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Know Your Forest From the Ground Up!

Forest soil is more than meets the feet. It is a dynamic system that serves as home for countless living things, a disposal area for Nature's "wastes", a filter of potentially noxious substances, and a storehouse for nutrients and water.

Water is one of your forest's most important assets. Each time it rains and whenever the snow melts most of this water is added to the ground water. The composition and depth of your forest's floor determine how fast water from rain and snowmelt moves through the soil making it available to trees and other forest vegetation, and how much of it is added to the underground reservoirs characteristic of healthy forest land.

Over the years, considerable amounts of organic material are returned to the soil in the form of leaves, twigs, branches, decaying roots, and eventually fallen dead trees. This layer of organic material - the litter layer - is incorporated into the top layers of the soil by the process of fungal decay and the action of a host of soil animals. This mixing of organic material with the soil particles creates structure in the soil. Soil structure is the arrangement of individual soil particles into aggregates or clumps. Soil clumps increase the size and the amount of spaces in the soil. The soil spaces contain both air and water, both essential for plant growth. In addition, the litter layer not only absorbs several times its own weight of water, but it breaks the impact of raindrops that would otherwise loosen soil particles and clog soil spaces thus reducing the infiltration rate and increasing run-off.

Healthy forest soils tend to be resilient to erosion because more water moves into them than runs off. This movement of water into the soil is called infiltration. The combination of the sponge-like action of the litter layer and the infiltration rate of the soil below is what prevents runoff and erosion in forest lands.

The plants that grow in a forest often give clues to the soils below. We have great fun exploring the thirty-three acres of largely forested land we own on the southeast side of Owls Head Mountain in Keene. We have found that many of the plants on the southern, lower half of our property are quite different from those on the northern, upper portion. A substantial stream, Walton Brook, bound the lower parcel. As the property goes northward from the Brook, it is laid out in a series of east-west running ridges and small ravines. This topography lends itself to cool, shaded areas near the Brook and other small streams. Majestic hemlocks, hobble bush, club mosses, and a variety of springtime wildflowers such as bishop's cap, star flower, painted trillium, and pink lady's slippers flourish here. The combination of the hemlock litter and the underlying bedrock – presumably acidic granite – maintains suitably acidic conditions for these acid-loving plants.

The upper parcel is quite different. Its northernmost border meanders alongside a granite palisade in an east-west fashion achieving elevations of about eighteen hundred feet. In early spring, hepaticas, saxifrage, and columbine grow on these southeastern-facing slopes. Near the palisade, there is little above-ground water although farther down we see seeps, several vernal pools, and even some swampy areas where trout lily and foam flower bloom in early spring.

One year, in search of other springtime beauties, we followed the palisade west beyond our property line and found scores of yellow lady's slippers growing alongside an intermittent brook at an elevation of about 2100 feet. Whereas pink lady's slippers prefer acidic woodland soils, yellow lady's slippers are fond of alkaline soils and cool breezes. Quite possibly, as the glaciers moved across the Adirondacks they deposited a band of alkaline sedimentary rocks in this particular spot.

More than a hundred years ago, the upper parcel was pastureland. Today, even-aged hardwoods, predominately northern red oak and sugar maple grow in abundance. Red oaks can adjust to a variety of soil types as long as there is sufficient soil depth and drainage. Sugar maples can also survive in a wide variety of soil types, but for maximum tree growth and sap production, their soils should be deep, moist but well-drained, and with medium or fine textures. On our property, we see more maples on the lower, moister portions whereas the oak tend to dominate the upper, drier areas. At the foot of the palisade where the soils are

relatively shallow, several of the mature oaks have succumbed to blow-down caused by high winds and heavy loads of early, wet snow.

We are planning to maintain our forest by planting smaller, suitable trees in this area near the palisade. We also hope to keep the remaining trees healthy by culling “undesirables” such as weedy poplars and any significantly damaged trees. The more healthy trees growing in the forest, the more the leaves, twigs, and branches will be added to the litter layer, and the more soil and water will stay put.

Our plan also includes making more trails for snowshoeing and cross-country skiing using established Best Management Practices (BMPs). BMPs are recommended practices and devices that can be used in trail and road construction to control erosion. Any time soil is disturbed there is the possibility of its being transported by run-off and ending up in streams or other bodies of water. Building water bars in trails to divert runoff, avoiding placement of trails or roads in wet soils, and keeping trails and roads away from streams when possible are examples of BMPs.

So, take a walk in your forest. Look around. Make a management plan that includes a discussion of forest soil health. It will protect your investment – from the ground up!

For additional information on forestland activities that will benefit your objectives, visit Cornell’s forestry website at www.ForestConnect.info, contact your local office of Cornell University Cooperative Extension, or join the New York Forest Owners Association through their website at www.nyfoa.org.

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This article was written by Emily L. Selleck, Extension Educator, Cornell Cooperative Extension of Essex County
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Editors note: This article is the third in a 15 part series that is provided through a joint initiative of Cornell University Cooperative Extension and the New York Forest Owners Association as an educational service that helps the citizen of New York enjoy, use, and sustain private rural lands. For more information on these and other topics, please contact your local office of Cornell Cooperative Extension or visit www.ForestConnect.info or www.NYFOA.org