Nurse Logs of The Ridges Sanctuary

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THE RIDGES

What is a nurse log?

Trees have varying lifespans which can be shortened if they become diseased or injured. Being so large, trees require lots of nutrients, water, and space to grow, and when a tree falls, it opens space for other species to grow where they would have been outcompeted for resources before. As tree material is decomposed by fungi, lichen, moss and other decomposers, the remaining tree materials become available for use by young plants. This small sanctuary for young plants is commonly referred to as a Nurse Log. A nurse log is identified as fallen tree that supports the growth of seedlings, saplings, and new growth by providing a nourishing environment, protection, and water while decaying (Feng et al., 2022).

Why are there lots of fallen trees in The Ridges Sanctuary?

Silurian dolostone is the bedrock that makes up the Door County Peninsula. The bedrock is exposed in many places around the peninsula, especially along the Niagara Escarpment that was formed by glaciers that gouged through the soft shale substrate and left 400-million-year-old harder dolomite exposed (Niagara Escarpment - Door County Coastal Byway, 2022). Because of this, shallow soil depths are common in Door County with “less than five feet in depth to bedrock; 22% of the soil is less than 18 inches in depth and another 17% is between 18 to 36 inches in depth” (McDonald, 2024). The bedrock prevents trees from developing deep taproots and are instead forced to send their roots out horizontally above the rock. This leaves trees highly susceptible to windfall. Therefore, lots of downed trees can be seen in The Ridges, but even in death, these trees are essential to ecosystems.

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Why does The Ridges Sanctuary not remove tree debris?

In nutrient poor soils such as the substrate in the developing ridges, survival rates of plants can be much lower. Trees have tons of valuable organic molecules stored up in their bodies and these nutrients are still in the tree when they fall. Fallen logs provide a small sanctuary for new growth with stored nutrients, protection, and water in addition to being a food and place of shelter for a wide variety of wildlife including birds, mammals, insects, pollinators, and invertebrates. If dead trees are removed when they fall, the natural recycling process is prevented, and decomposers are unable to complete their role in an ecosystem.

Decomposers

Growth and life cannot be supported without the decay and decomposition of dead material. Ecosystems rely on decomposers and detritivores to recycle dead organic matter, turning it into resources for new and existing life.

These nearly invisible organisms work to decompose organic material in alternative ways. Detritivores are animals that feed on dead organic material and break down those materials internally while fungi and bacteria are decomposers that break down dead and decaying materials externally and then consume the nutrients they create afterwards. But both decomposers and detritivores work to break down organic materials into smaller and simpler forms that are more readily used by other organisms. Some of the nutrients that decomposers release back into the ecosystem include carbon dioxide, nitrogen, calcium, phosphorus, and water (National Geographic Society, 2022).

Fungi sends individual strands called hyphae through substrates, including dead trees, eventually creating a weblike body called a mycelium. The fruiting body of the fungi is called the mushroom and is produced by the mycelium when conditions are optimal for reproduction. The mushroom is the reproductive stage of fungi, and it produces spores that are spread via wind or by animals (Trees For Life, 2019). Fungal spores land on dead and decomposing material, and the fungi will begin its growth into a large organism that spreads throughout the dead organism. To receive the required nutrients for growth and survival, fungi take apart large, complex molecules by secreting enzymes that break them down into bioavailable forms. However, the fungi and decomposers do not need all the nutrients that they create by decomposing which leaves the rest to be integrated back into the soil, air and water to be used by other members of the ecosystem.

In addition to fungi, other decomposers in an ecosystem include mosses, aerobic bacteria, microorganisms, lichens, insects, worms, slugs, and snails! As you investigate rotting logs, try to identify decomposers that you can see!

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Guiding Questions

Do you see more baby trees or plants growing on a stump?

Can you find a stump with a mushroom coming out of it? What color is it?

What kind of insects do you observe on a nurse log?

What differences do you see in nurse logs on different ridges of the sanctuary?

References

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