

WHY IS VEGETATION IMPORTANT?

Grasslands and forests around the world are shrinking. What happens to the soil in these regions? How are the wildlife and the people who live in these regions affected?

Your answers to these questions help to explain why Earth's vegetation is important. Vegetation affects the soil, interactions within the environment known as **ecosystems** (Figure 3.1), and the climate of a region. It also affects the people who live there, and whether or not they live well or struggle to survive.

Changes in vegetation have both local and global effects. The more we learn about vegetation, the better we will understand how and why we need to protect it.

EARTH'S NATURAL VEGETATION REGIONS

Earth's **natural vegetation** consists of the plants that grow freely without help from people, as opposed to those planted by people. There are three major natural vegetation regions around the world: forests, grasslands, and deserts. Each region covers about one-third of Earth's total land area. Where the regions are located depends mostly on the climate, which includes temperature and precipitation, and the type of soil.

What animals might live in grasslands but not in deserts?

ecosystem interactions that link living and non-living parts of the environment

natural vegetation plants that are natural to an area and grow freely there

FORESTS OF THE WORLD

Trees can grow from areas below sea level to places high in the mountains. They can grow at different latitudes, from the equator and almost up to the Arctic Circle. For example, **boreal** forests are in northern regions.

Tropical forests grow between the Tropic of Cancer (23.5°N latitude) and the Tropic of Capricorn (23.5°S latitude), and **subtropical** forests are found on the outer edges of these. Some species of trees need large quantities of water to survive; others do not. Trees are either coniferous or deciduous. Coniferous trees have needle-shaped leaves. Deciduous trees lose all their leaves for part of the year. Broadleaf trees have broad, flat leaves. Some are deciduous, such as maple and oak; others, such as mahogany, are evergreen. Evergreen trees have some leaves all year round. They can be both broadleaf or coniferous.

On **Figure 3.2**, you can locate the six main forest types: tropical broadleaf forests, subtropical broadleaf forests, Mediterranean forests, broadleaf deciduous forests, mixed forests, and needleleaf evergreen or boreal forests.

boreal of the North or northern regions

tropical between the Tropic of Cancer and the Tropic of Capricorn

subtropical just north of the Tropic of Cancer and just south of the Tropic of Capricorn

GRASSLANDS OF THE WORLD

Grasses do not need as much precipitation as trees. They can survive in drier regions. As well as grasses, grasslands include species of wildflowers and other grass-like plants, such as sedges and rushes. They are also home to many animal species. There are two types of grasslands: tropical grassland and mid-latitude grassland.

DESERTS OF THE WORLD

Deserts are extremely dry regions. A region is a desert if it has low precipitation, about 250 mm per year or less. Or it is a desert if it has a very high rate of evaporation compared to the amount of rain it gets. Evaporation is the change of a liquid to vapour or gas. There are three types of deserts: semi-desert scrub, desert, and tundra and high-mountain vegetation. Semi-desert scrub and deserts are usually hot. The **tundra** and high-mountain vegetation regions, which have low precipitation, are cold regions.

tundra vast Arctic region without trees where the soil is frozen year round



FIGURE 3.1 Grasslands' ecosystems support high numbers of grazing animals, such as giraffes and elephants.

I wonder what other animal species live in grasslands?

