

M04t06_LitterMovement

Indicator number seven is litter movement and this is the degree and the amount that litter has been moved around the site and also the size of litter that may be moved. When we talk about litter, we're talking about dead plant material that is in contact with the soil surface. We're not talking about branches of dead sage brush or juniper opinion. We're talking about branches that have fallen on the ground and are in contact with the soil surface. So, we can have redistribution by water and we can have redistribution of litter by wind and both of these are indicators that we're beginning to see or can be indicators that we're beginning to see movement of the litter and the organic matter associated with the litter around the sides accumulating in certain parts of the site or even being removed from the site. This is a problem possibly, simply because litter is a very important factor in soil development and if we are depleting our site from accumulation of litter and the incorporation of that litter over the surface soil, then, sooner or later, we're going to see a deterioration in the quality of the soil and again, we're looking for, we're concerned about the amount that's being moved and we're concerned about the size that litter may be moved, (i.e.), are we moving just little fine pieces of litter and are we moving it just a very short distance, are we moving large branches and getting them involved in a water flow pattern or gully where they're being carried great distances away from where they were originally deposited on the soil. In our comparison, we have an opinion site, a mountain pinyon site in western Colorado and you can see in the picture on the right a situation where you have going down around the arrow and then off into the distance, you have an area where that water is able to flow, this is water, litter

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movement by water situation and its branches fall off of the sagebrush or the pinyon juniper trees that grow on this particular site. You can see large litter being moved and large branches can be carried from under the tree down slope and possibly finally into a gully where they could be carried off site or they might begin to form litter dams at some point down slope that could possibly even begin the process of helping to store soil and store both big and small litter from being carried off of the site. This indicator is really quite important to us in helping us understand this question soil site stability, the attribute of soil site stability simply because the organic matter associated with the litter is so important to the process of soil development.

Indicator number eight is soil surface resistance to erosion and this indicator reflects the characteristic of the surface soil that causes it to resist the detachment either by raindrops or by flowing water and the little cartoon in your right-hand picture in this slide illustrates what happens when a raindrop hits the soil surface,, it carries such energy that it tends to kind of explode the soil particles that are right at the surface into the air and then those soil particles come down and are supported or go into or are carried off by the thin column of water, the thin layer of water that may be on the surface of the soil which you can see there as the soil particles beginning to move down slope. As they tumble, then, they come into contact with other soil particles and detach them and so once raindrops splash has managed to start the process of erosion, then, soil particles and the energy of the water, the flowing water continues to maintain and

continue more and more erosion. So, what we're looking for in this particular indicator is the idea that soil organic matter combined with characteristics of the soil, physical characteristics of the soil can bind together the soil particles into aggregates and the more stable these aggregates are which is illustrated by the two slides top and bottom on your left-hand side of the screen, the more stable those aggregates are the more they're going to resist the erosion by either raindrop splash or the process of water running across the surface of the soil and this is actually the test that we use in the field to measure the aggregate stability of the surface soil when we're trying to determine how surface indicator number eight would be evaluated. So, what you see again is comparing the left-hand and the right-hand slide on the same ecological site you see the left-hand slide after, even after several minutes and being dipped into water more than once, you see that that aggregate on the bottom left, that soil aggregate on the bottom left is still held together by the organic matter, the roots that have been incorporated over time into that aggregate and you can see the one on the lower right-hand picture has dissolved almost completely so that there is very little stability in the soil in that situation and so we call that a departure from the reference and that's how we measure this particular characteristic. It is very important because it is a factor that helps us evaluate the beginning of an erosion process and it's used to evaluate the soil site stability, hydrologic function and biological integrity because the condition of that surface soil, the organic matter in that surface soil is very important to plant growth in many ways that we'll talk about a bit more.