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*Wind Cave National Park, Hot Springs, South Dakota*

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# Management of Prairie Dog Populations in Wind Cave National Park<sup>1</sup>

Richard W. Klukas<sup>2</sup>

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Abstract.--Since the late 1920's there have been periodic control programs on black-tailed prairie dogs in Wind Cave National Park. The most recent control effort, which began in 1982, resulted in the reduction of total dogtown acreage from 2,000 to 750 acres. Recent studies carried out within the park have provided managers with more soundly based justification for carrying out control programs. The same information also points to the importance of maintaining prairie dog populations at or above certain minimum levels and the need for integrating this control program with several of the other resource management programs being carried out in the area.

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## INTRODUCTION

In 1903 the United States Congress established Wind Cave as a 10,840 acre national park. The area was set aside due to its cave resources and for the potential which it held as a reintroduction site for species such as elk, bison and pronghorn. Additional lands were added to the park over time so that by 1946 its boundaries encompassed roughly 28,000 acres.

As the park grew its ungulate herds (bison, elk and antelope) were allowed to increase in size. The earliest wildlife management activities centered on regulating bison and elk herd sizes and controlling predator species such as coyotes and bobcats. Black-tailed prairie dogs (*Cynomys ludovicianus*) were also considered to be in need of regulation as evidenced by sketchy accounts and records in park files dating back to the 1920's and 1930's. In those early years management of wildlife populations deemed to be in need of control was based largely on instinctive reactions, and trial and error experiences. In recent years the development of ecological concepts and understandings, as well as their application, has led not only to a tolerance of the prairie dog but to an appreciation of its role in maintaining a dynamic natural setting for other native plants and animals.

These new insights and a vastly improved attitude toward prairie dogs would not have come about were it not for a considerable number of recent studies which have been recently conducted both within Wind Cave and adjacent areas. The primary purpose of this paper is to discuss some of this recent work and describe a possible future course for the management of black-tailed prairie dogs in Wind Cave National Park.

## RESEARCH FOCUSED ON MANAGEMENT QUESTIONS

Most prairie dog studies in the park have been conducted by graduate and post-graduate researchers. In nearly all cases the immediate study goals of these persons were not focused on answering questions that were of concern to managers. Nevertheless their work often produced information that allowed for important insights far beyond what was anticipated. Such findings will be discussed later in this paper. The National Park Service however, has carried out studies which dealt primarily with problems and questions perceived to be critical to the establishment of a suitable prairie dog management program. These studies were carried out through research contracts or by park personnel.

With respect to the prehistoric occurrence of dogtowns, Carlson (1986) and White (1986) determined that prairie dog colonies have been present on lands within the park for at least the past several thousand years. In addition, White speculated that dogtowns appear to have contracted, expanded or were abandoned or recolonized depending on major shifts in climate.

Garrett and Franklin (1982) studied movements of prairie dogs (immigration) to determine the extent that prairie dogs from the park might contribute to the establishment and growth of towns on lands beyond its boundaries.

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Garrett and Franklin (1982) in addition experimented with visual barriers as a means of reducing, halting or directing the expansion of dogtowns.

Garrett and Franklin (1983) and later Klukas (unpublished) used Diethylstilbestrol (DES) to determine if prairie dog population management could be achieved by limiting natality. Population regulation through use of smoke bombs, rim and center fire rifles and zinc phosphide was also tested by park personnel. Among all the approaches to control that were tested, that involving the use of zinc phosphide treated baits proved most effective and practical.

#### OTHER STUDIES RELATING TO PRAIRIE DOGS

The earliest prairie dog research carried out in Wind Cave was a study on behavioral and life history characteristics by J. A. King in 1955. J. Hoogland came to the park in the mid 1970's to explore more fully the behavioral characteristics of blacktails and continues at present in that pursuit. King and Hoogland have uncovered a substantial body of information of importance to other researchers (i.e. ecologists, behaviorists, geneticists, etc.) as well as to those interested in the management of prairie dog populations (King 1955, Hoogland 1979, 1981, 1985).

