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Black-Footed Ferret Recovery'

Dean E. Biggins² and Ronald A. Crew

Abstract.—The captive population of black-footed ferrets (*Mustela nigripes*) increased from 24 to 58 animals in 1988, and was split to provide the species added protection against extinction. Experimental reintroductions may begin in 1991. In some areas, "experimental population" designations as authorized under Section 10 (j) of the Endangered Species Act may be used to provide wider management latitude. The Black-footed Ferret Interstate Coordinating Committee oversees much of the work related to reintroduction. Expanded effort to locate wild ferrets now includes a \$10,000 reward offer. Research focuses on captive breeding, reintroduction techniques, disease, and habitat. A new Recovery Plan was approved in 1988.

INTRODUCTION

The black-footed ferret (*Mustela nigripes*), a weasel-like animal closely related to two species of Eurasian polecats, was listed in 1967 as an endangered species in the United States (Federal Register 32:4001, 11 March 1967). Biggins and Schroeder (1988) reemphasized the black-footed ferrets's dependence on prairie dogs (*Cynomys* spp.), and reviewed landmark events in recent ferret history, culminating with a brief description of status in 1987. Captive propagation of ferrets caught in Wyoming was just beginning, and its success improved in the years following.

The Black-footed Ferret Recovery Plan was completely revised in 1988 (U.S. Fish and Wildlife Service 1988), reflecting emphasis on captive propagation and reintroduction and incorporating the Wyoming Game and Fish Department's Strategic Plan (Wyoming Game and Fish Department, 1987). The current strategy for this recovery

effort involves captive **propagation of** ferrets followed by reintroduction into secured habitats across the species' range in the next 10-20 years. New goals set target levels of 200 breeding adults in captivity by 1991 and 1500 free-ranging breeding adults **by the year 2010**. Further, there should be at least 10 wild populations with at least 30 adults each, and wild populations should be distributed over the widest possible geographic area (consistent with the historic range of the species). The species will be eligible for downlisting from endangered to threatened status if these criteria are met and the rate of subpopulation establishment is at least as high as the rate of subpopulation disappearance for a period of 5 years. The amount of habitat needed (prairie dog colonies) for 1500 breeding adult ferrets is estimated at 75,000 ha (185,000 ac). About 0.4-0.8 million hectares (1-2 million acres) of prairie dog habitat remain in the United States but much may be unsuitable for ferret reintroduction (Minutes of the Black-Footed Ferret Interstate Coordinating Committee, 8-9 March 1988). Requirements for delisting have not been established.

The remainder of this paper is devoted to describing the present status of black-footed ferret recovery efforts and reviewing the tasks that are faced in the near future. The revised Blackfooted Ferret Recovery Plan (U.S. Fish and Wildlife Service 1988) places tasks into the following five groups: 1) captive propagation, 2) location and

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evaluation of habitat, 3) location of additional ferrets, 4) reintroduction, and 5) management of free-ranging populations. Of 190 tasks and subtasks identified, 67 were assigned to the "research" category. All five groups of tasks have investigative and operational elements, and it is imperative that researchers work closely with groups involved in implementing the recovery strategy. The U.S. Fish and Wildlife Service (Service) Division of Fish and Wildlife Enhancement, under the Director of the Denver Regional Office (Region 6), has been delegated lead responsibility to organize and implement a national strategy for recovery of the black-footed ferret. The National Ecology Research Center, within the Service's Research and Development arm (Region 8), conducts or coordinates most Service-sponsored research on the ferret. A 6th group of tasks in the Plan focuses on organizational arrangements that will facilitate work specified in groups 1-5.

population was split following the successful breeding season of 1988. Genetically representative young-of-the-year were sent to two additional facilities; the National Zoological Park's research facility in Virginia received seven ferrets and the Henry Doorly Zoo in Omaha, Nebraska received eight ferrets. The captive breeding phase can be deemphasized after about 10 years, although a small facility may be needed to augment wild populations destroyed by canine distemper or other events.

Much of the research in captive breeding has focused on developing techniques to maximize reproductive output and retain as much genetic diversity as possible. Topics under investigation include collection and cryopreservation of gametes, artificial stimulation of the reproductive cycle, artificial insemination, *in vitro* fertilization and embryo transfer, methods of detecting estrus, and genetic variability. Cooperating institutions are the University of Wyoming, University of Idaho, National Zoological Park, National Cancer Institute, and the Wyoming Game and Fish Department. In addition, a study of the nutrition of captive ferrets is being conducted by the Bronx Zoo. The National Ecology Research Center coordinates and funds most captive propagation research.

