



The Importance of Sharks to Our Oceans

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Evolution of sharks and rays

- They have been evolving for **400 million years**.
- The **fossil record** for elasmobranchs is **three times greater** than that for **dinosaurs**.
- **Extant sharks and rays** can be traced back **100 million years**



John G. Maisey

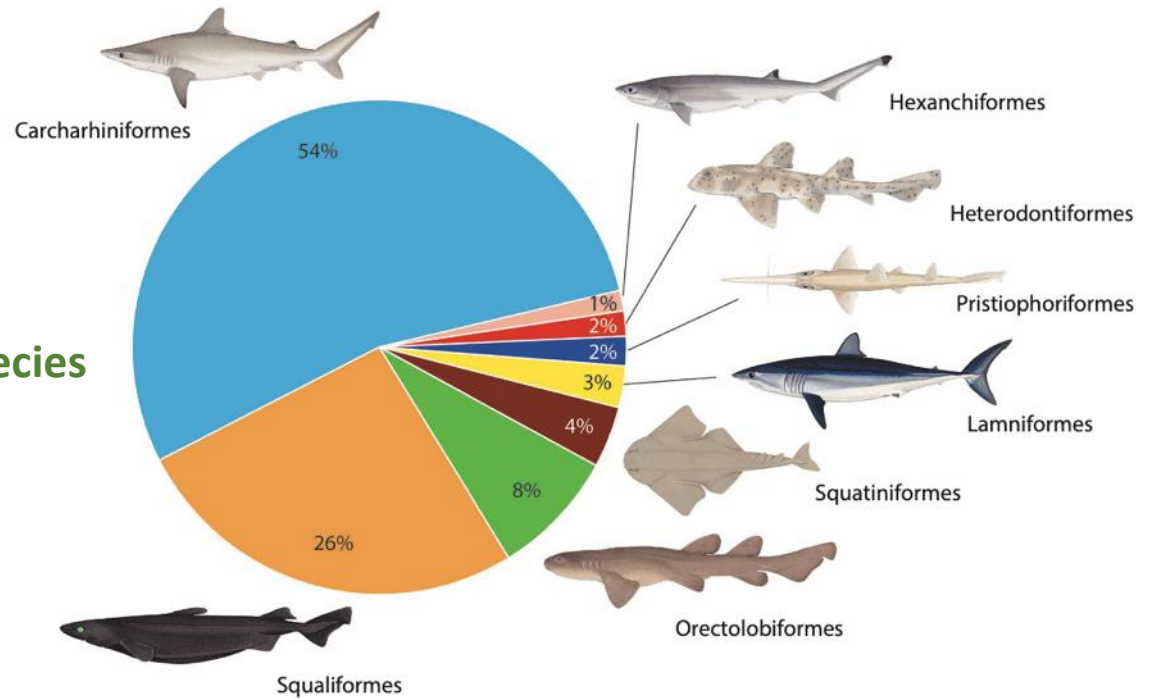
Xenacanth shark (2 m, 250 M yrs.)

From 20,000 known marine fish species...



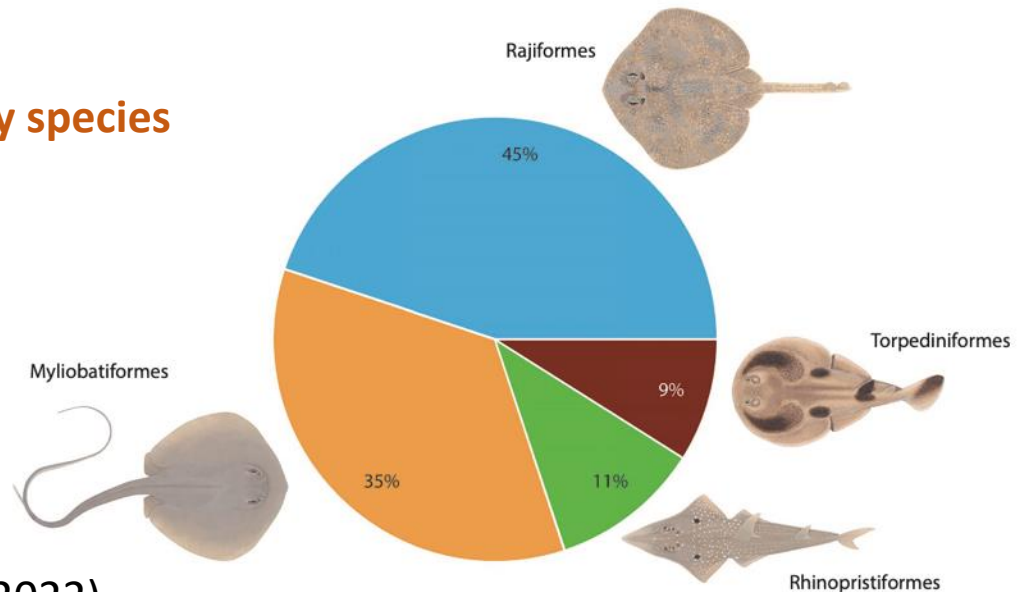
1,249 species belong to the Chondrichthyans

- 544 shark species (8 orders)



- 658 skate and ray species (4 orders)

47 chimera species



White et al. (2022)

Size range of sharks species

Whale shark
Tiburón ballena
(18.8 m)



Dwarf lantern shark
Tiburón cigarro
(17 cm)



