

How the Condition of the Land Affects the Amount of Runoff and Erosion

In the Hill Country, the amount of soil many of us have is minimal and somewhat limits what types of plants grow here and how much biomass can be produced in a single growing year. Some people, however, are fortunate to live in areas of deep soil, usually in the lower elevations along creek or river valleys where the soil from the uplands has been transported by erosion over many years.

Many people's first thoughts about erosion are during floods when creeks or rivers are flowing out of their banks and moving sediment downstream. Or maybe when rainwater first collects into low areas and then flows into obvious gullies.

But in all cases, erosion really starts where raindrops strike the ground. When raindrops fall from the clouds, they will strike either vegetation first, or, if there is no living or dead vegetation, then bare ground. The first few raindrops that fall on vegetation will wet the leaves and maybe eventually, if it keeps raining, all the vegetation will be completely wet and the remaining rainfall will reach the ground.

Once rainfall reaches the ground, one of two things can happen. It can either soak into the ground or it can run off. If rainfall hits bare ground, it is said that the drops can be traveling as much as 20 miles per hour, and this can dislodge tiny particles of soil. If the rain is falling faster than it can soak into the ground, it will begin to accumulate into a very shallow layer on the ground and start to move downhill. Any tiny particles of soil that were dislodged can be suspended into the water as it moves downhill and this is the actual beginning of water-caused erosion.

How much runs off versus how much soaks in depends on several things: how fast it is raining, how fast water can soak into the ground, and the slope. We don't have any control on how fast it is raining or the slope of our land. But we can have some control on how fast water soaks into the soil. Water soaks into the ground much faster under native bunchgrass than into bare ground, (any vegetation is better than bare ground). So the more grass and the healthier the grass, the more rain will soak into the soil and the less that runs off and thus the less erosion will occur.

I had a really stark demonstration of that beginning a few years ago. The "Drought of 2011" really started in the fall of 2010, with the result that virtually no new native grass grew in the pasture during 2011, and by the end of 2011 much of the leaf litter from 2010 had also pretty much degraded. So we had a lot of more bare ground than usual.

We had a hard 3+ inch rain at our place one night early 2012. The next morning, I went out and looked around and found a huge litter dam consisting of leaf litter, dead cedar needles, and soil that was caught up against our fence by leaves that had accumulated against the fence. (See accompanying photo.) This "litter dam" was about 20-feet long and 6-feet wide. The area in question drains about 5 to 7 acres of pasture and has a very gentle slope. What I was looking at was the result of sheet erosion after a drought

that killed much of the grass. Walking into the pasture that day revealed a lot of bare ground where the dead leaf litter had been carried away by the rain.

Well, this past January (2017) we had a similar 3+ inch rainfall one night, and I went out to look at the same place that had the litter/soil accumulation 5 years earlier, with the intention of taking a photo of the accumulation this year. I would show you the corresponding photo, but there was nothing to take a photo of—there was no visible accumulation at all. Why the difference? In 2016 we had one of the best rain years ever in terms of total rainfall and timing, and so we had very much better grass cover in the pasture.

When the grass cover was poor, we had a lot of runoff and a lot of erosion, but when the grass cover was very good, we had very little runoff and no erosion. So landowners do have some control on potential erosion by their management practices and how much grass cover they have on their property.

Until next time...

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