

Fresh Water Environments

Changes in water quantity and quality can affect living things

Lesson 32

Earth's Water



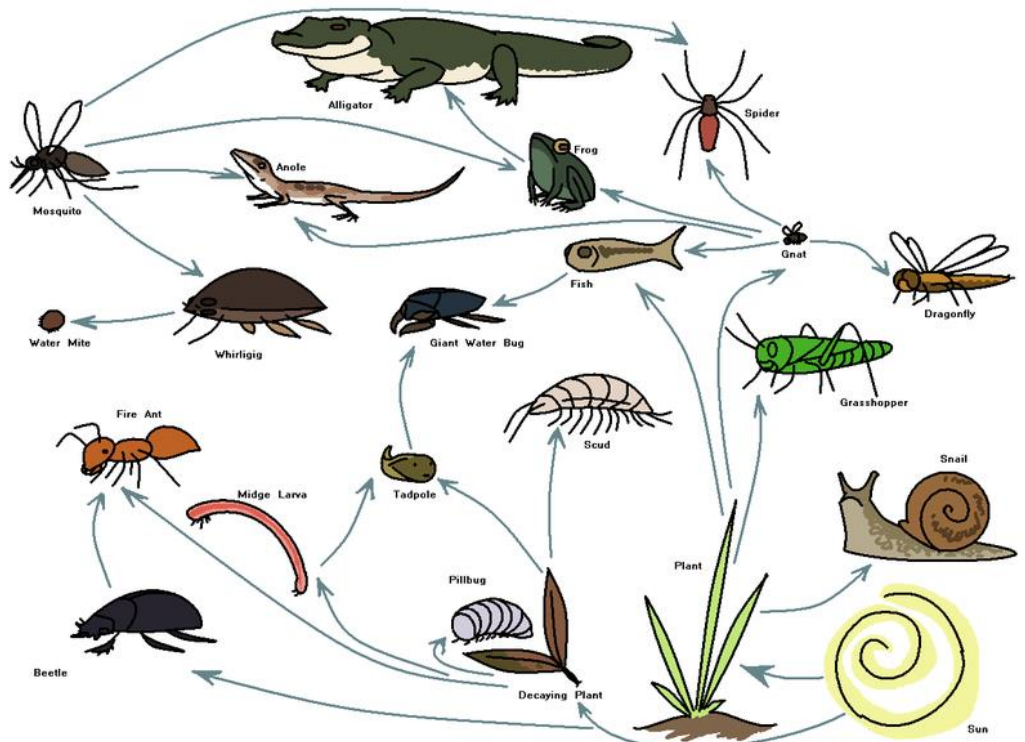
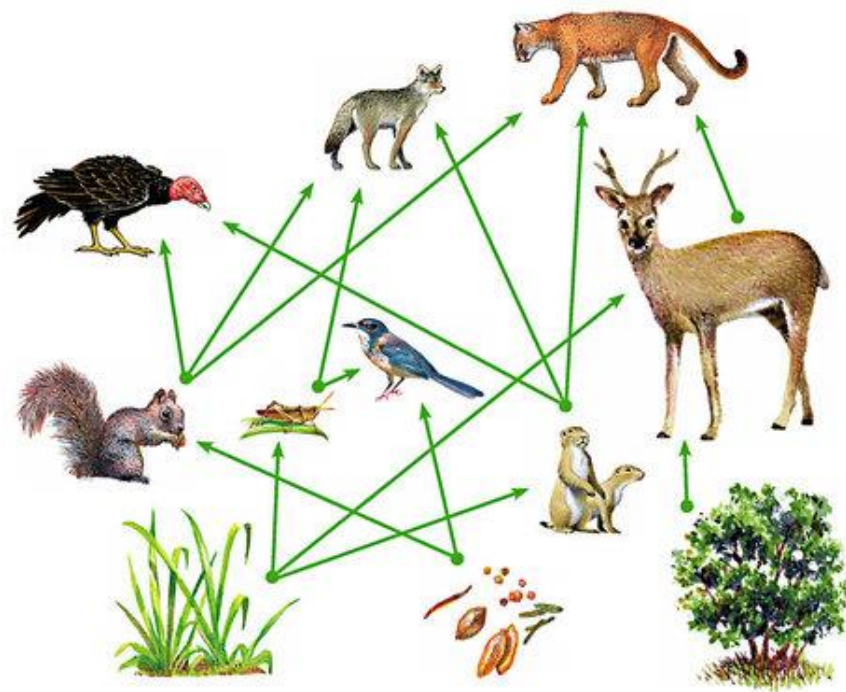
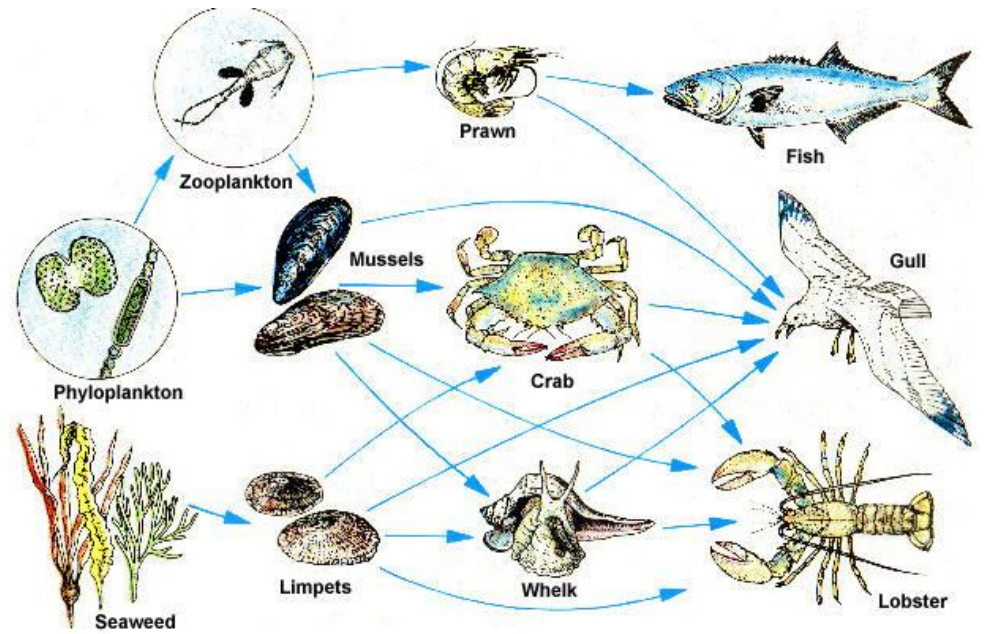
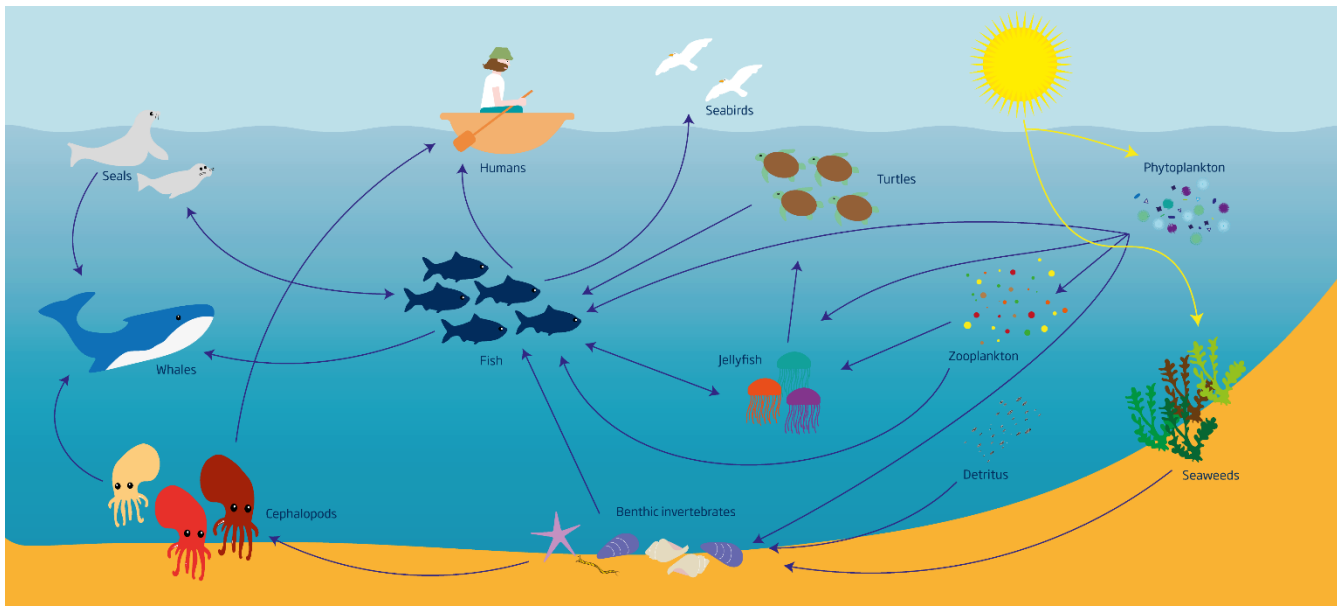
- Earth's fresh and salt water are home to thousands of species of plants and animals
- Some water environments are dramatically more productive than others
 - Have a larger total number or amount of life forms compared with other water environments



