Texas Agricultural Extension Service
The Texas A&M University System

Healthy Range Watersheds Critical to the Future of Texas

Water for Texans Series
No. 2 August 1998

K. Brian Hays
Extension Assistant-Water Conservation

Larry D. White
Professor and Extension Range Specialist

The majority of water Texas citizens use originates from rangelands, except for east Texas where forest lands dominate. Manipulation of vegetation on range watersheds has a major effect on the quantity and quality of surface and ground water. The primary quality concern on rangeland is sediment loads resulting from erosion. The primary quantity concern is increased flooding and more frequent drought-like conditions.

The amount of rainfall received decreases from east to west across Texas (50+ inches in east Texas to as little as 8 inches in far west Texas). Rainfall moves from range watersheds through evaporation, vegetation (transpiration), infiltration into the soil, or runs off as overland flow.

Many factors determine what happens to the rainfall received. Some of the primary factors affecting where rainfall goes are the type, quantity, and density of vegetative cover; storm intensity; soil moisture prior to the storm event; soil water holding capacity; and slope. These factors affect how much evaporates, infiltrates, moves through vegetation, and the amount and velocity of overland flow which may erode the soil surface.

Properly managed rangeland has adequate vegetation cover to protect the soil from raindrop impact, promote infiltration, and slow and filter overland flow to minimize erosion.

When conditions result in excessive overland flow from a rainfall event, surface erosion can occur and form gullies in accumulation areas.

Photo by Allan McGinty

This photo guide series is being developed to help land managers identify characteristics that indicate watersheds at risk and where management practices need to change or degradation will accelerate.

Degraded, unhealthy range watersheds have lost the most productive soil, are unable to capture rainfall received, have increased nonpoint source pollution, have promoted down stream flooding, and left the range less productive. Some erosion is natural on rangelands but these are very localized situations. The photo series illustrated in this guide identifies specific at risk observations you can make to determine if your management needs to be changed to prevent degradation. A few localized instances of these at risk situations indicate the need for close and frequent monitoring so that management can be changed before wide spread erosion occurs. Extension Range Specialists and County Extension Agents can assist you with management changes that may be needed to recover your range watershed to a healthy, sustainable condition.

For additional range information see our website at http://texnat.tamu.edu

Support provided by TAEX, Extension Water Supply and Conservation Initiative and Renewable Resource Extension Act

Healthy **At Risk** **Unhealthy**

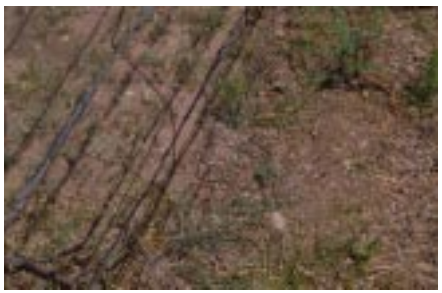


The above left-hand photo shows a range site with good plant distribution and minimal bare ground. This condition is important for slowing overland flow of water and sediment. Fragmentation of plants, an increase in bare ground and sediment accumulation at the base of plants, as shown in the center photo, indicate management should be adjusted before substantial degradation occurs. The right-hand photo shows results of sheet erosion with an erosion shelf formed by overland flow of water.



The above left-hand photo shows a range site with good cover, very little bare ground and no pedestaled plants (no soil has washed away from the base of a plant leaving the roots exposed). Plants in the center photo are becoming pedestaled with increasing bare ground. When these factors are present management should be reevaluated to prevent additional loss of topsoil and vegetative cover. The right-hand photo shows plants that are severely pedestaled (3-4 inches of topsoil gone) with the roots of the plants showing and a less productive soil remaining.





The above left-hand photo shows a short grass range site with good ground cover and evenly distributed litter. The center photo shows a litter dam that has formed due to water movement over the soil surface indicating that there was not enough vegetation left to slow water movement or promote infiltration. Management needs to be adjusted to prevent the further loss of soil, nutrients and organic matter, as shown in the right-hand photo where it has left the property.