K-STATE
Research and Extension

# Prairie Dog Management

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**"PRAIRIE DOGS WERE INNUMERABLE." — J.R. MEAD, 1859.**

These notes from J.R. Mead were among the first to describe the natural history of the prairie dog in Kansas. Since then the population has varied but has been mainly going down. Before it was settled, most of Kansas supported tall grasses that tended to restrict prairie dog populations. Prairie dogs thrived only in places overgrazed by native animals. With the arrival of the Europeans, prairie dog populations expanded. As buffalo numbers dwindled due to overhunting and before the range was stocked with domestic livestock, populations declined. Over the years, rangelands were fenced, ponds built, and large areas plowed. Remaining rangelands were overgrazed. By the early 1900s, prairie dogs inhabited an estimated 2 million acres. Programs and laws to control prairie dogs popuations were put into place, some of which remain in effect today.

## DISTRIBUTION AND DESCRIPTION

Prairie dogs occupy an estimated 130,000 acres of rangeland in Kansas, or about 1 percent of suitable habitat, leaving ample room for their numbers to increase. Prairie dogs play an important role in the prairie ecosystem. They increase plant and animal diversity and provide recreational opportunities for nature observers, photographers, and the sporting public. Less desirable outcomes include alteration of range conditions and forage competition. This fact sheet highlights the economic importance of the black-tailed prairie dog in Kansas. Focusing on the prairie ecosystem, it explores positive and negative effects of prairie dog activity and provides land managers with current recommendations for safe, effective, and legal control.

## BIOLOGY

Five prairie dog species exist in North America, but only the most common one, the black-tailed prairie dog, is found in Kansas. These large, burrowing ground squirrels live in the western two-thirds of the state. Weighing 1-3 pounds and measuring 14-17 inches long, the black-tailed prairie dog has reddish-tan fur, large eyes, small ears, a broad head, and a black tip on the end of a hairy tail.

### PRAIRIE DOG FACTS

- **Prairie dogs bark like dogs.** The name prairie dog came from their warning barks, which early settlers compared to the bark of a dog.
- **Burrows provide shelter for many animals.** The black-footed ferret, one of the most endangered mammals in North America, feeds almost exclusively on prairie dogs.
- **Prairie dogs rarely drink water.** They obtain all the moisture they need from their foods. Their numbers increase during drought years.

## SOCIAL ORGANIZATION

Prairie dogs are highly social and live in what are called "coteries." Coteries are close-knit groups of prairie dogs that live within the same burrow. This is where prairie dogs raise their young. Several coteries make up a neighborhood and many neighborhoods grouped together make up a prairie dog town or colony. Coteries usually consist of one adult male, three adult females, and six offspring. Members of these small groups may display territorial behavior toward adjacent groups in the town. Prairie dogs are active during the day. They may stay below ground for several days during cloudy and cold winter weather, but they are not true hibernators.

Prairie dogs build underground homes or burrows. Burrows are approximately 10 yards apart, 3-14 feet deep, and anywhere from 10-100 feet long or more. A crater-like mound 3-10 feet

across at the burrow entrance serves as a lookout station and prevents water from rushing in. Most burrow systems have one entrance, but some have two or even three.

Most black-tailed prairie dogs mate for the first time as two-year-olds, with females producing one litter of 3-8 young after 28-34 days gestation. Young are born from March through April, but only about three or four survive to come above ground. Those that make it, venture out at 5-6 weeks of age, usually by early May.

Prairie dog densities increase from about five per acre in late winter to 20 per acre after young are born, but densities of up to 35 per acre have been reported. Females remain in their coterie for life, but yearling males disperse up to 3 miles in late spring. Prairie dogs can expand the area they occupy by up to 50 percent per year and consume the same forage as livestock, which is why landowners want to manage populations.

