



education



This article is a

Encyclopedic Entry

Ecosystem

An **ecosystem** is a geographic area where **plants**, **animals**, and other **organisms**, as well as **weather** and **landscape**, work together to form a bubble of life. Ecosystems contain biotic or living, parts, as well as abiotic factors, or nonliving parts. **Biotic factors** include plants, animals, and other organisms. **Abiotic factors** include **rocks**, **temperature**, and **humidity**.

Every factor in an ecosystem depends on every other factor, either directly or indirectly. A change in the temperature of an ecosystem will often affect what plants will grow there, for instance. Animals that depend on plants for **food** and **shelter** will have to **adapt** to the changes, move to another ecosystem, or **perish**.

Ecosystems can be very large or very small. **Tide pools**, the **ponds** left by the **ocean** as the **tide** goes out, are complete, tiny ecosystems. Tide pools contain **seaweed**, a kind of **algae**, which uses **photosynthesis** to create food. **Herbivores** such as abalone eat the seaweed. **Carnivores** such as **sea stars** eat other animals in the tide pool, such as clams or **mussels**. Tide pools depend on the changing level of ocean water. Some organisms, such as seaweed, thrive in an **aquatic** environment, when the tide is in and the pool is full. Other organisms, such as **hermit crabs**, cannot live underwater and depend on the shallow pools left by low tides. In this way, the biotic parts of the ecosystem depend on abiotic factors.

The whole surface of Earth is a series of connected ecosystems. Ecosystems are often connected in a larger **biome**. Biomes are large sections of land, sea, or atmosphere. **Forests**, ponds, **reefs**, and **tundra** are all types of biomes, for example. They're organized very generally, based on the types of plants and animals that live in them. Within each forest, each pond, each reef, or each section of tundra, you'll find many different ecosystems.

The biome of the **Sahara Desert**, for instance, includes a wide variety of ecosystems. The **arid climate** and hot weather **characterize** the biome. Within the Sahara are **oasis** ecosystems, which have **date palm** trees, **freshwater**, and animals such as **crocodiles**. The Sahara also has **dune** ecosystems, with the changing landscape **determined** by the **wind**. Organisms in these ecosystems, such as snakes or scorpions, must be able to **survive** in sand dunes for long periods of time. The Sahara even includes a **marine** environment, where the Atlantic Ocean creates cool **fogs** on the Northwest African coast. **Shrubs** and animals that feed on small trees, such as goats, live in this Sahara ecosystem.

Even similar-sounding biomes could have completely different ecosystems. The biome of the Sahara Desert, for instance, is very different from the biome of the Gobi Desert in Mongolia and China. The Gobi is a cold **desert**, with **frequent snowfall** and freezing temperatures. Unlike the Sahara, the Gobi has ecosystems based not in

sand, but kilometers of bare rock. Some **grasses** are able to grow in the cold, dry climate. As a result, these Gobi ecosystems have **grazing animals** such as **gazelles** and even **takhi**, an **endangered species** of wild horse.

Even the cold desert ecosystems of the Gobi are **distinct** from the freezing desert ecosystems of Antarctica. Antarctica's thick **ice sheet** covers a **continent** made almost entirely of dry, bare rock. Only a few **mosses** grow in this desert ecosystem, supporting only a few birds, such as **skuas**.

Threats to Ecosystems

For thousands of years, people have interacted with ecosystems. Many cultures developed around nearby ecosystems. Many Native American tribes of North America's **Great Plains** developed a **complex** lifestyle based on the native plants and animals of **plains** ecosystems, for instance. **Bison**, a large grazing animal native to the Great Plains, became the most important biotic factor in many Plains Indians cultures, such as the **Lakota** or **Kiowa**. Bison are sometimes mistakenly called buffalo. These tribes used buffalo **hides** for shelter and clothing, buffalo meat for food, and buffalo horn for tools. The **tallgrass prairie** of the Great Plains supported bison **herds**, which tribes followed throughout the year.

As human populations have grown, however, people have overtaken many ecosystems. The tallgrass prairie of the Great Plains, for instance, became **farmland**. As the ecosystem shrunk, fewer bison could survive. Today, a few herds survive in protected ecosystems such as Yellowstone National Park.

In the **tropical rain forest** ecosystems surrounding the Amazon River in South America, a similar situation is taking place. The Amazon rain forest includes hundreds of ecosystems, including canopies, understories, and forest floors. These ecosystems support **vast food webs**.

Canopies are ecosystems at the top of the rainforest, where tall, thin trees such as **figs** grow in search of sunlight. **Canopy** ecosystems also include other plants, called **epiphytes**, which grow directly on branches. **Understory** ecosystems exist under the canopy. They are darker and more humid than canopies. Animals such as **monkeys** live in understory ecosystems, eating fruits from trees as well as smaller animals like beetles. Forest floor ecosystems support a wide variety of **flowers**, which are fed on by **insects** like butterflies. Butterflies, in turn, provide food for animals such as **spiders** in forest floor ecosystems.

Human activity threatens all these rain forest ecosystems in the Amazon. Thousands of acres of land are cleared for farmland, housing, and **industry**. Countries of the Amazon rain forest, such as Brazil, Venezuela, and Ecuador, are underdeveloped. Cutting down trees to make room for **crops** such as **soy** and **corn** benefits many poor farmers. These **resources** give them a **reliable** source of **income** and food. Children may be able to attend school, and families are able to afford better **health care**.

However, the **destruction** of rain forest ecosystems has its costs. Many modern **medicines** have been developed from rain forest plants. **Curare**, a muscle relaxant, and **quinine**, used to treat **malaria**, are just two of these medicines. Many scientists worry that destroying the rain forest ecosystem may prevent more medicines from being developed.

The rain forest ecosystems also make poor farmland. Unlike the rich **soils** of the Great Plains, where people destroyed the tallgrass prairie ecosystem, Amazon rain forest soil is thin and has few **nutrients**. Only a few seasons of crops may grow before all the nutrients are absorbed. The farmer or **agribusiness** must move on to the next patch of land, leaving an empty ecosystem behind.

Rebounding Ecosystems

Ecosystems can recover from destruction, however. The **delicate coral reef** ecosystems in the South Pacific are at risk due to rising ocean temperatures and decreased **salinity**. Corals bleach, or lose their bright colors, in water that is too warm. They die in water that isn't salty enough. Without the reef structure, the ecosystem collapses. Organisms such as algae, plants such as **seagrass**, and animals such as fish, snakes, and shrimp disappear.

Most coral reef ecosystems will bounce back from collapse. As ocean temperature cools and retains more salt, the brightly colored corals return. Slowly, they build reefs. Algae, plants, and animals also return.

Individual people, cultures, and governments are working to preserve ecosystems that are important to them. The **government** of Ecuador, for instance, recognizes ecosystem rights in the country's **constitution**. The so-called Rights of Nature says Nature or **Pachamama** [Earth], where life is reproduced and exists, has the right to exist, **persist**, **maintain** and regenerate its **vital** cycles, structure, functions and its processes in **evolution**. Every person, people, community or nationality, will be able to demand the recognitions of rights for nature before the **public** bodies. Ecuador is home not only to rain forest ecosystems, but also **river**

Key Points:

Summary: