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Rangeland Health and Sustainability

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Texas rangelands are a multiple use natural resource. Rangelands produce our meat and fiber, provide habitat for much of our wildlife, and capture in lakes and underground aquifers most of the water used by our cities, agriculture and industry. Rangelands also provide recreation such as hiking, off-road vehicle use, birding, camping, etc, and their aesthetic beauty is enjoyed by all Texans. So, the health of Texas rangelands is important to every citizen of the state.

What is Healthy Rangeland?

Healthy rangelands have a great diversity of plant and animal species. They are dominated by perennial plants rather than annuals. Healthy rangelands have a minimum of erosion because the soil surface has sufficient plant cover to protect it from the impact of rain. This plant cover also slows the movement of water across the soil surface so that it has time to soak into the soil. Healthy rangelands produce a variety of herbaceous forage for livestock and wildlife. And, most important, the ecological processes on healthy rangelands (hydrologic cycle, nutrient cycle and energy flow) function well and support healthy plants and animals.

What is Unhealthy Rangeland?

Unhealthy rangelands have more annual than perennial plants and inadequate plant cover. They are prone to excessive erosion by wind and water. As soil is washed from the surface of the ground it accumulates as sediment in streams, rivers and lakes. Erosion makes the land less productive and less able to support diverse populations of plants and animals. Less water infiltrates the soil to recharge underground aquifers. Unhealthy rangeland has far less value for livestock and wildlife. In many cases the effects of poor management that make rangeland unhealthy are irreversible.

What Are the Warning Signs?

- **Pedicelled plants.**
  When the grass plants on a site each sit on a small pedicel of soil it is a sign of sheet erosion. Each plant's roots and crown protect the soil directly underneath, but the soil between plants is washed away with each rainfall. It is possible for unprotected soil to lose more than an inch of topsoil during a single rainstorm. It may take centuries to replace that inch of soil through natural processes. The less soil there is, the less water the soil can store, which results in fewer and less productive plants.

- **Bare ground.**
  Large areas, or increasing areas, of bare ground are a symptom of unhealthy rangeland. The soil must be covered with vegetation or mulch to protect it from the impact of rain. Unprotected soil erodes easily and forms crusts. This reduces the amount of water that can infiltrate the soil profile to support plant growth and recharge aquifers.

- **Browse lines.**
  If there is a distinct absence of woody vegetation from ground level to a height that browsers such as goats and deer can reach, it is a sign that woody plants are being consumed at too great a rate. This reduces plant diversity and overall rangeland health. The strength of rangeland ecosystems is their diversity of plant and animal species. Diversity protects the health and sustainability of the system over time.

- **Gullies and steep, denuded stream beds.**
  Gullies and stream banks that are devoid of vegetation are another sign of excessive erosion and poor rangeland health. Vegetation on stream banks holds soil and slows the flow of water. To correct the formation of gullies and steep stream banks, the land manager must slow the movement of water through these areas. It is also necessary to correct the factors that led to their development in the first place.

- **Domination of annual plants.**
  If rangelands are abused, as through overgrazing, perennial plant species will gradually be replaced by annual species. Annual plants have short life cycles that permit them to grow only during favorable conditions. Unfortunately, they do not provide dependable, continuous protection to the soil surface, nor do they provide sufficient forage for livestock and wildlife.

How Do I Monitor For These Warning Signs?

It is very important to monitor rangelands so that you can make appropriate, timely management decisions and correct problems before they destroy the resource. Rangelands are very complex. There may be several different plant communities in any given pasture. Each plant community has its own mix of grasses, forbs and woody plant species. The species mix changes over time because of the effects of weather, seasons, brush and weed management, and grazing by livestock and wildlife. Monitoring should include looking for changes in plant communities and increases in erosion. With monitoring you can ensure that your management practices are not harming the land and that your management activities are producing the desired results.

Rangelands can be monitored using a variety of methods. Some of the more common techniques are vegetation sampling, excluding small areas from grazing, or photo points. The latter method is one of the easiest to use. By comparing photographs and detailed notes for the same location over time, changes in rangeland health can be observed and documented. The photographs, notes and interpretations are a permanent record for each location and situation. These observations and photographic records are necessary to establishing the cause of changes in resource conditions. Photo points are a means of monitoring rangeland health with a minimum of input in terms of time and expense.

When comparing photographs of a specific photo point over time, look for changes in the amount of forage, brush, weeds, bare ground, litter and erosion; look for changes in the types of plants found in the photographs (plot); also look for the absence or presence of specific plants. Records of grazing use, brush management and rainfall will help you interpret these photographs. For detailed information on setting up and interpreting photo points to monitor range health, see L-5216, “Range Monitoring with Photo Points,” available from your county Extension agent or from http://texaserc.tamu.edu

Other publications in this series:

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