

Changes in Ecosystems: Ecological Succession

A close-up photograph of a forest floor. The ground is covered with a mix of green and yellow leaves, some of which are partially decayed. Thin, brown tree trunks and branches are visible, rising from the leaf litter. The lighting is natural, suggesting a sunny day with some shade.

Succession is to an ecosystem as stages of growth are to a human

Definition:

- Natural, gradual changes in the types of species that live in an area; can be primary or secondary
- The gradual replacement of one plant community by another through natural processes over time
- May take hundreds of years



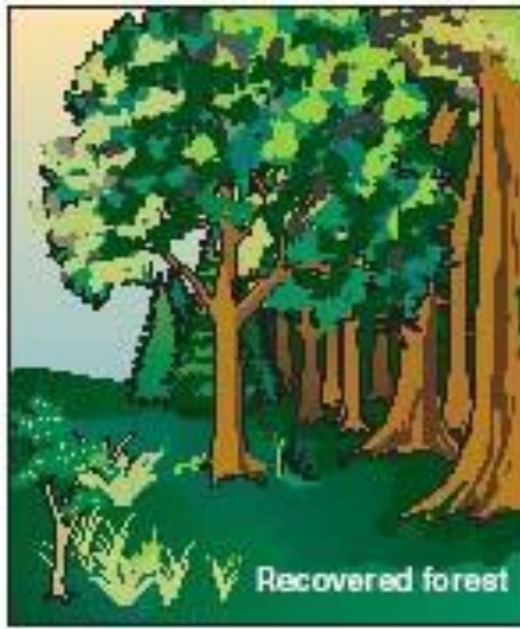
1.



2.



3.



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Primary Succession

- Begins in a place without any soil
 - Volcanoes
 - Glaciers retreating to expose rock
- Starts with the arrival of living things such as lichens that do not need soil to survive
- Called **PIONEER SPECIES**
- ***not very common!**



<http://botit.botany.wisc.edu>



<http://www.saguaro-juniper.com/>



Pioneer
species in a
parking lot
crack

Lichens – Pioneer Species

- Do not require soil
- Colorful, flaky patched
- Composed of two species: fungus & algae
- Algae photosynthesize, fungi absorbs nutrients & holds water
- Overtime, break down rocks



Lichens – Pioneer Species

- As rocks break apart water freezes on the cracks, which breaks up rocks even further
- When lichens die, they accumulate in cracks
- Mosses begin to grow and die, leading to creation of fertile soil
- Fertile soil is made up of: broken rocks, decayed organisms, and water

Primary Succession

- Soil starts to form as lichens and the forces of weather and erosion help break down rocks into smaller pieces
- When lichens die, they decompose, adding small amounts of organic matter to the rock to make soil



Primary Succession

- Simple plants like mosses and ferns can grow in the new soil



<http://www.uncw.edu>



<http://uisstc.georgetown.edu>

Primary Succession

- The simple plants die, adding more organic material
- The soil layer thickens, and grasses, wildflowers, and other plants begin to take over



<http://www.cwrl.utexas.edu>

Primary Succession

- These plants die, and they add more nutrients to the soil
- Shrubs and trees can survive now



<http://www.rowan.edu>

Primary Succession

- Insects, small birds, and mammals have begun to move in
- What was once bare rock now supports a variety of life



