

# Biological Oceanographic Survey



Supapong Pattarapongpan

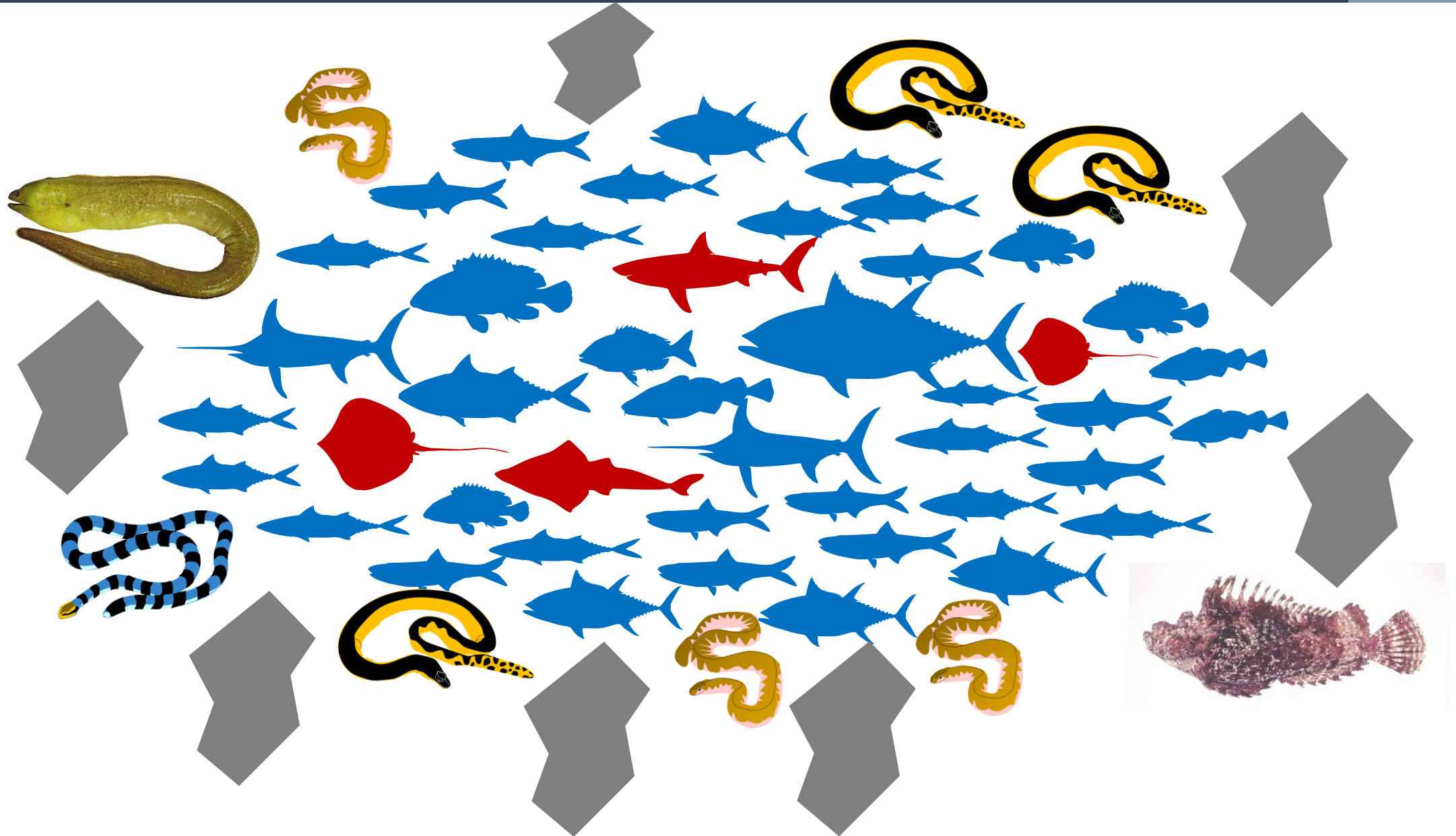
Fishery Oceanographer

Fishing Ground and Oceanographic Section

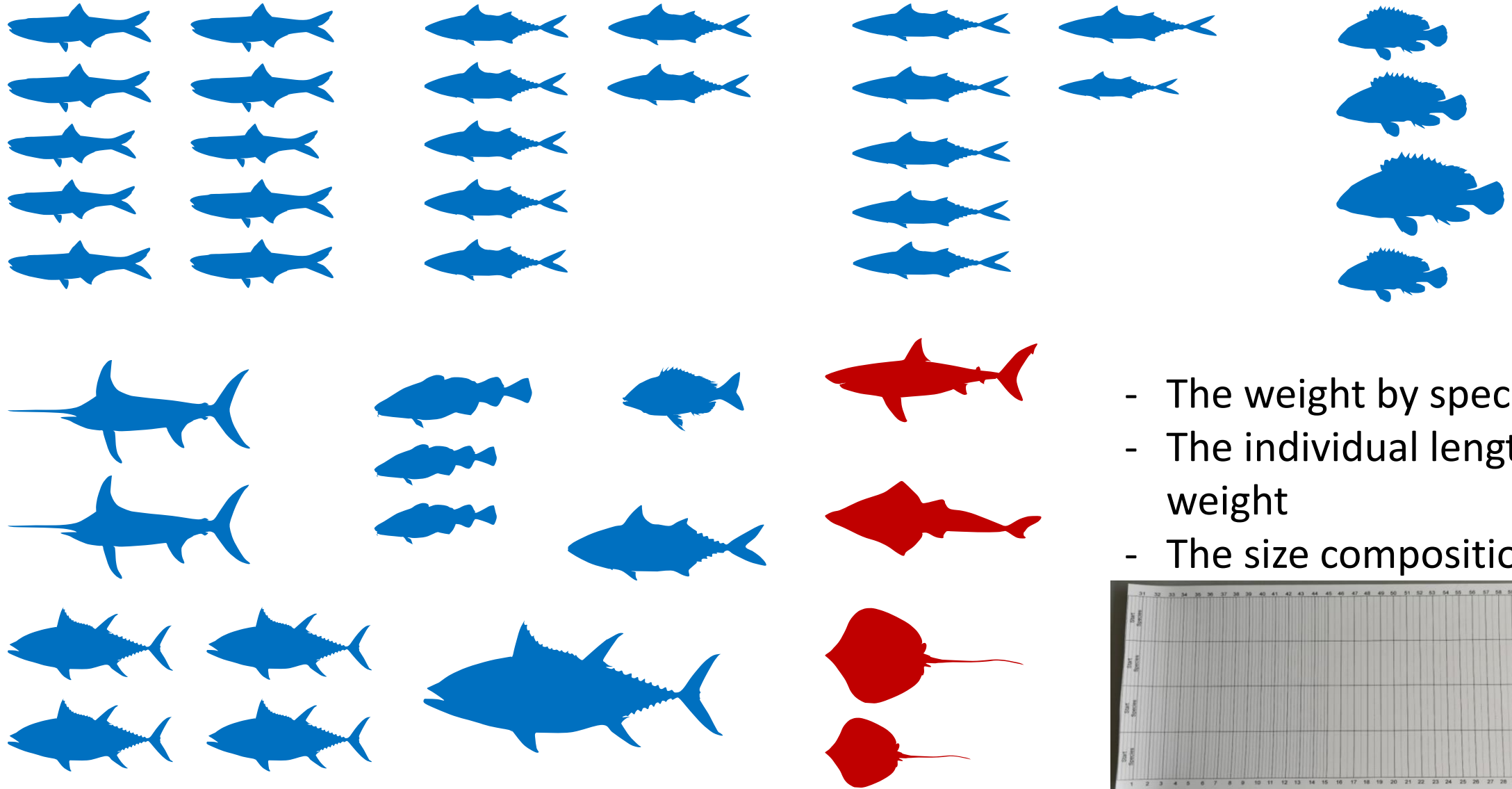
Southeast Asian Fishery Development Center, Training Department (SEAFDEC/TD)



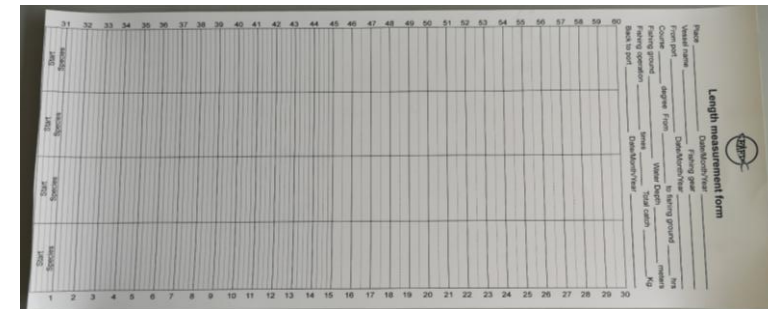
# The trawl catch management



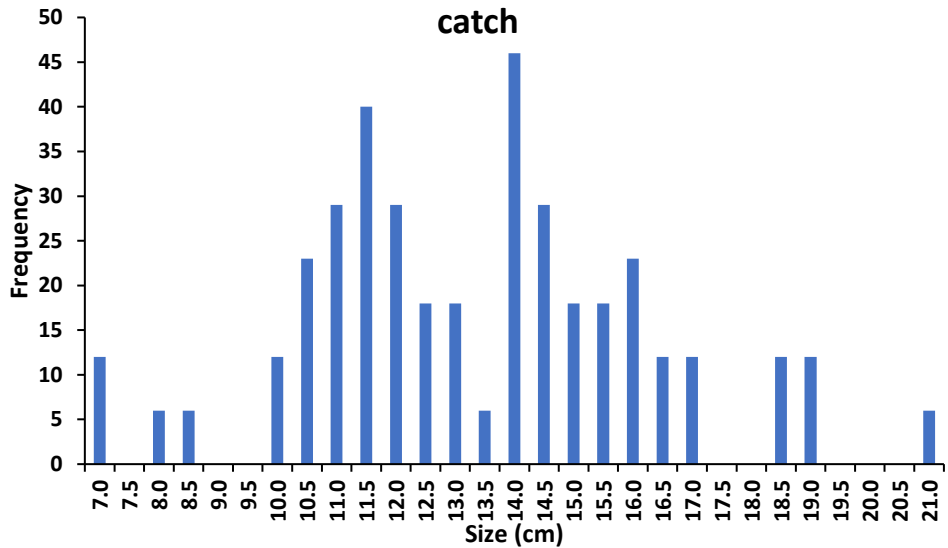
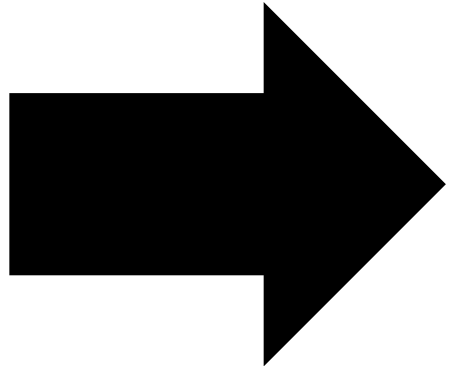
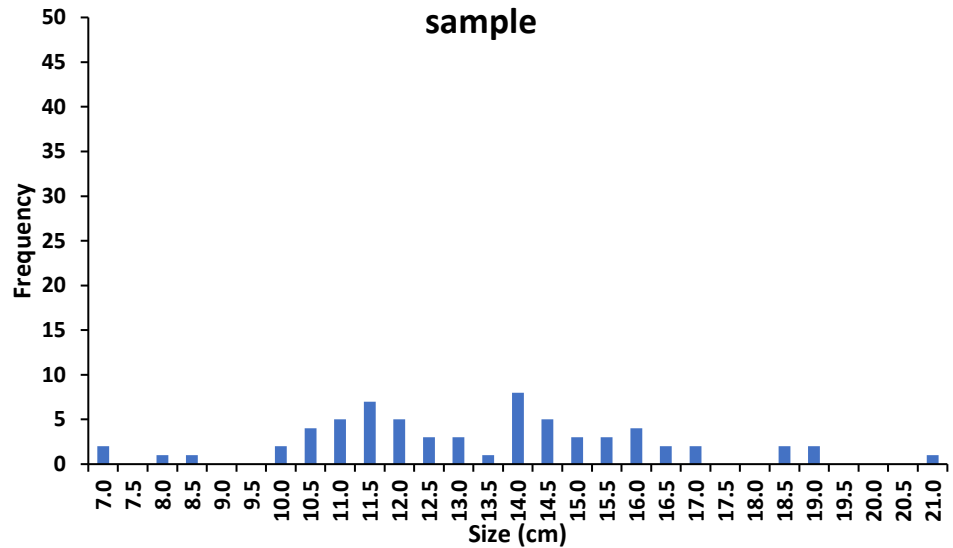
# The trawl catch management



