



# CHANGING TIMES ON THE GREAT PLAINS

## THE RISE OF AGRICULTURE AND THE DECLINE OF THE BARKING SQUIRREL

**RJ LUCE**

*Black-tailed Prairie Dog. Photo by Bob Gress*

Captain Meriwether Lewis and Lt. William Clark probably had little idea of what would happen in the wake of their 1804-06 expedition, but dealing with what followed was mostly left to our ancestors, yours, and mine. Mine came from Ireland and Germany to farm in Nebraska, and like many of their contemporaries across the plains, probably saw native wildlife species as competitors.

The history of the black-tailed prairie dog (*Cynomys ludovicianus*) since 1804 mirrors the alteration of the Great Plains from the vast prairies that Lewis and Clark found to today's agricultural and urban-dominated landscape. Ironically, the Corps of Discovery described many species new to science, but at the same time brought about the demise of both the prairies themselves and the wildlife diversity that occurred pre-settlement.

On July 4, 1804, as Lewis and Clark prepared to leave on their journey, officials released word that the Louisiana Territory in its entirety had been sold to the United States of America. This knowledge made the thrill of the imagined discoveries to come even more poignant. Thomas Jefferson wrote that approval of the

Louisiana Purchase: “increased infinitely the interest we felt in the expedition.”

Captain Lewis and Lt. Clark were soldiers, not naturalists or scientists. However, Lewis, because of extensive pre-expedition training by Jefferson, and other scientists and naturalists, was prepared to describe the new wildlife species he encountered. The Corps of Discovery found species that not even renowned naturalists John James Audubon or Alexander Wilson had ever seen. To their credit, Lewis and Clark were impartial observers when it came to describing native wildlife species. Their descriptions did not include an opinion about whether the prairie dog, wolf, grizzly bear, or coyote were good or bad.

When Clark first described the Great Plains in eastern Nebraska, he had yet to see a prairie dog and had no concept of the extent of their range, but he perfectly described the type of habitat then occupied by prairie dogs inland from the river—tallgrass prairie.

*“Capt. Lewis and mySelf walked in the Prairie on the top of the Bluff and observed the most butifull*

The black-tailed prairie dog, one of five North American prairie dog species, evolved on the Great Plains late in the “Age of the Mammals”, the Cenozoic Era. Ancestral prairie dogs appeared in the southern Rocky Mountains during the Pliocene Epoch five million years ago, and the range they occupied historically was similar to the current range (Figures 1 and 2).

Figure 1. The range of the black-tailed prairie dogs- Pleistocene Epoch to 1804<sup>2</sup>.

The ancient prairie dog, *Cynomys nio-brarius*, was described from the Pleistocene era “Sheridan Beds” in northwestern Nebraska. Forms recognizable as modern prairie dogs emerged about 2 million years ago. In 1804, “modern” black-tailed prairie dogs occupied between three and twenty percent of the area within the boundary of their 400 million-acre historical range<sup>3</sup> (Figure 2).

Figure 2. The historical range of the black-tailed prairie dog of the Great Plains<sup>4</sup> at the time of the Lewis and Clark Expedition.

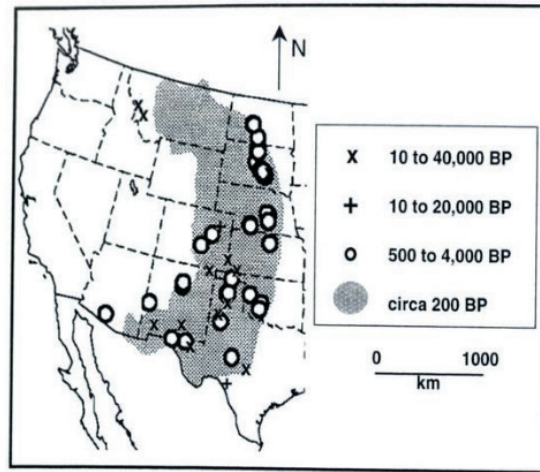


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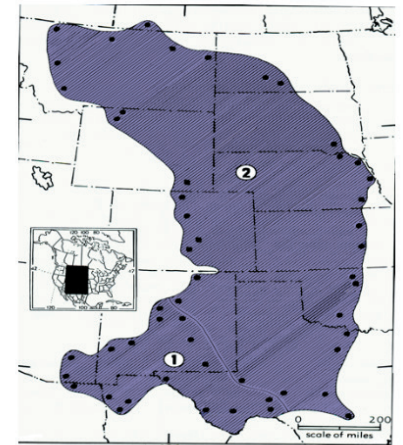


Figure 2. The historical range of the black-tailed prairie dog of the Great Plains<sup>4</sup> at the time of the Lewis and Clark Expedition.