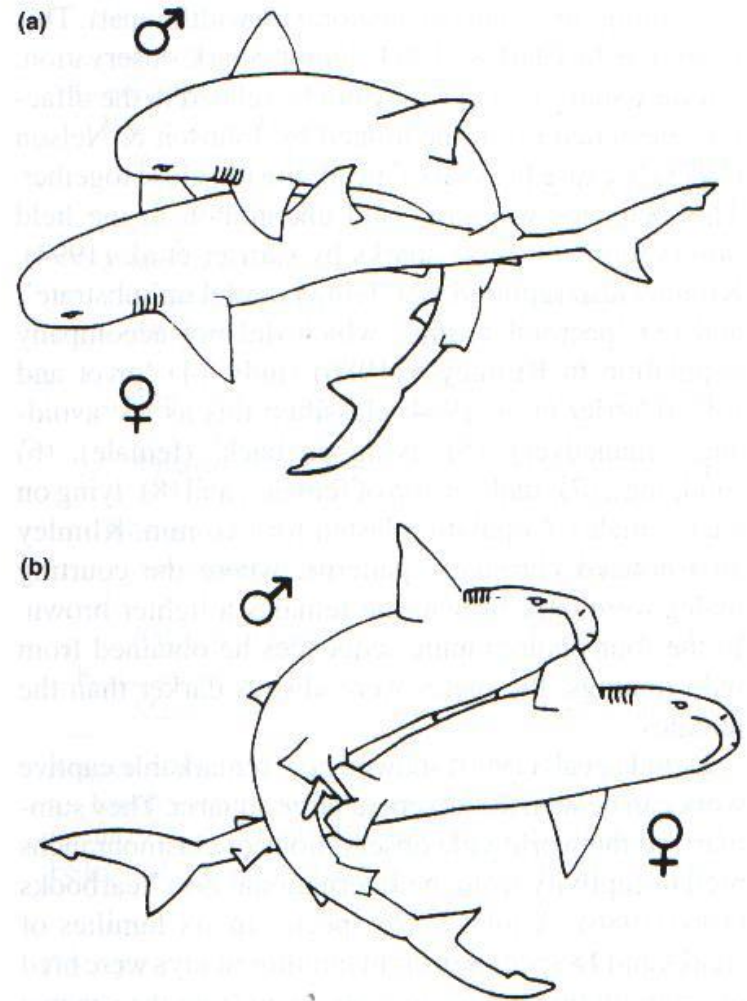
Shark reproduction



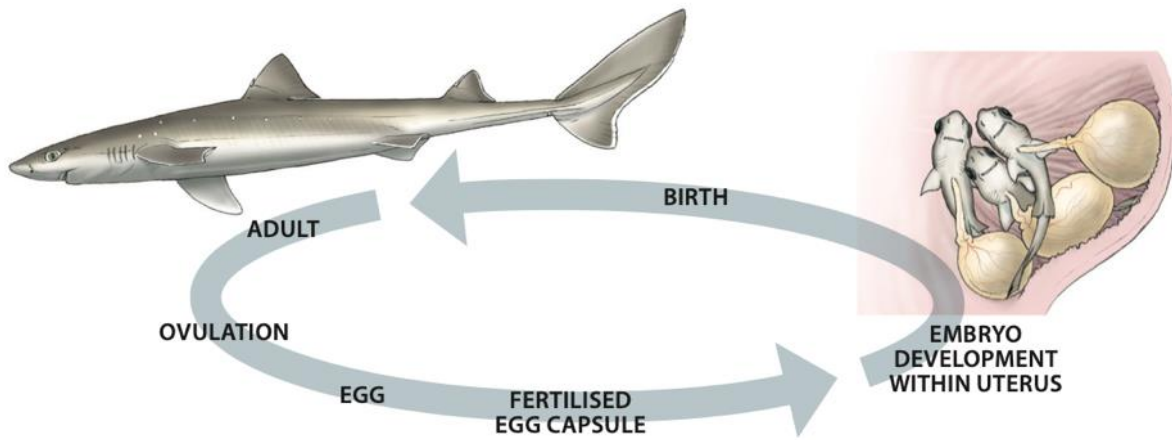
Oviparity



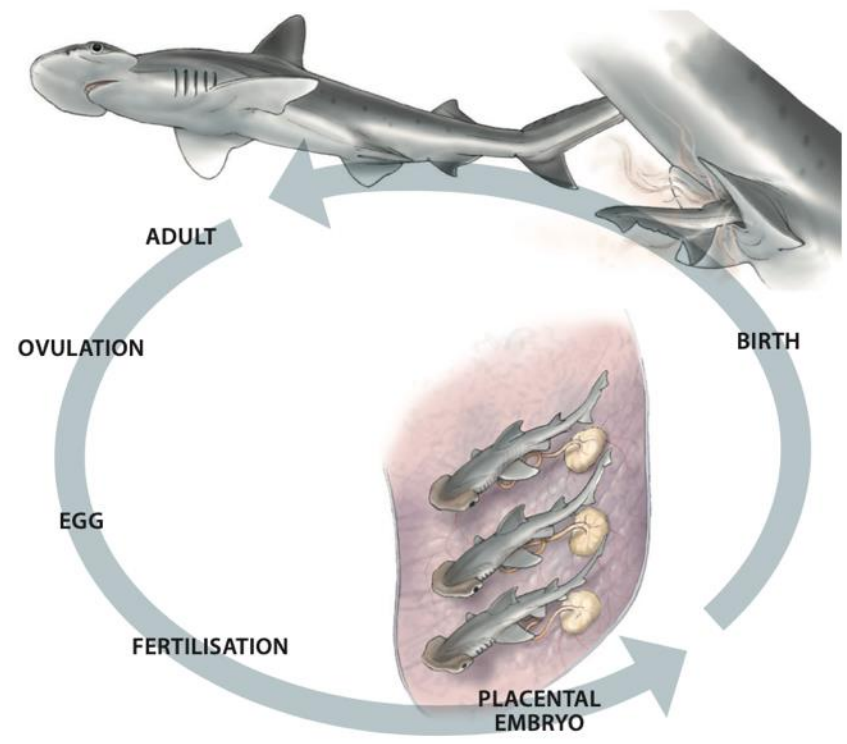
Viviparity (live birth)



Tricas y LeFeuvre (1985); Uchida et al. (1990)

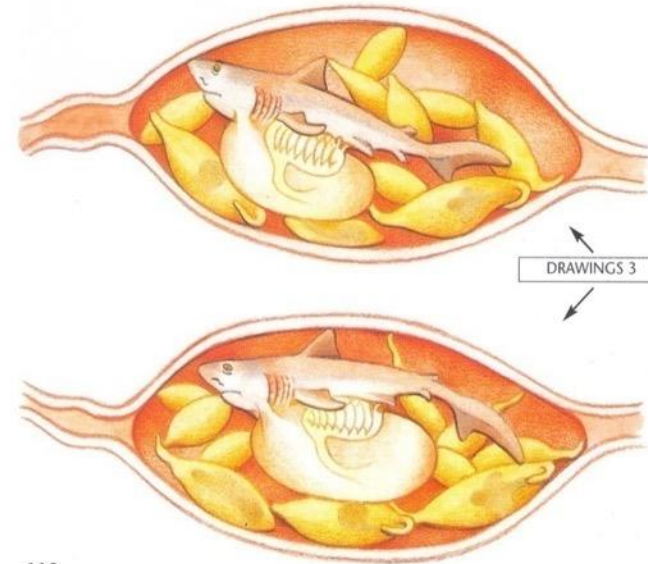
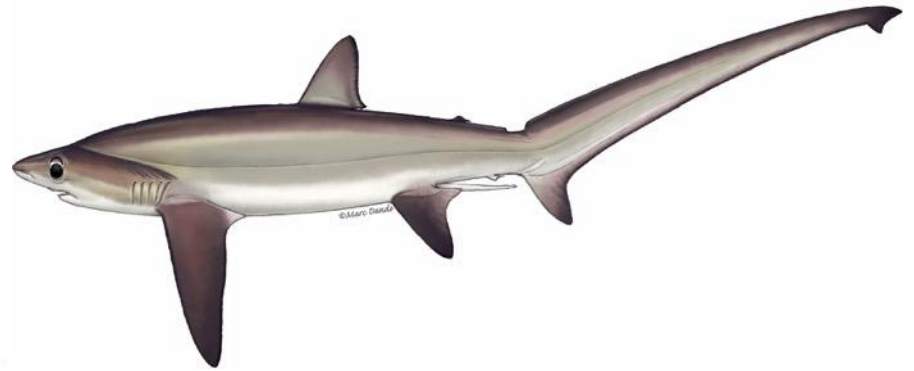


