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Montana Black-footed Ferret Conservation and Management Guidelines
February 2021

This document is not a directive nor does it commit any resources for new efforts.

(USFWS Photo)

Prepared by Montana Fish, Wildlife and Parks along with members of the Montana Prairie Dog and Black-footed Ferret Working Group

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INTRODUCTION

The black-footed ferret (*Mustela nigripes*) was listed as endangered in 1967 pursuant to early endangered species legislation in the United States and was "grandfathered" into the Endangered Species Act of 1973 (ESA.) The black-footed ferret depends on prairie dogs (*Cynomys spp.*) for food and their burrows for shelter and raising young (Hillman 1968, Biggins et al., 2006). In Montana the historical range of the black-footed ferret coincided with the range of the black-tailed prairie dog (*C. ludovicianus*) and the white-tailed prairie dog (*C. leucurus*) (Figure 1). The black-footed ferret's close association with prairie dogs was an important factor in the ferret's decline. From the late 1800s to approximately the 1960s, prairie dog occupied habitat and prairie dog numbers were dramatically reduced by conversion of native grasslands to cropland, poisoning and disease (U.S. Fish and Wildlife Service 2013a). The black-footed ferret population declined precipitously as a result throughout its range (Biggins 2006).

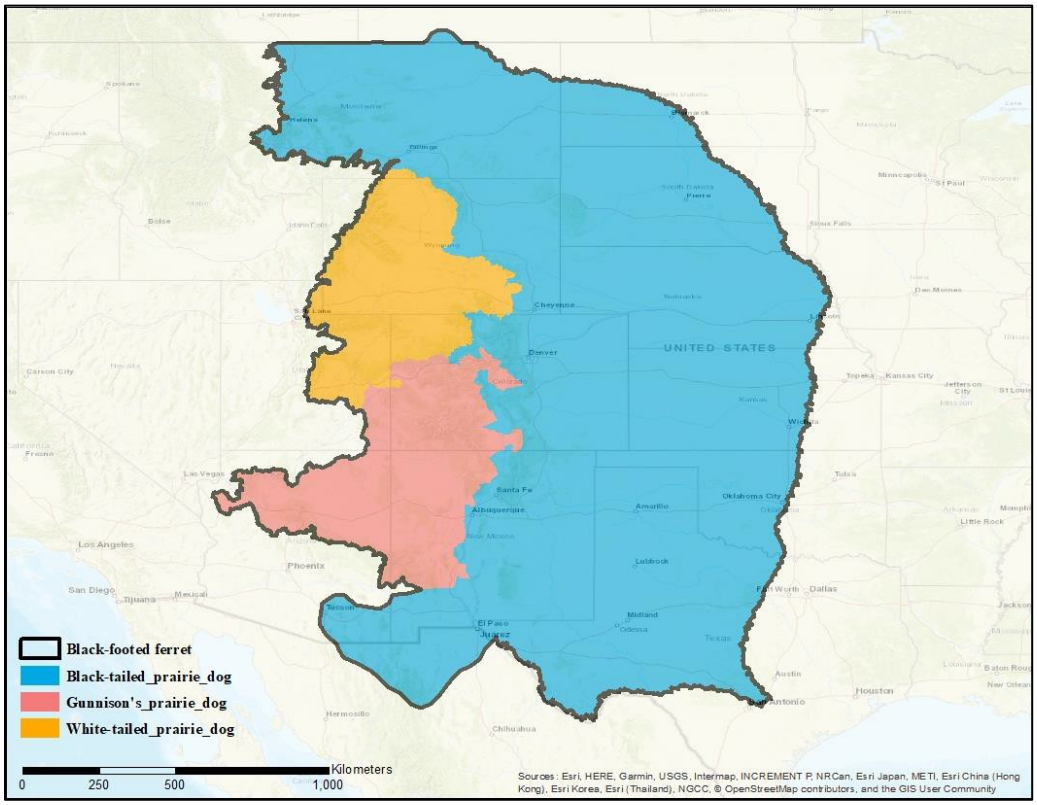

Figure 1. Historical distribution of the black-footed ferret and the distribution of black-tailed, Gunnison's, and white-tailed prairie dogs.

The original U.S. Fish and Wildlife Service (USFWS) black-footed ferret plan was approved in June 1978. A revised Recovery Plan was approved in 1988 and the most recent plan was approved in 2013 (USFWS 2013a). These plans establish population objectives and outline steps for recovery that, when accomplished, will provide for viable populations within the species historical range and delisting of the species from the ESA. Since 1991, black-footed ferrets have been released at 30 reintroduction sites in Wyoming, South Dakota, Montana, Arizona, Colorado, Utah, Kansas, New Mexico, Canada and Mexico (Figure 2).

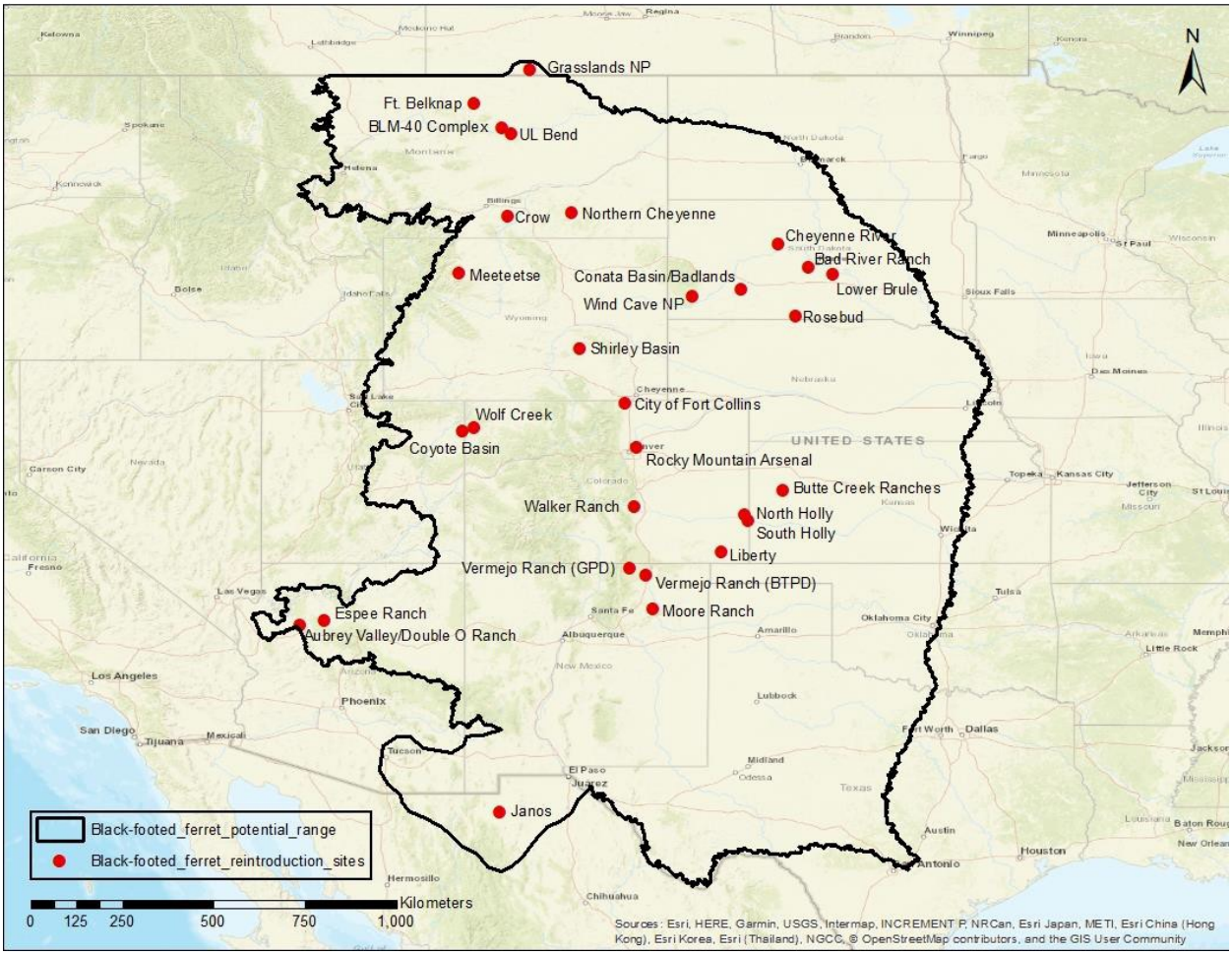

Figure 2. Black-footed ferret potential range and locations of reintroduction sites. The potential range represents the outer boundary of areas where black-footed ferrets occur or could occur, but not all areas within the potential range are occupied or provide potentially suitable habitat. The potential range encompasses approximately 231,425,000 ha.

A document titled 'A Black-footed Ferret Reintroduction in Montana: Project Description and 1994 Protocol' (Christopherson et al. 1994) was developed to guide local black-footed ferret recovery efforts at that time. Similar to the purpose of that document, this document is intended to guide site-specific decisions and management actions in Montana with the goal of promoting the recovery and conservation of the black-footed ferret consistent with the 2013 Recovery Plan. In accordance with Montana Fish, Wildlife and Parks' (MFWP) commitment toward recovery of the species range-wide, management of black-footed ferrets in Montana is intended to reflect the recovery objectives developed by the USFWS in the 2013 Recovery Plan (USFWS 2013a). Site-specific management plans for reintroduction of black-footed ferrets will need to be developed by the MFWP and USFWS along with completion of appropriate environmental analyses in order to meet recovery objectives.

Specific objectives of these newly developed Montana conservation and management guidelines include:

- Establish recovery and management goals for black-footed ferrets in Montana,
- Define a process by which black-footed ferret reintroduction sites are initiated and maintained throughout Montana in a manner that achieves recovery and management goals, and
- Outline a framework for black-footed ferret management that allows for adaptive changes to species recovery throughout the state.

Although MFWP, in collaboration with the USFWS, will take the lead on implementing these guidelines, developing and maintaining partnerships will continue to be critical to its success. The Montana Black-footed Ferret and Prairie Dog Working Group (hereafter 'Montana Working Group'), whose purpose is to coordinate management, conservation and research efforts and share information was instrumental in the development of these guidelines.

Members of the Montana Working Group that worked on the details of this document over the 2019 and 2020 calendar years included representatives from the Montana Fish, Wildlife and Parks, Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Natural Resources and Conservation, Montana Natural Heritage Program, World Wildlife Fund, Wildlife Ecology Institute, Natural Resources Conservation Service, and others. Private and tribal landowners and land managers have been and will remain major players in black-footed ferret recovery and management efforts in Montana and were involved in guideline development. MFWP will continue to collaborate with all organizations and individuals interested in participating in black-footed ferret recovery efforts through the Montana Working Group.

This document is divided into four main sections:

- History of black-footed ferrets in Montana and reintroduction efforts to date.
- Prairie dog population information and management challenges.
- Black-footed ferret population information and management challenges.
- Strategy and management needs for establishing new black-footed ferret recovery sites in Montana.

BACKGROUND

Species Recovery Plan

The black-footed ferret was first listed as endangered under the Endangered Species Preservation Act in 1967 (USFWS 1967), and recovery of the species is under the jurisdiction of the USFWS in collaboration with the 12 western and midwestern states within the historical distribution of the species (Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming). The 2013 *Recovery Plan for the Black-footed ferret* (hereafter 'Recovery Plan') developed by the USFWS outlines the conditions that must be met for the species to be considered recovered and eligible for downlisting or delisting (USFWS 2013a). This Recovery Plan has been revised twice since first drafted in 1978 (USFWS 1988, 2013). In the most recent Recovery Plan, the USFWS recommends that each of the 12 states initiate or maintain:

- One or more large size black-footed ferret reintroduction sites with the potential for >100 adult breeding black-footed ferrets, and
- One or more medium size black-footed ferret reintroduction sites with the potential for 50-100 adult breeding black-footed ferrets, and
- One or more small size black-footed ferret reintroduction sites with the potential for 30-50 adult breeding black-footed ferrets.