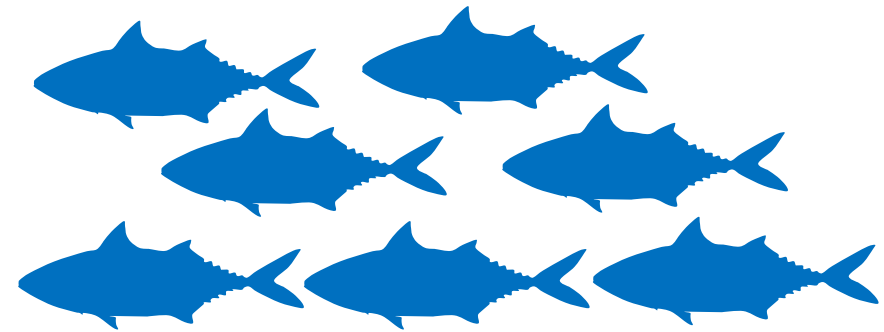
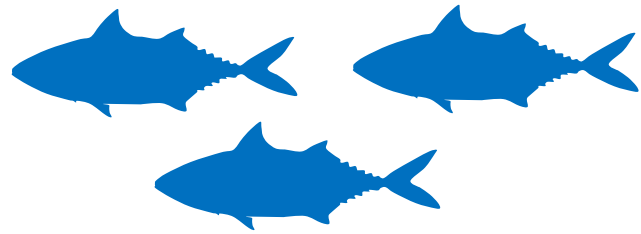
- The weight by species
- The individual length and weight
- The size composition



# The length-frequency data

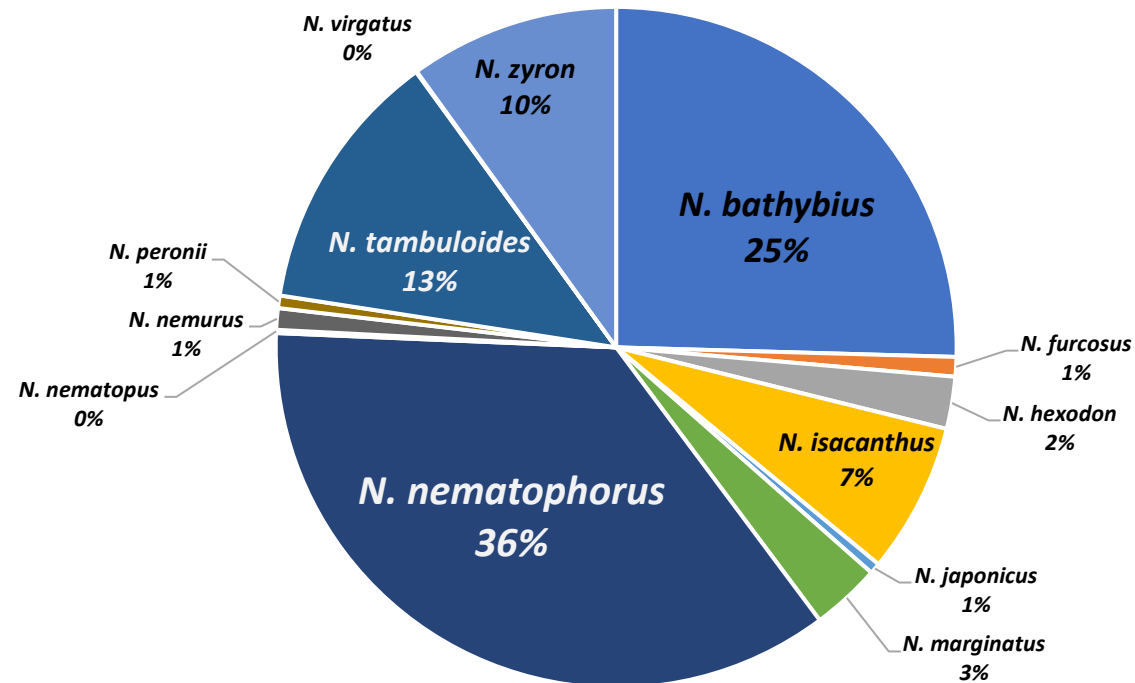
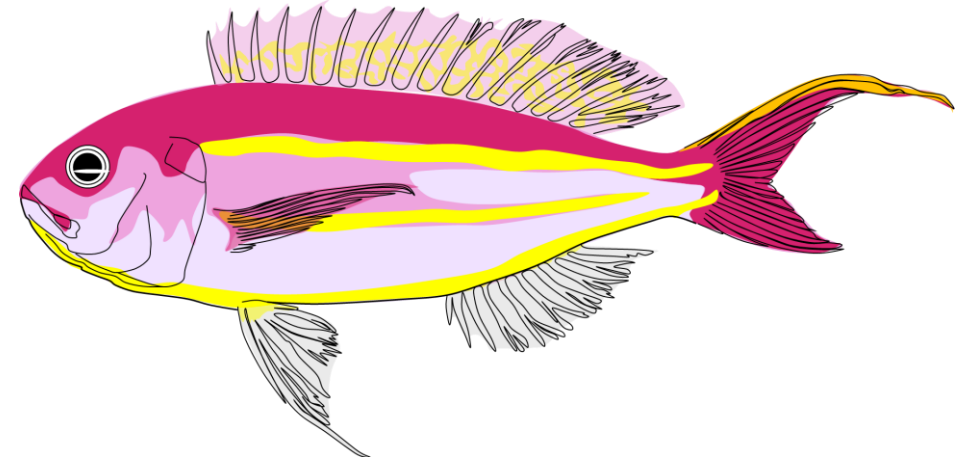


