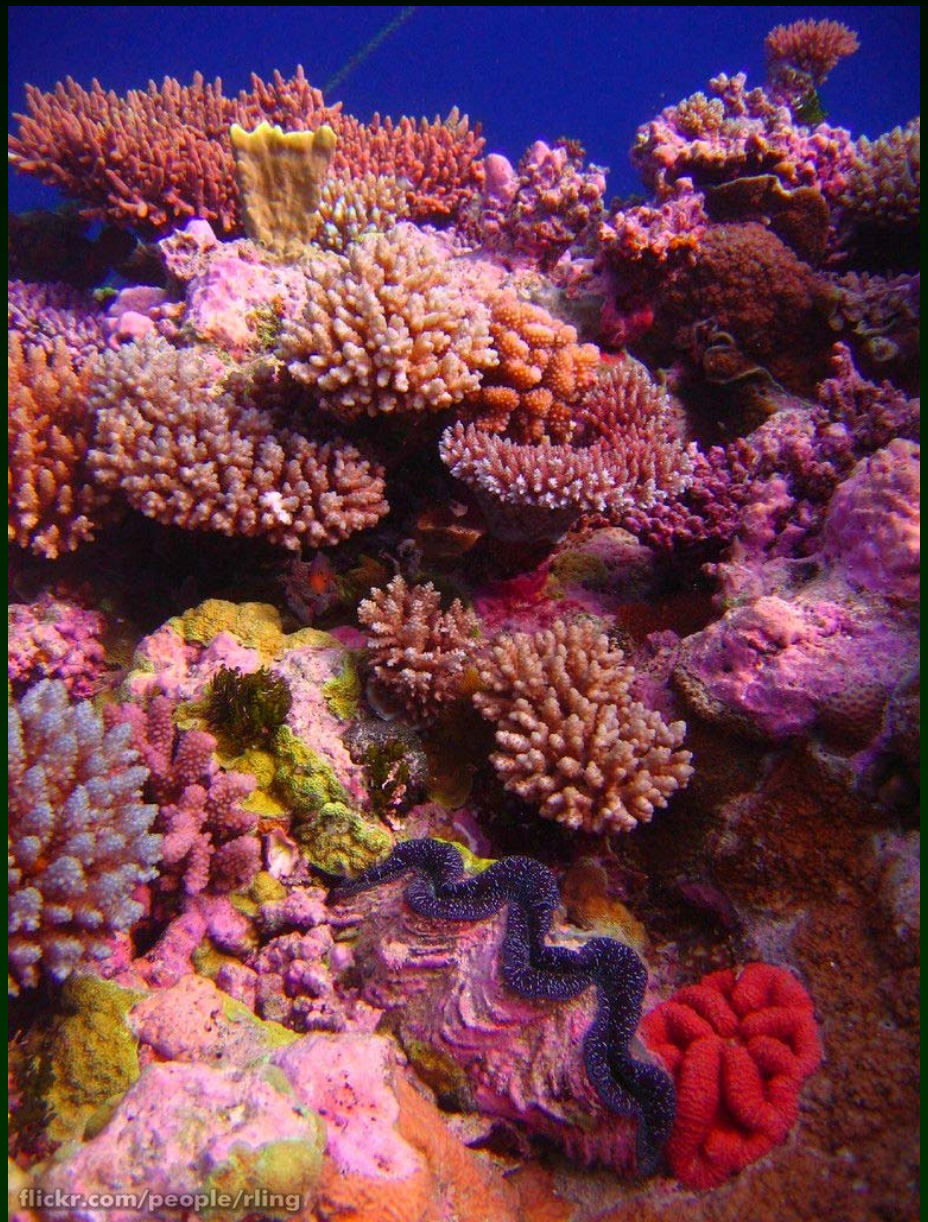
Aquatic Ecosystems



Aquatic Ecosystems

- The types of organisms in an aquatic ecosystem are determined by the water's salinity.
  - Salinity - Amount of salt in the water.
- **Freshwater ecosystems** do not have any salt in the water.
  - Freshwater ecosystems include ponds, lakes, streams, rivers, and wetlands.

Abiotic Factors of Aquatic Ecosystems

- Abiotic factors affecting life in these ecosystems includes:
  - Water temperature
  - Amount of sunlight
  - Oxygen level in the water
  - Nutrients in the water
  - Movement of the waterr

Organisms of Aquatic Ecosystems

- **Plankton** are the mass of mostly microscopic organisms that float or drift freely in the water.
  - Microscopic animals are called **zooplankton.**
  - Microscopic plants are called **phytoplankton**.
- **Nekton** are all organisms that swim actively in open water, independent of currents.
  - Examples: Fish, turtles, whales

Organisms of Aquatic Ecosystems

- **Benthos** are bottom-dwelling organisms of the sea or ocean and are often attached to hard surfaces.
  - Examples: Barnacles, clams, sea worms
- **Decomposers** are aquatic organisms that break down dead plants or animals.

