

JUMPSTART YOUR HABITAT RESTORATION – the Essence of Carbon



By Darcy Grahek, Stillwater Natives Nursery in Bandon, Oregon © 2025

Going back in time to the most recent Ice Age, humans were not absent from the land, but those people were disconnected from the land due to harsh conditions of ice and cold. Along the coastline, temperatures were more moderate and when they were able, those ancient people practiced excellent stewardship of the land that provided everything for them. Trees were felled for canoes and houses but also to control the forests, ever-encroaching into meadows. If you have meadows, you know what the Red Alder, the Shore Pine or the Dune willow can be. Their mission is to make a forest.

Fire – created a resiliency among forests to bounce back. Our ecoregion might burn every 450 years on average. Dead standing wood might take decades to fall, and they and the huge root wads provided nutrients back into the soil, re-setting the stage, cyclically. Using soil to partially bury your dead wood and start decomposition will create mossy, decaying material that does not burn as easily as ladder fuels.

Water and Floods - Water moves nutrients. Too much water can create erosion or slow decomposition. Microbial activity depends on moisture in the soil. Soil life goes dormant or elsewhere in the dry season. Here in our coastal ecoregion, the land of bogs, water can perch in the sandstone layers. Many native plants can access this unseen water.

Beavers – those first native people learned a lot about ecological engineering from beavers. Much of their purpose is to slow the water down, slow the nutrient chain down, chew down the trees to add carbon. Beaver meadows are among the richest. They set the stage for carbon capture, and we can too.

The Native Americans refer to beaver as a people, beaver people. This is something I want to do today when I talk about the diversity of life in the soil. Rather than say species, I will say people. Except for bacteria, I will call them colonies because that is how they operate.

Edge of the forest – a place of carbon exchanges. Bacteria begin a decomposition process of decaying wood, roots, or leaves. The plants have the ability to put an exudate out the end of their root hairs that serves as an alert to bacteria, inviting them to colonize here at the root tip. Next they are joined by other microbial communities, unlocking carbon and other elements. A soil food web begins this way with amoebas, paramecia, rotifers, protozoa, nematodes, and worms to name a few. Nutrient exchanges take place. Most of these people are very small and need moist soil to move around and do their best work. Decomposing wood stores a good deal of moisture even after the rainy season. Think of the dampness and coolness under a log. Down wood adds richness to the soil as it encourages the diversity of life in the soil. It is very easy for us humans to discount or overlook what we cannot see.

Mycorrhizae literally means mushroom root and the mushrooms you see are the fruiting body of many of the fungi. Their mycelium forms a network of fine white filaments running throughout the forest. You might see the fuzzy white clusters as you are transplanting or in your compost pile. It looks like mold which is also fungi. Fungi are not able to obtain carbon except as an exchange with the plants or consuming creatures of the food web. Mycelium are able to go further than plant roots, in search of water and nutrients.. They create enzymes that can mine the mineral soil for necessary nutrients like phosphorous, potassium, or zinc.

Mycorrhizae are particularly effective at sourcing phosphorus, which is often immobile in soil. The fungi store and transfer polyphosphate granules to the plant. This network also aids in sourcing of essential minerals such as zinc, iron, calcium, magnesium, and copper. Incredibly, the fungi can re-allocate resources to where they are needed most, such as providing struggling young saplings.

Enhance your habitat by retaining carbon in the form of snags, stumps and large down logs. In place of large dead wood you can create piles or bunkers of fallen limbs or cutting from your pruning work. Along with old growth trees, these carbon stores provide for decomposers that facilitate a slow release of nutrients into the ecosystem. Carbon readily combines with Nitrogen to create a balanced soil humus.

Nitrogen fixing microbes Nitrification is a two-step process that converts ammonia into nitrates and nitrites, which many plants can readily use. This process is carried out by specialized bacteria in the soil: Diazotrophs, a microbial community converting ammonia (NH_3) into nitrates.

Fertilizer use can unbalance the soil food web. If used at all with native plants it should be used sparingly and not repeatedly. The boost in energy and growth rate for the plants can come at a cost of compromised immunity and a poor relationship with the soil.

Non forested community- Meadows, prairies, wet prairies, wetlands, or swales, for instance, are bacterial driven communities for the most part. There will be a dominant bacterial colony with carbon-fixing genes that will be invited by the plants to work together. The colony envelopes the root hairs, like a glove. This is the beginning of an extensive food- web that has evolved here, in this place. The plants provide bacteria like a pasture to hungry cows, feeding the next level of single-cell creatures like paramecia and amoebas. This will attract the rotifers and the protozoa as a feast is provided. The beneficial nematodes have a place at this table, and then a variety of worms and mollusks contribute to soil health. Many human activities can disrupt the balance of life. Spraying pesticides, driving heavy equipment on the land, pasturing livestock, or using inorganic fertilizers can hinder micro and macro organisms. Damaged soil can be restored and adding organic matter such as leaves, aged compost or cover crops can improve the habitat.