**Raising  
with the  
total catch**



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

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

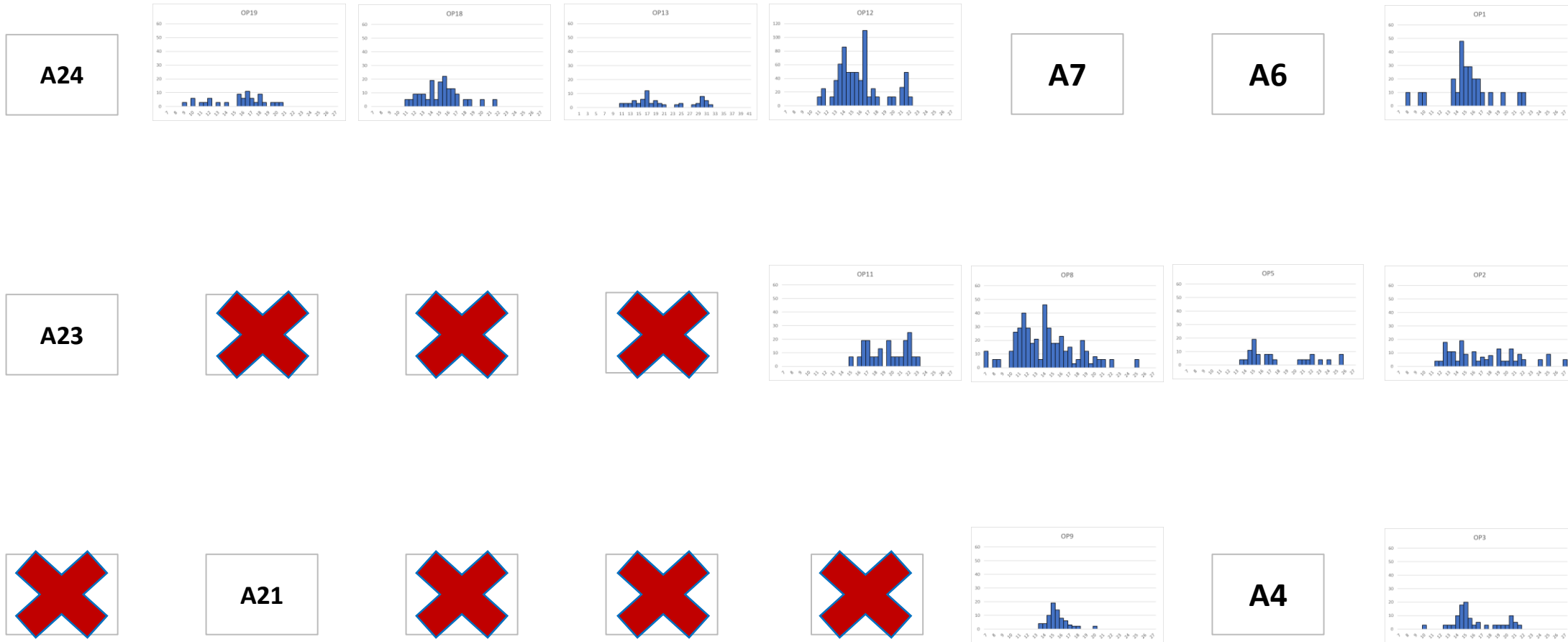


# Example, red sea bream (*Nemipterus* spp.)

Deep  
sea

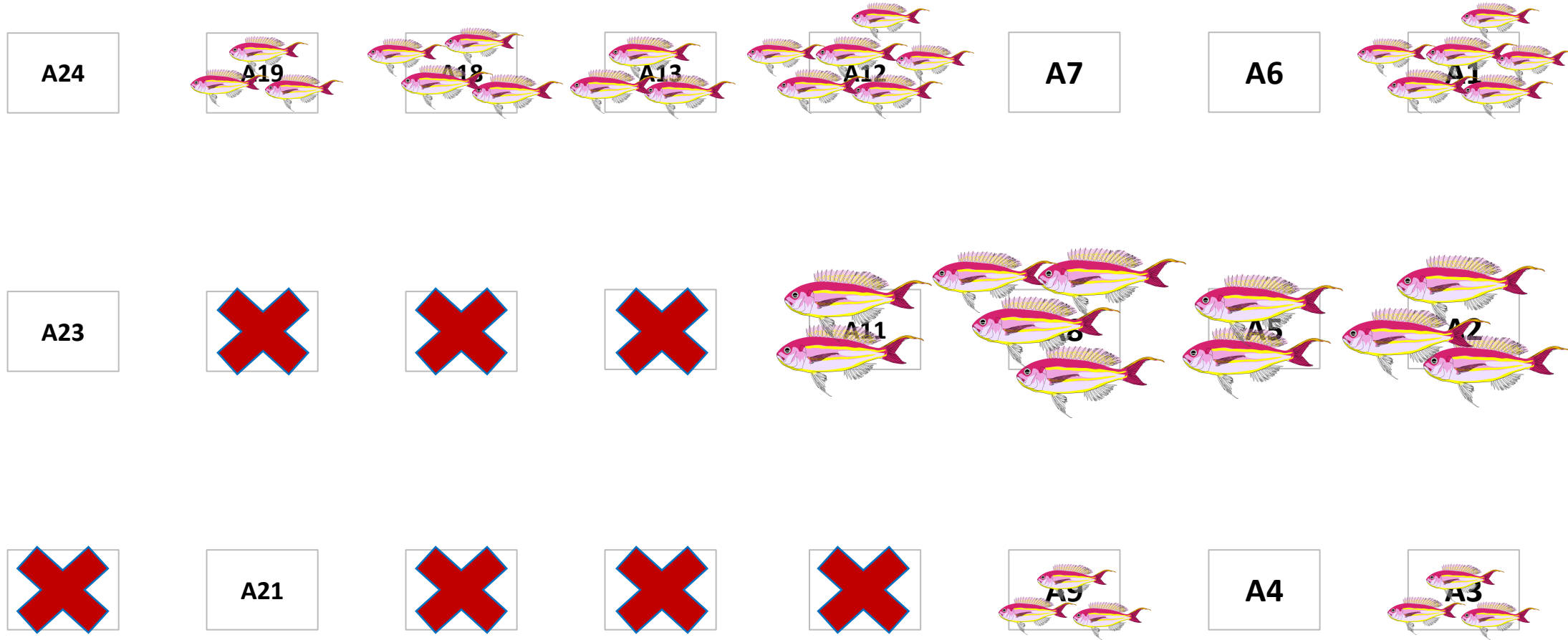


Coastal

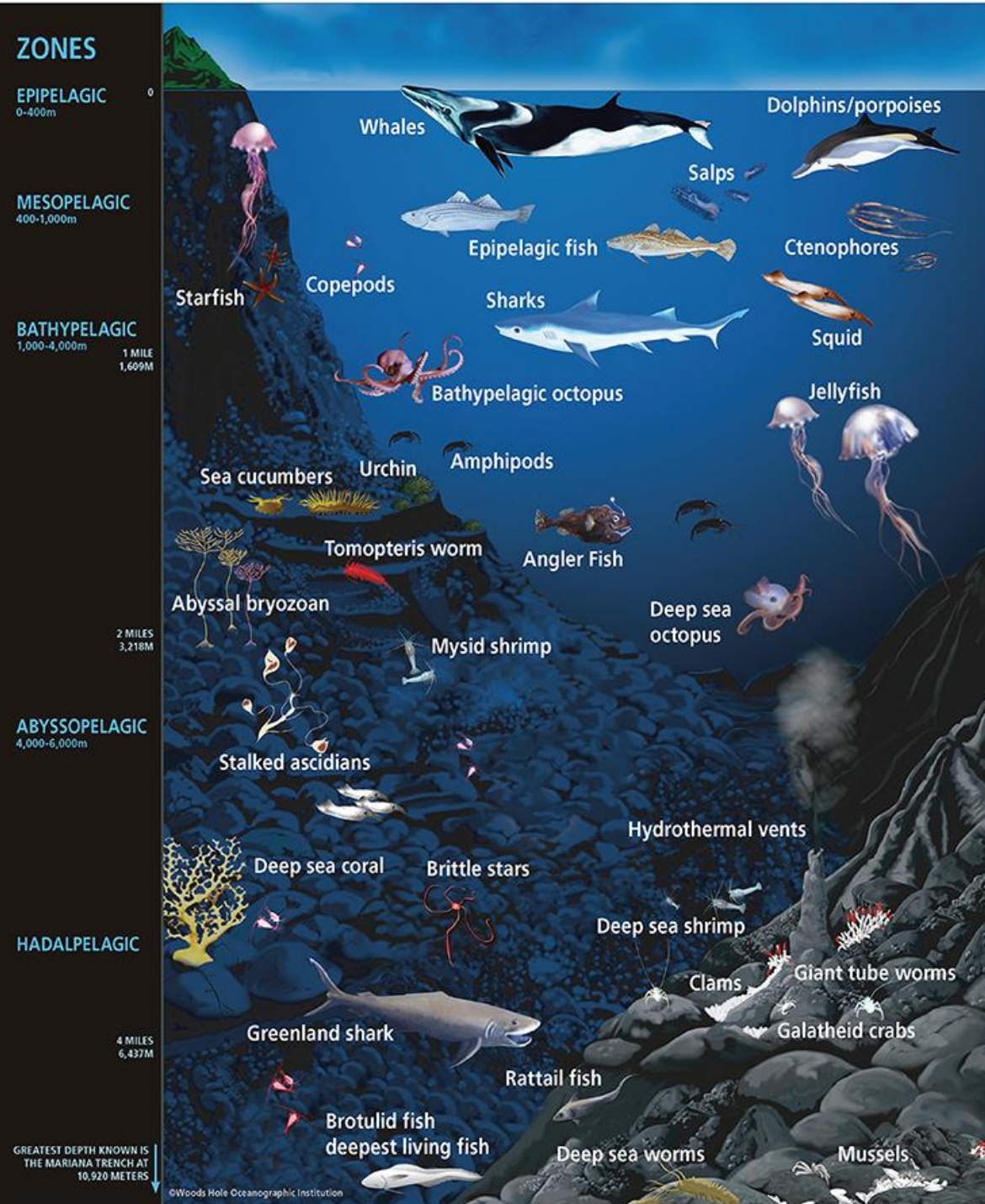


# Example, red sea bream (*Nemipterus* spp.)

Deep  
sea  
↑  
↓  
Coastal







Biodiversity

Genetic Diversity

Population Dynamics

Bio-  
Chemistry

Habitat  
Usage/Specification

Laval  
Distribution

Resilience

Distribution

Evolution  
and  
Adaptation

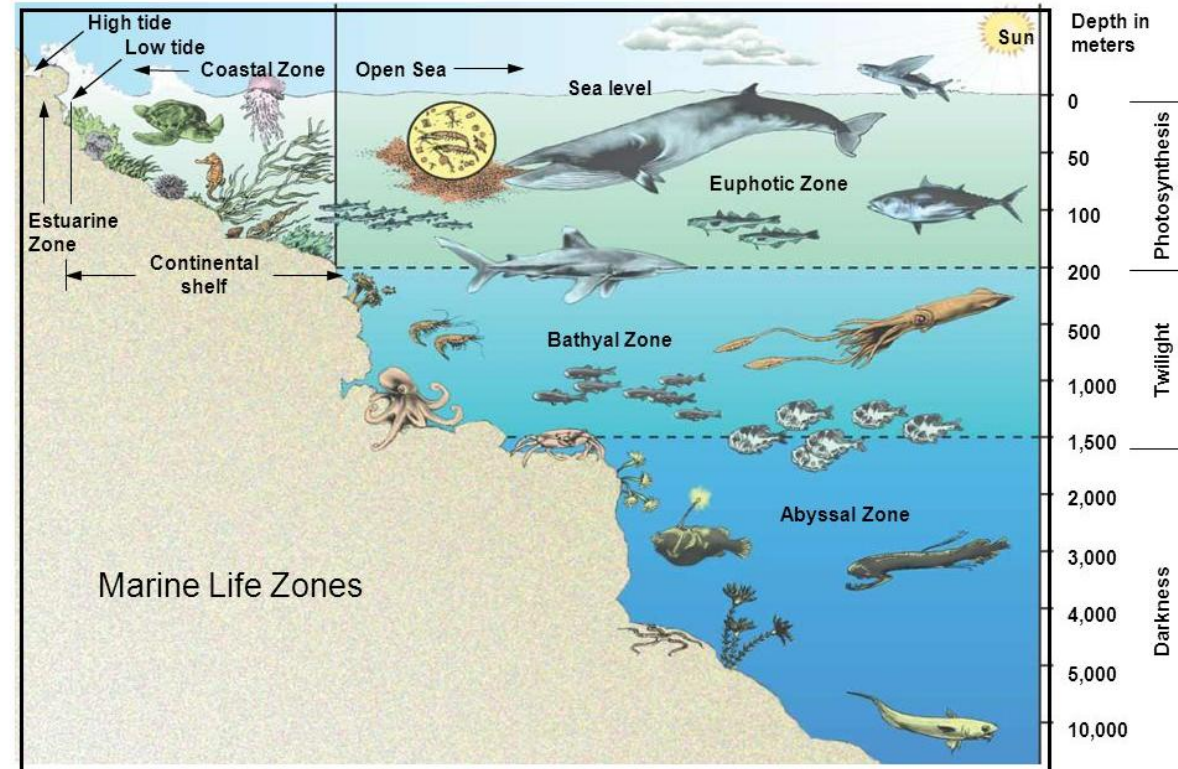
Stock Assessment

Comparative  
Physiology

Deepsea  
Ecology

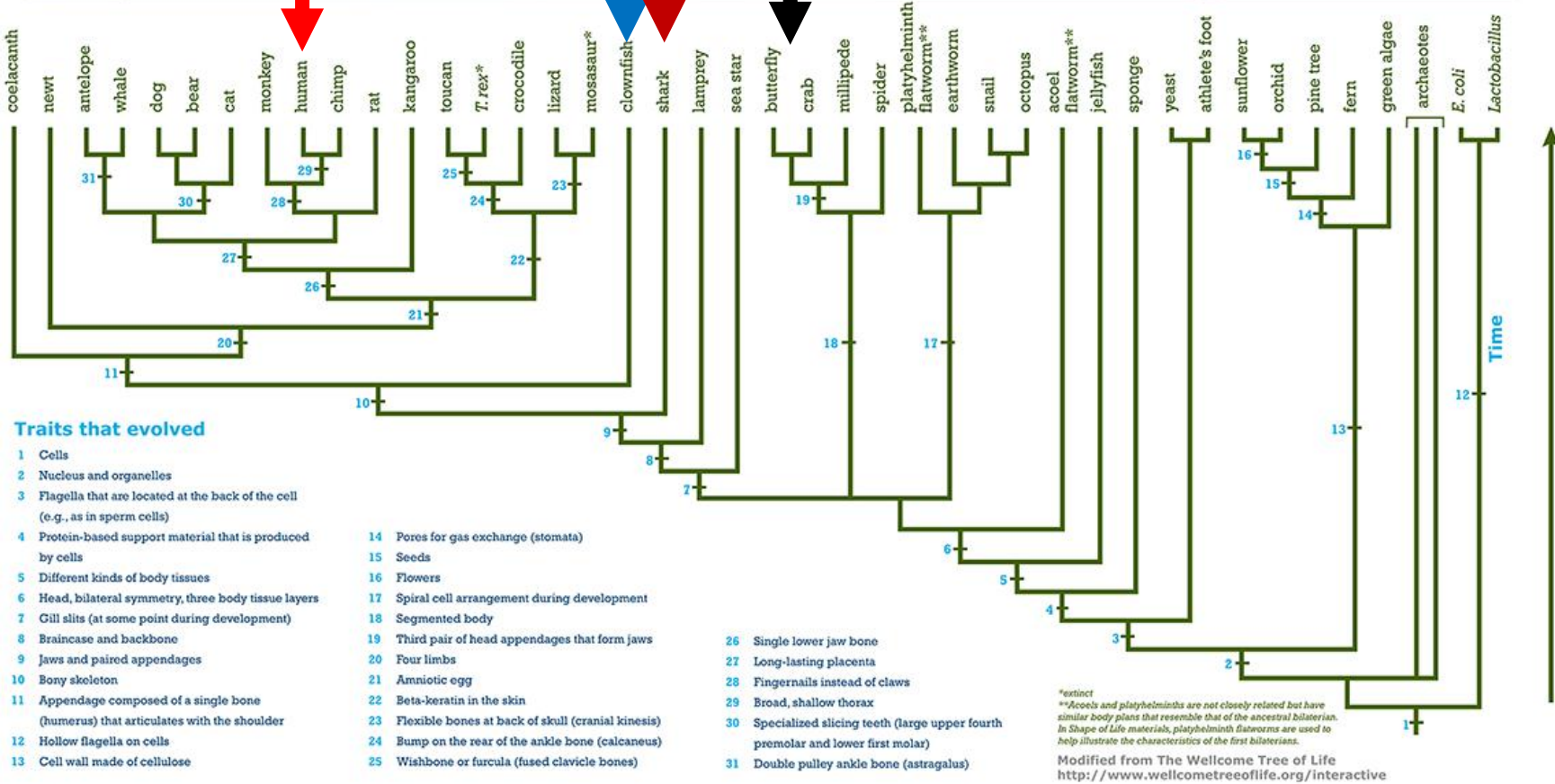
Hydrothermal  
vent

- 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









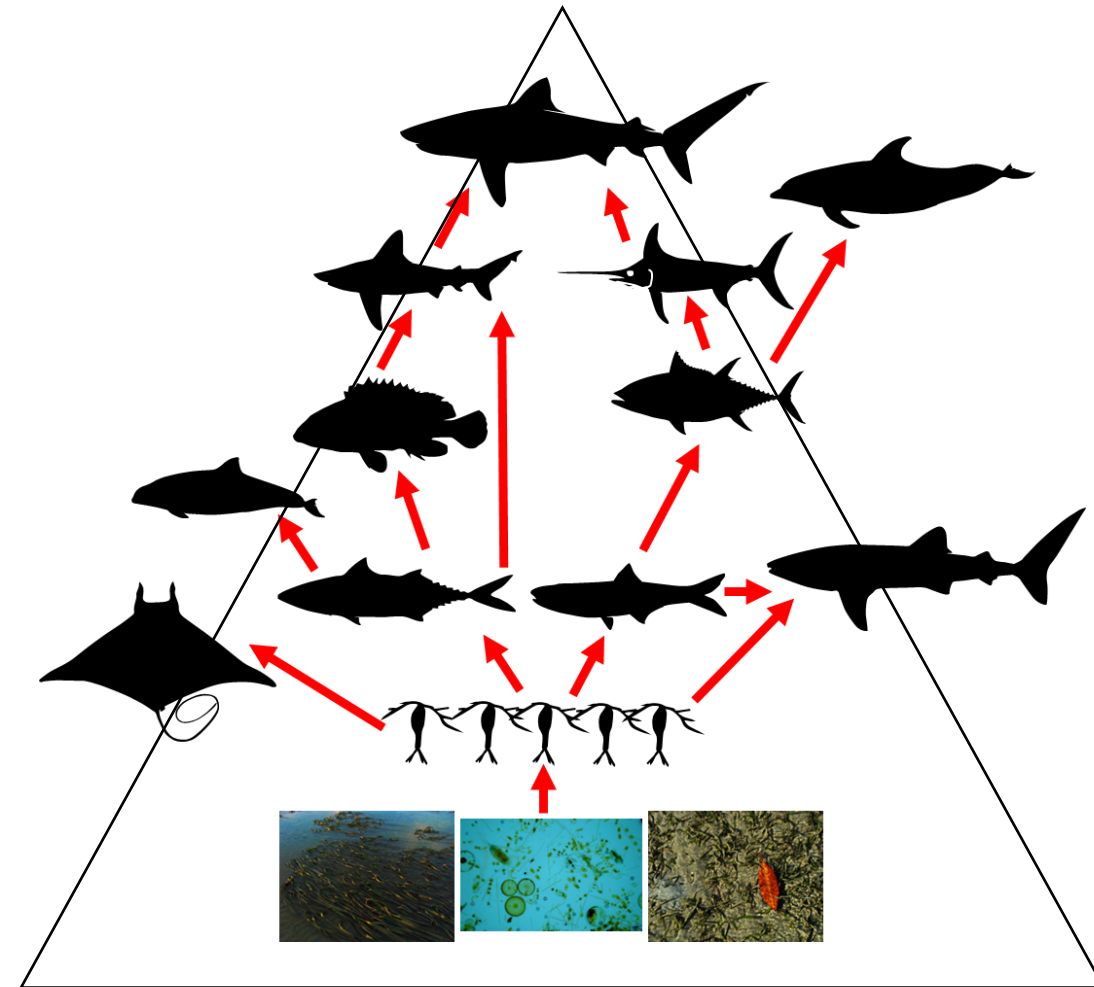
Visit **The Tree Room** at [www.treerom.org](http://www.treerom.org) to learn more about evolutionary trees.  
 UOMP Understanding Evolution - <http://evolution.berkeley.edu>  
 © 2015 The University of California Museum of Paleontology, Berkeley, and the Regents of the University of California

