
Arctic National
Wildlife Refuge
Yellowstone
National Park
Mono Lake
Monterey Bay National
Marine Sanctuary
Cimarron
National
Grassland
Saguaro
National Park
Delaware Water Gap
National Recreation Area
Monongahela
National Forest
Everglades
National Park
Florida Keys National
Marine Sanctuary
El Yunque Caribbean
National Forest

Ecoscenario Introductions

Every place on Earth has defining environmental conditions. Some of the most important environmental factors include sunshine, water quality, wind, temperature, air quality, substrate, and chemicals. Because the United States extends from the arctic to the tropics, there are amazingly different conditions throughout the country. The United States may be the most environmentally diverse country in the world.

Because of its environmental diversity, the United States also has incredibly diverse organisms. Something lives wherever you look—on the land, in the water, on mountain peaks, on desert sands, and everywhere else.

Considered together, a physical environment and the community of organisms living in that environment define an ecosystem. The physical conditions and organisms in one kind of ecosystem are different than the conditions and organisms in another kind of ecosystem. There are dozens of different ecosystems in the United States. We have selected 11 for study in this course. The ecosystems and the issues associated with them are called **ecoscenarios.** The ecoscenarios focus on national parks or sanctuaries. Their locations are indicated on the map on page 30, and brief introductions to ten ecosystems are presented on the next ten pages. (Mono Lake is introduced on pages 25–29.)

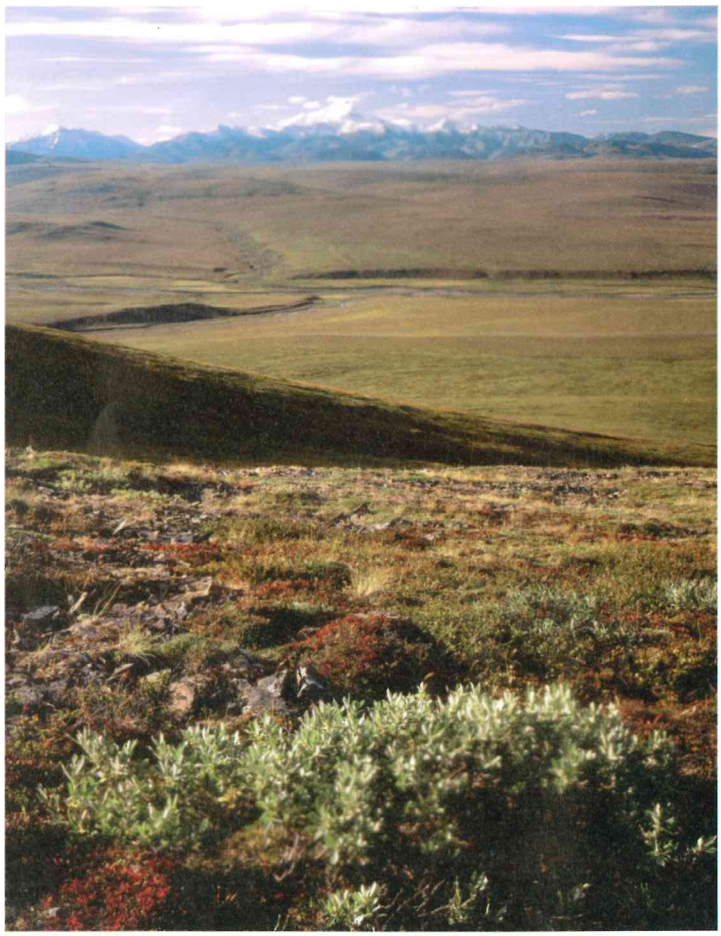
Some organisms are flexible in their lifestyles. They can survive in a number of ecosystems. The coyote is one example. Coyotes have a wide range of tolerance for temperature, can use lots of food sources, are fast runners, and are secretive and social. These characteristics allow them to live in forests, grasslands, and deserts.

Saguaro cacti, on the other hand, are specialized for one set of physical conditions. They require hot, arid conditions, with little rain and a bit of shade during their first decade or so of life. They can survive only in the conditions found in the Sonoran Desert.

One species of organism is unique—*Homo sapiens.* Humans live in all the ecoscenario locations. If the environment is unsuitable for humans, like the extreme cold of the arctic or the depths of the offshore oceanic waters, we take a suitable environment into the ecosystem to sustain ourselves. Warm clothes and housing, imported food and water, and a self-contained air supply make it possible for us to live in the arctic and underwater. When humans interact in new ecosystems, for living space, food production, resource acquisition, or waste disposal, we are intruding on an ecosystem inhabited by other organisms.

