

Reading Your Landscape: Are Your Pastures Healthy?

Larry D. White, Barron S. Rector and K. Brian Hays

Professor and Extension Range Specialist; Associate Professor and Extension Range Specialist; and Extension Assistant-Water Conservation; The Texas A&M University System

Water has always been a major limiting factor on Texas rangelands. Every drought reminds us that forage production is not guaranteed every year and that management must be prepared for the inevitable forage shortfall even if livestock are properly stocked for the normal year. Climatic risk has to be managed to prevent the degradation of resources, maintain or improve resources for the future, prevent non-point source pollution, and reduce financial risks.

While the amount and timing of rainfall are important, the productivity of rangeland is more closely tied to the amount of soil moisture captured when it rains and the presence of desirable plant species to use that moisture. There are tools to help you analyze the history of rainfall on your property and estimate the probability of receiving different amounts of rainfall throughout the year. One is the Rainfall Analysis software available from the Texas Agricultural Extension Service. However, it is your current and past management practices that determine how much rainfall penetrates the soil, the kinds of plants on your land, and the amount of runoff, sediment, and non-point source pollutants that leave your property.

Where Does Your Rainfall Go?

Factors that affect where rainfall goes are the type and density of vegetative cover; the intensity of a storm; the amount of moisture in the soil before the storm; the capacity of the soil to hold water; and the slope of the land. These factors affect how much moisture evaporates, infiltrates or runs off the land, and the velocity of runoff water.

While you can not change some of these factors, your management does determine the condition of the soil and the vegetation, and that can make the difference between capturing rainfall for the production of desirable rangeland plants or seeing your land erode and your forage disappear. If you correctly “read” the condition of your rangeland, you can make timely management decisions to protect your resources.

How Do You Determine Pasture Health?

Knowing what to look for is the key to reading your landscape. Managers must monitor both current conditions and changes over time to determine if damage to

the soil, plant communities, and water resources is occurring; if past decisions are producing expected results; and whether management should be changed to correct problems before they become critical.

The first indicator of range or pasture health is vegetative cover both—the amount of vegetation and the species composition. Good vegetative cover, with little bare

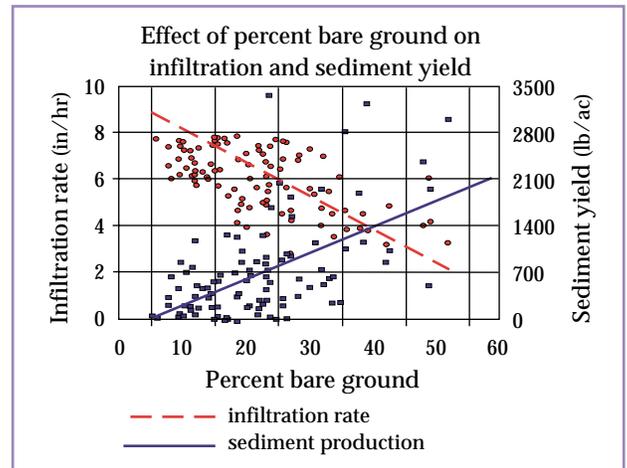


Figure 1. A simple pace transect can be used to monitor the amount of bare ground and plant cover to estimate the infiltration rate and sediment yield from a 6-inch storm. (This graph was adapted from “Hydrologic interrelationships with vegetation and soil as affected by selected livestock grazing systems and climate on the Edwards Plateau,” 1985, a PhD dissertation by T. L. Thurow, Texas A&M University.)

ground, slows the movement of water across the land and lessens the impact of raindrops on the soil surface. The greater the raindrop impact and the faster the water moves, the more soil will be dislodged and carried away. The slower the movement of surface water, the more time there is for it to soak into the soil. By monitoring the amount of bare ground on your land and the evidence of erosion, you can determine how your management is affecting the soil surface (Fig. 1).

