

ENDANGERED SPECIES

Technical Bulletin Reprint

Wildland Management Center
School of Natural Resources
The University of Michigan

Black-Footed Ferrets on the Edge

by Dr. Tim Clark

The small black-footed ferret (*Mustela nigripes*) population found near Meeteetse, Wyoming, in late September 1981 brought the prospect that this critically endangered mammal could be restored to healthy numbers (see *Endangered Species Technical Bulletin Reprint* 2(8):1-4). By late 1983, there was almost a promise of a successful conservation story, a potential textbook case: a species feared extinct was rediscovered, very carefully researched, successfully captive bred, and finally reintroduced to the wild in several secure preserves, all in a timely and cost effective manner. I am very sorry to report a series of major setbacks that now make this scenario highly doubtful. Today, the wild Meeteetse population has been decimated and only 6 ferrets are in captivity as a breeding nucleus. Overall, the prospects for species recovery have been significantly diminished.

Ferrets formerly occupied all or parts of 12 states and 2 Canadian provinces and became the unintended victim of habitat loss as prairie dogs (*Cynomys* sp.), their chief food source, were destroyed by wholesale poisoning which began in the 1880's and continues to the present. The possible renewed use of strychnine to annihilate prairie dogs, authorized by the Environmental Protection Agency, does not bode well for ferrets. Historically, not only were ferrets killed directly in prairie dog destruction, but they were also made more susceptible to random events such as accidents and disease that accelerated extinction due to habitat fragmentation.

The ferret's historic range included over 100 million acres, but by the late

1940's, not a single ferret could be found. Only one small population was ever studied between the time the species was first described by John Audubon and John Bachman in 1851 and the discovery of the Meeteetse ferrets in 1981. In 1964, a ferret family was found in south central South Dakota. Over the next 11 years, 10 other litters and about 80 different individuals were found there. After 1974, no ferrets could be located. A captive breeding program came along too late using the last 9 ferrets seen, but it did provide information on how to house and breed ferrets. It also demonstrated that ferrets are 100% susceptible to canine distemper (*Morbillivirus*) when several ferrets died of the disease.

The South Dakota field studies and laboratory efforts provided the badly needed outline of ferret life history for the first time. The years of hard work by Con Hillman, Bob Henderson, Ray Linder, Jim Carpenter, and others served as a good foundation for the Meeteetse conservation efforts. With the apparent extinction of the South Dakota ferret population, many people and agencies feared the species extinct. As a result, efforts to locate more ferrets slowed considerably, and in some cases came to a standstill, over the next 7 years.

But starting in 1973, I never gave up hope of finding ferrets and continued looking year after year. When the first Meeteetse ferret turned up, killed by a dog in a rancher's front yard, both the rancher and state Game and Fish Department officials invited me to Meeteetse. The ferret program came to involve many state and federal agencies, all charged under various laws with saving ferrets and their

habitats and other endangered species—Wyoming Game and Fish Department (WGF), U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management, U.S. Forest Service, and others. Jack Turnell, Manager of the Pitchfork Ranch, aided conservation efforts directly as did many ranchers and citizens in the Meeteetse area. Besides these interests, my Biota Research and Consulting/Idaho State University (Biota/ISU) conservation studies were

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photo by Tim Clark

Will there be a future for the black-footed ferret?

Ferrets on the Edge continued

endorsed and supported by Wildlife Preservation Trust International, New York Zoological Society (Wildlife Conservation International), World Wildlife Fund-U.S., National Geographic Society, Charles A. Lindbergh Fund, The Nature Conservancy, National Wildlife Federation, Chicago Zoological Society, National Academy of Sciences, and others. My colleagues and I volunteered all of our time over the next 4½ years as we conducted the bulk of the field work, while conservation organizations covered field expenses.

Companion studies by the U.S. Fish and Wildlife Service-Denver Wildlife Research Center focused each autumn on radio telemetry of selected ferrets, prairie dog population studies, predators of ferrets, and other aspects of ferret natural history. Dean Biggins, Kathy Fagerstone, and Max Schroeder directed these studies. WGF veterinarian Tom Thorne directed handling and

marking of ferrets each fall and directed health care of captive ferrets. More recently, several University of Wyoming graduate students have carried out ferret and prairie dog studies.

We learned many details of ferret behavior and ecology. Ever since the 1870's, ferrets had been known to associate with prairie dogs; ferrets eat prairie dogs and use their burrows for shelter and sites to rear young. We found ferrets on 37 white-tailed prairie dog colonies at Meeteetse totaling about 8,000 acres in over 100 square miles. These 37 colonies were equally owned by private ranchers, the state of Wyoming, and the U.S. government (BLM). The largest colony of 3,500 acres contained two-thirds of all the ferrets. Clumped around this large colony within 3 miles were 10 other large colonies. Nearly all the ferrets were found in this dense clump of colonies about a township in size. Beyond these 37 colonies, prairie dogs were scarce for miles. It was obvious that the 37 colonies were an "island" of ferret habitat, beyond which dispersing ferrets stood little chance of survival, let alone recolonization. Indeed, we repeatedly searched, but never found ferrets outside the 37-colony "island complex."