Reproduction modes



Fecundity

Bigeye thresher
Zorro ojón

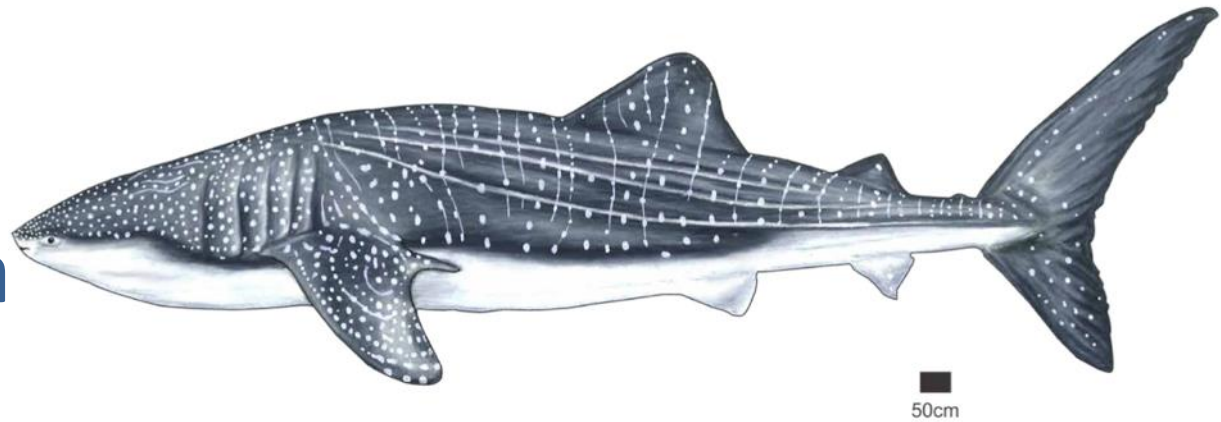


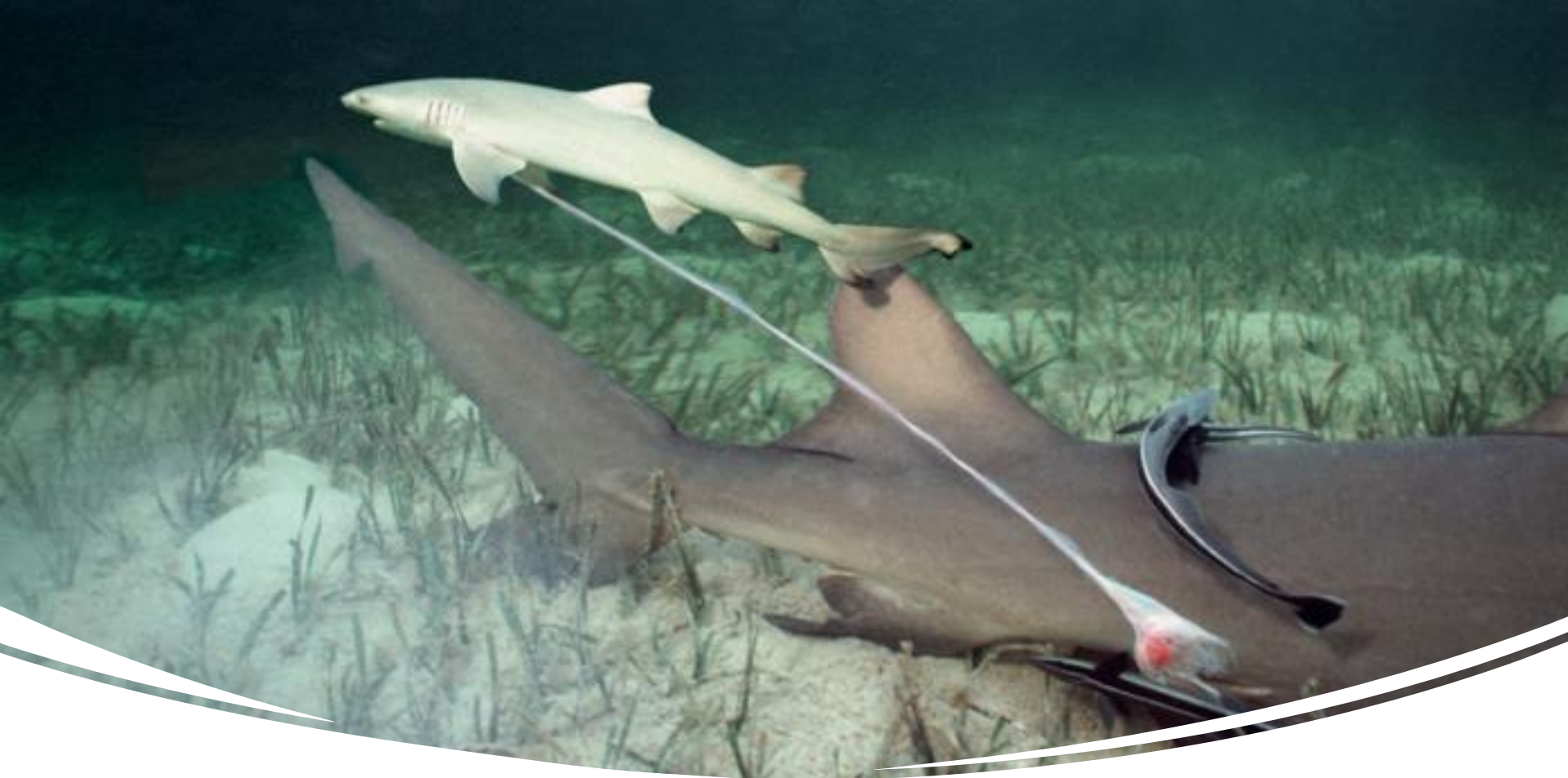
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*A mi amigo Oscar,
de un tiburón a otro.
JOSE CASTRO.*