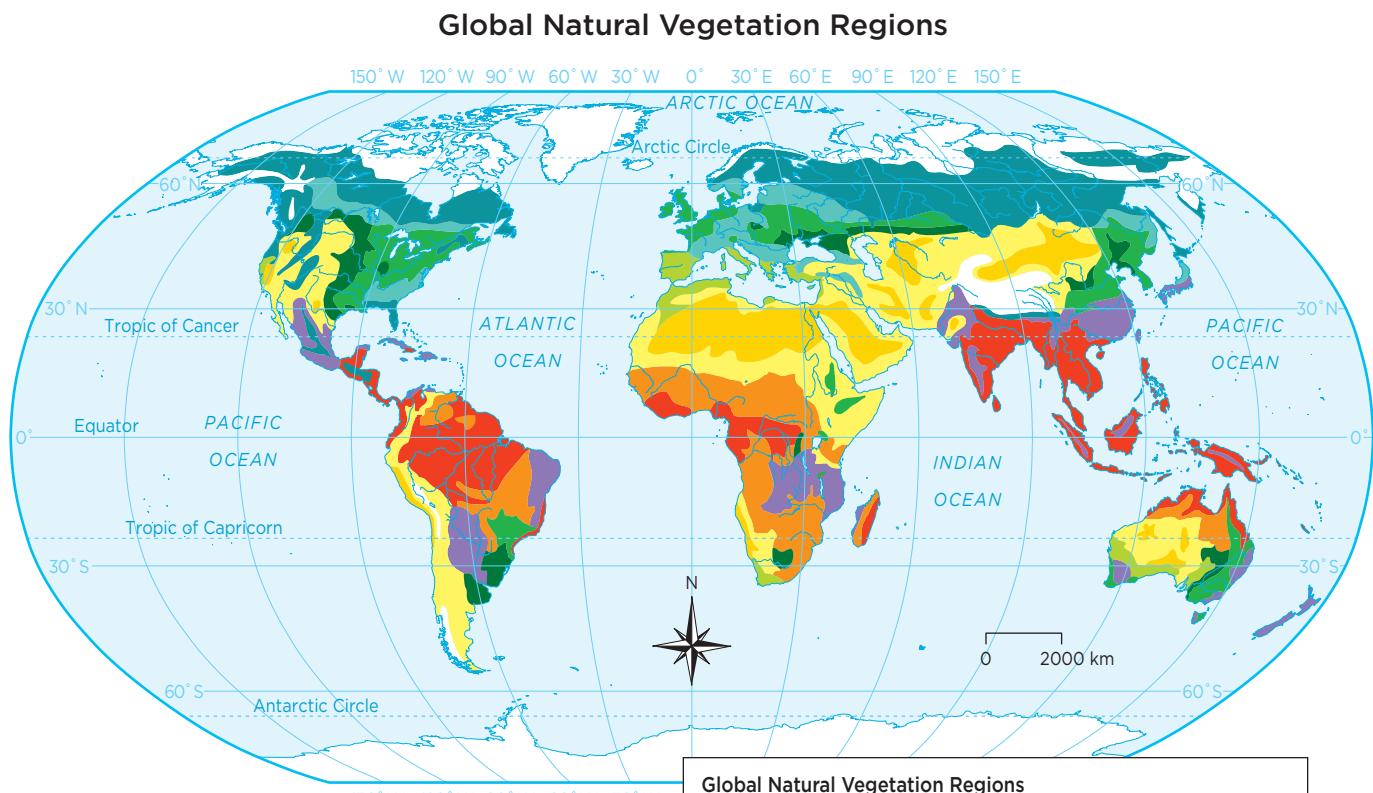
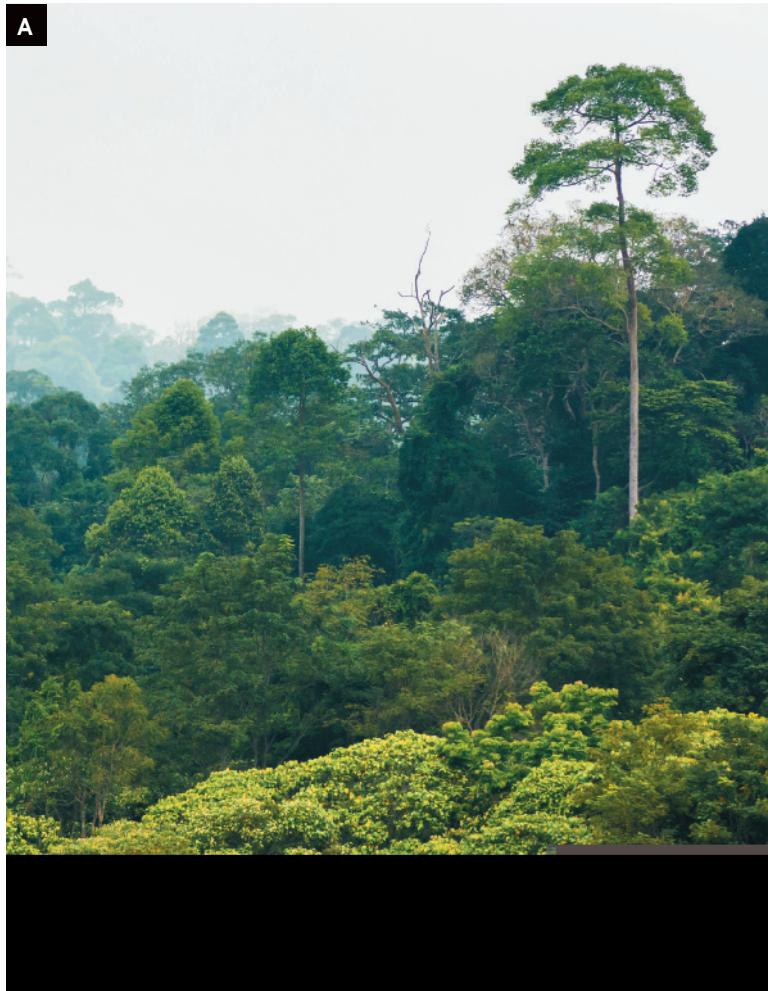


FIGURE 3.2 This map shows the natural vegetation regions around the world.

