

Chapter 11 Living Resources ■ *Section 1 Summary*

Biomes

Key Concepts

- What factors determine the type of biome found in an area?
- What are the characteristic organisms of the six major biomes?

A **biome** is a region with a certain climate and certain forms of vegetation. **It is mostly the climate—temperature and precipitation—in an area that determines its biome. The six major biomes are the desert, rain forest, grassland, deciduous forest, boreal forest, and tundra.** The climate limits distribution of plants. In turn, the types of plants determine the kinds of animals that live there.

A **desert** is an area that receives less than 25 centimeters of rain each year. Deserts have large shifts in temperature during the course of a day. Desert organisms are adapted to the lack of rain and to the extreme temperatures.

Tropical rain forests are warm and humid and found near the equator. The tall trees form a leafy roof called a **canopy**. A layer of shorter trees and vines forms an **understory**. Temperate rain forests are found farther north. They also receive a lot of rain but are cooler than tropical rain forests.

A **grassland** is an area that is populated mostly by grasses and other nonwoody plants. Most grasslands receive between 25 and 75 centimeters of rain each year and are populated mainly by grasses and other nonwoody plants. Grasslands that are located close to the equator are called **savannas**. Savannas receive as much as 120 centimeters of rain each year. Grasslands are home to many of the largest animals on Earth.

The trees found in deciduous forests, called **deciduous trees**, shed their leaves and grow new ones each year. These forests receive at least 50 centimeters of rain each year. Temperatures vary during the year. Some of the mammals enter a low-energy state called hibernation in the winter.

Boreal forests contain **coniferous trees**, which produce their seeds in cones and have leaves shaped like needles. Winters are long, very cold, and snowy. Summers are rainy and warm enough to melt all the snow.

The **tundra** is extremely cold and dry, often with no more precipitation than a desert. Most of the soil is frozen all year long. The frozen soil is called **permafrost**. Plants include low-growing mosses, grasses, and shrubs.

Some areas of land are not part of any major biome. These areas include land that is covered with thick sheets of ice and mountain ranges.

The climate changes dramatically as you go up a high mountain. Each altitude zone on the mountain has a different climate and a different community of plants. You would pass through different climate zones if you climbed from California's Central Valley to the top of a mountain in the Sierra Nevada.

Chapter 11 Living Resources ■ *Section 2 Summary*

Aquatic Ecosystems

Key Concepts

- What abiotic factors influence aquatic ecosystems?
- What are the major types of aquatic ecosystems?
- What are the ecological roles of organisms in aquatic food webs?

Almost three quarters of Earth's surface is covered with water. Many organisms make their homes in aquatic, or water-based, ecosystems. **All aquatic ecosystems are affected by the same**

abiotic factors: sunlight, temperature, oxygen, and salt content.

Freshwater ecosystems include streams, rivers, ponds, and lakes.

Animals that live in streams are adapted to the strong current. Few plants or algae grow in the fast-moving water of streams. As streams merge, they grow into larger, slower-moving rivers. Plants are able to root on river bottoms, and these producers provide food for young insects and homes for frogs and tadpoles.

Ponds and lakes are bodies of standing, or still, fresh water. Lakes are generally larger and deeper than ponds. In large ponds and most lakes, algae floating at the surface are the major producers. Many animals, including turtles, snails, dragonflies, frogs, and fish, are adapted to life in the still water of lakes and ponds. Scavengers such as catfish live near the bottom. Bacteria and other decomposers feed on the remains of other organisms.

The ocean has different zones. An **estuary** is found where the fresh water of a river meets the salt water of an ocean. **Marine ecosystems include estuaries, intertidal zones, neritic zones, and the open ocean. These zones are classified largely by the depth of water.** Between the highest high-tide line and the lowest low-tide line is the **intertidal zone**. Below the low-tide line is the **neritic zone**, a region of shallow water over the continental shelf. Below the open ocean's surface is the deep zone, which is completely dark.

Kelp forests, which occur off of California's coast, grow in cold neritic waters where the bottom is rocky. Giant kelp, a form of brown algae that grows up to 30 meters long, is the major producer in kelp forests. Kelp forests are home to many animals.

In tropical regions, coral reefs may form. **Coral reefs** are created by colonies of tiny coral animals. Incredible numbers of animals live in and around coral reefs, making them one of Earth's most diverse ecosystems.

