

COWBOY HYDROLOGY

Article and photos by STEVE NELLE

As a landowner, what is your primary interest? What things do you prioritize and pay the most attention to when it comes to land management? Perhaps you are primarily a cattle raiser who also has a strong interest in white-tailed deer. Or a Bobwhite quail fanatic who has cattle as a secondary interest. Maybe your main interest is songbirds and you manage your land accordingly. These and a dozen other land management priorities are all common to today's diverse Texas Wildlife Association membership.

But, no matter what your primary wildlife and land management interests are, Texas landowners can never forget that you are also hydrologists. You, the landowners of Texas, are the primary water managers of the state. Only about 1 percent of Texans own rural land; the other 99 percent depend on your management of land and water resources. What you do on your land greatly affects the waters of Texas.

WHAT IS COWBOY HYDROLOGY?

Hydrology is an extremely complex science, involving the knowledge of physics, geology,

chemistry, engineering and biology. Few of us can claim to have a deep understating of hydrology, yet it is important that we understand the basics. Cowboy hydrology is the branch of hydrology based on the common sense understanding of how land management affects water. Perhaps there is no more important topic for Texas landowners than the study of cowboy hydrology and the understanding of how the water and the land are connected.

The 26 million citizens of Texas rely upon the hydrology that happens on Texas farms, ranches and forests. Texas has over 190,000 miles of creeks and rivers and most of them run through private land. What happens on the rural agricultural lands of Texas affects the water that all Texans depend on.

Cowboy hydrology begins when the raindrops hit the ground and continues all the way downhill as the waters come together to form creeks and rivers. Cowboy hydrology also includes the movement of water downward into the soil and beyond, into aquifers. Cowboy hydrology affects the quantity of water, the quality of water, the movement of water, the storage of water

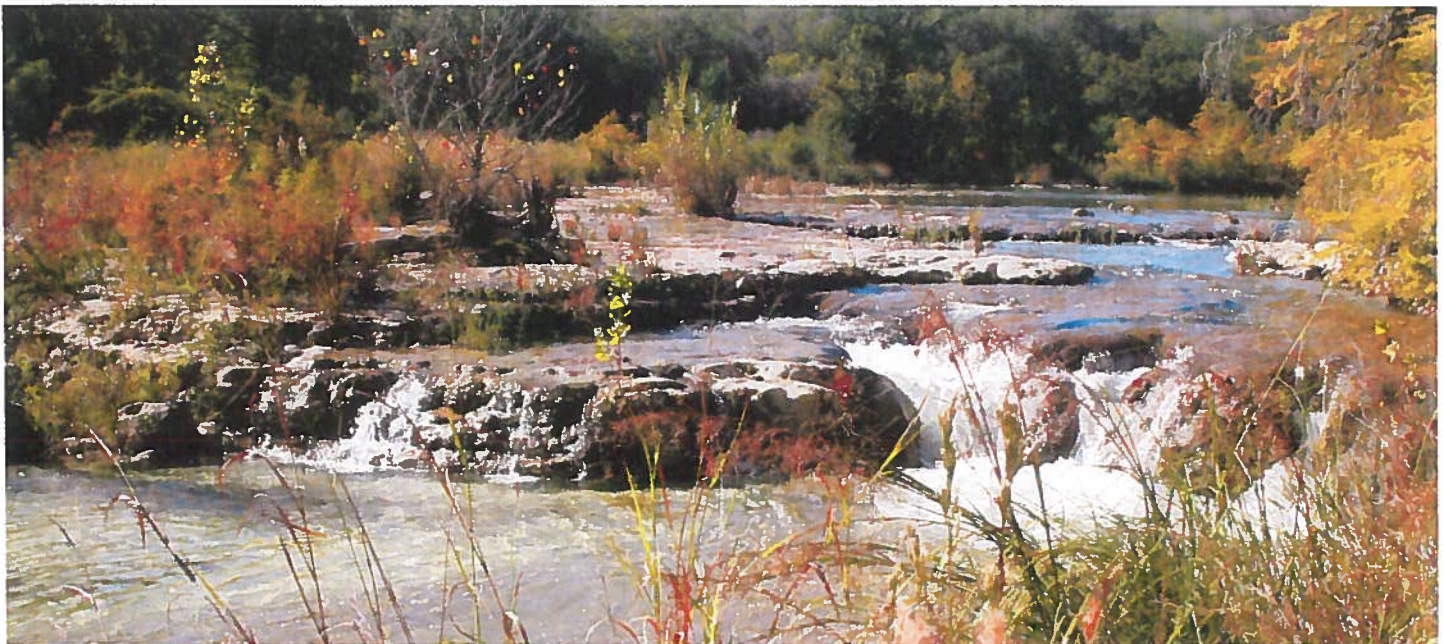
and the distribution of water throughout the year.

