

In the center of Texas exists the Texas Hill Country, an area which encompasses 25 counties and is where I live. Over time, land has been handed down, divided, and sold to new landowners. This turnover and increase in ownership can be problematic. The plans made and the actions taken by uneducated landowners, while usually well-intentioned, can sometimes do more harm than good. There are some landowners who have no plans at all to fix and/or maintain their property, and have intentions of only taking from the land without considering the consequences.

Much of the economy of the Hill Country has been historically driven by an agricultural engine, with cattle, wool, mohair and hay production leading the way; although life as a rancher in the Hill Country is shaky at best. While there are many fertile areas, The Edwards Plateau is not blessed with a thick blanket of fertile topsoil, and in most parts is equipped with only a few inches of it, which must be used strategically in order to both feed our livestock and grow our produce. The Hill Country is also known to receive small amounts of rainfall, as there have been several torturous droughts over the last 100 years. These factors combine to make ranching in the Hill Country a challenge.

Over the past few decades the tourism and recreation industries have been steadily catching up with, and in some cases, are now surpassing farming and ranching as the primary economic forces in many areas of the Hill Country. Hunting, fishing, camping and water sports like canoeing, kayaking and tubing are now a catalyst for growth. The sport hunting of whitetail deer and Rio Grande turkey has expanded the income possibilities for landowners, and the introduction of exotic species has extended hunting

to a year round activity. As a result, the multiple uses for land have driven prices skyward over the last 20 years.

These modern-day changes in the industry have made the job of a landowner as challenging as ever, with so many decisions to be singlehandedly made out on the range. Managing rangelands, whether the property in question is large or small, presents many opportunities to go wrong. Overgrazing, poor brush management, and their effects on water infiltration are three topics I will address today.

Overgrazing has long been a major problem confronting the stewards of our ranges. Landowners who do not possess the proper knowledge in range management can easily overstock their pastures or leave their livestock to graze in one pasture for too long, causing the vegetation in that grazing location to deplete over time. If an animal grazes more than half of the vegetation of a plant, the roots become shorter which, in turn lowers the maximum height at which the vegetation can grow. If the severity of the overgrazing is extreme, a majority of the desired vegetation will not be replenished, but replaced by invasive and undesirable species, creating even greater problems for landowners who are dependent on their land's natural vegetation as a primary source of nutrition for their livestock. If the vegetation is not properly rested on a regular basis, the eventual result will be a denuded, useless pasture which will be subjected to erosion and overtaken by unwanted invasive species. The livestock can be moved to a new grazing area if there is one available, but the rangeland will be left devastated.

First and foremost to prevent these negative outcomes, ranchers must determine the proper stocking rate for their property and the type of livestock they wish to run on it. Stocking rates vary depending on factors such as type of animal and its condition, type of forage available, average rainfall, and site conditions. Another tool to prevent overgrazing is the “take half, leave half” method. Once half of the vegetation’s yield has been consumed from a given pasture, the landowner should rotate his livestock to a new pasture; giving the vegetation in the previous one a chance to recover. “Take half, leave half” can literally be calculated with the simple lift of a finger. A landowner can easily determine exactly how much “half” of his vegetation would be by placing a plant specimen, roots excluded, on his index finger and balancing it out. This is one of the most practical and accurate ways that an everyday landowner can determine what half of his vegetation should look like.

The second example of poor range management is the way brush and other undesirable vegetation is controlled. Before the Edwards Plateau was settled there were large expanses of rolling grass lands which were interspersed with clumps of live oak trees. The draws and canyons between the hills were generally thick with juniper, mesquite, and other types of undesirable growth. This growth is what we in the Hill Country consider brush. The reason this brush occurred in the draws and on canyons and did not proliferate elsewhere was due to the common occurrence of wildfires. These fires would sweep across the grasslands, burning not only the grass, but also any other young, small plants trying to grow. These natural fires prevented the invasive species from getting a

toehold on the grasslands, maintaining a natural balance that had existed for many centuries.

Once the Hill Country began being settled, people by necessity fought the fires and worked hard to prevent them. The result? The abundantly grassy rangelands were transformed by juniper, mesquite and other types of vegetation that had previously been confined to the draws and hillsides. These woody species were of much less value to the farmers and ranchers in the area, because they were not conducive to the goals of grazing livestock or raising crops. The dense cover and increase in forbs and woodies provided by the change in landscape, while poor for grazing and farming, were perfect for the establishment of a large whitetail deer population. As years passed and rangeland management and the deer population spiraled out of control, the high amount of deer combined with poor rangeland conditions quickly shifted the use of the land from agriculture to hunting and recreation. Deer hunting progressed from a hobby to a huge industry, and in many cases provided more revenue to the landowner than was possible with strictly agricultural operations.

