

III. Managing,
Natural
Resource
Systems



A Billion Acres

of Rangeland:

Our Nation's

Multiple-Use

Lands

By Thadis W. Box

76

Almost a billion acres of our country is made up of rangelands—a particular land type that is not easily defined. Almost everyone can recognize cropland. Forests have stands of trees that are managed for timber products. Rangelands, though, are those areas that are too dry, too wet, too cold, or too high for intensive agriculture or forestry. They are those lands that are grazed by animals and that produce most of our domestic livestock, while supporting deer, elk, turkey, grouse, and other wildlife.

To many people rangeland conjures up visions of vast, open, unfenced prairies, cowboys, and shepherders. It is true that these are characteristics of rangelands, but ranges may also be fenced into pastures, closely managed, rotated, and husbanded for maximum production of livestock.

Most of our rangelands are in the western United States. States such as Wyoming and Nevada are more than three-fourths rangeland. In States west of the Great Plains, most have one-third to one-half of their land in range. Although the bulk of the rangeland is in the American West and Alaska, significant range areas occur within forested areas of the southeastern United States.

While rangelands of the United States produce most of the feeder livestock, it would be a mistake to evaluate them on this basis only. Rangelands provide habitat for wildlife, serve as a

*Thadis W. Box is
Dean, College of Nat-
ural Resources, Utah
State University,
Logan.*



Erwin W. Cole

recreational resource, produce water, enhance amenity values, and affect our lives in ways not easily evaluated from an economic standpoint.

Never before in our history have more demands been made on the ranges of this country. Not only must they support livestock, wildlife, and other animal production, but the pressure of recreational use as well. Their scant water resources must serve agriculture and industry alike. These resource values, all a part of rangelands and range products, are often in conflict, one with the other. For each product there is a separate group of backers with its own political power, pulling the land manager in several directions at once.

Climatic Extremes

Rangeland environment tends to extremes of harsh climate; it is often too cool, too wet, or too dry. The arid and semiarid rangelands, the largest portion, are

The Great Plains—the largest expanse of natural grasslands left in the United States—is used

primarily for cattle production. These short grass plains are noted for high range quality.

characterized by low rainfall that is sporadically distributed both geographically and seasonally. Temperatures can be hot enough to cook an egg in summer, cold enough to freeze the ears off an unprotected saddle horse in winter.

These extreme conditions produce unique plant communities. In addition to the soils in which they grow, most plant types are the result of two environmental gradients: Temperature changes from cold in the North to hot in the South, and the moisture level changes from wet in the East to dry in the West.

The two most important range areas are the grasslands and savannas of the Great Plains and

Texas, and the mountains and deserts of the West. Other significant types are the annual grasslands of California, the south-eastern forest, and marshes of the Gulf Coast.

America's vast midsection was once virgin grasslands. Grass covered the area from the Canadian border extending south well into Texas, and from Iowa and Illinois west to the Rocky Mountains. Throughout the Midwest, what was America's original tall-grass prairie is now mostly productive cropland. Isolated segments of the tall grass remain in the Osage Hills of Oklahoma, the Flint Hills in Kansas, and the sand hills in Nebraska.

Pioneers Overoptimistic

There has been much written . . . within the last ten years about the deterioration of the ranges. Cattlemen say that the grasses are not what they used to be; that the valuable perennial species are disappearing, and that their place is being taken by less nutritious annuals. This is true in a very marked degree in many sections of the grazing country.

This quotation could be from a bulletin recently published by any of our conservation groups. However, it was written by Jared G. Smith in the 1895 *Yearbook of Agriculture*. Yet, today, many of the same words are echoed.

There is no doubt that large areas are still producing far less than their potential. However, our ranges are in the best condi-

tion they have been in this century and I believe they are improving.

The pioneers who settled this country were overoptimistic about its carrying capacity. With the best of intentions they stocked the range, developed the wilderness, and set in action a process that led to deterioration of rangelands. In most instances, ranges were badly overgrazed within two decades after the first livestock were introduced.

The report of Smith, a U.S. Department of Agriculture grasses specialist, in 1895 was typical of many written at the time. Livestock men came into an area where grass was plentiful and free. Profits were great. Large corporations established livestock enterprises, and in a few short years livestock ranges were overgrazed.

