Defenders of Wildlife * Forest Guardians * Animal Protection Institute
Center for Native Ecosystems * Prairie Hills Audubon Society
Prairie Preservation Alliance * Southern Plains Land Trust

May 12, 2006

Pawnee National Grassland Supervisor's Office
Attn: Karen Roth
2150 Centre Ave., Building E
Fort Collins, CO 80526

Dear Pawnee National Grassland officials,

Please accept these comments in response to the April 12, 2006 notice of intent to prepare an Environmental Assessment (EA) regarding prairie dog conservation and management on the Pawnee National Grassland (PNG). We agree that the current Land and Resource Management Plan (LRMP) should be amended to improve prairie dog conservation and management across the Pawnee Grassland. We appreciate the opportunity to participate in the process of developing prairie dog management strategies.

The Pawnee National Grassland is the only sizeable area of federal land in northeast Colorado's shortgrass prairie. This fact makes it very important to the region's wildlife, especially wildlife that is persecuted elsewhere such as the black-tailed prairie dog.

We are particularly encouraged that the PNG is proposing to change the current maximum allowable acreage for prairie dogs to no maximum limit on occupied prairie dog habitat. However, we have some concerns about the stated "purpose and need" for the PNG's proposed project. We also have some concerns about the current list of proposed actions outlined in the PNG scoping letter from Steven Currey dated April 12, 2006. Proposed actions include: setting a minimum population size for Pawnee prairie dogs, identifying where prairie dogs are desirable and not desirable on the Grassland, and identifying prairie dog management tools. We strongly recommend a few changes and additional proposed actions. Our recommendations are summarized below:

- The minimum prairie dog population size should be at least 19,300 acres, or 10 percent of the PNG.
- Prairie dog suitability models should not be used to justify removing prairie dogs from occupied Grassland areas. Successful occupation of an area by prairie dogs is a sufficient indicator of habitat suitability.
- Prairie dog poisoning and shooting should not be considered as management tools.
- Methods available to prevent and minimize the impacts of plague should be implemented.

- Removal of prairie dogs is not desirable, however, when prairie dogs are removed livestock grazing must also be removed to help prevent recolonization.

The remainder of this letter states our concerns about the proposed purpose and need for an amendment to the PNG LRMP regarding prairie dogs and provides additional information in support of our recommendations.

Purpose and Need

The PNG scoping letter of April 12, 2006 states that the need for the proposed EA and subsequent action includes the:

> … "need to respond to concerns with prairie dog movement from Forest Service lands of the PNG to adjoining private lands, where ranchers and farmers are concerned about losses in agricultural production, costs of managing prairie dogs, effects on land values, and risks to human and livestock health and safety."
>
> … "need to respond to the concerns of conservation groups who want to conserve prairie dogs for the wide variety of wildlife species that are dependent on the habitat provided by prairie dog colonies."
>
> … "need to address prairie dog management on a site-specific basis on the Grassland. In some places on the PNG, prairie dogs are moving into places where they are not desired, such as riparian areas and areas that the PNG District Ranger wants to manage for mid to tall vegetative structure. Management strategies need to be developed to address these site-specific prairie dog management issues."

We hope the PNG is not undertaking the EA and proposed project merely to appease a few disgruntled landowners and conservationists. The Pawnee is federal public land, and as such, management decisions and actions must promote the larger national public interest. There is a significant national public interest in protecting native wildlife on federal lands.

Given the proposed needs, the stated purpose of the project by the PNG is to "develop management strategies for black-tailed prairie dogs." We find this stated purpose uncomfortably ambiguous and vague. The problem that must be addressed in the process is that the current sections of the LRMP that pertain to prairie dogs are inadequate and even run counter to the important purpose of promoting a viable populations of prairie dogs on the Pawnee. The real need is to develop an amendment to the management plan that allows for the recovery and conservation of prairie dogs. We believe that this purpose and need can be fulfilled by this process in a way that advances the common public interest and reduces conflict with neighbors, without requiring lethal means to manage prairie dogs.

The black-tailed prairie dog (*Cynomys ludovicianus*) is a native species of the Great Plains, which includes the Pawnee National Grassland. Indeed it is a keystone species of the prairie grasslands [see appendix for more information of the prairie dogs' keystone role]. Prairie dogs create habitat through their burrow digging and other activities and serve as prey for an array of native prairie predators. At least nine native grassland species depend on prairie dogs and their habitat and another 170 have been shown to benefit from prairie dogs. Due to concerted, often government-sponsored, extermination programs prairie dog populations across the plains began plummeting in the early decades of the 1900s. Plague, an introduced exotic disease originating from Asia, contributed to significant prairie dog declines starting in the 1930s. Prairie dogs have no known natural immunity to the disease.

