Conservation Grazing Uses Livestock as Ecosystem Engineers

Livestock are proven ecosystem engineers in the Great Plains and in other rangelands around the world.

The trick is to manage them accordingly.

Historically, the prairies of the western Great Plains east of the Rocky Mountains had a diverse mix of vegetation both in plant species and plant heights, ranging from barely an inch to 2½ feet. For this rain-deprived area, that's about as diverse as you're going to get.

Buffalo, prairie dogs, and wildfires helped maintain this mosaic. But humans changed it by converting rangelands to croplands in the early 20th century and, more recently, by converting rangelands to residential ranchettes.

Rangeland management practices implemented over the past 50 years—such as evenly distributing livestock and water sources and using moderate stocking rates—mainly focused on livestock production. These practices, while very successful in terms of sustainable livestock production, have led to more homogeneous landscapes. This is opposite of the historical heterogeneity that resulted from the disturbances caused by grazing, fire, and prairie dogs.

The result has been declines in the numbers of wildlife species, from grassland birds to black-tailed ferrets, the only ferret native to North America. The "management to the middle" practices leave few areas on the landscape that are either intensively disturbed—having very short vegetation and a lot of bare soil—or relatively undisturbed, from a rest in grazing. Unfortunately, the vast majority of "species of concern" in these rangeland ecosystems are those with habitats that are associated with either highly disturbed or minimally disturbed areas. This issue creates conflicts between ranchers and environmentalists.

As a result, there is an emerging need to manage these rangelands for a variety of ecosystem goods and services—including carbon storage, aesthetic beauty, biodiversity, recreation, wildlife habitat, and water—through an understanding of the tradeoffs involved.

Realistically, livestock are the primary practical tools for altering vegetation on rangelands because of environmental concerns about herbicides and the high costs of treating vast acreages of rangeland. This management style, called "conservation grazing," balances the tradeoffs between livestock production and other ecosystem services. Conservation grazing allows this by recreating and maintaining the historical mosaic of vegetation through various techniques, including varying levels of grazing.

Conservation grazing is a recent development and has resulted in a marked shift in the once negative views of cattle grazing held by many environmentalists and conservationists.

As described in the article on page 4 of this issue, one way that conservation grazing can be accomplished is with controlled late-fall burns. Burning patches of pastures creates habitats that have large areas of bare ground and vegetation less than 2 inches high. These conditions are favorable for prairie dogs and mountain plovers, and the burned areas provide green, nutritious forage for livestock and antelope and other wildlife the following spring. The ARS Rangeland Resources Research Unit (RRRU) did its fourth controlled burn in early October 2010 at one of its long-term field sites in Colorado. The fire and conservation grazing research is a joint effort of the RRRU and other Agricultural Research Service labs in Miles City, Montana, and Woodward, Oklahoma.

Other conservation grazing techniques include varying the seasons and the areas in which cattle graze, adding sheep and goats to the livestock mix, and varying livestock numbers and animal densities. Cattle can be encouraged to graze certain parts of a pasture by placement of water troughs, supplemental feed locations, and herding. Livestock will tend to congregate in areas around water and supplemental feed, and the trampling of their hooves creates patches of bare ground. The management practice of leaving a pasture ungrazed for a season to create a temporary "grass bank" fits in well with conservation grazing and also provides management flexibility to deal with drought.

The growing number of ranching coalitions offers more opportunities for regional planning. The RRRU works with one of the oldest groups, the Crow Valley Livestock Cooperative, which has worked with the U.S. Department of Agriculture since 1937. The list of authors of a conservation grazing paper published in 2010 illustrates the RRRU's breadth of cooperation: Besides two ARS researchers from the lab, there are representatives from the Environmental Defense Fund and the Rocky Mountain Bird Observatory and a prairie ecologist with the Wyoming Game and Fish Department.

We rangeland scientists cannot work by ourselves anymore. We share the natural resources arena with a diverse group of interests. But we all have the same goal: providing a sustainable flow of ecosystem goods and services from rangelands that meet the needs of society. It is also time to fully acknowledge the role of livestock as engineers of entire ecosystems, with positive implications for a wide variety of wildlife, from insects to grassland birds, hawks, owls, prairie dogs, ferrets, foxes, and coyotes.

Then we can manage that role to blend production and conservation goals.

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