

Interactions That Change an Ecosystem

Changing Ecosystems

- What are some factors that might cause an ecosystem to change?



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Natural	Human
• fire	• bioinvasion
• drought	• habitate loss
• earthquake	• pollution
• change to abiotic elements (e.g, water, sunlight)	

Succession

- The replacement of one population of living things by another over time.



- Dominant plant and animals species are gradually replaced by new species.
- Plants play a key role as they provide both food and shelter.

Primary Succession

- **Primary succession** occurs in an area where there has never been any life (e.g., sand dunes, rocky shore, newly formed volcanic island).



Primary Succession



- Lichen are the first organisms to 'colonize' the bare rock. It is called a **pioneer species**.
- Lichen begins the process of building soil by breaking down the rock.

Primary Succession

- Moss grows next on the lichen and thin soil.
- The death and decay of the moss will help create enough soil for grass, weeds, and small plants to grow.



Primary Succession



- As each generation of plant grow and die, more soil is created.
- This allows for **shrubs** and **bushes**. They out-compete the shorter plants.
- Eventually **trees** will grow (and out-compete the shrubs). A forest develops.

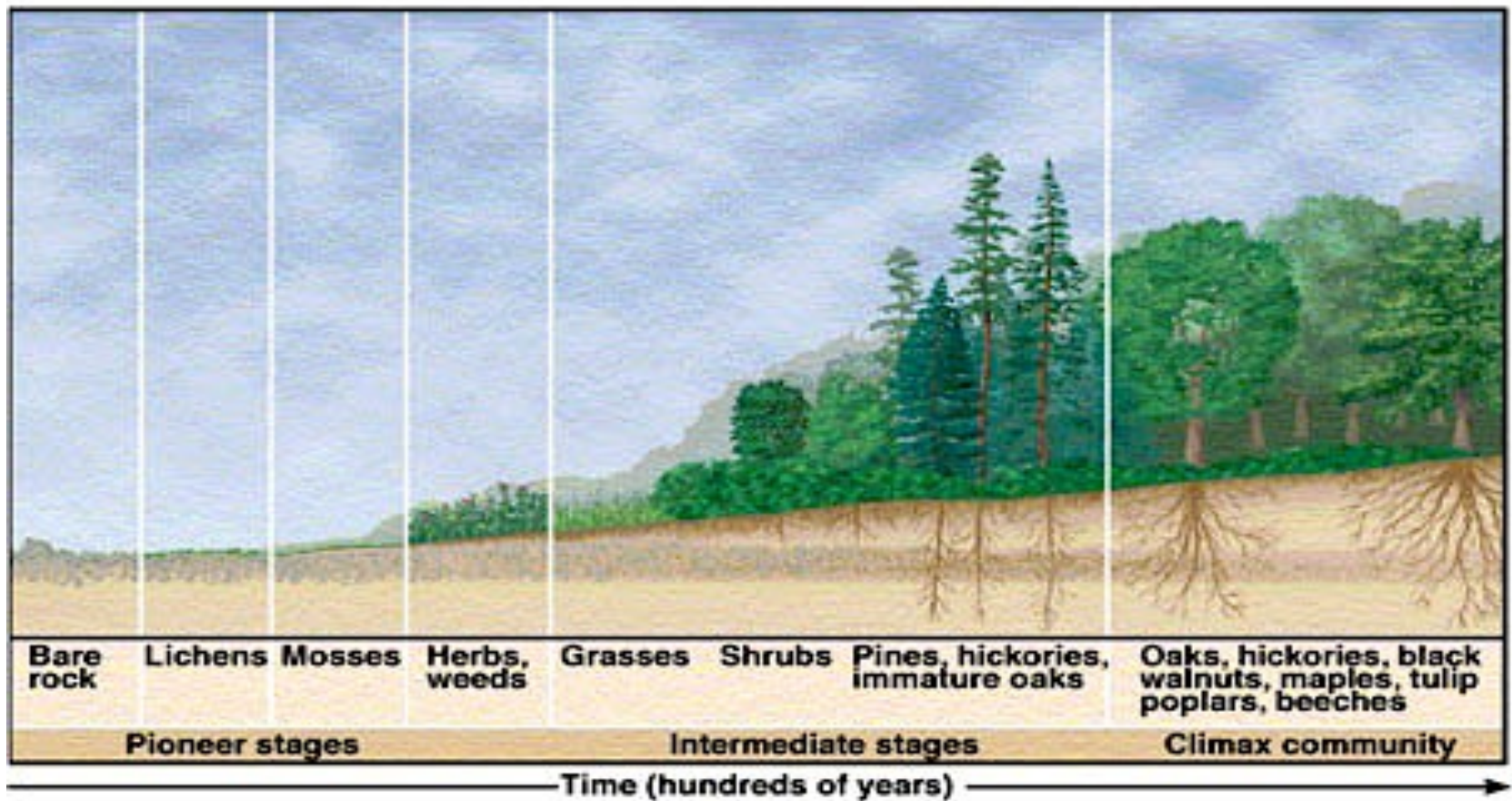
Primary Succession



- When a mature forest is reached it's called a **climax community**. The ecosystem is stable and simply renews itself.
- As each new plant species begins to grow, consumers that feed on it move into the area. As the plants change so too do the animals.

Primary Succession

SUMMARY:



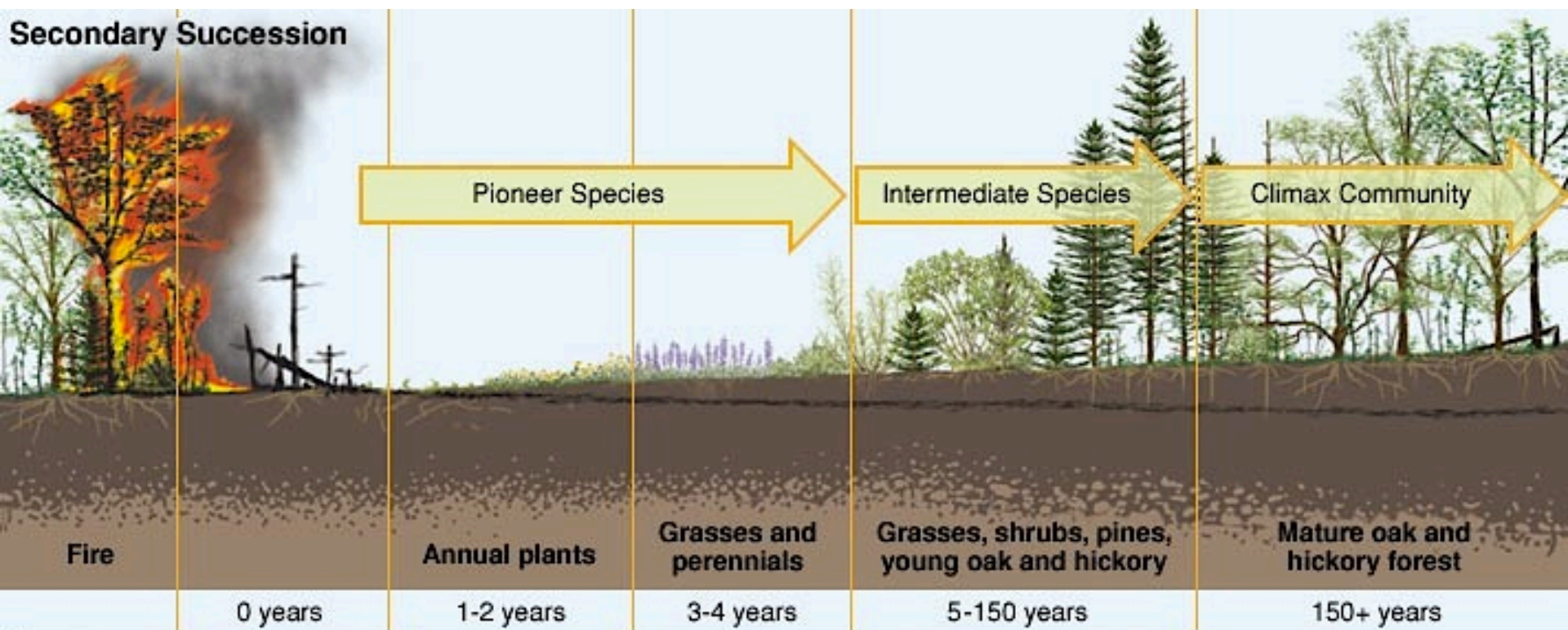
Secondary Succession

- **Secondary succession** occurs in an area where a **community** has been **destroyed or disturbed** by **natural** occurrences (e.g., **fire, drought, earthquake**) or **human** activities (e.g., **forestry, farming, pollution, construction, bioinvasion**).



