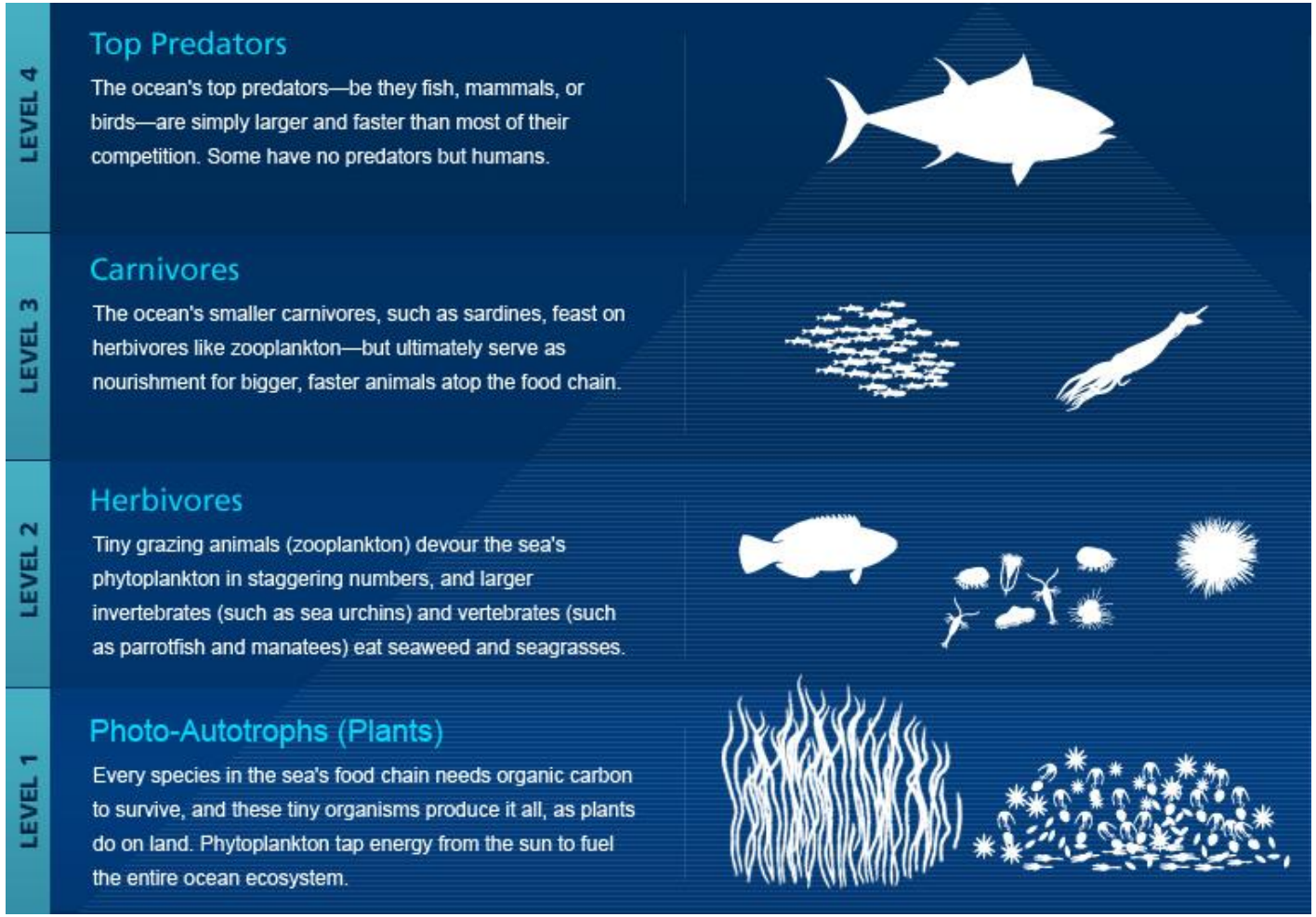
Biological Oceanography: Taxonomy

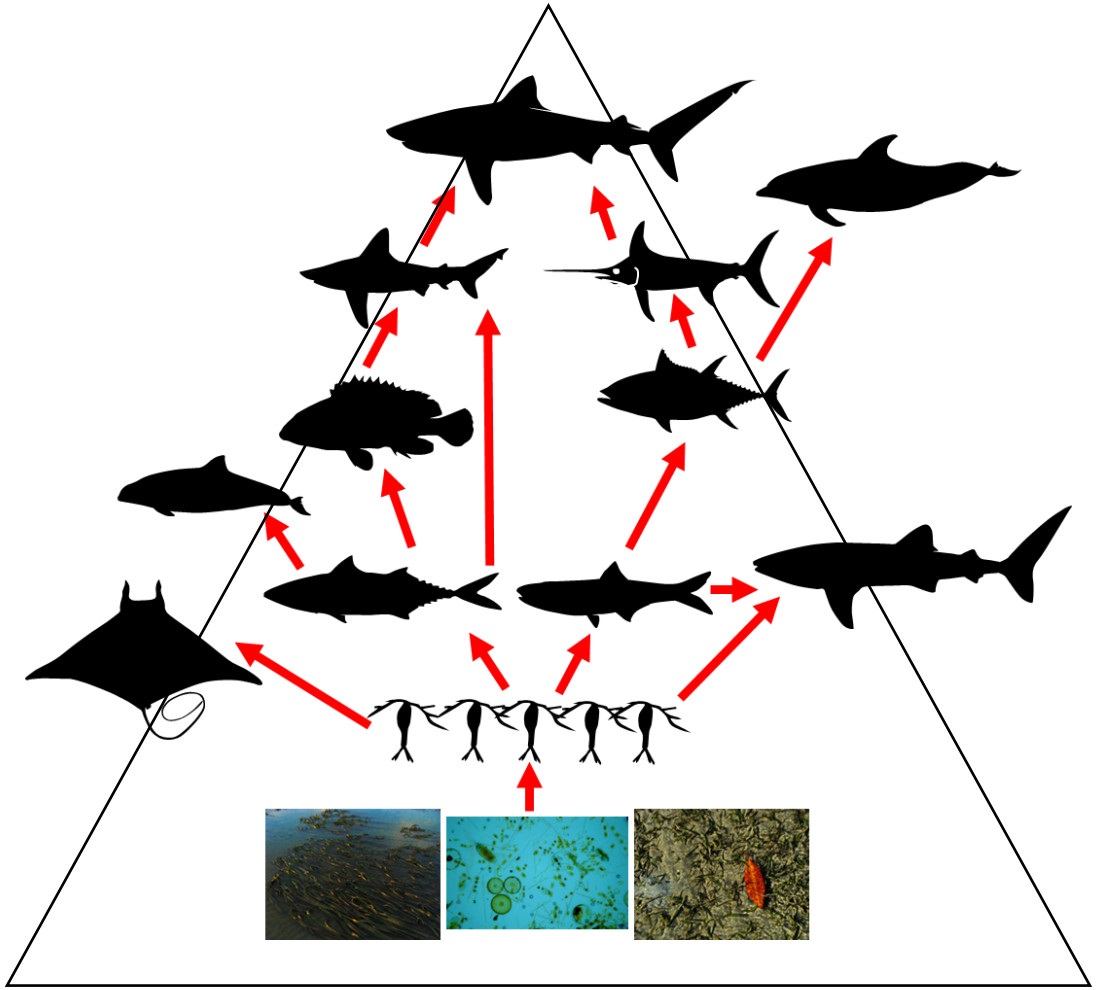


- All life forms are related at some points.
- The distance between point to point indicate the evolution.
- The closer, the more relate between taxa.

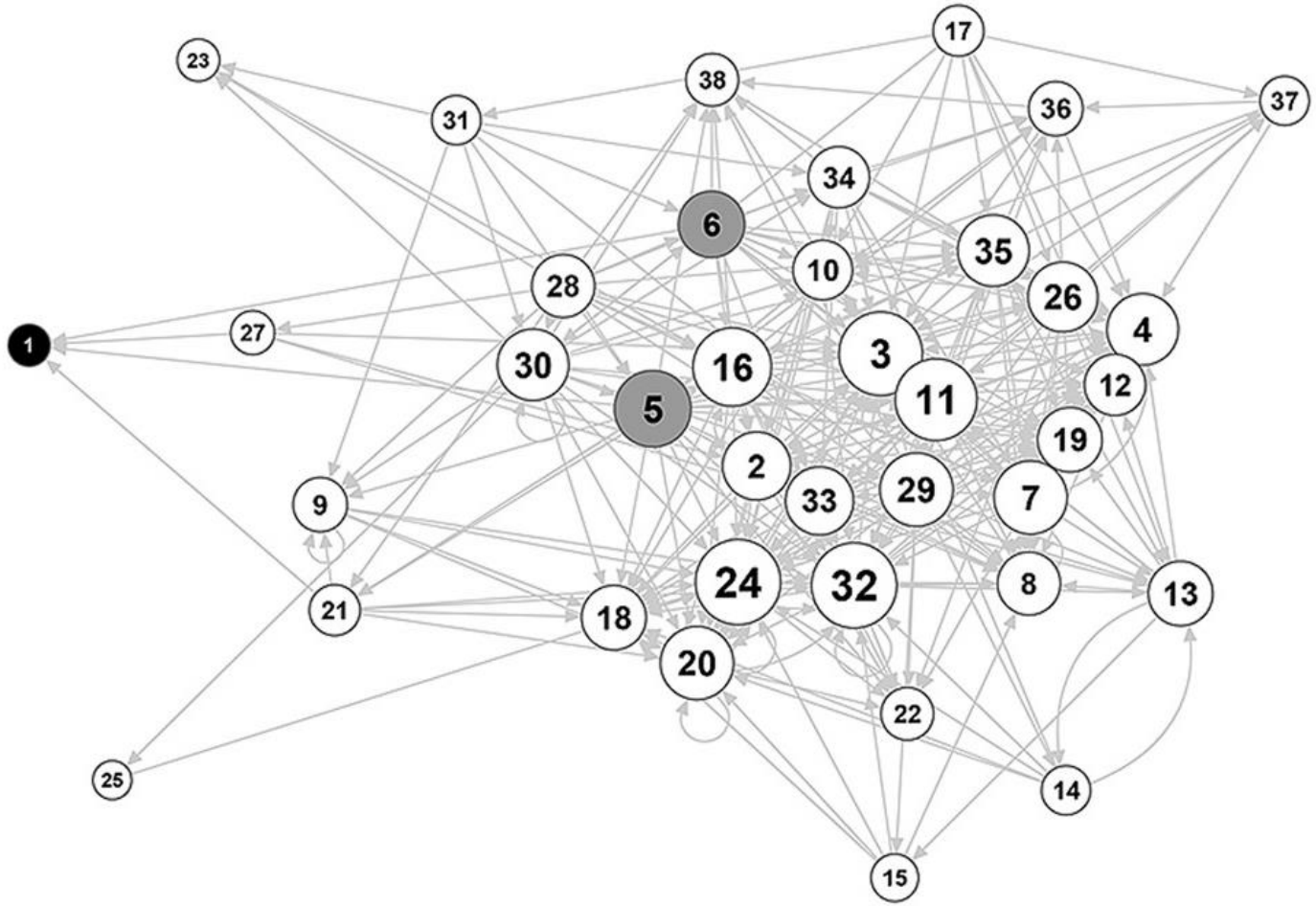
https://www.shapeoflife.org/news/resource/2016/10/18/tree-life