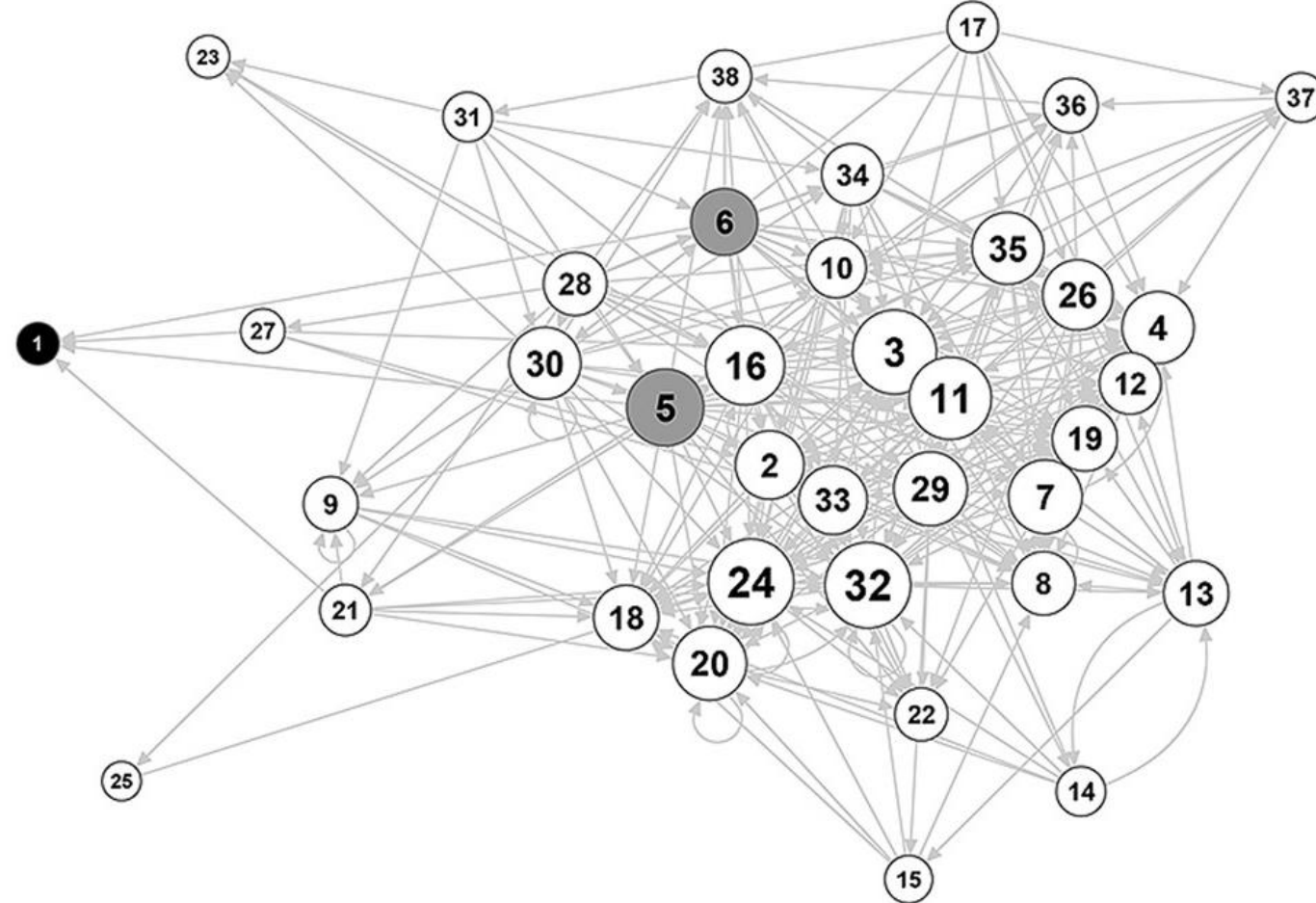


- All life forms are related at some points.
- The distance between point to point indicate the evolution.
- The closer, the more relate between taxa.

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

LEVEL 4	<h3>Top Predators</h3> <p>The ocean's top predators—be they fish, mammals, or birds—are simply larger and faster than most of their competition. Some have no predators but humans.</p> 
LEVEL 3	<h3>Carnivores</h3> <p>The ocean's smaller carnivores, such as sardines, feast on herbivores like zooplankton—but ultimately serve as nourishment for bigger, faster animals atop the food chain.</p> 
LEVEL 2	<h3>Herbivores</h3> <p>Tiny grazing animals (zooplankton) devour the sea's phytoplankton in staggering numbers, and larger invertebrates (such as sea urchins) and vertebrates (such as parrotfish and manatees) eat seaweed and seagrasses.</p> 
LEVEL 1	<h3>Photo-Autotrophs (Plants)</h3> <p>Every species in the sea's food chain needs organic carbon to survive, and these tiny organisms produce it all, as plants do on land. Phytoplankton tap energy from the sun to fuel the entire ocean ecosystem.</p> 



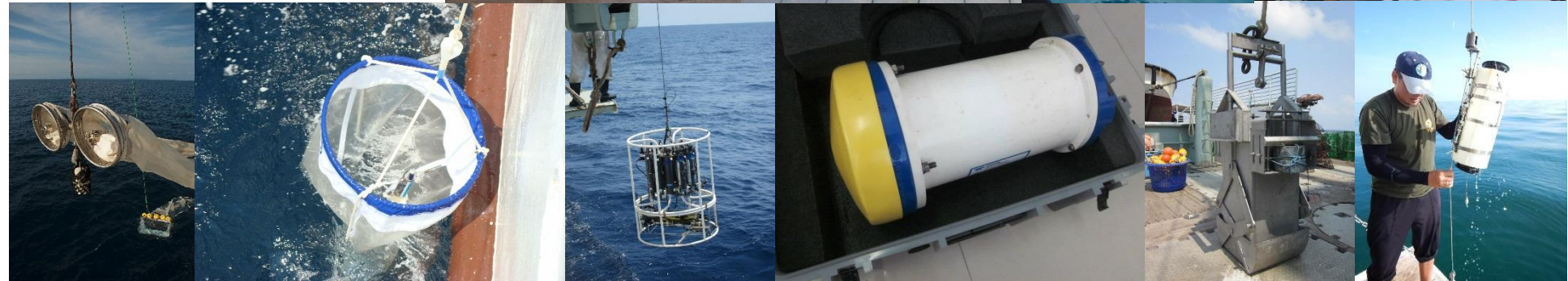
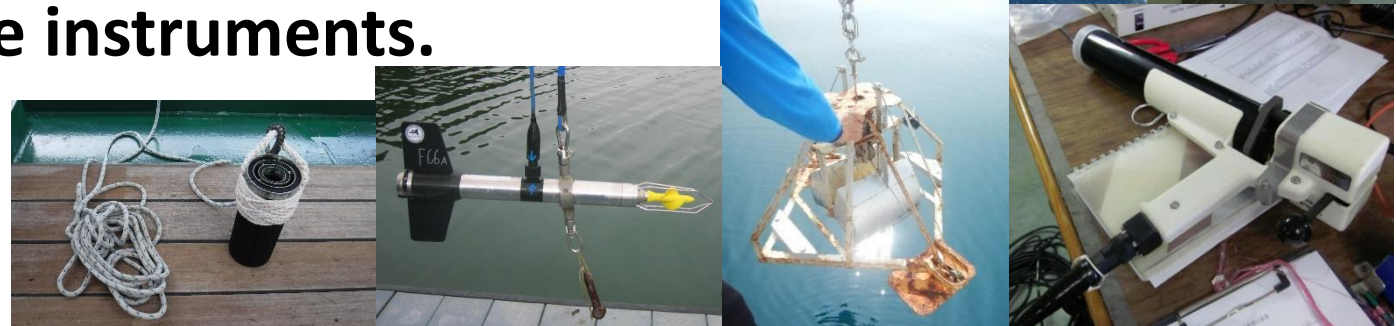
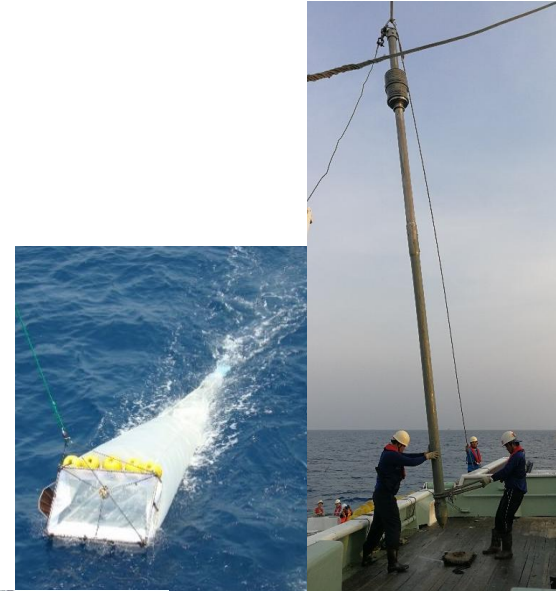


- |                |                     |                     |                  |                    |
|----------------|---------------------|---------------------|------------------|--------------------|
| 1 Clam_fishers | 9 Sea_urchin        | 17 Seaweed          | 25 Silverfish    | 33 Leopard_grouper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

# Biological Oceanographic Instrument

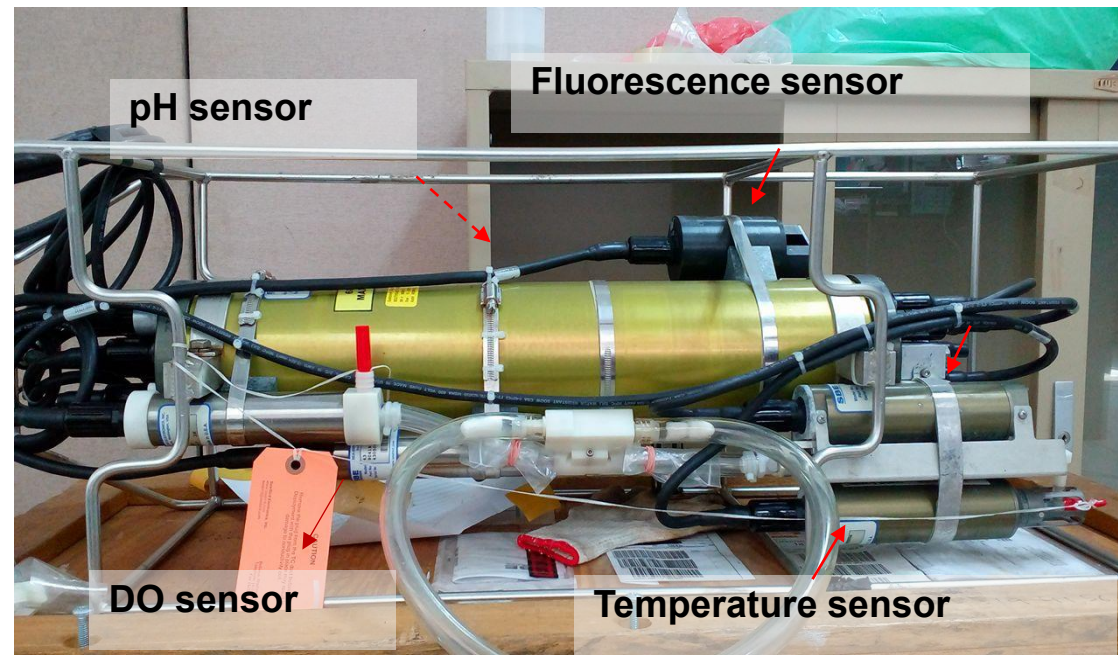
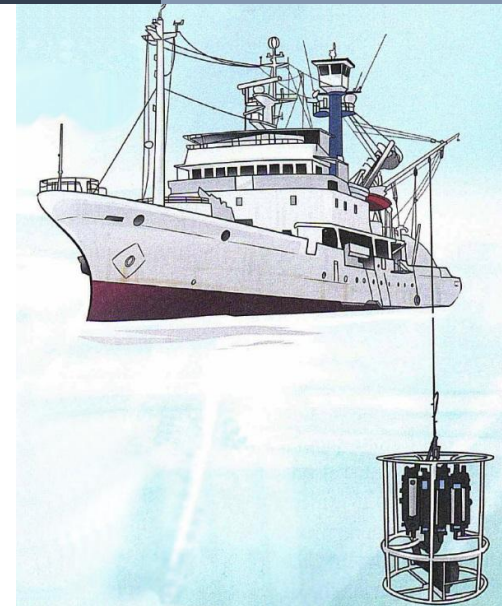
14