TYPES OF FORESTS

FIGURE 3.3 There are six types of forests: (A) tropical broadleaf forest (Thailand, Asia); (B) subtropical broadleaf forest (Mexico, North America); (C) Mediterranean forest (Italy, Europe); and (D) broadleaf deciduous forest (Canada, North America); (E) mixed forest (Japan, Asia); and (F) needleleaf evergreen or boreal forest (Finland, Europe).



A. Tropical broadleaf forest

Climate

- large amounts of precipitation: more than 2000 mm of rainfall per year
- rains every month of the year
- very hot all year; average temperature above 24 °C

Description

- greatest abundance and diversity of plant and animal species
- most trees have broad or wide, flat leaves
- trees do not lose their leaves

B. Subtropical broadleaf forest

Climate

- large amounts of precipitation: as much as 2000 mm of rainfall per year
- several dry months
- hot all year

Description

- trees are deciduous and lose their wide, flat leaves during the dry season
- many species are adapted to use the light that reaches the ground during the dry season when the treetops are bare

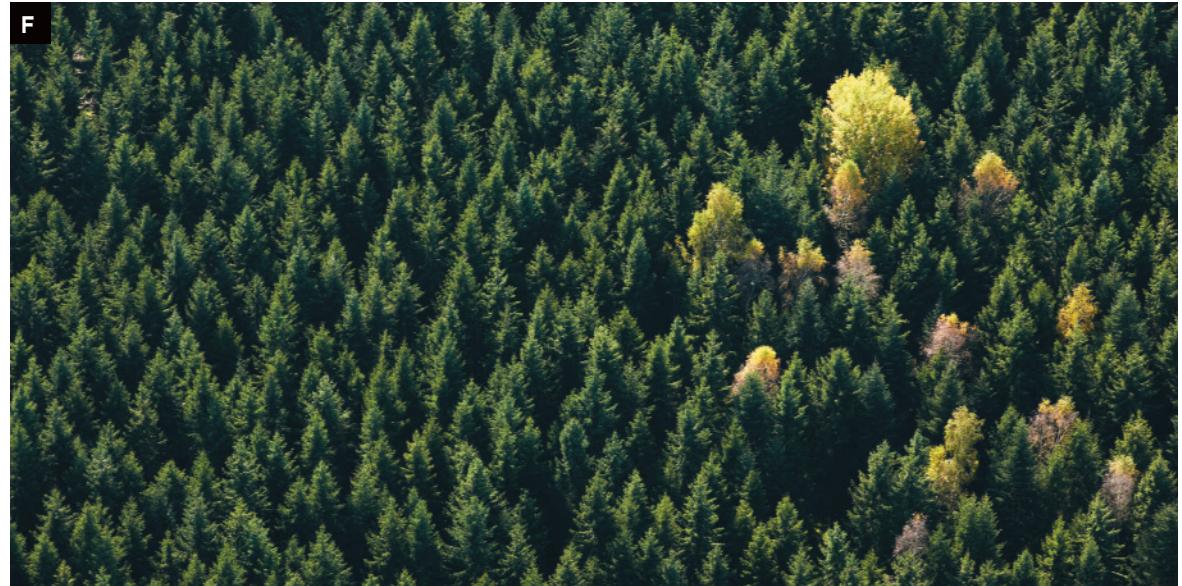
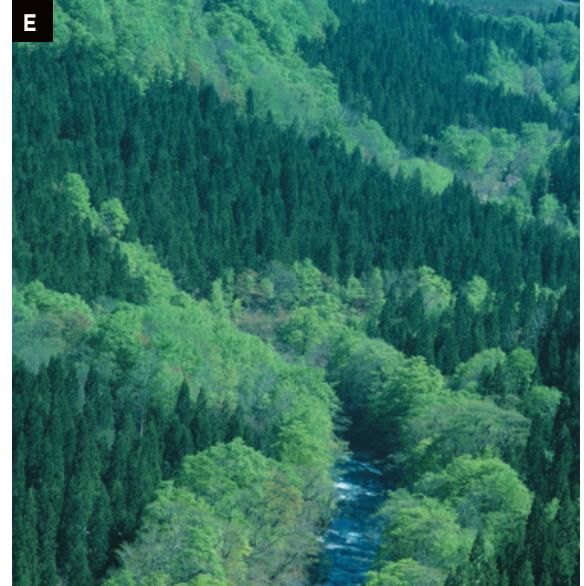
C. Mediterranean forest