Biological Oceanography: Marine Ecology





Biological Oceanography: Marine Ecology

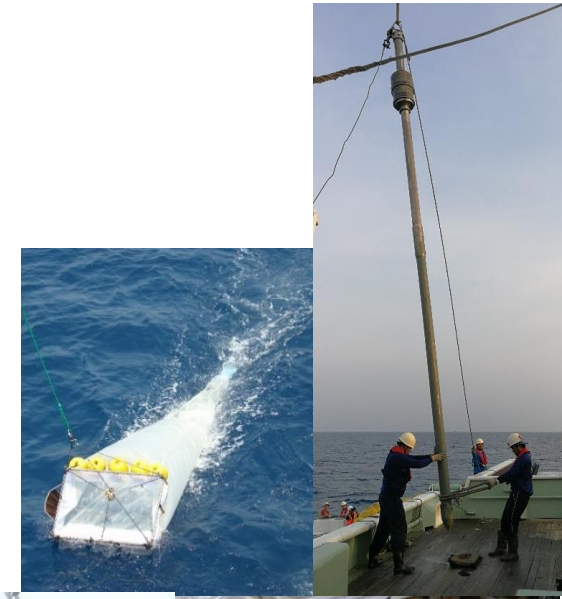


1 Clam_fishers
2 Grouper
3 Large_shark
4 Small_shark
5 Clams
6 Hatchet_clam
7 Snapper
8 Sea_lion
9 Sea_urchin
10 Sea_turtle
11 Squid
12 Cazon
13 Spanish_mackerel
14 Corvina
15 Weakfish
16 Octopus
17 Seaweed
18 Gulf_grouper
19 Seabirds
20 Sand_bass
21 Snail
22 Brown_snake
23 Mussel
24 Spotted_cabrilla
25 Silverfish
26 Triggerfish
27 Sea_cucumber
28 Detritus
29 Sardine
30 Zooplankton
31 Phytoplankton
32 Gulf_coney
33 Leopard_grouper
34 Shrimp
35 Flounder
36 Clownfish
37 Angelfish
38 Stingray

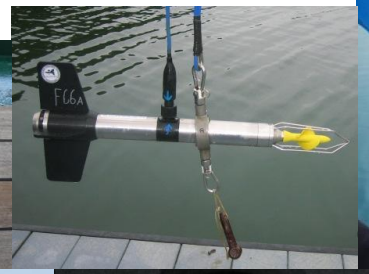
Cisneros-Montemayor et al. (2020)

Biological Oceanographic Instrument

- The instruments that help us to measure or sample various oceanographic samples for all purposes.
- These instruments can help us to understand the condition in their habitat
- Also, to develop the sampling plan based on the results.
- **We can understand the adaptation and biodiversity from the information obtained by using these instruments.**





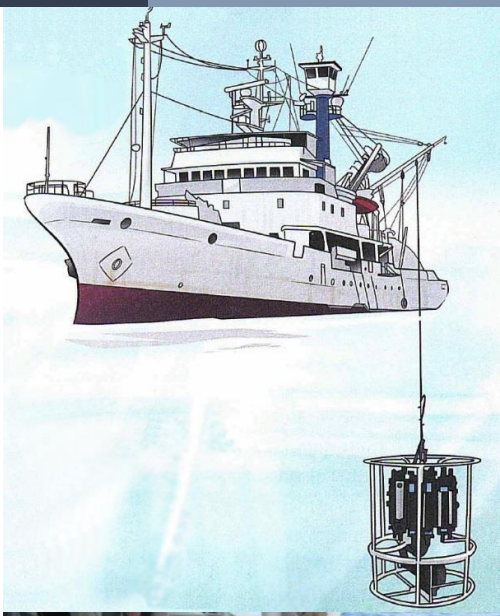


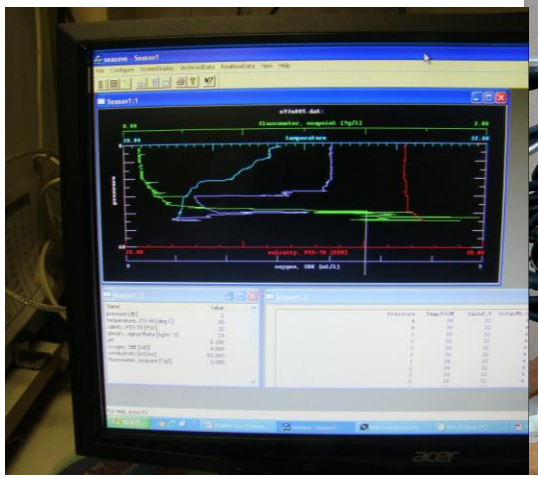


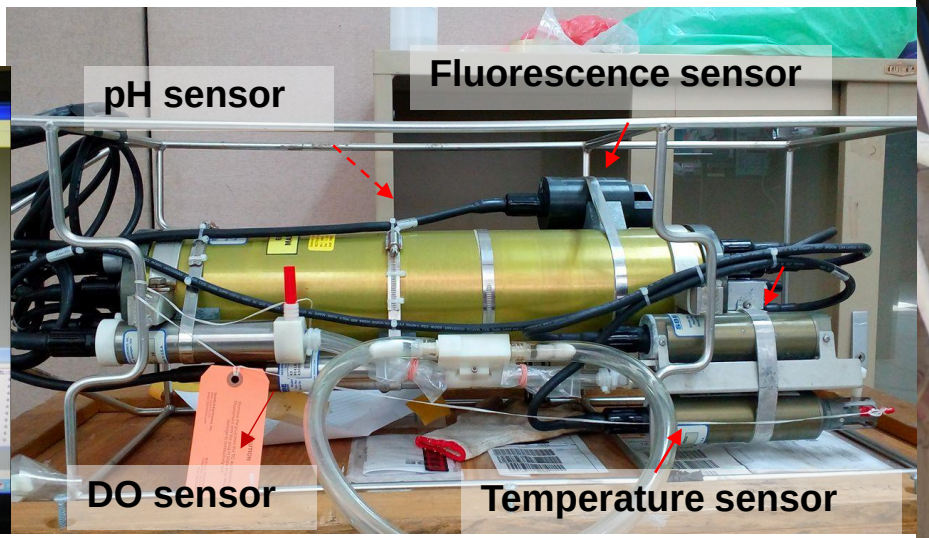
Biological Oceanographic Instrument

Conductivity Temperature Depth (CTD)

- The maximum operation depth: 6800 meters.
- With a frame, it can collect water from 12 depth ranges.
- Can put additional sensors along.
- Send the real-time signal to the processing unit onboard.