Lakes and Ponds

- Lakes, ponds, and wetlands usually form naturally from glaciers.
  - **Artificial lakes**: Created by humans damming flowing rivers and streams.
- The types of organisms present depend on the amount of sunlight available.

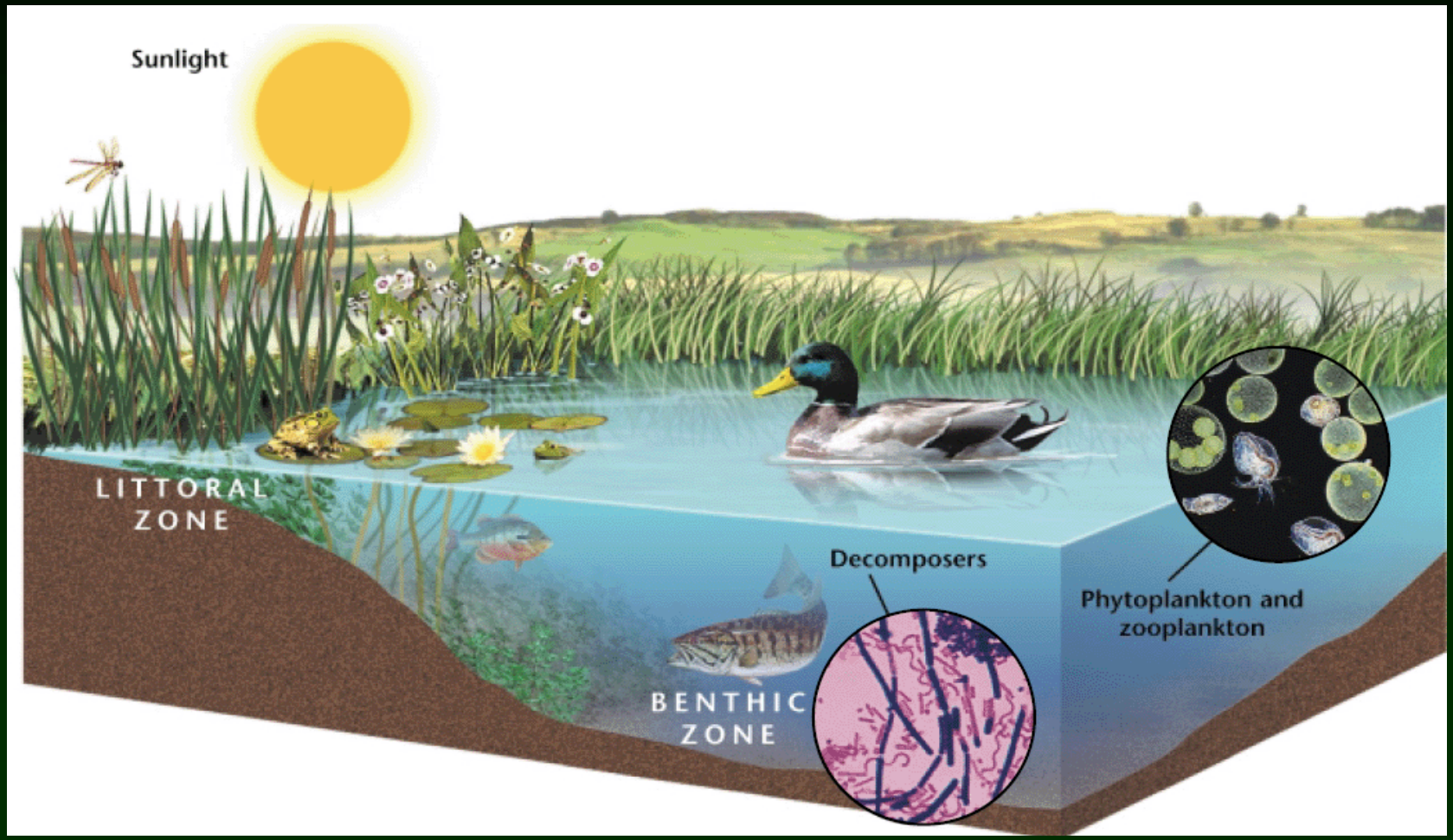
Lakes and Ponds

- The **littoral zone** is a shallow zone in a freshwater habitat where light reaches.
  - Located along the shore.
  - Inhabited by producers such as plants, algae, and some bacteria
    - Capture solar energy to make their own food during photosynthesis.