- 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.**

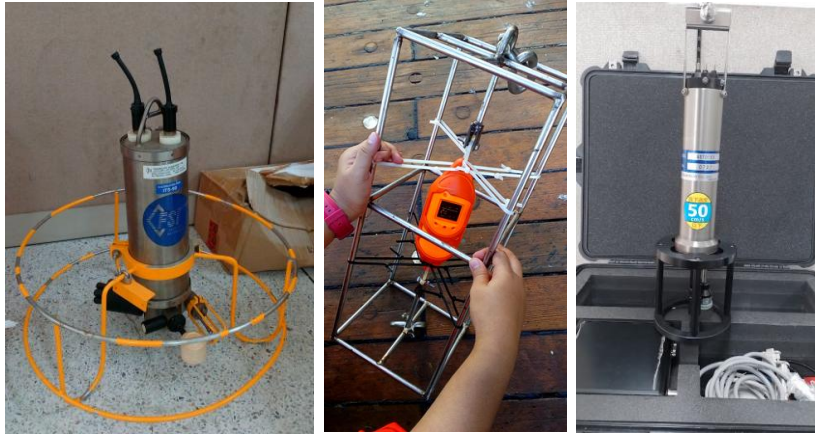


## Conductivity Temperature Depth (CTD)

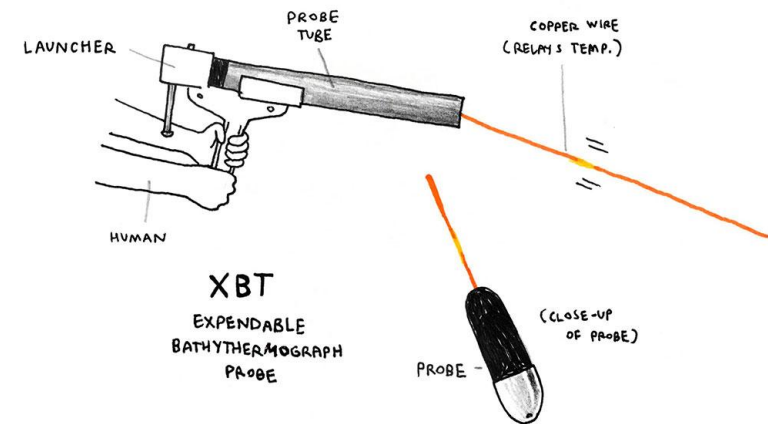
- The maximum operation depth: 6800 meters.
- With a frame, it can collect water from 12 depth ranges.
- Can put additional sensors along.
- Send the real-time signal to the processing unit onboard.



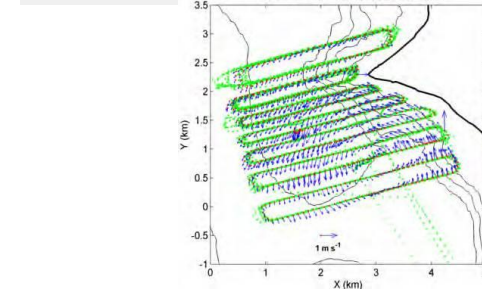
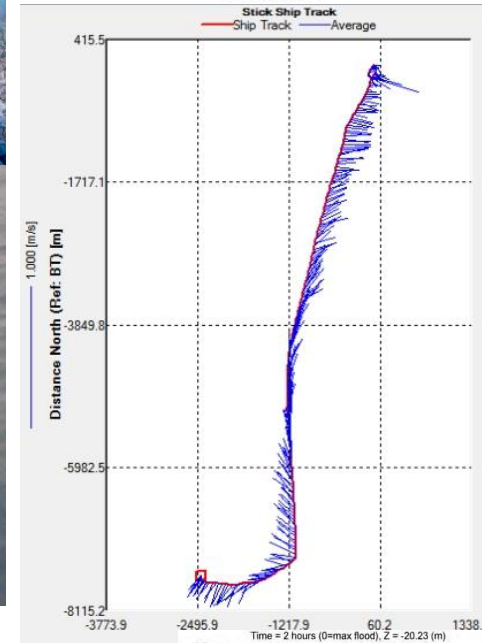
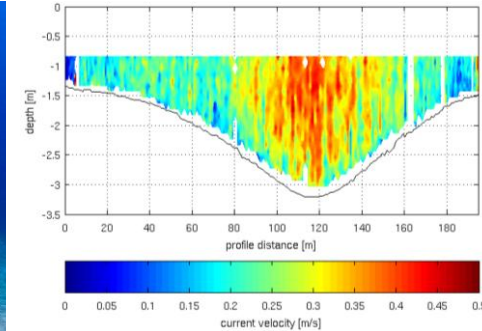
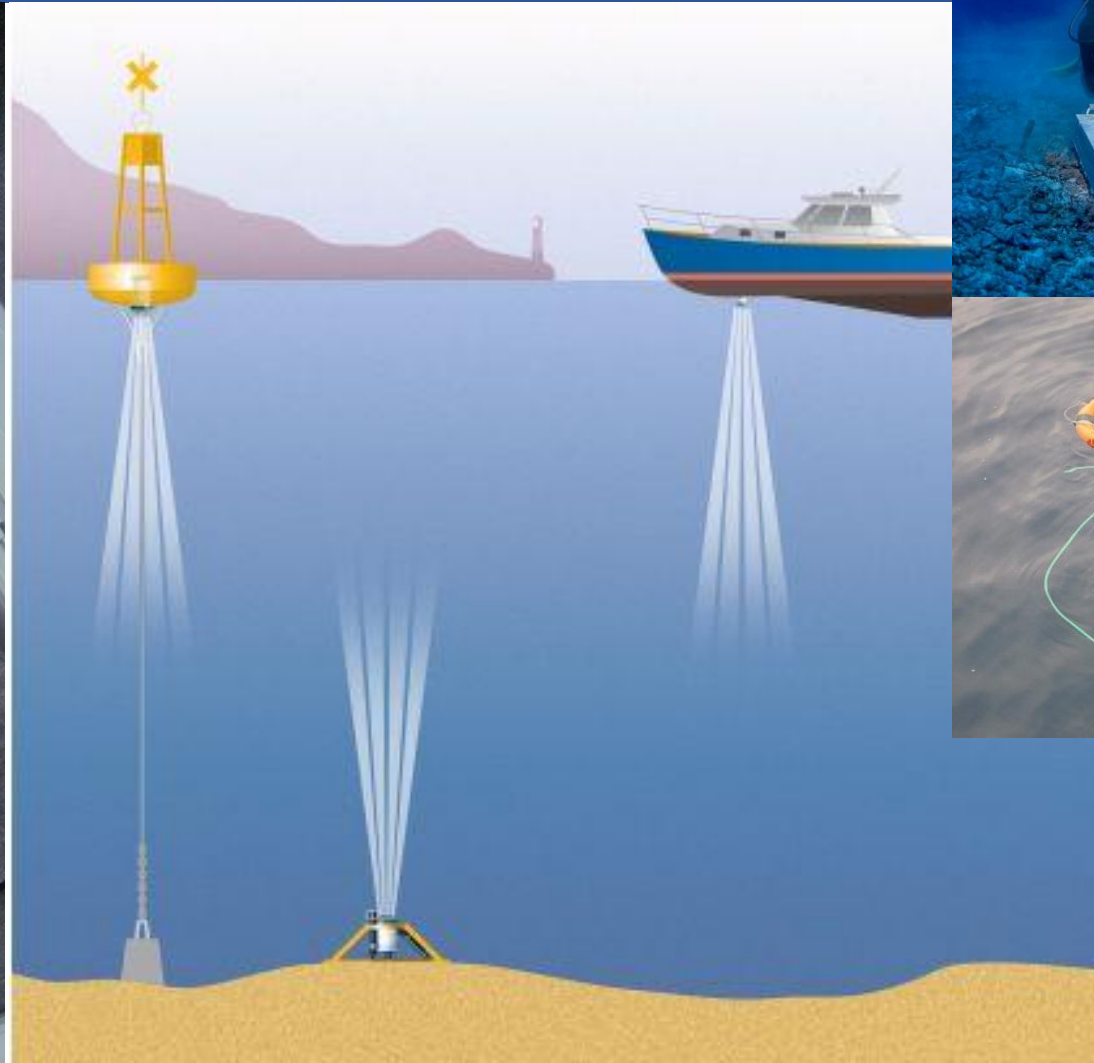
## Conductivity Temperature Depth (CTD)



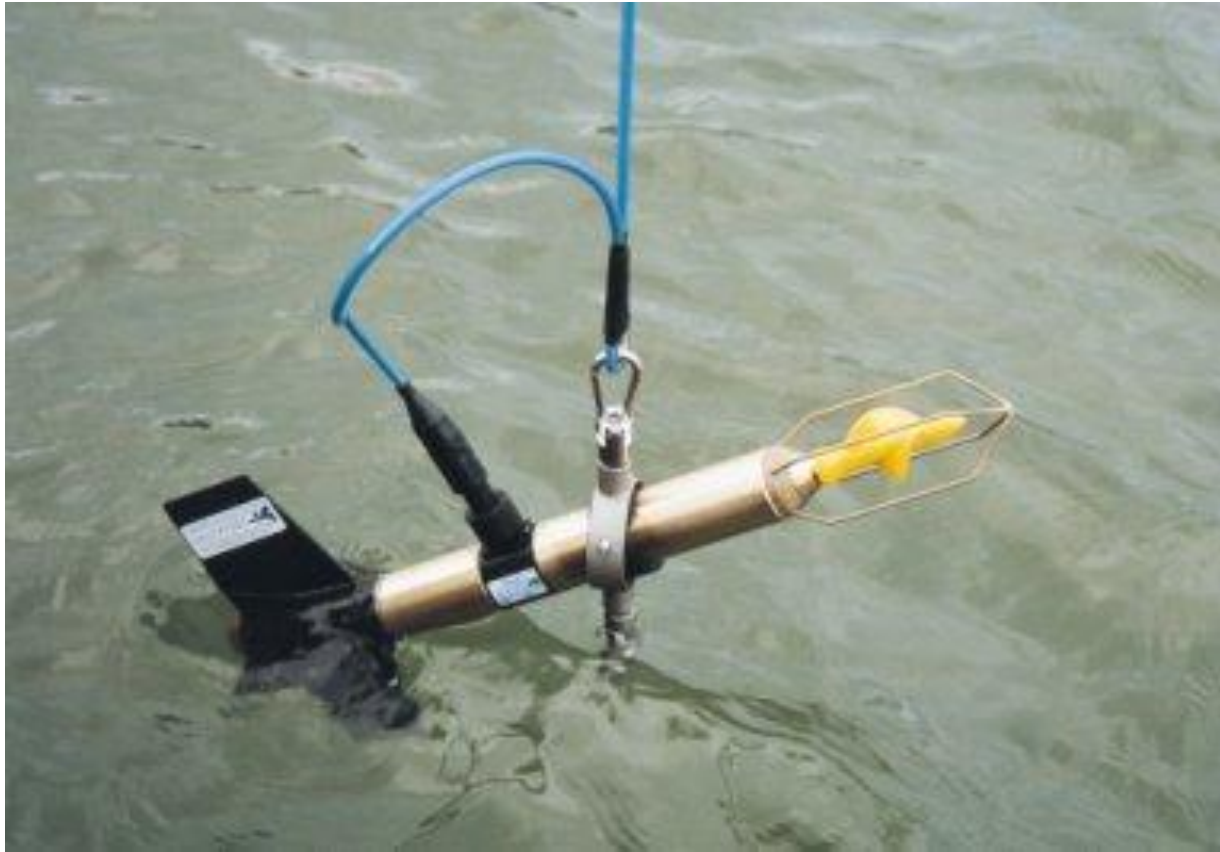
## Expendable Bathythermograph Probe (XBT)