CAPTIVE PROPAGATION

Captive propagation of ferrets is a cooperative venture of the Wyoming Game and Fish Department, the U.S. Fish and Wildlife Service, the Henry Doorly Zoo, and the National Zoological Park. The core breeding population is managed by the Wyoming Game and Fish Department in a specially constructed building at their Sybille, Wyoming research facility. Primary funding is provided by the Service from authorizations under Section 6 of the Endangered Species Act of 1973. The six ferrets in captivity in 1986 produced no offspring. Twelve more wild-caught ferrets were added to the captive population in 1986 and early 1987, and 2 of the 11 captive females produced 7 young in 1987. In 1988, 34 kits were weaned from 13 litters produced by 14 females, but an adult female died that year. The total population thus has grown from 18 to 25 to 58 in two breeding seasons, and the program is on schedule. All known black-footed ferrets are in captivity.

By 1991 up to five captive breeding populations in three or more facilities may be established. The parent genetic stock will be maintained at the Wyoming facility while the satellite facilities will be established with young from subsequent generations. The satellite facilities are to be financially self supporting, therefore not requiring additional funds for **captive breeding (Wyoming Game and Fish Department 1987). To provide protection against extinction from** a single catastrophic event, the

LOCATION AND EVALUATION OF FERRET HABITAT

Remaining potential habitat (prairie dog colonies) for black-footed ferrets has not been accurately estimated. Because of the success with captive breeding, there is increased emphasis on locating ferret habitat. This large effort presently encompasses 12 states, 2 Canadian provinces, and Chihuahua, Mexico. In 1987, the Service (Region 6), invited representatives from state conservation agencies, Service field offices, and several land management agencies throughout the ferret's historic range to attend a meeting to discuss the search for habitat and other aspects of ferret recovery. The resulting group, now known as the Blackfooted Ferret Interstate Coordinating Committee (ICC), promotes formation of state working groups and is a mechanism through which the Service receives information to debate, design, and document national-level recovery strategy. In addition, the ICC **committee serves as a valuable sounding board for conflicts and barriers to ferret recovery.** Representatives of the ICC are members of state-level

committees and communicate directly with state working groups on direction and guidelines devised and concurred upon at ICC meetings. Managers of the captive breeding program attend ICC meetings to advise on the probable timing of reintroductions and to obtain information on the status of habitat evaluations and preparations.

Researchers are working closely with ICC members to develop a system to evaluate the quality of potential reintroduction sites. Ranking sites with the evaluation criteria will help determine the order of reintroductions. The first national-level ranking of reintroduction sites is scheduled for December 1989. States and the Service will then work cooperatively with private and public land managers to develop management agreements and special rules for selected habitats and reintroduction of ferrets. At this time, no sites are managed for ferret reintroduction. Management will involve long-term commitments from state and federal agencies and negotiated agreements with numerous private land managers. Long-term easements may be necessary to compensate affected cooperating landowners.

During the next several years, the Service, states, and other federal agencies will be locating and mapping prairie dog complexes of sufficient quality to be considered for ferret reintroductions. Subsequently, states are proposed to be partitioned into three zone categories: 1) potential reintroduction habitat (black zones), 2) areas that support prairie dog populations, but lack sufficient data to evaluate them as potential reintroduction habitat (gray zones), and 3) areas where quality of prairie dog colonies is too low to warrant a ferret reintroduction effort (white zones). The white zone, encompassing much of the area in the western states with potential ferret habitat, could eventually be block cleared, indicating they would not require further ferret survey clearances for land use proposals needing Federal agency permits or funding. This zone concept does not mean that the Service, states, or other agencies support the eradication of prairie dogs in block-cleared white zones. Prairie dog colonies are an ecological community supporting an abundance of wildlife and plant species, and states are encouraged to develop management plans for prairie dogs in all three zones.

Black-footed ferret survey guidelines promulgated by the Service in March 1989 open the opportunity to begin block clearing complexes of prairie dog colonies under 400 ha (1000 ac) that have no potential for ferret reintroduction. In addition, these guidelines provide a mechanism to exempt surveys where complexes of white-tailed prairie dog (*Cynomys leucurus*) and Gunnison's prairie dog (*C. annisoni*) colonies are less than 81 ha (200 ac) or complexes of black-tailed prairie dogs (*ludovicianus*) are less than 32 ha (80 ac). These changes were brought about by research findings on ferret habitat requirements. Guidelines are available from Service field and state offices across the historical range of the ferret; Service personnel at these offices should be consulted for more information on the need for surveys.

LOCATING ADDITIONAL BLACK-FOOTED FERRETS

Genetic variability is low in the captive population of black-footed ferrets (O'Brien et al., in press), and finding any remaining wild ferrets would enhance the program. Search effort increased after the demise of the Meeteetse, Wyoming population in 1985. A \$5,000 reward in Montana (sponsored by the New York Zoological Society) expanded to most other states in the ferret's range by 1988, and the offer was increased to \$10,000 in 1989. The ICC recommended development of state contingency plans dictating the course of action if ferrets are located; most states have approved plans in place. Ferret reports are investigated by state conservation agencies and Service field offices. The National Ecology Research Center has maintained a response team to conduct follow-up work on good quality reports and to monitor and capture ferrets if necessary. No new ferret populations have been located despite the increased effort. Research effort focuses on improving methods to locate ferrets, including current studies on feasibility of aerial surveys for detecting sign in winter and studies of prairie dog burrow plugging/ferret digging relationships.

