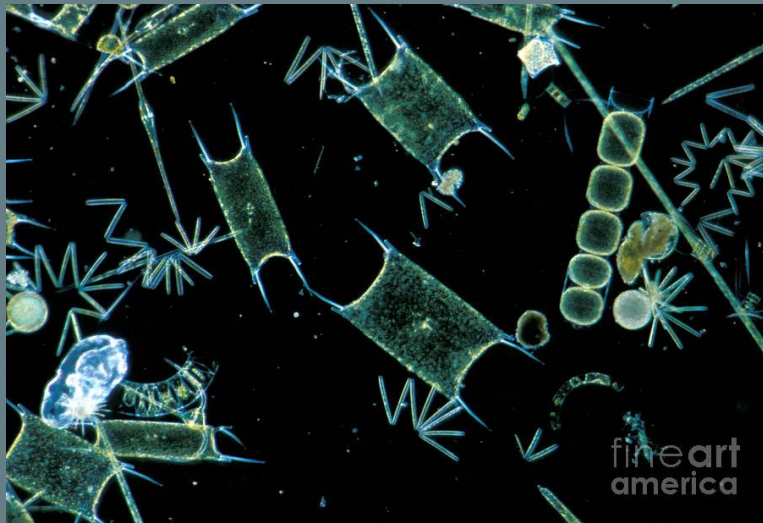


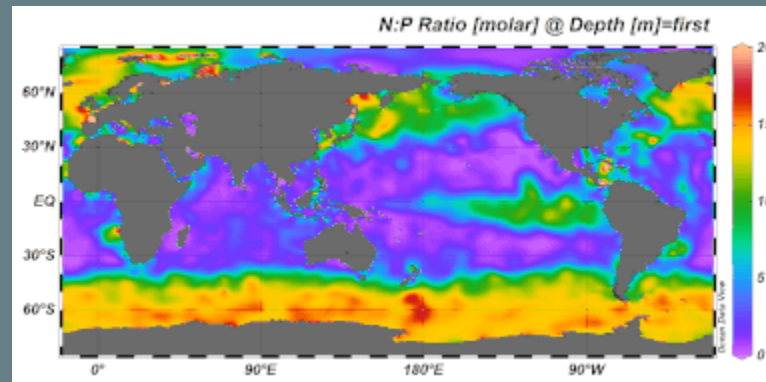
Marine Ecosystems

- Pelagic Marine (open ocean):
 - Euphotic zone =
 - Plankton: carried by currents
 - (Phytoplankton – photosynthesize in upper Euphotic zone)
 - (Zooplankton – Feed on phytoplankton)

