

Ecosystems

- 18.1 [Terrestrial Biomes](#)
- 18.2 **Aquatic Biomes**
- 18.3 [Biogeochemical Cycles](#)
- 18.4 [Energy Flow in Ecosystems](#)
- 18.5 [Ecological Succession](#)



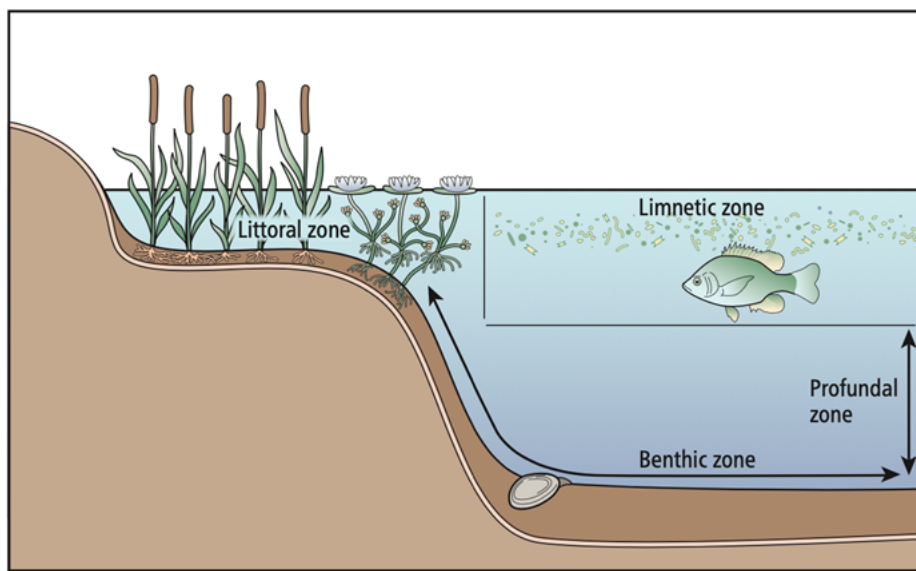
18.2 Aquatic Biomes

Life likely originated in the oceans, and many species continue to make use of aquatic habitats in both fresh water and salt water.

Freshwater Habitats

Freshwater habitats include lakes, ponds, and rivers. The still waters of lakes and ponds vary tremendously in size and biodiversity. Nonetheless, all can be divided into four major zones, as illustrated in Figure 18.4. Habitats close to the water surface and to shore are part of the *littoral zone*. The littoral zone is relatively warm because of its exposure to sunlight. Organisms that live in the littoral zone include photosynthetic plants and algae, insects, mollusks, crustaceans, fishes, amphibians, ducks, and turtles. The *limnetic zone* includes habitats that are close to the water surface but far from shore. The limnetic zone is occupied mainly by **plankton**, organisms that float in the water rather than swimming actively through it.

Phytoplankton are photosynthesizing plankton—they are the main producers in lakes and ponds. Zooplankton are heterotrophic plankton. In some lakes and ponds, fish also live in the limnetic zone.



The *profundal zone* includes the deep-water habitats in ponds and lakes.

Most organisms in the profundal zone consume organic debris that drifts down from above. The *benthic zone* describes habitats on the lake bottom. This zone is home to mollusks, worms, microorganisms, and other living things.

Aquatic species that live in the flowing waters of rivers and streams usually have adaptations that keep them from being washed away.

FIGURE 18.4

Lakes and ponds can be divided into different zones. Each zone is home to distinct kinds of living organisms.





Some species have hooks or suckers for attaching to rocks. Others are strong swimmers. As in lakes and ponds, photosynthesizing plankton are the main producers in rivers and streams.

Estuaries are habitats where freshwater rivers flow into oceans. The plants found in estuaries, such as marsh grasses and mangroves (Figure 18.5), have adaptations for dealing with changing salinity conditions. Estuaries are also home to many fishes, invertebrates, and birds and are essential nursery habitats for many fishes and invertebrates.

FIGURE 18.5

An estuary in southern Florida.

Saltwater Habitats

The oceans offer a wide range of habitats to living organisms, as shown in Figure 18.6. The largest habitat, by far, is the pelagic zone, which includes all ocean waters. The pelagic zone is further divided into two parts. The *photic zone* is close to the water surface and receives enough sunlight to power photosynthesis. The majority of pelagic species are found there. The deeper *aphotic zone* receives little sunlight and is much more limited in food availability and biodiversity.