The U.S. Fish and Wildlife Service (FWS) listed the black-tailed prairie dog as a candidate for listing as threatened from 2000-2004. In its decision to take the species off the candidate list, the FWS conceded that the country's black-tailed prairie population was only at about two percent of its historic size. The fact that the black-tailed prairie dog is not longer on the ESA candidate list is by no means an indication that populations are healthy or recovered. This means only that the species may not be in immediate danger of going extinct, and this is up for debate. Poisoning and plague continue to threaten the viability of this vital keystone species. Recreational shooting contributes to prairie dog declines and negatively impacts ecosystem health. Habitat conversion from native grassland to cropland or urban development also harms the population. Our prairie grasslands are the most endangered ecosystem in North America. Though the shortgrass prairie has experienced less destruction than the mid- and tallgrass prairies farther east, only 23 percent of the shortgrass remains intact (USDA Forest Service 1996). It is very possible that the continued existence of these threats could put the black-tailed prairie dog back in consideration for ESA listing.

The loss of prairie dogs and their colonies is linked to the decline of other prairie species, including the mountain plover, burrowing owl, swift fox, ferruginous hawk, and black-footed ferret, among others. In fact the almost complete disappearance of large prairie dog complexes caused the near extinction of the black-footed ferret, still one of the most endangered mammals in North America. The PGN is well within the historic range of the black-footed ferret. However there are no black-footed ferrets or prairie dog complexes large enough to support ferrets in the entire Central Shortgrass Prairie Ecoregion[1], which encompasses the Pawnee and all of Colorado's Eastern Plains.

A major problem undermining black-tailed prairie dog recovery and conservation is the lack of public land across the species' range. Only about 7 percent of the Central Shortgrass Prairie is owned by the public, while the rest is in private hands. Only 2.3 percent is managed by the federal government and much of that is military land, mostly

[1]The Nature Conservancy has characterized the Central Shortgrass Prairie Ecoregion as a 56 million acre portion of the western Great Plains that includes parts eastern Colorado, southeastern Wyoming, southwestern Nebraska, western Kansas, the Oklahoma panhandle, northwestern Texas, and northeastern New Mexico (The Nature Conservancy 2005).

off-limits to public visitation. Because most private lands in the Great Plains are devoted to agriculture, the best hope for establishing viable populations of prairie dogs that fulfill their keystone functions lies with our federal National Grasslands. If prairie dogs cannot be protected on these lands, including the Pawnee, we really cannot hold out much hope that they will recover at all.

As stated above, the Pawnee National Grassland is the largest public land area in northeastern Colorado and a vital hotspot for prairie wildlife and native grassland amidst a sea of farms and private cattle pastures. It is one of the few places where prairie dogs and the wildlife that depend on them can be guaranteed some level of legal protection. Additionally, the Pawnee is unique in that is perhaps the only National Grassland that can be visited by the citizens of several major municipalities comfortably in one day. The other Great Plains Grasslands are located far from urban centers. Thus, the Pawnee is one of the few places and perhaps the best place for significant numbers of U.S. citizens to see at least a rough approximation of what a wild prairie ecosystem is supposed to look like.

For the reasons stated above, we believe the purpose and need of the EA should be to develop prairie dog management strategies that encourage prairie dog recovery and expansion and promote prairie dog protection.

Prairie Dog Population Size

Today prairie dogs occupy roughly one percent of the Pawnee while livestock graze 100 percent. Please do not promote a plan that allows this imbalance to continue. Rather, please actively manage to restore prairie dogs to a minimum of 10 percent (19,300 acres), an acreage which roughly corresponds to their minimum historical range on the Pawnee. A plan that would allow prairie dogs to occupy as little as 200 acres in this plague-prone area could easily lead to their extirpation from the Pawnee in violation of numerous laws and policies.

In its Conservation Plan for Grasslands Species the Colorado Division of Wildlife recommends increasing the total acreage of shortgrass prairie in low structure vegetation on the Pawnee to 40 percent, see below.

> Action 8.5: Recommend maintaining a minimum of 20% of the total acreage of shortgrass prairie habitats in low structure vegetation suitable for the nesting Mountain Plover and other shortgrass associated species with a long term goal of increasing this to 40%, particularly on the PNG which is predominantly shortgrass prairie habitat.
> Action 8.6: Recommend maintaining low structure vegetation on suitable shortgrass prairie habitats by increasing range allotment carrying capacity and grazing intensity, encouraging expansion of black-tailed prairie dog colonies, or through prescribed burning as appropriate.
> Action 8.7: Recommend positioning areas targeted for low structure

vegetation based on historic records of concentrations of the nesting Mountain Plover.
Action 8.9: Secure funding to partner with the USDA Forest Service to implement changes in allotment infrastructure to return to or maintain low structure vegetation with no financial burden passed on to permit holders. (page 24)

Action 8.5: Recommend maintaining a minimum of 20% of the total acreage of the Pawnee National Grassland in low structure vegetation suitable for nesting mountain plovers and other shortgrass associated species with a long term goal of increasing this to 40%. (page 129).

Prairie dog colonies represent permanent mountain plover nesting habitat. Burning and livestock grazing rates and intensities change over time and do not keep the vegetation short year-round as do prairie dog colonies. The best way to maintain permanent low structure vegetation suitable for nesting mountain plovers is to increase prairie dog colonies. At a minimum, prairie dog colonies should be expanded on the PNG to more than 10 percent of the total area in support of the goals of the Division of Wildlife's plan.

