

Chap 10. Freshwater Biomes

- 10.1 Aquatic biomes
- 10.2 Standing-water ecosystems
- 10.3 Flowing-water ecosystems

Homework

- Copy the concept map about freshwater biomes into your notebook. As you read, fill in the concept map, then give it a title. (p154)

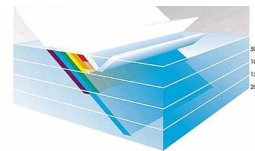
10.1 Aquatic Biomes

- An aquatic habitat is one in which the organisms live in or on water.
- The temperature in large bodies of water is more stable than the temperature on land.
- Also, rainfall has little effect on many aquatic biomes because the organisms are already underwater.
 - Recall that temperature and rainfall are important factors in land biomes.



10.1 Aquatic Biomes

- Important factors in aquatic biomes
 - The amount of dissolved salts
 - The depth of the water (sunlight)
 - The rate of flow
 - The amount of dissolved oxygen



10.1 Aquatic Biomes

- The amount of dissolved salts in a sample of water is called **salinity**.
 - Ocean water: about 30 parts per thousand (ppt)
 - Fresh water: 0.5 ppt or less
- Water that is more saline than fresh water, but less saline than ocean water, is called **brackish water**.



10.1 Aquatic Biomes

- Brackish water is common where fresh water meets the ocean (river deltas and coastal marshes)



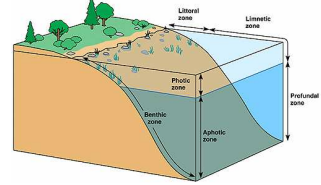
10.1 Aquatic Biomes

- The water in most lakes, ponds, and rivers is fresh water.
- There are, however, some exceptions (hypersaline lakes) with salinity of 40 ppt.
 - Great Salt Lake in Utah
 - Mono Lake in California



10.1 Aquatic Biomes

- The ecosystem present in water is greatly influenced by the amount of sunlight.
 - Photic zone: the top layer of water, which receives sunlight (up to 200 m deep in the open ocean)
 - Aphotic zone: below the photic zone, sunlight never reaches
 - Benthic zone: the floor of a body of water



10.1 Section Review

- What is an aquatic biome?
 -

10.1 Section Review

- What characteristic distinguishes the photic zone from the aphotic zone?
 -

10.1 Section Review

- How is salinity determined and measured?
 -

10.1 Section Review

- Suppose a friend wants to set up an aquarium and discovers that saltwater fish are more attractive, but a freshwater aquarium is easier to maintain. Your friend decides to set up a freshwater aquarium but buys some saltwater fish to place in it. Predict what the result of this decision would be, and why.
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10.1 Section Review

- An estuary is a place where ocean water meets river water. What kind of water would you expect to find in an estuary? Why?
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10.1 Section Review

- What two major factors are used to characterize aquatic biomes?
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10.1 Section Review

- What are the two main types of aquatic biomes?
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10.2 Standing-Water Ecosystems

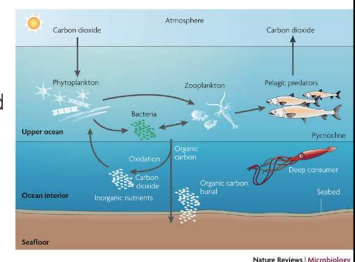
- Freshwater biomes can be divided into two main types.
 - Standing-water ecosystem: lake, pond, marsh, swamp, and bog
 - Flowing-water ecosystem: rivers, streams, creeks, and brooks

10.2 Standing-Water Ecosystems

- The top level of a standing-water ecosystem supports the plankton community
 - Plankton that carry out photosynthesis are called phytoplankton. Phytoplankton are particularly important because they are producers.
 - Plankton that do not carry out photosynthesis are called zooplankton. They are consumers.

10.2 Standing-Water Ecosystems

- Zooplankton feed on phytoplankton.
- Small fish feed on plankton and insect on the surface of the water.
- Larger fish feed on smaller fish, and so on.



10.2 Standing-Water Ecosystems

Wetlands

- Wetlands are ecosystem in which the roots of plants are submerged under water at least part of the year.
 - Marsh: low-lying wet land with grassy vegetation; usually is a transition zone between land and water.
 - Swamp: low land that is seasonally flooded; has more woody plants than a marsh and better drainage than a bog.
 - Bog: wet spongy ground of decomposing vegetation; has poorer drainage than a swamp.

10.2 Standing-Water Ecosystems



10.2 Standing-Water Ecosystems

Wetlands

- Wetlands act as efficient filters, detoxifying chemicals in the water. → They can be used as part of treatment systems for waste water.
- Wetlands are breeding, feeding, and resting grounds for migratory waterfowl, such as ducks and geese, and other animals.



10.2 Standing-Water Ecosystems

Wetlands

- Wetlands along the banks of rivers act as flood protection regions.
- We have several reasons for the disappearance of the wetlands.
 - Breeding grounds for mosquitoes
 - Unpleasant order (methane, or swamp gas) released by the organisms in the muddy, oxygen-free soil
 - More than half the wetlands in the United States have been destroyed.

10.2 Standing-Water Ecosystems

- The Florida Everglades is home to a huge number of organisms. (Figure 10.4 on page 160)
 - Alligators scoop out large depressions in the ground, forming pools called gator holes. → Without the gator hole, neither the fish nor the birds would survive the dry season.



