Improving Water Utilization on Arid Rangeland

Josh Waller
Society for Range Management
Colorado Section

Many of us have come to expect droughts more frequently. When people are experiencing a drought, they would like a solution, which is to receive more water. Unfortunately, there is no way of controlling how much rainfall we receive. There is however, a way to better use water that we do receive. I have grown up on a ranch near Hoehne, Colorado and experienced drought, which is currently plaguing our area. Drought is detrimental in Southeast Colorado because many of us don't know how to use the little water we receive efficiently. There are many ways to improve water usage. Improving soil health will lead to improved rangeland and higher plant production. Grazing management is an important aspect of the conservation of rangelands. Grazing, done improperly can damage rangeland, but can also improve rangeland when planned correctly. Finally, I believe the most important part of improving rangeland is understanding what hydrology is and how to manage soil health and grazing. We have to better understand how to use the water we receive, or we will destroy our rangelands.

The Importance of Healthy Soil

Soil health is an extremely important aspect of range conservation. Without functioning healthy soil, water cannot be utilized effectively. If the water we do get from precipitation does not infiltrate into the soil, creating healthy soil is unlikely. Some

properties of healthy soil are the soil must have adequate cover, organic matter, and plant diversity to perform its functions of capturing water and allowing the plants to grow. To maintain healthy soil, organic matter, cover, and plant diversity must be present. All three things will be interrelated with a healthy soil. The season-old cover of plants (also called detritus) will decay and produce organic matter in the soil. Organic matter is extremely important because it has a significant effect on water holding capacity and infiltration. In a sandy soil, increasing organic matter by one percent will increase water infiltration and holding capacity by forty percent, according to Jeff Goats, Resource Soil Scientist with the United States Department of Agriculture. Having adequate organic matter improves plant diversity, because plants have different nutrition needs. By increasing the cover, organic matter and plant diversity will eventually increase, so the key to a healthy soil is plant cover.

The Consequences of Unhealthy Soil

The consequences of not maintaining soil has serious effects on the rangeland, and because of this, water usage is also affected. If the soil is not healthy, then the water will not penetrate the soil, which means it is unable to infiltrate into the soil. Without infiltration, the plants cannot utilize the water over a long period of time; therefore, wasting the water we get by run off, which leads to erosion. When water is running off, it creates erosion on the rangeland. Erosion is a vicious cycle. When bare ground is present, water droplets hit the ground and take the soil away from where it should be, not allowing plants to grow in those areas. Over time, the ground becomes

more bare. When the ground has been left bare, a crust develops, through which water can't penetrate, making the cycle even worse.

Proper Grazing Management is Critical

I believe an effective way to address bare ground and soil crust is by using proper grazing management. Proper grazing consists of using proper stocking rates together with a prescribed rotational grazing schedule. The key again to reducing erosion is to have cover. The major benefit of maintaining healthy soil is producing more forage by increasing infiltration and water holding capacity. If we are able to improve all those aspects, then we will meet every rancher's goals of maintaining rangeland health and being able to run more cattle. Growing up on my family ranch, I never realized how important soil health is or the negative effects of having bad soil health. While assessing the rangeland on our ranch, I realized we have major erosion, as well as poor plant diversity and production, due to not maintaining our soil health. To sum soil health up, if you do not have a healthy soil, then you cannot effectively utilize the limited water received on our arid rangelands.

Grazing and soil health are very intertwined. Without one, the other cannot happen properly. Grazing is essential to conservation of a rangeland. Improper grazing is the quickest way to destroy a rangeland, but often proper grazing is the only option to bring it back to good condition. To start, if grazing is not managed correctly, it will deteriorate soil health. If cattle overgraze, too much of a plant will be eaten, the roots

will begin to die off, and the plant can't stay alive. This can lead to reduced organic matter and lower plant diversity, which causes a major issue: bare ground.

Bare Ground and Soil Crusting

Bare ground creates erosion and causes a crust to develop. The crust is a particularly bad situation because whatever water is received will not infiltrate, which means soil health can’t improve. Many people believe in order to fix this crust problem, there must be a reduction in grazing. I believe a more effective method to address soil crusting is to intensely graze the land with the entire herd for a short period of time. Following intense, short duration grazing, the field should be allowed to rest until grazed grasses have recovered, which means soil health will improve. By the cattle breaking the crust up, the soil receives and retains water allowing seeds to germinate, which promotes plant growth and reproduction. The resulting higher amount of cover leads to more decaying plant material in the soil, known as organic matter.

Importance of Plant Diversity

Now there is a task to maintain plant diversity to allow soil microorganisms to stay healthy. Plant diversity can be maintained by grazing the pasture. It is advised to not graze the pasture the same time of year every year, or the cattle will only be eating the same palatable plants, which reduces diversity. Proper grazing management is definitely the key to improving hydrology on our rangelands. If we realize the key to

grazing more animals is a healthy soil, that will allow the water we do receive to be better utilized. We, then, should be able to maintain a healthy and productive rangeland.

Rangeland Hydrology

Hydrology is a very complex aspect of rangeland maintenance. Hydrology describes how the precipitation is distributed and infiltrates over the rangeland. Hydrology incorporates all the ideas of range management, including soil health and grazing management. When rain hits bare soil, it dislodges soil particles, starting the erosion process. Understanding hydrology allows one to know what happens to the water and soil particles and their effects. A question that needs to be addressed is: does the water infiltrate into the soil or does it run off? More than likely, the water will run off on bare soil, but understanding that having plant cover will reduce the runoff and allow the organic matter in the soil to hold more water is key. Using the study of hydrology, one can adequately figure out how to stop erosion in the most detrimental areas. By controlling erosion, the ground absorbs more water creating a healthier soil, which means better production. Having an understanding of hydrology or how water works when it hits the soil will allow one to create a better grazing management plan to create better soil health. All three of these aspects are very important to our understanding how a rangeland needs to be protected and preserved.

Conclusion

Many people in Southern Colorado complain that we have a water shortage due to lack of moisture. Although that is true, most of the water we receive isn't effectively used. If we better utilized the moisture we received, we would drastically improve our rangelands. Soil health is an extremely important aspect of rangeland health and water usage. The key to soil health is to have adequate plant cover, allowing for organic matter to develop in the soil, which will allow more water to infiltrate, be held, and used by plant roots in the soil. To get a healthy soil, the land must be grazed properly, or soil health will be destroyed, leading to erosion. We must take erosion seriously, or it will destroy our land and make it unusable by future generations. On my family ranch, the more I look, the more this project has opened my eyes; and there is a lot of work to be done. I love my family's ranch, and I am eager to use the knowledge I have gained from this project to assist my family in improving our rangelands to become healthier and more productive. Our rangeland is one of the most important resources we have in this world. Rangeland conservation begins with the better utilization of water.

Work Cited

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