

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Great Plains Wildlife Damage Control Workshop  
Proceedings

Wildlife Damage Management, Internet Center for

---

April 1987

# Historical and Present Status of the Black-Footed Ferret

Dean E. Biggins

*U.S. Fish and Wildlife Service*

Max H. Schroeder

*U.S. Fish and Wildlife Service*

Follow this and additional works at: <http://digitalcommons.unl.edu/gpwdcwp>



Part of the [Environmental Health and Protection Commons](#)

---

Biggins, Dean E. and Schroeder, Max H., "Historical and Present Status of the Black-Footed Ferret" (1987). *Great Plains Wildlife Damage Control Workshop Proceedings*. 50.

<http://digitalcommons.unl.edu/gpwdcwp/50>

This Article is brought to you for free and open access by the Wildlife Damage Management, Internet Center for at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Great Plains Wildlife Damage Control Workshop Proceedings by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# Historical and Present Status of the Black-Footed Ferret<sup>1</sup>

Dean E. Biggins<sup>2</sup> and Max H. Schroeder<sup>3</sup>

---

Abstract.--The black-footed ferret (Mustela nigripes) was once widely distributed in the Great Plains and intermountain valleys of North America, its range overlapping the combined ranges of several species of prairie dogs (Cynomys spp.). Most life history information has been obtained from studies of ferrets in southwestern South Dakota (1964-1974) and studies near Meeteetse, Wyoming (1981-present). The ferret's nearly complete dependence on prairie dogs was documented in both study areas. The recent collapse of the Meeteetse population of ferrets due to an outbreak of canine distemper underscores the threat posed by this disease, but reductions of prairie dogs by man and other diseases are also potentially harmful. Eighteen animals are being held for captive breeding, no free-ranging ferrets have been located, and species recovery seems dependent on captive propagation and releases.

---

## INTRODUCTION

The black-footed ferret (Mustela nigripes) is a member of the family Mustelidae. The long, slender animals weigh 650 to 1400 grams; adult males are about 47% heavier than adult females (Anderson et al. 1986). The historic range of the black-footed ferret was coextensive with the combined ranges of the black-tailed prairie dog (Cynomys ludovicianus), the white-tailed prairie dog (C. leucurus), and Gunnison's prairie dog (C. gunnisoni). The black-footed ferret is nearly totally dependent on the prairie dog ecosystem, and any prairie dog management program potentially affects the ferret's welfare. The black-footed ferret is now perhaps North America's rarest mammal. We review the ferret's historic distribution and abundance, summarize more recent developments, and present perspectives on the animal's future.

## HISTORIC DISTRIBUTION AND ABUNDANCE

Audubon and Bachman introduced the black-footed ferret to the scientific world in 1851, although Indians of several Great Plains tribes were already familiar with the animal (Clark 1976). Some authors have implied or categorically stated that the ferret was always uncommon, although others (e.g., Henderson et al. 1969, Hillman and Carpenter 1980) have qualified their remarks by pointing out the difficulties of finding ferrets even when they are known to be present. Evidence suggesting historical rarity includes use of ferret parts in Indian ceremonies (Fortenberry 1972), the relatively late discovery of the ferret, and the paucity of reports and specimens. However, our experiences with ferrets near Meeteetse, Park County, Wyoming, support the implication by Linder et al. (1972) that ferrets were seldom reported simply because they are fossorial, nocturnally active, and thus difficult to observe. The ferret population in Park County was the largest known for the species, yet few residents had ever seen one and they were not "discovered" until 1981. Researchers usually had to locate ferrets using high-intensity spotlights, equipment unavailable to the natives and early settlers of the Great Plains.

Some early records of the black-footed ferret came from trappers. Such records are sparse, but the American Fur Company received

---

<sup>1</sup>Paper presented at the Eighth Great Plains Wildlife Damage Control Workshop, Rapid City, South Dakota, April 28-30, 1987.

<sup>2</sup>U.S. Fish and Wildlife Service, National Ecology Center, 1300 Blue Spruce Drive, Fort Collins, Colorado

<sup>3</sup>U.S. Fish and Wildlife Service, Region 6, P. O. Box 25486, Denver Federal Center, Denver, Colorado 80228

86 ferret skins from Pratt, Chouteau, and Company of St. Louis in the late 1830's (Johnson 1969). Fur traders of that era must have recognized the North American ferret by its similarity to its Eurasian relatives. In the early 1900's, trappers involved in animal control operations undoubtedly took many ferrets; 25% of the specimens reported by Anderson et al. (1986) were taken in this manner. The proportion of ferret specimens saved relative to total number trapped is unknown. During the early years of predator control, ferrets may have been discarded as having no particular value; in later years, recognition of the animal's rarity may have caused the same response--this time out of fear of reprisal or even legal action (after passage of the Endangered Species Act of 1973).