Ferrets disappeared in large numbers from the fall of one year to spring breeding of the next year. We estimated annual losses of about 67% of the total population (juveniles 85%, adults 50%). Predation from owls, hawks, eagles, coyotes, and badgers, and losses from accidents and dispersal seemed to account for the huge annual ferret mortality. This meant that a "surplus" of Meeteetse ferrets existed to begin captive breeding. A few of the ferrets that were lost to natural causes each fall and winter could be removed for captive rearing programs. In 1983, we wrote a paper exploring recovery options and strongly recommended captive breeding. Again in 1984, we recommended captive breeding.

A tragic picture of the ferret population emerged in 1985. By early July, our initial counts showed the ferret population was much lower than in previous years, especially given its large size of 129 the previous fall. Intensive spotlight surveys were immediately undertaken to find ferrets.

About this time a volunteer for the USFWS (Sonya Ubico) discovered sylvatic plague (*Yersinia pestis*) in the ferret's prey—prairie dogs. Plague has been known to destroy 95+% of prairie dog populations in days or weeks. Our concern for the ferrets and the prairie dogs on which they depend sharply increased. As it turned out, USFWS estimated that by late summer about 22% of the total Meeteetse prairie dog complex was "inactive" probably caused by plague. Some of the "inactive" areas were formerly the densest, and thus the loss of prairie dog biomass was well about 22%. Unfortunately, the plague may not yet have run its course either.

Intensive surveys in summer 1985 showed 58 ferrets (13 litters), as compared to 129 ferrets (25 litters) at the same time in 1984. Many of these ferrets were seen only once, unlike observations in past years where ferrets, once located, could be located night after night. Mark/recapture population estimates showed only 31 ± 8 ferrets about September 10th, 16 ± 5 about October 9th, and 6 about November 1st, 1985. We can document the loss of about 150 ferrets between fall 1984 and fall 1985. During July—September, ferrets were dying at about one every 2-3 days. The population was being reduced by about 50% every 30 days.

The probable cause was later diagnosed as canine distemper, always present in nature, and probably brought in by skunks, racoons, foxes, or coyotes. Between September 12 and October 11, 1985, 6 ferrets were live-captured from Meeteetse and placed in a WGF facility. On October 22, canine distemper was diagnosed when one of the captive ferrets died and another showed symptoms. All 6 ferrets were housed in the same room, and because distemper can be spread through the air, all 6 ferrets eventually died. Between October 25 and November 1, another 6 ferrets were caught, taken to Laramie and housed individually; these 6 still survive to the present. Four of these may be related (mother/offspring and siblings). Only a single ferret is known for sure to survive in the wild at Meeteetse through February 1986, but people are now hopeful that there are other animals there too.

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Ferrets continued

In short, ferret recovery, which was well along in 1984, is now highly problematic.

The Captive Breeding Specialists Group (CBSG) of IUCN is now advising the WGF and USFWS on the 6 captive ferrets. Chaired by Ulysses Seal, the CBSG consists of Jim Doherty of the New York Zoological Society, Chris Wemmer of the National Zoological Park, and Mike DonCarlos of the Minnesota Zoological Garden. CBSG has met three times since early December, 1985. They have significantly contributed to captive breeding efforts by reviewing WGF facilities, resources, personnel, support, and plans. They have concluded that it would be genetically desirable to have at least 20 breeders as founders of the captive population for maximum retention of genetic diversity. On this basis, and because the 2 male ferrets in captivity were immature and unlikely to breed in 1986, CBSG said "It is of highest priority that every effort be made to secure 2 adult males or young males from the wild population." This recommendation was not taken by WGF and USFWS. The CBSG estimated that the 2 immature males stood only a 10% chance of breeding success in 1986. The results are in now and the 6 captive ferrets produced no young this year. To maximize successful reproduction of captive ferrets, the CBSG is recommending a plan be adopted in advance of the summer 1986 field surveys at Meeteetse that if fewer than 10 ferrets are found this summer, they all be captured and added to the WGF captive breeding facility.

What is the future for the ferret? Three avenues exist. First, the wild Meeteetse ferret(s) may somehow manage to hang on and repopulate the prairie dog areas. Second, the breeding of the 6 ferrets currently in captivity may be successful. Third, more ferrets may be found somewhere. All three are thought to have a low probability of success. The best chance is probably with the captive ferrets, especially if numbers can be augmented, as they further adjust to captivity and new breeding technologies are used to encourage litter production. Searches for more ferrets continue over a several state area. Perhaps a small ferret population or



photo by Tim Clark

Captive breeding may be the black-footed ferrets' only road to recovery.

two will be found before the Wyoming captive population dies out. Potential transplant sites have been identified and are awaiting to receive ferrets if they ever become available.