Human actions in ecosystems raise issues. The benefits for humans must be measured against the impacts on the health of the ecosystems. Our actions must be guided by decisions that take into account the long-term well-being of all concerned, the existing ecosystem and the needs and desires of people. The decisions can be difficult, but they should not be based purely on short-term gains for humans.

Arctic National Wildlife Refuge



The Arctic National Wildlife Refuge in the northeastern corner of Alaska is one of the most pristine, undisturbed places on Earth. To the south are the rugged mountains of the Brooks Range.

The most productive area of the refuge, and the most used by wildlife, is the 600,000-hectare (1.5-million-acre) coastal plain. This area is dominated by an ecosystem known as middle arctic tundra. Here the treeless landscape is covered with low-growing plants over a layer of permanently frozen soil called permafrost. In summer the region is dotted with standing water. During this short, soggy growing season, insects flourish, supporting millions of migratory waterfowl. Thousands of caribou migrate to the coast to bear young and feed on the low plants and lichens.

A long-standing issue in the Arctic National Wildlife Refuge is whether the coastal plain should be developed for oil drilling. Other areas in Alaska, such as Prudhoe Bay, have already experienced oil drilling. Petroleum scientists have examined part of the Arctic National Wildlife Refuge, called Area 1002, and predict that there is oil there. When the U.S. Congress founded the refuge, it also authorized future oil development in the northern part of the refuge. People have been debating the issue of oil and gas drilling in Area 1002 for almost 40 years.

Cimarron National Grassland

For thousands of years the section of the country between the Rocky Mountains and the Mississippi River was an almost endless sea of grass. The prairies and plains grasslands supported a diverse community of animals, including insects, birds, rodents, and large grazing animals like antelope and bison. Most of the prehistoric grasslands have been converted to agriculture.

Cimarron National Grassland is 44,500 hectares (110,000 acres) in the southwest corner of Kansas. More than a hundred years ago, these lands were known as the Point of Rocks ranch. The Beaty brothers, who operated this ranch, grazed cattle on the plentiful grasses. Around 1885, homesteaders began to settle in this area as well. Years of cattle grazing and farming degraded the soils. In the 1930s strong winds swept through the area, blowing away the topsoil. Cimarron was in the dust bowl that lost millions of acres of grassland soil.

In 1937 the U.S. government started a program to restore the soils. Most of the restored soil is now productive farmland. One large section, the former Point of Rocks ranch, was set aside as the Cimarron National Grassland in 1960. Cimarron is managed to maintain it as a native grassland to serve as a reminder of what once was a major ecosystem in the United States.

The main management issue in Cimarron National Grassland is rangeland fires. Some people view fire as beneficial to the ecosystem and believe it is a tool for management. Others feel fire is dangerous and should be put out quickly.

Delaware Water Gap National Recreation Area

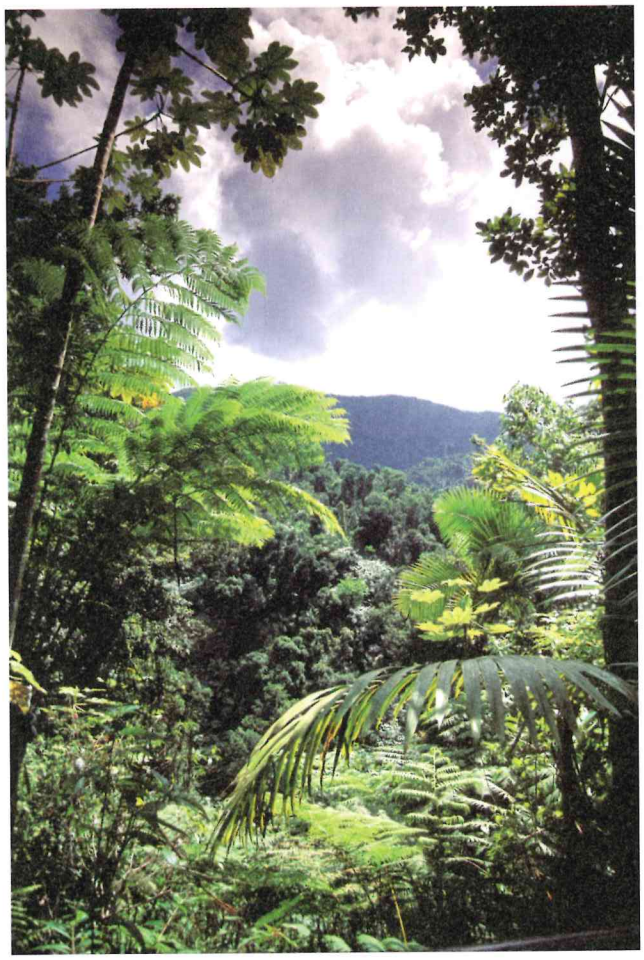
The Delaware Water Gap National Recreation Area is a 64.3-kilometer (40-mile) stretch of the Delaware River, running between the states of New Jersey and Pennsylvania. The Delaware River is the largest free-flowing river in the eastern United States—no dams block the river's flow to the ocean.