AN INCH OF RAIN

The famous Texas novelist and historian, Elmer Kelton understood cowboy hydrology. In his classic book *The Time it Never Rained*, Kelton reveals his insights into the land / water connection

Time was when an inch of rain would have brought fresh life, a greening to the land. But there had been grass then, a spongy turf to soak up and hold the moisture, and live roots to draw sustenance from it. Now the bare ground had nothing to soften the impact of rain, to catch and drink up the water. The first burst of precipitation would pack and seal the topsoil. The falling raindrops would strike hard and splash upward, brown with mud. Instead of soaking in, the water would swirl and run away, following the contours of the land, seeking out the draws and swales. Burdened by a heavy load of stolen soil, the rivulets swelled quickly into streams, the dry draws turned to rivers, and the muddy rivers bled away the vitality of a once-generous land.

An inch of rain will wet the soil to a depth of 6-12 inches if all of it soaks in. This is what



When the land is well managed and soaks up rainfall, the base flow of creeks is sustained in dry times.



Dense vegetation along creek areas helps to reduce erosion, slow down the water and increase groundwater recharge.



Rotational grazing and flexible stocking rates keep this North Texas prairie in excellent hydrologic condition to catch and hold the maximum amount of water.

sustains plant life, animal life and human life. But, if the soil is bare, sparsely covered, hard-packed or crusted, only a fraction of that inch will go into the soil. The rest of it flows downhill as runoff. Landowners are literally giving away life-giving water when they allow unnaturally high amounts of runoff.

Landowners can invest in the future water holding capacity of the soil by retaining a cover of grass and litter. Conversely, landowners can waste and squander their rainfall by grazing too short, thus thinning the grass cover and inhibiting the rate of infiltration.

Range managers have long noted that the management of the land influences the onset, duration and severity of drought. Well-managed land holds more water thus lengthening the period of time that a single rainfall event sustains plant growth. Cowboy hydrology means making the most of every raindrop that falls so that each inch of rain goes deeper, lasts longer and does more good.

HYDROLOGY AND HUSBANDRY

The ancient Greek scholar and philosopher Plato may not have been a cowboy, but he understood cowboy hydrology. The account below is a historic compilation of the Greek landscape in the Attica region prior to the time of Plato.

In the primitive state of the country, the



mountains and hills were covered with soil and there was an abundance of timber. The plains were full of rich earth, bearing an abundance of food for cattle. Moreover, the land reaped the benefit of the annual rainfall, having an abundant supply of water in all places; receiving the rainfall into herself and storing it up in the soil. The land let off the water into the hollows which it absorbed from the heights, providing everywhere abundant fountains and rivers. Such was the state of the country, which was cultivated by true husbandmen, who made husbandry their business, and had a soil the best in the world and abundance of water.

This historical narrative describes what must have been a perfectly functioning water cycle with emphasis on the role of land husbandry. We note his emphasis on the fertile soil, the abundant timber and rich prairie, and the abundance of springs

and rivers. This rich natural abundance was maintained and managed by husbandmen, the equivalent to today's land stewards.