Range 'Almost Destroyed'

A correspondent for Utah's *Deseret News* wrote from Grantsville, Utah, on Sept. 25, 1879, just a little over two decades after livestock were introduced into the area:

The crops of all kinds, including fruits, are very light in Grantsville this year. Scarcely enough were raised for home consumption which is due largely to the scarcity of water and the high winds we have had in the past summer to dry out the ground. The wells are nearly all dried up and have to be dug deeper. At present the prospect for next year is a gloomy one for the farmers, and in fact all, for

when the farmer is affected, all feel the effects.

The stock raisers here are all preparing to drive their stock to where there is something to eat. This country which was one of the best ranges for stock in the territory, is now among the poorest; the myriads of sheep that have been herded here in the past few years have almost entirely destroyed our range.

First attempts to control grazing and improve ranges began with the work of Smith, H. L. Bentley, and others, in Texas in the 1890's. Shortly after there were experiments in the Ephraim area of Utah, and other areas throughout the West.

The Forest Service was established in 1905, and from 1905 to 1910 began the slow process of limiting numbers and control of grazing on National Forests.

Just as grazing regulations were being implemented, World War I brought a demand for increased livestock production. Numbers were allowed to rise. After the war ended, scientific range management practices and controlled grazing were once again implemented and the National Forest ranges began to improve.

However, on that portion of Federal land not included in the National Forests, the story was different. Landless livestock operators used this land to pasture the animals which could no longer be grazed on the National

Forests. These lands, less productive to begin with, continued to deteriorate.

Taylor Grazing Act

The first authority to control grazing on the public domain came with passage of the Taylor Grazing Act in 1934. However, implementation of this act has been a slow process that is still continuing.

The number of animals using the public range has declined. Today the total number of animal unit months allowed is only about a third of that which occurred in 1935. Sheep have decreased significantly. However, the number of cattle has actually increased, partly because of a shift from sheep to cattle ranching.

In general, the range has improved. The amount of good and excellent range has not altered much since 1935. The great improvement has been made in poor and fair range condition. For instance, in 1935 over 58 percent of the ranges were in poor condition. By 1972, this amount had decreased to 32 percent, and today has decreased even more.

This movement from poor to fair represents a significant step in western range improvement. One would not expect those ranges that had deteriorated for half a century to move from poor to good to excellent condition within one decade. The shift from poor to fair is a reasonable and progressive step in range improvement.

The Great Plains

The largest expanse of natural grasslands left in the United States is that area generally known as the Great Plains. Sometimes called short-grass plains or mixed prairie, they begin at about the 100th Meridian and extend westward to the Rocky Mountains.

Precipitation is usually between 22 and 26 inches per year, with about two-thirds of it falling as rain between April and September. This produces the moisture supply for short- and mid-grasses during the growing season.

The dominant grasses are of low stature, often sodforming, with warm-season grasses predominating in the southern part of the region and cold-season grasses in the north.

Blue grama is the most common grass. It occurs from Canada to Texas. In the central and southern portion, buffalograss is found mixed with blue grama. In the more northern parts of the area, western wheatgrass, needle-and-thread, and other cool-season grasses replace buffalograss. Blue grama often produces 50 to 95 percent of the forage on a given range and is the key species upon which range management is usually based.

The short-grass plains are noted for high range quality. The grasses cure well and maintain their nutritional value during the dormant period. Animals gain in

the summer, and hold their condition well in the winter if snow cover permits grazing.

The Great Plains region is used primarily for cattle production. Livestock are grazed yearlong in the southern area. In the central area they may be grazed 8 to 10 months or, with supplemental feed, yearlong. In the more northern areas they may be able to graze only 6 or 8 months, and must be supplemented the remainder of the time.

Most of the rangelands of the Great Plains are privately owned. They are generally in fair to good condition. Although they have been grazed for over a century, their productivity has been maintained reasonably well.

These short-grass plains are marginal for crop production. During favorable moisture years of high grain demand there is a tendency to plow up grasslands and grow grain crops on them. When grain prices decline, they are converted back into grasslands for forage crops.

This shifting land use pattern causes many problems with range improvement and soil stabilization. Imprudent cultivation of these soils was the primary cause of the "dirty thirties"—wind erosion associated with America's Dust Bowl in the 1930's.

Desert Grasslands

Some grasslands occur in the arid regions. These are mostly in Texas, New Mexico, and Arizona, and extend deep into north Mex-

ico at elevations less than 4,300 feet. They are usually rough in topography with numerous hills and broad valleys.