Delisting goal from the Recovery Plan: *Establish free-ranging black-footed ferrets totaling at least 3,000 breeding adults, in 30 or more populations, with at least one population in each of at least 9 of 12 States within the historical range of the species, with no fewer than 30 breeding adults in any population, and at least 10 populations with 100 or more breeding adults, and at least five populations within colonies of Gunnison's and white-tailed prairie dogs.*

Montana Black-footed Ferret Population Goal

The 2013 Recovery Plan outlines state-specific population targets for minimum numbers of breeding adult black-footed ferrets and a minimum acreage of prairie dog occupied habitat that would result in the range-wide recovery of the species. Specific recovery goals for Montana dictate a need for nearly 300 adult black-footed ferrets over 44,000 acres (Table 1). Meeting these minimums could be accomplished on a mix of land ownerships to include public, private, and tribal.

State/Country	**Approximate # of breeding black-footed ferret adults established to date**	**# of sites per State/Country to date**	**Potential contribution of adults/acres needed to downlist**	**Potential contribution of adults/acres needed to delist**
Montana	10	4	147 adults/22,000 acres	294 adults/44,000 acres

Table 1. Potential Montana contribution to achieve delisting of the black-footed ferret across its range.

THE HISTORY OF BLACK-FOOTED FERRETS IN MONTANA

Black-footed ferrets are considered a Species of Concern in Montana and federally listed under the ESA as endangered. Forty-four specimens are known from the state. Coues (1877) reported the earliest specimen (now lost) from the "Milk River." The most recent specimen was taken in Carter County in 1953. Thirty-two (73%) of these specimens came from seven counties in the southeastern part of the state. In 1984, Campbell and Forrest found two separate remains, a black-footed ferret skull and a mandible on a prairie dog colony in Carter County, where black-footed ferrets reportedly had been observed in 1977 (Jobman and Anderson 1981). From the condition of the remains and the recent occupancy history by prairie dogs in the area, it was estimated that they were no more than 10 years old, supporting the 1977 sighting. Repeated searches in the area failed to produce other evidence or observations of living animals (Anderson, et al. 1986).

Black-footed ferrets were reintroduced into Montana after the 17-year absence onto the UL Bend National Wildlife Refuge in 1994, the Fort Belknap Reservation in 1997 and again in 2013, the Northern Cheyenne Reservation in 2008, the Bureau of Land Management's "40 Complex" in 2001, and the Crow

Reservation in 2015. Today, only the Fort Belknap and Crow reintroduction sites have black-footed ferret populations. Sylvatic plague, a non-native disease lethal to black-footed ferrets and their prairie dog prey, has caused the loss of both species at the other sites despite efforts to curtail it.

UL Bend / Charles M. Russell National Wildlife Refuges

The first release of black-footed ferrets in Montana was in 1994 on the UL Bend National Wildlife Refuge located in southern Phillips County and managed as part of the Charles M. Russell National Wildlife Refuge. A total of 255 captive-reared kits were released through the years and a minimum of 328 wild-born kits were observed (Figure 3). The original objective was to establish a self-sustaining population, but given plague, drought, the small, fragmented and isolated black-tailed prairie dog colonies, along with the general intolerance for prairie dogs outside the Refuge, ferret population expansion was limited. There was an average of 5.9 females in the spring breeding population from 2004 to 2019 (Figure 4). The fall 2017 population of at least 24 ferrets dropped to two remaining adults by fall 2018 following a 67% elimination of the prairie dog acreage from plague. By fall 2019, the entire population was extirpated. There are no plans for reintroductions in the immediate future.

This reintroduction site has been used for several research projects and investigations on Sylvatic plague. Projects have evaluated pre-conditioning captive-reared kits prior to release, use of the injectable F1-V fusion protein vaccine to protect ferrets from plague, plague circulation at enzootic levels, and an oral vaccine against plague for prairie dogs. Most recently, evaluations are underway to control fleas on prairie dogs with an insecticide delivered in an edible bait that can be delivered in an economical and practical way to reduce the impacts of plague. Findings from this type of work inform ferret reintroduction protocols and overall recovery discussions.

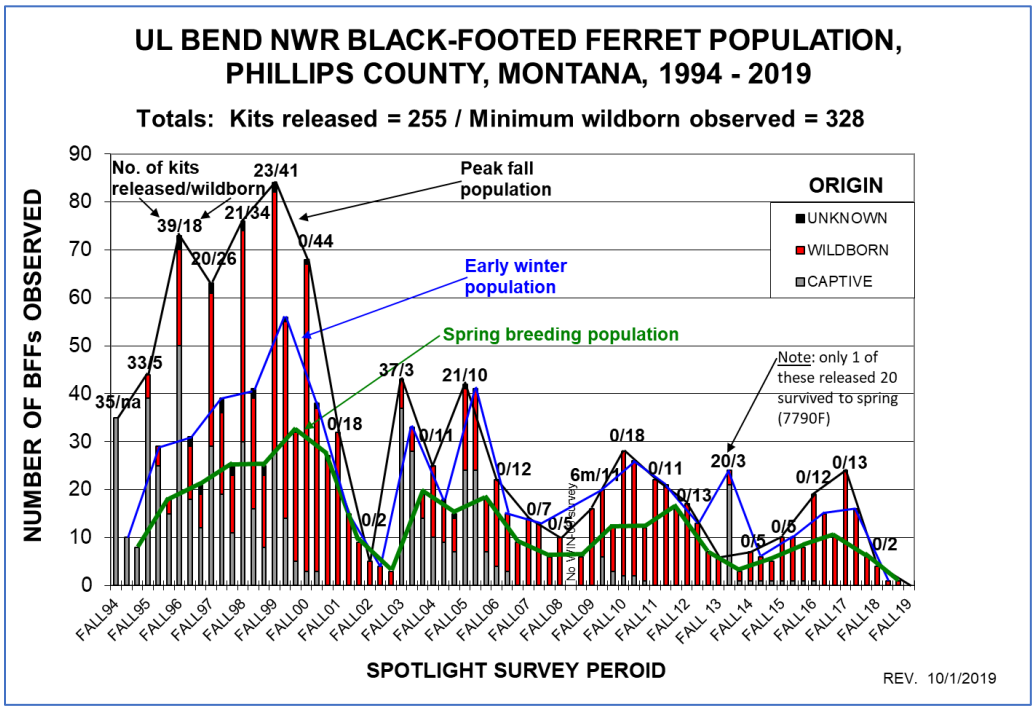

Figure 3. History of a black-footed ferret population at UL Bend National Wildlife Refuge in Phillips County, Montana through fall 2019.

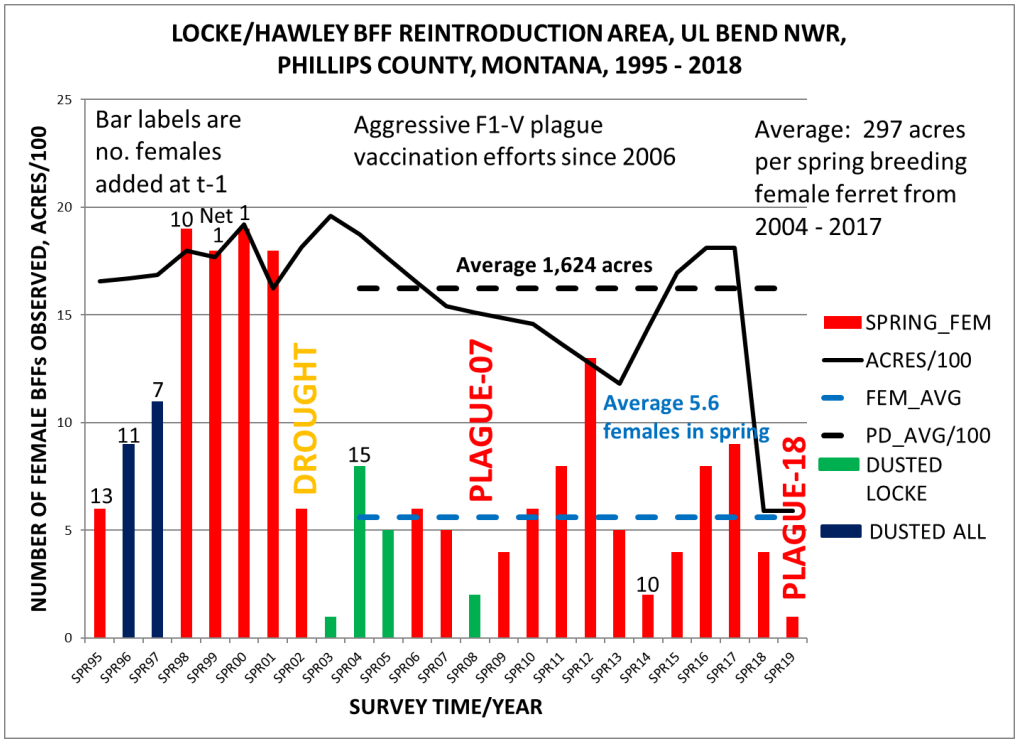

Figure 4. History of the female portion of the black-footed ferret population at UL Bend National Wildlife Refuge in Phillips County, Montana through spring 2019.

Fort Belknap Reservation

Because of the cultural significance of black-footed ferrets to the tribes of Fort Belknap, a resolution was passed in 1996 to reintroduce them. MFWP entered a Memorandum of Understanding with the tribes to begin a black-footed ferret reintroduction program in 1997. Fort Belknap became the 6th federally-designated black-footed ferret reintroduction site, and notably, the first reintroduction site on Tribal land.

During 1997-1999, 167 black-footed ferrets were released within two areas known as Snake Butte and People's Creek. At the time, the Snake Butte release area included two 1.5km sub-complexes of approximately 1,000 and 1,400 acres. The People's Creek release area was composed of a single sub-complex totaling about 5,000 acres. Unfortunately, an epizootic outbreak of sylvatic plague swept through the release sites in 1999 and nearly eliminated populations of both species. Reintroduction efforts were suspended as a result.

Since that time however, prairie dog populations have rebounded, and new partnerships have formed to return black-footed ferrets to the Reservation once again. During 2013-2015, 67 ferrets were reintroduced into the Snake Butte area (Figure 5). This area was selected because it is tribally owned and protected, and home to the tribes' bison herd. During 2014, ferrets were released at a site south of Snake Butte (i.e., Lake Seventeen), yet in subsequent years that site became hard to access so Snake Butte remains the primary ferret reintroduction area. Sylvatic plague mitigation occurs annually in prairie dog colonies and ferret kits born into the wild are cage-trapped and vaccinated against sylvatic plague and canine distemper; consequently, the ferret population is faring well and producing kits each year. As of fall 2019,

there were an estimated 15 black-footed ferrets, including eight kits (Figure 6). The goal is to expand this population to reach 30 adults so that it may contribute to national black-footed ferret recovery efforts.