Anderson et al. (1986) recorded the status of 412 black-footed ferret specimens from 12 states and 2 Canadian provinces. Sight reports were not considered because of difficulty in assessing their authenticity; nevertheless, their list supports an original widespread occurrence of the ferret, and suggests that it was a common animal in at least portions of its range. We join others (Linder et al. 1972, Hubbard and Schmitt 1984, Anderson et al. 1986) in questioning the commonly accepted axiom that the black-footed ferret was "always rare." The data of Anderson et al. (1986) indicate an increase in specimens collected through the 1920-1939 period (fig. 1). This increase probably reflects increased attention given the species rather than change in the ferret population. Efforts to find ferrets continued to increase in later years, underscoring the precipitous decline in specimens obtained.

During the 1960's and 1970's, ferret specimens for which approximate date of death could be established originated only from South Dakota, Montana, and Wyoming (fig. 1). In the 1970's, all such specimens came from Mellette County (South Dakota), Park County (Wyoming), and Carter County (Montana), although unverified sightings were reported from other areas and states.

Most knowledge of black-footed ferret life history was obtained from studies conducted in Mellette and adjacent counties, South Dakota, during 1964-1974, and in Park County, Wyoming, during 1981-1986. In South Dakota, 11 ferret litters were observed by biologists from 1964-1972 (Linder et al. 1972), but searches failed to reveal ferrets on the Mellette County study areas after 1974. In Wyoming, 70 ferret litters were observed by researchers from 1982-1986; the highest minimum count of ferrets for a single year was 129. An outbreak of canine distemper decimated the Meeteetse population in 1985 (Forrest et al., in press); the last known animal was removed in 1987 for captive breeding.

An attempt at captive propagation of South Dakota ferrets began in 1971, with the capture of six animals; another individual was added to the founder stock in 1972, and two more in 1973 (Carpenter and Hillman 1978). Four of the original six animals died of vaccine-induced canine distemper shortly after capture (Carpenter et al. 1976). Litters of young were produced during two consecutive years by one female, but none survived more than two days. The last of these captives died in 1978 (Carpenter et al. 1980).

A second attempt to captive breed began in 1985, with the capture of six ferrets from Meeteetse. Two of the animals developed symptoms of canine distemper soon after capture, indicating that they had been exposed to the virus before capture (Williams et al., in manuscript). All six ferrets died of the disease; the last four animals apparently contracted it from the first two. Six more ferrets were captured late in 1985, eleven in 1986, and one in 1987; these 11 females and 7 males form the current captive breeding program in Wyoming.

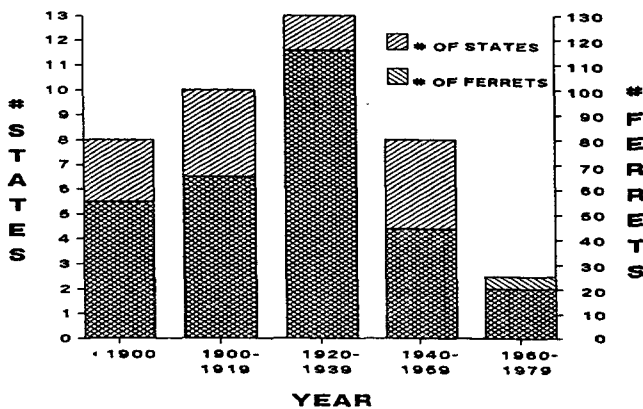


Figure 1. Numbers of black-footed ferret specimens collected and number of states (U.S.) and provinces (Canada) represented (data from Anderson et al. 1986).

THE FERRET DECLINE--MORE QUESTIONS THAN ANSWERS

Life history studies in South Dakota and Wyoming underscored the nearly complete dependence of black-footed ferrets on prairie dogs. Prairie dogs (particularly the black-tailed species) may have increased in the late 1800's and early 1900's due to heavy overgrazing (Clark 1973); their numbers were then greatly reduced by control programs and

conversion of prairies to croplands. Sylvatic plague, a disease that may have been introduced into North America (Eskey and Haas 1940) also can cause massive prairie dog dieoffs (Barnes 1982). The ferret decline may be related to an overall decline in prairie dogs, but ferrets have decreased proportionately more than their prey, suggesting involvement of other factors.