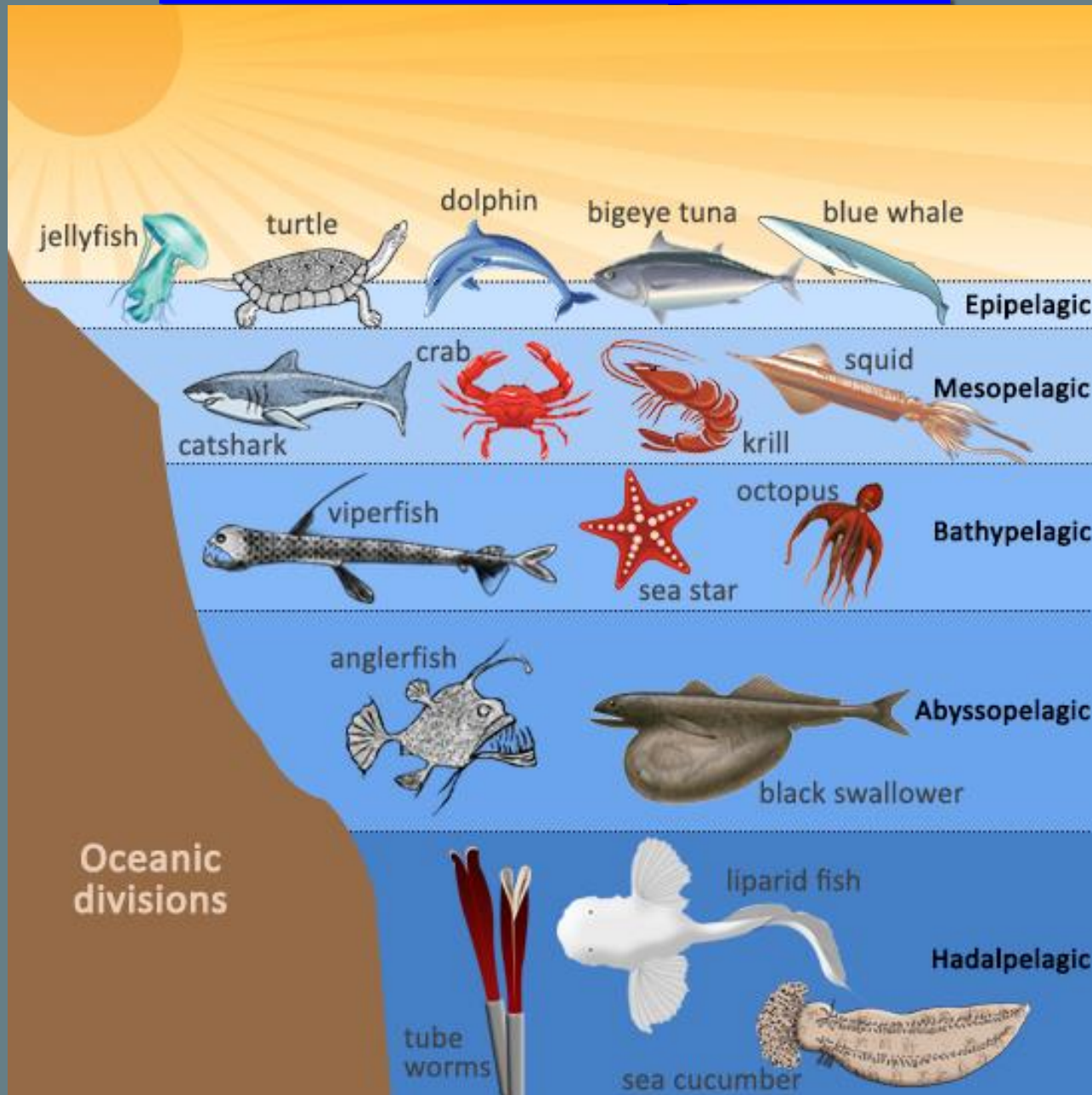


Where are the nutrients?

- Phosphorus, nitrogen and carbon are important nutrients needed by producers to “start the food web.”
- Most productive areas are where currents bring up nutrients that have settled to the bottom and where rivers deposit their load of suspended and dissolved materials.

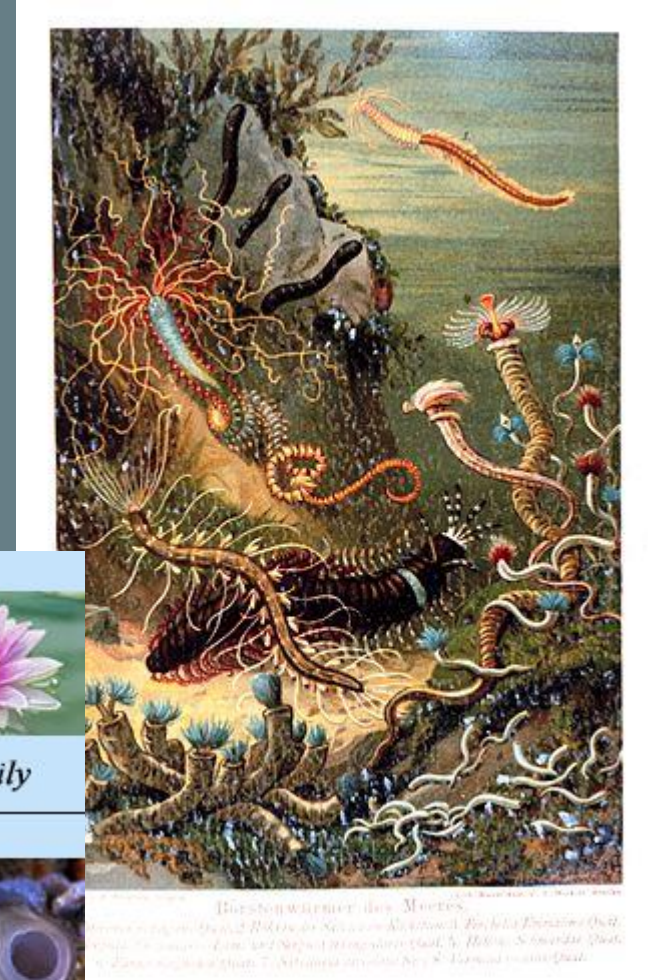


Marine Ecosystems



Marine Ecosystems

- Benthic Marine (ocean bottom):



Benthic Plants



*Giant Kelp
(Brown Algae)*

Water Lily

Benthic Animals



Catfish

*Tunicates
(Sea squirts)*



"Fred Bavendam/Peter Arnold, Inc."