In contrast to this DOW plan, the proposed PNG plan allowing prairie dogs to occupy as little as 200 acres in this plague-prone area could easily lead to their extirpation from the Pawnee, in violation of numerous laws and policies. We must assume that PNG officials will allow prairie dogs to fall to this low level of 200 acres at least at some point in time, which would constitute a serious and immediate threat of extirpation. If in fact PNG officials have no intention of allowing prairie dogs to fall to this low level of 200 acres, then please reflect in the plan the lowest level that will be tolerated by increasing the minimum goal to that level. Once again, we recommend 19,300 acres.

The PNG is also important for possible reintroduction of native wildlife that is no longer present in northeast Colorado, such as the endangered black-footed ferret. In order to restore the ferret, prairie dogs must be allowed to expand. If sufficient prairie dog habitat existed in Northern Colorado's plains, the region could once again support this endangered species. Black-footed ferrets require large complexes of prairie dogs to survive. The PNG may be one of the best places to restore adequate numbers of prairie dogs to enable ferret recovery in eastern Colorado. Please include a minimum goal of at least one 10,000 acre complex of prairie dogs – the minimum amount necessary for successful reintroduction of the black-footed ferret. This seems a very reasonable request for an agency with a multiple-use mandate.

Desirable Prairie Dog Areas

Until prairie dogs occupy a minimum of 10 percent of the Pawnee, they should be allowed to colonize any area that they choose, rather than only the areas that Pawnee managers find "desirable" for prairie dogs. The April 12, 2006 notice of intent letter leads

us to believe that many areas will be determined "undesirable" based on the very weakest of logic:

> There is a need to address prairie dog management on a site-specific basis on the Grassland. In some places on the PNG, prairie dogs are moving into places where they are not desired, such as riparian areas and areas that the PNG District Ranger wants to manage for mid to tall vegetative structure. Management strategies need to be developed to address these site-specific prairie dog management issues.

This line of argument is unreasonable and unsupportable.

First, prairie dog colonization within riparian areas is a rare event that would be reversed over time by burrow flooding. As for areas adjacent to riparian areas, this is where prairie dogs belong. Prairie dog colonies once existed often for miles and miles along numerous streams and rivers of the Great Plains. What is the problem with prairie dogs colonizing near riparian areas? Do you have any evidence that prairie dogs are causing riparian degradation or water pollution? Of the Pawnee's total riparian areas, what percentage contains prairie dog colonies and what percentage is grazed by livestock? Poisoning a prairie dog colony simply because it borders a riparian area would harm wildlife, would not solve any riparian degradation or water quality problem, and is not justified.

Second, the presence of prairie dog colonies within areas that the PNG wants to manage for mid to tall vegetative structure would not interfere with this management goal. On the contrary, these prairie dog colonies would provide important islands of diversity within the larger mid to tall vegetative area. As long as prairie dog colonies continue to occupy such a miniscule percent of the overall Pawnee landscape, or even if they grow to around ten percent of the Pawnee, how would this constitute a problem with managing for mid to tall vegetative structure? Moreover, Weld County has over 250,000 acres of private land enrolled in the Conservation Reserve Program (CRP) (from Natural Resource Conservation Service Data 2006). CRP lands are characterized by mid-tall structure vegetation that tends not to support prairie dog colonies. The region's CRP lands help provide a vegetative diversity in the region.

We are also curious as to how many additional reasons will be identified to make areas "undesirable" for prairie dogs. One of our concerns is the possible use of habitat suitability models to limit prairie dog tolerance to only those areas determined as suitable by a model. Although these models should prove useful in identifying the best opportunities for acquiring/exchanging land and where prairie dog translocation may have the best chance of success, they should not be used to determine where prairie dogs shouldn't be allowed to exist. Obviously, anywhere that a prairie dog colony occurs would appear to be suitable to the prairie dogs.

The April 12 scoping letter identifies the proposed action:

> This decision will include minimum population size; will identify where

> prairie dogs are desirable and where they are not desirable on the PNG; and will identify the tools that would be available to manage prairie dogs and their habitat, including the tools to address the movement of prairie dogs from the PNG to adjacent lands, and the tools to manage where prairie dogs are desired and where they are not desired on the PNG.

We strongly agree with the need to include a minimum population size. This size should be large enough to guarantee viability of prairie dogs on the Pawnee in the presence of plague, and also large enough and in an adequate configuration to guarantee viability of associated species. We strongly disagree, however, with identifying where prairie dogs are desirable and where they are not desirable. We all know the outcome of such a "map" of desirability; prairie dogs will be controlled in "undesirable" areas, but little to nothing will happen to actively increase their numbers in the "desirable" areas. It will merely make more areas off limits to wildlife.

Management Tools

PNG provides a range of potential management tools in its scoping letter. While we consider the PNG's proposed action to eliminate a maximum quota for prairie dogs a big step forward, the addition of poisoning and shooting as potential management tools represent many steps backward. The Pawnee prairie dogs are currently protected from shooting, and Pawnee officials have not allowed poisoning for decades.

The following methods to increase prairie dog colonies should be included in the plan:

- keeping the Pawnee closed to prairie dog shooting;
- maintaining existing poisoning restrictions;
- relocating prairie dogs to start new colonies in desired areas on the Pawnee, especially when taken from adjacent private lands where they are not wanted;
- dusting prairie dog burrows in key colonies to prevent spread of plague.