The presence or absence of water, even seasonally – has great impact on the microbial community. During the dry season, diverse adaptations such as dormancy, retreating to moist places or creating a biofilm jacket, can allow organisms to survive until the next rainy season. Repeated wetting and drying of soil can be disruptive to these populations. Water native plants only as necessary to preserve ideal conditions for the life in the soil.

Reclaiming open areas that are weedy or colonized by invasive plants can be a daunting task. Laying down cardboard with a 3–4-inch layer of mulch cuts the light to the seed bank and can prevent regrowth of certain invasives. The stable moisture and temperature provided allow the decomposers to consume plant parts, roots and seeds. Use wood mulch to provide more carbon. Blackberries, ivy and bindweed will send runners out from under this cover and so along with mechanical removal, constant pruning will eventually drain the plant's resources. Mulched pathways create softer soil over time and if you can surround the invasives, removal becomes easier.

(Break)

Habitat piles – lay down cardboard first in the area of your pile. Create a mound of sticks, branches, and storm debris. The collection of carbon also supports surrounding vegetation. The aim is to create a lasting shelter structure with air tunnels and openings for wildlife to access. Larger materials as the lowest layer makes a stable base. Small, pruned branches crossed over that base. Piles need to be both wide and deep enough to create safe spaces within; at least 6 -10 feet across at the base and about 6 feet tall. Driftwood can also be added in the sizes needed. Fire is always a concern, make sure that no piles are placed near buildings or under trees where they could act as ladder fuels for fire. When placing wood, remember that suspended above the ground dries out and rots more slowly than wood that touches the moist ground. Building around a log, stump, rock pile or other base structure or even using cinderblocks or other materials to create a higher soil mound that can reach the wood will help with the process. You can disguise habitat piles by planting large shrubs in front of them.

Tree work – if you, a neighbor or the Utility Company will be removing or pruning trees near your site, ask for any wood chips or pieces of log, of a size you can manage. You can ask various local arborists for a load of wood chips, but it is wise to specify non-invasive plant materials. A fresh pile will off-gas for about 10 days and then it is safe to use around plants.

Helpers – Whether you hire someone or have a friend or family member helping out, make sure they understand your priorities. Landscape services are notorious for wanting to mow or weed-eat, blow off sidewalks and be done. They are unfamiliar with these methods and may want to dispose of some of your dead wood. Emphasize your most important work that is to be done first and make sure the workers understand the mission.

Using stumps as planters – after hollowing it out, drill sloping drainage holes from the sides of the stump, angling them downwards toward the ground to prevent waterlogging. Add a layer of gravel or broken pottery at the bottom for enhanced drainage, then fill the hollow with soil and plant.

Nitrogen fixing plants – like peas, beans and other legumes, some native plants have the ability to fix nitrogen into little clusters around their roots. Wax Myrtle, Ceanothus, Red Alder, Lupine, and Clovers.

Maintenance – covering the ground with cardboard and mulch acts as a soil conditioner and will function as a weed deterrent for about 3 years. It will greatly reduce weeding chores and can be reapplied as needed. Small logs can be partly buried, 4 -5 inches, around flower or vegetable beds as a way to reduce encroachment of the lawn grasses or weeds that spread by rhizomes.

Leaves - are one of the very best things you can add to any garden sites. Chop them first if possible, running over them with a mower. Either way, the nutrients will be readily taken up by life in the soil. Do not use Black Walnut or Eucalyptus leaves as they contain compounds that inhibit plant growth.

Pruning - our native species evolved with deer and elk and pruning is essential if you want to control their spread. A rule of thumb is to prune flowering shrubs just after they have flowered.

Moles – are looking for earthworms and grubs to eat. They move a lot of nutrients around. Their mounds are very annoying. They will frequent areas of your landscape that get watered because that is where the worms go. If you cannot tolerate them, traps work the best.

RESOURCES

Mulch

Bandon - Oregon Overseas Timber <https://ootci.com/>

Coos Bay - Agri-Tech Design, Rex Miller (541) 269-1971

Cardboard - furniture stores, appliance stores, recycle bins

Landscape Helpers

Tatiana Havill – Wild Pollinator Gardens wildpollinatorgardens@gmail.com

Abraham Byrd – Conservation Coast abrahambyrd@gmail.com

Habitat piles <https://www.nnrg.org/habitat-piles/>

Organic compost, low nutrients

Currydale Farms 49877 Highway 101 Bandon OR (541) 347-4356

Books – by Jeff Lowenfels

Teaming With Microbes: The Organic Gardener's Guide To The Soil Food Web

Teaming With Nutrients: The Organic Gardener's Guide to Optimizing Plant Nutrition

Teaming With Fungi: The Organic Grower's Guide to Mycorrhizae