M. J. Schleiden

Marine Ecosystems

Coral Reef Ecosystems:

Produced by coral animals that build cup-shaped external skeletons and have mutualistic algae. They need warm, shallow, clear water.



Marine Ecosystems

Mangrove swamp:

- Tropical forests in shallow water near shore.
- Mangrove trees (leaves can excrete salt).
- Tree roots provide habitat for oysters, crabs, jellyfish, sponges and fish.



Marine Ecosystems

- Abyssal ecosystem: no light for photosynthesis. Rely on drifting organic matter.



Marine Ecosystems

- **Estuaries**: Shallow, partially enclosed areas where freshwater enters the ocean.
- Fluctuating salt conditions
- Productive (nutrients from rivers and energy from sun).
- Nursery sites for many fish and crustaceans.
- Trap sediment, acts as filter for pollution but can eventually fill in.



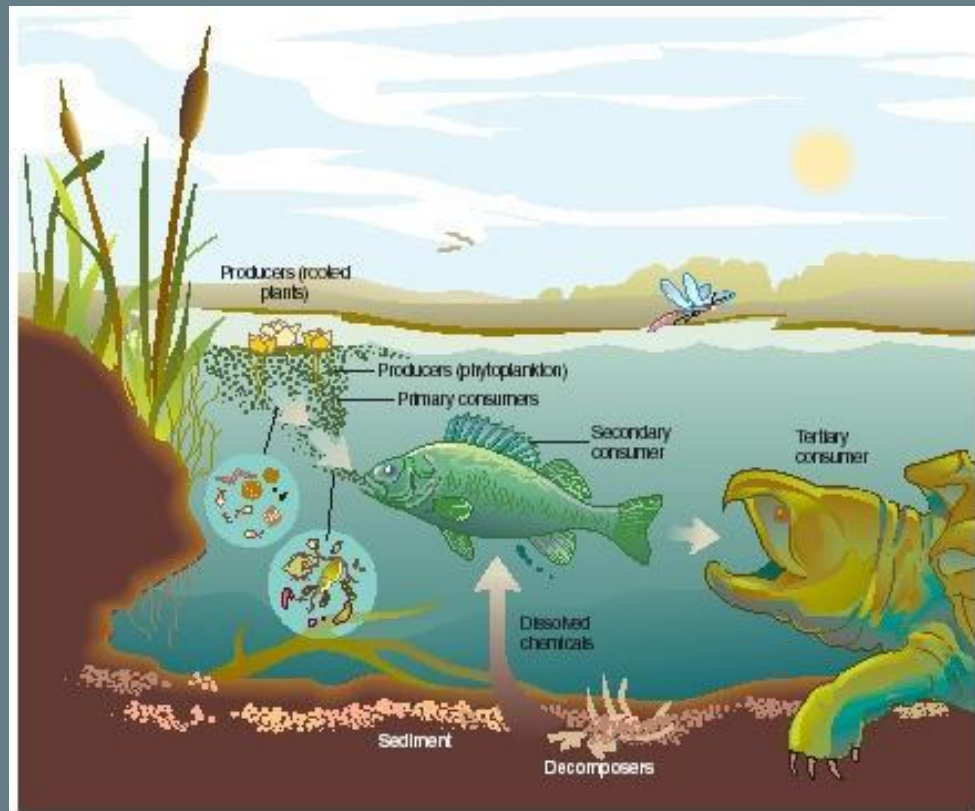
Human impacts on Marine Ecosystems

- Overfishing
- Fish farming leads to addition of nutrients and spread of disease
- Estuaries affected by fertilizer, animal waste and pesticides
- Oil pollution
- Trash
- Coral reefs affected by siltation
- Mangroves converted for fish farms



Freshwater ecosystems

- Less salt than marine systems
- Water temperature can change greatly
- Oxygen can be limiting factor