The following methods to limit unwanted prairie dog colonization on adjacent private lands should also be included in the plan:

- consolidating public lands around important prairie dog colonies and potential habitat to reduce public/private conflicts in these areas;
- eliminating livestock grazing in areas next to private lands where prairie dogs are not wanted so that vegetation has the opportunity to grow and make the areas less suitable for prairie dog colonization;
- eliminating livestock grazing during drought conditions in all areas where prairie dog expansion near private lands is not wanted.

On the Pawnee, prairie dogs are currently protected from shooting year-round thanks to a Colorado Division of Wildlife regulation (CDOW Regulations, Chapter 3, Article II, #309A.2.a) Shooting should not be a part of the Pawnee prairie dog plan. Across the entire historic range of the black-tailed prairie dog, only a few areas are off limits to prairie dog shooting, representing a miniscule fraction of one percent of the remaining

black-tailed prairie dog population, which itself is less than two percent of the historic population. Due to Colorado Division of Wildlife regulation, the Pawnee is one of these off-limits areas. This is reason enough to keep the Pawnee closed to shooting, even if the Colorado Division of Wildlife revokes the shooting closure. In fact, this plan should include a Forest Service shooting closure regulation in the chance that the Colorado closure is revoked or revised. This closure can be modeled after the existing Forest Service closures on the Buffalo Gap and Thunder Basin National Grasslands.

Some argue that shooting does not pose a significant threat to prairie dogs, but the environmental impacts of prairie dog shooting are actually quite severe. Prairie dog shooting significantly reduces black-tailed prairie dog populations and population densities (USFWS 1998a, b). Shooting also alters prairie dog behavior. For instance, Irby and Vosburgh (1994) found that even light shooting has a significant effect on prairie dog behavior, with 42% of prairie dogs retreating to the burrows on a lightly shot colony, contrasted with a 22% retreat rate on unshot colonies, and 55% retreat rate on heavily shot colonies. Further, Irby and Vosburgh (1994) found that prairie dog shooters prefer higher densities of prairie dogs. This causes shooters to spread the pressure of their activity depending on population density, causing uniformity in prairie dog populations across colonies. Biologically, such uniformity is destabilizing to prairie dog populations.

Studies also report that shooting may decrease colony expansion rates (Miller et al. 1993; Reading et al. 1989). One study revealed that a colony in Montana had a 15% annual expansion rate when prairie dogs were not hunted, contrasted with a 3% expansion rate when they were (Miller et al. 1993). This dramatic decrease in rates of expansion represents decreased migration, which constitutes human interference with an integral population dynamic in prairie dogs: prairie dog dispersal.

Even without shooting pressure, there is a low survival rate of dispersing males (Garrett and Franklin 1981). In addition, prairie dog dispersal takes place in late spring (Knowles 1985; Garrett and Franklin 1981), which is one of the most popular times of the year for recreational prairie dog shooting. The negative impacts of shooting on prairie dog migration may therefore be considerable.

Shooting impacts may be unpredictable and colony-specific. Knowles and Vosburgh (2001: 7) compared black-tailed prairie dog shooting studies conducted in Montana, and concluded, “Shooting can impact prairie dog populations and …it is just a matter of the number of hours of shooting effort expended on a colony in relation to the size of the colony that determines the level of impact.”

Individual shooters can seriously impact prairie dog colonies. Randall (1976) chronicled the activity of three individual shooters who traveled from Minnesota to shoot white-tailed prairie dogs in Wyoming. In one week they concentrated on seven towns and tallied 1023 kills. This was in 1976, and prairie dog shooters are much better equipped today. Jerry Godbey of the U.S. Geological Survey Biological Resources Discipline reported that when he surveyed white-tailed prairie dog towns in Colorado, Utah, and Wyoming in 1997-1998, he found spent shells or dead prairie dogs at “virtually every

site" (Jerry Godbey, USGS, personal communication to Erin Robertson, 3 August 2001). Mr. Godbey said that he met one shooter near Delta, Colorado with three rifles who said that he shot white-tailed prairie dogs at least four times a week. This shooter estimated that he used 10,000 rounds per year, with an estimated 95% kill rate. Those figures translate to take of 9500 prairie dogs annually by a single person. Keffer et al. (2000) found that after they shot 22% of the black-tailed prairie dogs on one colony as part of a controlled shooting study, 69% (212 individuals) of the remaining prairie dogs left the colony. Small colonies may be particularly vulnerable to negative impacts from shooting (Knowles 2002, citing J. Capodice, pers. comm.). Entire colonies can potentially be eliminated from shooting pressure (Knowles 1988; Livieri 1999).

In addition, the threat that shooting poses extends to prairie dog associated species. For example, prairie dog shooting causes a reduction in the prey base. This may affect a broad range of avian and mammalian predators that prey on prairie dogs. The danger here is apparent:

> Viable populations of associated species cannot be expected at low prairie dog densities. Based on our observations of other prairie dog complexes in Montana, prairie dog complexes need to be broadly distributed and with relatively high occupancy to assure minimal viable populations of associated species (Knowles and Knowles 1994).