Lakes and Ponds

- The **benthic zone** is a dark region deep underwater.
  - Located at the bottom.
  - Inhabited by decomposers, insect larvae, shellfish, and bottom-feeders.
  - Not enough light for photosynthesis.
  - The main food source is dead and decaying organisms that sink into this zone.
    - There are no photosynthetic producers here.

A Lake Ecosystem



How Nutrients Affect Lakes

- **Eutrophication** is an increase in the amount of nutrients in an aquatic ecosystem.
  - Effects of fertilizer runoff:
    - This increases the amount of algae and other plants living there.
    - The plants and algae eventually die and decay.
    - The bacteria in the water begin to decompose the dead plants and algae. This uses up the water's oxygen.
    - The reduced amount of oxygen kills fish and other animals that need it.

How Nutrients Affect Lakes

- Sewage has similar effects; except it directly increases bacteria populations.

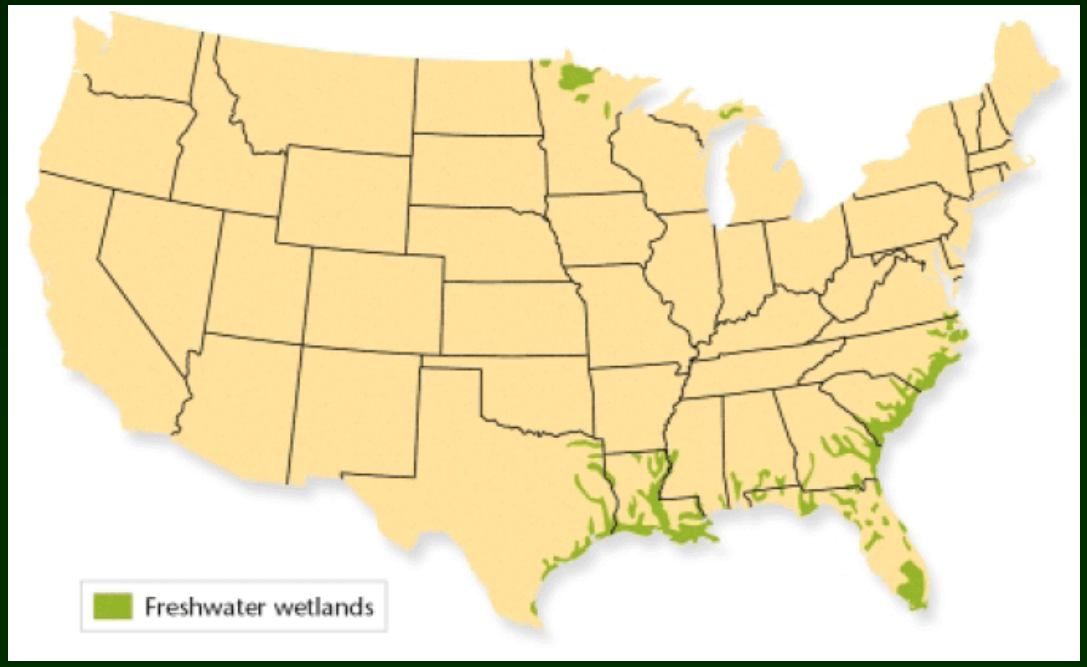
Eutrophic Pond

Rivers

- Rivers have several parts, each with different characteristics:
- Source
  - The river is usually cold and full of oxygen.
  - The speed is fast; the depth is shallow.
- Course
  - The river may widen, become warmer, slower, and the oxygen decreases.
- Mouth
  - The river enters a larger body of water.
    - Often creates nutrient-rich brackish water

Freshwater Wetlands

- Freshwater wetlands are areas of land that are covered with fresh water for most of the year.
- In the United States, most freshwater wetlands are located in the southeastern states.



Freshwater Wetlands

- Wetlands perform several important environmental functions.
  1. Act like filters or sponges that absorb and remove pollutants from the water.
  2. Control flooding by absorbing extra water when rivers overflow.
  3. Provide a home for large amount of biodiversity.

Marshes

- Marshes tend to occur on low elevation, flat lands and have little water movement.
- Marshes have **no trees.**
- Marshes can be:
  - Saltwater
  - Brackish
  - Freshwater

Swamps

- Swamps occur on flat, poorly drained land, often near streams.
- Dominated by woody shrubs or water loving trees.