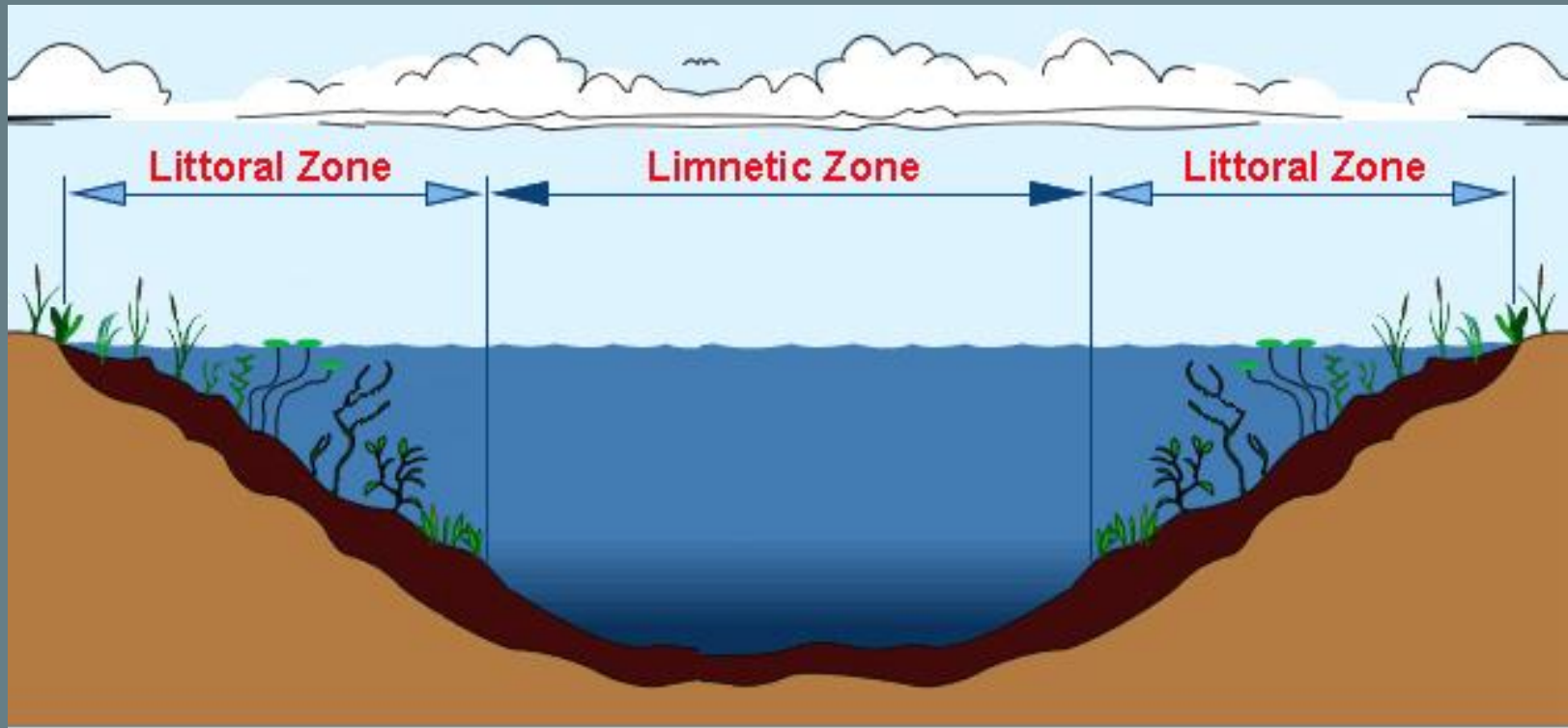


Freshwater ecosystems

- Lakes and ponds: euphotic zone, plankton similar to marine
- Emergent plants: above water but roots below (cattails, water lilies etc.)
- Submerged plants (elodea, chara etc.)

