

Ecological succession refers to the series of ecological changes that every community undergoes over long periods of time. The process of succession begins with relatively few **pioneering plants** and the animals that are associated with these plants. The plant life serves as food, and often shelter for the animal life that can survive in that environment. The succession in the plant life is therefore paralleled by a succession in animal life. As a result of the process of succession, a primitive community develops.

The organisms that make up the primitive community gradually change the environmental conditions so each successive community paves the way for the next. Each successive community develops through increasing complexity until it becomes a final, sustainable, stable, or self-perpetuating community, of dominant organisms, known as a **climax community**. In an ecosystem with a climax community, the conditions continue to be suitable for all the members of the community. The climax community is the final stage of ecological succession.

In Newfoundland and Labrador there are examples of succession at various stages all around us. A muddy hole that seems to have dried up and new vegetation is growing around and even in it. A large open area that may have pockets of water but when you step back you can visualize a pond covering the whole area.

Now let's have a look at the stages of succession and explain the factors that cause it to occur.

- Primary Succession
- Secondary Succession
- Contributing Factors

Primary succession:

There are two types of succession, the first type of succession is called **primary succession** which refers to a sequence beginning in an area where there is no soil or previous forms of life. Primary succession occurs in an area such as a freshly cooled lava field, or a newly formed sand dune. In terrestrial habitats, primary succession is a very slow process because it begins with the formation of soil. The soil forms as a result of weathering and the action of pioneer organisms. Large rocks are broken down into smaller pieces and eventually bacteria, fungi, and lichens inhabit the area. These organisms are known as **pioneer organisms** because they are the first type of life to inhabit the region.

The pioneer organisms add organic matter to the primitive soil, changing the conditions of the microenvironment so that mosses, ferns, and other primitive plants begin to take over. Grasses may eventually replace the more primitive plants and when they die, they make the soil even richer. Shrubs grow and shade the grass causing it to die. Then trees may grow and shade out the shrubs. Seedlings of other trees may grow well in the shade. In this way, one community of trees will be succeeded by another community with different trees.

This process of succession will continue until a dominant or climax community is finally established.

Secondary Succession:

Secondary succession occurs in an area in which an existing community has been partially destroyed and its balance upset, either by natural causes, such as fire, or as a result of human activity, such as the cutting of a forest, or abandoning a farm.

The major difference between primary and secondary succession in a terrestrial environment is that in secondary succession, soil already exists. Seeds of plants will begin to grow. Those that do grow will come from dormant seed already in the soil, or will come from plants in communities nearby. The seeds will establish a community but succession will eventually result in a climax community that is often the same as would normally be found in the typical climax community in the region. An abandoned farm may become a forest given enough time.

The final climax community is generally the same as the climax community that surrounds the disturbed area. The series of stages leading to the climax community will not be the same as for a primary succession that created the original climax community.

Factors that contribute to ecological succession:

The type of climax community that is established will depend on the environmental conditions of the area. The most important environmental conditions that affect succession include:

- climate (temperature, precipitation, and availability of sunlight),
- soil (salinity, fertility, moisture, texture, etc.),
- geographical features (latitude, altitude, and proximity to mountain ranges or large bodies of water).

For example, in a hot arid desert, the climax community will certainly be quite different from the climax community that would form in a humid but cool environment such as a boreal forest (Taiga).

Some biologists argue that there is no such thing as a climax community because the entire earth is in constant change or upset. The causes of upset include:

- natural (catastrophic events such as flood, fire, volcanic activity, climate change, species extinction, etc.),
- and human influenced (such as acid rain, ozone depletion, enhanced global warming, pollution, habitat destruction, monoculture farming, clear-cut logging, over-fishing, etc.).

Every ecosystem exists because there is a balance between its members (producers, herbivores, omnivores, predators, scavengers, parasites, competitors, decomposers, etc.) and its abiotic environment (climate, soil, availability of sunlight, pH, oxygen levels, salinity, etc.). It is this balance between the biotic and abiotic factors that creates the stability of the ecosystem.

In general: the greater the biodiversity, the greater the stability. In spite of this stability, every ecosystem is also relatively fragile in that the entire ecosystem may be stressed or even destroyed. Any factor or group of factors that upsets the balance that maintains stability must be of concern to all humankind. Humankind must be aware that what we do as a species will ultimately affect the spaceship Earth.

We must take responsibility to maintain the global balance. We must be concerned about the quality of the water, land and air around us. What happens when an entire region of grassland or forest is destroyed to make a farm? How does this affect our world in the short term and perhaps more importantly in the long term? Does the destruction of the tropical rain forest of Brazil affect global climate? Are we as humans changing our environment in such a way that we may not be able to survive as the dominant or climax species?