



# Prairie Dog Ecology and Management in Oklahoma

## Amber Breland

Graduate Research Assistant  
Natural Resource Ecology and Management  
Oklahoma State University

## Dwayne Elmore

Extension Wildlife Specialist  
Natural Resource Ecology and Management  
Oklahoma State University

## Larry Wiemers

Biologist - Landowner Incentive Program  
Oklahoma Department of Wildlife Conservation

## Terry Bidwell

Extension Range Specialist  
Natural Resource Ecology and Management  
Oklahoma State University

## Description

Black-tailed prairie dogs (*Cynomys ludovicianus*) are one of 5 species of prairie dogs and the only species that occurs in Oklahoma. They are highly social burrowing rodents that are found in grasslands. Black-tailed prairie dogs stand approximately 12 inches tall, weigh 1.5 lbs, and are brown in color with a distinct black tip on their tails.

Prairie dogs live in large groups commonly called colonies. Colony boundaries are distinct from surrounding grasslands because these small herbivores keep vegetation within the colony clipped close to the ground (12 inches or less). This behavior allows the prairie dogs to detect predators.

Within a colony, prairie dogs are divided into family units known as coteries. Coteries typically contain a dominant breeding male, a few breeding females, and several juvenile or non-breeding prairie dogs. Each coterie has an established territory surrounding several burrows, which they will defend from other prairie dogs.

Territoriality is a very strong trait in prairie dog behavior. When juvenile prairie dogs mature, they are forced to disperse from their coterie and either establish a new coterie or they leave the colony altogether to search for a new colony or a suitable site to establish a new colony.

Multiple colonies, which exchange dispersing individuals, are called a complex. Complexes are important to the success of the prairie dog, allowing for repopulation of smaller colonies, which frequently die out, and for maintaining genetic diversity.

## Prairie Dog Habitat

Prairie dogs require well drained, medium textured soils to allow for burrow excavation and mound construction. Burrows in sandy soils tend to collapse and prairie dogs avoid

Oklahoma Cooperative Extension Fact Sheets  
are also available on our website at:  
<http://osufacts.okstate.edu>



**The black-tailed prairie dog is a keystone species in Oklahoma.**

these areas. Soil depth is also important, as deeper soils offer increased protection from predators, such as badgers, and extreme temperatures. Topography with gentle slopes of 6 percent or less allows for better predator detection. Black-tailed prairie dogs do not hibernate, but they often become less active during the winter and rainy periods.

Prairie dogs dramatically affect the vegetation found on a site. The continuous grazing of vegetation results in a distinct plant community in a colony. Typically, the outer edges of the colony are dominated by grasses, while the center is made up of forbs and dwarf shrubs. Many wildlife species utilize these areas for grazing, including American bison and pronghorn antelope.

Prairie dogs prefer grasses and forbs during summer months and prickly pear, thistle, and plant roots in the winter.

## Burrows

Colonies typically have many underground burrows with one or more entrances. The number of burrows varies highly by soil type and colony size, ranging from 4 to 100 burrows per acre. These tunnels range from 4 to 12 inches in diameter, 16 to 33 feet in length, and 7 to 10 feet in depth.

Burrows serve multiple purposes. They provide: escape cover from weather and predators, sleeping and resting areas, and nurseries. Within the burrows, there are nest chambers, which are 12 X 20-inch cavities filled with dry grass for rearing young and sleeping. Many burrows also have small chambers

or a widening of the burrow 3 feet or less from the surface for temporary refuge and turning around within the burrow.

Burrow entrances are often encircled by conspicuous mounds of dirt. Known as dome and rim craters, these prevent flooding, create drafts through burrows for better ventilation, and provide an elevated point from which individuals can scan for predators.

## Legal Status

The black-tailed prairie dog is considered a rare species of special concern in Oklahoma and many other states and has been declared extinct in Arizona. In Oklahoma there are an estimated 60,000 acres of grasslands occupied by prairie dogs. This represents a small percentage of the historical acreage of this species.

Oklahoma Title 800:25-17 addresses the protection of black-tailed prairie dogs and black-footed ferrets within the state. The species is protected on federal lands. Other public lands may only control populations if there is a public health or safety issue. Permits are required for the use of poisons to control prairie dogs. Poisons may not be used in counties with fewer than 1,000 animals. Prairie dogs may be legally killed using a firearm or bow and arrow on private land.

## Reasons for Decline

Throughout the black-tailed prairie dogs' range, significant declines have been caused by loss of habitat, extensive poisoning campaigns, and disease (sylvatic plague) during the last century. Recreational shooting and trapping can contribute to reduced numbers locally, but to a much lesser extent.