*prospects imaginable, the Prairie is Covered with grass about 10 or 12 Inch high.”*

Near the mouth of the Platte River, Private Joseph Field shot a badger, a species new to Euro-America naturalists and a close associate of prairie dogs. Badgers are often found in prairie dog colonies, but tallgrass prairie near the river, without bison grazing, would have been too tall to accommodate prairie dogs when the Corps passed by in 1804. Their discovery of a colony close to the river was to be three months and roughly 200 miles upriver from the Platte.

Another animal that often frequents prairie dog colonies is the coyote, or what Clark described on August 12, 1804, as a “Prairie Wolf.” The wily coyote Lewis saw escaped collection, and his kind, being fast learners have managed to thwart human attempts at eradication for over 200 years.

An animal less adaptable to the human invasion was the bison. Experts estimate that bison may have numbered from 30 to 60 million before settlement (Figure 3). On August 23, near the 98th Meridian, Private Field excitedly returned from a hunt reporting that he had killed a “buffalo,” the first one collected by the Corps of Discovery. Stephen Ambrose<sup>5</sup> called the bison: “the quintessential animal of the North American continent, the symbol of the Great Plains, more than any other animal save the beaver that drew men to the West.”

The bison made it possible for the Corps and those that followed to feed themselves as they opened the West. But, Lewis and Clark’s discovery of the herds eventually lead to their destruction, and soon after that the demise of the native prairies themselves, including millions of acres of prairie dog





*Figure 3. The historical range of the bison in North America<sup>6</sup> (The dashed line represents the approximate widest distribution (Hornaday 1889). The solid line identifies the short- and mixed-grass prairie where the large herds, and most animals, were located).*

habitat that had been maintained through heavy grazing by wandering herds of bison. The herds clipped the grasses short, then after the bison moved on and the grass regenerated, prairie dogs moved in to maintain the short grass.

Range fires or grazing by large herbivores to create a mosaic of grass less than four inches tall interspersed with patches of bare ground is still necessary today to both create and maintain habitat suitable for prairie dogs and associated wildlife species in tall and mixed grass prairie. By themselves, prairie dogs cannot trim tall grass to the desired height, or maintain it, especially during years with above-average precipitation. Prairie dogs existed in the eastern and central part of their historical range (east of the 100th Meridian which runs north-south through west-central South Dakota, Nebraska, and Kansas) primarily because of the influence of bison.

The concept of ecosystems, and the ecological term “keystone species” were unknown in 1804<sup>7</sup>. And no one, except perhaps Native Americans, recognized or gave a thought to the fact that natural systems were being radically altered as the bison, a keystone species, disappeared from the plains.

The bison was a keystone species pre-settlement, but the prairie dog was and is the “ecological engineer of the prairie,” the species that maintains grassland habitat in its most productive ecological state. Prairie dog colonies provide habitat for nine obligate wildlife species (species that completely, or at least highly depend on prairie dogs for food or habitat), 117 wildlife species that have some dependence but also occur off of prairie dog colonies, and 208 wildlife species that at least occasionally use colonies but occur with similar or greater frequency elsewhere<sup>8</sup>.

The “keystone species” concept was borrowed from the field of architecture. A central wedge-shaped stone is used in the construction of an arch. The keystone locks the arch together and allows the entire structure to stand. A keystone wildlife species provides a similar function, providing food and habitat for other species and allowing them to exist where they otherwise could not.

