The Nebraska Sand Hills¹

Ann Bleed and Charles Flowerday

THE SAND HILLS REGION, approximately 19,300 squares miles of sand dunes stretching 265 miles across Nebraska and into South Dakota, is the largest sanddune area in the Western Hemisphere and one of the largest grass-stabilized dune regions in the world.

Obviously, topography, among other things, distinguishes the region from the surrounding prairies. Dunes are as high as 400 feet, as long as 20 miles, and have slopes as steep as 25 percent. Another distinguishing feature is that the large sand masses now held in place by grasses were formed by blowing sand during a surprisingly recent time, mostly during the last 8,000 years or less.

Although the Sand Hills were used in a variety of ways by prehistoric Native Americans, early explorers spoke of the region as a "great desert of drifting sand," and many a homesteader cursed their existence. To some, the country was aloof, austere, forbidding—the wind sucking their courage as it sucked the green from the grass by mid-June. Some saw it as a great sea caught and held forever in a spell, and were afraid (Sandoz 1962).

N MORE THAN JUST THE EMOTIONS it calls forth, the region is a land of contrasts, unlike the broad plains that surround it, a land marked by a mixture of opposites. At the same time wet and dry, it is simple and homogeneous, yet complex and varied. A writer and rancher's wife, Marianne Beel, a native of Cherry County, wrote that the landscape changes "from more stable hills covered with big bluestem near Broken Bow to the less stable dunes of the interior, where [the] major plants are sand bluestem, prairie sandreed, and switchgrass, and where blowouts are more prevalent. I've always found it interesting that, for the most part, the Sand Hills end abruptly along the south boundary of the Niobrara River" (Beel, personal correspondence). At various places near the border, however, the dunes intergrade with sand sheets, where only small patches of dunes can be found.

Although it can immobilize large dunes and support the numerous cattle ranches that are the economic base of the region, the grass cover is extremely fragile and susceptible to wind erosion. One of the many unique plants of the Sand Hills is the blowout or Hayden's penstemon, which is classified as an endangered species. It lives only in the sandy, wind-eroded blowouts of the region and therefore is considered endemic to the Sand Hills.

HE CLIMATE OF THE SAND HILLS RANGES from subhumid in the east to semiarid in the west. This statement, however, hardly begins to describe the variable nature of Sand Hills weather. The midcontinental position of the region ensures that the summers are hot and often dry while the winters are cold. Nevertheless, two things appear to be consistent: the ever-blowing wind and the late winter or early spring snow storms, including blizzards that often hit during calving season, a natural hazard of great economic significance.

The midcontinental position of the Sand Hills is also in part responsible for the unique mix of plant and animal species that inhabit the region. The mixture of species is distinctive because it contains in one area representatives from regions far to the east, west, south, and north. Species more typical of eastern woodland forests co-exist alongside species from the more arid west. Species typical of colder climates far to the north and species from the warmer southern climates can all be found. Grasses from the tallgrass prairie to the east integrate with grasses of the shortgrass prairie to the west. Thus, the area appears to be an ecological meeting ground, where species from different vegetative and faunal regions coexist, creating distinctive biological communities.

Range management practices in the Sand Hills also have taken on a characteristic uniqueness. Traditional practices, which work well in other prairie areas, have given way to new management schemes that appear to be better adapted to the Sand hills ecosystem and are said by some to have doubled their grazing capacity (Beel, personal communication).

The combination of the highly permeable sand dunes sitting on top of thick deposits of sand and gravel gives the Sand Hills another unique characteristic, the oftrepeated pattern of a dry, dune-top prairie ecosystem situated immediately adjacent to a wetland, lake, or constantly flowing stream. Though the climate is dry, the high permeability of the sandy soils and of the sands and gravels of the underlying deposits has allowed for the percolation and accumulation of a vast quantity of groundwater. The top of this groundwater reservoir may be hundreds of feet below a dune top but often occurs above the floor of the interdunal valleys. This is how plants and animals typical of semiarid habitats exist alongside marsh and lake inhabitants.

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THE LARGE GROUNDWATER RESERVOIR UNDER THE SAND HILLS also helps create the rich diversity of life found in the area. The presence of so much groundwater so close to the surface produces a large number of aquatic habitats: the lakes, marshes, subirrigated meadows, and constantly flowing streams. In particular, the cold streams fed almost entirely by groundwater provide a home for numerous species of fish not typically thought to be in Nebraska. The biological study of these habitats is just beginning.