Low population densities result from shooting and will therefore work to the detriment of mammalian and avian prairie dog predators. In addition, there is no evidence to suggest that prairie dog shoots do not result in the harming or killing of non-target species, such as the burrowing owl, ferruginous hawk, and mountain plover. To the contrary, first-hand accounts indicate that these shoots do result in the harming and killing of a variety of wildlife species other than prairie dogs.

Relatedly, there is growing concern about the effects that spent shells may have on prairie dog predators. A preliminary study on the effects of prairie dog shooting on raptors (Wyoming Cooperative Fish and Wildlife Research Unit 2001) showed that black-tailed prairie dog towns on Thunder Basin National Grassland that were shot were visited by raptors an average of 2.42 times per hour, while towns that were not shot were visited an average of 0.5 times per hour. Blood samples taken from burrowing owls on a town where shooting occurred showed elevated lead levels. Knowles and Vosburgh (2001: 15-16) also raise this issue:

> Fragments of lead ingested by raptors when scavenging shot prairie dog carcasses have the potential to kill or severely disable raptors. Burrowing owls are reported to scavenge poisoned prairie dogs (Butts 1973) and would also be expected to feed on prairie dogs killed by recreational shooting. Ferruginous hawks and golden eagles are 2 other raptors known to scavenge on dead prairie dogs. Shooting in some areas has been sufficiently intense during the past decade to literally put millions of pieces of lead on the ground. It is unknown if passerine birds are picking

> up pieces of this toxic heavy metal. Mortalities in morning [sic] doves have been noted with ingestion of only 2 lead pellets. Ingestion of lead is a known significant problem for birds (Lewis and Ledger 1968 and Wiemyer et al. 1988).

On his Moreno Valley (NM) study site, Cully (1986: 2) noted that, "One of the major sources of recreation for the residents of the area is shooting prairie dogs, a practice that may contribute to the attraction of raptors to the valley." He suspected many of the area raptors were primarily subsisting on shot prairie dogs. To the extent shooters were using lead shot – which is extremely likely – those raptors were being exposed to lead poisoning.

While some of the above studies pertain to white-tailed and Gunnison's prairie dogs, cited biological impacts - reduced populations and population densities, altered behavior, potential colony extirpation, and impacts on associated wildlife – would reasonably extend to black-tailed prairie dogs on the Pawnee.

Unfortunately, even with the strong protections the currently exist on the Pawnee, recurring plague epizootics have prevented prairie dogs from occupying even a mere two percent of the Pawnee. Because of recurring plague, the full protections from shooting and poisoning that now exist must stay in place to give prairie dogs the best chance possible to occupy a greater percentage of the Pawnee.

Addressing Adjacent Neighbor Intolerance of Prairie Dogs

We realize that some people, especially those in the agricultural community, will never accept prairie dogs. We understand that Pawnee managers have been under considerable pressure from adjacent landowners and local elected officials to poison prairie dogs on the Grassland. We believe that the PNG should try to uphold good neighborly relations with adjacent landowners. But, conflicts where a prairie dog colony exists on both the Grassland and adjacent private land should not automatically result in prairie dogs being poisoned on the Grassland.

Again, prairie dogs are native wildlife species and they should not be sacrificed merely because people assume they are causing damage. Evidence of actual economic loss directly caused by prairie dogs must be produced to justify the removal of prairie dogs anywhere on the Grasslands. And, such removal should not include lethal methods. Additionally, if prairie dogs are removed from any Grassland area, cattle must be removed as well. Cattle grazing encourages prairie dog colony expansion, and prairie dogs will likely recolonize areas that allow continued livestock use. The removal of livestock grazing from the periphery of areas where prairie dogs are not wanted, such as along private property boundaries where prairie dogs are crossing onto lands owned by people who do not want prairie dogs, would allow for the creation of natural impediments to prairie dog dispersion. Encouraging the growth of mid to tall-grass boundaries and buffers by removing livestock grazing would minimize areas where conflicts may occur.

Maintaining livestock grazing in such areas, however, would preclude even the possibility of a successful long-term resolution to this conflict.

Extensive research, conducted over the course of the past twenty years, indicates that prairie dogs do not present the significant economic threat to livestock operations that has been portrayed time and time again. For instance, O'Meilia et al. (1982) found no significant difference in the weight of steers grazing on and off prairie dog towns. O'Meilia et al.'s study was conducted under heavy cattle stocking rates, thereby maximizing opportunities for competition between cattle and prairie dogs.

Other studies have similarly concluded that prairie dogs pose a negligible economic threat to cattle ranching. Hansen and Gold (1977) found that cattle weights did not significantly differ between colony and off-colony sites. In addition, Collins et al. (1984) reported that poisoning prairie dogs was not cost-effective, as the annual cost of maintaining control exceeded the annual value of the forage gained. Their conclusion held whether one assumed the perspective of the Forest Service or a grazing permittee.

Uresk (1985) finds that controlling black-tailed prairie dogs did not result in increased forage for the four-year time period he studied. Similarly, Klatt and Hein (1978) reported that eradication of prairie dogs would not significantly benefit cattle grazing, as changes in vegetation following five years of prairie dog abandonment were minor in the shortgrass prairie. In fact, these researchers concluded that there were decreases in total vegetative cover after prairie dog abandonment of colonies.