The endangered black-footed ferret, a weasel-like animal that lives only in prairie dog colonies and feeds almost exclusively on prairie dogs, heads the list of prairie dog obligate species. Keen observers though they were, the Corps of Discovery neglected to observe a black-footed ferret. The ferret was not named and scientifically described until 1851. Why didn’t the Corps of Discovery see a black-footed ferret? Perhaps that can be explained by a Pawnee story that called the ferret “ground dog,” and referred in mythical stories to the ferret as an animal that speaks of itself as “staying hid all the time”<sup>10</sup>.

Some of the other species that partially meet the obligate species criteria are mountain plover, burrowing owl, golden eagle, ferruginous hawk, horned lark, deer mouse, northern grasshopper mouse, and swift fox.

On September 14, Clark killed what he thought was a goat of some sort. Lewis weighed, measured, and wrote a description of the animal that we now know as the pronghorn antelope, a species often observed

grazing on regenerating shrubs and forbs within prairie dog colonies. The same day Private Shields brought into camp a “hare of the prairie,” a white-tailed jackrabbit, also new to science, and often found near prairie dog colonies.

The black-tailed prairie dog became a part of the Corps of Discovery’s story about two months into the two-year-long expedition.

September 7, 1804, Clark wrote: “*Capt. Lewis and myself walked up, to the top which forms a Cone and is about 70 feet higher than the high lands around it ... in descending this Cupola, discovered a Village of Small animals that burrow in the grown (those animals are Called by the French Pitite Chien) ... the Village of those animals Cows. about 4 acres of Ground on a Gradual descent of a hill and Contains great numbers of holes on the top of which those little animals Set erect make a Whistling noise and when allarmed Slip into their hole...!*”

The hill to which Clark referred is Old Baldy located in present-day Boyd County, Nebraska, not far from the junction of the Niobrara River with the Missouri River four miles downriver from the Nebraska-South Dakota border.

Meriwether Lewis described the first prairie dog he saw:

“*The little animal found in the plains of the Missouri which I have called the barking squirrel weighs from 3 to 3 1/2 pounds, its form is that of a squirrel.*”

Lewis hadn’t seen one before himself, but he knew that in 1742, over a half-century before the Corps of Discovery, French explorer Louis Verendrye had described the burrowing animals he called ‘petit chien’ or ‘little dog’ that he saw in his travels in North and South Dakota.

The Corps of Discovery, intent upon capturing a live prairie dog, attempted to flood a prairie dog out of its burrow on September 7, 1804.

Captain Clark wrote: “*Cought one a live by poreing a great quantity of water in its hole we attempted to dig to the beds of one of thos animals, after digging 6 feet, found by running a pole down that we were not half way to his Lodges...*” He continued: “*...we por’d into one of the holes 5 barrels of water without filling it...*”<sup>1</sup>

On September 17, Lewis was exploring what he called Corvus Creek when he encountered an incredible scene.

Lewis wrote: “*The whole plain, described as three miles by three miles, was intirely occupied by the burrows of the ‘barking squiril.’ This anamal appears here in infinite numbers. The shortness of the grass gave the plain the appearance throughout its whole extent of beautifull bowl-ingress in*

Prairie dogs prevent natural flooding of their burrows by constructing volcano-like mounds up to eighteen inches or more in height that do not allow surface runoff to enter. They clean their houses often, expelling feces and hair, and their underground homes are well insulated, maintaining a near-constant year-round temperature and humidity.

Prairie dogs exhibit complex social behaviors and have at least eleven distinct calls and a variety of postures and displays with which they communicate. They defend themselves and each other against predators through constant vigilance and communication. Their calls warn each other of danger, predators, etc. and they have such a refined communication system that they can communicate to each other the nature of the danger, such as a coyote, a human with a gun, or a car. Coterie members maintain unity through physical contact, often performing nose-touching, and engage in mutual grooming similar to behavior in apes and chimps.



*Black-tailed Prairie Dogs. Photo by Bob Gress*

*fine order. This scenery already rich pleasing and beautiful, was still farther heightened by immense herds of Buffalo deer Elk and antelopes which we saw in every direction feeding on the hills and plains<sup>10</sup>.”*

The number of new species described by the Corps of Discovery was extraordinary. But, behind Lewis and Clark came the settlers, and the lands and wildlife they described were soon radically altered.