A certain amount of vegetative cover should be left ungrazed at all times. This is called the threshold residue. It varies with plant species, soil type and climate, and it determines the amount of rainfall captured and the potential for future grass production (Fig. 2). Ten to 17 inches of rainfall can produce as little as 1,100 to 1,800 pounds of forage, or as much as 4,000 pounds of forage, depending on the amount of residue left ungrazed. Your management tool is to adjust your live-

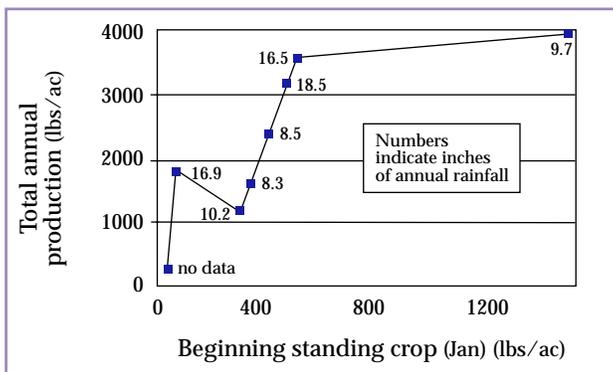


Figure 2. The amount of forage left ungrazed determines next year's forage production. The most important thing is not how much rain you get, but how much soil moisture you trap for future plant growth. (No rainfall data were available for one location.)

stock stocking rate seasonally so that the threshold residue is not removed.

The kinds (species) and classes (grasses, forbs, etc.) of plants determine the amount of rainfall that will be intercepted by foliage and evaporate back to the atmosphere, or that will reach the soil surface (where it may either infiltrate the soil or run off). Being able to identify the plants on your land is very important. Plants reflect the environment produced by your management and the natural climatic and soil factors of your property.

Monitoring plants with photo points can help document seasonal and annual changes in the landscape and pinpoint problem locations. For more information about this topic, see "Range Monitoring with Photo Points," L-5216, available from the Texas Agricultural Extension Service.

The second indicator of the health of your landscape is the soil surface. Large areas of bare ground, pedestaled plants, litter dams, rills and gullies are signs that rainfall is running off the land rather than infiltrating the soil. Another danger sign is stream bank erosion, which often occurs when riparian vegetation (the vegetation along rivers and streams) is inadequate to stabilize the bank against flowing water. Riparian vegetation is important for maintaining natural stream channels. Closely checking stream bank stability and riparian zone vegetation can help you recognize a problem with the land upstream.

How Can You Maintain Healthy Range Resources?

Know what is happening on your land. Check for signs of increasing bare ground, reduced litter, lower forage production, changing plant species, and stream bank erosion. These signs tell you that rainfall is not being effectively captured and that sediment losses are reducing the soil's productivity and water-holding capacity. Then you can quickly change your management before the next storm further degrades your property. Learning to read your landscape will pay off in greater productivity now and sustainable productivity in the future.

Other publications in this series:

- L-5367, Increasing Bare Ground Indicates Poor Watershed Health
- L-5365, Are Your Streams Healthy
- L-5364, Know Your Plants to Protect Your Watershed

For further information:

Hanselka, C. W. and L. D. White. 1986. Rangeland in dry years: drought effects on range, cattle, and management. In R.D. Brown (ed.), *Livestock and wildlife management during drought*. Cesar Kleberg Wildlife Research Institute, Texas A&I University, Kingsville, Texas.

L-5216, Range Monitoring with Photo Points, Texas Agricultural Extension Service.

L-5141, Do You Have Enough Forage? Texas Agricultural Extension Service.

Rainfall Analysis software. Contact the Extension Rangeland Ecology and Management group at (979) 845-2755.

For additional range information see: <http://texnat.tamu.edu>

For additional risk management information see: <http://trmep.tamu.edu>

Support for this publication series was provided by the Texas Agricultural Extension Service Water Supply and Conservation and Risk Management initiatives.



Produced by Agricultural Communications, The Texas A&M University System
 Extension publications can be found on the Web at: <http://texaserc.tamu.edu>

Educational programs of the Texas Agricultural Extension Service are open to all people without regard to race, color, sex, disability, religion, age or national origin.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Chester P. Fehlis, Deputy Director, Texas Agricultural Extension Service, The Texas A&M University System.