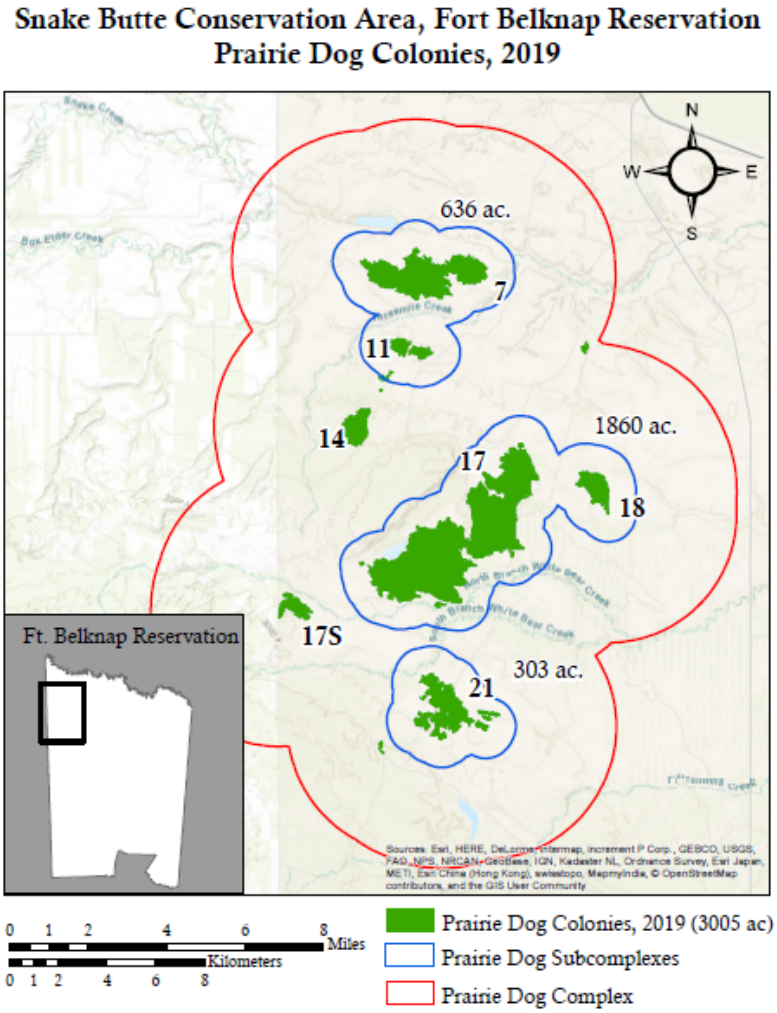

Figure 5. Map of the black-footed ferret recovery area and associated prairie dog complexes on the Fort Belknap Reservation in Montana.

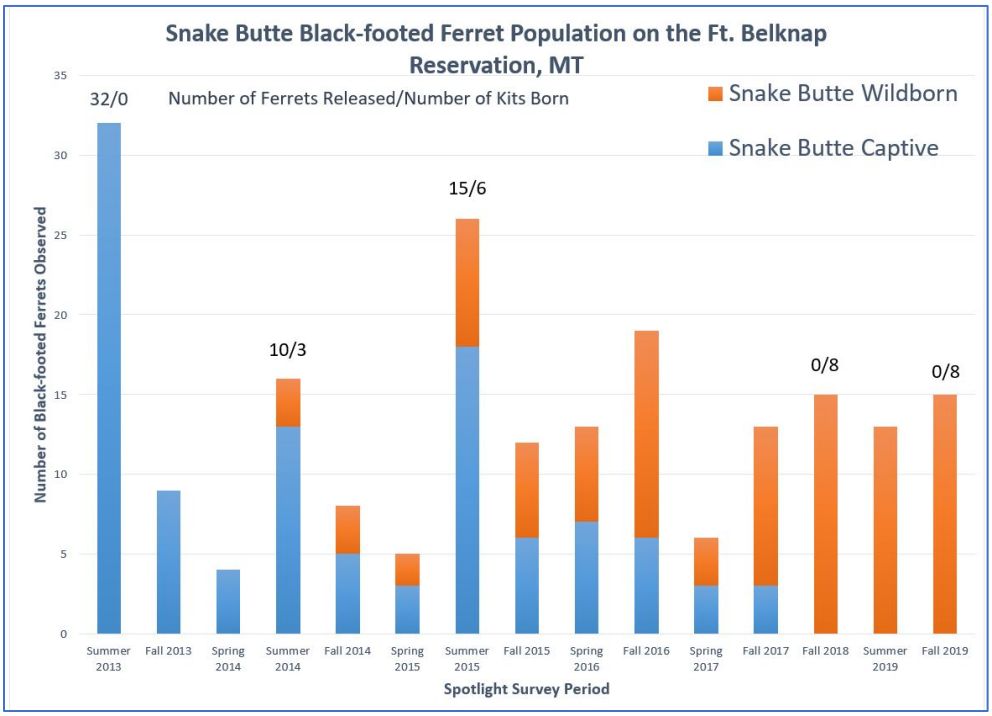

Figure 6. Summary of the number of black-footed ferrets released and minimum number detected during surveys from 2013-2019 on the Fort Belknap Reservation in Montana.

BLM 40-Complex

The BLM 40-Complex is located in southern Phillips County, about 45 miles southwest of Malta, MT. Twenty black-footed ferrets were released during fall 2001 and a total of 95 were released through 2004 (Figure 7). A total of 15 wildborn kits were observed from 2002-2006. The complex consists of 8 colonies that totaled 1,636 acres in 1988. Plague caused a sharp decline in prairie dogs that began in 1992 and continued to a low of 580 acres in 1996. Prairie dog colonies had recovered to 1,112 acres by the time of the first release in 2001.

In concert with the UL Bend reintroduction area, the BLM 40-Complex was part of the study examining the effects of flea control and ferret vaccination to mitigate plague on ferret survival reported by Matchett et al. (2010). All burrows on half of the colonies were infused with deltamethrin dust, an insecticide that kills plague-infected fleas, each summer from 2003-2005 to control fleas and reduce the risk of plague. Between 2005 and 2006, plague eliminated all of the non-dusted colonies. Only one ferret could be found by fall 2006 (Figure 7). No ferrets have since been observed and the most recent mapping in 2011 indicated a total of 801 acres of prairie dogs on the BLM 40-Complex.

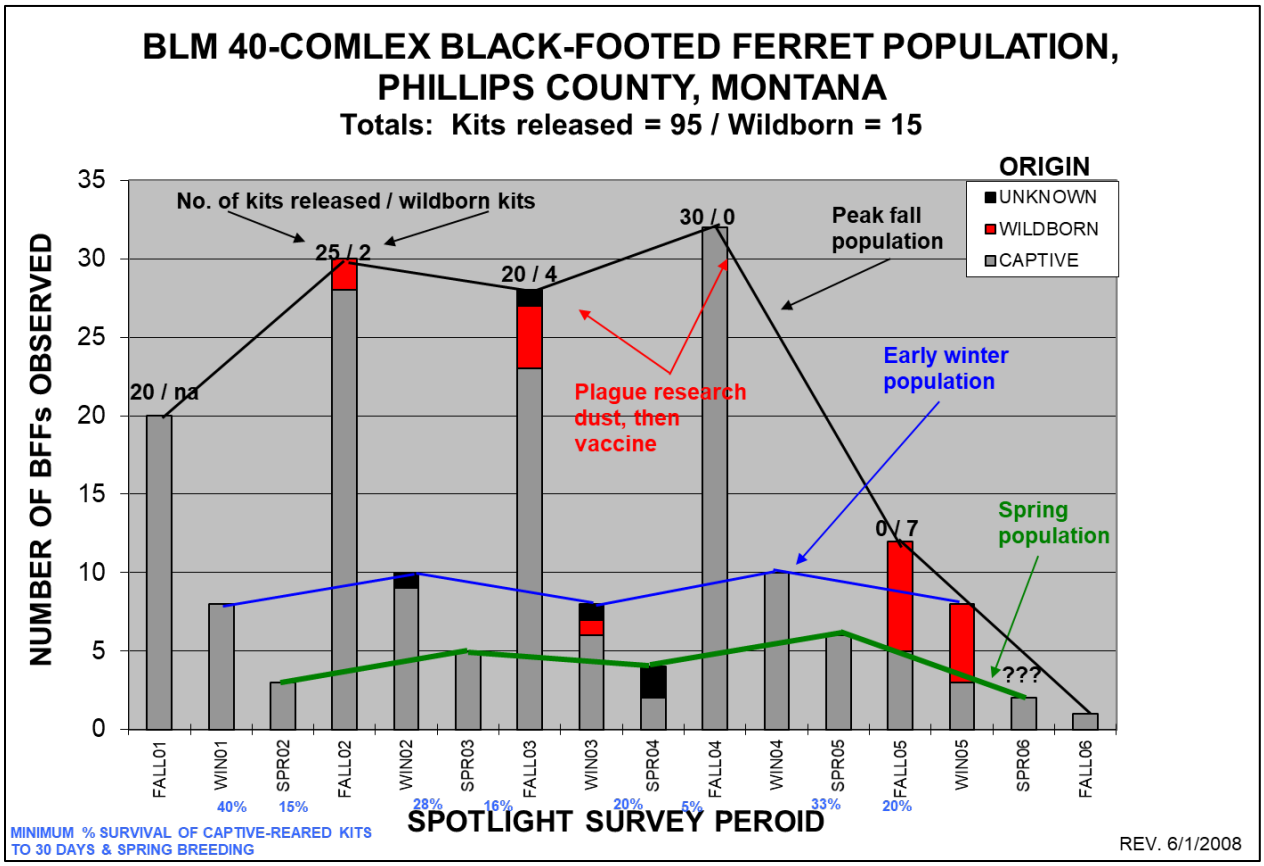

Fig. 7. Summary of the number of black-footed ferrets released and minimum number detected during surveys in 2001-2006 on the BLM 40-Complex in Montana.

Northern Cheyenne Reservation

The last known wild black-footed ferret sighting on the Northern Cheyenne Reservation was in 1923 (Anderson et al. 1986). To restore the species on the Reservation, the Northern Cheyenne Tribe passed a resolution, secured a Section 10(a)(1)(A) recovery permit from the USFWS, and implemented a landowner incentive program. Black-footed ferrets were first reintroduced on the Northern Cheyenne Reservation in 2008, returning the species to tribal land after an 85-year absence.

During 2008-2010, 88 ferrets were released onto a complex of 4,500 acres of prairie dogs. Both ferrets and prairie dogs thrived until sylvatic plague hit the Reservation in 2010. Despite efforts to mitigate plague through dusting prairie dog burrows with deltamethrin dust, funding was limited, and un-dusted prairie dog populations plummeted to less than 500 acres. By 2013, it was believed that no black-footed ferrets existed on the Reservation and efforts to recover the prairie dog population began through annual plague mitigation efforts. In 2016 and 2017, the Northern Cheyenne Department of Natural Resources and partners began expanding black-footed ferret habitat through prairie dog translocation into the Logging Creek Conservation Area, which had approximately 800 acres of prairie dogs in 2018 (Figure 8). The Tribe's plan is to continue expanding prairie dog colony acreage in the Logging Creek area and reintroduce ferrets once again.

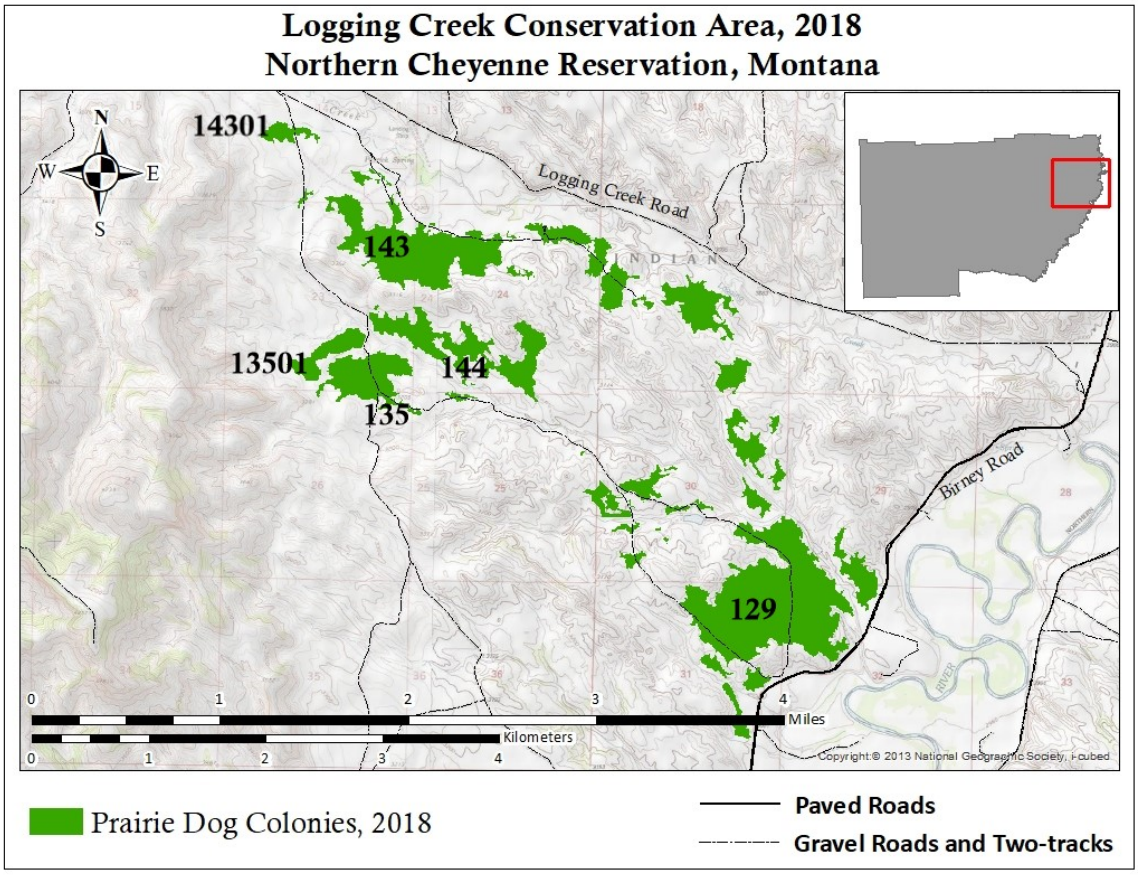

Figure 8. Prairie dog colonies within the Logging Creek Conservation Area of the Northern Cheyenne Reservation in Montana.