The few anthropogenic impacts on prairie dogs prior to 1804 had been attributable to Native American uses of prairie dogs for food and ritual items and did not impact the sustainability of the habitat or the prairie dog population itself. For the first one hundred years of European settlement, impacts on all wildlife were minimal, with the primary impact being hunting and consumption as food. But the impacts became progressively more harmful to the wildlife resource as the human population grew, and the rate of land conversion from prairie to cultivated agriculture accelerated beginning with the Homestead Act in 1862. Another big event was the Oklahoma Land Rush of 1899.

Between 1880 and 1899 alone, 104 million acres of the western plains’ surface area were converted

to crop production<sup>11</sup>. At present, native grasslands have been reduced by over 60 percent, resulting in a significant loss of black-tailed prairie dog habitat. There still remains approximately 57,700,000 acres of unplowed land in the western Great Plains that has the potential for conversion to cropland<sup>12</sup>. The area currently occupied by black-tailed prairie dogs in the United States, Canada, and Mexico, originally 100,000 million acres, is now less than 2 million acres, a net decrease of over 98 million acres<sup>13</sup>.

Another major impact on prairie dogs that began about 1900 was widespread poisoning due to perceived competition for forage between livestock and prairie dogs. The first cattle came to the western part of the northern plains in 1866. Cattle numbers increased from 1.1 million in 1870 to 4.4 million in 1880 to 8 million in 1886<sup>14</sup>. Ranchers soon reasoned that prairie dogs ate grass, so there would be more grass for their cattle if the prairie dog were eliminated. Anecdotal evidence suggests that black-tailed prairie dog numbers decreased following the extermination of the bison in the mid to late 1800s, and increased after the advent of homesteading due to the creation of suitable habitat when the tall and mixed grass prairies were broken. Then, unfortunately, C. Hart Merriam, naturalist for the Hayden Geological Survey in 1872,



singled out the prairie dog as a major threat to livestock production.

The science of range management was still new, and like all science could be misinterpreted. Merriam stated an opinion, in 1902, that “the annual loss from prairie dogs is said to range from 50 to 75 % of total productive capacity of the land and to aggregate to millions of dollars.” And he speculated: “256 prairie dogs eat as much forage as one cow and calf.”<sup>9</sup> Merriam and others ignored the fact that the prairie dog had been around a long time before European settlers appeared on the scene, or that the prairie dogs themselves had shaped and maintained the native grasslands he and his counterparts now sought to protect by eliminating the prairie dog.

As a young man growing up in Buffalo County, Nebraska on the eastern edge of the Nebraska Sandhills, I appreciated without knowing why, the seventy or so acres of unbroken, native grassland on our home farm. I was often drawn to that small remnant of the past, spending hours walking, occasionally rolling, in the high grass or visiting the small prairie dog colony on one corner of the pasture. Further west, in the heart of the Sandhills, I marveled at the miles and miles of rolling hills covered with native grasses, the same landscape that had been present 200 years ago, and that remains to a large degree today.

But I was truly awed when wandering the banks of the South Loup River, a tributary of the Platte, my father discovered a reminder of the past—a bison skull recently eroded from a sandbank by high water. We wanted to keep it forever,

Prairie dogs occur in family groups called coteries that occupy a territory of about one-half acre. A coterie consists of a single adult male, one to four adult females, and several related yearlings and juveniles, both male and female. Family members aggressively defend their territory against non-family members. Coteries occur adjacent to each other but do not overlap for the most part, and both families stay on their side of an invisible line in the dirt. Occasionally an adult male will preside over two adjacent territories, but not often. A grouping of coteries is called a colony. Prairie dog colonies are geographically separated from other colonies, ideally, by not more than about six miles, so the exchange of individuals between colonies can occur. Colonies range from a few acres to thousands of acres, with the largest historically recorded colony in Texas estimated at two-hundred fifty miles long by one hundred miles wide (25,000 square miles), with approximately 400 million prairie dogs. By comparison, the largest colony left in 2004 was only about 10 square miles<sup>13</sup>.