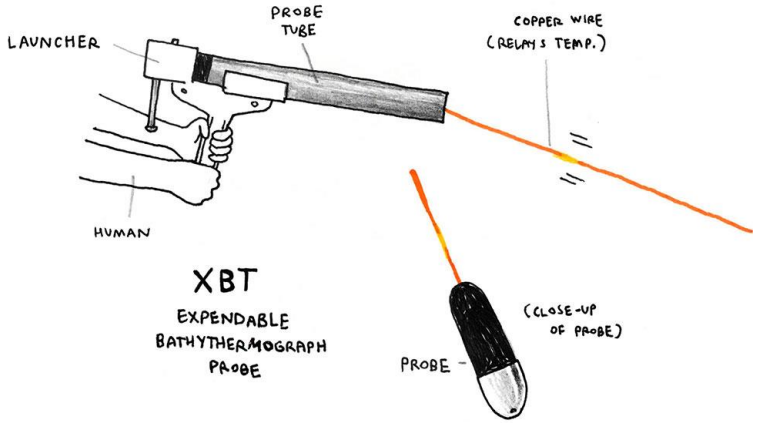




Biological Oceanographic Instrument

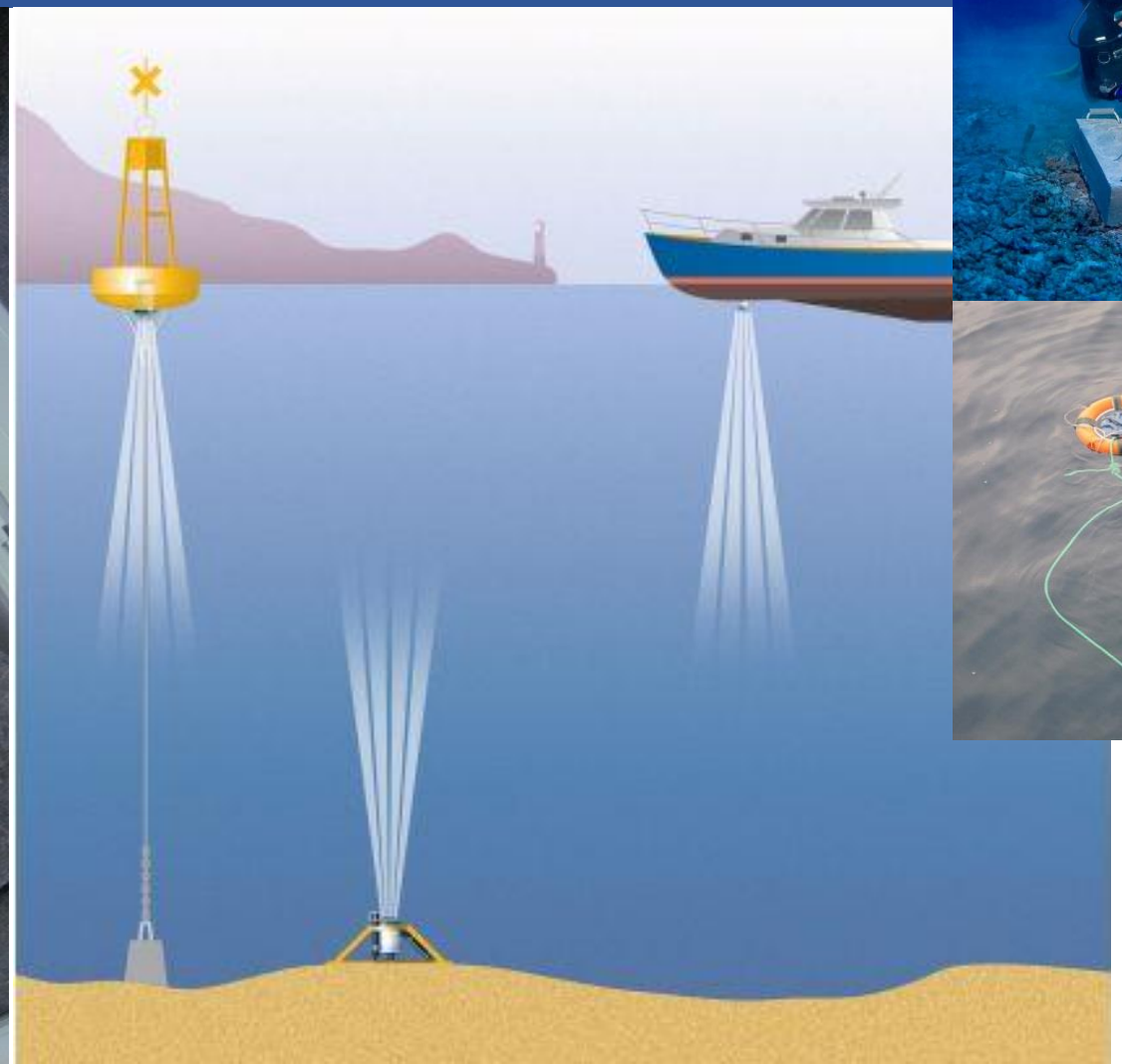
Conductivity Temperature Depth (CTD)

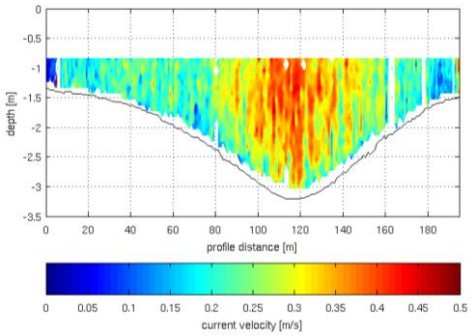
Expendable Bathythermograph Probe (XBT)

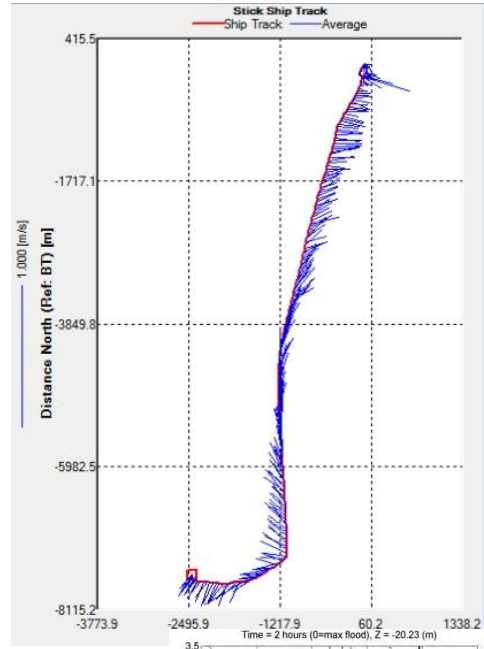


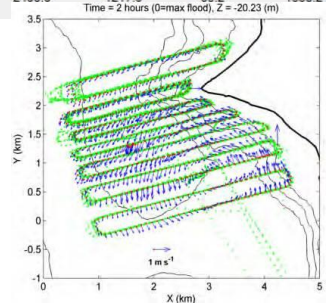
Biological Oceanographic Instrument

Acoustic Doppler Current Profilers (ADCP)



