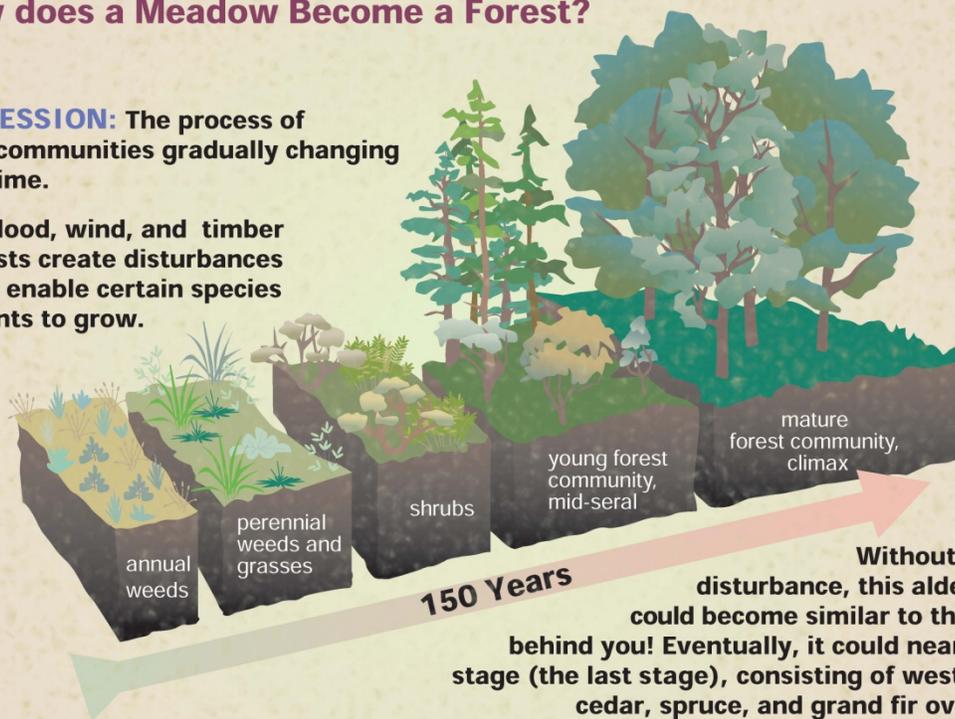


## How does a Meadow Become a Forest?

**SUCCESSION:** The process of plant communities gradually changing over time.

Fire, flood, wind, and timber harvests create disturbances which enable certain species of plants to grow.



What disturbances might occur here?  
How might they affect this plant community?



### Learning Objectives-after this lesson, students will be able to:

Explain the progressive stages a forest goes through by describing the composition of different species and densities prior to reaching a climax community.

Describe the function of corridors.

### Vocabulary Words

Succession  
Seral Stages  
Climax Community  
Disturbance

Shade Tolerant  
Shade Intolerant  
Edge

## SUCCESSION

Forest openings are critical for many plant communities. Many plants like western larch and ponderosa pine need lots of light to germinate and grow. Without openings, these species cannot thrive. Openings can be natural (fire, disease, windthrow, fungal or insect outbreaks, etc.) or man-made (logging, fire breaks, utility cuts).

Openings in the forest also affect wildlife, such as deer, birds, and other creatures. In the winter, more sunlight means warmer temperatures in openings, and often better foraging in the spring and summer. Deer and other species may live near the edge of an opening, taking advantage of both the forage available in the opening and the shelter offered by the forest itself.

### Stages of succession

**Succession** is the more or less predictable progression of the vegetative composition and structure of an ecological community. In each stage, the plants present prepares the area for the next stage in succession until a final equilibrium state, the climax is achieved.

**Initial** – pioneer species colonize an area in which life is not present, often following an ecological *disturbance*. Pioneer species must be hardy and must grow quickly to survive the often harsh conditions of a bare landscape. Such species include lichens, algae, mosses, and grass-like plants.

**Intermediate** – species in the area are more demanding in relation to environmental factors. Generally larger plants and shrubs.

**Sub-climax** – more complex than intermediate, precedes final stage. Larger shrubs and small trees are often indicative of this stage.