Today as you drive through the Hill Country, vast expanses are now covered with unwanted growth that sucks the water and nutrients from the soil, greatly reducing its value for agriculture and providing massive quantities of fuel for wildfires to feed upon. Unlike the beneficial wildfires that raced across the grass of past rangelands, today's wildfires are terribly destructive, causing great losses of pasture, structures, livestock and wildlife; not to mention the threat to ourselves, homesteads, and communities.

A landowner must utilize a range of brush management techniques in order to gain an upper hand over the undesirable species on their property. There are four widely recognized methods that are used for brush management: mechanical, chemical, biological, and fire. Bulldozing unwanted brush is a prime example of the mechanical method. The use of heavy equipment for brush removal is a common practice, and a single operation can be effective on certain brush species. Chemical brush control methods vary depending on the time of year, the age of the targeted vegetation, distance to water, and available application equipment. Many brush control herbicides are species and season specific, and can be hazardous if not applied properly. Grazing is an example of the biological brush control method. The effectiveness of grazing as brush control is dependent upon three factors: the species and age of the target vegetation, species of the animal, and management goals of the landowner. Generally, sheep and goats are most effective at stressing or reducing the presence of woody brush. Fire, or prescribed burning, as a brush control method should only be used after a complete inventory of resources has been developed and a prescribed fire plan should be developed only by those both trained and certified to apply the practice. Long term effectiveness of fire as a brush control tool is usually dependent upon the follow-up treatments applied to the area. Follow-up treatments are any of the four methods of brush control which are performed after the initial treatment in order to ensure the effectiveness of that first treatment, in this case, a prescribed burn.

The last factor I will discuss, water retention via water infiltration, involves both brush and grazing management. The land's ability to retain water plays a major role in the health

of the Hill Country ecosystem, as the number one limiting factor to production on any rangeland is water. You hear talk constantly in Texas about how water levels in many of the state's aquifers have gradually declined due to poor water conservation in both the urban and Ag industries. In fact, it is estimated that every Texan uses an average of 200 gallons of water for domestic purposes each day. Brush and grazing management are key factors that determine how much of the rain falling over our rangelands will be absorbed into the ground and into the water table.

When it comes to water infiltration, brush is a major concern. A single mesquite tree can consume up to 20 gallons of water per day, and has a lateral root system that is capable of extending up to 50 feet away from the tree, therefore increasing its ability to absorb moisture. A large ashe juniper tree can consume up to 40 gallons per day, and possesses a deep root structure and dense, fibrous roots that sit near the soil surface to allow the absorption of moisture from even the driest of soils. Whereas other trees are able to control their water output by limiting their water usage, mesquite and ashe juniper are not capable of conserving water. Whatever they absorb will be put to waste almost immediately with the help of transpiration.

Mesquite and ashe juniper can also prevent rainfall from reaching the soil. In the Hill Country, where the average annual rainfall is about 30 inches, a dense group of ashe juniper will allow less than a fourth of the rainfall to reach the soil. The remaining rainfall is caught up in the branches or in a blanket of litter beneath the juniper until it finally evaporates. This means only about 20 percent of all rainfall will actually reach the soil's root zone, if a landowner has not properly managed the brush on his property.

Whereas a healthy piece of rangeland containing a variety of desirable grasses is capable of allowing up to 90 percent of rainfall to reach the soil. However, if a landowner overgrazes his pasture leaving the ground barren, the rainwater will runoff instead of absorb into the soil. As a result, most of the fertile soil will be washed away, and the compaction of the remaining soil by wind and water will form a hard crust on the surface, making the infiltration of water into the hard packed soil near impossible. Over time, it becomes increasingly difficult for desirables to establish in the hard, dry, eroded soil, and the condition of the rangeland is greatly deteriorated. By practicing proper brush and grazing management a landowner can greatly increase his land's ability to absorb rainfall while also reducing erosion and runoff.

In conclusion, these are three factors that contribute to the health of the Hill Country ecosystem and are intertwined in a system that must be continuously managed and monitored. In saying this, I mean that when practicing grazing management, you are also practicing brush management and improving water infiltration; conversely, while managing brush you are also managing grazing and water infiltration. It is a delicate cycle that must not be taken lightly for the sake of the future of our precious rangelands. The responsibilities which come with the ownership of land are many, and all of the various tasks, regardless of how tedious or difficult they may be, must be tended to so that our beautiful land may be both enjoyed and put to good use for generations to come. If you are a landowner, YOU are a LAND MANAGER.