The Delaware Water Gap National Recreation Area includes riparian woods along the Delaware River and covers 28,000 hectares (69,000 acres) of eastern hardwood ecosystem in New Jersey and Pennsylvania. This park was established on September 1, 1965, for public recreation, to preserve scenic and scientific resources, and to protect the ecosystem from commercial development. In 1978 part of the Delaware Water Gap National Recreation Area was designated a national wild and scenic river. After years of public discussion, plans for a dam and reservoir on the river were abandoned in 1992.

The Delaware River is one of the cleanest rivers in the United States. The Delaware Water Gap National Recreation Area is an example of the meeting of several ecosystems—a freshwater ecosystem, a riparian ecosystem (the trees and other native vegetation that border the river), and a forest ecosystem.

Water quality in the Delaware River is a constant issue. The health of the ecosystems depends on a continuous supply of clean water. Pollution management is essential. Acid rain entering the watershed from remote sources also affects ecosystem health.

El Yunque Caribbean National Forest



Puerto Rico is an island in the Caribbean Sea southeast of Florida. The Caribbean National Forest, on the eastern end of Puerto Rico, is commonly called El Yunque (el•YOONG•kay). El Yunque gets its name from the cloud-shrouded mountaintops. Those same clouds provide abundant, warm rainfall all year, producing a lush tropical rain forest. El Yunque has abundant, diverse vegetation, which supports populations of unique birds and amphibians.

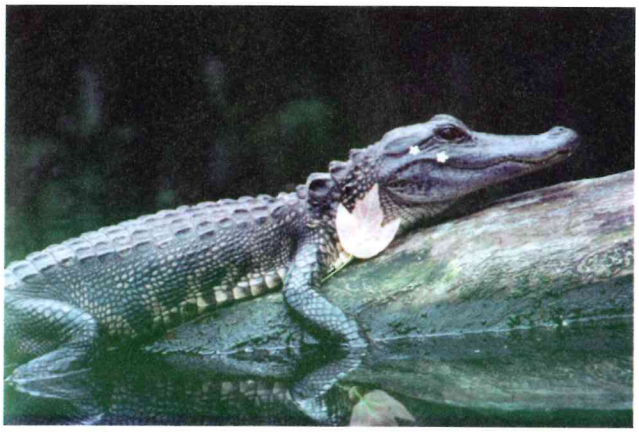
El Yunque has a long history as a tropical forest reserve. In 1876, when Puerto Rico was still under Spanish rule, King Alfonso XII of Spain proclaimed El Yunque a forest reserve. He did this not to preserve its diversity and beauty, but because the forests were filled with trees that were used to build ships. Because El Yunque is a reserve, the forest was used sparingly, and it was not destroyed for cities and agriculture.

The primary concern for tropical forests, including El Yunque, is how to deal with habitat loss and destruction in the past, present, and future. Worldwide, rain forests cover 2% of Earth's surface, yet contain half of all plant and animal species. The rain forests, and the species that live in them, are being lost very rapidly. It is estimated that each hour about 3600 hectares (9000 acres) of rain forest are cleared. At the same time, six plant or animal species go extinct.