As on land, organisms in the ocean are connected by food chains and food webs. But in the ocean, the producers are algae rather than plants.

Most algae are **plankton**—tiny organisms that float in water. Throughout the ocean, plankton are a source of food for organisms of all sizes. For example, algae is eaten by single-celled consumers called protozoans. The protozoans are eaten by animal plankton, which are eaten by fish, which are eaten by top-level predators such as birds and seals.

Chapter 11 Living Resources ■ *Section 3 Summary*

Forests and Fisheries

Key Concepts

- How can forests be managed as renewable resources?
- How can fisheries be managed for a sustainable yield?

Forests are an important living resource. Trees and other plants produce oxygen that other organisms need. They also absorb carbon dioxide and many pollutants in the air. Forests help prevent flooding and control soil erosion. Many products come from forest plants. Because trees reproduce and grow relatively quickly, they are considered a renewable resource. A **renewable resource** is one that either is always available or is naturally replaced in a relatively short time.

Because new trees can be planted to replace trees that are cut down, forests can be renewable resources. There are two major methods of logging. Cutting down all the trees in an area at once is called **clear-cutting**. Cutting down only some trees and leaving a mix of tree sizes and species behind is called **selective cutting**. Clear-cutting is usually quicker and cheaper than selective cutting. However, selective cutting is usually less damaging to the forest environment. When an area of forest is clear-cut, the habitat changes. Clear-cutting also exposes the soil to wind and rain.

Forests can be managed to provide a sustainable yield. A **sustainable yield** is an amount of a renewable resource such as trees that can be harvested regularly without reducing the future supply. One sustainable approach is to log small patches of forest in stages. This way, different sections of forest can be harvested every year.

A **fishery** is an area with a large population of valuable ocean organisms. If a fishery is managed properly, it can be a valuable renewable resource. But if fish are caught at a faster rate than they can breed, the population decreases. This situation is called "overfishing."

Managing fisheries for a sustainable yield includes setting fishing limits, changing fishing methods, developing aquaculture techniques, and finding new resources. Laws can help protect fish species by limiting the total amount of fish that can be caught or by setting a minimum or maximum size for the fish. A fishery may be closed until the fish populations recover. Nets with larger holes can be used to allow young fish to escape. Fishing methods that kill all the fish in an area can be outlawed. **Aquaculture** is the practice of raising fish and other water-dwelling organisms for food. Another way to help feed a growing human population is to fish for new species.

Chapter 11 Living Resources ■ Section 4 Summary

Biodiversity

Key Concepts

- In what ways is biodiversity valuable?
- What factors affect an area's biodiversity?
- Which human activities threaten biodiversity?
- How can biodiversity be protected?

The number of different species in an area is called its **biodiversity**. Preserving biodiversity is important. **People value wildlife and ecosystems for their beauty and as a source of recreation. In addition, biodiversity has both economic value and ecological value within an ecosystem.**

Organisms also provide food, oxygen, and raw materials for clothing, medicine, and other products. All the species in an ecosystem are connected to one another.

Factors that affect biodiversity in an ecosystem include area, climate, and diversity of niches. Tropical rain forests are the most diverse ecosystems in the world. The climate makes food available for organisms year-round. Coral reefs are the second most diverse ecosystems in the world. A reef provides many different niches for organisms. A species that influences the survival of many other species in an ecosystem is called a **keystone species**.

The disappearance of all members of a species from Earth is called **extinction**. Species in danger of becoming extinct in the near future are considered **endangered species**. Species that could become endangered in the near future are considered **threatened species**. Natural events such as earthquakes can cause species to become extinct. **Human activities can also threaten biodiversity. These activities include habitat destruction, poaching, pollution, and the introduction of nonnative species.** The major cause of extinction is **habitat destruction**, the loss of a natural habitat. The illegal killing or removal of wildlife from their habitats is called **poaching**. Some species are endangered because pollutants build up in organisms through the food chain. Introducing exotic species into an ecosystem can also threaten biodiversity.

Three successful approaches to protecting biodiversity are captive breeding, laws and treaties, and habitat preservation. One scientific approach is **captive breeding**, which is the mating of animals in zoos or wildlife preserves. Laws and treaties can help protect species by making it illegal to sell endangered species or products made from them. The most effective way to preserve biodiversity is to protect whole ecosystems.