There are several reasons why the historical belief that prairie dogs are always detrimental to cattle ranching is inaccurate. First, prairie dog grazing results in a higher nitrogen concentration in plant shoots, compared with off-colony areas (Whicker and Detling 1988; Coppock et al. 1983a; 1983b; Krueger 1986). More generally, Whicker and Detling (1988: 783) reviewed the literature on the increased nutrition of forage on prairie dog colonies and concluded:

> In patches created by prairie dogs, plant biomass has a greater live-to-dead ratio (albeit lower standing crop), a higher crude protein (nitrogen) concentration, and a greater digestibility than biomass from the uncolonized prairie (Coppock et al. 1983a). These characteristics result in improved nutrition per unit of food consumed on the colony.

Indeed, rather than promoting soil erosion, as prairie dogs have been described as doing, the creation of more bare soil and the reduction in plant biomass and cover on prairie dog colonies "may cause microclimatic changes in the system" (Whicker and Detling 1988: 782), which may lead to increased nitrogen in plants on prairie dog towns. The effects of this warmer microclimate are offset by greater available soil moisture on prairie dog towns (Day and Detling 1994). Decreases in transpiring leaf area, conservation of soil moisture, changes in soil physical properties, and the promotion of water infiltration to deeper soil depths all probably account for the improved soil moisture availability and plant water status on prairie dog colonies. This improved water status and the higher ratio of green forage on colonies later in the season may explain preferential grazing by bison

(Bison bison) (Krueger 1986; Day and Detling 1994) and pronghorn (Antilocapra americana) (Krueger 1986). In fact, Bonham and Lerwick (1976) report that some plant species preferred by livestock are more abundant on prairie dog colonies than on study sites without prairie dogs.

Legal duties

These shortcomings of the proposed PNG prairie dog amendment fail to live up to the Forest Service's duties toward wildlife on the PNG. The Forest Service must "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives . . .," 16 U.S.C. § 1604(g)(3)(B); "preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species, including endemic . . . species, . . . so that it is at least as great as that which would be expected in a natural forest," 36 C.F.R. § 219.27(g); "provide for and maintain diversity of plant and animal communities to meet overall multiple-use objectives," 36 C.F.R. 219.27(a)(5); and "provide for diversity of plant and animal communities . . . consistent with the overall multiple-use objectives of the planning area." 36 C.F.R. § 219.26. Further, "[r]eductions in diversity of plant and animal communities and tree species . . . may be prescribed only where needed to meet overall multiple-use objectives." 36 C.F.R. 219.27(g). "Diversity" is "the distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan." 36 C.F.R. § 219.3. "Diversity of plant and animal communities" is "[t]he distribution and relative abundance of plant and animal communities *and their component species* occurring within an area." 36 C.F.R. 219.36 (emphasis added).

Courts have identified the maintenance of diversity on national forests and grasslands as a substantive standard the Forest Service must meet. *See Blue Mtn Biodiversity Project v. U.S. Forest Service*, Civil No. 01-703-HA (D. OR) (2002) ("Clearly, the NFMA imposes substantive duties on the Forest Service, one of which is the duty to "provide for diversity of plant and animal communities."); *Inland Empire Pub. Lands Council*, 88 F.3d 754, 757 (9th Cir. 1996) ("NFMA imposes substantive requirements"); *Seattle Audubon Soc'y v. Moseley*, 798 F.Supp. 1484, 1489 (W.D. Wash. 1992) (noting that § 1604(g)(3)(B) "confirms the Forest Service's duty to protect wildlife. . . . This duty 'requires planning for the entire biological community—not for one species alone") (internal quotations omitted); *Utah Envtl. Cong. v. Zieroth*, 190 F.Supp.2d 1265, 1268 (D. Utah 2002) (stating that "NFMA imposes substantive duties, one of which is the duty to 'provide for diversity of plant and animal communities'") (*quoting* 16 U.S.C. § 1604(g)(3)(B)); *Utah Envtl. Cong. v. Bosworth*, 372 F.3d 1219, 1225-26 (10th Cir. 2004) (analyzing § 1604 and its regulations and concluding that together they impose substantive population-gathering requirements on the Forest Service); *Sierra Club v. Espy*, 822 F.Supp. 356, 364 (E.D. Tex. 1993), *rev'd on other grounds*, 38 F.3d 792 (5th Cir. 1994) (holding that the Forest Service's "statutory duty clearly requires protection of the *entire biological community*"); "*Unlike NFMA*, NEPA does not "mandate that agencies achieve particular substantive environmental results." *Native Ecosystems Council v. United States Forest*

Serv., 418 F.3d 953, 958n4 (9th Cir. 2005) (citing *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 371 (1989) (emphasis added).