Most of the area receives between 10 and 20 inches of precipitation, and evaporation is high. Fifty to seventy percent of the rain falls in late summer. Due to high evaporation, vegetation must use moisture rapidly or it is lost. Annual evaporation is high. This, coupled with extremely high temperatures, makes the area one of the hottest, driest grasslands of the world.

There is no single dominant key species throughout the area. In the low spots with heavy soil and groundwater, tobosa grass dominates. On the foothills and in shallower or sandier soils, black grama may be the key species. Other desert grass species of local importance are mesquite grass, threeawn, hairy grama, buffalograss, and various dropseeds.

A number of shrubs are associated with desert grasslands. The most common are mesquite, creosote bush, and several acacias and oaks. Cacti, mainly prickly pear and cholla, occur throughout.

Desert grasslands are used primarily for cattle production. Cow-calf operations tend to predominate, although some cow-calf yearling and steer operations are well established. Sheep do well in these areas, but few ranchers concentrate on sheep production.

Some ranges support large populations of wildlife. Pronghorn antelope, javelina, and mule deer are the major large animals. Jackrabbits and other small herbivores are found locally. Scaled quail, and in some areas California quail, are found. A large variety of nongame birds is usually present.

Southwest Shrub-Steppe

The U.S. Department of Agriculture has described about 40 million acres of western rangelands as southwestern shrub-steppe. These are located primarily in Arizona, New Mexico, and Texas and may be simply an extension or close associate of the desert grassland types.

Vegetation ranges from short grass to scattered shrubs to shrub. These types typically represent a transition from the woody communities, such as desert shrub and pinyon-juniper, to the desert grassland area. Main shrubs in this type are creosote bush and mesquite. Major grasses include black grama, threeawns, tobosa grass, curly mesquite grass, and sideoats grama.

These areas contain the same grass species as the desert grasslands and are normally managed with the desert grasslands or the hot desert shrubland. This shrub stand is often singled out for range improvement projects, the major one being removal of woody vegetation.

Hot Desert Lands

Hot desert shrublands contain a mixture of creosote bush, mesquite, blackbrush and Palo Verde. They extend from Texas, New Mexico, and Arizona south into central Mexico. These deserts have the most arid climate in North America, and their vegetation illustrates many adaptations to resist drought. Most plants have evolved for survival rather than production.

Precipitation is extremely low, averaging only between 3 and 14 inches annually. There are individual years that receive less than 1 inch of rain in the true desert areas. Evaporation is high with rates of 120 to 160 inches per year common. The frost-free

period is normally long. Scarcity of rainfall limits production.

The natural vegetation is shrubs interspersed with succulents and low-growing forbs and grasses. One of the most widespread shrubs is creosote bush. This vegetation type often forms almost pure stands, with few other perennial species growing within it. Associated with the creosote bush are annual grasses, such as threeawns and grammas. Some other shrubs are found, as are cacti and other succulents.

Mesquite woodlands occur on heavier soils along drainage ways throughout the desert region. Here trees and shrubs grow as a scattered savanna or strips

About 40 million acres of western rangelands—mainly in Arizona, New Mexico, and Texas—are described as southwestern shrub-steppe. The vegetation ranges from short grass to scattered shrubs.



Albert Thibaut

of dense woodland. Grasses associated with mesquite areas are the same as those found in desert grasslands.

On sandy soils almost pure stands of blackbrush occur. Perennial grasses found in this type are dropseeds and other hot season grasses.

Most hot deserts are used for yearlong livestock range, but forage production depends upon rainfall. Some lands are used only seasonally. The seasons of the desert are not those of fall and spring. Instead, wet- or dry-season grazing defines the seasonal use. Livestock water is usually scarce, development of water facilities expensive and difficult.

Most of the desert shrub ranges are publicly owned. Parts of the hot desert are in private ownership, generally managed with the more productive desert grasslands or shrub-steppe types. Most of the public land is Federal, managed by the Bureau of Land Management.

Mountain, Cool Desert

Mountain and cool desert ranges occur in a large geographic region west of the Continental Divide and east of the Sierra Nevada and Cascade Mountains. They are bounded on the north by the Canadian border and on the south by the hot deserts which occur along the Utah-Arizona border.

This area contains almost all of the States of Utah, Nevada, and Idaho; roughly the western third of Montana, Wyoming, and Colorado; and the eastern third of Washington and Oregon.

It includes all of the arid and semiarid shrublands of the Great Basin (between the Rockies and the Sierras), wooded and grassed foothills of the Rockies, and mountain vegetation of the Rockies west slope.