Disease and genetic problems could have been influential in the ferret decline. Studies of black-footed ferrets from Meeteetse revealed the population has low levels of genetic variation (O'Brien et al., in press), indicating a possible genetic bottleneck at some time in the past. The combination of maladies suffered by captive ferrets from the Mellette County, South Dakota population also was suggestive of inbreeding (Carpenter et al. 1981). The extreme susceptibility of the black-footed ferret to canine distemper became evident during the first experiences with captive ferrets from South Dakota. A modified live virus vaccine that was sufficiently attenuated for use on European ferrets (*Mustela putorius*) produced fatalities in black-footed ferrets (Carpenter et al. 1976). Erickson's (1973:159) suggestion that "the hazards of exposure of the highly sensitive black-footed ferret to canine distemper virus may be substantial" proved prophetic when the Meeteetse population was devastated by the disease in 1985. Blood tests conducted on other carnivores present in the study area showed that some coyotes (*Canis latrans*) and badgers (*Taxidea taxus*) had been exposed to canine distemper virus, which suggests a broader scale epizootic with many potential routes for interspecific transmission.

An incomplete understanding of disease, genetics, small population biology, and habitat loss allows synthesis of a wide variety of scenarios to explain how black-footed ferret numbers were reduced to their present level. In the process of considering possibilities, questions such as the following seem relevant:

1. Did prairie dog reductions fragment ferret habitat (i.e., prairie dog towns) sufficiently to create small, insular subpopulations of ferrets, each with greatly increased risk of "chance extinction" (Harris et al., in press) resulting mostly from the ferret's characteristically large seasonal fluctuation in numbers?
2. Did prairie dog reductions result in sufficient fragmentation of ferret habitat to isolate remaining black-footed ferrets, leaving subpopulations that would become inbred?

3. Is hypersensitivity of black-footed ferrets to canine distemper a result of inbreeding?

4. Did the black-footed ferret historically have to cope with canine distemper epizootics?

5. Does a discontinuous distribution of black-footed ferret populations offer protection from extinction due to a canine distemper epizootic by providing barriers against intraspecific transmission of the disease?

6. Would a large, geographically continuous population of ferrets be better able to survive a distemper epizootic through reinvasion by survivors?

7. What role does interspecific transmission of canine distemper play in the dynamics of the disease?

On the other hand, the explanation for the decline of ferrets is not necessarily as complex as implied above. If settlement of the Great Plains exposed the ferret to a new disease with which it had not evolved, then the ferret might have been taken to the verge of extinction regardless of prairie dog reductions, population isolation, or genetic problems. Canine distemper has become increasingly suspect in the ferret decline, but the Meeteetse case history is the only documentation of the disease in free-ranging black-footed ferrets; its impact on other ferret populations is unknown.

#### THE FUTURE

The black-footed ferret has little chance for recovery without an aggressive program of captive propagation. The immediate goal must be preservation of the gene pool; without that, there are no future options. If all future populations of black-footed ferrets are produced from the present captive animals, genetics will be a major concern (Ballou, in press). A comprehensive effort to locate more ferrets is imperative, with the primary objective of increasing genetic variation in the captive population. A prerequisite for reintroduction of ferrets is maintenance of complexes of prairie dog colonies as ferret habitat. The prospect for successful reintroduction of ferrets would be enhanced by (perhaps depends on) a better understanding of factors that placed the ferret in its current status.

Potential problems with genetics, disease, and available habitat imply that some level of perpetual management action will be needed to ensure persistence of reintroduced populations. A possible management strategy

could include maintenance of several captive populations in addition to the reestablished wild populations, exchange of animals between populations (Brussard, in press), a program for monitoring wild populations, and use of releases and transplants to rapidly rebuild any population reduced by diseases or other catastrophes.

After the ill-fated experience with South Dakota ferrets, Carpenter et al. (1981:746) suggested that ferret recovery faced "more formidable obstacles than previously envisioned." That statement clearly remains appropriate after the Meeteetse case history. Nevertheless, an impressive array of resources and expertise has been assembled to address problems of ferret recovery, and, with good fortune, the black-footed ferret may yet be returned from the brink of extinction.

