

What is the Most Valuable Part of Your Land?

Recently, an article in Texas Wildlife caught my eye. It was one of a series of articles called "Lessons from Leopold" written by a friend of mine, Steve Nelle, a retired NRCS agent and one of the most knowledgeable people I know on the subjects of conservation, ecology and land stewardship. Steve and I share a great respect and affection for the teachings of Aldo Leopold.

The article in question was on the topic of prairie soil, and contained a quote from Leopold from 1938, "The black prairie was built by the prairie plants, a hundred distinctive species of grasses, herbs, and shrubs; by the prairie fungi, insects and bacteria; by the prairie mammals and birds, all interlocked in one humming community of co-operations and competitions, one biota."

Leopold was answering the question, "What is the most valuable part of the prairie?" and his answer was that it is not the animals or the birds or even the grasses and wildflowers. It is the soil!

I am always interested in hearing people describe property they have just bought or wish they could, and they usually describe the view, the trees, the hills, the animals, or maybe the creek. But they never mention the soil. But without adequate fertile soil, they couldn't have grass or wildflowers or shrubs or trees. And without the vegetation, there would be no animals or birds. And in fact, to complete the circle, without vegetation, there would be no soil!

Soil, or at least healthy, fertile soil, is a mixture of five components: (1) Mineral matter from decomposed rock which we call sand, silt or clay based on the size of the particles. (2) Dead organic matter from decomposing vegetation as well as soil organisms. (3) Living organisms such as bacteria, fungi, protozoa, nematodes, earthworms, and insects. (4) Water. And (5) Air.

And it is the interactions of these different components, the relative amounts of each, and the environment in which the soil exists that determines not only the fertility of the soil, but how it functions and how it is sustained over time.

Sand is made up of relatively large particles with a small surface area and is capable of holding relatively little water, clay is made up of very small particles with a high surface area and is capable of holding a lot of water, and silt is in between. Most of the dead organic matter in the soil comes from vegetation, especially grasses, both the dead leaves above the surface which decompose into tiny particles that become incorporated into the soil, and the grass roots, about a third of which die each year, and are replaced. This dead organic matter helps to provide vegetation with needed nitrogen and other minerals.

All of the living organisms (from microscopic to macroscopic) live off of this organic matter and also contribute to and become part of the dead organic matter, further enhancing the fertility of the soil. Both the organisms living in the soil and the vegetation growing on the surface need both water and air to survive. As the larger organisms move through the soil they keep the soil porous, as does the decay of the grass roots which die and are replaced.

This porosity not only allows the soil to receive water and air needed for all the functions it provides, but the porous soil thus produced is responsible for capturing rainwater and allowing it to soak into the soil, thus preventing erosion and the loss of rainwater.

If it weren't for the grasses, the soil would not be protected from erosion and would cease to be fertile. If it weren't for the soil, the grasses couldn't live. The same mutual dependence can be said for the soil and its microorganisms. The synergistic interdependence of all the components of the prairies, including the birds and animals and insects is what made the prairie, from central Texas to Canada, the breadbasket of the world.

Since settlement times we have lost a lot of soil to erosion, and some of the components of healthy, fertile soil are in limited supply in many areas, so that the productivity of the soil is not what it once was. But all of the interactions mentioned above are still occurring, and still essential. We just need to understand, protect and conserve our soil, because it truly is the most important part of our land.

Until next time...

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