

A photograph of a forest. In the foreground, there is a dense layer of brown pine needles on the ground, interspersed with green and yellow plants. Several tall, thin tree trunks are visible in the background, some with rough bark. The overall scene suggests a forest in the process of ecological succession.

Changes in Ecosystems: Ecological Succession

What is Ecological Succession?

- Ecological Succession is the 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

What are Pioneer species?

- Pioneer species are a group of organisms, such as lichens, found in the primary stage of succession and that begin an area's soil-building process.



MOSS



FIREWEED



LICHENS

Pioneer Species



Lichens break down rock to form soil.



Low, growing moss plants trap moisture and prevent soil erosion



Stages of Primary Succession



Bare rock is exposed due to some type of **disturbance** like a retreating glacier or volcanic eruption. **No soil is present.**



Pioneer species, like lichens and mosses, establish themselves on the rock substrate.



Pioneer species die and decay, providing soil and nutrients for other plant species like shrubs and small trees.



Small and Large trees begin to grow, and the community reaches an **equilibrium** or balance. This results in a **climax community**.

Primary Succession: The establishment of new community where none existed before.

Secondary Succession



Stages of Secondary Succession

1



Organisms are driven away or killed by some type of **disturbance**, like a forest fire, leaving behind only the **soil**.

2



Pioneer species, like grasses and weeds, begin to grow from the soil. Roots and seeds left over may also begin to grow again.

3



Some pioneer species die and are replaced or outcompeted by other species like shrubs and small trees.