Whale shark

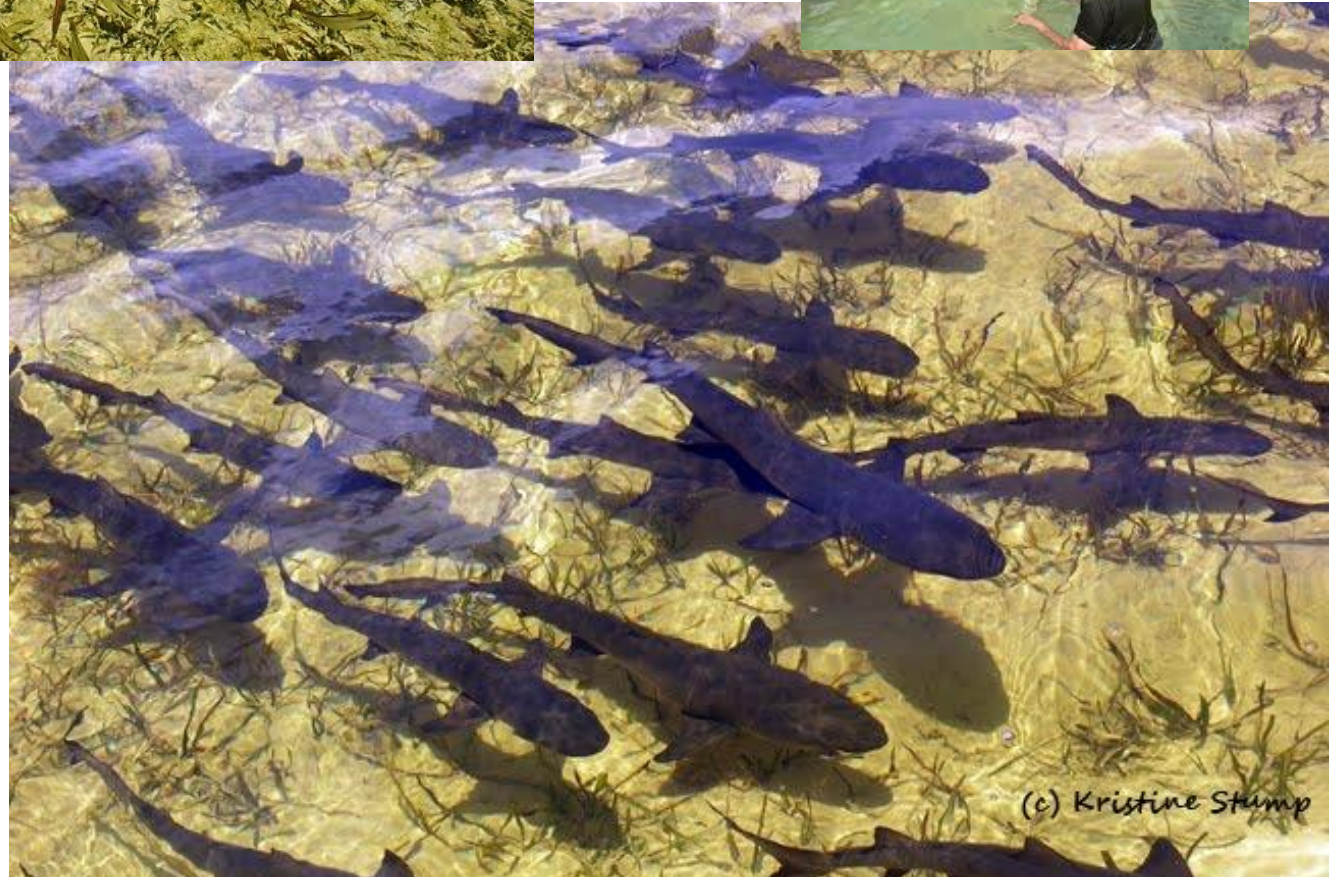
Tiburón ballena





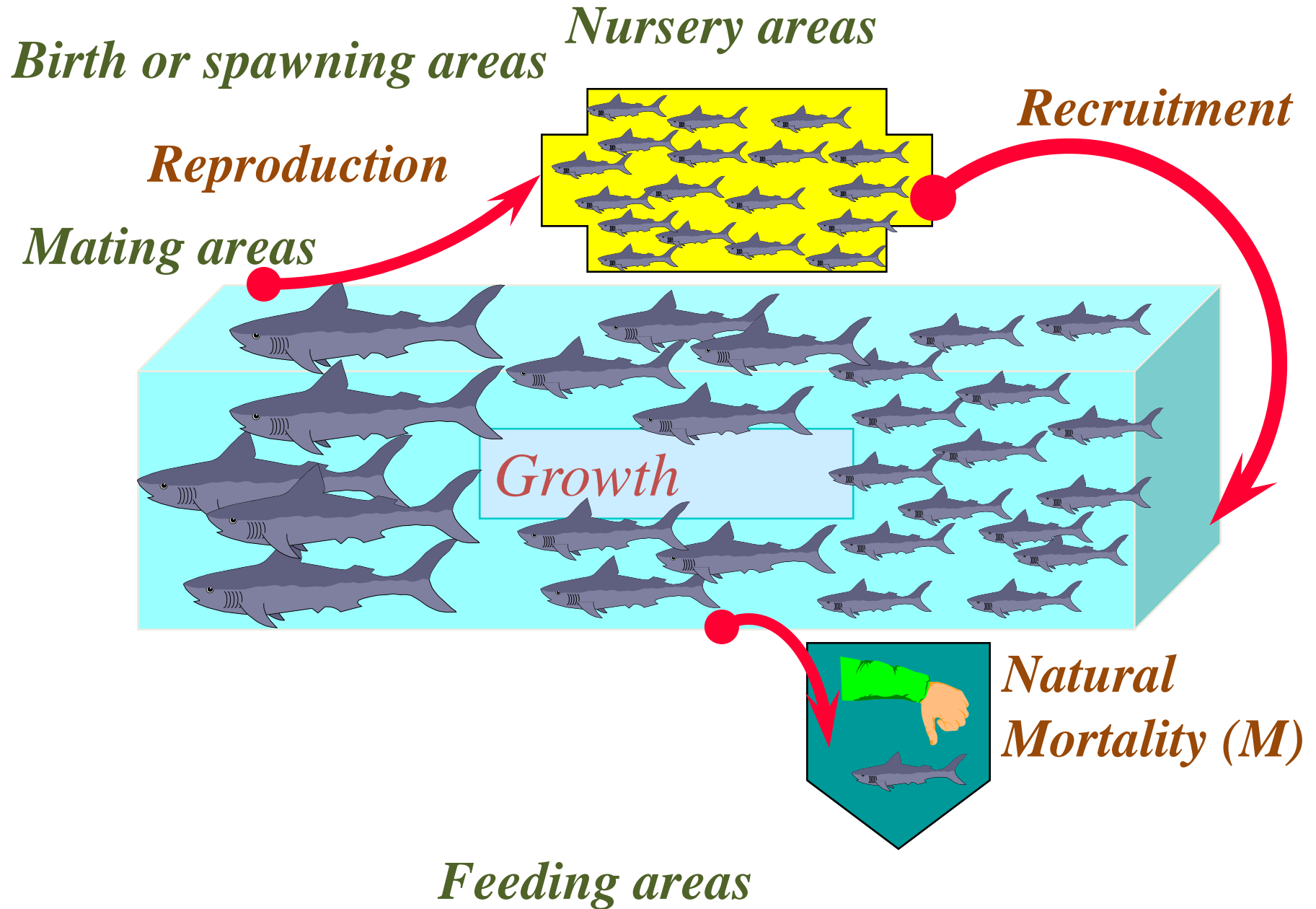
- **Recently born sharks resemble the adults and need a place to grow fast and to be safe from predators**