#### LITERATURE CITED

- Anderson, Elaine, Steven C. Forrest, Tim W. Clark, and Louise Richardson. 1986. Paleobiology, biogeography, and systematics of the black-footed ferret, *Mustela nigripes* (Audubon and Bachman), 1851. *Great Basin Nat. Mem.* 8:11-62.
- Ballou, Jonathan D. In press. Considerations of inbreeding and outbreeding depression in the captive propagation of black-footed ferrets (*Mustela nigripes*). In U. Seal et al., eds., *Proceedings of the Workshop on Captive Propagation of Black-footed Ferrets*, 13-15 August 1986, Laramie, Wyoming. Yale Univ. Press.
- Barnes, Allan M. 1982. Surveillance and control of bubonic plague in the United States. *Symp. Zool. Soc. London No.* 50:237-270.
- Brussard, Peter F., and Michael E. Gilpin. In press. Demographic and genetic problems associated with small population size with special reference to the black-footed ferret (*Mustela nigripes*). In U. Seal et al., eds., *Proceedings of the Workshop on Captive Propagation of Black-footed Ferrets*, 13-15 August 1986, Laramie, Wyoming. Yale Univ. Press.
- Carpenter, James W., Max J. G. Appel, Ray C. Erickson, and Meliton N. Novilla. 1976. Fatal vaccine-induced canine distemper virus infection in black-footed ferrets. *J. Amer. Vet. Med. Assoc.* 169:961-964.
- Carpenter, James W., James D. Davidson, Meliton N. Novilla, and Jimmy C. M. Huang. 1980. Metastatic, papillary cystadenocarcinoma of the mammary gland in a black-footed ferret. *J. Wildl. Dis.* 16:587-592.
- Carpenter, James W., and Conrad N. Hillman. 1978. Husbandry, reproduction, and veterinary care of captive ferrets. *Proc. Amer. Assoc. Zoo. Vet., Knoxville, Tenn.* 1979:36-47.
- Carpenter, James W., Meliton N. Novilla, and Hans E. Kaiser. 1981. Neoplasia and other disease problems in black-footed ferrets: implications for an endangered species. Pages 739-746 in H. E. Kaiser, ed. *Neoplasms: comparative pathology of growth in animals, plants, and man.* Raven Press, New York.
- Clark, Tim W. 1973. Prairie dogs and black-footed ferrets in Wyoming. Pages 88-101 in R. L. Linder and C. N. Hillman, eds. *Proc. Black-footed Ferret and Prairie Dog Workshop*, South Dakota State University, Brookings.
- \_\_\_\_\_. 1976. The black-footed ferret. *Oryx* XIII:275-280.
- Erickson, Ray C. 1973. Some black-footed ferret research needs. Pages 153-164 in R. L. Linder and C. N. Hillman, eds. *Proc. Black-footed Ferret and Prairie Dog Workshop*, South Dakota State University, Brookings.
- Eskey, C. R., and V. H. Haas. 1940. Plague in the western part of the U.S. *U.S. Public Health Bull. No.* 254. 83 pp.
- Forrest, Steven C., Dean E. Biggins, Louise Richardson, Tim W. Clark, Thomas M. Campbell III, K. A. Fagerstone, and E. Tom Thorne. In press. Population attributes for the black-footed ferret (*Mustela nigripes*) at Meeteetse, Wyoming, 1981-1985. *J. Mammal.*
- Fortenberry, Donald K. 1972. Characteristics of the black-footed ferret. *U.S. Fish and Wildl. Serv. Resour. Publ.* 109. 8 pp.
- Harris, Richard B., Tim W. Clark, and Mark L. Shaffer. In press. Estimating extinction probabilities for isolated black-footed ferret populations. In U. Seal et al., eds., *Proceedings of the Workshop on Captive Propagation of Black-footed Ferrets*, 13-15 August 1986, Laramie, Wyoming. Yale Univ. Press.
- Henderson, F. Robert, Paul F. Springer, and Richard Adrian. 1969. The black-footed ferret in South Dakota. *South Dakota Dept. Game, Fish and Parks Tech. Bull.* No. 4. 37 pp.
- Hillman, Conrad N., and James W. Carpenter. 1980. Masked mustelid. *Nature Conservancy News*, March-April:20-23.

Hubbard, John P., and C. Gregory Schmitt. 1984. The black-footed ferret in New Mexico. Final report to BLM, Sante Fe, New Mexico, under BLM Contract No. NM-91.-CT1-7 to Dept. Game and Fish, Sante Fe, and under New Mexico Dept. Game and Fish Proj. FW-17-R.

Johnson, D. 1969. Returns of the American Fur Company, 1835-1839. J. Mammal. 50:836-839.

Linder, Raymond L., Robert B. Dahlgren, and Conrad N. Hillman. 1972. Black-footed ferret--prairie dog interrelationships. Pages 22-37 in Symposium on Rare and Endangered Wildlife of the Southwestern United States, New Mexico Dept. Game and Fish, Sante Fe.

O'Brien, Stephen J., Janice S. Martenson, Mary A. Eichelberger, E. Tom Thorne, and Frank Wright. In press. Biochemical genetic variation and molecular systematics of the black-footed ferret, Mustela nigripes. In U. Seal et al., eds., Proceedings of the Workshop on Captive Propagation of Black-footed Ferrets, 13-15 August 1986, Laramie, Wyoming. Yale Univ. Press.

Williams, Elizabeth S. 1987. Summary of the disease survey of carnivores near Meeteetse, Park County, Wyoming, 1985-1986. Unpubl. report to U.S. Fish and Wildl. Serv., National Ecol. Center. 15 pp.

Williams, Elizabeth S., E. Tom Thorne, Max J. G. Appel, and David W. Belitsky. In manuscript. Canine distemper in black-footed ferrets (Mustela nigripes) in Wyoming.