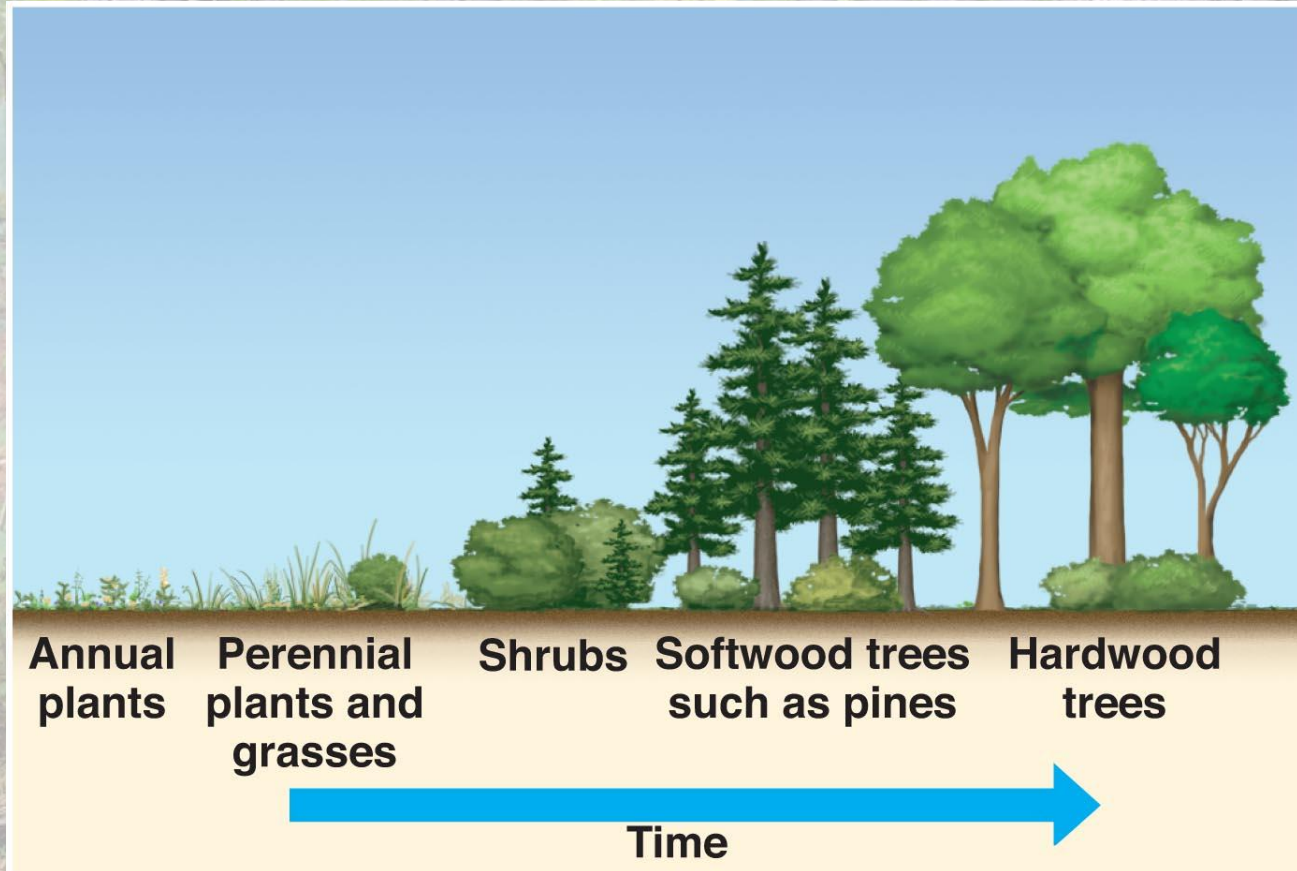
4



Small and large trees begin to grow, and the community reaches an **equilibrium** or balance. This results in a **climax community**.

Secondary Succession: The *reestablishment* of community following disturbance.