The east slope of the Sierra Nevadas and the Cascades and the entire vegetation of the scattered mountains of the Intermountain and Great Basin area form part of these ranges.

Almost all the land in this broad geographical area is rangeland, most of it in public ownership.

The entire intermountain area is characterized by low and er-



atic precipitation. The Sierra Nevadas and the Cascades on the west and the Rocky Mountains on the east form barriers to moisture movement and cause rain shadows (areas of insufficient rain on the leeward side of mountains) within the area.

Most of the precipitation comes as snow and may vary from as low as 4 inches in some of the salt deserts to as high as 40 to 48 inches at the top of the mountains. Summer rains are not dependable, and rangeland productivity occurs as a result of moisture available for a short period of time in spring. Soils are extremely variable.

Used as Winter Range

Generally, the broad valleys in the lower portion of the Central Basin are covered by low shrubs. Some are almost pure stands of shadscale. Others contain Nuttall's saltbush, winter fat, greasewood, or big sagebrush. In some areas these shrubs occur in mixed stands with half a dozen or so other desert shrubs intermixed.

Grasses and herbaceous vegetation are usually scarce. Most of the forage comes from the shrubs themselves. Much of the area is used as winter range for sheep and cattle.

The lower elevations of mountains and foothills are usually covered by big sagebrush and grass or a combination of low, shrubby, woody species. These areas receive slightly higher rainfall than the lowlands. Soils

are less salty and somewhat deeper.

The foothills provide major spring and fall ranges for livestock operations. They also provide the major amount of winter forage for mule deer and elk. Spring-fall ranges are in short supply for livestock, and winter range for wildlife is usually on the same piece of land. Much of the foothill land is privately owned. Many of the ranges have been improved or have potential to be improved for livestock grazing.

Most of the grasses that have been planted are exotics, such as crested wheatgrass and Russian wildrye. These species are easier to establish and maintain themselves better over a long period than do the closely related native bunch grasses.

Water and Recreation

Mountains of the area support a number of different plant communities, varying from low shrubs in the foothills to alpine parks and forests in the higher mountains. There is some variation, but in general the plant communities at the lowest elevations are low shrubs, and at successively higher elevation change to pinyon-juniper, Ponderosa pine, aspen and lodgepole pine, spruce-fir, subalpine forest, and finally, alpine.

Lower elevations of the sagebrush, pinyon-juniper and Ponderosa pine areas may be used for spring or fall range. Higher elevation ranges are almost exclusively summer range.

It is also in these high areas that most of the water in the West is produced, and these scenic areas offer some of the Nation's prime recreational land. They are used for hunting, fishing, camping, hiking and backpacking in summer, and for skiing, snowmobiling, and other sports in winter.

In summary, ranges of the mountain and intermountain States are primarily multiple-use lands. They are mostly publicly owned and are managed for recreation, wildlife, water, timber, and livestock production.

The foothills and some of the interior basin of California are covered by annual grasslands. Here the Mediterranean climate provides for moist, cool winters and hot, dry summers. Annual plants such as brome grass predominate. They are mixed with a number of annual clovers and forbs.

The California annual rangelands are almost all privately owned and used in farming or forestry enterprises, as well as for individual ranches. The winter period of rapid vegetative growth and the long summer dry period set up conditions of abundant winter nutrition and short forage supply in summer.

Recent Improvements

Much has been done in recent years to ensure range improvement. The Society for Range Management was established in 1948, and professional people have worked since then to improve range productivity.

There is evidence the ranges are improving. Most of the public range which improved between 1935 and 1966 is on National Forest lands. It had been under control longer and had a higher potential than the deserts. The continued improvement between 1966 and the mid-1970's represents a positive response to management on National Forest ranges and on the remainder of the public lands.

Private landowners began applying scientific range management as it developed in the mid-1930's. Today the private rangelands are in better condition than they have been in this century.

The fact that ranges are improving does not mean they are all reaching their potential. Several authorities have estimated productivity could easily be doubled.

Improvement of American rangelands has been slow, partly because of dry climate and inherent ecological conditions, but also because we as a Nation have not understood them and, as a consequence, largely continue to ignore them.

Our first mistake was to overestimate their productive ability, underestimate their fragile nature, and attempt the sort of development appropriate to a more humid area. We could make a mistake now by assuming that, because they have improved, they no longer need attention. They are an important national resource and deserve the attention of the American citizen.