Female prairie dogs only have one litter of four to six young per year, despite the perception among many farmers and ranchers that prairie dogs are as prolific as mice, which produce several litters per year. Black-tailed prairie dogs occur at an average density of 25-140 per acre, but can at least temporarily occur at much higher densities if confined to areas from which they cannot emigrate. Prairie dog mound and burrow systems are extensive, and mounds, with accompanying burrows, occur at a density of 100 - 700 per acre. At the higher density, the land might resemble a moonscape, and from an ecological perspective, is probably declining in productivity due to overpopulation.

Underground, a prairie dog colony is also impressive. Prairie dogs build complex burrow systems with burrows up to sixteen feet in depth and connected underground within coteries. Below ground wind, cold, and humans, are not a concern. Naturalist C. Hart Merriam<sup>9</sup> describes a burrow system excavated by Dr. W. H. Osgood in the late 1800s.

In the doctor's words: “In this case, the burrow went down nearly vertically to a depth of 14 1/2 feet below the surface, when it turned abruptly and became horizontal... The horizontal part was 13 1/2 feet in length.”



*Bison in Theodore Roosevelt National Park. Photo by Dave Rintoul*

but like the Great Plains of the past, it dried and disintegrated almost before our eyes. I longed to see a live bison, or better yet, a herd of thousands rolling across the prairie like the tall grass undulating in a good Nebraska wind. Teresa Jordan<sup>15</sup> described the sound when bison were released to the Tallgrass Prairie Preserve in the Flint Hills of Oklahoma:

“This is the sound of history and valor and triumph and squalor and sorrow, and it really does sound like thunder. But thunder would be borne by the air. We would feel it in our chests, our diaphragms. This sound comes up from the ground, through the soles of our feet.” She continues, “Each of us is alone, watching as if from a great distance something primal and real. And most of us are weeping.”

We have taken it for granted that vast prairies, bison herds, and prairie dog colonies are a thing of the past. But do they have to be? Science and technology have given us the means and the arrogance to manipulate nature and natural systems with increasingly catastrophic results for over 200 years, but perhaps there is a limit, intrinsic in our souls if not our pocketbooks. Maybe now is the time for a change in thinking, one that could make preserving and restoring native prairies and wildlife on a landscape scale into a recognized public benefit.

Conversion of native prairie to cropland is still

occurring, and will further reduce the remaining prairies, some of which are black-tailed prairie dog habitat. But as a nation, we can choose to stop or reverse that trend through government programs, new legislation, and better management of public lands, especially our national grasslands. The rewilding movement, now in its infancy in America, could bring back native habitats and wildlife on a large scale if sufficiently funded through such avenues as the Land and Water Conservation Fund. President Biden’s administration, through the Inflation Reduction Act and other recent legislation, supports the goal to protect 30% of the land in America by 2030 as part of the effort to address climate change on Earth.

Neither effort has even partially reversed the large-scale land conversions brought about by the Homestead Act, but support is growing. The demographic shift now taking place on the Great Plains favors it. Many families trying to make a living on small farms have been forced off of the land for economic reasons. Land prices in the Great Plains have sagged in some places, businesses have suffered and closed, and an exodus is taking place, making land available for rewilding.

America is now an urban society, but we value open places and wild lands now more than ever. Not as land from which to make a living, but as a sanctuary



where we can seek solace for the soul—where natural systems can grow and evolve, and deal with climate change. Grasslands are as good at carbon sequestration as forests, maybe better.

Wendell Berry<sup>18</sup> suggested that if agriculture is to remain productive: “It must preserve the land, and the fertility and ecological health of the land, the land that is, must be used well.”

Wallace Stegner<sup>16</sup> said: “Wilderness can be a means of reassuring ourselves of our sanity as creatures, a part of the geography of hope.” Many of us have associated that feeling with the geography of high, lonely mountains, but why not the prairies? Where can anyone feel more isolated, alone, and in touch with the land than in the middle of the Nebraska Sandhills, or while watching free-ranging bison graze in the Flint Hills of Kansas or Osage Hills in Oklahoma, or on Little Missouri National Grassland in North Dakota?