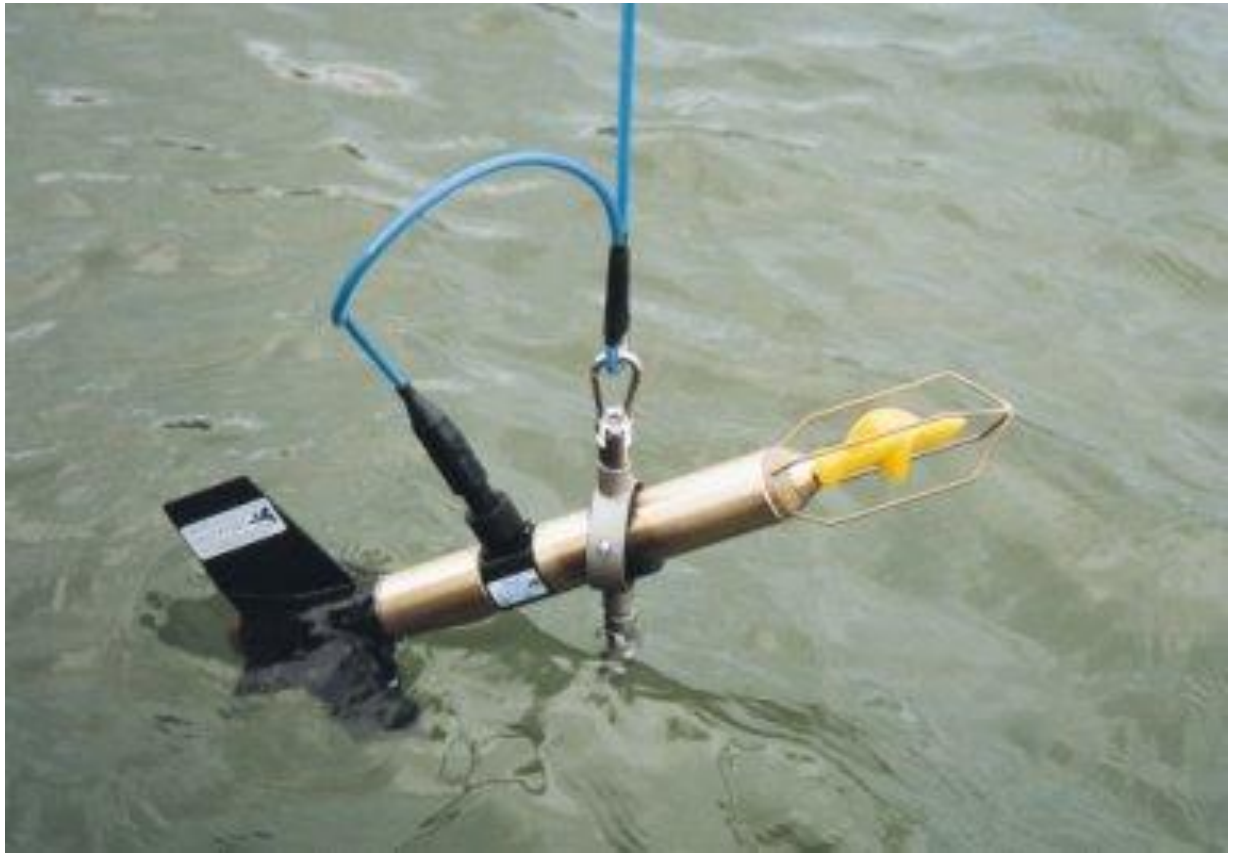


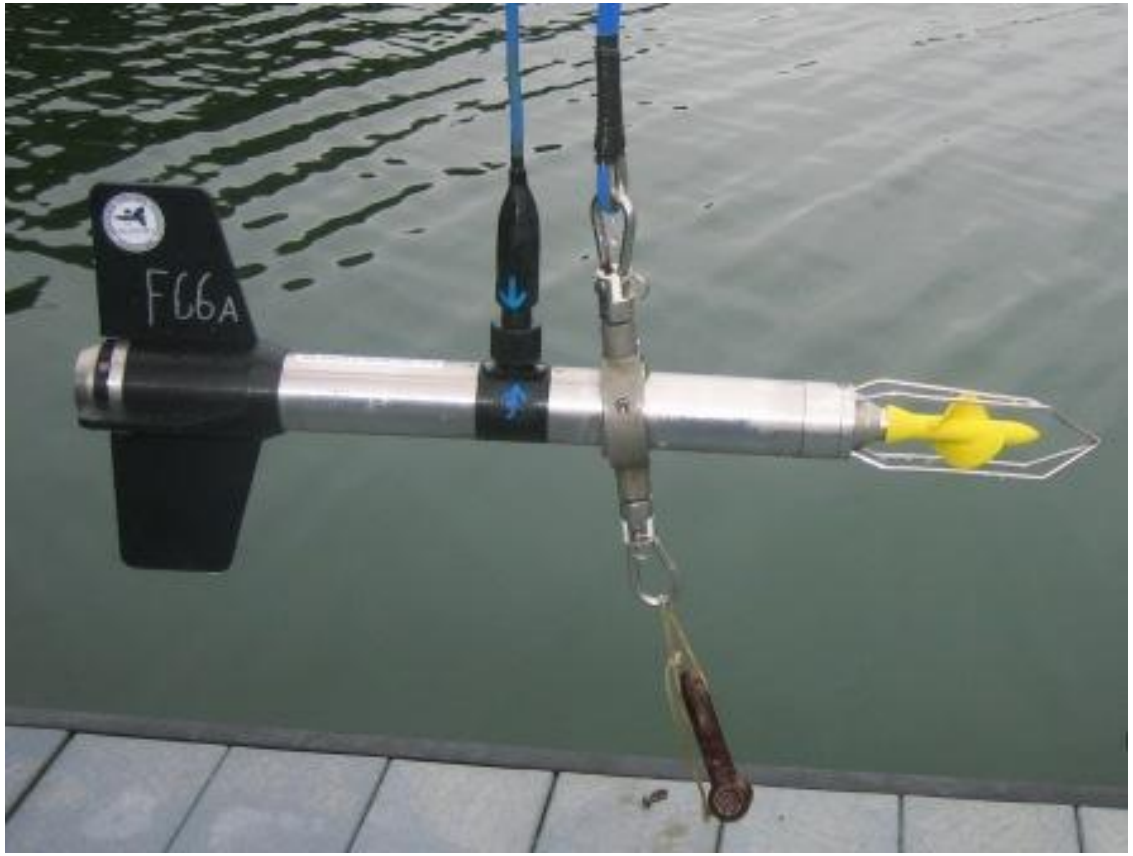




Biological Oceanographic Instrument

Current Meter

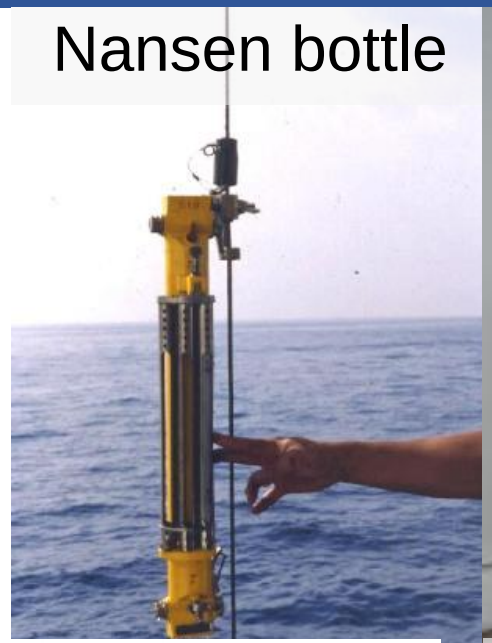




Biological Oceanographic Instrument

Water Sampler

Nansen bottle



Van Dorn

Niskin water sampler

Ruttner water sampler

Biological Oceanographic Instrument

Plankton Sampler

Bongo net

Neuston net

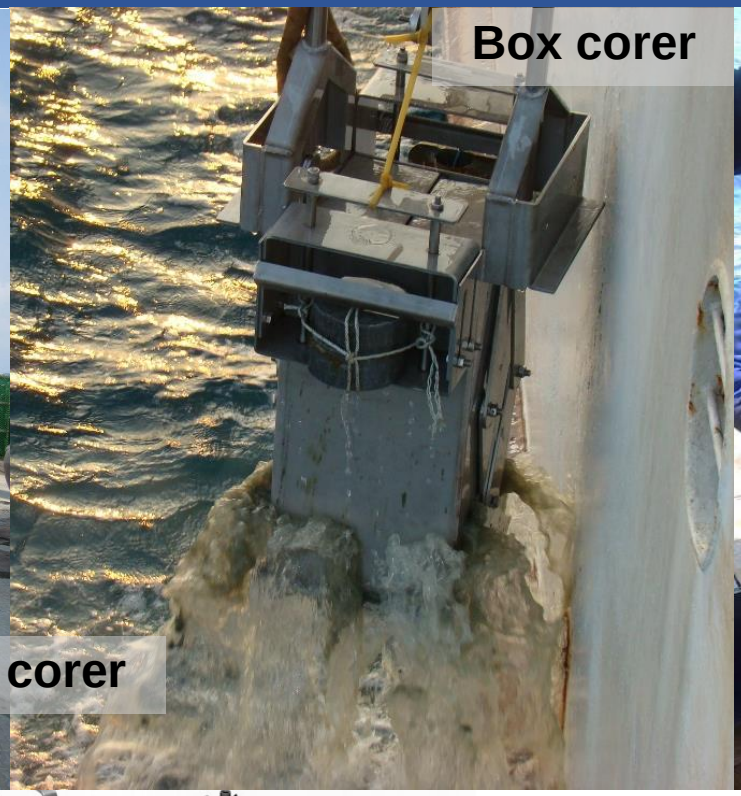