In Oklahoma black-tailed prairie dogs have experienced a significant decline since settlement. Historically, primary threats to the species in the state were poisoning programs and conversion of native grasslands to other uses such as agriculture. Today, as much as 95 percent of Oklahoma's grasslands and at least 99 percent of its prairie dog population occur on private lands.

## Prairie Dogs and Livestock

Research has shown that prairie dogs, cattle, sheep, and horses, utilize many of the same plants for forage. The overall influence of prairie dogs on cattle performance varies depending on the site.

Studies have shown range site quality influences prairie dog-livestock competition. Highly productive mixed-grass prairie sites only showed losses of 10 percent of annual net primary production (ANPP), while less productive sites like desert grasslands reached 100 percent loss in ANPP. Most of the areas in Oklahoma where prairie dogs are found would be classified as moderately productive sites.

Concerns with forage production losses have also focused on burrow mounds. On average, less than 6 percent of a colony's total area is comprised of these areas of exposed soil. However, preferred livestock forage species often occur near or on mounds, including western wheat grass, buffalo grass, and scarlet globemallow.

While prairie dogs clip and consume vegetation that would otherwise be available to cattle, colonies have a reduced dead to live plant matter ratio. This results in better palatability, digestion, and nutrition for cattle, prairie dogs,



**Figure 2. Cattle graze prairie dog colonies due to the high quality forage.**

and other animals. Thus, while total forage quantity may be reduced, forage quality is improved.

Over time, the intense herbivory of prairie dogs can result in increased silica content of plants, reducing palatability. Nevertheless, bison, pronghorn, and elk have been shown to preferentially graze prairie dog colonies. Bison grazing on colonies have shown to have a significant nutritional advantage over those that graze undisturbed prairie. Although cattle may not have as strong a preference for colonies as bison, cattle will graze colonies with equal or greater frequency as unoccupied range.

Livestock grazing benefits prairie dogs as well. Grazing reduces vegetation height, which helps reduce predation on prairie dogs by improving predator detection. Sites preferred by cattle are often the same as those preferred by prairie dogs and are made more desirable by cattle trails. These trails allow for dispersal and connectivity between prairie dog colonies.

## Cost Efficacy of Prairie Dog Control

As mentioned in the previous section, many methods have been used to reduce or eliminate black-tailed prairie dogs from rangelands. While such practices have had range-wide effects, they are not always locally successful. Many factors influence prairie dog control including: rainfall, type and abundance of vegetation, age and size of colony, density of prairie dogs and burrows, and distance to other colonies. One must also consider the risk of poisoning non-target animals; including birds of prey and scavengers who feed on carcasses and other small mammals which may consume poisoned bait.

With time, prairie dogs become wary and more difficult to locate and bait. Abandoned or severely depopulated colonies are attractive to dispersing prairie dogs and are often quickly restored. Remaining individuals have more forage available and thus grow faster, survive better, breed at younger ages, and produce larger litters. Colonies typically increase 30 percent each year for several years following a poisoning event until they reach the carrying capacity of that site.

Often the benefits of prairie dog control through use of poisons and other devices do not justify the time or costs. For example, one study showed that for a gain of one animal unit month (AUM) per year, treatment of no less than 17 acres was necessary. Even assuming a low annual prairie dog reproductive rate of 5 percent, it was estimated that it would take 20 to 40 years to recover the initial cost of control. Thus,

it was impossible to recover initial costs before another round of control was needed. Therefore, there was no economic benefit to control.

Once a colony has been eliminated, changes in soils and vegetation are not immediate and may require additional actions, including temporarily excluding livestock from the area, leveling mounds, filling burrows, and reseeding.

In most cases, forage competition is insignificant and removal of prairie dogs from a property does not result in significant increases in livestock production. Bait and poisons are expensive, distributing bait is time consuming, and colonies can repopulate rapidly unless complete eradication is achieved. While there are certain situations where removal of prairie dogs may be beneficial, as in agricultural fields, landowners should carefully consider the true economic outcome of control efforts. In most cases, control is not cost effective.

Exclosures are a common method of assessing the impacts of prairie dogs and other herbivores on forage available to livestock. This involves using cattle panels to create small ungrazed areas. Adding chicken wire to the bottom allows for the additional exclusion of small mammals like prairie dogs. To determine the amount of forage consumed by prairie dogs, two exclosures could be placed next to one another, one excluding cattle and one excluding both prairie dogs and cattle. At the end of one growing season, the vegetation is clipped, dried, and weighed to compare the forage quantity.

## Benefits of Black-tailed Prairie Dogs

The herbivory, burrowing, and mound building activities of prairie dogs create conditions which support more than 200 animal species as well as a diversity of plants and insects. The prairie dog is therefore known as a keystone species. This means it is a vital part of the native rangeland.