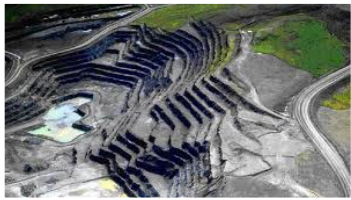
Secondary Succession

- After a natural disturbance, since the **soil** is already present, **flowers** and **grasses** grow first. Then, **shrubs** and **bushes**. This is followed by **trees**. The community re-establishes itself.



Human Impact - Habitat Loss

- Humans use land for building cities, farming, mining, recreation, and travel. All activities can result in loss of habitat for other living things.
- This means loss of producers, and as a result the loss of consumers.
- Example: Building a new mall.
 - ✧ Wetlands drained, meadows paved, trees cut.
 - ✧ Plants die as cut down or cannot move.
 - ✧ Animals die due to loss of habitat.
 - ✧ Animals move to new area; must compete with those organisms already living there. They either coexist, take over, do not survive.



Habitat Loss and Biodiversity



- **Biodiversity** can be used to measure the health of an ecosystem – the more varied the organisms, the more interactions will take place.



- Habitat loss puts organisms at risk. They can become **endangered** (in danger of becoming extinct) due to **reduced populations** or from the **change to elements** (e.g., loss of water, shelter).
- Can lead to **extinction** (a species no longer exists anywhere on Earth!).



List some organisms that have become extinct.





Invasive Species and Biodiversity

- **Invasive species** are species **not normally found** in an ecosystem.
- In most cases, they have been **introduced** into an area by **human activities**.
- Brought in by **boats, trucks, on shoes!**
- **Released** or **escaped** from **farms** and **pet collections**.
- The problems with invasive species:
 - ✧ compete for **same resources as native species**.
 - ✧ May have **no natural predators**.
 - ✧ **Grow and reproduce** rapidly.



Invasive Species and Biodiversity

Invasive Species found in Ontario

Image	Invasive Species	Effects on Ecosystem
 A black beetle with long, segmented antennae and white spots on its elytra, shown from a top-down perspective.	Asian longhorn beetle	<ul style="list-style-type: none">• Chinese insect brought by ship.• Attacks healthy hardwoods, effects animals using hardwood.
 A cluster of small, white, four-petaled flowers growing from a green leafy base.	Garlic mustard	<ul style="list-style-type: none">• Compete with many spring wild flowers for nutrients and sun.• Consumers depending on wild flowers soon disappear.
 A cluster of brown, ribbed mussels with dark stripes, shown from a close-up perspective.	Zebra mussels	<ul style="list-style-type: none">• Carried by ocean ships.• Remove plankton from bottom of food chain.• Causing clams, fish to disappear.
 A field of tall, purple, spike-like flowers with many small blossoms, set against a blurred green background.	Purple loosestrife	<ul style="list-style-type: none">• Brought by European pioneers.• Out-compete native plants in wetlands. Effects consumers too.• Clogs irrigation and waterways.