## Acoustic Doppler Current Profilers (ADCP)

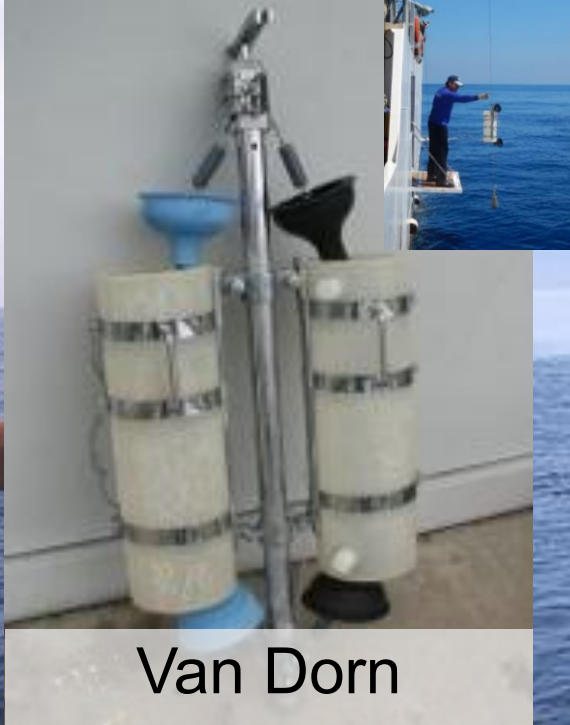
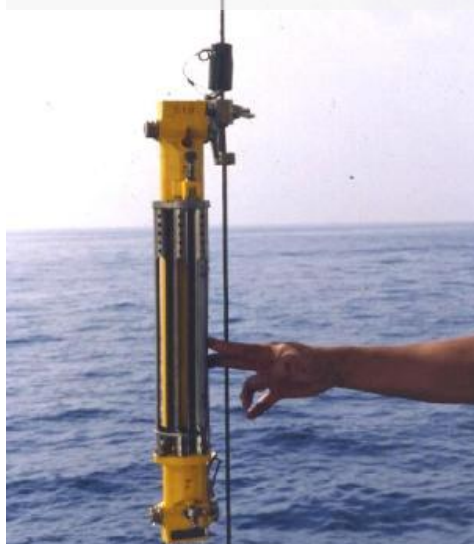


## Current Meter



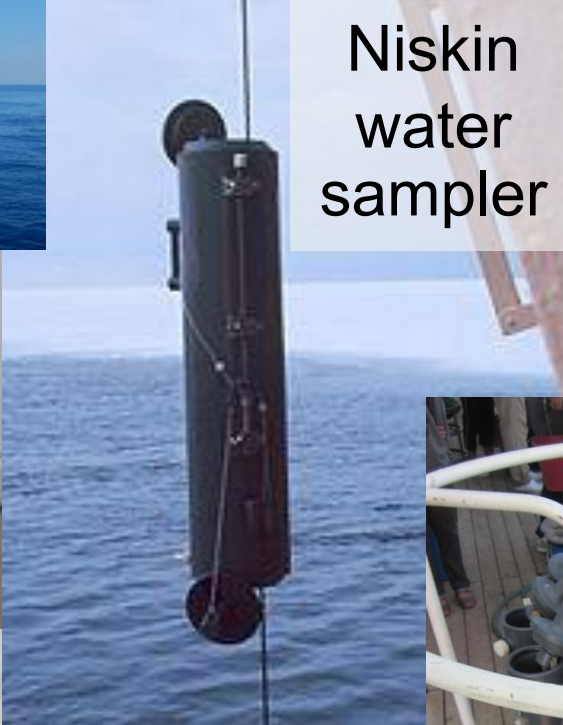
## Water Sampler

Nansen bottle



Van Dorn

Niskin water sampler



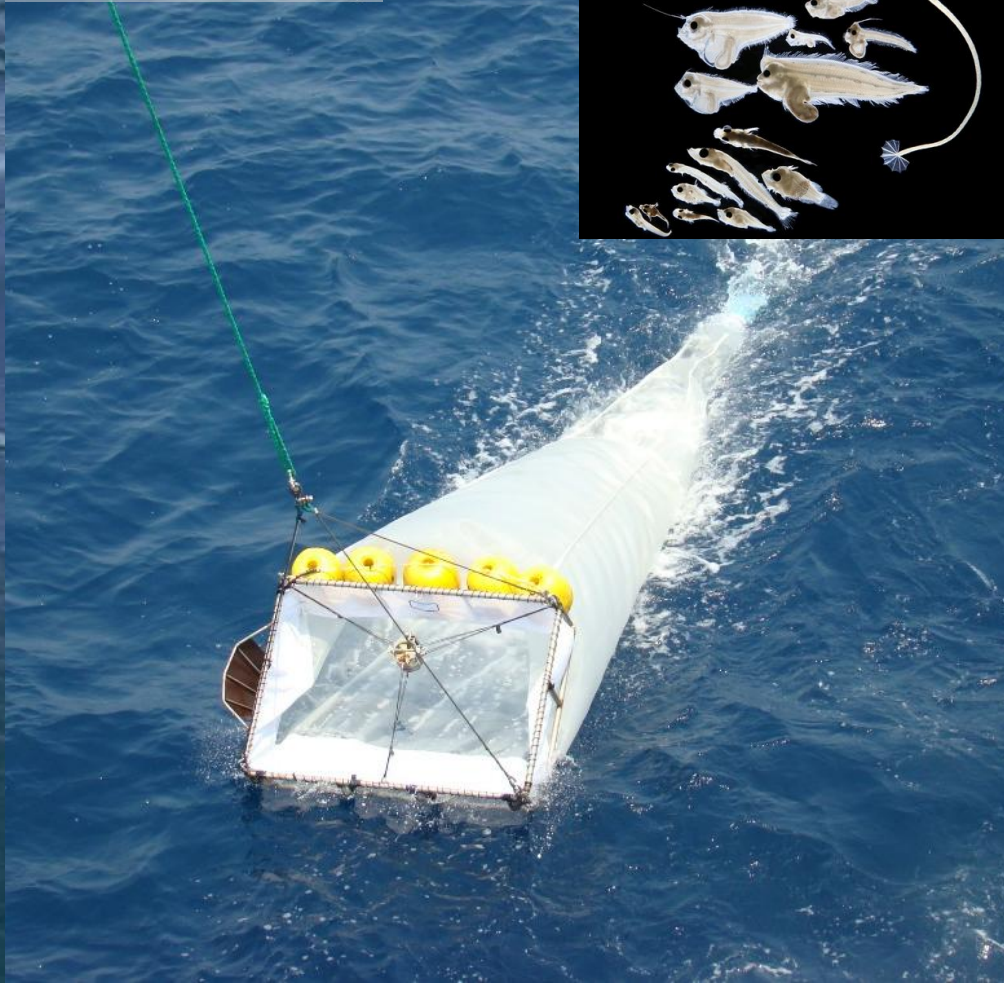
Ruttner water sampler

## Plankton Sampler

Bongo net



Neuston net



O-ring net

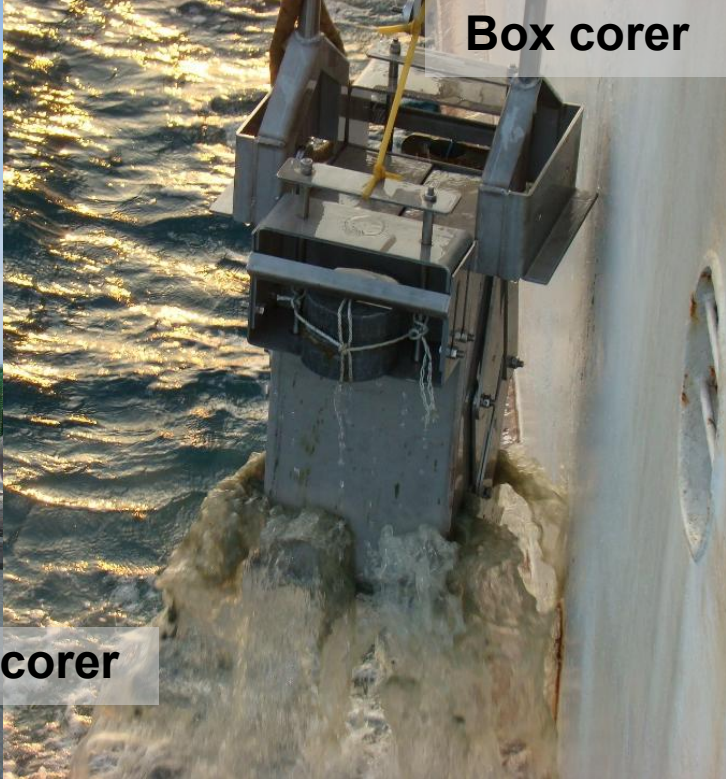


Norpac net for zooplankton

## Grab



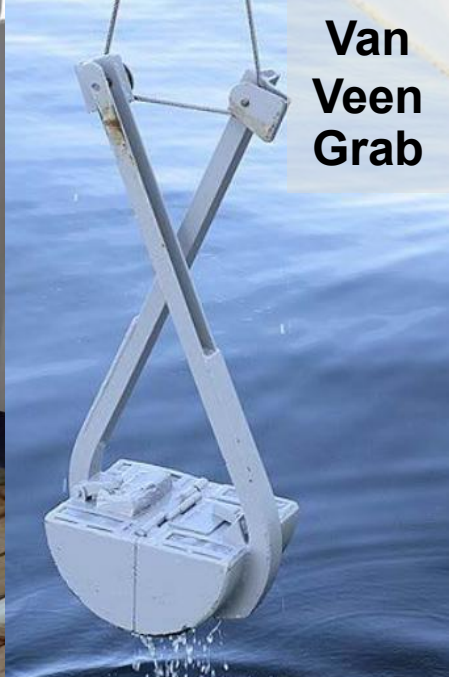
Box corer



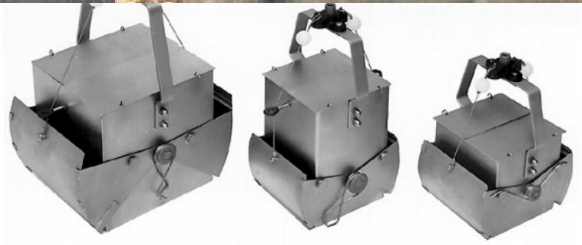
Box corer



Smith McIntyre Grab



Van Veen Grab



Ekman Grab



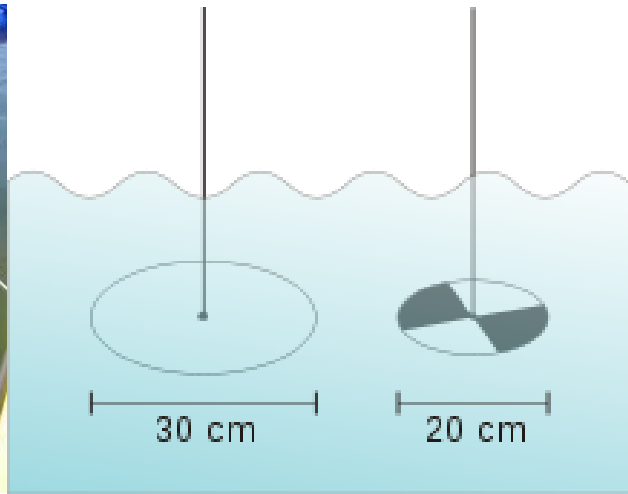
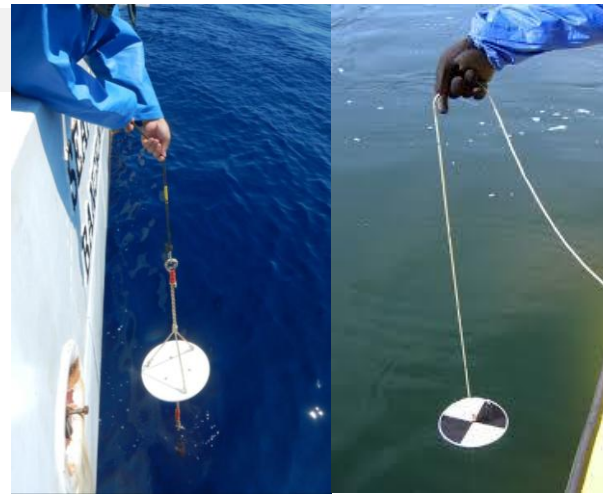
## Water surface