Crow Reservation

Nearly a century ago, black-footed ferrets occupied black-tailed prairie dog colonies on the Crow Reservation in southern Montana. Although little is known about that ferret population, it is likely that sylvatic plague caused the population to perish. Over time, however, prairie dog populations on the Reservation recovered and the Crow Nation Fish and Game Department expressed interest in re-establishing a black-footed ferret population on the Reservation. In 2015 the Crow Tribe reintroduced black-footed ferrets to the Wild Horse Ridge Conservation Area (Figure 9). Subsequent releases of ferrets occurred annually from 2016 – 2018 to establish a population; a total of 86 ferrets were released.

The estimated population of black-footed ferrets in 2019 included a minimum of 5 individuals, including two kits (Figure 10). The main prairie dog complex has approximately 3,925 acres with the potential for enough habitat to support 30 or more breeding adult ferrets. Annual plague mitigation efforts have been ongoing since 2015 and will continue as one means to expand this population.

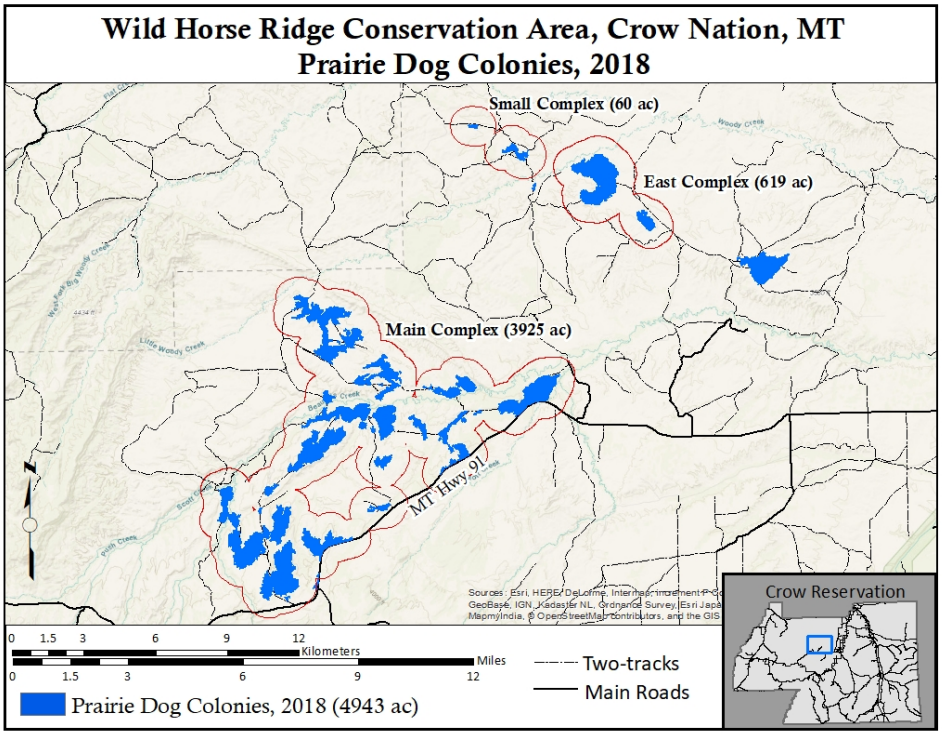

Figure 9. Black-footed ferret reintroduction area and associated prairie dog colonies on the Crow Reservation in Montana.

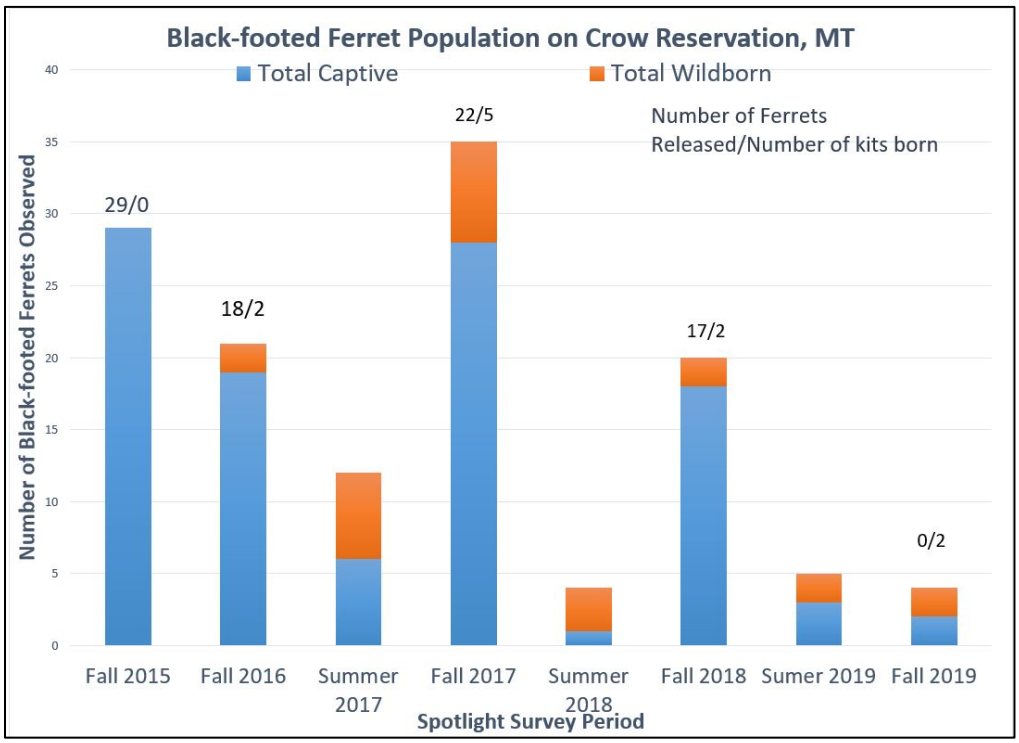

Figure 10. Summary of the number of black-footed ferrets released and minimum detected during surveys from 2015 through 2019 on the Crow Reservation in Montana.

CURRENT PRAIRIE DOG POPULATION AND MANAGEMENT CHALLENGES

Both black-tailed prairie dogs and white-tailed prairie dogs are considered Species of Concern in Montana. Prairie dogs are important species in Montana's short-grass prairie ecosystem. Prairie dog colonies provide habitat conditions required by several species, including burrowing owls (*Athene cunicularia*), swift foxes (*Vulpes velox*), mountain plovers (*Charadrius montanus*) and black-footed ferrets. In addition, prairie dogs serve as a principal prey item for other species including black-footed ferrets, badgers (*Taxidea taxus*), golden eagles (*Aquila chrysaetos*) and ferruginous hawks (*Buteo regalis*). Prairie dogs can also be a nuisance for landowners. Prairie dog populations must be controlled in some situations, including when they invade cultivated fields, or when prairie dog towns reach a size that conflicts with livestock production.

Montanans have long recognized the need to conserve, as well as control prairie dog populations. To this end the Montana Working Group promotes tolerance and appreciation for the species. Landowner incentive programs, technical assistance for population control, disease management and education are all focuses of group members depending on the situation where they are working. MFWP is committed to conserving prairie dogs as a critical part of the ecosystem while recognizing the challenges they can present to landowners.

Occupied Black-tailed Prairie Dog Acreage Estimates

Flath and Clark (1986) estimated that roughly 1,500,000 acres of Montana were occupied by prairie dogs during the period from 1907-1914. Since 1914 that occupied range has declined over 90% (Clark et al. 1987). Recent work to estimate occupied prairie dog range has differed in scope and method, but confirms the significant decline of this species across the state.

The following excerpt is from Rauscher et al. (2013): *The first statewide inventory of prairie dog colonies in Montana was conducted in the mid-1980s and produced an estimate of 119,999–129,999 acres of occupied habitat (Campbell 1989). A cooperative statewide inventory effort between 1996 and 1998 yielded a minimum estimate of 65,999 acres (FaunaWest 1999). However, this inventory did not include areas where access was denied or results of other prairie dog survey efforts by various entities, including those conducted on tribal lands. In 2002, the Montana Working Group estimated that there were approximately 52,141 acres of active prairie dog colonies on non-tribal lands based on the best available information, which was known not to include all prairie dog colony area in the state (MPDWG 2002). None of these previous efforts provided sufficient rigor, repeatability, or confidence to evaluate management actions, develop a monitoring program, or adequately inform a federal status review.*

A 2008 effort to estimate occupied black-tailed prairie dog acres statewide from aerial surveys using aerial line-intercept methods resulted in an observed 191,330 acres of active colonies (95% BCI, 171,688–206,036) and 32,098 acres of inactive colonies (95% BCI, 17,393–51,817) (Rauscher et al. 2013) (Figure 11).

In the spring of 2010, an initial effort to map black-tailed prairie dog colonies statewide using 2005 National Agriculture Imagery Program (NAIP) imagery was completed in order to provide a current picture of occupied prairie dog acres (USDA Farm Services Agency 2010, Maxell et al. 2010). The mapping effort identified 8,852 potential black-tailed prairie dog colonies that ranged in size from 2.5 acres to 2,945 acres; 2,598 (29%) of these had previous confirmation of activity in the immediate area. It is important to note

that estimates of acreage for areas with recent evidence of prairie dog activity are biased high by an unknown magnitude because other ground features, such as ant mounds and Richardson's ground squirrel (*Spermophilus richardsonii*) burrows, have likely been misinterpreted as evidence of recent prairie dog activity and because only a portion of each individual 1 hectare/2.47 acre grid cell had to show evidence of recent prairie dog activity to be coded as occupied. Ground truthing is always needed to correct for this kind of bias.