Coppock was among the first of many ecologists who was able to enhance their investigations through use of information obtained from earlier studies by King and Hoogland (Coppock, et al, 1983). Coppock and associates' determination that prairie dogs were affecting bison grazing patterns led to a number of subsequent related studies by fellow graduate students and staff of the Natural Resources Ecology Laboratory at Colorado State University. Among the findings of this group were that: prescribed fire can be used to reduce bison grazing activities on dogtowns (Coppock and Detling 1986); and that summer grazing of dogtowns by bison offered significant nutritional advantages (Ravndal 1985). These and various other findings of no less significance are described more fully in another paper to be presented at this workshop by James Detling and April Whicker (see: Control of Ecosystem Processes by Prairie Dogs and Other Grassland Herbivores).

While many of the above behavioral and ecological studies were being carried out by visiting researchers the National Park Service was undertaking studies to determine the importance of prairie dogs as a food source for predators. During the period 1975 to present 38 prairie dog predations were observed and recorded. Although six predator species contributed to this total only the coyote, with 17 predations (45%), appeared to demonstrate somewhat of a reliance on the prairie dog as a dietary subsistence item. A concurrent study on coyote food habits by Franklin et al (in writing) appears to verify this assumption.

The array of research findings referred to so briefly above have generated a considerable body of information which can be utilized in a number of ways within Wind Cave National Park. Interpretation based on new information on prairie dog behavior, and natural history and the role of prairie dogs as a key component of the ecosystem can be upgraded and enriched for presentation to the public.

This same information, viewed from a different perspective, can be applied to the improvement of Wind Cave's prairie dog management program. Modifications of the current program can be guided by a number of important considerations brought to light by recent research. Some of those which seem to be most relevant are as follows:

1. Prairie dog colonies on park lands have varied in size, number and importance through a good portion of the post-Pleistocene period.
2. There are significant interactions between prairie dogs and associated plants and animals. These interactions include not only modifications of feeding, growth, and behavioral characteristics but may be of evolutionary significance as well.
3. Natural predation of prairie dogs does not occur with enough frequency to exert a controlling influence on any but the smallest sized colonies. With the possible exception of the badger there appears to be no predator species which is strongly reliant on the prairie dog as a food source.
4. There are no practical, indirect or non-toxic approaches to control of prairie dog populations that alone can fulfill all the requirements for accomplishing such within the park.
5. Fire can be used to stimulate the growth of dogtowns as well as to temporarily halt their rate of growth or to even reduce their size. Prescribed burns immediately adjacent to dogtowns can enhance dogtown expansion by reducing the height and density of bordering ground cover. Fires on areas removed from dogtowns will significantly reduce ungulate use of colony sites. Under such conditions prairie dogs must on their own accomplish the reduction of ground cover required for expansion into uncolonized areas.
6. High populations of elk, bison and perhaps pronghorn, along with absence of fire and less than normal precipitation during the plant growing season provide optimal conditions for expansion of dogtowns.

The above considerations in concert imply that there is a need for modification of the park's current prairie dog management program. A revised program should clearly demonstrate a recognition of the essential role of prairie dogs in catalyzing or promulgating many important ecological and evolutionary processes. Control of prairie dog colony

sizes and locations needs to be reconsidered. The current program calls for reducing total acreage to 700 acres and limiting the number of colonies to five. A more flexible or dynamic approach would appear to be justified by the considerations discussed above. Colony sites which have been unoccupied for decades should be allowed to grow to their former size when recolonized. Other colonies which have been occupied for many decades could be depopulated for a period long enough to permit the return of a ground cover more typical of uncolonized areas. Total acreage should be allowed to fluctuate between 700 to 1200 acres and numbers of active colonies could be as high as ten.

The long interval between the most recent reduction (1982-1986) of total colony acreage and the previous such effort (mid-1950's) was perhaps the most important factor contributing to the unprecedented recent high level of dogtown acreage (2,000+ acres) within the park. Future efforts to control the size and locations of colonies should be carried at intervals no longer than five years. In all forthcoming management plans it will also be necessary to consider the use of indirect (prescribed fire and ungulate herd size reduction) as well as direct (zinc phosphide and rifles) control measures.

Current and future research efforts will likely provide information that will point to the need for further refinements and modifications in the prairie dog management program. Experiences gained in managing prairie dogs over many decades and information obtained from recent intensive research efforts point to the necessity of viewing prairie dog management as a dynamic, ever evolving but never static, program.

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