O-ring net

Norpac net for zooplankton

Biological Oceanographic Instrument

Grab

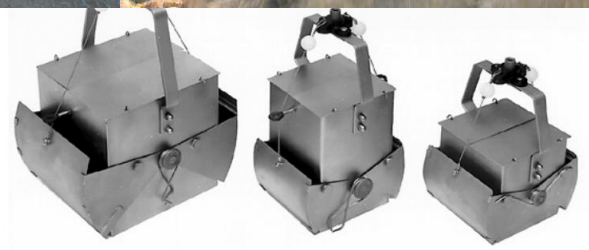
Box corer



Box corer

Smith McIntyre Grab

Van Veen Grab



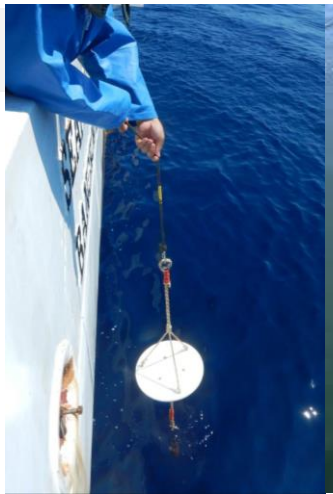
Ekman Grab

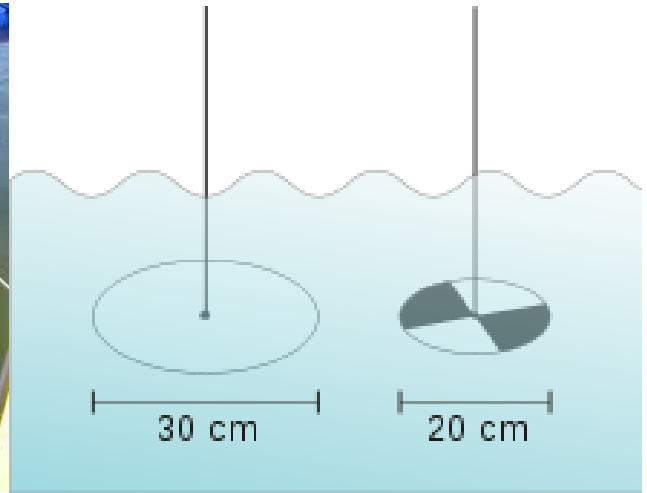
Biological Oceanographic Instrument

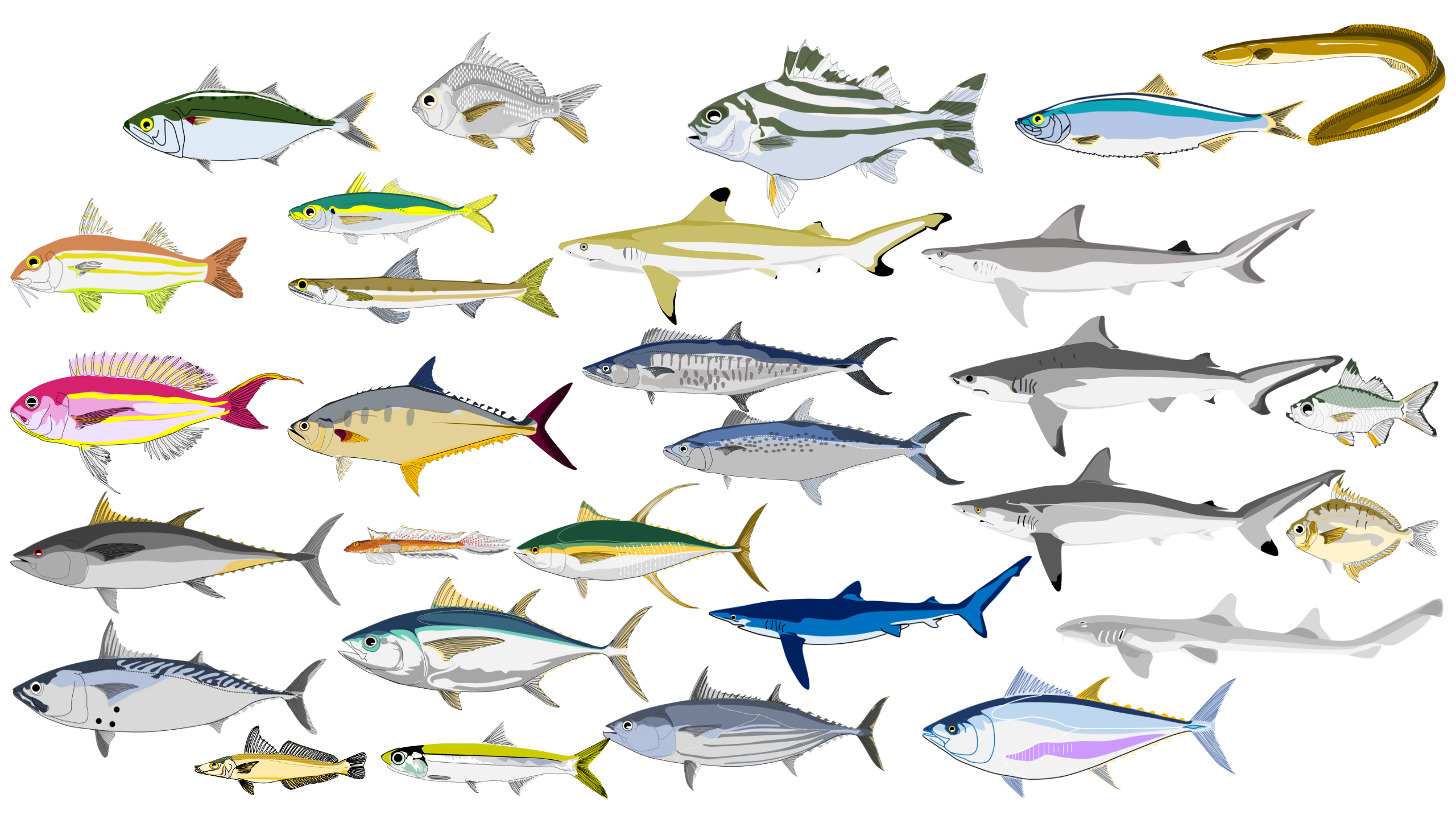
Water surface

Forel-Ule scale

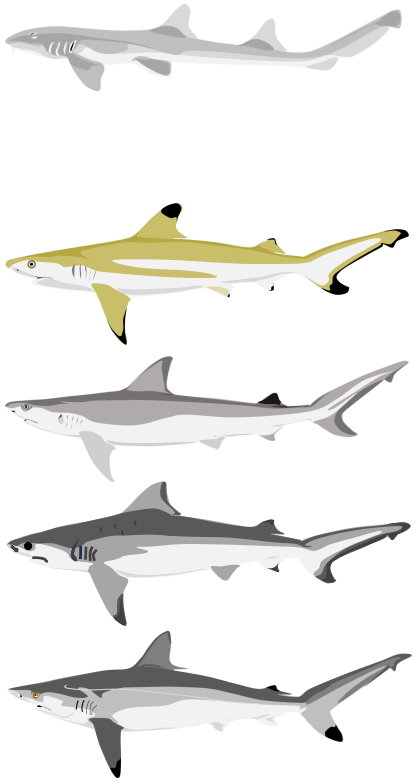