Louise Erdrich<sup>17</sup>, speaking of her home country in

North Dakota said: “It was big grass. Original prairie grass – bluestem and Indian grass, side oats grama. The green fringe gave me the comforting assurance that all else planted and tended and set down by humans was somehow temporary. Only grass is eternal. Grass is always waiting in the wings.”

We had the ability to remake the land into what it is today, so we have the ability to restore it. We can conserve or recreate large blocks of native prairie. For the first time in over 200 years, since the Corps of Discovery embarked on its journey up the Missouri, America has the opportunity to not only have a strong rural economy and provide farmers and ranchers a way to make a living but also to have a functioning prairie ecosystem on a sustainable scale.

Even if we don’t do it for our wild friends, we should do it for ourselves. “Grass sings, grass whispers,” wrote Louise Erdrich.

It will sing for each of us if we will but listen.

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<sup>1</sup> Gary E. Moulton, ed., *The Lewis and Clark Journals* (Lincoln: University of Nebraska Press, 2004.)

<sup>2</sup> Mark V. Lomolino and Gregory A. Smith, “Dynamic Biogeography of Prairie Dog (*Cynomys ludovicianus*) Towns Near the Edge of Their Range,” *Journal of Mammalogy* 82, no. 4 (2001): 937-945.

<sup>3</sup> Craig J. Knowles, “A Summary of Black-tailed Prairie Dog Abundance and Distribution on the Central and Northern Great Plains.” Prepared for the Defenders of Wildlife, Missoula, MT, 1995: 65 pp.

<sup>4</sup> E. Raymond Hall, *The Mammals of North America* (New York: John Wiley & Sons, 1981).

<sup>5</sup> Stephen E. Ambrose, *Undaunted Courage* (New York: Simon and Schuster, 1996).

<sup>6</sup> Fred B. Samson and Fritz L. Knopf, *Prairie Conservation* (Washington, D.C.: Island Press, 1996).

<sup>7</sup> Joe C. Truett, “Migrations of Grassland Communities and Grazing Philosophies in the Great Plains: A Review and Implications for Management,” *Great Plains Research* 13 (Spring 2003): 3-26.

<sup>8</sup> Natasha B. Kotliar, Bruce W. Baker, April D. Whicker, and Glenn Plumb. “A Critical Review of Assumptions about the Prairie Dog as a Keystone Species,” *Environmental Management* 24, no. 2 (1999): 177-192.

<sup>9</sup> C. Hart Merriam, “The Prairie Dog of the Great Plains,” *Yearbook of the United States Department of Agriculture 1901* (Washington, D.C.: United States Government Printing Office, 1901), 257-270.

<sup>10</sup> Stephen E. Ambrose, *Undaunted Courage* (New York: Simon and Schuster, 1996).

<sup>11</sup> William A. Laycock, “History of Grassland Plowing and Grass Planting on the Great Plains” (paper presented at the Impacts of the Conservation Reserve Program in the Great Plains Symposium, Denver, CO, 1988).

<sup>12</sup> R.W. Hexem and K.S. Krupa, “Land Resources for Crop Production,” *USDA Economic Research Service, Agricultural Economics Department Number 572*, (1987), 24.

<sup>13</sup> Robert J. Luce, *A Multi-State Conservation Plan For The Black-tailed Prairie Dog, Cynomys ludovicianus, in the United States – An Addendum to the Black-tailed Prairie Dog Conservation Assessment and Strategy*, November 3, 1999. Western Association of Fish and Wildlife Agencies Interstate Prairie Dog Conservation Team, 2003.

<sup>14</sup> W.R. Bell, “Death to the Rodents,” *U.S. Department of Agriculture Yearbook 1920* (1921): 421-438.

<sup>15</sup> Teresa Jordan, “Playing God on the Lawns of the Lord” *Heart of the Land* (New York: Pantheon Books, 1994), 110-116.

<sup>16</sup> Wallace Stegner, “Coda: Wilderness Letter,” *The Sound of Mountain Water*. (New York: Doubleday, 1969).

<sup>17</sup> Louise Erdrich, “Big grass” *Heart of the Land* (New York: Pantheon Books, 1994), 145-150.

<sup>18</sup> Wendell Berry, “Nature as a measure” *What Are People For?* (Counterpoint Press, 1990).