## ECONOMIC IMPORTANCE

Prairie dog burrows provide shelter for many animals, including burrowing owls, cottontail rabbits, and rattlesnakes. One study found 89 vertebrate species associated with prairie dog towns in Oklahoma. Prairie dogs are eaten by endangered black-footed ferrets, badgers, coyotes, foxes, eagles, prairie falcons, hawks, owls, and possibly bobcats, mink, and long-tailed weasels. Prairie dog towns attract photographers, hunters, and nature observers.

Burrowing by prairie dogs decreases soil compaction, increases water intake, aerates the soil, and promotes soil formation. Prairie dog activity normally does not cause severe soil erosion. On a typical town with 25 mounds per acre, the amount of soil exposed on the mound and adjacent areas is less than 3 percent of the total area.

### *Health Risks*

Individuals involved in prairie dog management programs may be exposed to plague. Although there have not been any recent cases of human plague in Kansas, a few cases are reported in the western U.S. every year. Plague is transmitted to humans through bites of fleas inhabiting infected rodents. Most human plague cases occur as a result of direct contact with wild rodents. Symptoms include swollen and tender lymph nodes, chills, and fever. Early diagnosis and treatment are imperative. Before walking through affected areas, take the time to apply insect repellent to socks and pant cuffs, tucking pants inside of boots.

### *Effects on Rangeland*

Prairie dogs modify rangeland creating conditions that favor survival. They feed on many of the grasses and forbs that are important to livestock. The annual dietary overlap is estimated to be 64-90 percent. Prairie dog clipping and selective feeding influences plant abundance. The effect on rangeland forage and livestock production differs depending on the geographic location, rainfall, dominant grass species, and other factors. Varying effects on rangeland vegetation have been reported, from no obvious effects, to a 20-40 percent reduction in forage availability, to an increase in the percentage of a grass species preferred by livestock.

Prairie dogs may clip plants to avoid predators. This can improve forage by leading to regrowth of younger, less mature plants that are more palatable and digestible to cattle. Younger plants often have a higher crude protein level, which increases nutrient value.

Prairie dog competition is more noticeable during drought when there is less forage available. The severe droughts from 2002-2010 showed the devastating consequences of too many grazers (either prairie dogs or cattle) and too little rainfall. Higher-quality vegetation does not benefit cattle producers if there is not enough for cattle to eat. Bare ground becomes more evident when forage is shorter and more sparse. As a result, prairie dogs affect more acres. Even though numbers may not increase, prairie dogs appear more numerous as they spread out in search of forage. Colorado and South Dakota studies reported dramatic declines in the average daily gain by steers as the percentage of pasture colonized by prairie dogs increased.

### *Black-Footed Ferrets*

The black-footed ferret feeds on prairie dogs (Figure 1). It is illegal to kill them because they are an endangered species. Ferrets are mostly active at night but are seldom seen because of their low densities. Black-footed ferrets have been scarce since they were discovered in 1851. A black-footed ferret had not been seen in the wild in Kansas since 1957. In 2007, the U.S. Fish and Wildlife Service reintroduced the black-footed ferret on two ranches in Logan County, Kansas. Captive-bred ferrets have produced wild-born young but may have to be introduced at regular intervals to sustain the population. Because black-footed ferrets feed almost exclusively on prairie dogs, adequate numbers of prairie dogs are essential to their survival. The U.S. Fish and Wildlife service does not require ferret searches before treating prairie dog colonies in Kansas because the black-footed ferret is not thought to be present outside of Logan County.

## CONTROL METHODS

Methods for managing prairie dog populations include deferred grazing, shooting, poison baits, and burrow fumigants. Other tactics such as providing hiding places to attract predators, the use of visible barriers, or live trapping have not proven effective in reducing prairie dog numbers. The use of suction devices or explosives to destroy burrows is illegal, and these methods have not been effective in other states.