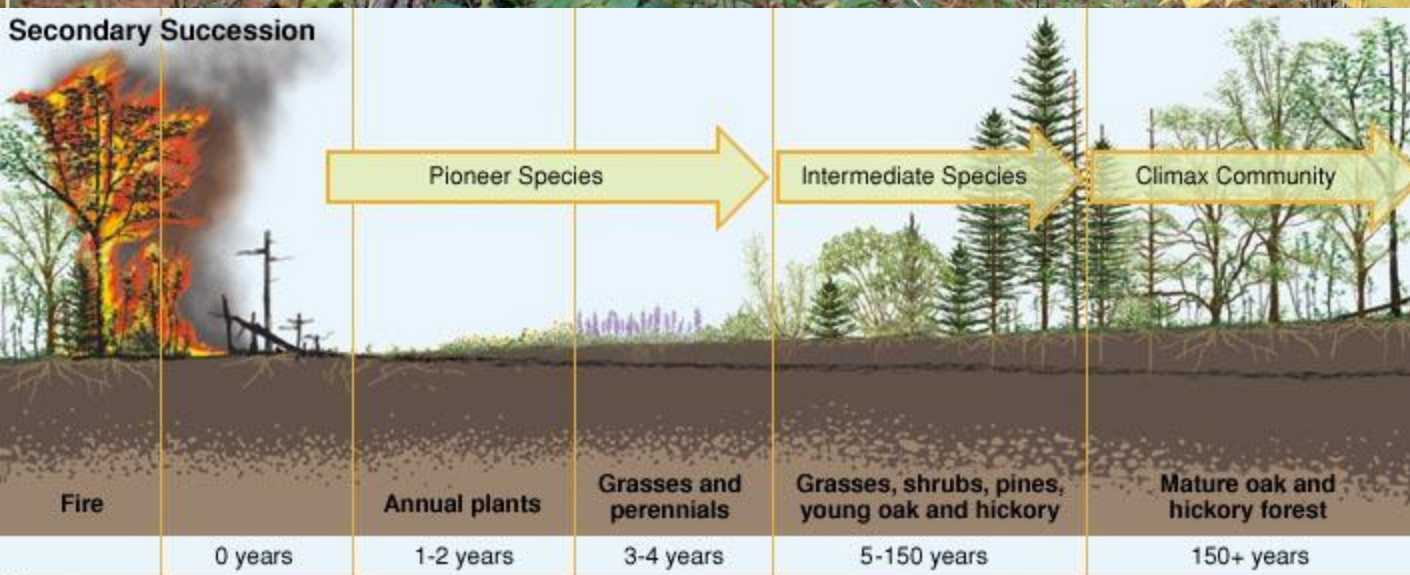
<http://p2-raw.greenpeace.org>

Secondary Succession

- Begins in a place that already has soil/(ecosystem previously existed) and was once the home of living organisms
- Occurs faster and has different pioneer species than primary succession
- Example: after forest fires, floods, earthquakes
- ***very common!**