**Climax** - is the assemblage of plants that grow in an area when the final stage of succession has been reached.

## Trees in the Forest

Plants such as western larch and ponderosa pine that need a lot of sunlight are called *shade-intolerant species*. Shade-intolerant trees do not thrive under a canopy of shade. The *shade-tolerant species* such as cedar and fir will out-compete the shade intolerant species in shady conditions. Shade tolerant species are more adapted to growing with less available sunlight. Therefore, forests will change in species composition through time. A young forest is more likely to be composed of shade intolerant species slowly becoming shade tolerant dominated over time. This is *succession*.

## Forest openings

**Corridors** are lineal features whose primary wildlife function is to connect two significant and otherwise isolated habitat areas. The purpose of wildlife corridors is to reduce or moderate adverse effects of habitat fragmentation. For example, a band of trees may be left uncut during a timber harvest to connect two forested pieces that the harvest would otherwise leave isolated from one another. Animals needing hiding cover will use these corridors to move from one section of habitat to another.

**Edge**, also called **Ecotone**, is a term used in habitat ecology referring to the area between two habitat types. For example where a meadow and forest meet, this is the edge. Where habitat is fragmented by roads, timber harvest, or development, more edge is created. Some species, primarily habitat generalists (e.g., raccoons), will proliferate with increased amount of edge in a landscape. However other, more specific “core-dwelling” species (e.g., pine marten) do not fare as well as edge increases.

## Wildlife

Different species of wildlife will use the different types of habitat throughout a landscape. Some species, such as woodland caribou and some owls, prefer the old growth climax forests to provide them with the food they have evolved to eat. Other species, such as snowshoe hare, prefer young forests. Still other animals,

such as lynx, will frequent both young and old forests to meet their food (snowshoe hare) and denning (older forests) requirements.

Many species of animals use different habitat types for different life requirements. For example, deer may rest in a forested area that provides good hiding cover, but will venture out into a meadow to eat. Thus, a mosaic of habitat types across the broad landscape will benefit the greatest variety of animals.

### **At the WaterLife Center**

The Wetland Forest Trail is surrounded by different types of habitat on all sides. For example, the yard is across the road to the north. If the yard were left untended by humans, do you think it would become a forest look like the timber patch to the east? Would it eventually become an area similar to the Wetland Trail? For this to happen, trees and shrubs would first start to extend the forested area along the *edge*. What do you think will be the first plants to grow there?

Conversely, if a tree falls in the forested wetland, it will create an opening. This will allow more sunlight into that area, making it a drier micro-site, and vegetation would progressively grow until the opening was closed again.

What else might affect succession? How about soil types?



## Suggested Activities

### **The Succession Game**

This is a modified rock-paper-scissors activity, so to speak. All students start out as “bare ground,” for which they are squatting close to the ground with their arms stretched out horizontally. They must hop around and find someone else at the same stage of succession that they are (which will not be difficult starting out, since everyone is bare ground!).

Once they meet someone, they play rock-paper-scissors (explain this to make sure everyone is on the same page) and the “winner” gets to move further along in succession to become grass. Grasses are still squatting, but wave their hands above their head like grass swaying in the wind. “Losers” must find another bare ground, and play again. Grasses may now play other grasses.

The game continues as grasses become shrubs (standing halfway with their hands out in an upside-down “V”) and eventually trees (standing tall with their hands together above their head). Since, in this simple version of succession, trees are the climax – the top rung of the ladder – once you become a tree your feet are rooted in the ground and you stand in the same spot and get to watch the other plants try to move along the successional path.

As facilitator, watch how the ratios start to change. When there are a few trees, and several shrubs and grasses, with maybe a few bare grounders left, have everyone stop, freeze, and look around to see the community that has been created. Briefly discuss how even with trees around there is still bare ground, grass and shrub-life.

You may wish to freeze the game many times and have the students notice how the structure of the community looks. When nearly all the students are trees, holler out some kind of natural or human made disturbance (wildfire, wind storm, logging operation) and tell them the disturbance cleared the area down to bare soil.....have them start again.