### *Deferred Grazing*

A study in Barber County, Kansas, found that prairie dog numbers can be reduced by grazing mid-grass prairies from September through April to increase grass height. Deferred grazing on short grass prairies of extreme western Kansas has not been shown to reduce prairie dog numbers. Short duration or cell grazing, instead of grazing all season long, may allow vegetation to grow tall enough to deter prairie dogs. Proper stocking rates and other range management practices can prevent overgrazed conditions that create prime habitat for prairie dogs. In this study, ungrazed grass buffer strips 100 feet wide around the perimeter of a prairie dog colony were not shown to be effective in stopping prairie dog dispersal.

Photo: Kimberly Fraser, USFWS

*Figure 1. The black-footed ferret, one of the most endangered mammals in North America, is nicknamed the prairie dog hunter.*

## *Shooting*

Intensive rifle shooting during the February breeding season has been shown to disrupt reproductive activities and prevent prairie dog colonies from spreading. Although shooting is not considered a successful eradication technique, some landowners derive income by leasing the opportunity for sportsmen to shoot the animals on their land in an attempt to offset forage losses. Those considering this option are advised to use non-lead ammunition to avoid poisoning predators and scavengers, including raptors.

## *Poisoning*

Two types of toxicants used for prairie dog control are poison grain and pellet baits or fumigants. Poison baits kill a variety of birds and mammals, but fumigation kills **all** wildlife in the burrows. All are poisons and should be used with caution. Only products labeled for prairie dog control can be used legally for this purpose. Always read and follow the directions on the label. In 2018, 29 different products were registered for prairie dog control in Kansas, all labeled for restricted use. Additional training and private or commercial certification from the Kansas Department of Agriculture is required to purchase or use any of these products.

### Poison Grain Baits and Pellets

Poison grain products work best during clear, settled weather. Rain washes the toxicant from some baits. Baits should only be used when the most desirable foods (green grass and forbs) have become dried and dormant. Fall baiting may be effective when applied while prairie dogs are eating grass seeds to build fat reserves for winter. Grain baits registered in Kansas contain the active ingredients chlorophacinone, diphacinone, and zinc phosphide. Label requirements vary depending on the product.

Toxicants pose risks to predators and scavengers in the environment. Anticoagulants such as chlorophacinone and diphacinone applied in-burrow are less hazardous to birds. Chlorophacinone products are less hazardous to birds and mammals than zinc phosphide in terms of primary risks. Secondary risks to birds are lower than they are for mammals. More laboratory and field research is needed to quantify secondary hazards. Zinc phosphide poses the greatest risk to birds that eat the bait. The risk to nontarget animals is high, while the risk to mammalian scavengers is low.

**Zinc phosphide.** When using zinc phosphide grain or pellet baits, offer untreated oats, preferably steam-rolled, for 1-2 days to increase bait acceptance according to instructions on the label. Prebaiting significantly improves control and provides more predictable results. Both prebait and bait should be applied on the edge of the mound where bare soil meets the grass. Zinc phosphide baits are extremely hazardous to birds and should not be placed on top of the mound or down into the burrow. Zinc phosphide is a relatively slow-acting poison, and small amounts can be absorbed through human skin.

The application rate should not exceed 1 heaping teaspoon (4 grams) per burrow when using 2 percent zinc phosphide oats or ZP Rodent Bait AG. A typical town requires about ⅓ pound of zinc phosphide bait per acre. Applying excess bait increases risks to nontarget animals but does not improve control.

Zinc phosphide poison baits should not be applied more than once per season. Prairie dogs usually become bait shy if they survive the first treatment. Do not breathe zinc phosphide dust or fumes, and wear rubber gloves to avoid skin contact. Zinc phosphide is poisonous to all animals and should be stored away from humans or pets. Apply treated bait only after all or most of the prebait has been eaten, and only to burrows where the untreated bait was consumed, usually two days after prebaiting. Zinc phosphide is typically applied between July 1 and January 31.