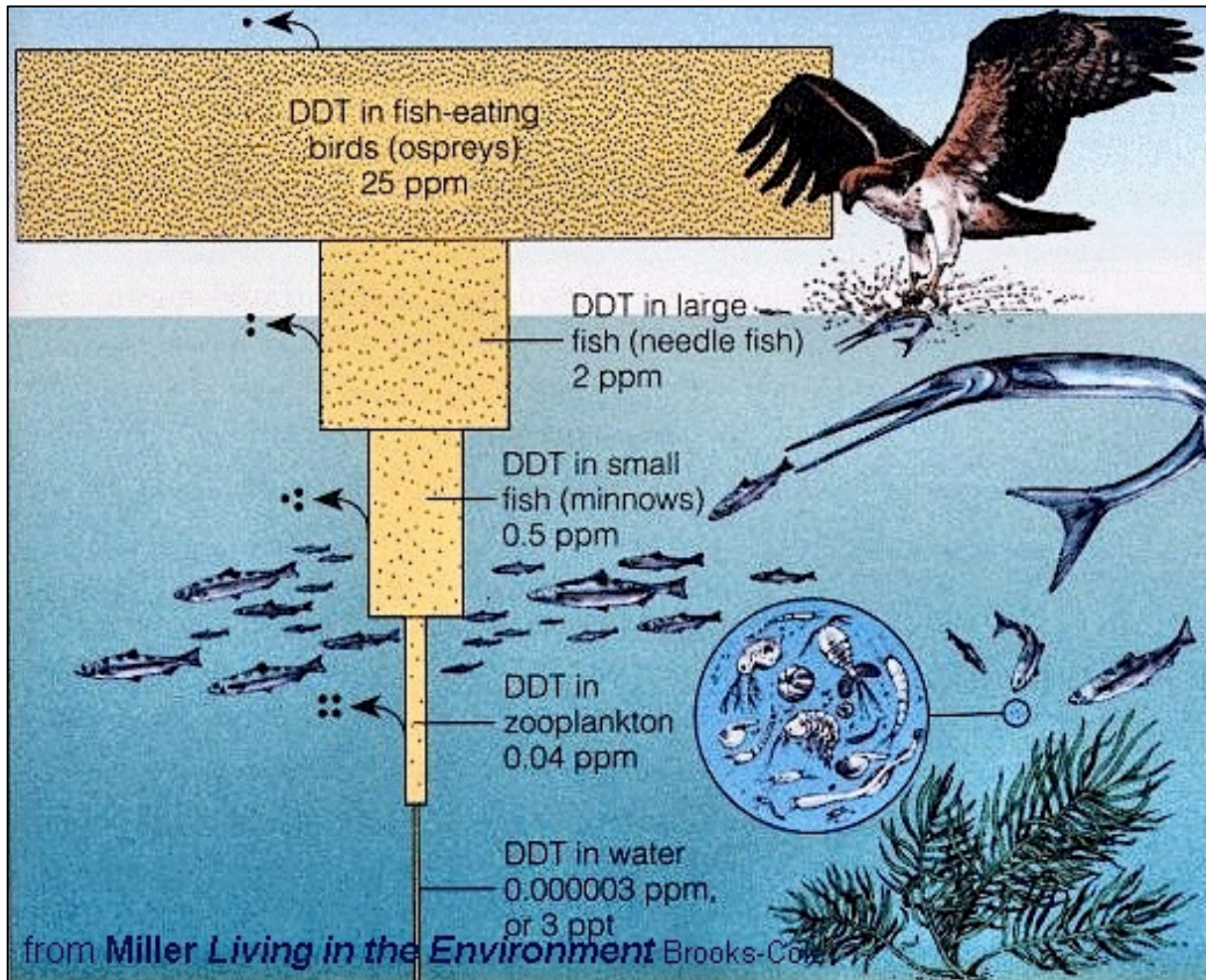
Pollution and Biodiversity

- **Pollution** is a substance that has harmful or poisonous effects on the environment.
- **Air** – burning of fossil fuels; industrial activities, use of cars and planes.
- **Water** – spillage or disposal of chemicals, can enter and flow through watersheds; oil spills poison rivers, lake, oceans.
- **Soil and nutrients** – use of fertilizers and pesticides can enter food chain at the base (producer level)
- Pollution tends to enter the ecosystem through abiotic elements. It is then passed to producers, and then consumers throughout the food chain and food web.



Pollution and Biodiversity

BIOACCUMULATION



- The build-up of toxic chemicals in the bodies of organisms.
- Chemicals are passed on as one organism eats another.
- Since they must eat a lot of food to get enough energy, chemicals magnify quickly.