Secchi dish

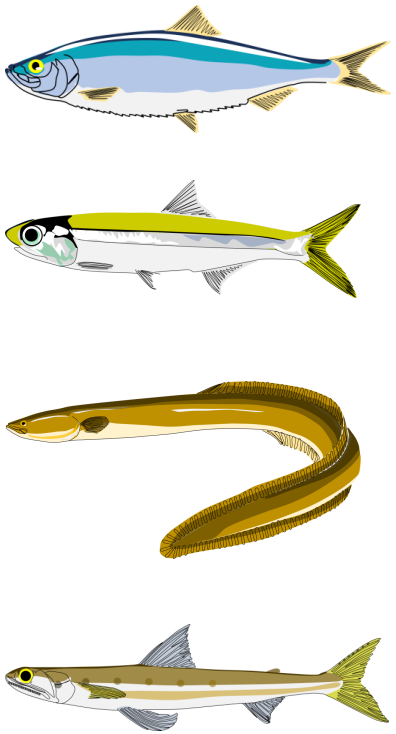


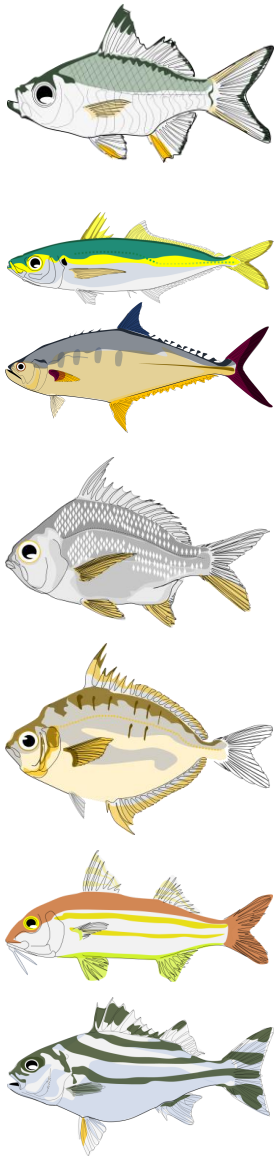


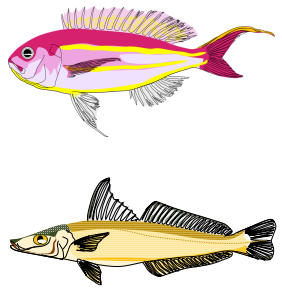


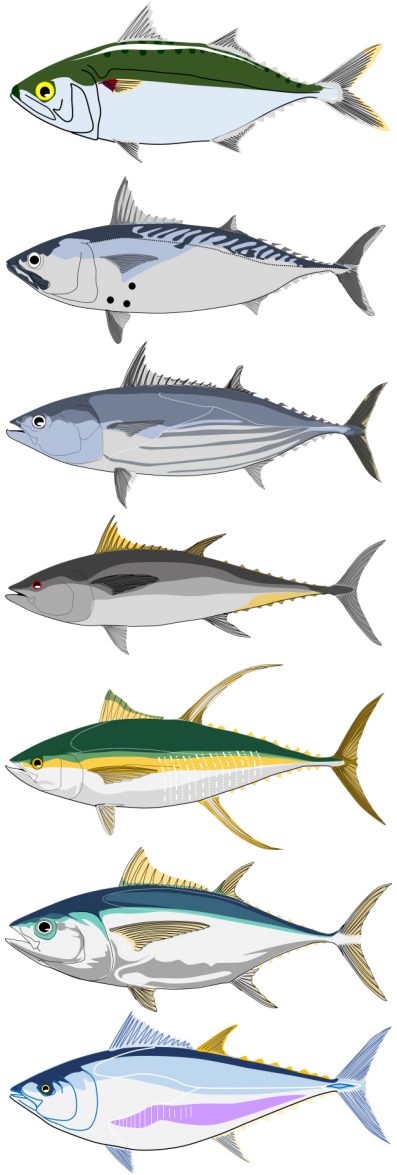
Classification



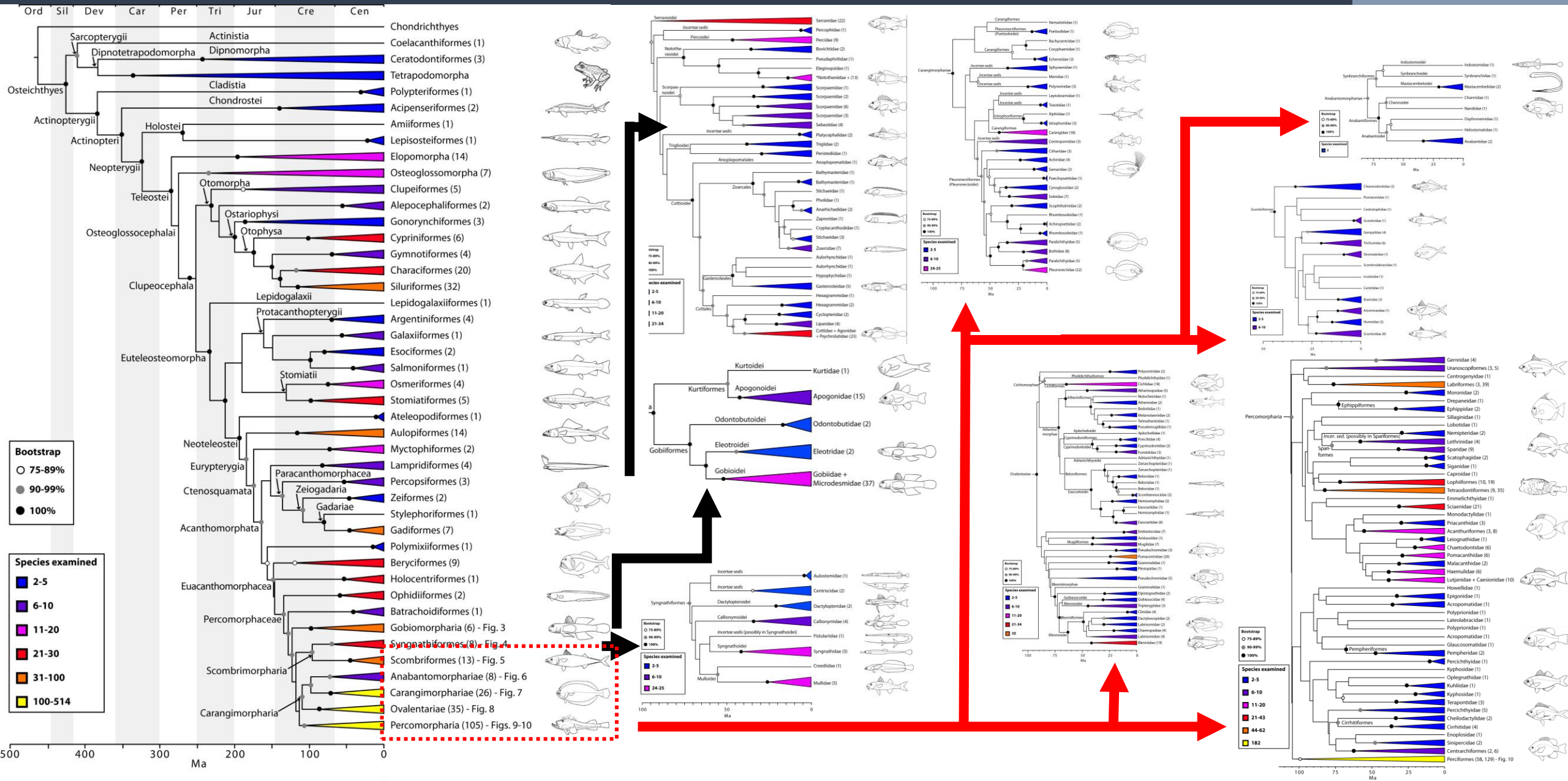




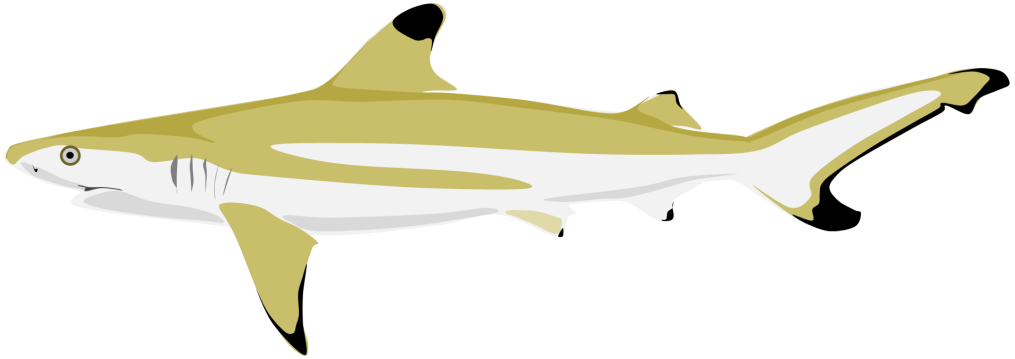


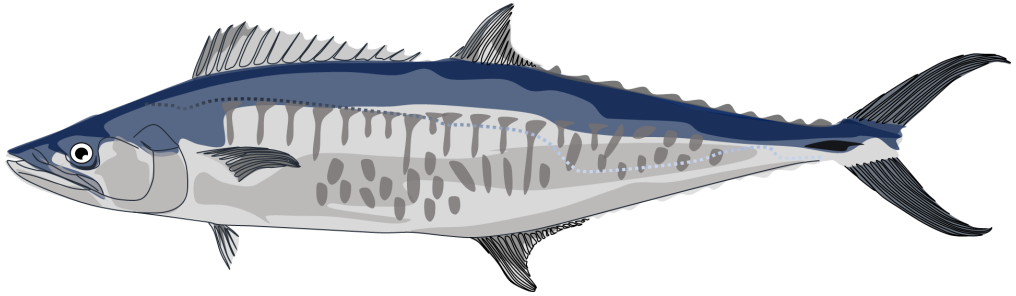


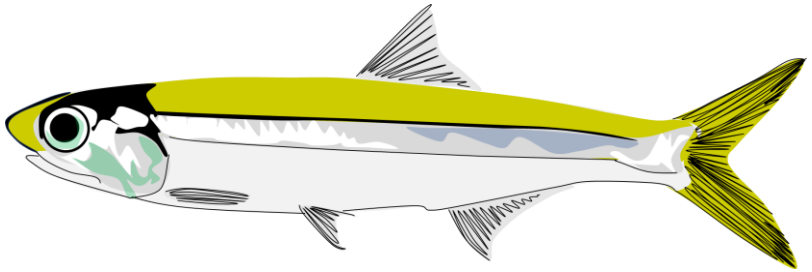
Phylogenetic Tree: Fish Edition