But, unfortunately, the story of natural abundance and good husbandry does not continue. After an unspecified period of time, the landscape of Greece changed to one of desolation. Plato's firsthand account below is a sad commentary to what can happen to rich natural resource abundance when land is abused.

In comparison of what then was, there now remain only the bones of the wasted body. All the richer and softer parts of the soil have fallen away and the mere skeleton of the land being left. For the fact is that a single night of excessive rain now washes away the earth and lays bare the rock. Now the land is losing the water, which flows off the bare earth into the sea.

These two contrasting accounts of the water cycle demonstrate the effect that land management has on water resources. When land is "cultivated by true husbandmen," rainfall soaks in and is stored in the soil where it later helps sustain springs and rivers. When land is abused by widespread deforestation, overgrazing or poor farming techniques, runoff is increased, soil is eroded away and springs and rivers dry up.

SLOW DIFFICULT JOURNEY

The journey of water through the land can be likened to a long trail ride. What kind of saddle trip comes to mind as you think about the following words: rough, difficult, arduous, sluggish, complicated, interrupted, grueling, laborious, obstacles, detours, barriers, blockages, impediments, obstructions,



Retaining dense vegetation along riparian areas through carefully managed grazing helps improve water quality and wildlife habitat.





Keeping a good cover of grass at all times is the golden rule for cowboy hydrology.



When small headwater tributaries are well managed, it contributes to the health of larger creeks and rivers downstream.

diversions? In our fast-paced world, these words do not bring pleasant thoughts of an enjoyable ride.

However, these words accurately describe the ideal flow of water downhill in a properly functioning water cycle. From the place where each raindrop hits, the journey of water to its next destination should be slowed and impeded by as many natural obstacles and barriers as possible.

The law of gravity dictates that water runs downhill. Geometry teaches us that the shortest distance between two points is a straight line. But, when it comes to land and water stewardship, the goal should be to upset these two laws as much as possible.

Land management can either speed up or slow down this journey of water downhill. Good land stewardship means slowing the movement of water. In this condition, the land serves more like a “water catchment.” Poor land stewardship usually results in a quick and efficient movement of water downhill. In this condition, the land serves more like a “water shed.” The difference between these two is important.


As water flows downhill, the slower it moves, the longer it remains in contact with the soil, and the greater opportunity it has to soak in. Fast runoff means limited infiltration. Slow runoff means greater infiltration. A robust blanket of grass and plant litter on the soil surface provides the millions of small obstacles needed to slow the water down. Not only does this blanket of vegetation allow good infiltration, but it also filters and intercepts soil particles that may have become detached.

In this ideal slow-motion, zigzag trip downhill, much of the water soaks into the earth. Here, it can be stored in the soil profile and used by plants, or it can percolate more deeply into underground water tables. During heavy rainstorms, all of the water cannot soak in and some of it continues downhill until it reaches a draw or creek. Slow runoff from the hills means a slow but more prolonged rise in the creek. As the floodwaters gradually spill out into the floodplain, they spread out, slow down and soak into the shallow alluvial aquifer. Then, as the runoff subsides, the newly recharged aquifer helps to sustain the flow of the creek during dry times.



RIPPLING EFFECT

Cowboy hydrology is the realization that common sense conservation produces clean water, more water going underground and more sustained flows over time. The cowboy hydrologist always looks at the big picture. He sees that in one way or the other, every decision made on a ranch has rippling effects that affects neighboring property and everyone downstream. A land stewardship ethic acknowledges that the rights of land ownership must be strongly tied to the responsibilities of owning land. One of those responsibilities is the constant awareness of how your management affects the shared water resources of Texas.

The next time it rains hard, put on a raincoat, go outside and watch what happens to water as it soaks into the ground or moves downhill. Consider how well-managed land protects the earth, fills the aquifers, sustains the creeks and processes the rainfall for maximum benefit. It is amazing, humbling and sobering to think that our treatment of the land determines the fate of Texas waters. 



Most of the 190,000 miles of creek in Texas run through private land. Healthy creeks benefit all citizens of Texas.