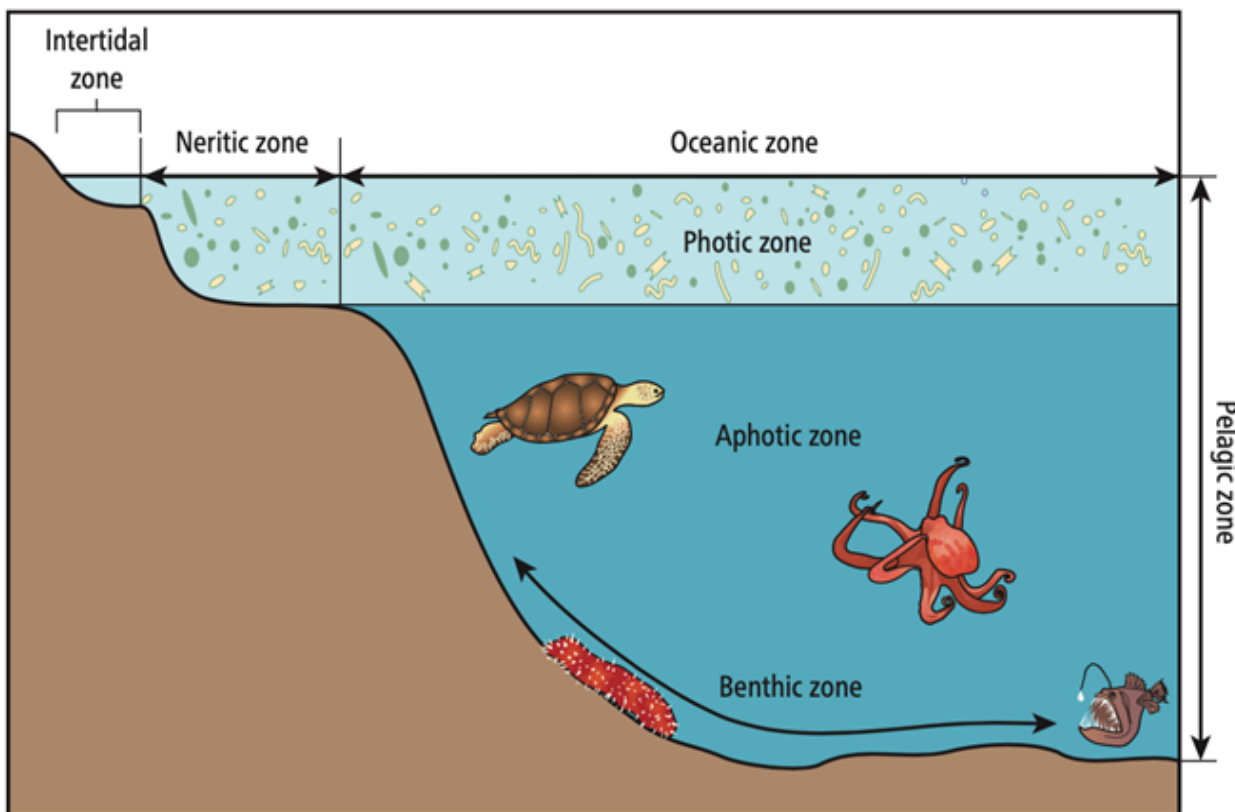


FIGURE 18.6

The ocean offers a variety of habitats to living organisms. Ocean habitats are divided into different zones based on depth and distance from shore.



Pelagic species use one of two modes of locomotion. Plankton float wherever water currents take them. Plankton include living things such as diatoms, dinoflagellates, and the larvae of animals such as clams, lobsters, and sea urchins. The phytoplankton, or photosynthetic plankton, are the main producers in oceanic food chains. **Nekton** swim actively through the water. Fish and sea turtles are examples of nekton. Humans aren't aquatic organisms, of course, but when we do get in the water, we can behave like plankton or nekton (Figure 18.7).

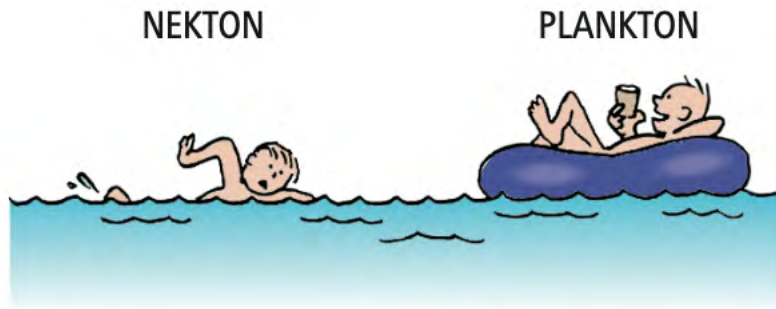


FIGURE 18.7

In the water, humans can behave like nekton or plankton.

Most marine species actually live in the *benthic zone* on the ocean bottom. Benthic species may live on the surface of the ocean bottom, like lobsters, or burrow into the sediment, like clams and worms.

Ocean habitats also can be categorized based on their closeness to shore. The *intertidal zone* is closest to shore. As the tide moves in and out, the intertidal zone alternates between being submerged underwater and exposed to air. Intertidal species, such as barnacles, sea anemones, and starfish, must be able to deal with exposure to air, temperature fluctuations, and waves (Figure 18.8). Special adaptations allow them to live in this environment. Many intertidal species have thick shells or hide in crevices to keep from drying out. In addition, all intertidal species can attach firmly to rocks or other surfaces so that they do not get washed up onto the beach. The *neritic zone* describes underwater marine habitats near the coasts. Coral reefs, the most diverse marine ecosystems on Earth, are found in the neritic zone. Habitats in the neritic zone contain high levels of nutrients that wash into the water from land. Because of this, the neritic zone is richer in life than the regions of the ocean further from land, known as the *oceanic zone*.

FIGURE 18.8

Diverse organisms, including starfish, sea anemones, and sea urchins, occupy this tide pool.



READING CHECK

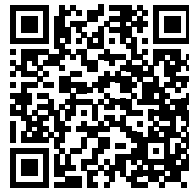
1. **Scallops live on shallow seafloors. They move by quickly opening and shutting their shells, shooting jets of water that propel them in spurts. Are scallops pelagic or benthic? Are they nekton or plankton?**
2. **The flounder has a very unusual feature—one of its eyes migrates from one side of the body to the other side during development. It ends up with two eyes on the same side! What type of aquatic habitat do you think the flounder occupies?**

CHECK YOUR ANSWERS

1. Scallops are benthic nekton.
2. Flounders are benthic fish that lie flat on the seafloor. One eye migrates from the “underside” of the body to the “top” side, where it is of more use.

To learn more about aquatic biomes, check out the following websites:

<https://www.nationalgeographic.org/encyclopedia/aquatic-biome/>



<https://ucmp.berkeley.edu/exhibits/biomes/freshwater.php>

<https://ucmp.berkeley.edu/exhibits/biomes/marine.php>