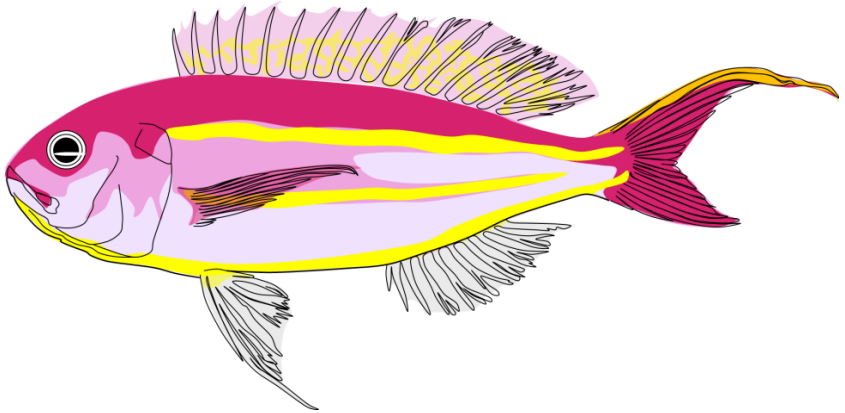


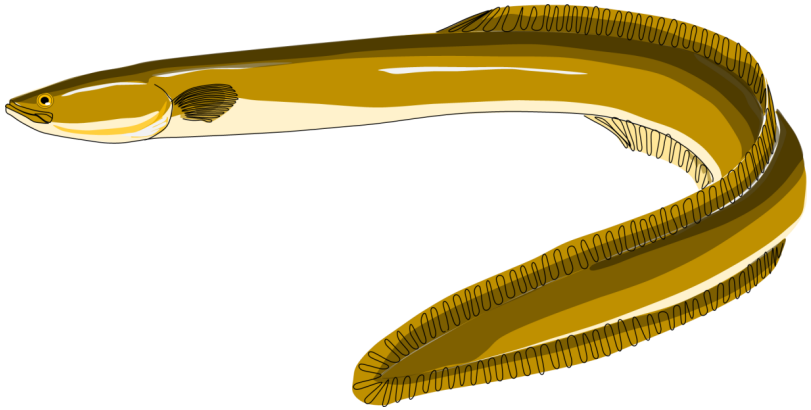
Characteristics



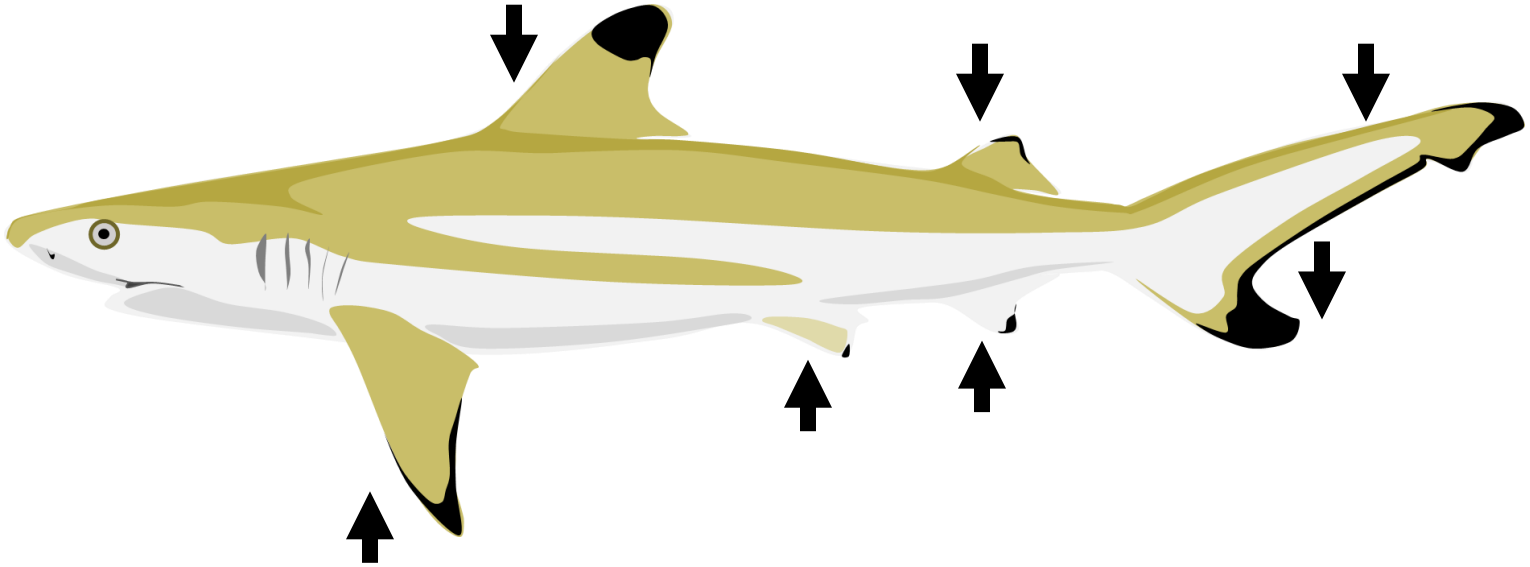


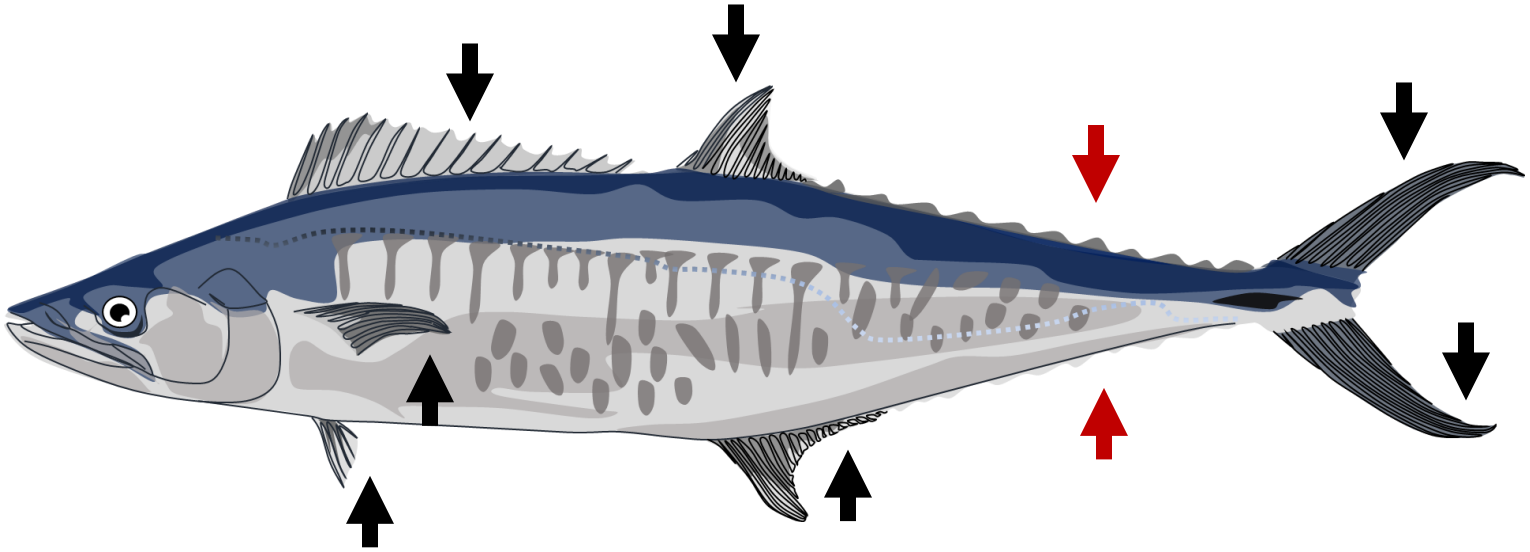






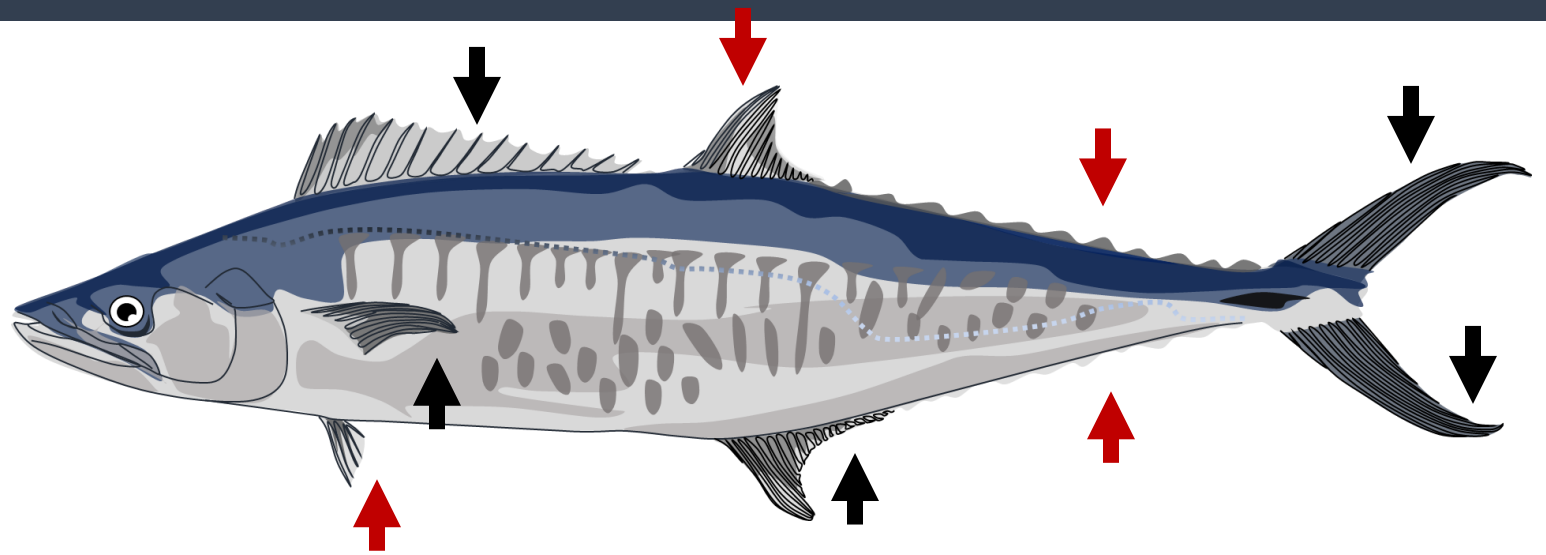
Characteristics

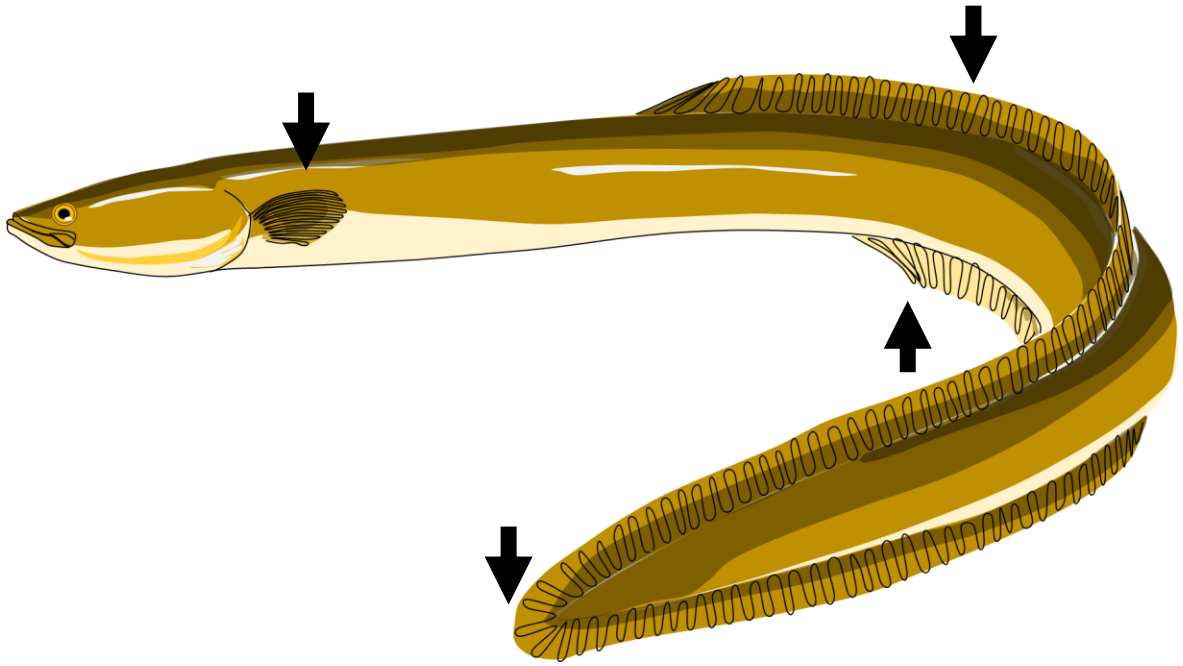




1) 1st dorsal fin
2) 2nd dorsal fin
3) Upper caudal fin
4) Lower caudal fin
5) Pectoral fin
6) Pelvic fin
7) Anal fin
8) Finlet