Climate

- less than 1000 mm of precipitation per year
- hot, dry summers and cool, damp winters
- distinct dry season

Description

- plant species have adapted to survive summer drought conditions
- includes woodlands (mix of smaller trees and shrubs) and shrublands (mainly short, woody plants)
- tree species include olive and cork trees



D. Broadleaf deciduous forest

Climate

- from 600 to 1500 mm of precipitation throughout the year
- four distinct seasons, including warm, moist summers and mild winters
- average annual temperature between 7 °C and 17 °C

Description

- tree species are mostly deciduous, such as oak, maple, and beech
- leaves falling on the ground every year form a thick, fertile soil

E. Mixed forest

Climate

- from 600 to 1500 mm of precipitation throughout the year
- warm, moist summers and mild to cool winters

Description

- transition zone between coniferous forests and broadleaf deciduous forests
- mix of coniferous and deciduous tree species

F. Needleleaf evergreen or boreal forest

Climate

- from 300 to 850 mm of precipitation per year, much of it as snow
- cold temperatures; short growing season

Description

- few plant species because of harsh conditions
- tree species are mostly coniferous with narrow, needle-like leaves, such as spruce and pine
- ground cover is slow-growing lichen, mosses, and grasses that are adapted to the cold

TYPES OF GRASSLANDS

FIGURE 3.4 There are two types of grasslands: (A) tropical grassland (Tanzania, Africa); and (B) mid-latitude grassland (Argentina, South America).



A. Tropical grassland

Climate

- from 100 to 1200 mm of precipitation per year
- most moisture arrives during a short rainy season

Description

- includes many species of tall grasses, and some shrubs and trees
- supports large herds of grazing animals such as elephants and zebras

B. Mid-latitude grassland

Climate

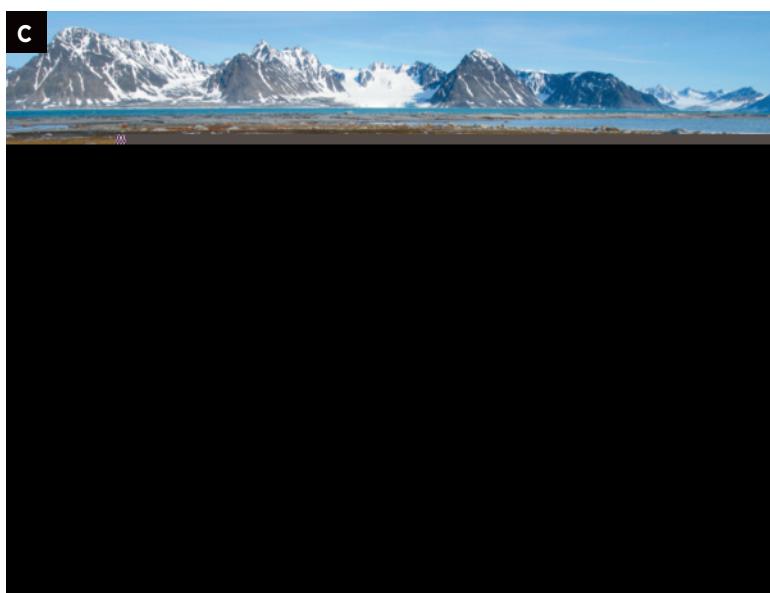
- from 250 to 750 mm of precipitation per year
- cold winters and warm summers

Description

- includes tall and short grasses, some shrubs, and scattered trees, some of which grow in river valleys
- growing seasons average 100 to 175 days
- plant species have adapted to the scarce moisture by creating thick root mats that prevent moisture from soaking into the soil

TYPES OF DESERTS

FIGURE 3.5 There are three types of deserts:
(A) semi-desert scrub (Bolivia, South America);
(B) desert (Morocco, Africa); and (C) tundra and high-mountain vegetation (United States, North America).



