

Prairie Dog Legislation and Burrowing Owls in Nebraska

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(Photo credit: Jessica Milby, UNL)

Introduction

Nebraska legislation has historically recognized the black-tailed prairie dog (*Cynomys ludovicianus*) as a pest on rangelands across the state (Figure 1). The Black-tailed Prairie Dog Management Act is legislation passed in 2012 that allocates resources to control the spread of prairie dogs in the state. The prairie dog act, which has been controversial, allows county officials to create management plans for control and eradication of prairie dog colonies, and sets up financial support for implementation. This is because prairie dogs are semi-fossorial, meaning they dig tunnels, and their heavy grazing patterns can create large areas of disturbance on rangeland and pastures throughout Nebraska. Because of this lifestyle, prairie dogs are also considered ecological engineers that create habitat for many wildlife species utilizing their colonies and underground tunnel networks (Jones et al., 1996).

The western burrowing owl (*Athene cunicularia h.*) is one species that uses the prairie dog colonies during major parts of its life cycle. Because of habitat loss and degradation result-

ing from prairie dog control, the burrowing owl is included in the current list of Tier-I at-risk species determined by the Nebraska Natural Legacy Project. The listing indicates that the longevity of the species is imperiled or vulnerable within the state, with prairie dog population declines listed as the most prevalent threat to habitat security (Panella, 2013). In this article, we discuss how legislation related to prairie dog control influences the habitat requirements of burrowing owls.

Burrowing owls in Nebraska and habitat requirements

Burrowing owl habitat across Nebraska plays a vital role in maintaining healthy populations of burrowing owls in the United States. A common co-inhabitant of prairie dog colonies, this species requires holes in the ground for nesting and brood rearing (Figure 2). This is a critical component of owl population recruitment, since without recruitment, populations cannot compensate for mortality. The owl is a small bird and seldom excavates its own burrow (Martin, 1973), but instead relies on semi-fossorial grassland mammals to create



Figure 1. Although more common in western Nebraska, black-tailed prairie dogs can establish colonies on range and pasturelands across the state. (Photo: Jess Milby, UNL)

nesting sites (Johnsgard, 2002). Although abandoned tunnels within black-tailed prairie dog colonies are most commonly used for nesting, burrowing owls have been documented using holes created by American badgers (*Taxidea taxus*), rocky outcroppings, and irrigation drainage pipes (Haug et al., 1993). The burrowing owl also uses these tunnels for brood rearing since they provide great protection from aerial and aboveground predators. In addition, tunnels provide an escape from extreme daytime temperatures (Martin, 1973). Thus, the tunnel system of prairie dogs is critical for nest and fledgling success.

In addition to the belowground refuge of the prairie dog's tunnel system, the aboveground habitat shaped by prairie dog colonies provides for the owls as well. The vegetation in and around prairie dog colonies is often grazed down to very short heights (Bonham & Lerwick, 1976). Low vegetation structure allows for quicker detection of predators (Hoogland, 1995). Since prairie dog colonies are often found within proximity to areas preferred by grazing cattle (Knowles, 1986), there is a readily available source of dung that the burrowing owl utilizes. Burrowing owl nest burrows are often found with translocated cattle dung around the rims. Dung near the nests attracts insect activity and provides a readily available food source for both young and mature owls (Levey et al., 2004).

Because of these factors, prairie dog towns are documented to have the greatest burrowing owl abundance and nest density, compared with other burrow sources across the state (Desmond & Savidge, 1996). Prairie dog complexes, areas with more than one colony, are also important to burrowing owl persistence. Burrowing owls typically prefer a system of loose colonization, and prairie dog complexes complement this preference by providing multiple nest sites within close proximity to each other (Haug et al., 1993). Loose colonization could be associated with an increased detection of predators because greater numbers of individuals are searching for dangers. Preference for complexes also could be related to the decreased likelihood of an individual nest being predated. Burrowing owls may also respond to prairie dog barks in detection of predators as observed in other grassland birds (Hoogland, 1995). Desmond and Savidge (1996) concluded that prairie dog colony size is the greatest limitation to burrowing owl nest site availability. While nest success was proven higher in towns with higher prairie dog densities typical of restricted town sizes, higher nest abundance was observed in larger colonies (Desmond, 1991). This supports the multiple burrow predator defenses hypothesized previously in this publication.

Active prairie dog colonies are critical for nest site availability since adult burrowing owls often return to previous successful nest sites in consecutive years. Complete colony

eradication through poisoning efforts or diseases like sylvatic plague is detrimental to both adult burrowing owls and juvenile owls, which have also been documented returning to nesting sites where they were successfully fledged (Terrell, 1984). Burrowing owls use prairie dog towns that have been eradicated for a short time after extirpation or destruction, but their presence stops once burrows become degraded and collapse. While burrowing owls also use badger excavation sites as documented by Desmond (1991), the holes usually do not last multiple years and degrade or collapse more quickly than active prairie dog colonies.