These recent Meeteetse events influence how and if ferrets can ever be recovered. Like all species, ferrets are susceptible to extinction from both systematic pressures (e.g., habitat destruction by man, climatic events) and stochastic events (i.e., random/chance events: demographic, environmental, natural catastrophes, and genetic). Once ferret habitat is reduced and fragmented by massive prairie dog poisoning, remaining small local ferret populations are susceptible to local extinction for several reasons—many stochastic. Indeed, the plague and distemper epidemics in the small Meeteetse ferret/prairie dog complex in 1985 illustrate this fact clearly.

What does this mean for ferret recovery? Because of increased extinction probabilities from systematic and stochastic sources, recovery planning should include population viability assessments (PVA). Craig Groves and I conducted a PVA for ferrets: based on conservative genetic considerations, we estimated that a breeding population of 200 ferrets is needed for short-term fitness of a population. Additional and more sophisticated PVA, including demographic and environmental stochasticity, are underway and will be useful in setting species recovery

targets in recovery planning. Additionally, a genetic model of ferrets is also being developed.

The metapopulation concept is valuable in ferret recovery. Many prairie dog complexes, each representing a patch of habitat, are irregularly distributed over the landscape. They vary in size and can support ferret populations of various sizes (most below 200 ferrets). The whole group of distinct populations can be viewed as a population of populations, or a metapopulation. For ferrets, species extinction is the equivalent of its extinction on all patches or prairie dog colony complexes. Ferret recovery will entail maintaining many small ferret populations, most below 200 individuals, over many habitat patches throughout their former range. Effective species conservation will require an understanding of the process of local extinction in patches of various sizes, and ferret recovery must be viewed as a metapopulation management challenge.

In Montana, for example, 8 major ferret habitat patches (i.e., prairie dog colony complexes) have been tentatively located. These total about 34,000 acres in 180 colonies. Some of these habitat patches are larger than Meeteetse and others are smaller. Altogether, the Montana prairie dog colonies identified as potential translocation sites are comprised of a range of patch sizes. These habitat patches offer areas of relatively large size,

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abundant and dense prey, small inter-colony distance, dense burrow openings, and a dispersed pattern of prey populations that can provide protection from pandemic catastrophic disease (*stochasticity*). A higher degree of protection is offered by this arrangement of habitat patches, some 200 miles apart, than existed at Meeteetse. In the future, any large ferret metapopulation occupying these Montana habitat patches will need appropriate management.

The catastrophic decline of the 1986 Meeteetse ferret population and the subsequent death of the first 6 captive ferrets were picked up quickly by the press. In the last 6 months major articles have appeared in *Natural History*, *Defenders*, *Animal Kingdom*, *Bison*, *Audubon*, *New York Times*, *New York Newsday*, *Washington Post*, and regionally in the *Billings (Montana) Gazette*, *Casper (Wyoming) Star Tribune*, and *Salt Lake City (Utah) Deseret News*. These articles largely focused on a mix of ferret biology, history of the Meeteetse ferret program, and personal views and perspectives by program participants and others. As the ferrets died in 1985, in both the field and laboratory, conflict increased as some program participants called for intervention to save more wild ferrets, while others concluded that the wild ferrets were fine and the reduced numbers were a result of "dispersal." The articles reflect these views about what happened to the ferrets and why. In all, there

is much sadness at the loss of ferrets, disappointment in the ways the ferret program has unfolded, and hopes that somehow we can yet save the species.

The turn of events in the Meeteetse conservation program are a complex mix of conservation biology and organizational behavior. The ferret program was formally established by WGF and USFWS. Like all organizational structures, WGF's formal program does two things: it provides a map of tasks, responsibilities, reporting relationships, and groupings, and it provides a mechanism for linking and coordinating organizational elements into a coherent whole. How this formal organizational apparatus responded to the declining ferret population in 1985 is at the heart of the conflict. For example, as Robert May of Princeton University recently observed in "The cautionary tale of the black-footed ferret" in *Nature*, "If such a mess can be made of efforts to save a creature as attractive as the black-footed ferret in a country as well organized and prosperous as the United States, prospects for conservation in other parts of the world are indeed bleak." Whether the ferret can be recovered is still an open question, and what we collectively learn from the events that took place trying to save the Meeteetse ferrets is also an open question.

One of the major variables in the ferret conservation program is its organization and management. As with NASA's space shuttle catastrophe, not only is the technical

side of the disaster under close scrutiny, but so too are the organization and management, including decision-making processes. The Presidential Investigation Commission has already concluded that the organization and management of NASA's program was flawed. Whatever review of the ferret program ensues, if any, it should fully review all the major variables so that we can learn the lessons for effective endangered species management in the future. There is too much at stake not to reflect on the ferret program and learn its hard lessons.

Dr. Tim Clark is a Research Associate with the New York Zoological Society and the Department of Biological Sciences at Idaho State University and has worked extensively on black-footed ferret conservation with the New York Zoological Society, Wildlife Preservation Trust International, World Wildlife Fund-US, and the National Geographic Society.

NOTICE

A monograph published by Brigham Young University Press on the black-footed ferret is now available from Dr. Stephen L. Wood, Editor, *Great Britain Naturalist*, 332 MLB Life Sciences Museum, Brigham Young University, Provo, Utah 84602. The cost is \$10.

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