Lemon shark
Bimini island
Sam Gruber

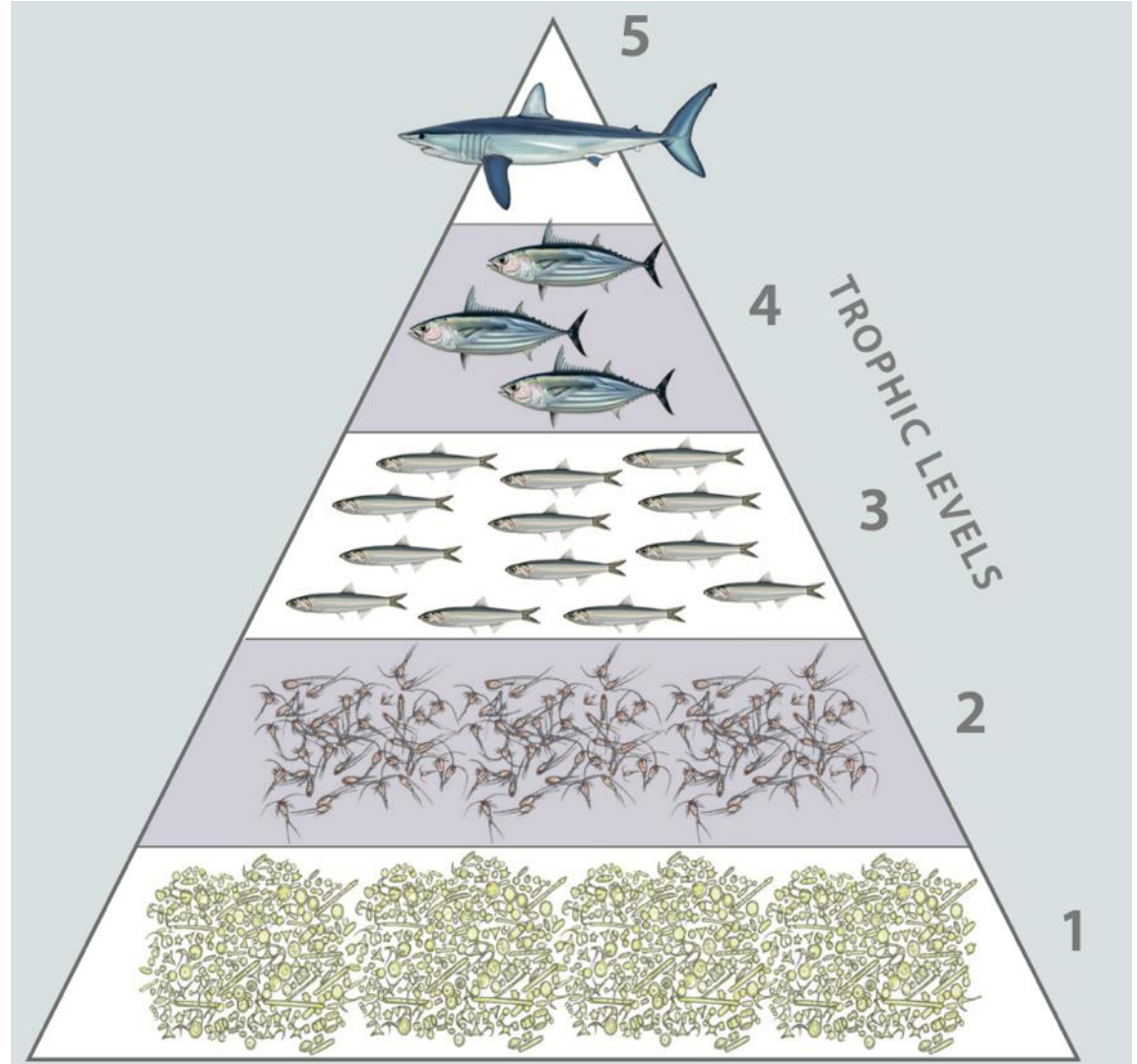


Nursery areas
Áreas de crianza

(c) Kristine Stump

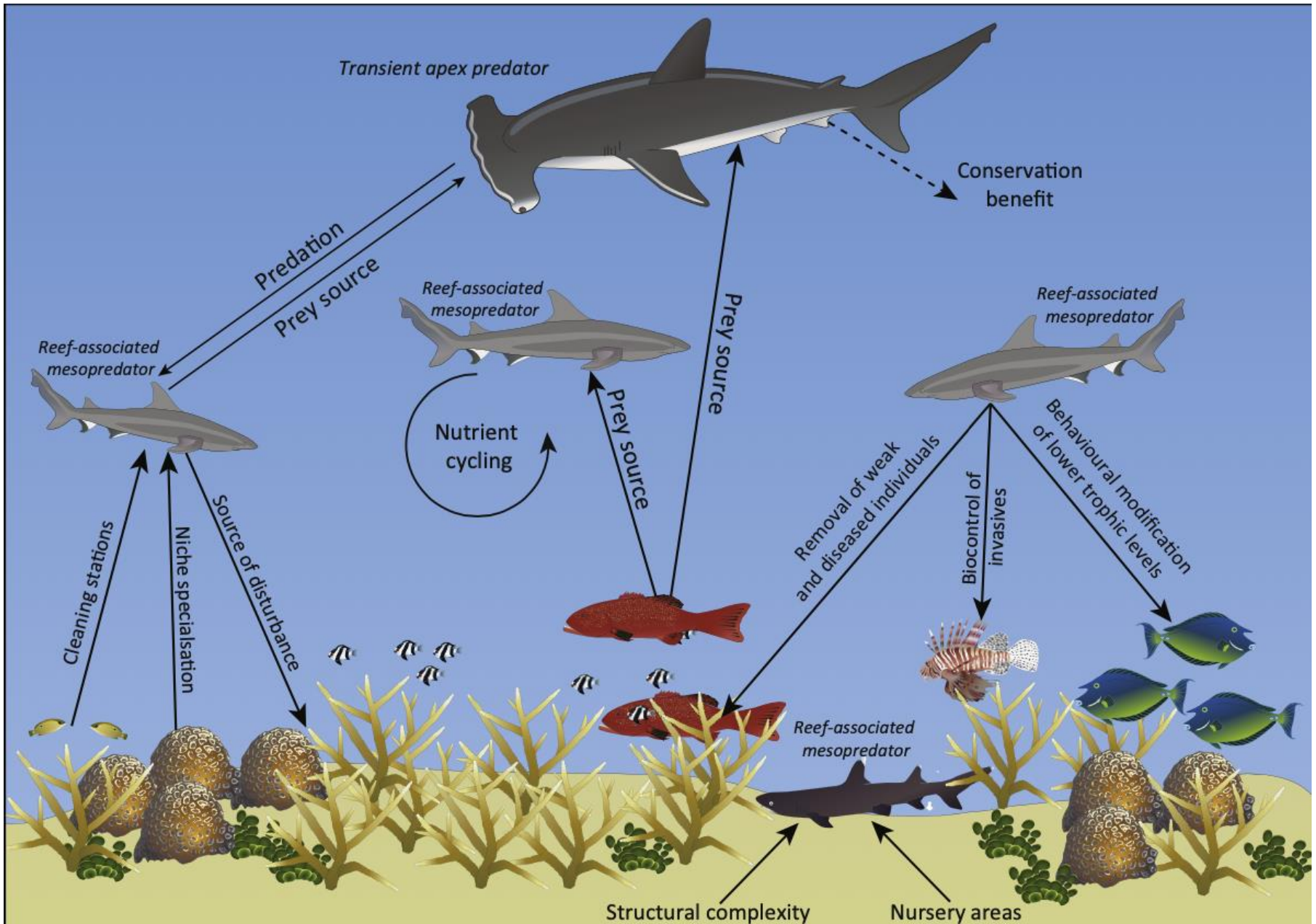


Sharks are considered as top predators ...however



Coral reef's communities

Roff et al. (2016)



REPRODUCTION STRATEGIES

r-Strategist

- Many offspring produced
- Short life expectancy
- Low energy investment
- Small size of organisms



K-Strategist

- Few offspring produced
- Long life expectancy
- High energy investment
- Large size of organisms



MSUMFE

Low fecundity

Mean maximum age
20-25 yrs (400 yrs)

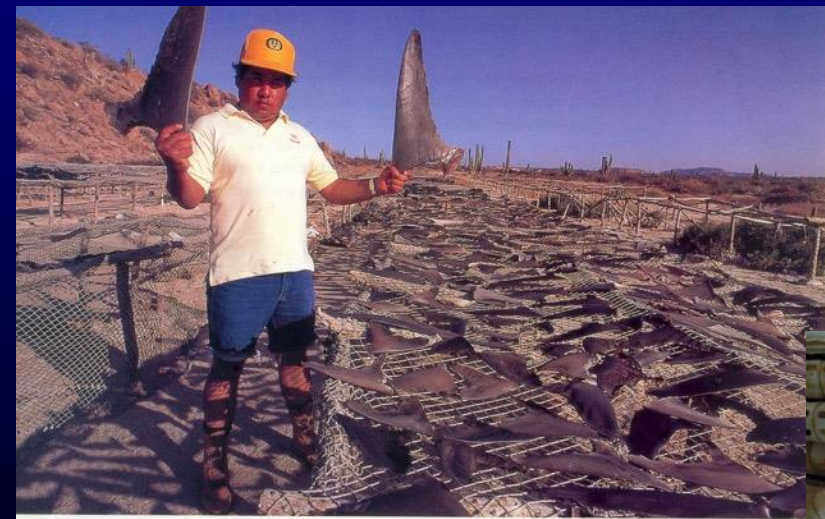
Late maturity (4-20
yrs)