Specifically, prairie dog burrows create places of refuge from predators and extreme temperatures for reptiles, amphibians, small mammals, and birds. Colonies also attract a variety of species due to the increased seed production and forage quality. In particular, many species of grassland birds rely on prairie dog colonies for the critical habitat they provide.

Prairie dog colonies also attract species such as the American badger, coyote, and raptors, which take advantage of the high concentration of prey.

Prairie dogs have further conservation value as many rare grassland species are closely associated with colonies. Black-footed ferrets, burrowing owls, swift foxes, and mountain plovers are a few of these.

Continuous soil disturbance and herbivory strongly influence the plant community as well. With the loss of the prairie dog these distinct plant communities would be lost. On a much broader scale, complexes of prairie dog colonies increase the patchiness or heterogeneity of the landscape.

Removing prairie dogs has negative effects on rangeland and many of the species which rely on colonies for survival. Prairie dogs are an important component of healthy native rangelands.

## Current & Future Threats to Black-tailed Prairie Dog

Continued loss of habitat is one threat to the species. A primary concern with loss of habitat is the loss of connec-

tion between colonies, resulting in the isolation of individual colonies. As colonies become separated and complexes disappear, colonies become less stable with increased rates of inbreeding and slower, if any, recovery from significant mortality events.

Continued poisoning, conversion of rangeland to other uses such as introduced pasture or farming, excessive recreational shooting, and other activities on private lands will likely have greater impacts in the future if connectivity within prairie dog complexes is not maintained and restored.

Another threat to the black-tailed prairie dog is sylvatic plague (*Yersinia pestis*). Carried by fleas, this disease spreads quickly through colonies with devastating mortality rates, often in excess of 90 percent. While this disease appears to be limited to the panhandle counties, it impacts 80 percent of the prairie dog populations in the state, posing the greatest threat to prairie dogs in Oklahoma.

## Landowner Incentive Program (LIP)

Landowners considering control of prairie dogs should first consider the Landowner Incentive Program (LIP) which is administered through the Oklahoma Department of Wildlife Conservation (ODWC) to facilitate the conservation, enhancement, and restoration of native habitat on private lands for wildlife species of concern. The ODWC provides technical and financial assistance to landowners with a 10-year conservation agreement with the department.

The primary habitats of concern in Oklahoma are the short and mixed grass prairies of the High Plains which have been altered through human activities. The majority of these grasslands occur on private lands, increasing the need for cooperation between wildlife management agencies like ODWC and landowners. LIP supports habitat management on private lands for the black-tailed prairie dog and other grassland species of conservation concern.

The goal of this program is to encourage landowners to conserve native grasslands with assistance from biologists to meet realistic management goals. Therefore, agreements do not restrict livestock grazing; only those activities that will alter the plant communities (i.e. disking, plowing, applying herbicides).

This program offers an economic incentive to maintain some acceptable level of prairie dogs on private land. Landowners receive \$10.00 per acre, including both occupied and expansion acres. For example, a landowner with 10 acres of occupied land and 30 acres of land made available for prairie dog expansion would receive an annual payment of \$400.00. Thus, the landowner would receive \$4,000.00 during a 10-year period. Therefore, in addition to the many ecological benefits of having prairie dogs, landowners can be compensated for the stewardship they are providing for the people of Oklahoma.

For more information on the LIP program please contact ODWC at:

Northwest Regional Office, ODWC  
(580) 254-9173  
Larry Wiemers, ODWC Biologist  
(405) 990-7206

## Selected References

- Barko, V.A. 1997. History of policies concerning the black-tailed prairie dog: a review. *Proceedings of Oklahoma Academy of Science* 77:27-33.
- Collins, A.R., J.P. Workman, D.W. Uresk. 1984. An economic analysis of black-tailed prairie dog (*Cynomys ludovicianus*) control. *Journal of Range Management* 37:358-361.
- Coppock, D.L., J.K. Detling, J.E. Ellis, and M.I. Dyer. 1983. Plant-herbivore interactions in a North American mixed-grass prairie. II. Responses of bison to modification of vegetation by prairie dogs. *Oecologia* 56:10-15.
- Guenther, D.A. and J.K. Detling. 2003. Observations of cattle use of prairie dog towns. *Journal of Range Management* 56:410-417.
- Koford, C.B. 1958. Prairie dogs, whitefaces, and blue grama. *Wildlife Monographs* 3:1-78.
- O'Meilia, M.E., F.L. Knopf, and J.C. Lewis. 1982. Some consequences of competition between prairie dogs and beef cattle. *Journal of Range Management* 35:580-585.
- Tyler, J.D., and J.S. Shackford. 2002. Vertebrate associates of black-tailed prairie dogs in Oklahoma. *Proceedings of the Oklahoma Academy of Science* 82: 41-47.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of \$1.35 per copy. 0909 GH