The combination of its natural features has given the Sand Hills region its uniqueness. This uniqueness was recognized by the U.S. Department of Interior National Park Service in their recent designation of a 32,900-acre site in central Grant County as a National Natural Landmark. More than 500 of these areas have been chosen to encourage preservation of important examples of the nation's natural history. One of the last frontiers of the contiguous 48 states, the Sand Hills were once perceived as inhospitable, and the area often was, and to some extent still is, avoided. Thus, the current residents are a hardy breed, many descended from pioneers, spread sparsely over a vast landscape. And though it is difficult, maybe impossible, to describe all of them or even a typical Sand Hills ranch, certain themes begin to dominate. Pride in heritage is an obvious but complex part of the region's values. Many ranches are now third- or fourthgeneration operations, 100 or more years old. The average ranch is about 4,000-6,000 acres. Many, if not most, are the result of a consolidation of holdings that was necessary and inevitable given the rangeland needed for a profitable operation-10-15 acres per animal unit per year in the eastern part of the region to about 30 acres per unit in the western part (an animal unit is a cow and a calf under 3 months of age; after 3 months the calf is considered a half unit.) In fact, the successful early ranchers generally ignored the legal limitations on acreage, devising ingenious schemes to link up holdings, and many of those who did not went bust.

ONE RANCH OWNER REMARKED that the biggest change in his lifetime was wrought by the advent of electricity. No electricity meant no running water, among other things. A single well with a cistern delivered water to one sink. Everything, from the coal brought in to the hay put up and fed, was freighted with horses, although one foreman owned a Model A. This same ranch still raises all its own Arabians. Horses are the best way to work cattle, he believes, because vehicles, even the all-terrain variety, are too hard on the land. Quarter horses are the more common horses used on most ranches. Another nearby rancher still puts up hay with draft horses, although his mowers are tractor-drawn. Horses always start, he explained, even on the coldest mornings miles from any electricity.

None of this should imply that Sand Hills residents routinely live a 19th Century lifestyle, far from it, but to make it evident that a keynote of the region is another contrast, that between past and present. Ranchers feed with pickups and, in a few cases, even helicopters. Horses are moved in trailers. Small airplanes are used to check wells. And the satellite dish and personal computer are often an important means of keeping in touch with the rest of the world. Even if a computer is not used for electronic marketing, it is often used to keep accurate breeding and production records and, with the aid of spread sheets, to minimize the guess work in calculating the costs of inputs.

Even with the creature comforts common elsewhere, one feature of life in the Sand Hills is that it produces an independence of spirit and strength of character all its own. Not that town or city dwellers do not possess these attributes, but the Sand Hills seems to call a person to himself or herself in a way that a place with more distractions does not. This strength has evolved in large part because of distance and isolation: if Sand Hillers do not do for themselves and for one another, who will? A nonbureaucratic, relatively non-hierarchical way of life has emerged. People are often known on a first-name basis for 50 to 100 miles around.

AND THE BEAUTY OF THE REGION, often unnoticed at first, becomes apparent, if subtle, when one looks closely with a steady eye. Wildflowers bloom through the growing season. Hawks and eagles ofttimes appear overhead; bobwhites, grouse, prairie chickens, and pheasants can be seen from the road, as well as deer or an occasional coyote. And, of course, the lakes and wetlands are frequented by waterbirds and shorebirds of all sorts and are often dotted with the domes of muskrat houses. Most of the bodies of water are manifestations of a groundwater reservoir that contributes to a sense of well-being in what would otherwise be an environment much more hostile to life of all kinds.

A rolling sea of grass that might seem desolate and isolated to some often evokes a serenity not experienced elsewhere for natives and those who have come to love the place.

Even so, the space and distance are not always friendly, particularly not when young people are at school many miles away and a blizzard blows in. Relatively long distances to schools and medical treatment impose certain nearly chronic hardships.

Schools are *the* hardship, one former ranch wife remarked. Another shed light on this statement by explaining that, as with many Sand Hills families, when her children went to high school, during the week she and they stayed in town while her husband remained on the ranch. However enjoyable the weekend reunions were, they weren't enough. And worst of all, when she was in town, she worried about her husband, especially if he should have an accident. And if she stayed at the ranch during the week, she felt that she should be in town with her children.

Regardless of hardships or inconveniences, ranching is the lifeblood of the region's economy, the essence of its

mystique, and probably the best use of its land. At least most of its residents believe so. And while some are reluctant to try much that seems too new too fast, changes have come aplenty in the last few decades, and more can probably be promised, particularly in the way of more sophisticated, more management-intensive techniques.

