



Figure 22.22 Elephants, *Loxodonta africana*, and zebras, *Equus burchelli*, share a water hole on the savanna in Kenya.



Figure 22.23 A chaparral in California.

Guidepost: How do ecosystems change?

of zebras, wildebeest, and gazelles, as well as elephants, giraffes, and hoofed animals, are found on the Serengeti Plains of the savanna (see Figure 22.22). At present these herds make up the largest concentration of animals to be found on any continent.

Consider the character of the savanna. What adaptations might savanna-dwelling animals have? Burrowing animals are common, and nest sites and shelters often are on the ground. Animals in the savanna are most active during the rainy season, and many species are nocturnal. In the winter-dry season, when the aboveground vegetation is dry, many animals are dormant or subsist on seeds and dead plant parts.

Chaparral Covers Dry Areas with Thin Soil

Midlatitude areas along coasts where cool ocean currents circulate often are characterized by mild, rainy winters and long, hot, dry summers. These areas, such as the California coast, are dominated by chaparral (shrubland), or brushland, communities composed of dense, spiny shrubs with tough evergreen leaves, often coated with a waxy material. Chaparral vegetation also is found in the Mediterranean region, along the coasts of Chile, southwestern Africa, and southwestern Australia. Plants from these regions are unrelated, but they resemble one another in form and function and show the same type of adaptations. Annual plants also are common in the chaparral during winter and early spring when rainfall is most abundant. Figure 22.23 shows a typical chaparral.

The plants of the chaparral are adapted to and maintained by periodic fires. Many of the shrubs have deep and extensive root systems that permit quick regeneration. The fires burn all the plant structures above the ground, thus releasing the nutrients in them. The nutrients then are available for use by the new plant shoots. In addition, many chaparral species produce seeds that germinate only after a hot fire. Deer, fruit-eating birds, rock lizards, and snakes are characteristic chaparral animals.

Concept Review

1. Describe the savanna biome and the abiotic factors that influence it. How does the savanna differ from other grasslands?
2. How does the character of the savanna influence the animals that live there?
3. What is chaparral? How are chaparral plants adapted to the abiotic factors?

Long-Term Changes in an Ecosystem

Through many years, one biotic or abiotic factor in an ecosystem may change. This change causes a second factor to change, which, in turn, changes a third factor. Eventually, the entire ecosystem may be quite different from what it was earlier. In this investigation you will trace the effects of a gradual climatic change on a model ecosystem. The model is much simplified from a real situation.