Reproduction cycle
every 1, 2 or 3 years

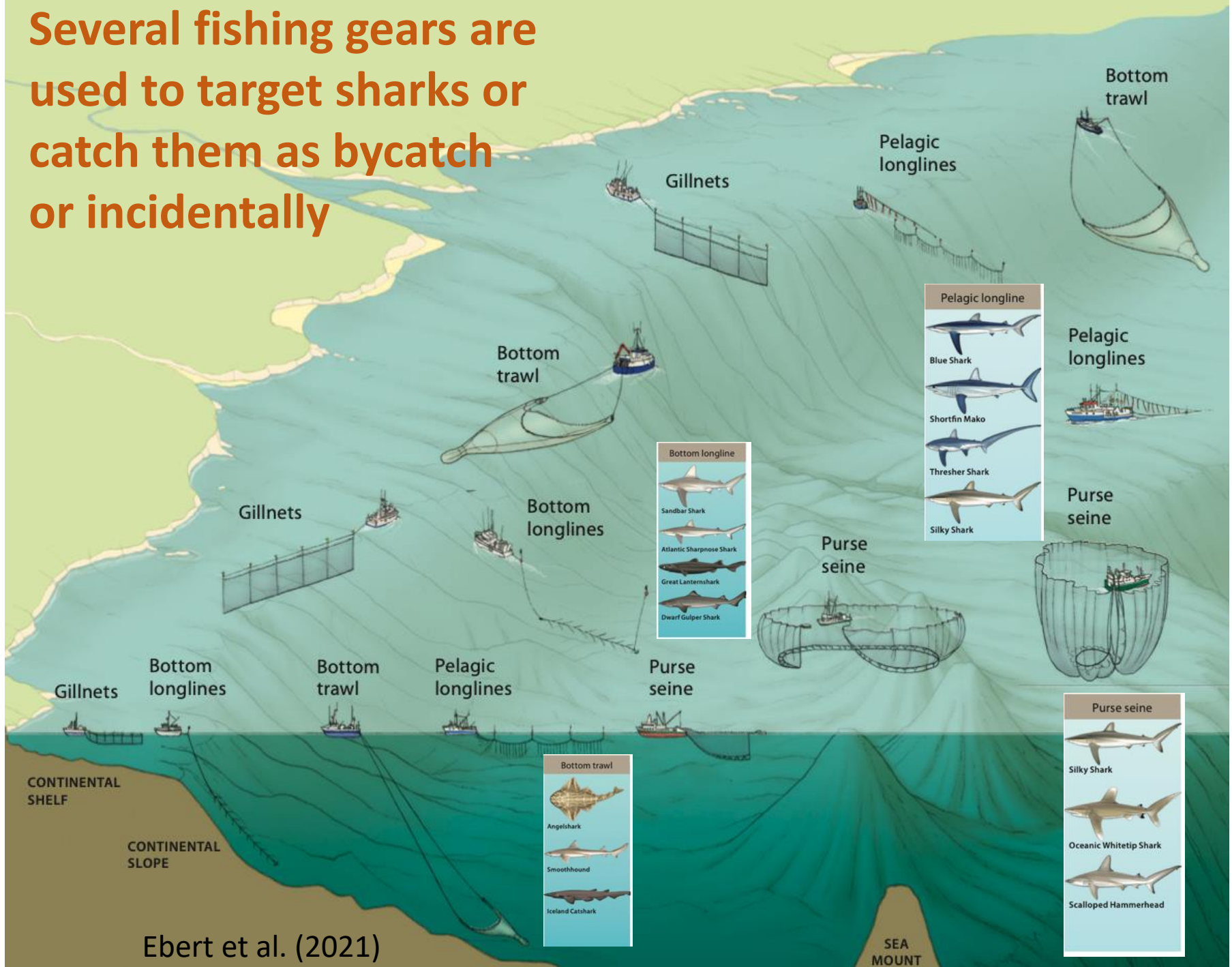
Low potential
productivity

Overfishing

Main fishing products

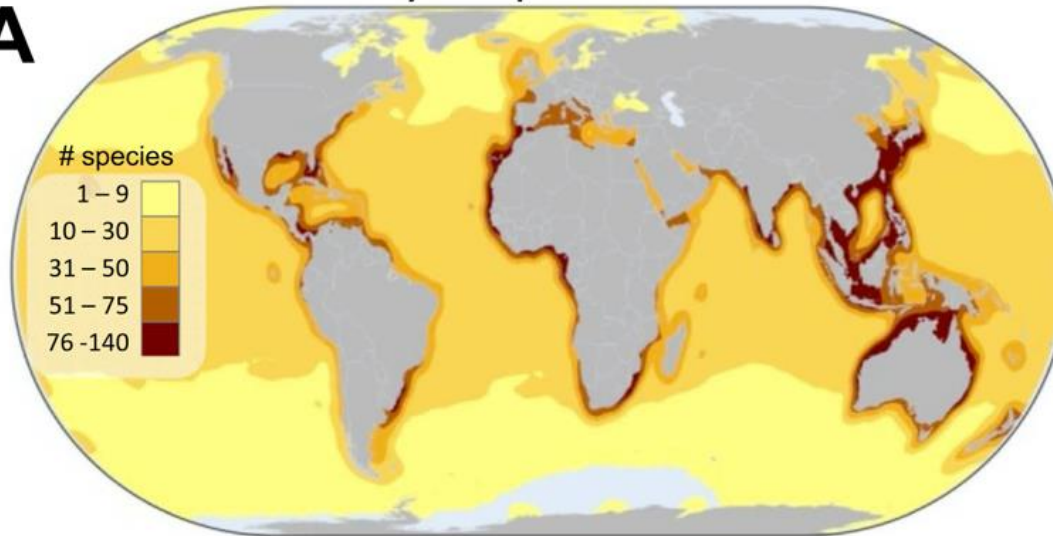


Several fishing gears are used to target sharks or catch them as bycatch or incidentally



