

## Keeping Water on the Land Longer

Sherman Swanson<sup>1</sup> Gary McCuin<sup>2</sup> and Kent McAdoo<sup>3</sup>

Water is the limiting factor for plant growth in the Great Basin. After warm spring temperatures allow plants to grow, they continue to grow until the soil moisture dries up. The longer water remains stored in the soil, the longer plants grow, increasing both above and below-ground plant material. In ever-wet riparian areas, plants grow throughout the summer. Riparian plants grow longer if the water from precipitation or snowmelt gets stored in an aquifer to be released as spring and stream flows. On any watershed, precipitation is the number one factor in forage production. It is unfortunate that there is little or nothing we can do to increase precipitation.

What we can influence is getting water into the ground. On uplands, roots in the soil provide the organic matter for soil structure and porosity. Above ground plant parts provide the solar panels to grow the roots and slow the impact of moving water. Slowing the movement of water allows time for it to soak into the soil. Thus, there is a three-way link among grazing for plant health, (more above and below-ground plant production) regrowth after grazing, and getting more water into the soil. Water that runs off and flows out of the watershed in the winter or early spring, or in a flood, creates risk but provides little or no benefit. The job of a watershed (or more descriptively, a water catchment) is to capture, store, and safely release the water from precipitation. Areas that control the rate and the effects of water flow the most on a catchment are the riparian areas. How riparian areas function to keep water on the land longer depends on their setting in the watershed. How well they do this depends on their vegetation (type, amount, and vigor), including woody debris in some places, and their form, including their floodplain in some places.

The physical functionality of riparian areas is a foundational keystone for ranch operations. Properly functioning riparian areas are critical to the ranch's economic viability. Not only does keeping water on the land longer improve forage quantity and quality (increasing livestock productivity), it increases resilience and stability of the watershed through the years, and reduces flood damage. It also decreases the potential for conflict with agencies and/or others who care about riparian areas for a long list of reasons. Ranchers have many opportunities for successful riparian management. The more successful ranchers are in managing riparian areas, the less other people will try to force them to manage differently.

During settlement, ranches were usually located where water was available to irrigate good soil, soil the stream had been depositing slowly for thousands of years. In most valleys the stream builds a floodplain with meanders that slowly sweep down the valley as the stream swings back and forth across the valley. As the stream moves, it deposits sediment on the point bars during high water. Sediment deposits keep pace with erosion on the outside of the meanders if those banks are held together by deep dense root

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<sup>1</sup> Range Extension Specialist, University of Nevada, Reno – College of Agriculture, Biotechnology, and Natural Resources -- Department of Natural Resources and Environmental Science.  
[sswanson@cabnr.unr.edu](mailto:sswanson@cabnr.unr.edu) ph 775-784-4057

<sup>2</sup> Eureka County Educator, University of Nevada Cooperative Extension

<sup>3</sup> Area Natural Resources Specialist, University of Nevada Cooperative Extension

systems. As riparian plants colonize (occupy) the sediment, new vegetation captures more sediment by slowing the velocity of high waters. Roughness from rocks, bends, and vegetation acts like a brake and meanders act like switchbacks on a mountain road, decreasing the slope. These features decrease the speed of flowing water so that it doesn't crash into banks with such force that it tears them up and washes them away. Slowing water in a thin sheet across a broad floodplain also allows deposition of a thin layer of fertile soils while the soil below becomes charged with water stored in a "sponge". Far more water goes into the aquifer when water flows across a floodplain than if the same flow is contained in a creek that has grown too deep from erosion in past high waters. Today many floodplains rarely have the opportunity to soak in the water of annual high flows in places as they once did in most years. We are too late to prevent channel erosion that has already happened. Fortunately, streams recover. We can work with their natural tendencies for restoration once we understand what creeks and riparian areas do to function properly. More importantly, we can prevent the unraveling of areas at risk.

The Creeks and Communities Team works with people all over Nevada to recognize opportunities to maintain and improve their creeks and riparian areas. We work with local people to help them develop their own solutions to unique challenges. The team includes people from many walks of life including ranching, land management agencies, education, etc. None of us is as smart alone as when we think as part of an interdisciplinary team. Our Creeks and Communities Team represents many disciplines, including hydrology, soils, range or plant ecology, and fish or wildlife biology. We have found that generally people come together in a community and work proactively together when they understand and focus on the physical functioning of their riparian areas. Even if people disagree about riparian values, they can agree about physical functions. Therefore, one of the first things we teach is riparian proper functioning condition assessment. Riparian areas function properly<sup>4</sup> when adequate vegetation, landform, and large woody debris are present to:

- dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality;
- filter sediment, capture bedload, and aid floodplain development;
- improve water retention and ground-water recharge;
- develop root masses that stabilize streambanks against cutting action;
- develop diverse ponding and channel characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
- support greater biodiversity.

All these functions differ from place to place. The type and amount of vegetation, landform, and woody debris needed for riparian functions also varies as do the specific benefits provided by the functions. This makes proper functioning condition tremendously flexible and useful, but not always easy to understand. We have two classes scheduled this spring. April 15 & 16 in Pine Valley, south of Carlin, NV and

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<sup>4</sup> Prichard, D., H. Barrett, J. Cagney, R. Clark, J. Fogg, K. Gebhardt, P.L. Hansen, B. Mitchell, and D. Tippy. 1993. Riparian area management—process for assessing proper functioning condition. TR 1737-9. USDI, Bureau of Land Management - Service Center, Denver, CO. 60 p.

May 21 & 22 in Bridgeport, CA. More classes can be scheduled as needed. The classes and instructional materials are free, and you are invited to come and learn as well as to add your thoughts, especially when we go look at creeks and springs.

Our Team does not want to be judgmental. We do want to help put you in charge of your creek in a positive way. We realize that your real estate value may eventually increase but emphasize that your family gets to enjoy the benefits of a functioning riparian system every day. We all believe in private property rights. We also recognize that what a neighbor does with his water and creek may affect your water, your part of the creek, and your ability to make a living. To be a good neighbor, people should take time to be careful about their creek. To be a community of neighbors, we often take time to work together to understand the creek, to be understood about the creek, and to find win-win solutions for priority problems in the creek.

Focusing on the physical functioning of riparian areas is working within your sphere of influence and for many it ought to be their center of focus in their watershed. While floods can be a real problem, floods can also be beneficial. Even minor floods sometimes tear the heart out of beautiful ranches, leaving a deep gully and an inability for the ranch to economically irrigate once valuable meadows. Yet, some dam-break events have hardly left a mark downstream.

Since we can do little to increase precipitation, we must take advantage of opportunities to increase the retention of precipitation to support plants and animals for a longer period. By influencing the movement of water we can improve infiltration of water into the soil, reduce accelerated erosion (particularly in the wrong places), or manage sediment deposition for stream recovery. Knowing what will be effective begins with understanding the stream's need for physical functions and developing an ability to assess functionality. Then managers can select strategies to target the management needed, and monitoring can focus on specific areas and questions. We hope to see you soon at a Riparian Proper Functioning Condition Assessment Class near you.