Secondary Succession

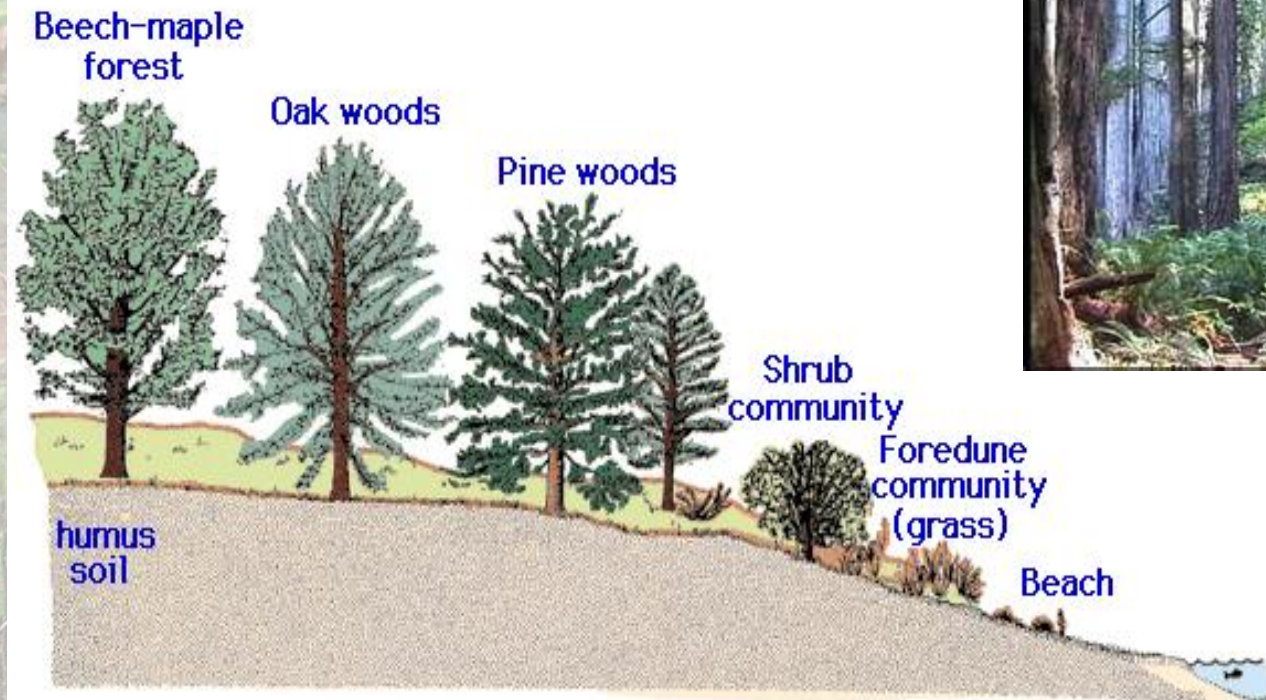


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Climax Community

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

Climax Community

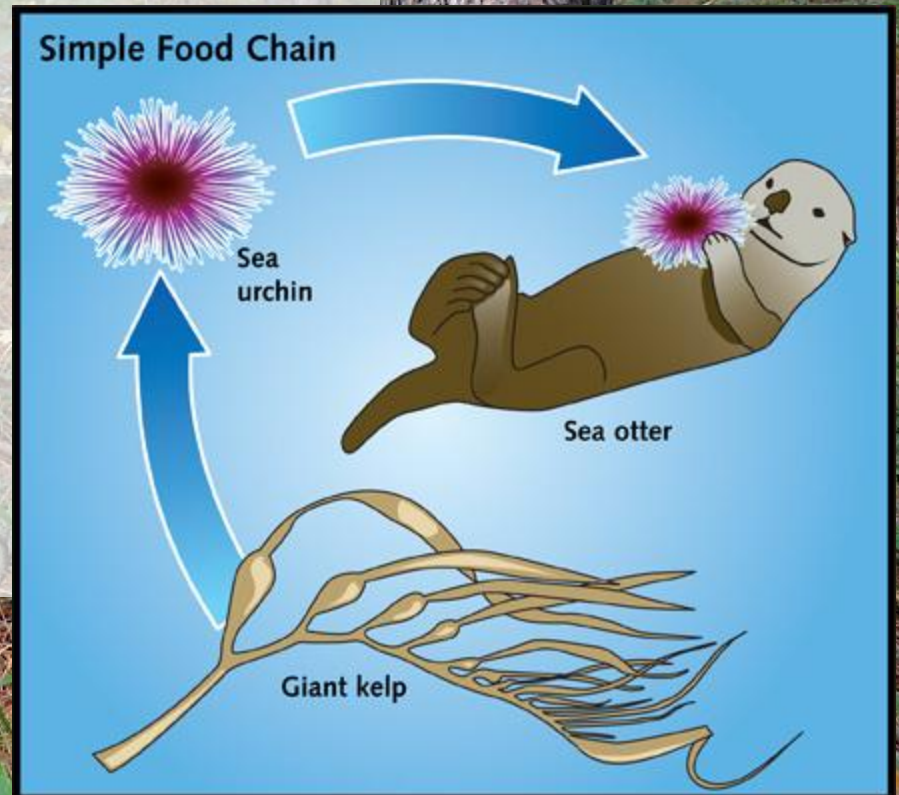


What are Keystone Species?

- Keystone species are a single species that is not usually numerous in a community but exerts strong control on the structure of the community.
- If the population of a keystone species declines it can have dramatic changes on the other species in the community.

Keystone Species

- Hunting of sea otters caused the kelp forest to nearly vanish.
- WHY?