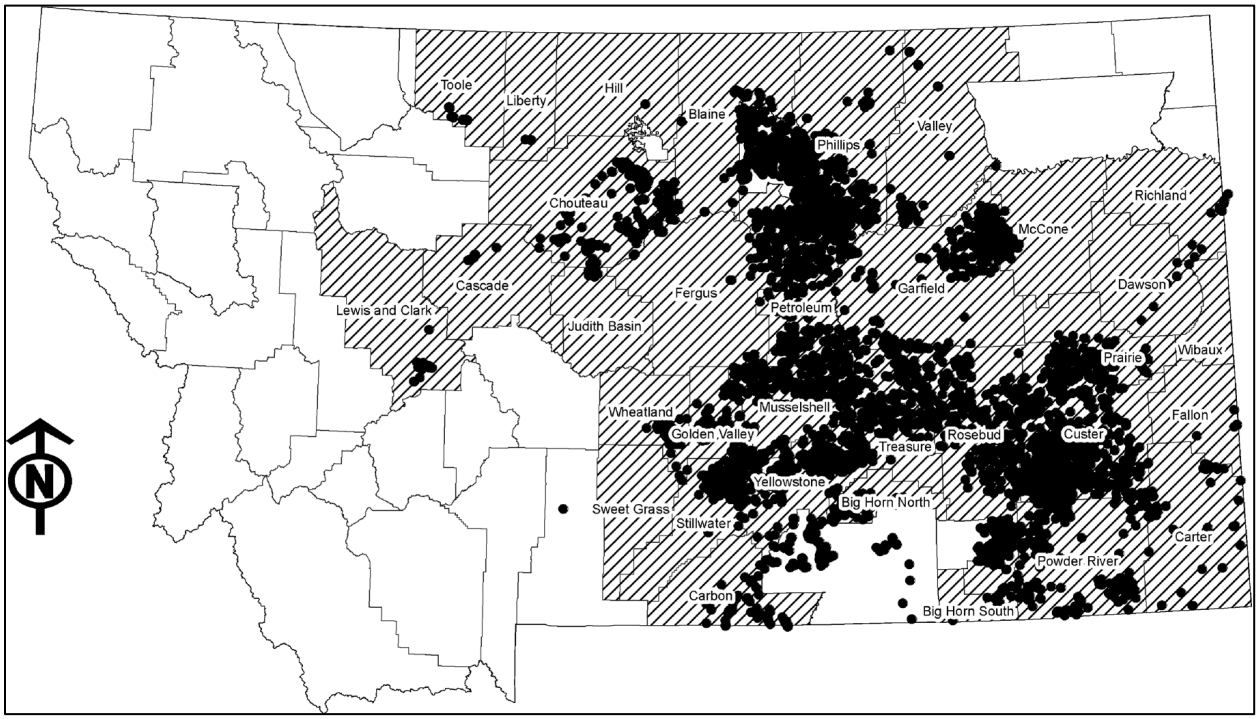

Figure 11. Counties (slashed) in Montana surveyed for black-tailed prairie dogs in 2008 and records of prairie dog colony locations (dots). The estimated percent of colonies classified as active from the air that were active on the ground was 86.8%.

The potential colonies were spatially distributed in a pattern that closely agrees with previous confirmed evidence of prairie dog activity. The modal size class for total acreage of potential prairie dog towns in the complexes defined by the 1.5, 3.0, and 7.0 km distance rule[1] is 101 to 500 acres (Figures 12 and 13). Private land ownership is the dominant ownership for 6,214 potential colonies (70.2%) totaling 427,197 acres. This is followed by federal land ownership, dominant for 1,227 potential colonies (14%) totaling 94,465 acres, tribal land ownership, dominant for 739 potential colonies (8.3%) totaling 65,283 acres, and state land ownership, dominant for 665 potential colonies (7.5%) totaling 58,588 acres (Maxell et al. 2010).

[1] The 1.5, 3.0, and 7.0 km distance rules are used to aggregate prairie dog colonies into complexes. Example: Colonies within 1.5 km of one another are combined to count towards one complex. Minimum complex size is often used to decide whether enough occupied acres are available for black-footed ferret reintroductions (Biggins et al. 2006). These distance rules are widely used by practitioners in the field and by the USFWS in determining suitable sites for black-footed ferret introductions.

Forty-four counties had some evidence of recent prairie dog activity, including eight that did not have previously confirmed observations of prairie dogs. The top six counties by numbers of potential colonies and total acres are Rosebud (1,833 potential colonies and 136,363 acres), Custer (1,709 potential colonies and 89,201 acres), Phillips (749 potential colonies and 74,193 acres), Powder River (6,219 potential colonies and 38,636 acres), Blaine (319 potential colonies and 35,503 acres), and Big Horn (569 potential colonies and 35,291 acres) (Maxell et al. 2010).

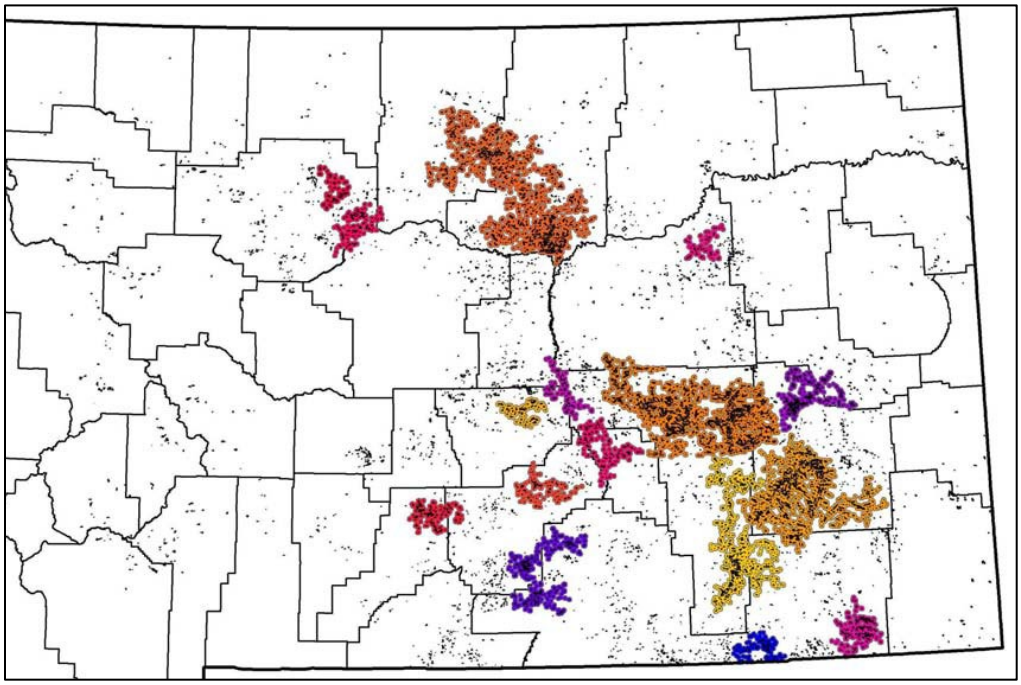

Figure 12. Complexes in eastern Montana containing greater than 5,000 acres of potential prairie dog colonies as defined by the 3.0 km distance rule. The 3.0 km distance rule aggregates all colonies within 3.0 km of each other and combines them into what is considered one complex. The 1.5, 3.0, and 7.0 km distance rules are used to aggregate prairie dog colonies into complexes. Example: Colonies within 1.5 km of one another are combined to count towards one complex. Minimum complex size is often used to decide whether enough occupied acres are available for black-footed ferret reintroductions (Biggins et al. 2006). These distance rules are widely used by practitioners in the field and by the USFWS in determining suitable sites for black-footed ferret introductions.

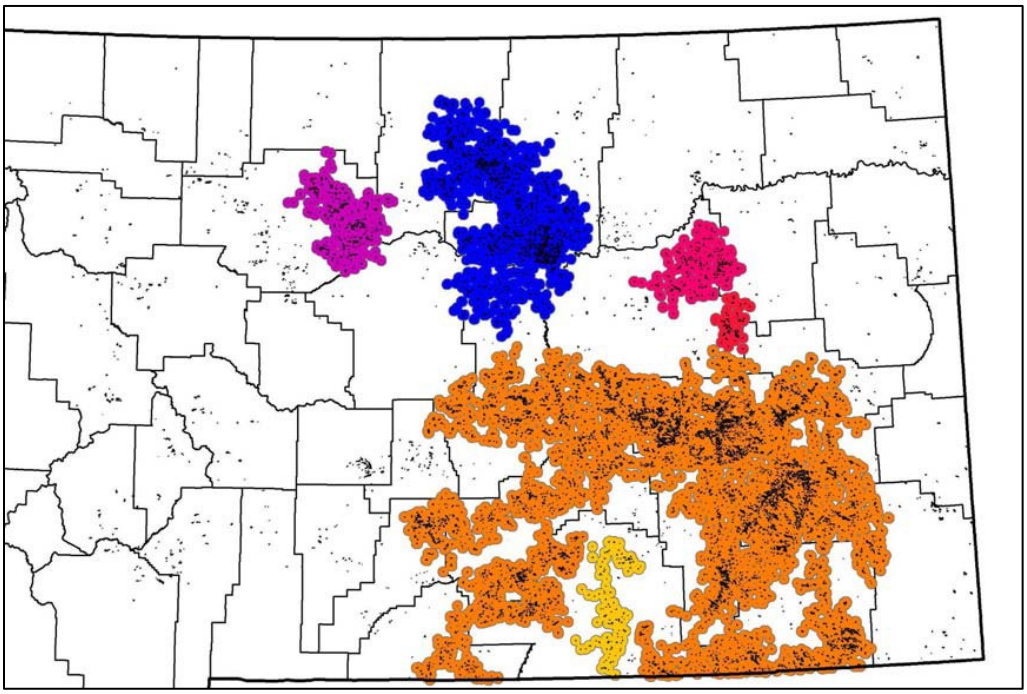

Figure 13. Complexes in eastern Montana containing greater than 5,000 acres of potential prairie dog colonies as defined by the 7.0 km distance rule. The 7.0 km rule aggregates all colonies within 7.0 km of each other and combines them into what is considered one complex. The 1.5, 3.0, and 7.0 km distance rules are used to aggregate prairie dog colonies into complexes. Example: Colonies within 1.5 km of one another are combined to count towards one complex. Minimum complex size is often used to decide whether enough occupied acres are available for black-footed ferret reintroductions (Biggins et al. 2006). These distance rules are widely used by practitioners in the field and by the USFWS in determining suitable sites for black-footed ferret introductions.

The most recent NAIP imagery mapping results for just southeastern Montana generally support the work from 2008 (Rauscher et al. 2013) in terms of where the highest densities of prairie dogs in the state are found (Figure 14, Bachen et al. 2016). Colony boundaries were delineated on the 2015 NAIP tiles following methods used for the previous projects (see Maxell et al. 2010). Across the area of interest (just the Miles City BLM district), the boundaries of 4,154 potential colonies were mapped totaling 556,136 acres (Figure 14). Of these colonies, 4 were over 5,000 acres in size, 55 were between 1,000 and 5,000 acres, and the remaining 3,199 were less than 1,000 acres. Mapped colonies averaged 134 acres with a minimum size of less than 1 acre and a maximum size of 9,210 acres. Total acres of active and inactive colonies exceeded those mapped in previous years within the same area. Although this could represent an increase in the area occupied by black-tailed prairie dogs, this could also be due to more detections as a result of better imagery or an overestimate of acres due to misinterpretation of ground features. Although more colonies were detected than in previous efforts many of the same complexes were delineated as from the 2005 and 2009 NAIP imagery (Maxell et al. 2010).