REINTRODUCTION

By the early 1990's, reintroduction will require much of the resources now devoted to other aspects of ferret recovery if captive propagation remains on schedule. Experimental reintroductions are being planned first for the Meeteetse, Wyoming area to test reintroduction protocol and to

reestablish reproduction in the wild as soon as possible. Additional sites selected by the Service and state conservation agencies will receive ferrets that are in excess of the needs of the captive breeding program as soon as they are available. The Service plans to use the flexibility provided under Section 10 (j) of the Endangered Species Act to designate reintroduced captive-raised black-footed ferrets as "experimental populations" wherever practicable and prudent. When reintroduced populations of ferrets begin to produce excess offspring, these offspring can be translocated to other reintroduction sites, helping reduce costs of and dependency on captive breeding programs.

Presently, most reintroduction activities are research-oriented. Two laboratory studies are beginning that will address the benefits of submitting ferrets to pre-reintroduction experience (training) in hunting, killing, and predator avoidance. A second phase of experiments will use results of the training phase in actual field trials. A closely related animal, the Siberian polecat (Mustela erversmanni), will be used in these first two phases; the final phase will be experimental reintroduction of black-footed ferrets. The experimental release of Siberian polecats closely parallels a study of California condor (Gymnogyps californicus) release and monitoring techniques using Andean condors (Vultur gryphus) as the investigational surrogate. Close monitoring of the first black-footed ferret reintroductions will be essential, and improved radio-telemetry techniques for monitoring will be tested on Siberian polecats. Canine distemper is a hazard to wild and captive ferrets (Carpenter et al. 1976, Forrest et al. 1988, Williams et al. 1988), and research is underway to develop an effective vaccine and practical means to administer it. Another study will attempt to assess the prevalence of canine distemper in other species of wild carnivores to gain insight into the probability of exposure of reintroduced ferrets. Reintroduction-related research is being conducted by biologists at the National Zoological Park, Wyoming Game and Fish Department, the University of Wyoming, the Wyoming Cooperative Fish and Wildlife Research Unit, and the National Ecology Research Center, primarily with funds administered by the Service.

MANAGEMENT OF FERRET POPULATIONS

Presently, there is almost no activity (operational or research) in this category. Future needs include development of monitoring strategies for ferrets, prairie dogs, and diseases, and refined plans for restocking and translocation to maintain genetic diversity and solve demographic problems.

ORGANIZATIONAL ARRANGEMENTS

This portion of the Plan suggests formation of technical and policy advisory groups to assist in developing effective solutions to the diverse challenges of ferret recovery. Working groups, public relations, education, communication, and funding are also **addressed** in this category. Examples of advisory groups include the Black-footed Ferret Advisory Team, which counseled the Wyoming Game and Fish Department on management and research of the Meeteetse population, and the Captive Breeding Specialist Group of the International Union for the Conservation of Nature and Natural Resources, which provided valuable assistance during the early stages of captive propagation. The ICC and state working groups were effective organizational arrangements discussed previously.

CONCLUDING REMARKS

The captive breeding program for ferrets has been highly successful, suggesting an optimistic prognosis for ferret recovery. Although it is essential, excellent captive production of ferrets does not assure recovery of the species: the greatest challenges may lie ahead. We speculate that a combination of factors led the black-footed ferret nearly to extinction-perhaps due to the synergism of severe habitat reductions (caused by prairie dog poisoning campaigns and sylvatic plague) coupled with canine distemper in the ferrets (Biggins and Schroeder 1988). We wonder, nevertheless, how much importance to ascribe to each problem, and even whether we have correctly identified all of the problems. If we understand the problems, can they be solved or mitigated? The opportunity to learn directly through hands on research of wild black-footed ferrets vanished with the animals, but the search for explanations continues. A careful evaluation of the behavior, ecology, and genetics of the highly successful **Siberian polecat**, the black-footed

ferret's closest living relative, should provide a different perspective from **which to interpret** the black-footed **ferret's decline**. It is also imperative that the first reintroductions of **ferrets be** carefully designed studies, **because** understanding the reasons for any failures may be crucial to ultimately achieving success.

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We thank everyone who has contributed to the black-footed ferret conservation effort. Unfortunately, space is too limited to mention everyone by name, and to single out individuals does disservice to those not named. We appreciate the foundation laid by those who studied ferrets in South Dakota and first attempted captive propagation. A diverse group of researchers at Meeteetse was able to build on that foundation. We are deeply indebted to the managers of the present captive propagation project in Wyoming for rebuilding ferret numbers (and our hopes for the species), to the zoos now contributing to that endeavor, and to the project's advisors. Participants in the evolving cooperative venture leading toward ferret reintroduction include state and federal agencies, private conservation organizations, private landowners, industrial developers, and universities. The team approach is indispensable; perhaps the cooperation exemplified here provides a new connotation for the term recovery team.

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