Bogs

- Found in colder climates with flat elevations.
- The water is acidic, which inhibits the growth of many decomposers.
  - Dead plant and animal matter doesn't decay as quickly and accumulates at the bottom.
  - This forms a thick mass of peat at the bottom of the bog.

Estuaries

- Estuaries - Bays or semi-enclosed bodies of brackish water that form where rivers enter the ocean.
  - Contain a high amount of plantlife.
  - Usually carry rich sediments (nutrients) from the river.

Human Impact on Wetlands

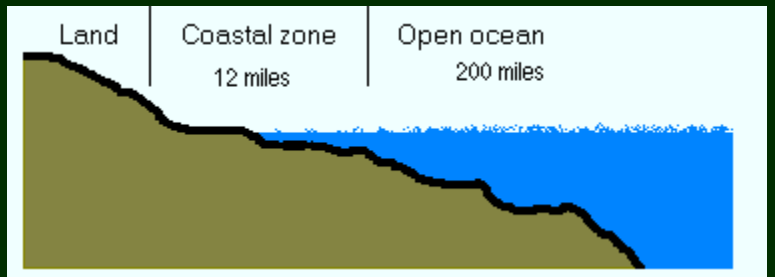
- Wetlands were previously considered to be wastelands that provide breeding grounds for insects.
  - As a result, many have been drained, filled, and cleared for farms or residential and commercial development.
  - The federal government only has laws to keep wetlands from being polluted, not from being drained.

Wetland Restoration

- Many state and local governments have sought to restore previously drained wetlands, in order to:
  - Improve water quality
  - Protect against floods and erosion
  - Provide a habitat for animals and plants
- Wadsworth Wetlands Research Project:

Marine Ecosystems

- Marine ecosystems have as much variability as those on land.
- Coastal Zone
  - Outermost edge of the ocean.
  - Can be underwater or dry, depending on the tides.
  - Highly affected by the action of waves, which are created by winds along the ocean.



Coastal Zone

- Coral Reefs - Accumulated skeletons of coral polyps.
  - Coral has a mutualistic relationship with algae, so it needs sunlight to survive.
  - Most commonly found along the shore, in shallow waters, close to the equator.
  - Among most endangered communities.
    - Global warming
    - Humans hunting tropical fish

Marine Shore Ecosystems

- Sandy Beaches
  - Strip of land that lies along the edge of a body of water.
  - Can be made of different materials:
    - White sand: Eroded coral reef
    - Black sand: Eroded from a volcano
    - Brown sand: Eroded from mountains
    - Rocky: Material from the ocean floor brought by waves.
      - Small pebbles and gravel.

Marine Shore Ecosystems

- Mangrove Swamps
  - A wetland formed from salty ocean water.
  - Contains shrubs and trees, mainly mangroves.

Marine Shore Ecosystems

- Salt Marsh
  - Wetland that is occasionally flooded by ocean salt water.
  - Does not have any trees; Mostly grasses