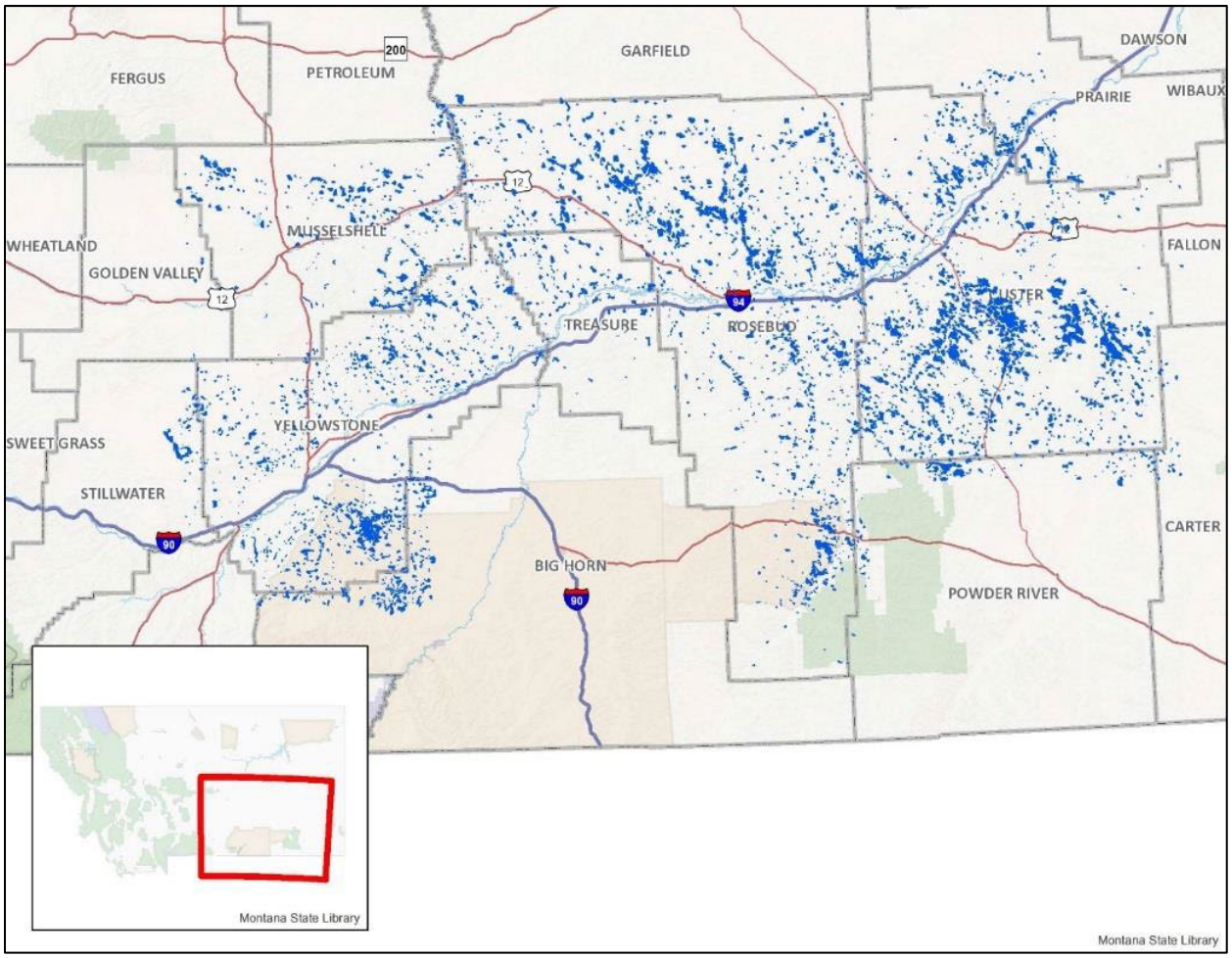

Figure 14. Colonies mapped from 2015 NAIP imagery in southeastern Montana, shown in blue.

The white-tailed prairie dog's gross range extends from a small part of southern Montana into central and southern Wyoming, northwest Colorado, and northeast Utah (Clark et al. 1971) (Figure 1). In Montana, the species is only found in southern Carbon County. A look at previously occupied colonies in 2016 showed eight active colonies and 11 inactive colonies that have been occupied at some point since 1990 (MFWP unpublished 2016). All eight active colonies are small with just 2-36 detected occupied burrows per colony. The white-tailed prairie dog population in Montana is too small to be considered suitable to contribute to black-footed ferret recovery.

Prairie Dog Population Conservation, Monitoring and Management

Prairie Dog Disease Monitoring and Management

Several techniques have been developed to monitor diseases, particularly plague, that threaten survival of prairie dogs. Visual counts may provide early evidence of a population decline as a result of disease outbreak (USFWS 2016), however, confirming the presence of diseases affecting prairie dogs and black-footed ferrets within a reintroduction site typically requires disease testing. Testing can be achieved through collecting blood and/or fleas from live prairie dogs and other small mammals trapped during dedicated trapping efforts; collecting blood from other carnivores, such as coyotes (*Canis latrans*);

collecting carcasses of dead animals, particularly prairie dogs and other small mammals; and swabbing burrows to collect fleas (USFWS 2016). Site-specific management plans for reintroduction of black-footed ferrets will be developed by the MFWP and USFWS and may require assistance from partners to implement disease monitoring and management strategies. Appropriate environmental analyses will be completed as part of any plan.

One strategy for plague management is applying insecticide dust into prairie dog burrows to minimize flea populations, the vectors of plague. The most effective treatment is deltamethrin (USFWS 2016). Deltamethrin is applied with mechanical sprayers, either on foot or ATV, into every burrow within the treatment area, regardless of whether the burrow appears to be occupied or not (USFWS 2016). Although extremely effective at killing fleas, recent research has shown that deltamethrin may become less effective with repeated annual use (Boyer et al. 2014; Eads et al. 2018). Consequently, deltamethrin should be used wisely and preferably incorporated into an integrated pest management strategy with other management tools. Deltamethrin has been used across Montana as part of general prairie dog conservation efforts and as part of black-footed ferret reintroduction programs. This tool will be incorporated into any future black-footed ferret reintroduction effort as it remains the most available, reliable tool to mitigate plague at reintroduction sites. The Wildlife Services division of APHIS has been assisting Montana partners in deltamethrin application on both private and tribal lands.

A recently developed, experimental sylvatic plague vaccine (SPV) developed by the USGS National Wildlife Health Center in Madison, WI was reported to provide "partial protection" of prairie dogs from plague (Rocke et al. 2017). During three years of testing at 12 study sites across 7 states, the odds of apparent survival when plague was detected were 1.76 times higher (95% BCI 1.28–2.43) on vaccine plots than on placebo plots for adults and 2.41 times higher (95% BCI 1.72-3.38) for juveniles. However, prairie dog populations still declined substantially on vaccine plots. When plague was not detected, there was no difference in survival of juveniles on paired vaccine/placebo plots and adult survival was significantly lower on vaccine plots (Rocke et al. 2017). Tripp et al. (2017) reported SPV prevented prairie dog colony "collapse". Both of those studies emphasized that additional fieldwork is required to optimize the use of SPV as a management tool for prairie dogs and to confirm whether its use will also provide benefits of reduced *Y. pestis* exposure to black-footed ferrets and other animals (Rocke et al. 2017). Matchett et al. (unpublished data, currently in preparation for publication) estimated apparent prairie dog survival on vaccine plots to be 5% lower than on paired placebo plots based on data from nearly 2,400 marked prairie dogs from 2013-2017.

Fipronil-treated grain has recently been registered by EPA for the control of fleas on prairie dogs and is being evaluated at black-footed ferret reintroduction sites at Conata Basin, SD, Lower Brule Reservation, SD, and Rocky Mountain Arsenal National Wildlife Refuge, CO. Fipronil has proven highly effective in suppressing fleas on prairie dogs for 12-15 months post treatment (Eads et al. 2019). Furthermore, efficacy of fipronil seems comparable to that of deltamethrin. Research is needed to evaluate potential toxicity or other negative effects from black-footed ferrets eating prairie dogs and small mammals that have consumed fipronil-laced grain. Fipronil in the form of "*FipBits*", a bait pellet like the distribution method for SPV baits, is being experimentally used in Montana, Arizona and South Dakota (Matchett, presentation to the Disease and Conservation subcommittees at the 2019 Black-footed Ferret Recovery Implementation Team meeting, Fort Collins, CO). "*FipBits*" are vastly cheaper and distributed more efficiently than the registered grain product. Preliminary results are very promising, and if proven effective, flea control/plague mitigation could be accomplished at a fraction of the cost of dusting or

fipronil grain treatments. Experimental use permitting from EPA is being sought for expanded evaluations of "*FipBits"* in multiple states (Matchett, pers comm. 2019).

Prairie Dog Translocations

A white-tailed prairie dog translocation in the early 2000s was conducted under the direction of an environmental analysis as required by the MFWP wildlife introduction/transplant code, 87-5-711. The analysis resulted in development of protocols and regulations established within Administrative Rule of Montana 12.9.10, and jointly adopted by MFWP and the MFWP Commission in 2004. The protocols within ARM 12.9.10 cover criteria for sending and receiving areas, monitoring requirements, conflict resolution, capture and transportation protocols, disease precautions, and the approval process. These protocols provide direction for other translocations within Montana and have been informally adopted by the Montana Working Group as best practices to be followed for the movement of both white-tailed and black-tailed prairie dogs.

Black-tailed prairie dog translocations have been conducted periodically by Montana Working Group members including the Humane Society of the US, Prairie Dog Coalition, World Wildlife Fund and most recently the American Prairie Reserve. Translocations by these groups have been conducted within single private landownerships and/or tribal reservations thus needing no formal approval by MFWP, yet these translocations have been conducted within the protocols described in the 2004 environmental analysis. Prairie dog translocations could be conducted as part of a black-footed ferret reintroduction program when occupied prairie dog colony acres could be increased through translocations.

Population Threats to Black-tailed Prairie Dogs

Black-tailed prairie dogs colonies are typically very dense, with densities up to 10 times that of white-tailed prairie dogs (Cully and Williams 2001). The species tends to contain the largest and most dense colonies of all prairie dog species (Hoogland 1996). Because of their high densities and behavior of clipping grasses and shrubs, black-tailed prairie dogs can compete with cattle for forage where they overlap, which can create conflicts with ranching operations (Derner et al. 2006). Overall impacts do vary (Sierra-Corona et al. 2015). Consequently, poisoning efforts are frequently used to control numbers and distribution of black-tailed prairie dogs. Excerpt from the Montana Department of Agriculture vertebrate pest/prairie dog bulletin: *Control of prairie dogs is not a one step process. To obtain significant reductions in prairie dog numbers (80 percent or more) the application of at least two lethal control methods in a single year will likely be required. Total eradication in a field will often require at least two years of effective application of lethal control methods.*

Other management efforts are implemented to address conflict issues, including recreational and targeted shooting. Depending on the intensity of recreational shooting it can impact local prairie dog populations although results are mixed (Reeve and Vosburgh, 2006.) Loss of prey base does likely affect black-footed ferret reintroduction sites (Paul 2005, Reeve and Vosburgh 2006.) Vosburgh (1996) investigated the impacts of recreational shooting on prairie dogs in northeast Montana finding during one year of investigation that prairie dog density declined 33% on hunted colonies and 15% on non-hunted colonies. He also found a positive correlation between shooting pressure and change in density on hunted colonies. Prairie dogs spent more time in alert postures and less time foraging on hunted than on non-hunted towns.

Long-term impacts from shooting are often not as significant as poisoning. The option of using poison for boundary control to prevent the spread of prairie dogs may be particularly important when assessing reintroduction sites for black-footed ferrets but anticoagulant rodenticides are not allowed within reintroduction sites. Boundary control is difficult however as prairie dogs can move large distances (Vantassel, personal communication.)

Historical and recent prairie dog population declines can be attributed in large part due to agricultural conversion of native grasslands (Lesica 1995) and urbanization (Knowles and Weggenman 1998). Thirty-two percent of historical native grasslands have been broken or significantly altered in eastern Montana (Pearson and Martin 2012). Conversion of the most productive remaining grasslands in Montana continues at an average of 9,455 acres per year (USDA Farm Service Agency, unpubl. data, 2005-2009).

Plague can be especially virulent for black-tailed prairie dogs, with mortality rates over 90% in infected individuals and localized or even regional extirpation of colonies (Cully and Williams 2001). See Montana site summaries for historical impacts of plague on prairie dog colonies and black-footed ferret restoration efforts. Clearly, plague management is very important to consider in evaluation of reintroduction sites.

Although both black-tailed and white-tailed prairie dogs are Montana Species of Concern, MFWP has little regulatory authority over these species. Prairie dogs are considered vertebrate pests under Montana Department of Agriculture statute (MCA 80-7-1101) and as such can be removed without regulation when they are injurious to agriculture, other industries, and the public. This classification prevents MFWP from implementing shooting closures or limits to removal efforts by landowners. Public land management agencies such as the Bureau of Land Management and Department of Natural Resources and Conservation can implement shooting and poisoning restrictions on public land as deemed necessary.

Reduction of Threats to Prairie Dogs within Black-footed Ferret Restoration Sites

Pre-release and annual sylvatic plague management will be part of any black-footed ferret reintroduction program. Additionally, site-specific management plans, e.g., reintroduction plans developed for the purposes of USFWS Safe Harbor Agreement enrollment (see Safe Harbor Agreements below), or federal agency Resource Management Plans, should restrict both recreational prairie dog shooting and poisoning within designated conservation zones to support black-footed ferret restoration goals. Recreational shooting and/or poison can be employed on the edges of the conservation area for boundary control as agreed to among private landowners, land management agencies, MFWP and USFWS.

