Demonstration of the Properties of Native Grasses

I have mentioned several times in this column over the past months that native grasses are the best thing to have on the ground to capture and hold rainwater. I think it might be useful to elaborate on that a little.

The root structure of native bunch grasses looks a lot like the leaf structure above ground, with many roots growing from the area just below the surface and growing down and outward from there. This is in contrast to roots of shrubs and forbs which usually have one or a few main roots and smaller roots branching from the main roots much like the branches off the trunk of a tree.

Grass roots don't live forever. It is estimated that about a third of the roots of a grass plant die each year and are replaced. When a root dies, as it decays it feeds all sorts of organisms that live in the soil from bacteria and fungi to earthworms and beetles. The "tunnels" left behind when the roots decay, as well as those made by the larger organisms such as earthworms, nematodes, and beetles, make the soil porous and keep it that way. They also allow air to get into the soil. It is this porosity of the soil that allows water to soak into the soil and not run off during a rainstorm.

A few years ago I learned a nice demonstration of the difference in the rate water soaks into the ground under a native bunch grass versus bare ground from Joe Franklin with the USDA Natural Resources Conservation Service. It is done like this.

I cut out the top and bottom of a large tin can (like a 2 or 3 pound coffee can) so I was left with a metal cylinder open at both ends. I found an area where there was healthy native bunch grasses growing as well as some bare ground (ground that has not had anything growing on it for a while, not recently disturbed soil). I hammered the can into the ground about 1-2 inches. Then I poured a measured amount of water into the can to almost fill it, and timed how long it took for all of the water to soak into the ground.

Virtually every time I have done this, it takes between 15 minutes and an hour for the water to soak into the bare ground and only about 5 minutes or less to soak into the ground under a grass plant.

There are several reasons for this. First, the soil beneath the bare ground doesn't have the porosity of that beneath the grass because of the lack of roots and the various associated organisms. Second, bare ground exposed to rainfall can have tiny particles of soil dislodged from the surface and flow into what pores there are and plug them up. And third, because of the structure and properties of clay particles.

Clay particles are very much smaller than those of sand or silt, and instead of being more or less spherical like sand grains, they are, on a microscopic level, flat plates. The flat plates lie stacked on top of each other like a deck of cards, but when water contacts the clay particles, it seeps in between the plates, swelling the clay. Without the grass roots, clay would not be very porous.

On the Kerr Wildlife Management Area, there was a large pasture that had a draw that funneled all of the runoff rainwater down to a water gap (fence across a draw or small creek). After every moderately heavy rain, the folks out there had to go out and rebuild the water gap fence because so much water ran off so quickly it knocked the water gap out and carried lots of soil with it. After clearing cedar, managing grazing and growing good stands of native grasses, the amount of runoff was very much reduced, the water gap was not washed out and what runoff there was ran clear.

The take-home message here is that a healthy stand of native grasses with little bare ground is the best thing you can have on the land to capture rainwater. I hope this explains what may seem to many of you to be my obsession with the importance of a good stand of native grasses.

Until next time…

Jim Stanley is a Texas Master Naturalist and the author of the books “Hill Country Ecology,” “Hill Country Landowner’s Guide” and “A Beginner’s Handbook for Rural Texas Landowners.” He can be reached at jstmn@ktc.com. Previous columns can be seen at www.hillcountrynaturalist.org .