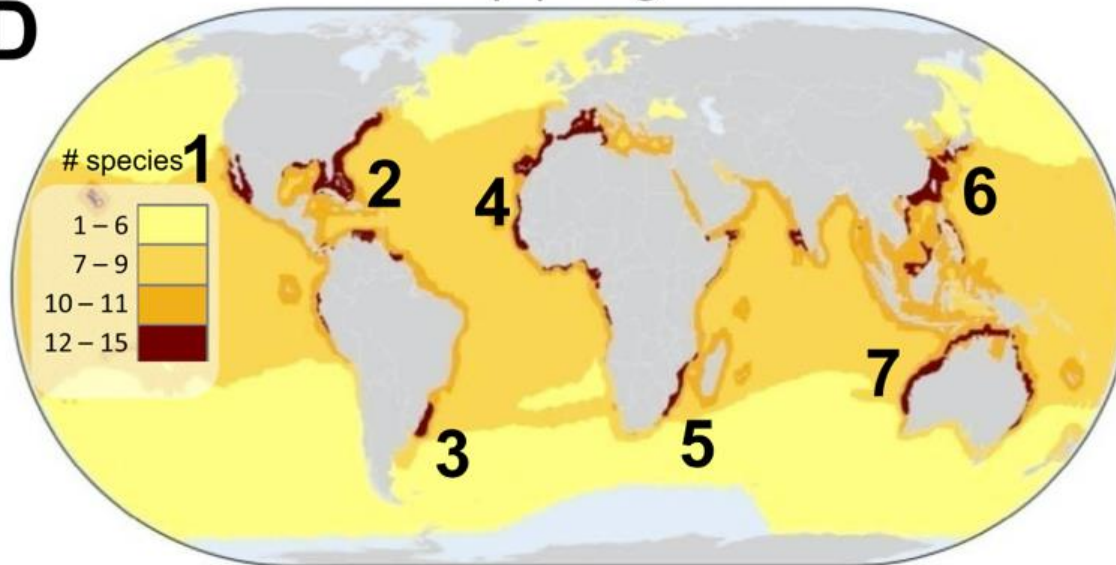
Chondrichthyan species richness

A



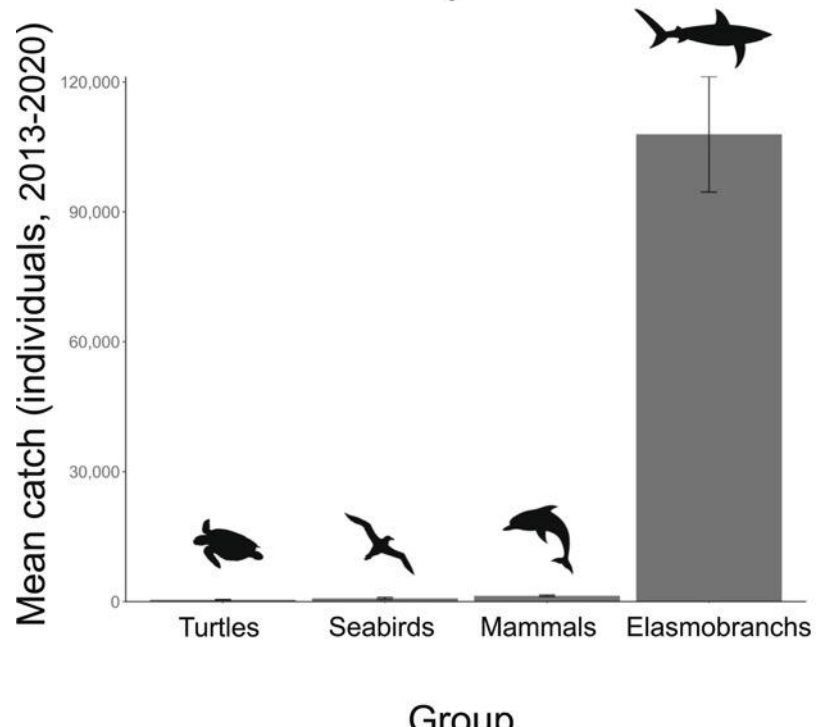
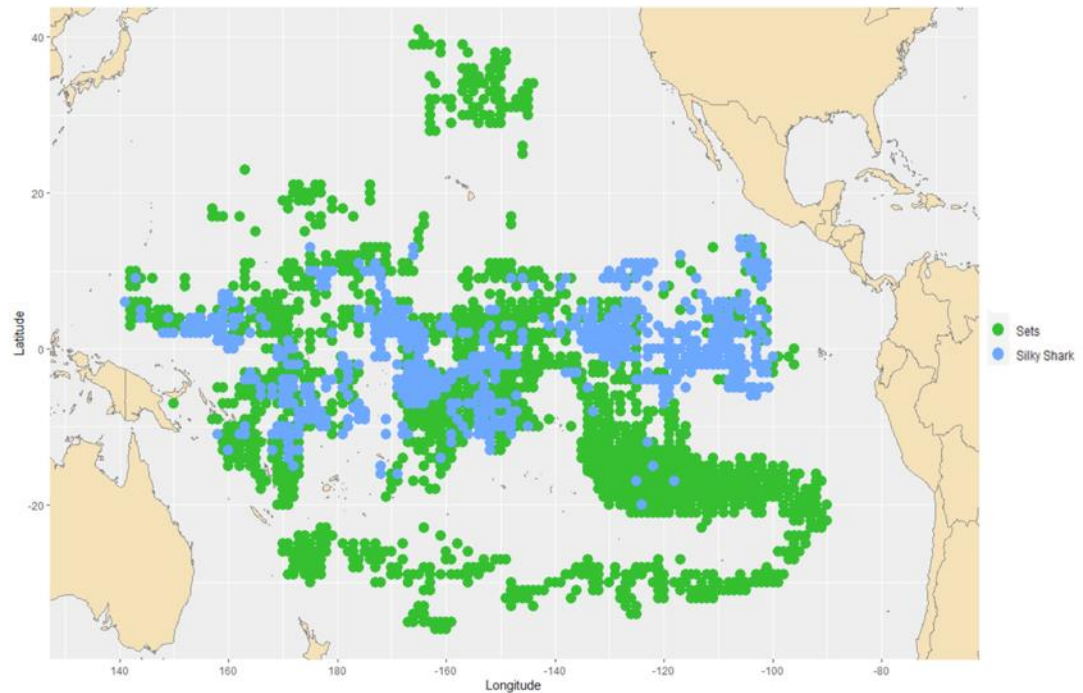
Neritic & epipelagic threat

D



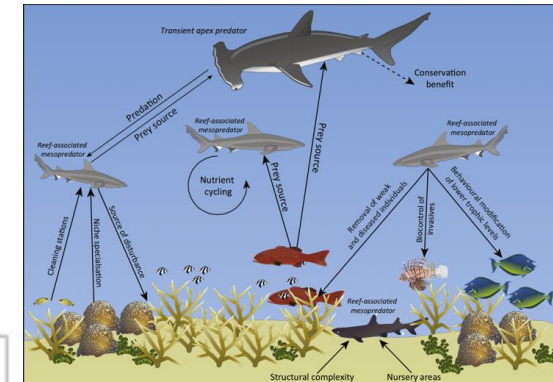
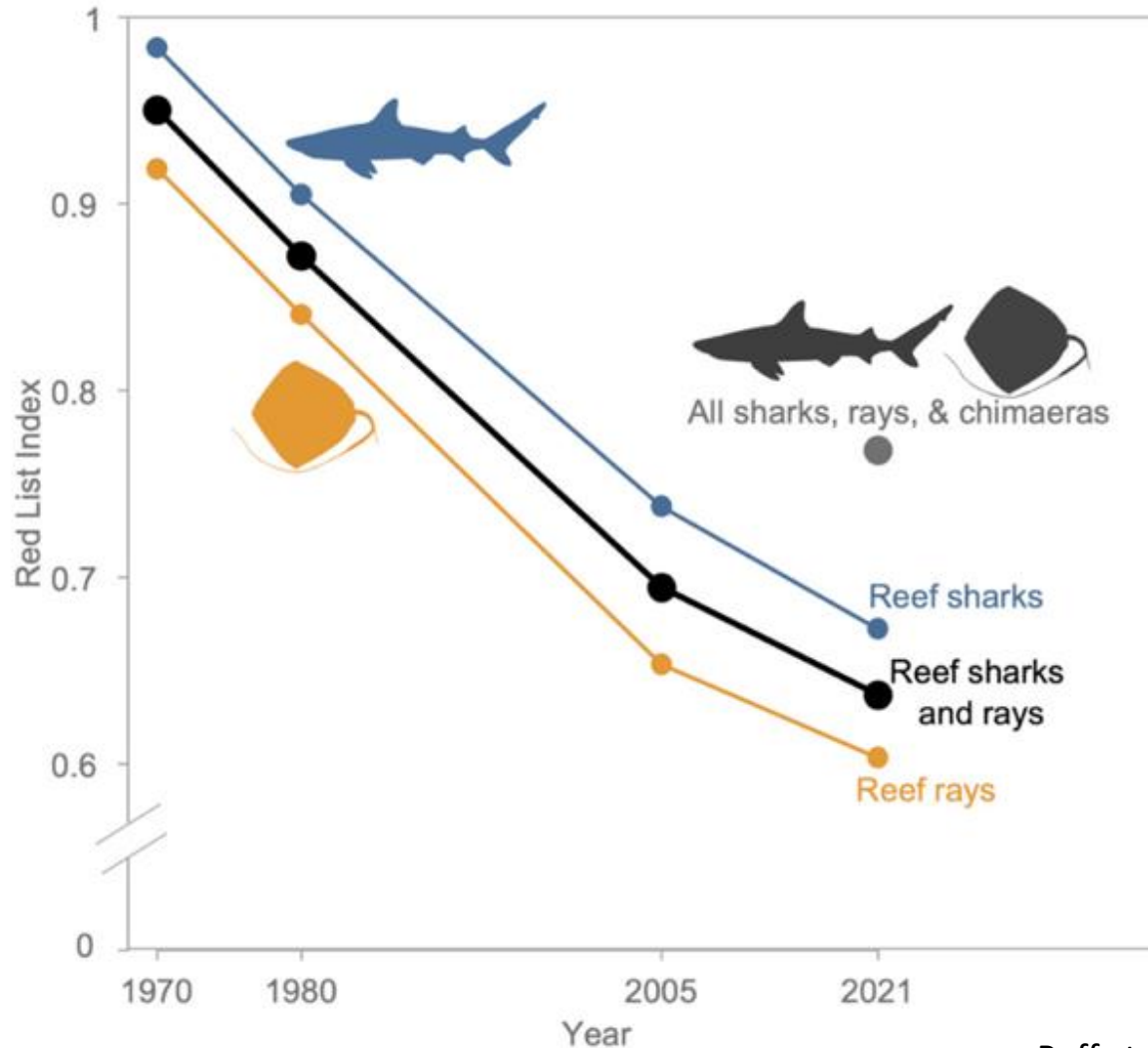
Chinese longline
Silky shark sets
Tiburón sedoso