As private lands are critical to black-footed ferret restoration, incentivizing landowners to maintain prairie dog populations is an innovative option for prairie dog conservation. Incentives are used to decrease human-caused mortality of prairie dogs, i.e., recreational shooting and poisoning, while improving prairie habitat for other native species. A landowner incentive program was developed by NRCS and USFWS in 2014 in Colorado. Under this effort, private landowners entered into NRCS and USFWS agreements to maintain prairie dogs and allow ferret releases. No comparable program exists for Montana landowners in part because no funding is currently available to support this type of program. The MFWP Working Grasslands Initiative established in 2017 does include a criterion for project selection that is intended to conserve prairie dogs. This criterion is worded as follows: *Project has adequate habitat for specific wildlife recovery needs, if relevant to project objectives (e.g., 1,500+ acres of prairie dog habitat suitable for potential black-footed ferret reintroduction)*. An incentive for landowners could be critical for conserving prairie dog-driven ecosystems and conserving lands where ferret reintroductions could take place, yet no

enrollment of landowners has occurred despite the efforts by members of the Montana Working Group. MFWP hopes to find interested landowners and funding for this program in the future.

BLACK-FOOTED FERRET CONSERVATION, MONITORING AND MANAGEMENT STRATEGIES

Black-footed Ferret Population Monitoring

The primary objectives for a black-footed ferret monitoring program are to estimate the population size, demography and distribution of ferrets to determine a site's status, progress and contribution towards site-specific and national recovery goals. Secondary but related objectives, such as research, may use many of the same techniques described within the Black-footed Ferret Field Operations Manual (USFWS 2016). The USFWS recognizes that individual black-footed ferret reintroduction sites may have different objectives annually based upon budgets, resources, needs, landowner tolerance and other factors. Ideally, the USFWS derives an annual summer/fall population estimate for each site. When population-level information is not available, data such as presence, population index or trend is valuable. Site managers should consult with USFWS on an annual basis regarding monitoring objectives and appropriate methodology. USFWS will need population size, demographic and distribution estimates periodically for recovery purposes (e.g., 5-year review, Recovery Plan revision) and will inform site managers no less than one year in advance of the need for these data.

Surveys to monitor black-footed ferret populations should be done between mid-August and mid-September to document reproduction in conjunction with estimating populations and take advantage of an increased probability of detection associated with emergence of kits (Eads et al. 2012, USFWS 2016). Currently, the best technique to detect black-footed ferrets is through the use of spotlight surveys throughout previously mapped prairie dog colonies (USFWS 2016). Spotlight surveys as described within the Field Operations Manual (USFWS 2016) are typically adequate to estimate either abundance or minimum number alive for black-footed ferrets at reintroduction sites.

Black-footed ferrets typically use a locomotive pattern known as "bounding" as they run between burrows and leave a distinctive track in the snow. Snow-tracking provides a non-invasive technique to collect data that may supplement spotlighting in northern climates. This technique should not be relied upon as a sole method of estimating population size, but as opportunistic data that may direct future spotlighting efforts (Richardson et al. 1985). An additional technique that is being investigated is the use of scent-detection dogs to detect the presence of black-footed ferrets. Although this has been investigated in the past (Reindl-Thompson et al. 2006), it has received only brief attention. If successful, this technique could increase the efficiency and efficacy of monitoring at current and future reintroduction sites in Montana and throughout the entire recovery area. PIT tags and dye-marking are the only approved methods to mark black-footed ferrets (USFWS 2016) and can help with population monitoring.

Black-footed Ferret Disease Monitoring and Management

Black-footed ferrets are very susceptible to canine distemper virus (CDV) and management of this disease is important for ferret recovery. Canine distemper virus exists naturally in wild carnivores and is likely present within some carnivores at all black-footed ferret reintroduction sites. Monitoring of CDV, for the purposes of black-footed ferret recovery, can be accomplished through serology of other carnivores in

the area but is not a high priority. Currently, managing CDV in the wild is not possible but efforts must be made to reduce the risk of CDV spread from human sources. (USFWS 2016).

Management of plague at reintroduction sites is a high priority for all partners and at present several tools are available. Plague exists across the western half of North America and has affected most, if not all, reintroduction sites. It may be safe to assume for all prairie dog complexes that plague is present in the greater ecosystem at some level (USFWS 2016).

Black-footed ferrets used for reintroduction programs come from the USFWS Black-footed Ferret Center vaccinated for both CDV and plague, and do not require additional booster vaccinations after release. At most reintroduction sites and dependent on available resources, wildborn kits are vaccinated for disease upon their first capture, and ideally 30 days later with a booster. All ferrets that have received initial and booster vaccinations are considered protected for life. Please refer to USFWS 2016 for details on field capture and vaccination protocols.

Black-footed Ferret Reintroduction Techniques

The USFWS specifies that black-footed ferrets should be released at least 932 ft apart, into as few colonies as possible to promote population connectivity, and at a density of 20 to 75 acres/black-footed ferret, depending on habitat quality (USFWS 2016). While the ideal complex size for reintroducing black-footed ferrets is ≥4,500 acres, the USFWS is willing to consider releases on sites of 1,500-3,000 acres as allowed within the 2013 USFWS black-footed ferret programmatic safe harbor agreement. The potential for population expansion to upwards of 4,500 acres is preferred.

ESTABLISHING BLACK-FOOTED FERRET RECOVERY SITES IN MONTANA

Montana has the potential to support multiple black-footed ferret recovery sites. Evaluating the potential of each possible site, however, could be extremely time consuming and costly. Consequently, these guidelines adopt a strategy from the Wyoming Black-footed Ferret Management Plan for evaluating and prioritizing potential sites in order to best allocate efforts to meet Montana recovery goals. The Wyoming Black-footed ferret Working Group developed a prioritization matrix (the basis for Appendix I) that allows personnel to evaluate different criteria in order to prioritize new sites for reintroduction. These guidelines adopt that prioritization matrix as the basis for reintroduction site evaluation in Montana.

Requirements for a site to be considered for black-footed ferret reintroduction:

- The USFWS requires a site with a minimum of 1,500 occupied acres of black-tailed prairie dogs to be considered for black-footed ferret reintroduction. The 1,500 acres should form a complex whereby colonies are within 1.5 km of one another. For a black-footed ferret population to contribute toward recovery goals there needs to be at least 30 adult black-footed ferrets; given that ≥ 4,500 acres is needed to host 30 adults, sites with this potential will be prioritized.
- Captive black-footed ferrets must be available for reintroduction.
- Current land management practices must be compatible with prairie dog occupancy.
- Private landowner support must exist for reintroductions on their lands.
- Community outreach must be conducted to ensure awareness of the idea. Reintroductions of black-footed ferrets to tribal lands fall outside regulatory authority of MFWP and can be conducted independent of these guidelines. Coordination among tribes and partners is however part of the larger discussion.

- Resources must be in place for annual sylvatic plague mitigation and boundary control, if needed, for the term of any formal agreements with MFWP or USFWS and ideally for five or more years.

Ranked criteria for selecting a site (see Appendix I):

- Habitat suitability and management
    - actual occupied prairie dog acreage (above the minimum requirement),
    - commitment to annual disease management,
    - prairie dog control adjacent to site (boundary control only),
    - potential to contribute to population connectivity.
- Stakeholder and financial support - general adjacent landowner and permittee support, dedicated resources for management and monitoring including dedicated resources for disease management, monitoring and boundary control if necessary.

Because specific details and the relative importance of each of these criteria may change as management efforts proceed, the matrix found in Appendix I will be a living document that can be updated as needed. In order to ensure the matrix is kept current and relevant, the Montana Working Group will annually discuss and re-evaluate the prioritization matrix, make updates as necessary, and evaluate and prioritize new and existing management needs. The Montana Working Group will evaluate and prioritize new sites periodically as resources and personnel allow based on other, ongoing reintroduction efforts and existing management needs for established sites.

MFWP and its partners will work with private landowners, tribes, land management agencies, and permittees/lessees to identify sites that may be biologically suitable and socially acceptable for prairie dog conservation and black-footed ferret reintroductions. MFWP process for any wildlife translocation or release requires completion of an environmental analysis. The process to complete an environmental analysis requires collection of public comment and approval by the Fish and Wildlife Commission based on public comment and impacts identified in the assessment. Once a site has been preliminarily selected it will be evaluated for reintroduction efforts, and a site-specific management plan will be drafted. Additionally, MFWP and the USFWS will collaborate with the Montana Working Group to ensure all necessary pre-release monitoring and management needs are addressed (e.g., plague management, boundary control, etc.) prior to release. Once these objectives are met, MFWP will work with the USFWS to develop a black-footed ferret allocation proposal for the site with specific release strategies.

The post-release relationship with private landowners is important in order to keep landowners informed and supportive of the restoration. MFWP and appropriate members of the Montana Working Group will conduct field visits to assist with black-footed ferret monitoring and/or continued plague mitigation as needed and/or as preferred by the landowner. Bi-annual check-ins or site visits will be conducted by MFWP or USFWS staff. Memorandums of Understanding between the landowner and MFWP in addition to agreements between the landowner and USFWS through Safe Harbor Agreements will be required to ensure coordination and accountability by all parties.

The USFWS developed a Field Operations Manual (USFWS 2016) that provides more detail on many of the topics below. Given the dependence of black-footed ferrets on prairie dog colonies for food and shelter (burrows), ferret conservation and management strategies also necessitate conservation and management strategies for prairie dogs at reintroduction sites. Consequently, it is important to incorporate both monitoring and management at each site for each species. Key objectives of each

recovery site include ensuring a healthy and productive black-footed ferret population, maintaining an adequate prey base of prairie dogs for black-footed ferrets, and monitoring populations and health of both ferrets and prairie dogs.

Complex Mapping

Potential release sites should be evaluated by mapping the colony boundaries and estimating prairie dog densities within the colonies prior to administrative procedures to establish a site and submitting a black-footed ferret allocation request to the USFWS.

Evaluating black-footed ferret habitat includes the following steps adapted from Biggins et al. (2006a):

- Map and estimate the size of prairie dog colonies.
- Circumscribe the prairie dog colony complex and calculate the percentage currently occupied.
- Estimate prairie dog densities on colonies with burrow density strip transects or visual counts.
- Calculate a Black-footed ferret Family Rating for the complex. The Black-footed ferret Family Rating is a relative number used to compare the suitability of prairie dog complexes for ferret reintroduction (USFWS 2016). An inadequate Family Rating renders a site unsuitable for ferret reintroductions.

The USFWS recommends mapping prairie dog colonies and estimating prairie dog density at reintroduction sites at a minimum of 3-year intervals. Between mapping efforts, the USFWS recommends annual qualitative assessments of prairie dog colonies, such as repeated visual counts or windshield surveys, to allow for early detection of declines possibly indicative of a plague outbreak (USFWS 2016). Some landowner incentive programs require annual or quarterly monitoring by the landowner or their agent.

Prairie Dog Complex Boundary Control at a Black-footed Ferret Reintroduction Site

Use of toxicants is typically not permitted within active reintroduction sites, but may be conducted in areas adjacent to reintroduction sites. APHIS Wildlife Services staff conduct boundary control to keep prairie dogs from spreading onto properties where they are not desired in other states, where significant conflicts exist between black-footed ferret recovery goals and adjacent landowner interests. Zinc phosphide is the preferred control agent for boundary control. Anticoagulant pesticides such as Rozol® and Kaput® should not be used, due to the risks of secondary poisoning effects on non-target wildlife species that consume prairie dogs, including ferrets (Hill and Carpenter 1982, Matschke et al. 1992). Other poisons such as aluminum phosphide, chlorophacinone and diphacinone are not recommended for use in areas where black-footed ferrets are known to be present due to their documented direct lethality or secondary poisoning impacts (Witmer et al. 2016). Similar to shooting, poisoning can be regulated by site managers and should only be used cautiously and sparingly, if at all (USFWS 2016).