A. Semi-desert scrub

Climate

- from 250 to 500 mm of precipitation per year
- high rates of evaporation

Description

- transition zone between desert and grassland
- includes a mix of vegetation types, such as sagebrush and dwarf shrubs

B. Desert

Climate

- less than 250 mm of precipitation per year
- high rates of evaporation
- very high daytime temperature and low nighttime temperature
- average temperature for hot deserts is 22 °C and for cool deserts is 10 °C

Description

- includes plants such as short grasses, sagebrush, and cacti
- plants have very long roots to reach for water deep below the surface
- plants may have no leaves, which reduces evaporation

C. Tundra and high-mountain vegetation

Climate

- from 150 to 250 mm of precipitation per year
- average summer temperatures are below 6 °C
- most moisture is locked up in ice and snow

Description

- soil is frozen solid except for the top few centimetres that thaw each summer
- vegetation includes mosses, lichen, grasses, and wildflowers

BENEFITS OF VEGETATION

Plants benefit us and the planet in many ways. For example, they prevent soil erosion and maintain the water cycle. They slow climate change by removing carbon dioxide (CO_2) from the air. Here are five other ways that vegetation benefits us and the planet.

OXYGEN

During **photosynthesis**, plants use energy from the Sun to combine CO_2 from the air with water. This creates carbohydrates and oxygen. Plants use the carbohydrates for growth and reproduction. They release the oxygen back into the atmosphere. Animals, including humans, breathe in oxygen. They need oxygen to survive.

photosynthesis the process by which plants convert sunlight into energy for growth

NATURAL HABITATS

Natural vegetation provides animals with habitats. **Habitats** give animals food, water, shelter, opportunities for mating, and some protection from predators.

habitat the place where a plant or an animal lives that provides it with all it needs to survive

RESOURCES

For thousands of years, people have used materials from plants, such as trees, to build shelters, furniture, and modes of transportation. We have used plant materials, such as bark, cotton, or vines, to make clothing, tools, and weapons. We have used wood to keep us warm and to provide heat for cooking. Thousands of medicines come from plants. At least three-quarters of the world's population uses plants or parts of plants for medicine.

Over the centuries, farmers **domesticated**, or adapted, some wild plants, such as the ancestors of today's wheat and corn. Over time, the plants adapted and changed, becoming easier to grow. We eat food made from grasses (grains) and trees (nuts), drink beverages (tea and coffee) made from shrubs, and make clothes from plant fibres such as cotton. Plant materials can be used to make various products, including car parts, including car parts (Figure 3.6).

domesticated wild animals tamed, or wild plants adapted, for use by humans



FIGURE 3.6 The exterior of this hybrid concept car contains seaweed (inset).

In what ways do I use plant materials in my life?



RECREATION

Around the world, natural environments are important places for recreation and relaxation. People enjoy camping in forests, hiking or skiing on mountain trails, and boating or swimming in rivers and lakes. These connections have encouraged **ecotourism**, tourism with low environmental impact, as more people choose vacations to enjoy nature in many places, such as the tropical rainforests of Costa Rica. In addition, many countries have developed national parks to preserve wilderness areas for people to enjoy, as well as to protect land and wildlife. There are also many urban parks around the world where city dwellers go to relax and reconnect with the natural world.

ecotourism to enjoy nature with low impact to the environment, promote conservation, and benefit the local people

What might be some characteristics of Costa Rica's vegetation that encourage ecotourism?

SPIRITUAL CONNECTION

Many people find spiritual value in the natural world. For example, Indigenous peoples all around the world are strongly connected to the land. The land holds a key importance in their belief systems. Australian Aboriginals' values are based on a deep respect for the land. They use plants for medicine and for ceremonial purposes. In North America, many First Nations people also use specific types of vegetation, such as sweetgrass, sage, and cedar, for similar purposes (Figure 3.7).



FIGURE 3.7 Sage is burned in this Muncey-Delaware First Nations smudging ceremony for spiritual cleansing.

CHECK-IN

- PATTERNS AND TRENDS** Create an organizer to compare the characteristics of the tropical broadleaf forest to two other vegetation types. Suggest reasons why there are differences in the characteristics.
- INTERRELATIONSHIPS** Why is natural vegetation important? Write a short paragraph or create an oral presentation to explain your ideas.
- INTERPRET AND ANALYZE** Use the natural vegetation regions tables (pages 78 to 81) to identify the type of natural vegetation in your community. Discuss with a classmate whether more of the vegetation in your community is human-influenced or natural, and identify some reasons why.
- INTERRELATIONSHIPS** With a partner, make a list of ten items you use that come from vegetation. Create a poster to demonstrate how your life would change without them.