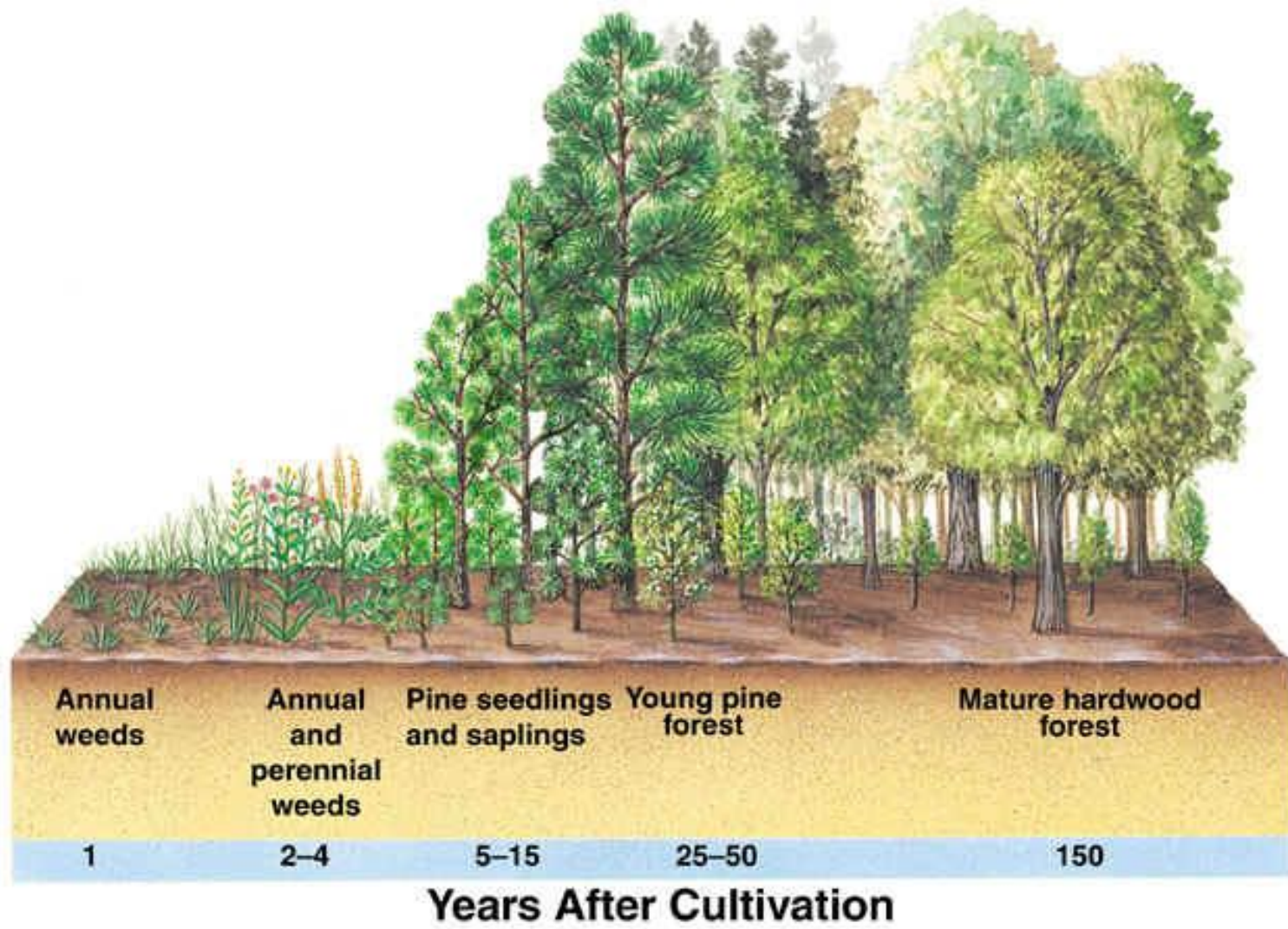


Secondary ecological succession after a fire on the left



Fires are a natural part of many forest ecosystems





Beech-maple
forest

Oak woods

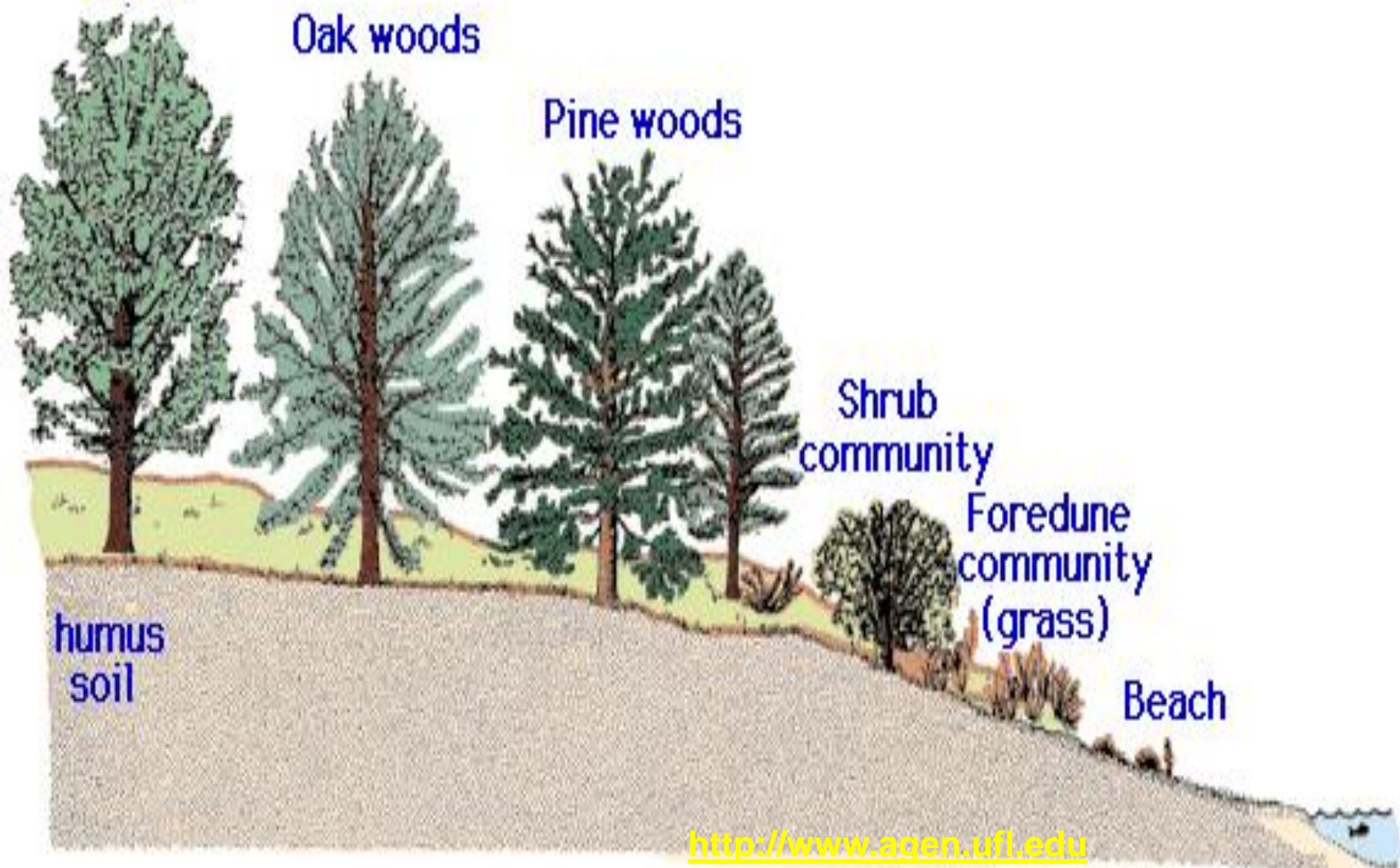
Pine woods

Shrub
community

Foredune
community
(grass)

Beach

humus
soil



Secondary Succession: Mt. St. Helens

- Erupted in 1980
- 44,460 acres burned and flattened
- After eruption, plants began to colonize the volcanic debris



Fire & Secondary Succession

- Natural fire caused by lightning are necessary parts of secondary succession
- Some species of trees (ex: Jack pine) can only release their seeds after they have been exposed to the intense heat of a fire
- Minor forest fires remove brush and deadwood



Climax Community

- A stable group of plants and animals that is the end result of the succession process
 - final, stable community
- Does not always mean big trees
 - Grasses in prairies
 - Cacti in deserts

When will the animal species return to the ecosystem?

- Consider what is needed for them to survive (i.e. habitat/niche)
- Animal species will not return until their needs can be met.
- What do they need? A habitat that will provide them with sufficient food, water, a hiding place, etc.

FOR HOMEWORK →

Choose your favorite disaster – how will succession occur?

- A disturbance:
 - a forest fire
 - a volcano
 - a flood
 - dried up pond
 - hurricane
 - tornado
 - abandoned ball field or tennis court
- * Write one-paragraph in **complete sentences** describing how succession will occur. Is it an example of primary or secondary succession?