Currently, an estimated 15,000 of the 700,000 burrowing owls that inhabit the U.S. migrate to Nebraska during the summer to nest (Panella, 2013). This appears to be a viable population for the state. However, recent GIS mapping determined that Nebraska currently has 4.6 million acres of highly suitable habitat for burrowing owls. There are 297 documented prairie dog colonies in this habitat. Colonies average 64 acres in size (Bishop et al., 2012). Given this small size, Nebraska's expansive area of habitat for the burrowing owl only includes a small fraction of habitat available as nesting sites.

An increased availability of nesting habitat within the state—or at the very least no additional habitat loss,—would provide the opportunity for burrowing owls to successfully nest and disperse to other areas within the state (Bishop et al., 2012) and to neighboring states as well. This is in addition to the return to previous nest sites within the state. Enforcement of regulations included in the Black-tailed Prairie Dog Management Act would continue to restrict and potentially reduce availability of highly suitable nesting habitat for the burrowing owl across the state.

Prairie dog legislation in Nebraska

Because of intensive disturbance to rangelands from burrowing and their use of grazing resources, prairie dogs have long been considered pests in Nebraska. Recognizing this, Nebraska legislation prioritized protection of the state's rangelands by listing the species as a rangeland pest in the 1930s. This set the stage for long-term eradication efforts confining prairie dogs to a marginal portion of their historic range within the state (*Figure 3*). This legislation remained in place until 1995 when the Nebraska Unicameral eliminated requirements to control prairie dogs on rangelands and removed the classification as rangeland pests (Nebraska LB 87, 1995).

Between 1995 and the implementation of current legislation, the black-tailed prairie dog has been petitioned to receive endangered status on the national level five times. Each petition has been denied, despite estimates that the prairie dog has been reduced to just 2 percent of its historic



Figure 2. Abandoned tunnels within black-tailed prairie dog colonies are commonly used for nesting and brood rearing by burrowing owls. (Photo: Jess Milby, UNL)

population across the western Great Plains (Miller et al., 1994). Denial in all five cases was based on reasoning that the species is currently still found throughout its historic range.

In 2012, the Nebraska Unicameral passed the Black-tailed Prairie Dog Management Act (Nebraska statute 23-3801), which resulted in the prairie dog being again classified as a rangeland pest. This statute did not mandate total eradication. Rather, the act lays the groundwork for counties to create prairie dog management plans focused on the perception of this species as a pest that requires control. Under this program, counties can require landowners to restrict expansion of prairie dog colonies into adjacent areas unless the neighboring landowner allows the colony to expand. Failure to comply with controlling the prairie dogs would result in fines of up to \$100 per day after notice. Also, county employees or contractors would be able to conduct eradication at the expense of the landowner (Nebraska statute 23-3801). Current legislation has proven the relevance of this issue with recently introduced bills challenging the act. Currently, Sheridan County is the only county in Nebraska to develop a

prairie dog management plan as permitted by Nebraska law. However, more counties are expected to adopt similar plans in the future.

The implications for burrowing owls

State legislation involving prairie dog colonies has extensive implications for the success of the burrowing owl in Nebraska due to its prairie dog habitat dependence. The western burrowing owl depends on prairie dog colonies in Nebraska for nesting and brood rearing (Desmond & Savidge, 1996) (Terrell, 1984), food (Levey et al., 2004), and escape from predators (Hoogland, 1995)(Johnsgard, 2002). Additionally, prairie dog colony size is the greatest limitation to burrowing owl habitat in Nebraska.

Historical statutes requiring eradication and current spatial control statutes can restrict prairie dog colonies, resulting in reductions in burrowing owl populations. Increased control could result in short-term reductions in available nest sites and consequently long-term population declines and