Everglades National Park

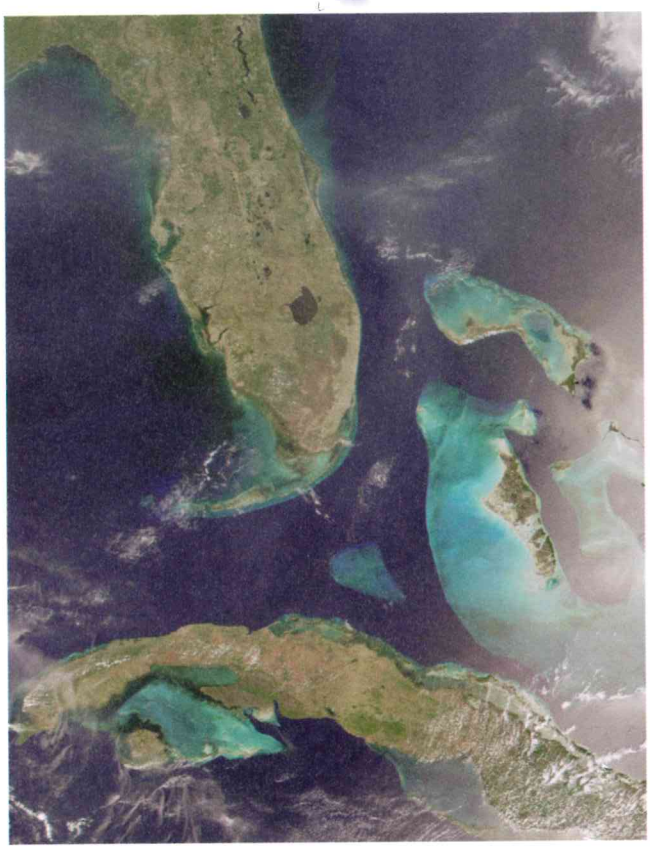
Everglades National Park is a subtropical wilderness on the southern tip of Florida. The wet prairies of saw grass, sometimes called the river of grass, give this ecosystem its name. The Everglades is a slow moving, very shallow, very wide river in which saw grass grows. This river starts at Lake Okeechobee and flows south to the Atlantic, Florida Bay, and the Gulf of Mexico. The Big Cypress Swamp borders the Everglades on the west, and to the east there is a low coastal ridge.

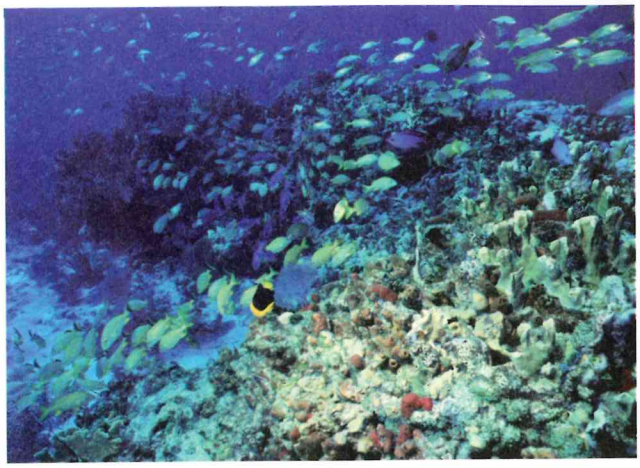
Ernest F. Coe is sometimes called the father of the Everglades because of his efforts to preserve this habitat. In 1928 Coe wrote to the director of the National Park Service, proposing that some of the south Everglades become a national park. Luckily, the director of the National Park Service had already been thinking that some of this ecosystem should be designated as a park. Everglades National Park was established in 1947. It is the largest designated wilderness area east of the Rocky Mountains and covers 610,684 hectares (1,509,000 acres). The Everglades area is very flat, with the highest elevation only 2.5 meters (8 feet) above sea level.



Water use and water quality are the primary issues concerning Everglades National Park. Water diversion for agriculture and development, especially in the last 50 years, has reduced the Everglades ecosystem to less than half its original size. Other issues include mercury pollution, endangered species, and introduced species.

Florida Keys National Marine Sanctuary





The Florida Keys are 1700 islands. They are the high points of a huge coral reef system that begins at the tip of Florida and curves southwest for 202 kilometers (km) (126 miles). It ends 145 km (90 miles) north of Cuba.

Surrounding the keys is Florida Keys National Marine Sanctuary. This marine sanctuary covers 9600 square km (2800 square nautical miles). The reefs in the sanctuary form the third largest system of coral reefs in the world. The warm clear water ranges in depth from 0.6 to 610 meters (m) (2 to 2000 feet) with an average of 15.25 m (50 feet).

The reefs of Florida Keys National Marine Sanctuary are biologically diverse and extremely productive. The coral structure provides substrate for algae and habitat for fish, worms, and other marine animals. The Florida Keys also have beds of turtle grass and mangrove forests. These communities provide important nursery habitat for marine fish and other animals.

One of the world's major shipping routes passes along the Atlantic side of the Florida Keys. The keys attract thousands of visitors who enjoy diving, boating, and fishing on and around the reefs. There is danger of pollution from boats and recreational facilities throughout the keys. The delicate coral organisms, which build the reef, are threatened by the intense use of the reef areas.