Earth's Water

- Scientists can compare the plant productivity, study the diversity of plants and animals, etc. to determine the health of water environments such as streams and oceans
- The disappearance of even a small, seemingly insignificant species could indicate a change in the water's quantity or quality
 - Could be a sign of more changes and disappearances to come





Freshwater Environments

- Freshwater environments range from deep, glacier-fed lakes and fast moving streams to shallow, weedy bogs
- Some animals spend their entire life in the same body of fresh water
- Other animals need both fresh and saltwater environments to survive
 - E.g. Salmon, spend more of their life swimming in the open ocean, but return to freshwater rivers to spawn



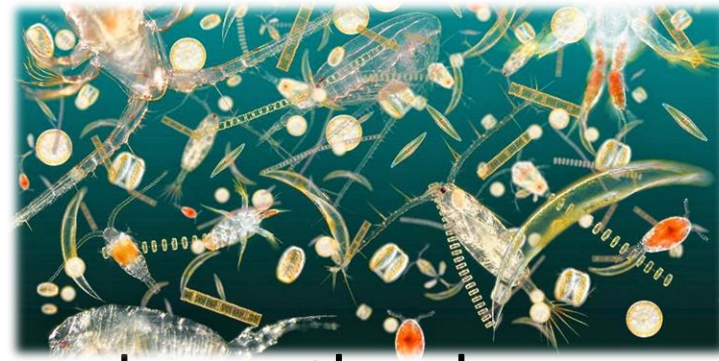
Freshwater Environments

Plants and animals are found in all freshwater environments, but their variety and productivity depend on a number of factors:

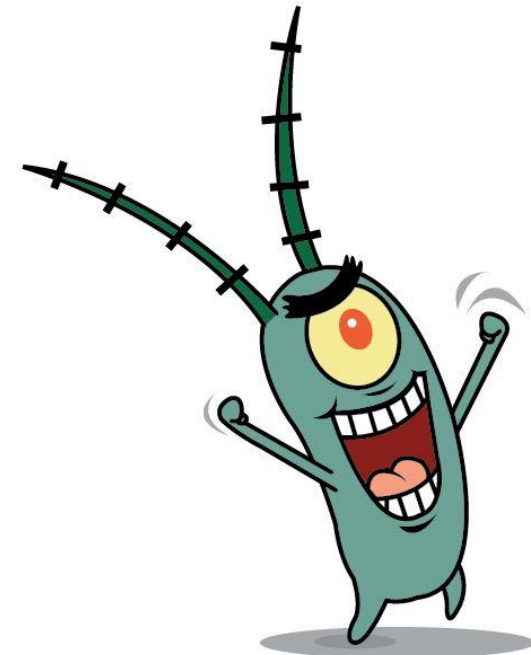
- How far down into the water the sunlight reaches
- What the nutrient content of the water is
- How deep the water is
- The speed at which the water is moving (if at all)
- The oxygen level of the water



Life in Lakes and Ponds



- Much of the life in a lake or pond can be found near the shores
 - The water is shallow
 - Many nutrients for plants and animals → insects, plants with roots, small fish are abundant
- In the sunlit waters away from the shore are the small, free-floating organisms called plankton
 - Phytoplankton = plants that produce their nutrients through photosynthesis
 - Zooplankton = tiny animals that eat other plankton for food
 - Form the first link in the aquatic food chain, providing food for everything from insects to fish