**Chloraphacinone and diphacinone.** These are first-generation anticoagulants with similar label requirements. Chlorophacinone is sold under the name Rozol Prairie Dog Bait, and diphacinone as Kaput-D Prairie Dog Bait. These products should only be applied underground. Apply ¼ cup (53 grams) of either product at least 6 inches down and only to active burrows. Retrieve and dispose of any bait spilled above ground or placed less than 6 inches into the burrow entrance. Baits applied in burrow are less likely to be consumed by birds.

Anticoagulants can be used between October 1 and March 15, with no prebaiting required. These restricted use products are labeled for hand or mechanical bait placement. With anticoagulant baits, small mammals such as prairie dogs begin to die 4-5 days after consuming a lethal dose. Return to the site within 4 days of bait application to collect and dispose of dead or dying prairie dogs and remove uneaten bait. Continue checking for dead animals at 1-2 day intervals. Search the entire colony using transects less than 200 feet wide, picking up carcasses in late afternoon to reduce the chance of nocturnal scavengers and predators finding dead animals.

Excessive prairie dog activity may warrant a second treatment. If so, wait six days before reapplying Kaput-D, or several weeks if using Rozol. Follow the same procedures for disposing of dead animals. Predators and scavengers that feed on animals killed with anticoagulants also may be killed. Applied as directed, poison grain baits reduce prairie dog numbers by about 90 percent, although green grass, lack of prebaiting, poor weather conditions, or moisture may hinder control. Always read and follow the directions on the label.

## Fumigants

Fumigants can be applied after a baiting program where better control or eradication is the goal. There are two types of fumigants legal for prairie dog control in Kansas: aluminum or magnesium phosphide products that emit poisonous gas and are labeled only for restricted use, and gas cartridges that release a suffocating carbon monoxide gas, which are not restricted. Fumigants are usually reserved for follow-up treatments because they are expensive, difficult to apply, and extremely hazardous to the black-footed ferret and other desirable wildlife species that occupy the burrows.

Fumigants work best when there is adequate soil moisture. The amount of product required can be greatly reduced by treating only active mounds. These mounds can be identified by covering the openings with a piece of sod or placing a dry cow chip on top, waiting three or four days, and treating only the holes reopened by prairie dogs.

Aluminum or magnesium phosphide or gas cartridges should be applied in the following manner:

- Place two tablets or 10 pellets of aluminum or magnesium phosphide as far down into the burrow as possible. Do not touch the tablets. Wear rubber gloves.
- Using a nail or ice pick, punch 5-6 holes in one end of the gas cartridge. Insert the nail part way and rotate to loosen the contents so the cartridge burns more rapidly. After the fuse has been inserted and lit and is burning well, gently roll the cartridge as far down into the hole as possible.
- After placing fumigant in the burrow, immediately plug the opening with a piece of sod, grass-side down, or a sheet of newspaper. Cover the burrow with loose soil, forming an airtight seal. Do not breathe the fumes. Be careful not to smother the fumigant. Fumigants will not give satisfactory control when the soil is dry.
- Do not use aluminum or magnesium phosphide until the soil temperature is greater than 45°F. Otherwise, gas forms too slowly to prevent prairie dogs from digging out. Avoid using fumigants in tunnels occupied by burrowing owls, which can be identified by white droppings, pellets, and feathers around the opening.

The use of burrow fumigants requires a permit from the Kansas Department of Wildlife, Parks and Tourism (KDWPT). Only individuals certified to apply restricted-use pesticides can apply aluminum or magnesium phosphide legally. Permit applications are available at local K-State Research and Extension offices but are processed on the recommendation of the K-State wildlife specialist and approved by KDWPT.

Extermination of the prairie dog population will not return the range to productive condition without rehabilitation of evacuated towns. Mounds should be leveled with a land plane, blade, or an offset disc to encourage revegetation. Livestock should be excluded from the prairie dog town with an electric fence and grazing deferred for at least one growing season to give the grass and root system time to recover. By continuing good grazing management practices, ranchers can return the range to high productivity and prevent other prairie dogs from becoming established.

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Revised from original by F. Robert Henderson, former Extension Wildlife Specialist.



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