Ecological communities can not be maintained unless the individual species of which those communities are comprised are maintained. Defendants must "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." 36 C.F.R. § 219.19 (1982). A viable population is defined as one with "the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area." Id. Further, "to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." Id. The Forest Service is also required to "provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species." 36 C.F.R. § 219.27(a)(6)(1982). Prairie dogs are a fundamental, keystone member of the plant and animal communities on the PNG. Maintaining adequate prairie dog populations is not only necessary to meet the Forest Service's legal duties toward the prairie dog itself, but to the other species whose viability is linked to the prairie dog. We urge the Forest Service to adopt the changes we recommend in order to bring this forest plan amendment in line with the Forest Service's legal duties outlined here.

Conclusion

Thank you for considering our comments. Please do all you can to increase and protect prairie dogs on the Pawnee National Grassland. Please contact Jonathan Proctor, listed below, if you have any questions about these comments or would like additional information.

Sincerely,

Jonathan Proctor
Defenders of Wildlife
1425 Market Street, Suite 225
Denver, CO 80202
jproctor@defenders.org

Lauren McCain
Forest Guardians
1536 Wynkoop St., Suite 300
Denver, CO 80202
lmccain@fguardians.org

Monica Engebretson
Animal Protection Institute
1122 S Street
Sacramento, CA 95814
monica@api4animals.org

Nicole Rosmarino
Southern Plains Land Trust
P.O. Box 66
Pritchett, CO 81064
splt@southernplains.org

Judy Enderle
Prairie Preservation Alliance
P.O. Box 12485
Denver, CO 80212-0485
judy@prairiepreservationalliance.org

Erin Robertson
Center for Native Ecosystems
1536 Wynkoop, Suite 302
Denver, Colorado 80202
erin@nativeecosystems.org

Nancy Hilding
Prairie Hills Audubon Society
P.O. Box 788
Black Hawk, SD 57718
phas.wsd@rapidnet.com

Appendix

The Keystone Role of Prairie Dogs

It is hard to overstate the importance of prairie dogs to the ecology of the shortgrass prairie. The role of prairie dogs as a keystone species is now well-established scientifically (Kotliar et al. 1999; Kotliar 2000; Miller et al. 2000). Prairie dogs probably qualify under multiple categories of keystone species—as prey and for their modification of habitat (Mills et al. 1993). The shortgrass prairie areas that prairie dogs inhabit should probably be considered ecosystems unto themselves.

Keystone species enrich ecosystem function uniquely and significantly through their activities, and their impact is larger than predicted relative to their biomass (Paine 1980; Terborgh 1988; Mills et al. 1993; Power et al. 1996; Kotliar et al. 1999; Miller et al. 1998/1999). Kotliar (2000: 1715). Prairie dogs are functionally unique; they perform roles within their ecosystem not performed by other species or processes. The scientific literature is growing that supports the argument that prairie dogs fulfill all the requirement of keystone species (Coppock et al. 1983a, b; Detling and Whicker 1988; Whicker and Detling 1988a, b; 1993; Reading et al. 1989; Society for Conservation Biology 1994; Kotliar et al. 1997; 1999; Wuerthner 1997; American Society of Mammalogists 1998; Kotliar 2000, Miller et al. 2000).

Prairie dog activities and the changes made by these activities create a unique ecological system known as the “prairie dog ecosystem” (Clark et al. 1989; Miller et al. 1996). Over 200 vertebrate species have been observed on prairie dog colonies (Koford 1958; Tyler 1968; Campbell and Clark 1981, Clark et al. 1982; O’Meilia et al. 1982; Agnew et al. 1986; Reading et al. 1989; Sharps and Uresk 1990; Mellink and Madrigal 1993; Hoogland 1995; Barko 1996; Manzano 1996; Ceballos and Pacheco 1997; Ceballos et al. 1999; Kotliar et al. 1999). Some of these species appear to depend on prairie dog colonies for their survival and many appear to benefit, at least seasonally or opportunistically from their existence (Reading et al. 1989; Hoogland 1995; Manzano 1996; Ceballos et al. 1999; Kotliar et al. 1999).

Prairie dogs and other animals inhabiting prairie dog colonies represent a rich prey patch for a large number of predators (Reading et al. 1989; Miller et al. 1996; Plumpton and Anderson 1997; Berry et al. 1998; Kotliar et al. 1999). A variety of predators including prairie rattlesnakes (*Crotalus viridis*), golden eagles (*Aquila chrysaetos*), great horned owls (*Bubo virginianus*), weasels (*Mustela frenata*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), and others prey on prairie dogs and small mammals that have a higher abundance on prairie dog colonies (Agnew et al. 1986). Some predators, especially black-footed ferrets (*Mustela nigripes*), are completely dependent on prairie dogs (Clark 1989; Miller et al. 1996). Other species, such as badgers (*Taxidea taxus*), swift foxes (*Vulpes velox*), and ferruginous hawks (*Buteo regalis*), benefit substantially from the presence of prairie dogs as prey (Uresk and Sharps 1986; Sharps and Uresk 1990; Allison et al. 1995; Plumpton and Andersen 1997, 1998; Berry et al. 1998; Goodrich and Buskirk 1998).