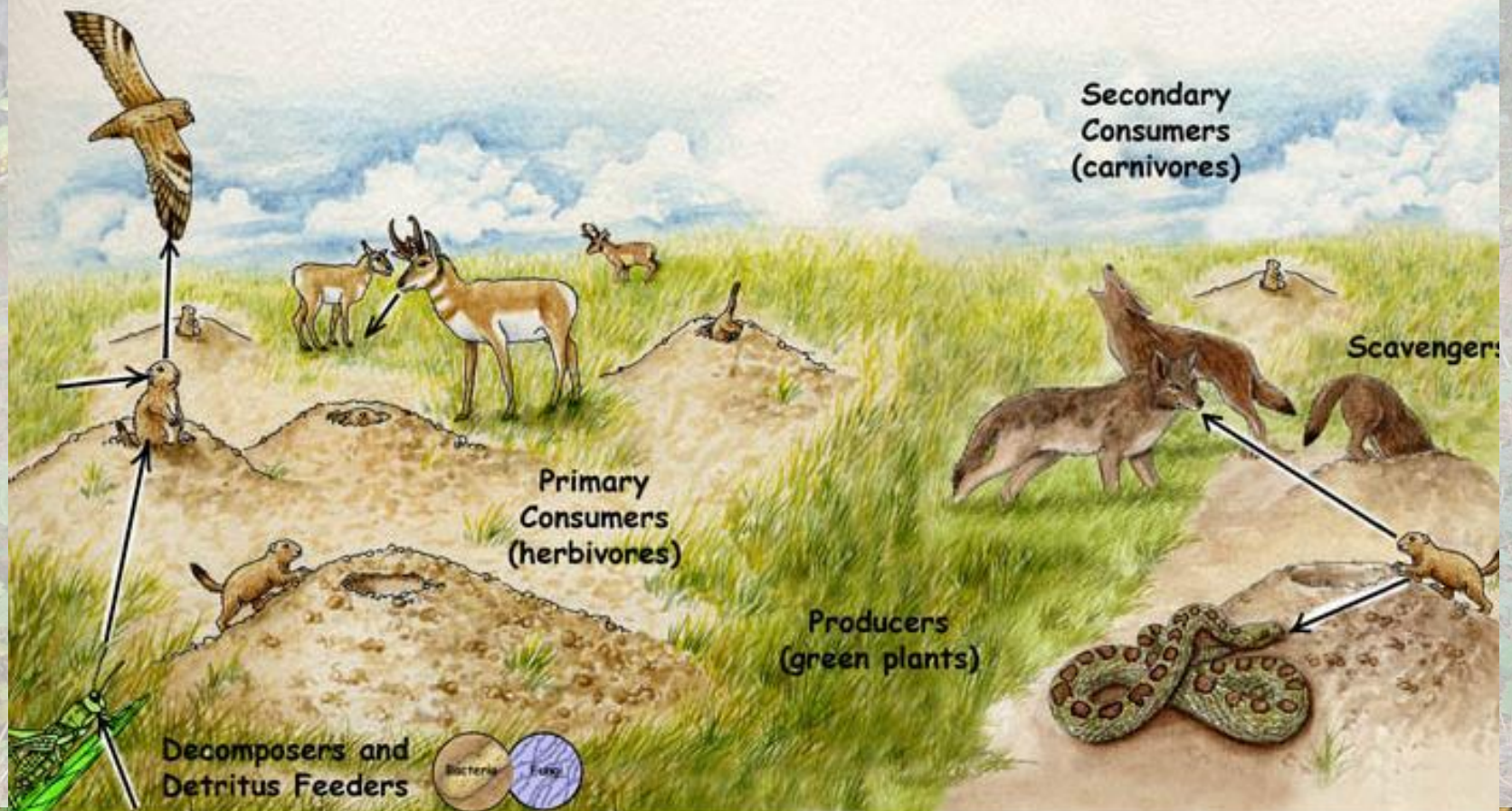


Keystone Species







- Killing of prairie dogs by farmers caused the black-footed ferret to become nearly extinct.
- WHY?



Keystone Species



Succession Flow Chart

<u>PRIMARY SUCCESSION</u>	<u>SECONDARY SUCCESSION</u>
Step 1: 	Step 1: 
Step 2: 	Step 2: 
Step 3: 	Step 3: 
Step 4:	Step 4: