



Soils Protect the Natural Environment

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The Soil of Various Environments

Some soil is covered by buildings, some soil is used for agriculture, and some soil remains in its natural state as part of deserts, forests, wetlands, and more. The soils in each of these environments are as different as the ecosystems. For example, in grasslands, deep rooted grasses grow, die, and decompose every year. These decomposing roots give the soils of grasslands dark-colored and nutrient-rich conditions to much deeper depths than other ecosystems. In forests, the tree roots grow for many years, and the soil's only source of organic matter is the needles and leaves that fall on the soil surface. These soils are only nutrient-rich for a thin layer. In the wet soil of coastal wetlands and **riparian** (i.e., near a river) areas, there is not enough air in the soil for microorganisms to respire (breathe) and do efficient decomposition work. These soils experience a buildup of plant material and are made up of more organic matter and less mineral matter than drier soils. The driest soils, in deserts, have very little organic matter because there is not enough water to support a large or diverse plant community. Desert soils are nutrient poor because of the low organic matter and because the lack of water slows the weathering process that can release nutrients from soil minerals.

Soil's Role in the Environment

Within these varied ecosystems, soil serves many important roles, such as being home to animals and storing water for plants. The soil also has specialized roles that help protect nature. For example, a wetland stores a lot of water. This protects both the land and the water that the wetland is between. If there are pollutants in the runoff from land, then the water gets slowed down and cleaned by the soil in the wetland before reaching the lake, ocean, or river. The wetland is also a **buffer**, or protection, from large waves that may be erosive to land. Wetlands also store large amounts of carbon. The organic matter that makes up wetland soil is carbon rich—if it were decomposed by microorganisms, this would release carbon dioxide. By remaining in the soil of wetlands, some of the carbon reaching our atmosphere is reduced.



Grassland

Forest

Wetlands

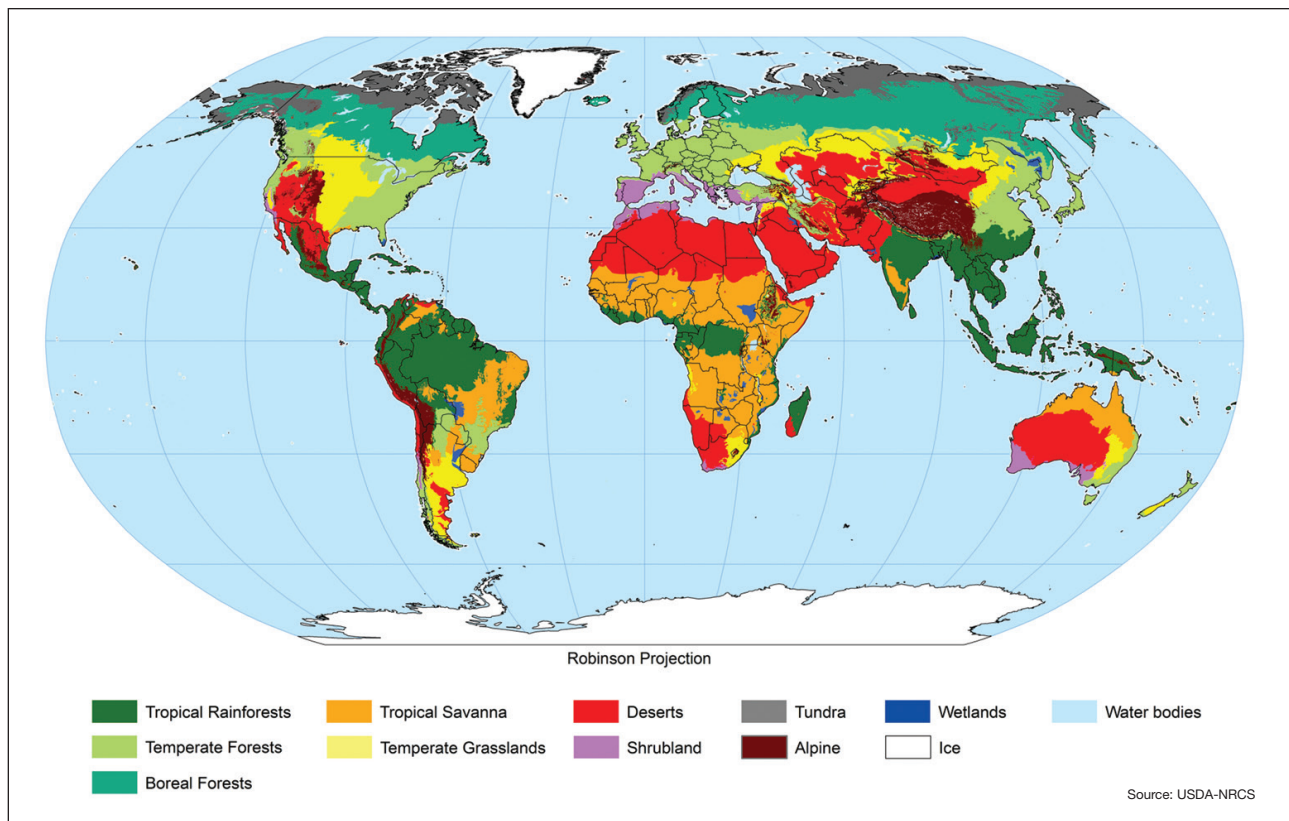
Desert

On a large scale, ecosystems are dictated by climate. However, soil can create a **microclimate**, which is an area of different moisture and temperature than its surroundings. In a seemingly wide-open grassland, there are areas with soil that holds more water, areas with soil that is shallow to bedrock, and areas with deep, rich soil. You can pick up on these soil differences by observing that some areas have a diversity of plants while some areas have only one or two types of grass; some areas might have only short grass while other areas have a small stand of trees. All this is dictated by the soil and subtle differences in water storage capacity.

It is because there are so many different soils on Earth that we have so many different ecosystems. The different soils are home to different microorganism communities and different plant communities that support different animal communities. Soils that are deep and provide bountiful nutrients and water to plants may have the most diversity, but special soil conditions can lead to some rare and special plant and animal species. Only certain microorganisms and plants can live in the very wet soils of wetlands or the very dry soils of deserts. It is important to protect these special areas, as well as the productive soils we use for homes and agriculture, so that soil can protect the natural environment.

Recap

Soil provides many ecosystem services. Different ecosystems give different soils different properties, and different soils give different ecosystems different communities. There are specialized ecosystems where the soil provides services that protect nature, such as slowing and cleaning water or allowing rare plants and animals to flourish.



World Biomes

Biomes are regions of the world with similar environments that have distinctive plant and animal communities. Soils are a crucial component of biomes in supporting plant and animal life.