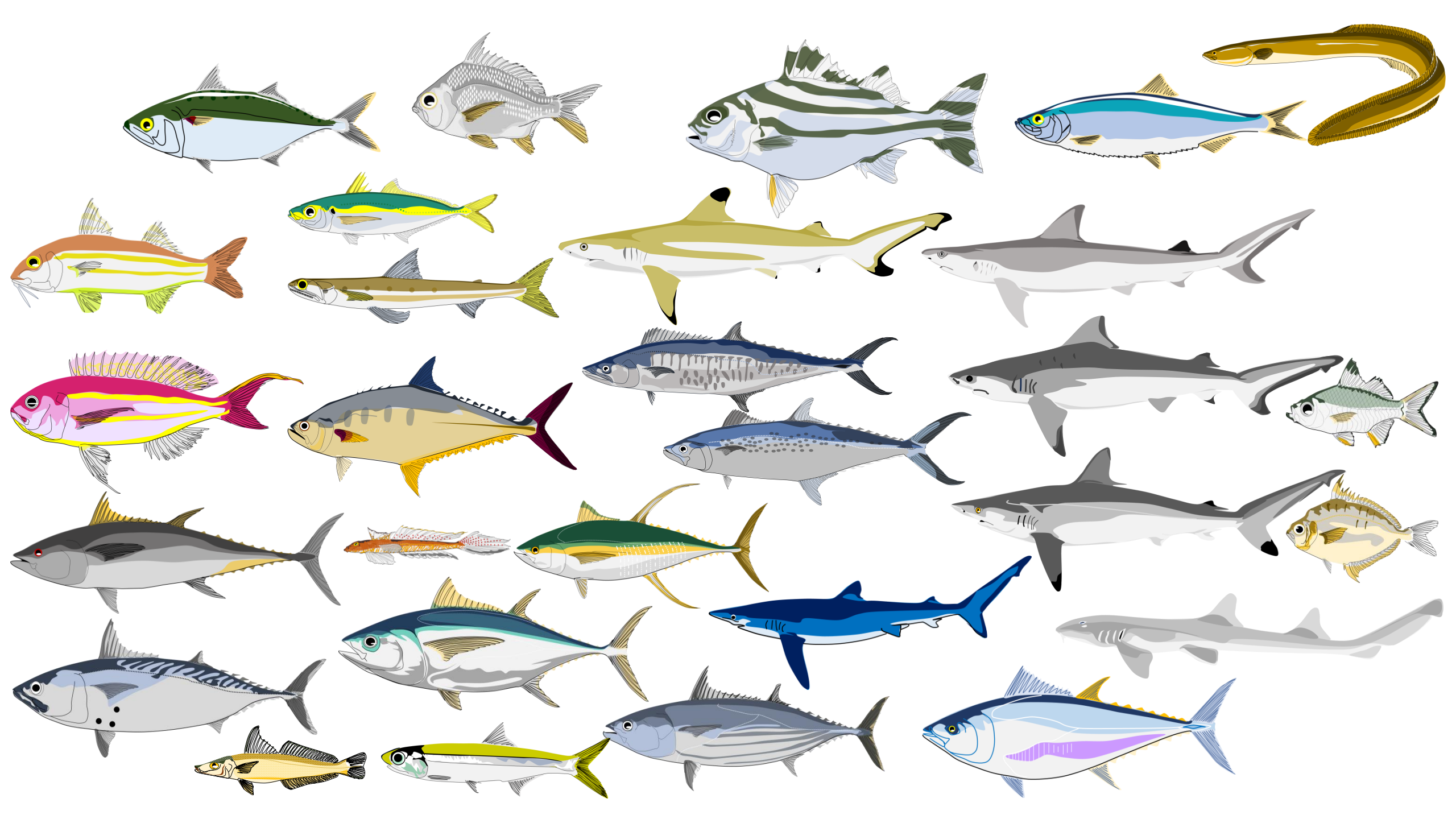


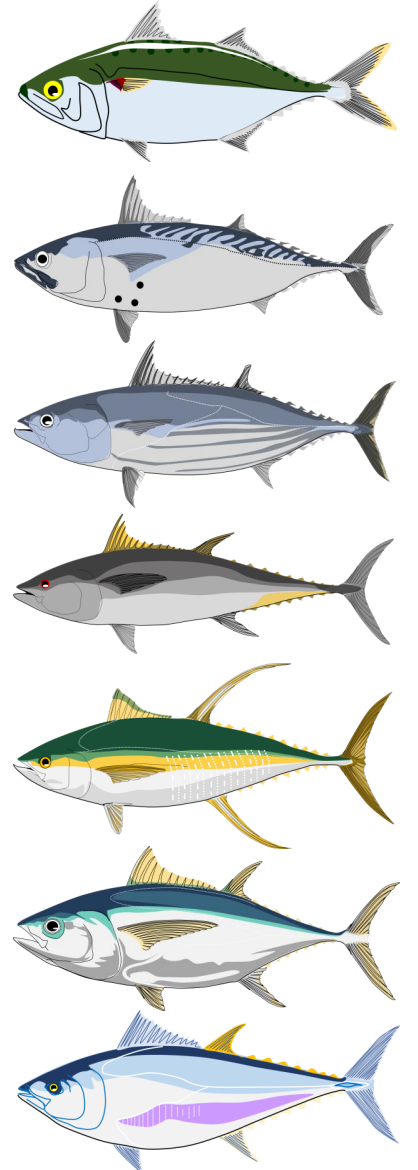
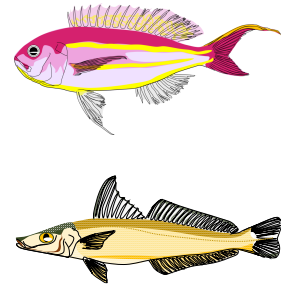
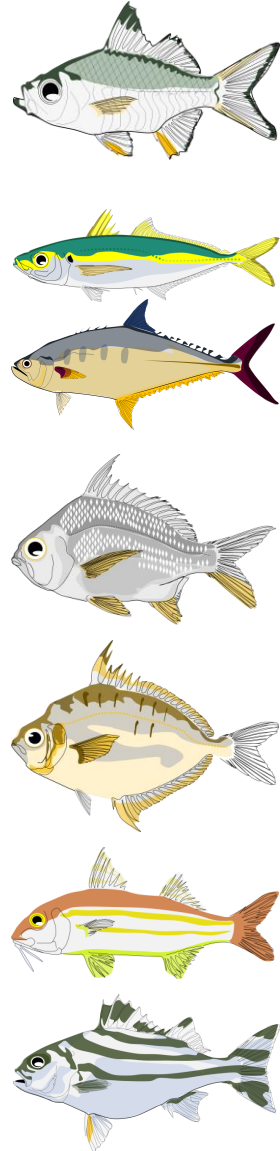
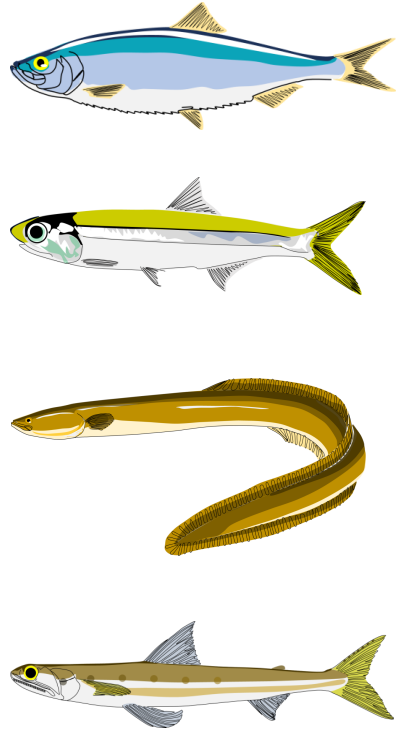
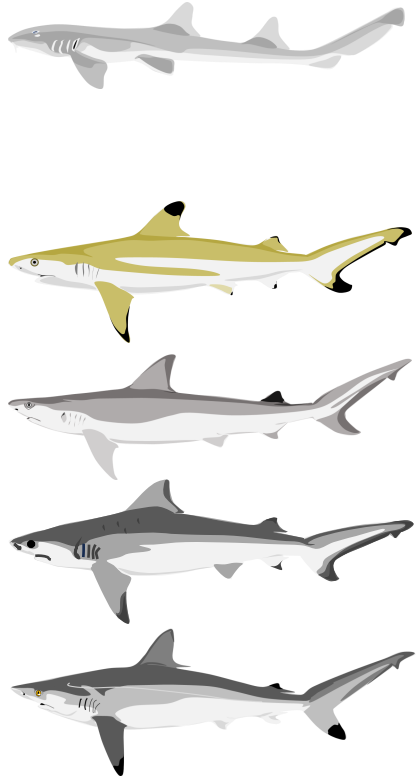
Forel-Ule scale



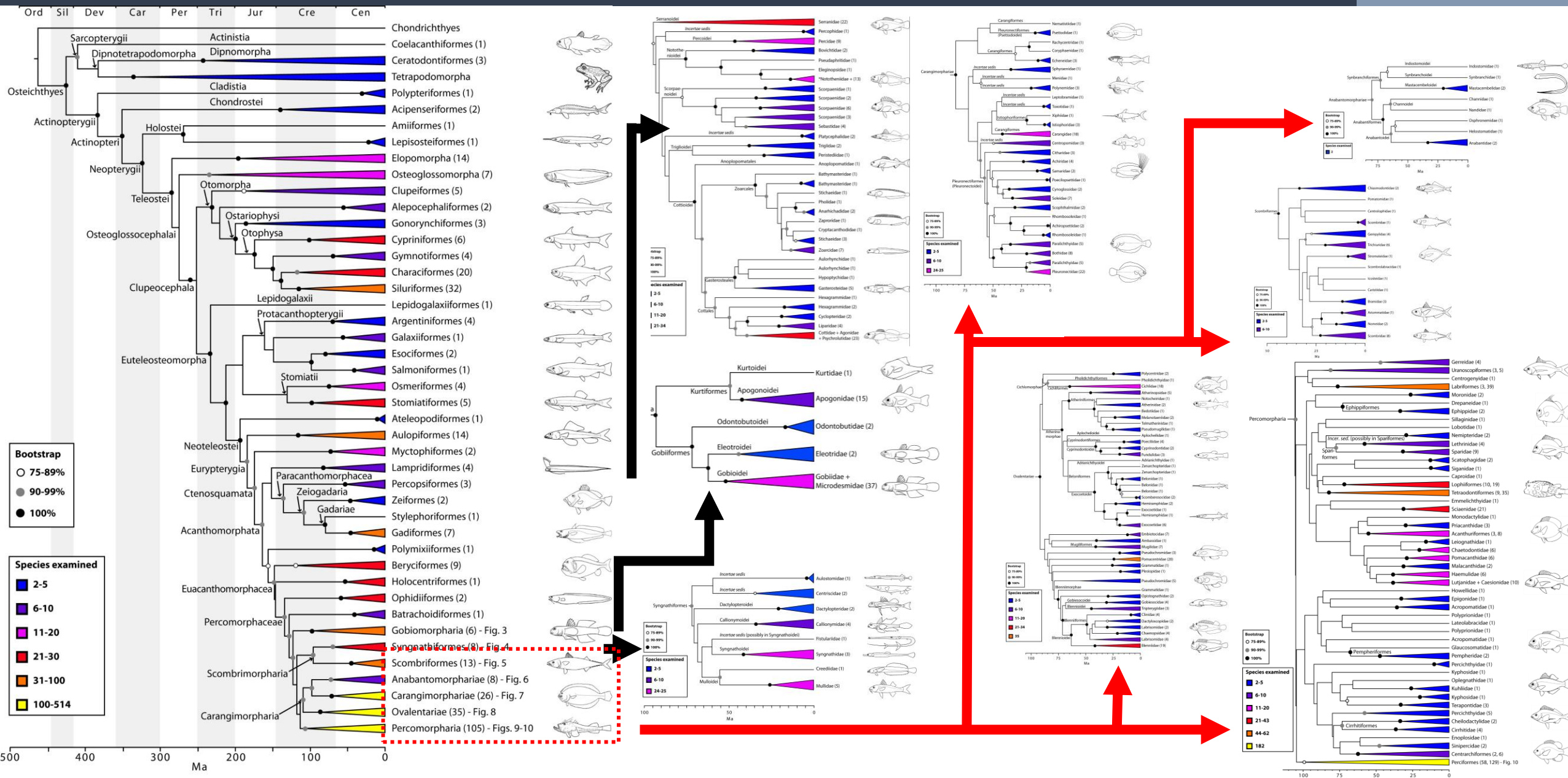
Secchi dish

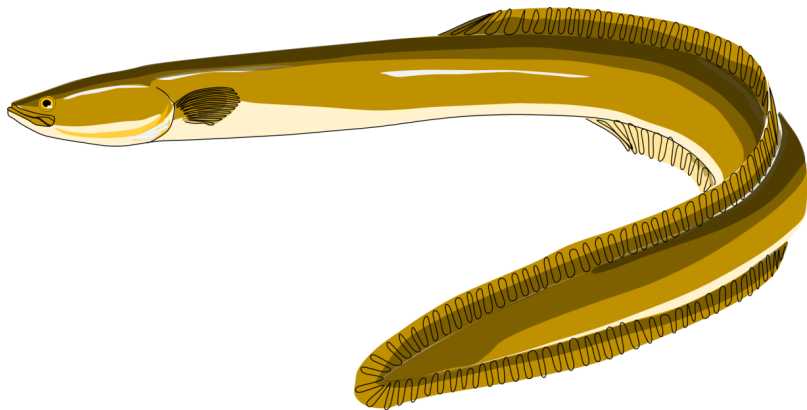
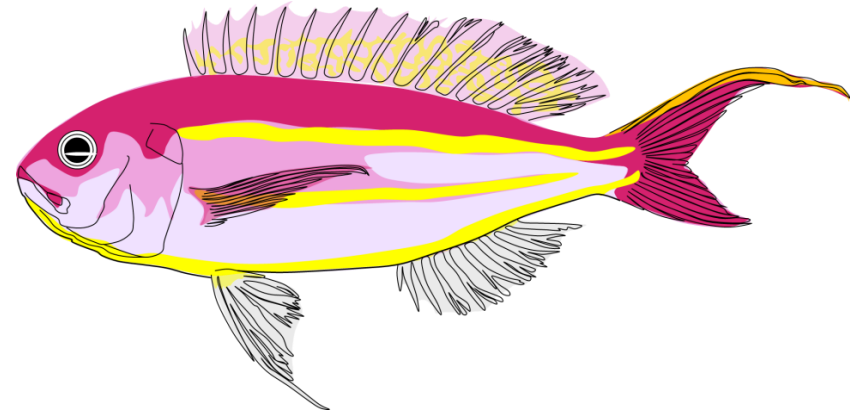
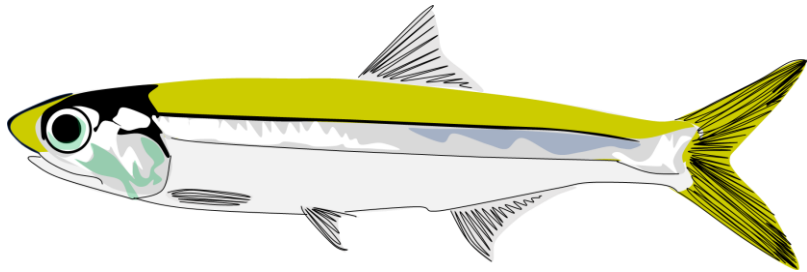
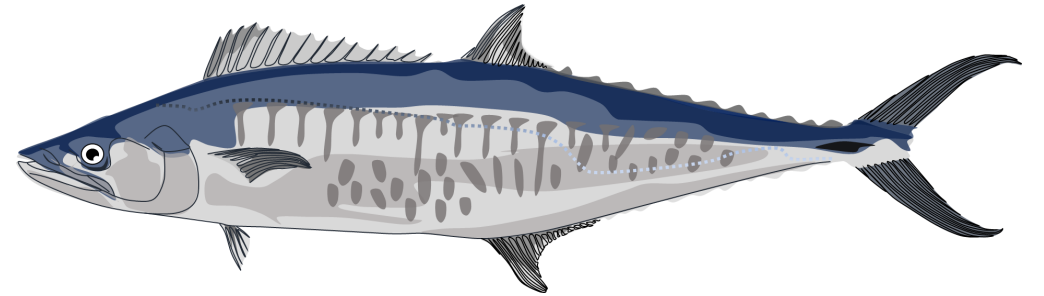
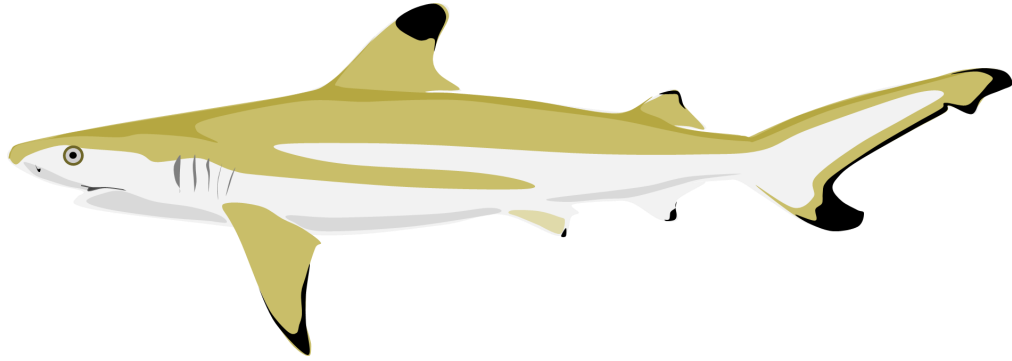


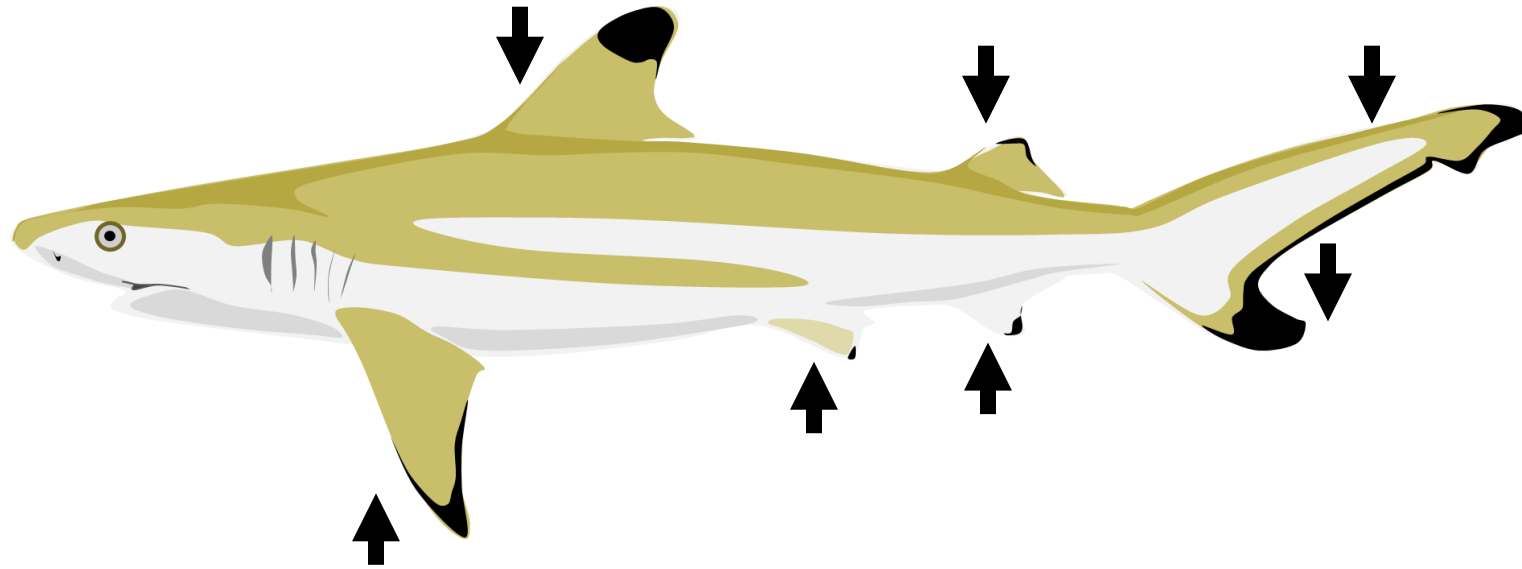




# Phylogenetic Tree: Fish Edition







1) 1<sup>st</sup> dorsal fin

2) 2<sup>nd</sup> dorsal fin

3) Upper caudal fin

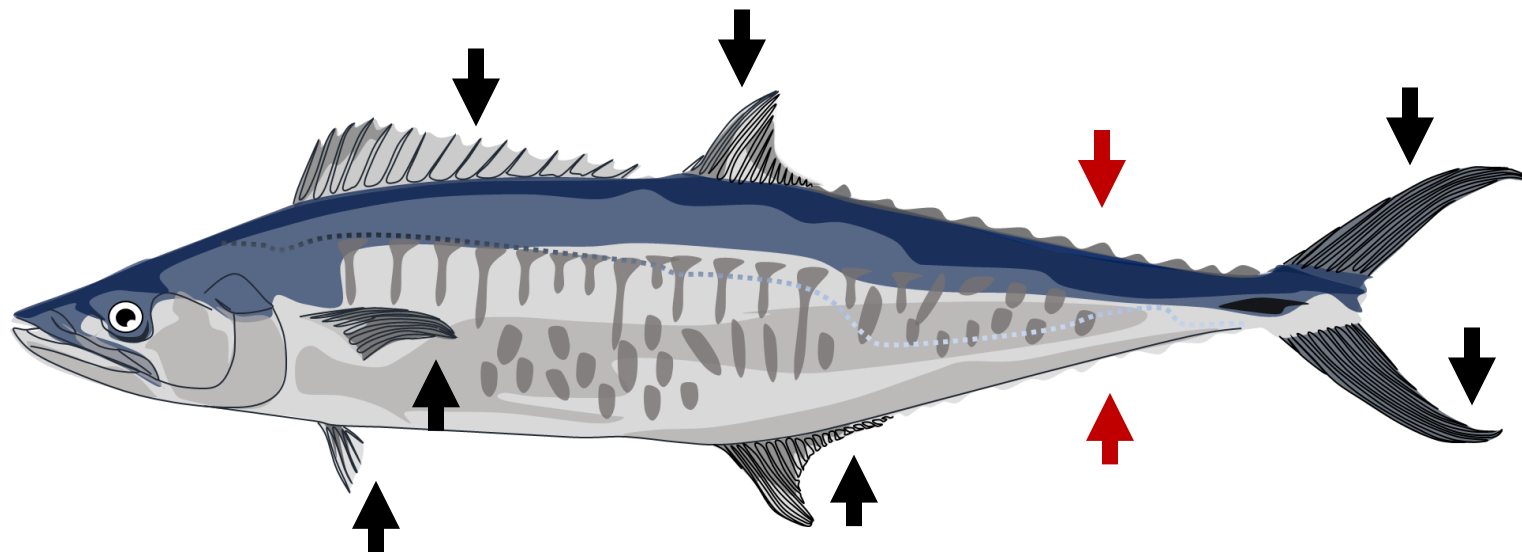
4) Lower caudal fin

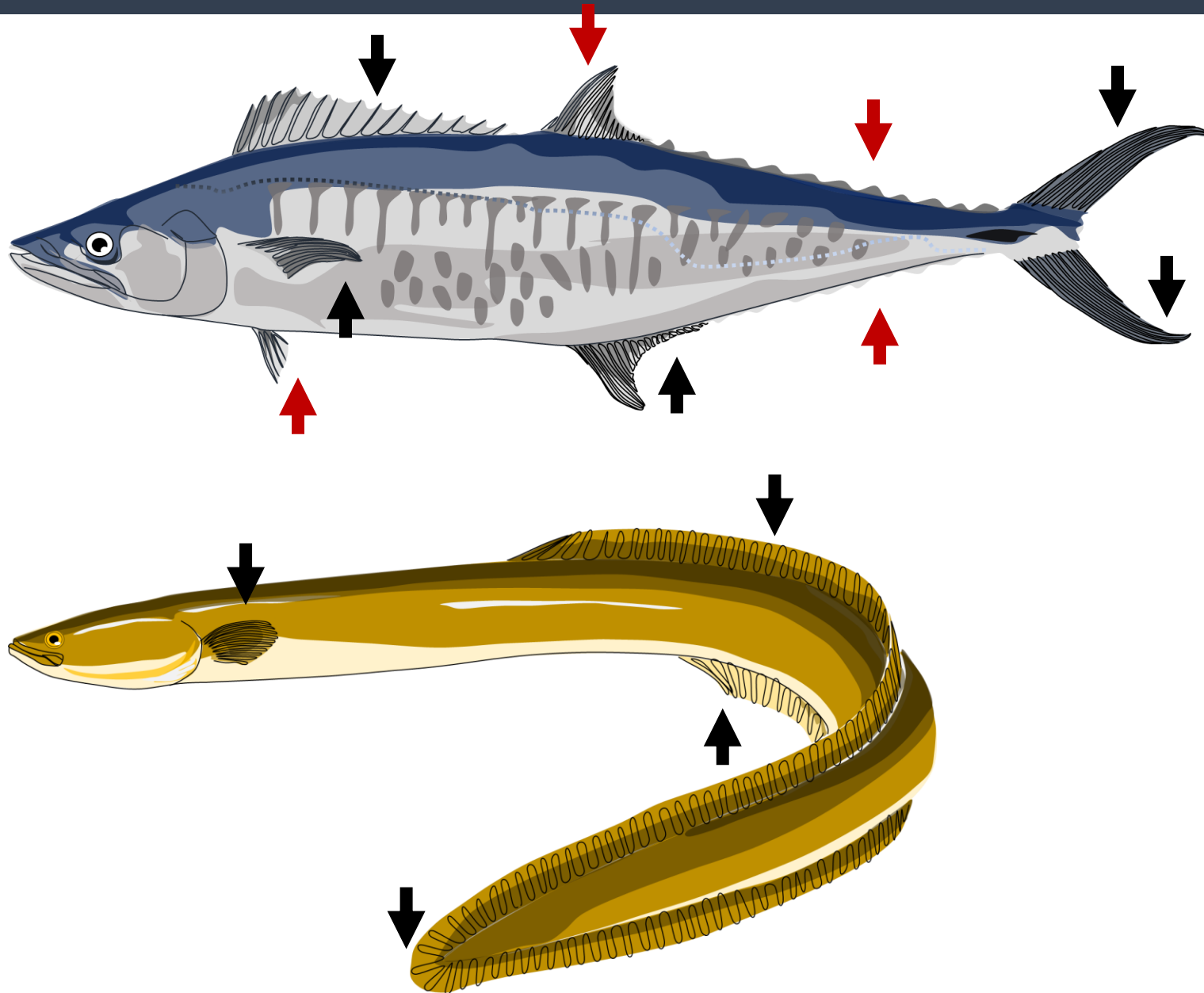
5) Pectoral fin

6) Pelvic fin

7) Anal fin

8) **Finlet**





1) 1<sup>st</sup> dorsal fin

2) 2<sup>nd</sup> dorsal fin

3) Upper caudal fin

4) Lower caudal fin

5) Pectoral fin

6) Pelvic fin

7) Anal fin

8) Finlet