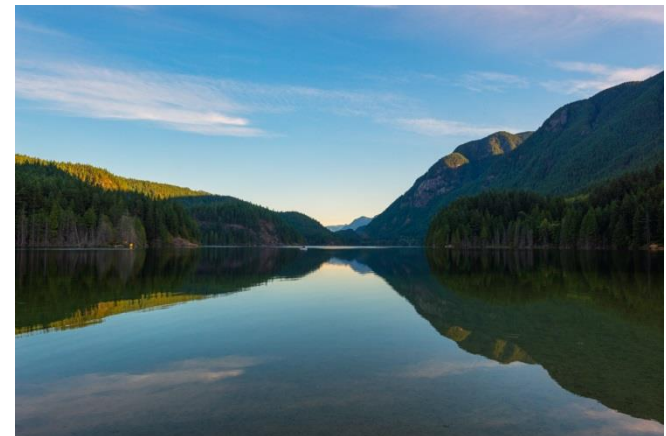
Life in Lakes and Ponds

- Home to a wide variety of amphibians (frogs, salamanders) and larger fish in the deeper areas of the water
- Various mammals and birds may establish a home base along lake or pond shorelines
 - Beaver and muskrat are common examples in BC



Lakes and Ponds

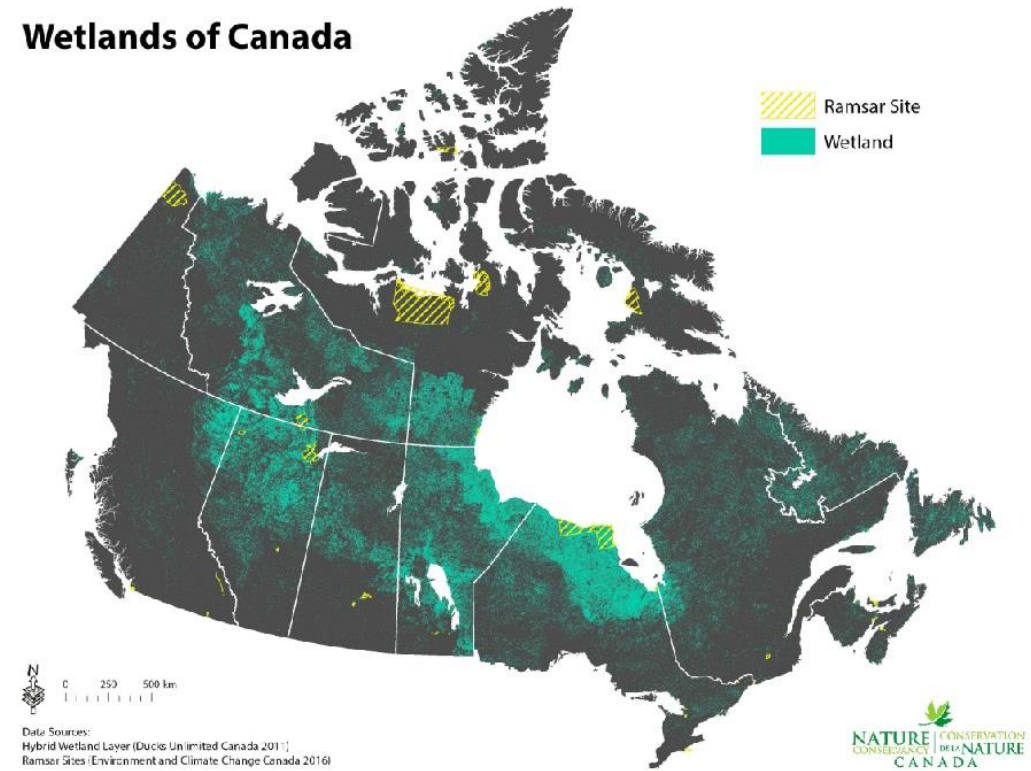
- Lakes and ponds serve an important purpose in the water cycle
 - Catch and store excess run-off
- Beneficial for the environment:
 - Provide a habitat (home) for a variety of plants and animals
 - Supporting rooted plants, which clean the water through natural processes