The benefits of prairie dogs extend well beyond simply being food for predators (Reading et al. 1989; Ceballos et al. 1999; Kotliar et al. 1999). Prairie dogs also substantially alter their environment. Since prairie dogs excavate more burrows than they regularly utilize[2], they create hibernacula, dens, and nests for many animals, such as black-footed ferrets, swift fox, badgers, cottontails (*Sylvilagus* spp.), burrowing owls, shrews, other rodents, and several species of reptiles and amphibians (Reading et al. 1989; Sharps and Uresk 1990; Plumpton and Lutz 1993; Fitzgerald et al. 1994; Desmond et al. 1995; Kretzer and Cully 2001). These species and more also use the burrows as refugia from predators or temperature extremes. As a result, researchers have found that desert cottontails (*S. audonbonii*), thirteen-lined ground squirrels (*Spermophilis tridecemlineatus*), and northern grasshopper mice (*Onychomys leucogaster*) exist in higher numbers on prairie dog colonies than in surrounding grasslands (O'Meilia et al. 1982; Agnew et al. 1988; Dano 1952 in Stapp 1998). Similarly, studies in Mexico found higher rodent species richness, density, and diversity, and higher avian species richness on prairie dog colonies compared with surrounding grasslands in Chihuahua, Mexico (Manzano 1996; Ceballos and Pacheco 1997; Ceballos, Pacheco, and List 1999). Most of the research to date has focused on birds and mammals with considerably less research on reptiles and amphibians (but see Kretzer and Cully 2001). Similarly, little is known about prairie invertebrates, yet the burrows in a prairie dog colony should offer habitat advantages to invertebrates as well.

Prairie dogs also have a large effect on vegetation structure, productivity, nutrient cycling, and ecosystem processes (Coppock et al. 1983; Detling and Whicker 1988; Whicker and Detling 1988a, b; 1993; Weltzin et al. 1997a; Stapp 1998). The activities of prairie dogs, especially their grazing and clipping of tall vegetation, result in changes in plant composition (Bonham and Lerwick 1976; Coppock et al. 1983, Detling and Whicker 1988; Whicker and Detling 1988a, b; 1993, Weltzin et al. 1997a; Detling 1998). In general, the vegetation on prairie dog colonies is characterized by lower biomass and a greater preponderance of annual forbs and short grasses compared to tall grasses and shrubs, but is higher in nitrogen content than vegetation from surrounding areas (Bonham and Lerwick 1976; Coppock et al. 1983, Weltzin et al. 1997a; Detling 1998). Prairie dogs negatively impact some plant species, reducing the prevalence and controlling the spread of taller grasses and several shrubs, such as mesquite (*Prosopis* spp.), sagebrush (*Artemisia* spp.), and longleaf jointfir (*Ephedra trifurca)* (Bonham and Lerwick 1976; Coppock et al. 1983; List 1997; Weltzin et al. 1997b). Ironically, prairie dogs are poisoned for livestock interests, but these shrubs reduce grass available for cattle, and mesquite makes roundups more difficult (Miller 1991).

Prairie dog burrowing activities modify ecosystem processes such as water, mineral and nutrient cycling. Prairie dogs turn over approximately 225 kg of soil per burrow system**,** which translates to several tons of soil per hectare (Whicker and Detling 1993). By mixing in nutrient-rich urine and manure, prairie dog digging can change soil composition, chemistry, and microclimate, facilitate below-ground herbivory, increase porosity of soil to permit deeper penetration of precipitation, and increase the

[2]Despite the common belief that there are several prairie dogs per burrow entrance, there are actually several burrow entrances per prairie dog (Biggins et al. 1993; Hoogland 1995).

incorporation of organic materials into the soil (Ingham and Detling 1984; Whicker and Detling 1988 a, b; Munn 1993; Outwater 1996). As a result, prairie dog colonies support higher numbers of nematodes and higher levels of soil nitrogen (Ingham and Detling 1984, Detling 1998). All of these processes contribute to aboveground plants with a higher nutritional content, greater digestibility, and a larger live plant to dead plant ratio, creating favorable feeding habitat for other herbivores (Whicker and Detling 1993). Indeed, pronghorn and bison preferentially graze on prairie dog colonies (Coppock et al. 1983; Krueger 1986; Detling and Whicker 1993, Detling 1998). Foraging models predict that bison can gain weight faster by grazing on pastures with prairie dog colonies than on grasslands without prairie dogs (Vanderhyde 1985 in Whicker and Detling 1993).

Kotliar et al. (1999:177) concluded that collectively these functions are large, not wholly duplicated by other species (either in form or extent), and that the loss of prairie dogs would lead to "substantial erosion of biological diversity and landscape heterogeneity across the prairie." They concluded that the prairie dog therefore fulfills the definition of keystone species (see also Kotliar 2000). We agree (see Stapp 1998 for an alternative view). The structure, form, and function of prairie dog colonies provide a keystone role in the prairie, and the role is large. Despite the difficulty in quantifying a role, we contend that existing evidence indicates prairie dogs (and other associated species) provide important prey to predators, and their grazing and burrowing activities modifies the environment in a manner beneficially used by other prairie organisms (Whicker and Detling 1993; Kotliar et al. 1999). Most importantly, those grazing and burrowing activities affect vegetative composition, vegetation quantity and quality, productivity, nutrient cycling, and soil quality (Bonham and Lerwick 1976; Coppock et al. 1983; Detling and Whicker 1988; Whicker and Detling 1988 a, b; 1993).

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