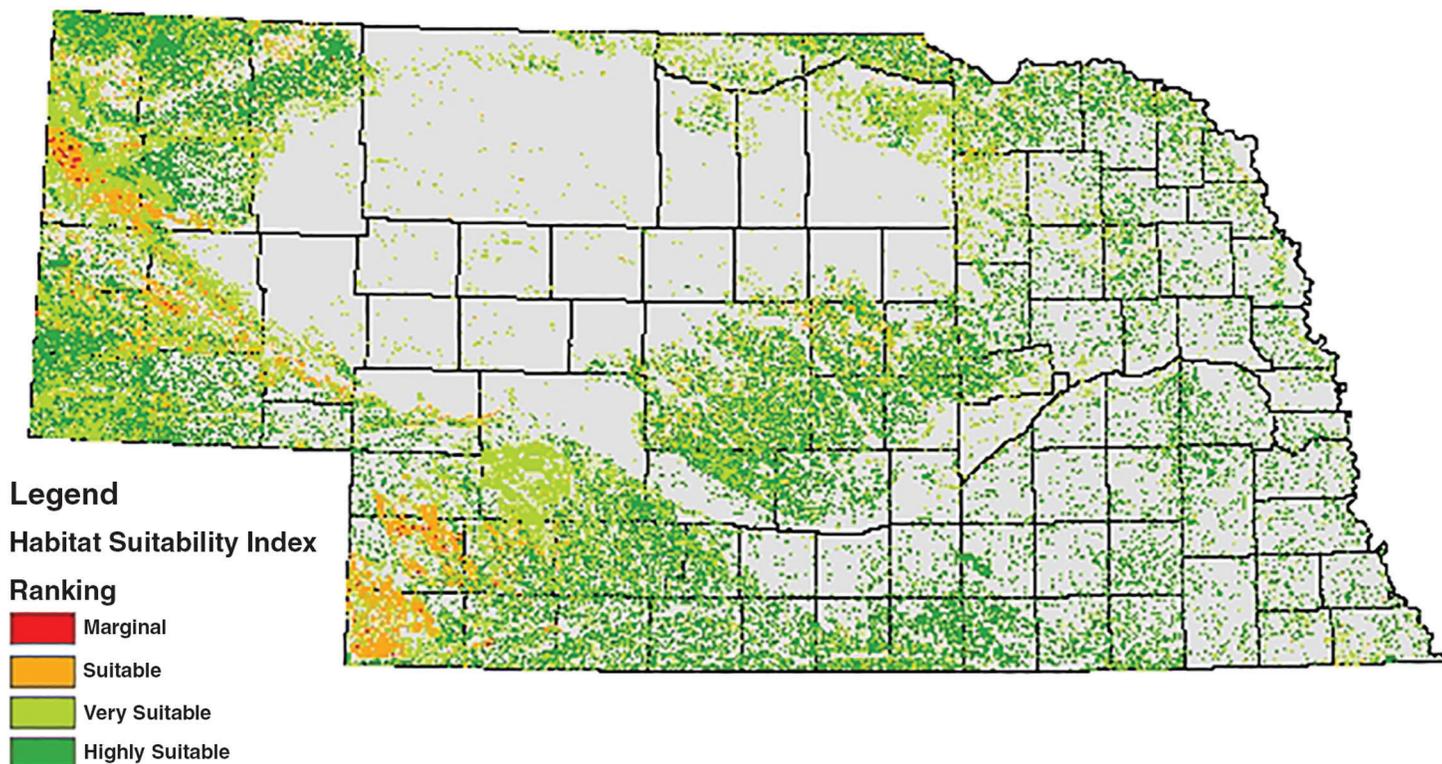


Figure 3. Rainwater Basin Joint Venture analysis of suitable habitat for prairie dogs and burrowing owls. Areas shaded in green are highly suitable and areas in red or not shaded are not suitable. Nebraska has a large amount of suitable habitat for burrowing owls and prairie dogs. However, only a fraction of that land is currently used by prairie dogs, and the state hosts a low population of nesting burrowing owls in respect to the amount of suitable habitat. Source: Rainwater Basin Joint Venture 2011.

local extinction of a species that is already at-risk in the state. The long-term success and recovery of the burrowing owl depends on regular and dependable burrow production consistent with active prairie dog colonies because of the owl's resource demands and need to return to successful nest sites.

Conclusion

Mandated control of prairie dogs, authorized through Nebraska statutes, could have unintended ecological consequences on the western burrowing owl. Removal of prairie dogs also may affect other Tier-I species within the state that rely on prairie dog colonies, such as the mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), and swift fox (*Vulpes velox*). Prairie dogs provide multiple ecosystem services to these species that other sources cannot match. Specifically for the burrowing owl, the colonies are a source of nesting and brood-rearing habitat, protection from predators and weather, and food. Other burrows like badger holes and rocky outcroppings do not provide the same benefits and are not sufficient to sustain long-term, viable burrowing owl populations. Legislation such as the Black-

tailed Prairie Dog Management Act is intended to provide a solution to a specific problem encountered by many stakeholders in the state. However, this type of legislation could unintentionally undermine the conservation of threatened and endangered species if indirect effects on these other species are not considered.

Acknowledgment

This article was written by a student in the University of Nebraska—Lincoln course, AGRO 444—Ecosystem Monitoring and Assessment.

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