Characteristics





1) 1st dorsal fin

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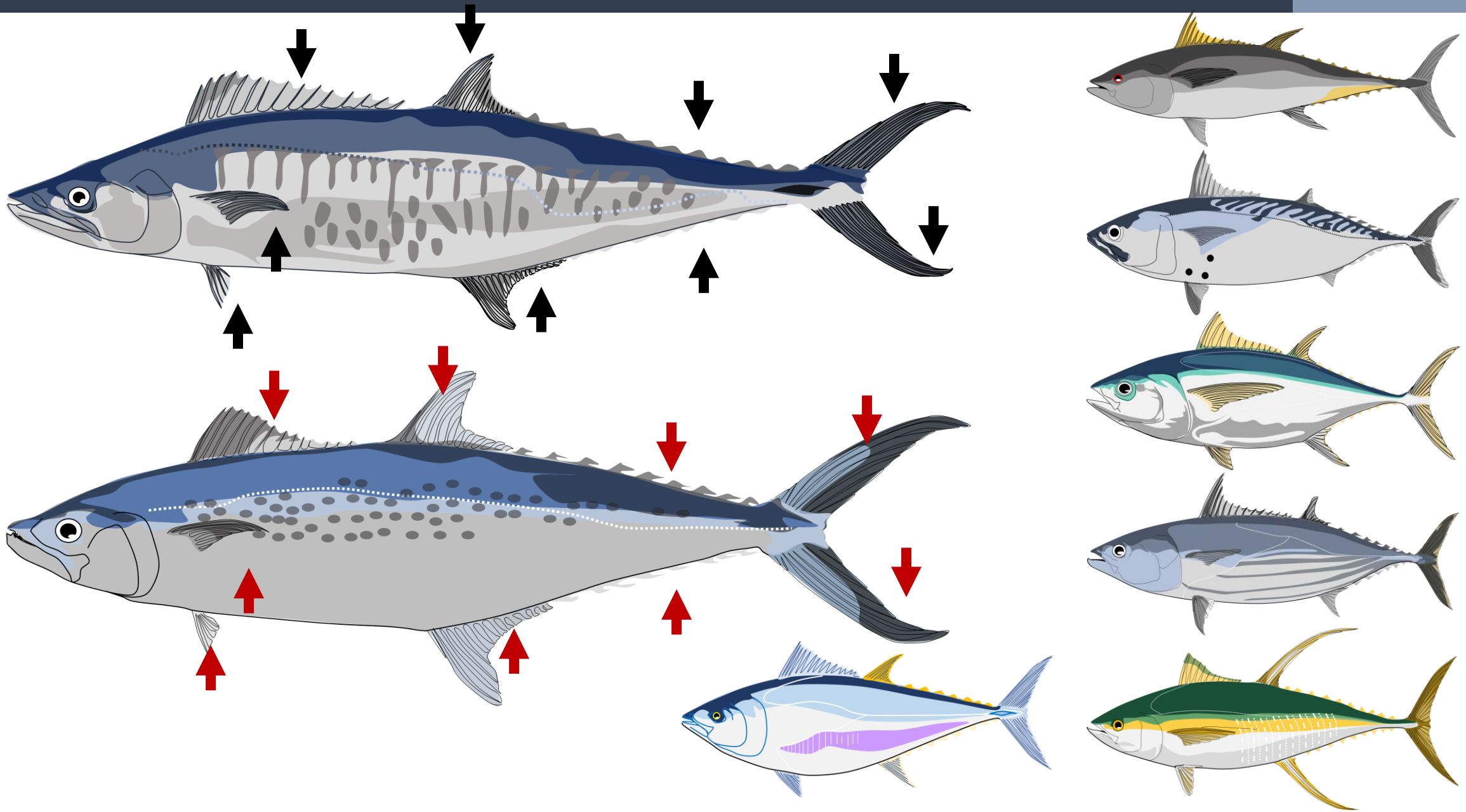
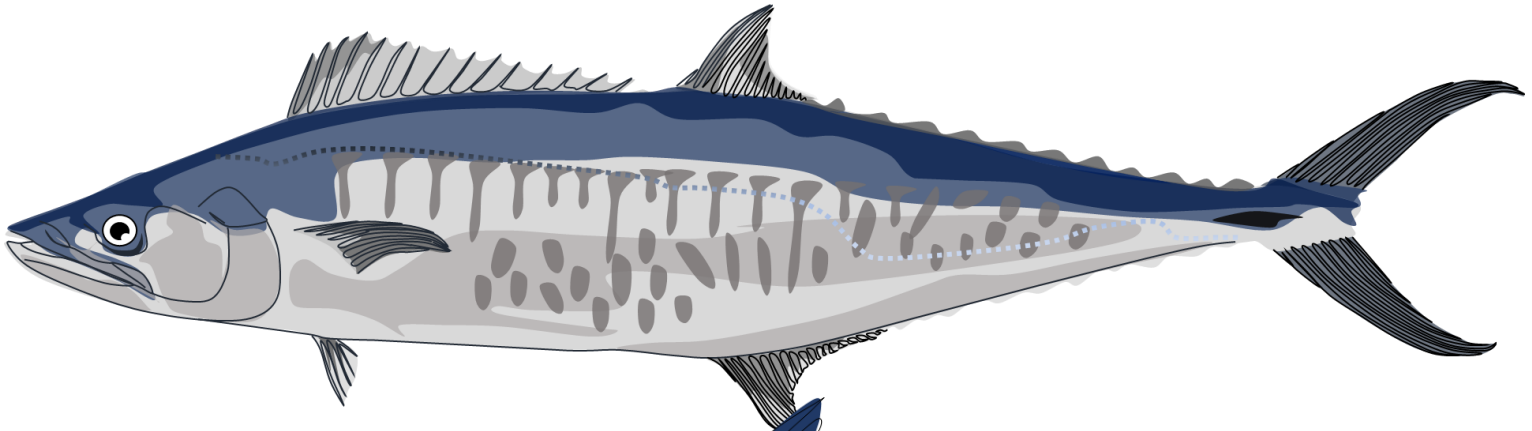
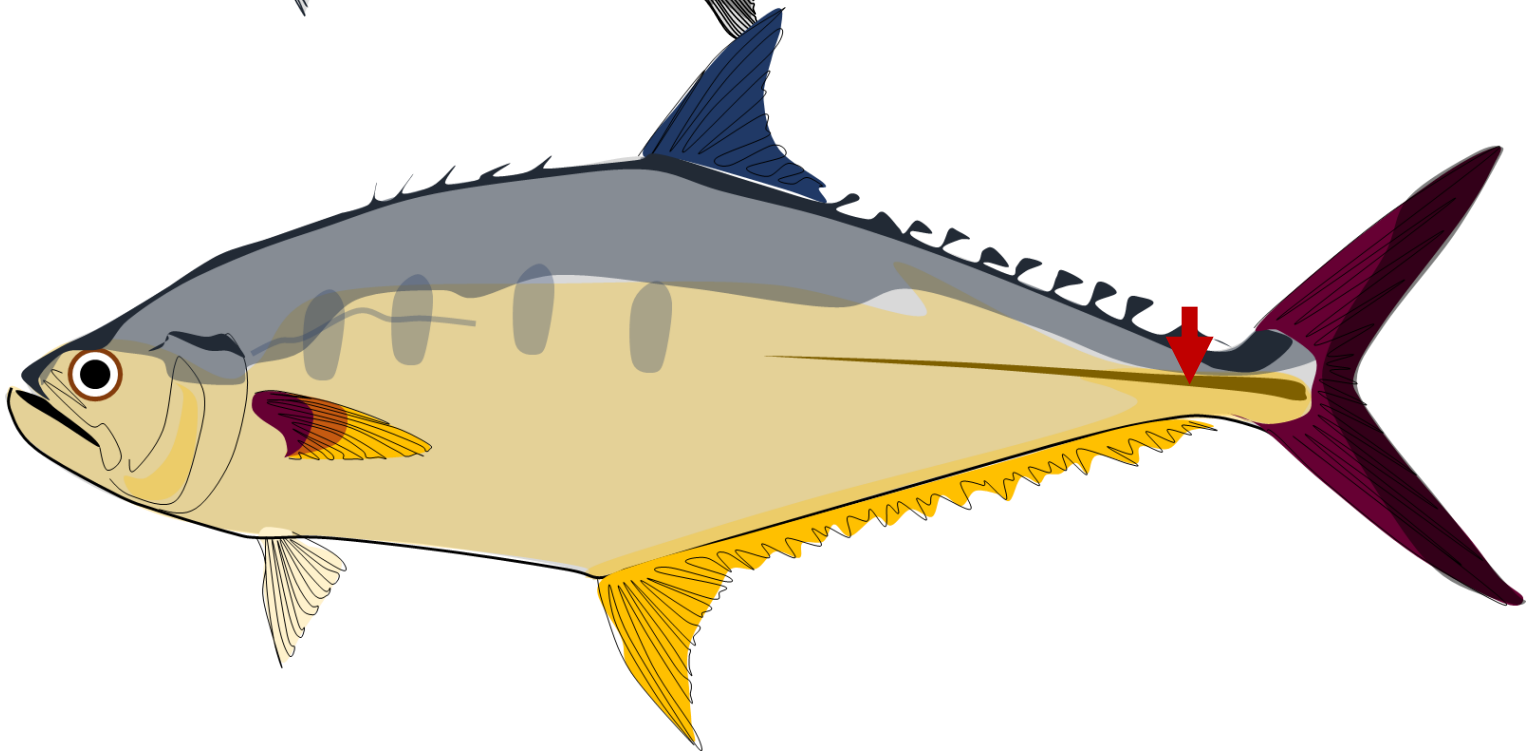
8) Finlet

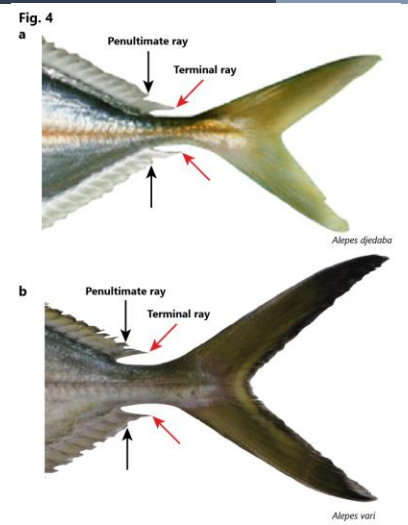
Characteristics

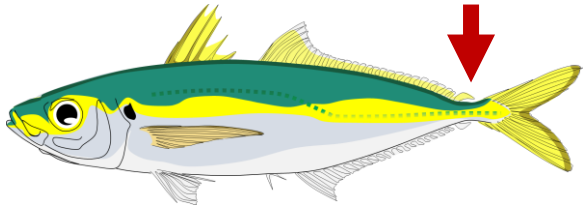


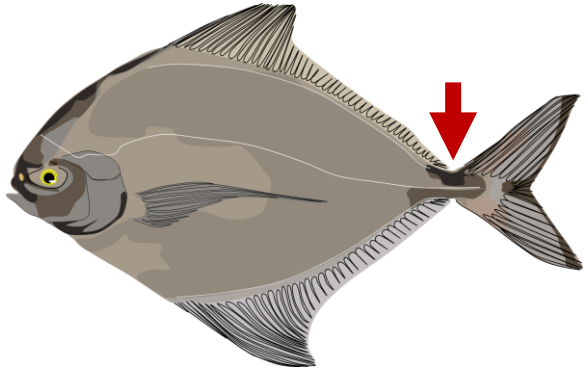
Characteristics











Characteristics