I HE SLOW BUT INEXORABLE ACCEPTANCE of cross-breeding of cattle has been one of the more profound and profitable changes since about the 1950s. Essentially, the rationale behind cross-breeding involves recognizing that no single breed is superior in every significant productive trait, so breeds should be selected for superior characteristics that complement each other. In addition, producers need to recognize animals within breeds that are much higher or lower than the averages. Standardized recordkeeping of beef performance in the late 1950s and early 1960s became a focus of scientists, extension workers, and "pioneer" producers willing to try breeding schemes that were initially received with much skepticism.

Through the 1970s and 1980s, consumer demand for leaner beef has promoted a continued interest in beefcattle genetics, while revising the goal for the final product to exclude an excessive amount of external fat and marbling.

Another practice gaining greater acceptance is synchronization of the estrous cycle. More common with artificial insemination, it has the effect of shortening the breeding interval. By shortening the breeding interval and, consequently, the calving period, fewer days are committed to labor-intensive calving.

In addition, intensive rotational grazing techniques, sometimes known as short-duration grazing, have begun to transform the more traditional grazing practices. As Professor James Stubbendieck of the University of Nebraska explains, concentrating large numbers of animals on the same or smaller area reduces the impact of the tendency to graze selectively, effecting a more uniform, more intensive grazing pattern. This kind of grazing, followed by extended deferment periods, tends to equalize grazing stress and allows for good plant recovery if growing conditions are suitable. Although daily gain per head may go down with this type of system, producers can stock more animals if they plan to retain ownership of cattle, and some compensatory gain can be recovered. With such a system, increased beef production per acre is possible while promoting better range condition. In fact, an abiding and still quickening interest among the region's ranchers in improving range condition has produced some of the best managed range in the world, with benefits that extend beyond the producer's pocketbook.

Also contributing to the success of ranching is the high production of hay from an abundance of subirrigated meadows, which results from the shallow water table in the valleys and interdunes. These meadows produce hay even when precipitation is sparse. OHELP ENSURE THAT THE SAND HILLS RANCH-ING industry can continue to benefit from improved methods of beef cattle, range and forage management, in 1981 the University of Nebraska started development of a ranch devoted to research on range livestock production. The NU Gudmundsen Sandhills Laboratory near Whitman, formerly the Rafter "C" Ranch, was owned by Pete and Abbie Gudmundsen, who donated the 12,817-acre facility to the University of Nebraska Foundation, which leases it to the Institute of Natural Resources for research, extension, and teaching activities.

AN INEVITABLE ASSOCIATION with Sand Hills culture is the rodeo. The Burwell Rodeo, begun in 1921 in what is now a national registered historic site adjacent to the Garfield County Fairgrounds, is Nebraska's largest and a major stop on the Professional Rodeo Cowboys Association circuit. But another rodeo, probably lesser known to outsiders, is the annual Old Cowboys and Cowgirls Rodeo in Hyannis. Begun in 1974, it is only for competitors 40 years old and over and has featured contestants in their 70s. For many, the rodeo is a significant social event, a time to see friends and cut loose a little.

Roundups and brandings are also important social occasions, as well as a time to pitch in and help your neighbors. Cowboys from most of the ranches in an area often help one another with branding, while their wives usually bring a country spread that can cover three or four tables.

The annual buffalo and longhorn roundup at the Fort Niobrara National Wildlife Refuge is another fascinating piece of Americana, uniting elements of the old and new West. The roundup corrals surplus animals that are sold at auction in the fall, keeping the herds in balance with their food supply. Thus, the refuge personnel, in their own way, repeat a pattern of land use that has marked the Sand Hills from the bison hunting of the prehistoric Native Americans to the present producers, transforming grass of little direct value to humans into usable protein.

Today, in addition to its agricultural uses, the region is an attractive area for hunters, anglers, and nature enthusiasts of all kinds. Some ranchers are even beginning to supplement their incomes by offering accommodations, trail rides, hunting and fishing, and even the chance to "work" a few cattle to tourists from an increasingly urban population. These too are benefits offered by the unique combination of natural resources found in the area.

References

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Visit the Sandhills on the Summer Tour—see the Trailboss for information.

Note: The book from which this article was condensed "An Atlas of the Sandhills" is available from: University of Nebraska, Conservation and Survey Division, Room 113, Nebraska Hall, Lincoln, NE 68588-0517; Phone: 402 472-3471