10.2 Section Review

- What are the major characteristics of a marsh?
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10.2 Section Review

- What is the difference the role of phytoplankton and the role of zooplankton in an aquatic food web?
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10.2 Section Review

- The number of migratory birds in the tundra during the summer has been declining in recent years. How might changes that have taken place in wetlands have contributed to this decline?
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10.2 Section Review

- What organisms can be found drifting in a pond or lake, and what is their role in the ecosystem?
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10.2 Section Review

- What are wetlands? Name some examples of wetlands.
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10.3 Flowing-Water Ecosystems

- Organisms that live in flowing-water habitats are adapted to the rate of the water's movement.
 - Some insect larvae have hooks that enable them to grab hold of plants.
 - Others have suckers that anchor them to rocks.
 - Salmon and trout have adapted to life in freshwater streams.



10.3 Flowing-Water Ecosystems

- The place where the stream begins is the source, or head, of the stream.
- Water near the source is called headwater.
- Headwaters in the mountains are often cold and contain large amounts of dissolved oxygen that can support a variety of organisms.
- But these headwaters tend to flow too rapidly for most organisms to live in the water.



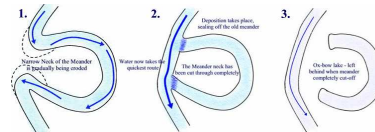
10.3 Flowing-Water Ecosystems

- Small particles that settle to the bottom of a body of water are called **sediments**.
- Sediments accumulate on the bottom of the streambed and provide a place for plant roots to grow.
- The plant growth further slows the flow of water, allowing the water to be warmed by the sun.



10.3 Flowing-Water Ecosystems

- Phytoplankton multiply in the warmer water to support consumers.
- The processes of sedimentation and erosion cause the course of a stream to change naturally over time. (Figure 10.7 on page 162)
- As a stream becomes older, it becomes more and more curved.



10.3 Flowing-Water Ecosystems

- Dams, dikes, and irrigation canals have been used to change streams' courses, often damaging their fragile ecosystems.
- Many dams are intended to control flooding in river systems, but flooding is a natural and beneficial part of many ecosystems.



10.3 Flowing-Water Ecosystems

- The **fish ladder** allows migrating fish to pass the dam on their way to spawning grounds.



10.3 Section Review

- What condition encourages sediments to settle out of the flowing water in a stream?
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10.3 Section Review

- Why are there fewer organisms in the headwater of a stream than further downstream?
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[10.3 Section Review]

- The headwaters of a stream often contain more dissolved oxygen than the water hundreds of kilometers downstream. Why is this true?
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[10.3 Section Review]

- Describe where and how a typical stream might form.
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[10.3 Section Review]

- What causes a stream to flow?
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[10.3 Section Review]

- Define sediments.
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[Chapter 10 Review]

- To be considered fresh water, water must contain salt in a concentration less than _____ parts per thousand.
 -
- Brackish water is common in coastal _____.
 -

[Chapter 10 Review]

- Organisms that live on the bottom of aquatic habitats are _____ organisms. They are often scavengers.
 -
- A type of standing-water habitat in which the soil is acidic and decay is slow is called a _____.
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Chapter 10 Review

- _____ are important breeding grounds for migratory waterfowl.
 -
- _____ tend to accumulate in slow-moving parts of a stream.
 -

Chapter 10 Review

- Levees and dams are _____ to farmlands because they protect the fields from floods.
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- Levees and dams are _____ to farm lands because they prevent stream sediments from being deposited on the fields.
 -

Chapter 10 Review

- _____ are the main producers in deep-water ecosystems.
 -
- Sunlight always reaches through the _____ zone.
 -

Chapter 10 Review

- _____ is produced in swamps by benthic bacteria.
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- The course of a stream can change over time as a result of _____ and _____.
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Chapter 10 Review

- Explain how a stream's flow rate affects its benthic community.
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Chapter 10 Review

- List four abiotic factors that determine the types of organisms in aquatic ecosystems.
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Chapter 10 Review

- A _____ is the deepest type of standing water. Its producers are drifting algae and benthic plants.
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- A _____ is land soaked with water. It has trees, shrubs, and plants adapted to oxygen-poor soil.
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Chapter 10 Review

- How does depth affect the food web of a lake ecosystem?
 -

Chapter 10 Review

- Describe four beneficial functions of wetlands.
 -

Chapter 10 Review

- Why does the reproductive behavior of salmon make the fish vulnerable to changes in habitat?
 - Salmon are born in the headwater of a stream, spend years in the ocean, and return to the same headwaters to spawn. Any change in either habitat would destroy the cycle.

Chapter 10 Review

- Fish that are adapted to live in cold water may not survive in warmer water. Why does temperature affect the ability of an animal to survive in the water?
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Chapter 10 Review

- How do the salinities of ocean water and fresh water compare?
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[Chapter 10 Review]

- Name two examples of hypersaline lakes.
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[Chapter 10 Review]

- What are the two main types of freshwater biomes? Give examples of each type.
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[Chapter 10 Review]

- What connection can you make between the amount of dissolved oxygen in a body of water and the number and diversity of organisms that live within it? Given reasons for your answer.
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[Chapter 10 Review]

- Infer one reason why wetland waters contain very little dissolved oxygen.
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