In most cases, changes to vegetation regions have been made on purpose. Often people have made these changes as a way to improve their own lives. But sometimes the changes and effects have been unintentional. In some cases, we do not yet know what the effects will be. In other cases, we know that the changes are harmful to people, wildlife, and the local environment (Figure 3.19). Some even harm the global environment, which means we are all affected.

On the following pages are some examples of how changes we have made to vegetation patterns affect plant and wildlife species specifically.
LOSS OF BIODIVERSITY

The vegetation regions on Earth are made up of ecosystems. An ecosystem is made up of the plants and animals in a location interacting with their environment and depending on one another to survive. All the different species of plants and animals in these ecosystems create Earth’s biodiversity. Some of the countries with the highest biodiversity are Brazil, Indonesia, Mexico, Ecuador, and Australia. Changes in natural vegetation patterns are threatening this biodiversity.

It is important that we preserve Earth’s biodiversity. An ecosystem that includes a great variety of animals and plants is better able to respond to changing conditions. Imagine, for example, that one plant species becomes extinct, or dies out. An animal that feeds on it must adapt by eating other species of plants. Otherwise, it will also become extinct.

All living things benefit if there is greater diversity on Earth. Tragically, many of Earth’s animal and plant species are extinct or endangered, close to becoming extinct. Earth’s biodiversity is shrinking, and so is our ability to survive as a living planet.

LOSS OF HABITAT

Forests, grasslands, and even deserts are home to plant and animal species. Changes in natural vegetation patterns caused by factors such as growing cities (Figure 3.20), the destruction of forests and grasslands, and desertification are causing the loss of many animal habitats. Habitat loss, or loss of where a species lives, is one of the leading causes of biodiversity loss. It can result in smaller numbers of many species and even the extinction of some species.

biodiversity the variety of life on Earth; “bio” means life, and “diversity” means variety

extinct loss of all individuals of a species

endangered at risk of becoming extinct

habitat loss occurs when a habitat no longer meets the needs of the species it once supported

FIGURE 3.20 A view of the city of Athens, in Greece, from nearby Ymittos mountain

I wonder how much natural vegetation has been changed so that people have a “habitat” of their own?
Spatial significance relates specifically to where places are located on the planet. Every location has certain features or characteristics that make it unique. The term that geographers use to describe the specific characteristics of a place is site. Spatial significance also looks at the importance of a place and the things around it.

We determine the spatial significance of a place by asking questions such as the following:

**Where?**
- What are the absolute and relative locations of the place?

**Why there?**
- What physical conditions or characteristics make this place important?
- What human conditions or characteristics make this place important?

**Why care?**
- How does its location make the place important to people? to animals? to plants?

**WHAT CHARACTERISTICS MAKE A PLACE SIGNIFICANT?**

A place might be significant for various reasons. It might be significant because of its physical characteristics, such as its landforms, climate, or natural vegetation. It might be important because of human activities, such as manufacturing. Often the significance of a place comes from a combination of these characteristics.

We can also think about spatial significance for plants and animals. The places that have the greatest spatial significance for plants and animals are those that best meet their needs for food and shelter. These places will have quite different characteristics than places that people find significant.

**MADAGASCAR**

The island of Madagascar is located off the east coast of Africa (Figure 3.21). It was separated from other land masses by tectonic plate movement about 160 million years ago. The plant and animal species on Madagascar evolved on their own. Today, 95 percent of the reptiles, 92 percent of the mammals, and 89 percent of the plants on Madagascar exist nowhere else on Earth. It is considered one of the planet’s biodiversity hot spots.

The biodiversity of Madagascar is under threat for several reasons:
- deforestation is taking place as a growing human population clears the forests for fuel and for farming
- valuable timber is being harvested illegally because of the income it creates
- many species are being captured by wildlife traders who sell the animals illegally to pet stores and collectors
- climate change is altering the natural patterns on the island

**FIGURE 3.21 Map of Madagascar**

**TRY IT**

1. **Where?** Locate Madagascar on a world map. What is its absolute location? What is its relative location?

2. **Why there?** What are the unique characteristics of Madagascar?

3. **Why care?** How is its location important to the people, plants, and animals that live there?

Use the Internet and other sources of information to develop your answers.
LOSS OF SPECIES
Any large change in natural vegetation patterns also leads to the extinction of plant and animal species. Because of this, and sometimes other factors such as poaching, the illegal taking or killing of wildlife, species are now becoming extinct at a faster rate than ever before. Since 1970, many animal species have become extinct. This includes the West African black rhinoceros, the Dutch Alcon Blue butterfly, and the Labrador duck. Many plant species, including Kingman’s prickly pear, have also become extinct. There are an estimated 16,000 plant and animal species currently on the edge of extinction, including the tiger (Figure 3.22). In the last 100 years, we have lost 97 percent of wild tigers. Studies predict that climate change will cause more loss of species than habitat loss. One-quarter of all plant and animal species on land may be threatened with extinction by 2050.

RISE IN NON-NATIVE PLANT SPECIES
Native species are plant or animal species that naturally live in a place. Non-native species are species that have moved into, or been introduced into, a new environment. Australia now has more non-native plant species than native species.

Sometimes this change happens accidentally. Sometimes people have brought in new plants on purpose. For example, in the 1930s, Australia introduced the athel pine to provide shade and to help prevent soil erosion. When non-native plant species are in a new environment, they compete with the species already there for space and nutrients. Sometimes the new species are fast-growing, produce many seeds, and are hardy. They can take over the habitat of the native species, such as the athel pine has done. These are known as invasive species. Invasive species can cause the native species to become extinct.

CHECK-IN

1. **GEOGRAPHIC PERSPECTIVE** Should Canadians be concerned about global patterns of natural vegetation loss? Debate the question with a classmate.

2. **INTERPRET AND ANALYZE** Create a graphic organizer to outline the causes of changes in natural vegetation and the consequences arising from the changes. Sum up your thinking in a 15-second soundbite.