Life in Wetlands

- One quarter of all the wetlands in the world are located in Canada
- For most of the last century, wetlands were considered simply breeding grounds for insects and other pests (rodents)
 - Almost 90% of wetlands in BC have been lost to industrial and urban residential development
- Only in the past few decades that people have realized the important role that wetlands play in the whole environment

Wetlands of Canada



Life in Wetlands

Wetlands contribute to the environment in many ways:

- Vegetation acts as filters for removing pollutants from the water
- Hold a quantity of water, which helps prevent flooding
- Many BC freshwater fish spawn in wetland environments
- A huge variety of wildlife make wetlands their home (migratory birds such as snow geese)
- Thick vegetation helps keep shorelines stable and minimizes erosion
- Many endangered species visit wetland areas as part of their life cycle



Life in Rivers and Streams

- The types of organisms found in the fast-moving waters of rivers depends on the water temperature, its speed, and the amount of sediment in the water (turbidity)
- **Plants** such as weeds, mosses, and algae are common in rivers
- A large number of **insects** are found on or in rivers
 - Many lay their eggs along the riverbed
- **Snails** and **worms** find home in the bottom of streams
- **Trout, pike, catfish** feed off the smaller organisms in streams



Life in Rivers and Streams

- A change in the variety or productivity of species in a river or stream (and in any water body) is of interest
- By monitoring species populations and abundance, scientists can detect whether the change in the plants and animals is caused by a change in quality or quantity of the water

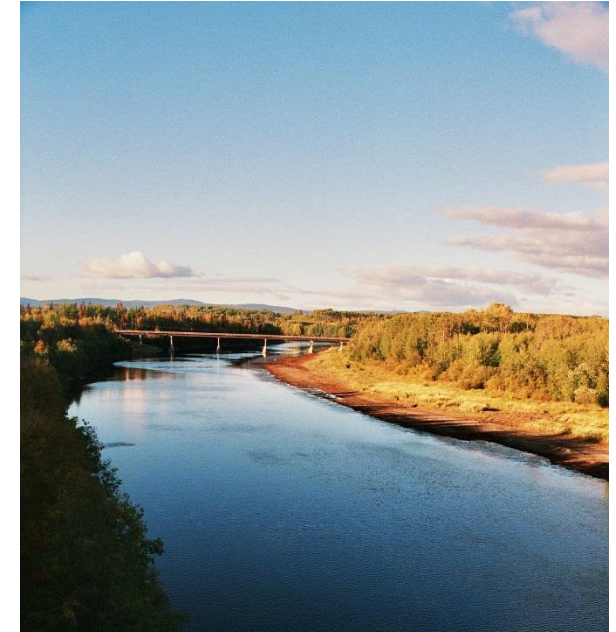


Changes in the quality or quantity of the water

Life in Rivers and Streams

Example - Salmon in the Nechako River:

- Biologists were concerned when they noticed that fewer salmon were returning to the river to spawn
 - Discovered that the water temperature was unusually high
 - The dam farther up in Nechako had reduced the water level in the lower part of the river → the shallower water was heating up in the sun
- To fix the problem, a cold water “spillway” will be installed to funnel cold water into the river, lowering the temperature and making the habitat healthy again for salmon



Life in Estuaries

- An **estuary** is an area of land that builds up where a river meets the ocean
 - E.g. located at the mouth of a river, where fresh water meets salt water
 - “brackish” water = a mixture of fresh and salt water
- Nutrients that come from the land, rivers, and the ocean accumulate in estuaries
 - Nutrients are distributed by winds, currents, and tides
- Ideal environments for plants and animals



Life in Estuaries

- In BC, estuaries make up on 3% of the coastline, but are used by 80% of the wildlife found on the coast
- Unique habitats to a range of organisms
 - Eel grass
 - Trout
 - Otters
 - Owls
 - Herons



Conclusion

- Scientists classify different freshwater environments by how the water moves
 - Rivers and streams have fast-moving water
 - Water in lakes and ponds tends to move very slowly
 - Wetlands and marches are areas where shallow water remains unmoving for much of the year
- All of these environments support a wide variety of plant and animal forms