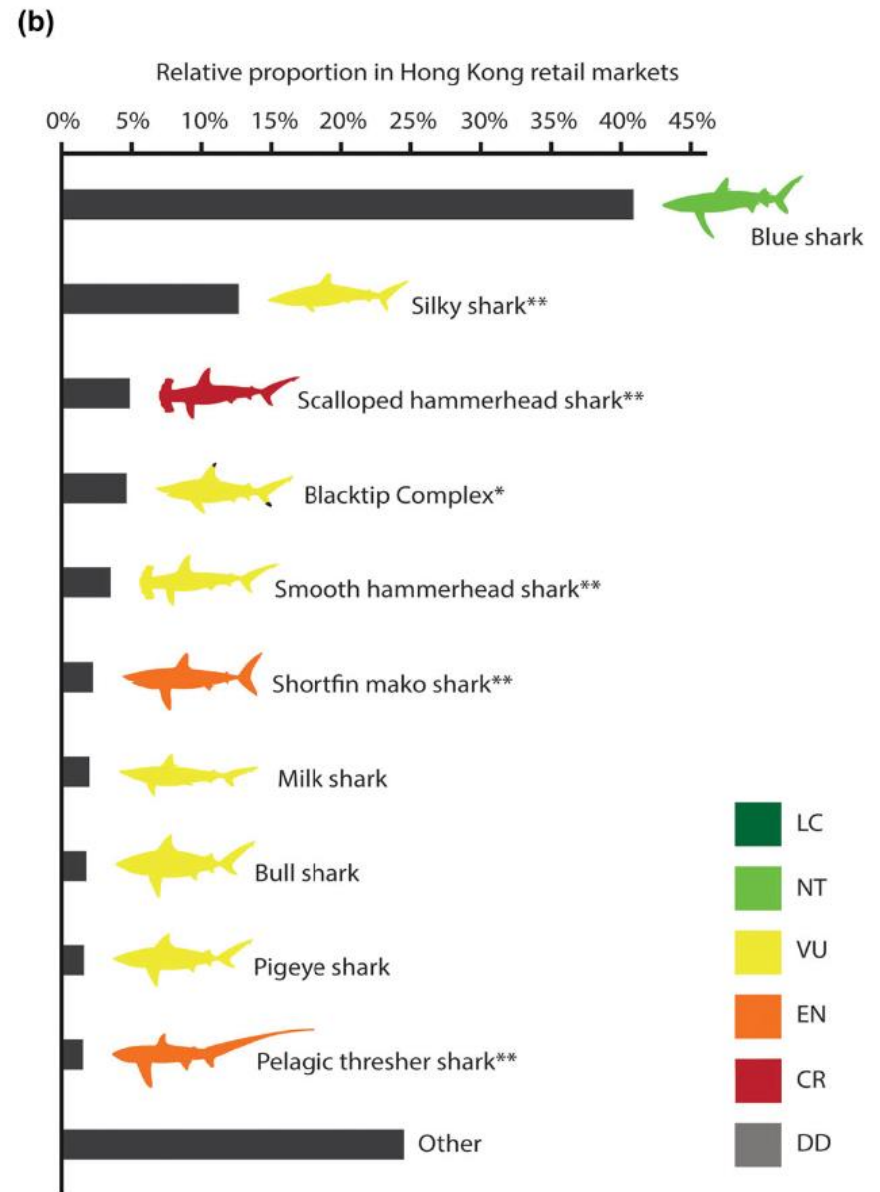
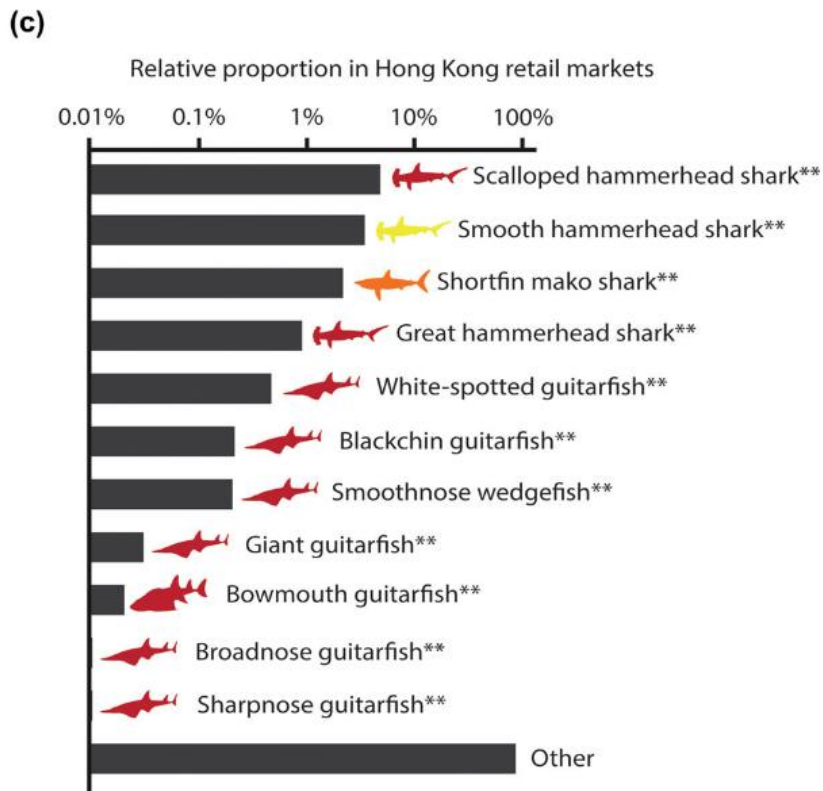
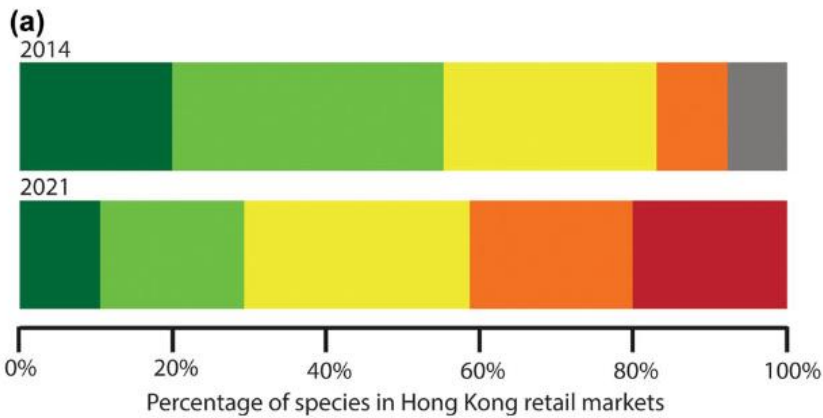
High seas longline fisheries shark bycatch or incidental catch



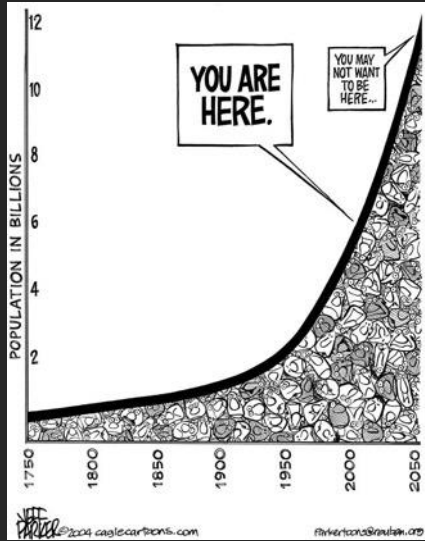
Kindong et al. (2022); Cronin et al. (2022)

Shark depletion in coral reefs





Challenges



Final remarks – the value of sharks

- Sharks are upper-level predators and have influenced the structure of marine communities in the last 100 million years. **Evolutionary value in today's biodiversity**
- Based on their life history (reproduction), sharks are **K** strategists, as marine mammals, elephants, and other large-size animals are. They are easy to be overfished. **Ecological value similar to whales and dolphins**
- Shark meat is a low-value food source for many human communities. **Social value**
- We need a new ethical approach to the management and conservation of sharks. **Need for the inclusion of an ethical value in the discussions**



- *Gracias*
- *Thank you*