Marine Shore Ecosystems

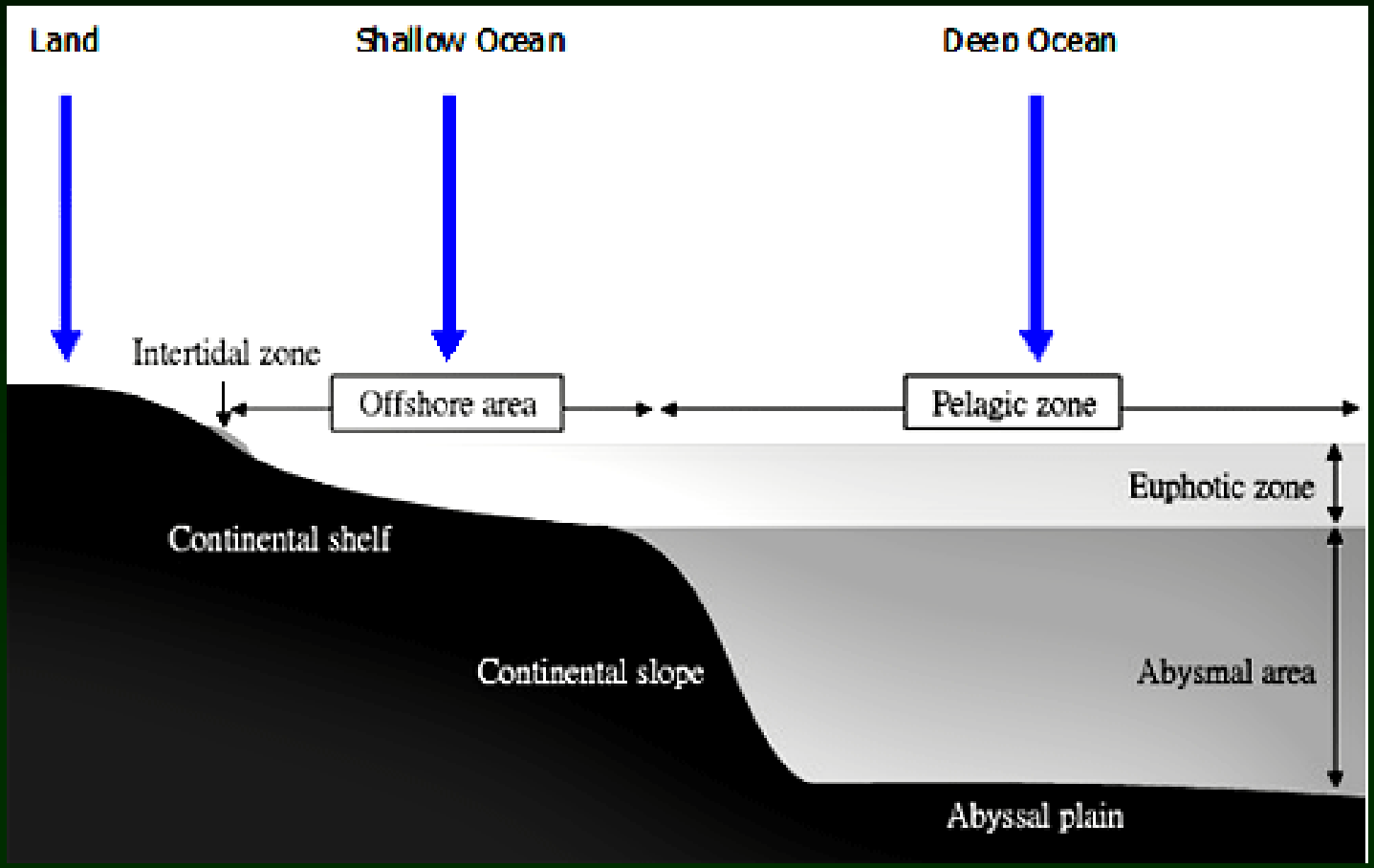
- Mudflats
  - Found near estuaries.
  - Very weak wave action results in a high accumulation of sediment, creating mud.

Marine Shore Ecosystems

- Rocky Shore
  - Large bare rocks and boulders found along the shoreline.
  - The rocks are exposed from large, heavy waves.
  - Highly affected by the coming and going of the tides.

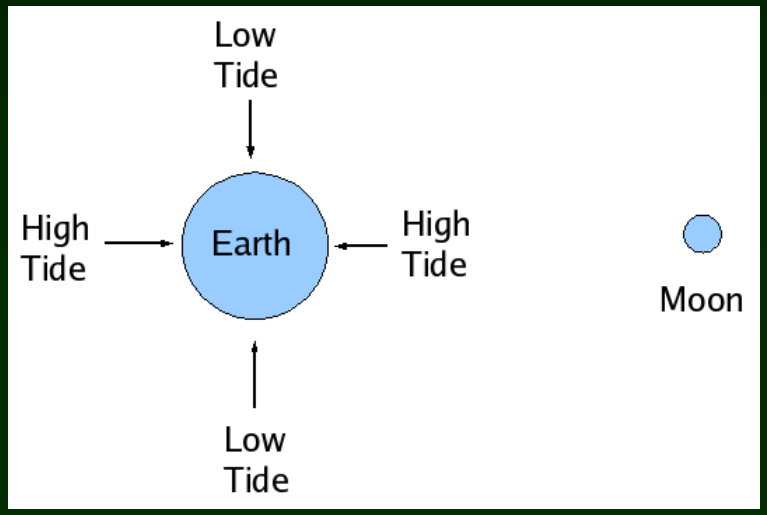
Tides

- Tides are the rise and fall of sea levels that occur about every 12 hours.



Tides

- Low tide: The water recedes to its farthest point away from the shore.
  - This occurs when the water is closest to the moon.
- Flood tide: The sea level rises, covering the intertidal zone.



Tides

- High tide: The water reaches its highest level on the coast.
  - This occurs when the water is farthest from the moon.
- Ebb tide: The sea level lowers, exposing the intertidal zone.

Open Ocean Zones

• Much like lakes, oceans also have different layers based on amount of light.

• The euphotic zone has the highest amount of plant life; the aphotic zone has the highest amount of decomposers.