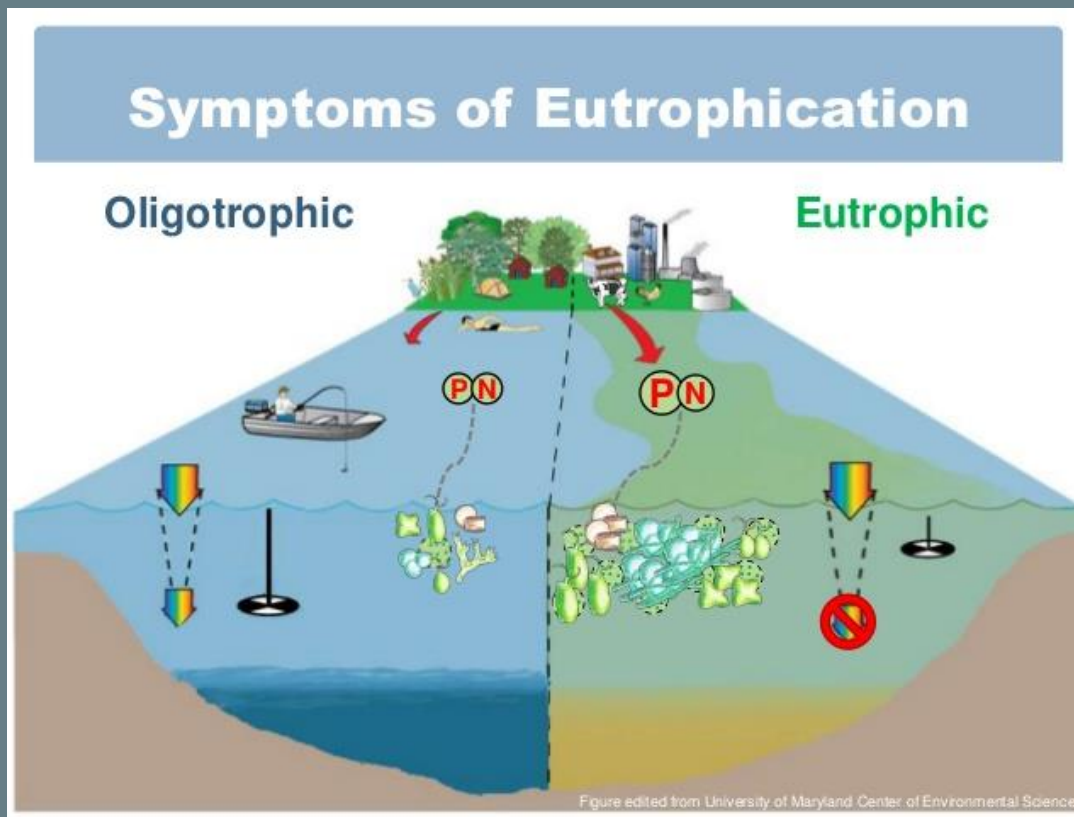


Freshwater ecosystems



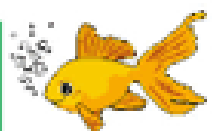
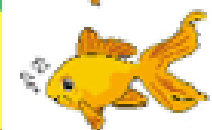
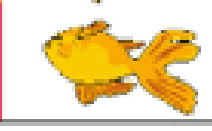
Freshwater ecosystems

- Oligotrophic: deep, clear, cold, nutrient-poor lakes low in productivity
- Eutrophic lakes: shallow, murky, warm nutrient – rich lakes



Freshwater ecosystems

- DO (dissolved oxygen)
- DO determines the type of organisms
- Decomposers use Oxygen from water to respire
- **BOD** (Biochemical oxygen demand) = amount of oxygen by decomposers to break down a specific amount of organic matter

Dissolved Oxygen (ppm = mg/l)	Water Quality	
5 - 14	Good. Supports life.	
3 - 5	Poor. Stressful to many organisms.	
0 - 3	Bad (hypoxia). Lethal to most organisms.	

DO vs. BOD

The type of aquatic system with the following combination would be most likely to have higher biodiversity:

- A. Low DO and High BOD
- B. Low DO and Low BOD
- C. High DO and High BOD
- D. High DO and Low BOD

Sources of DO

1. Producers: (byproduct of photosynthesis) – but on cloudy days or at night, remove O₂ for Cellular respiration.
2. Atmosphere: dissolves at the surface of water – more so in fast moving rivers.

(FYI: Warm water holds less DO than cold water and BOD is higher in warm water)

Freshwater ecosystems

- Streams and Rivers: moving water so attached organisms more important for photosynthesis than plankton
 - Periphyton: Attached algae, animals, and fungi.



Freshwater ecosystems

- Swamps: wetlands that contain trees that are able to live in places that are either permanently flooded or flooded for much of the year.
- Marshes: wetlands that are dominated by grasses and reeds.



Human impacts

[0.02 percent of the world's water is freshwater from lakes and rivers]

- Affected by agricultural runoff, sewage, sediment, and trash