Regulatory Assurances for Reintroductions

Endangered Species Act coverage for private land reintroduction sites could be provided under the Black-footed Ferret Programmatic Safe Harbor Agreement with the USFWS (USFWS 2013b) or an ESA Section 10(j) experimental, non-essential population designation.

<u>Safe Harbor Agreement</u>

A Safe Harbor Agreement (SHA) is a voluntary agreement involving private or other non-federal property owners whose actions contribute to the recovery of species listed as threatened or endangered under the ESA. The agreement is between cooperating non-federal property owners and the USFWS. In exchange

for actions that contribute to the recovery of listed species participating landowners receive formal assurances from the USFWS that if they fulfill the conditions of the SHA, the USFWS will not require any additional or different management activities. In addition, participants may return the enrolled property to the baseline conditions that existed at the beginning of the SHA at any time but landowners are required to give MFWP and the USFWS 90 days' notice and the opportunity to salvage any remaining black-footed ferrets upon their decision to opt out. The ESA 10(a)(1)(A) permit associated with the SHA authorizes incidental take of species that may result from actions undertaken by the landowner under the SHA, which could include returning the property to the baseline conditions.

By entering into a SHA, property owners receive assurances that land use restrictions will not be required even if the voluntary actions taken under the agreement attract particular ESA-listed species onto enrolled properties or increase the numbers or distribution of those listed species already present on those properties. The assurances are provided by the USFWS through a Certificate of Inclusion issued to the property owner, under the authority of section 10(a)(1)(A) of the ESA. Montana tribal reintroduction efforts to date on the Crow and Northern Cheyenne reservations are covered under the Safe Harbor Agreement (USFWS 2013b) or site-specific 10(a)1(A) permits.

<u>10(j) Experimental/Non-essential Population Designation</u>

Re-introduced black-footed ferret populations can be designated as nonessential experimental populations (as prescribed in Section 10(j) of the ESA of 1973, as amended). Under this designation, also known as the "10(j) rule" after the associated clause in the ESA, the USFWS is able to relax otherwise prohibited actions, including take resulting from an otherwise lawful activity, when doing so advances conservation efforts. The 10(j) rule enables private landowners and industries to continue current land management practices on lands that harbor black-footed ferrets, thus allowing these stakeholders to be active participants in and supporters of the conservation of ferrets. Montana reintroduction efforts to date in Blaine and Phillips County are covered under this 10(j) rule. The Fort Belknap reintroduction was also covered under a 10(j) rule.

<u>Site-specific Endangered Species Act Section 7 consultations</u>

In some instances, incidental take coverage may be provided by site-specific ESA Section 7 consultations with the USFWS where federal lands are considered for black-footed ferret reintroductions. Such consultations, through the issuance of biological opinions, typically provide for unlimited incidental take outside of designated conservation zones on federal lands, which provides regulatory certainty for adjacent non-federal landowners. This approach has been used for black-footed ferret reintroductions on federal lands in Colorado, and is being considered for use in other jurisdictions.

Adaptive Management

Each reintroduction site will represent a unique suite of challenges for the conservation and management of black-footed ferrets as well as prairie dogs. Consequently, it will be critical to adapt strategies to meet these differing challenges. At a minimum, the Montana Working Group will meet annually to discuss the status of each reintroduction site, evaluate conservation and management needs for each site, and prioritize new reintroduction sites as appropriate. The Montana Working Group will also evaluate the success of recovery efforts to date relative to the USFWS recovery objectives and update the prioritization matrix to evaluate new reintroduction sites as needed. In addition to adapting existing conservation and management strategies as necessary at current reintroduction sites, the MFWP, in collaboration with the USFWS, will evaluate and utilize new techniques when appropriate.

Finally, it is important to note that population objectives in these guidelines are based on recovery objectives identified in the 2013 Recovery Plan (USFWS 2013a). Should these numbers, or the metric used to evaluate recovery, change at the national level, it will be important to re-evaluate the objectives outlined here. Although the population objectives outlined are believed to provide sufficient numbers to maintain viable populations in Montana, it will be important to ensure that state objectives are in line with national objectives in order to achieve recovery range-wide.

LITERATURE CITED

Anderson, E, S.C. Forrest, T.W. Clark, and L. Richardson (1986) "Paleobiology, biogeography, and systematics of the black-footed ferret, Mustela nigripes(Audubon and Bachman), 1851,"Great Basin Naturalist Memoirs: Vol. 8 , Article 3. Available at: https://scholarsarchive.byu.edu/gbnm/vol8/iss1/3.

Bachen, D.A., B.A. Maxell, A.L. McEwan, and B. Crees. 2016. Mapping of Black-tailed Prairie Dog (*Cynomys ludovicianus*) colonies using National Agriculture Imagery Program (NAIP) 2015 Imagery. Montana Natural Heritage Program, Helena, Montana. 18 pp.

Biggins, D.E., J.M. Lockhart, and J.L. Godbey. 2006. Evaluating habitat for Black-footed ferrets: revision of an existing model. Pp. 143-150. In: J.E. Roelle, B.J. Miller, J.L. Godbey, and D.E. Biggins (eds.) Recovery of the Black-footed ferret – progress and continuing challenges. Reston, VA: U.S. Geological Survey Scientific Investigations Report 2005-5293. 288 pp.

Boulerice, J. 2017c. Spotlighting for black-footed ferret (*Mustela nigripes*) in the Shirley Basin/Medicine Bow Management Area. Pages 21-35 *in* Threatened, Endangered, and Nongame Bird and Mammal Investigations (A. C. Orabona, editor). Wyoming Game and Fish Department Nongame Program, Lander.

Boyer, S., A. Miarinjara, and N. Elissa. 2014. *Xenopsylla cheopis* (Siphonaptera: Pulicidae) susceptibility to deltamethrin in Madagascar. PLoS ONE 9:e111998.

Campbell, T. M. 1989. Prairie dog colony location surveys and black-footed ferret searches in Montana. Pages 1–12 in T. W. Clark, D. Hinckley, and T. Rich, editors. The prairie dog ecosystem: managing for biological diversity. Montana BLM Technical Bulletin no. 2, Billings, Montana, USA.

Clark, T. W., R. S. Hoffman, and C. F. Nadler. 1971. *Cynomys leucurus*. Mammalian Species 7:1- 4.

Cully, J.F. Jr., and E.S. Williams. 2001. Interspecific comparisons of sylvatic plague in prairie dogs. Journal of Mammology 82: 894-905.

Derner, J. D., J. K. Detling, and M. F. Antolin. 2006. Are livestock weight gains affected by black- tailed prairie dogs? Frontiers in Ecology and the Environment 9: 459-464.

Eads, D. A., D. S. Jachowski, J. J. Millspaugh, and D. E. Biggins. 2012. Importance of lunar and temporal conditions for spotlight surveys of adult black-footed ferrets. Western North American Naturalist 72:179-190.

FaunaWest. 1999. Status of the black and white-tailed prairie dogs in Montana. Montana Fish, Wildlife and Parks, Helena, USA.

Flath, D.L and T.W. Clark. 1986. Historic status of black-footed ferret habitat in Montana. Great Basin Naturalist Memoirs. No. 8:63-71.

Hill, E.F., and J.W. Carpenter. 1982. Responses of Siberian ferrets to secondary zinc phosphide poisoning. Journal of Wildlife Management 46:678-685.

Hillman, C.N. 1968. Field observations of black-footed ferrets in South Dakota. Transactions of the North American Wildlife and Natural Resources Conference 33:433-443.

Hoogland, J. L. 1996. *Cynomys ludovicianus*. Mammalian Species 535:1-10.

Jobman. W. G. and M. E. Anderson. 1981. Potential present range of the black-footed ferret as of January 1, 1981. Unpublished report, U.S. Fish and Wildlife Serv., Pierre, South Dakota. 65 pp.

Knowles, C.J. and M. Weggenman. 1998. Relocation of the Fort Harrison prairie dog colony. Paper presented at the 1998 Montana Chapter of the Wildlife Society annual meeting.

Lesica, P. 1995. An endless sea of grass no longer. Kelseya Vol. 8, No. 2.

Matchett, M.R., D.E. Biggins, V. Carlson, B. Powell and T. Rocke. 2010. Enzootic plague reduces black-footed ferret (Mustela nigripies) survival in Montana. Vector-borne and Zoonotic Diseases 10(1):27-35.

Matschke, G.A., K.J. Andrews, and R.M. Engeman. 1992. Zinc phosphide: black-tailed prairie dog – domestic ferret secondary poisoning study. Pages 330-334 *in* J.E. Borrecco and R.E. Marsh, editors. Proceedings of the Fifteenth Vertebrate Pest Conference, University of California, Davis.

Maxell, B.A., S. Blum, and K.V. Walker. 2010. Preliminary Report: Mapping Black-tailed Prairie Dog (*Cynomys ludovicianus*) colonies across Montana using the National Agriculture Imagery Program (NAIP) 2005 imagery. Report to the Miles City Field Office of the Bureau of Land Management and the Nongame Program of the Montana Department of Fish, Wildlife, and Parks. Helena, MT: Montana Natural Heritage Program. 27 pp. plus an appendix.

Montana Department of Agriculture. Prairie Dog Management - Vertebrate Pest bulletin. Helena, MT. 11 pp. https://agr.mt.gov/Topics/Vertebrate-Pests

Pearson, A.J. and B.H. Martin. 2012. Status of grassland and shrub steppe in the northern Great Plains of Montana. The Nature Conservancy, Unpublished Report.

Rauscher, R., S. Story, J. Gude, and R. Russell. 2013. Estimation of Black-Tailed Prairie Dog Colonies in Montana. Wildlife Society Bulletin. 37(3):608-615.

Reeve, A. F. and T. C. Vosburgh. 2006. Recreational Shooting of Prairie Dogs. Pg 139-156. In J. L. Hoogland (ed)Conservation of the Black-Tailed Prairie Dog: Saving North America's Western Grassland. Island Press.

Reindl-Thompson, S. A., J. A. Shivik, A. Whilelaw, A. Hurt, and K. F. Higgins. 2006. Efficacy of scent dogs in detecting black-footed ferrets at a reintroduction site in South Dakota. Wildlife Society Bulletin 34:1435-1439.

Rocke, T. E., D. W. Tripp, R. E. Russell, R. C. Abbott, K. L. D. Richgels, M. R. Matchett, D. E. Biggins, R. Griebel, G. Schroeder, S. M. Grassel, D. R. Pipkin, J. Cordova, A. Kavalunas, B. Maxfield, J. Boulerice, and

M. W. Miller. 2017. Sylvatic plague vaccine partially protects prairie dogs (*Cynomys* spp.) in field trials. EcoHealth 14:438-450.

Sierra-Corona, R., A. Davidson, E. L. Fredrickson, H. Luna-Soria, H. Suzan-Azpiri, E. Ponce- Guevara, and G. Ceballos. 2015. Black-tailed prairie dogs, cattle, and the conservation of North America's arid grasslands. PLoS ONE 10:e0118602.

U.S. Fish and Wildlife Service. 1967. Endangered Species List - 1967. Federal Register 32:4001.

U.S. Fish and Wildlife Service. 1988. Black-footed ferret recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado. 154 pp.

U.S. Fish and Wildlife Service. 2013a. Recovery plan for the black-footed ferret (*Mustela nigripes*). U.S. Fish and Wildlife Service, Denver, Colorado. 157 pp.

U.S. Fish and Wildlife Service. 2013b. Black-footed ferret programmatic safe harbor agreement. U.S. Fish and Wildlife Service Black-footed Ferret Recovery Program, Carr, Colorado. 54 pp.

U.S. Fish and Wildlife Service. 2015. Endangered and threatened wildlife and plants: establishment of a nonessential experimental population of black-footed ferrets in Wyoming. Federal Register 80:66821-66838.

U.S. Fish and Wildlife Service. 2016. Black-footed Ferret Recovery Program. Black-footed Ferret Field Operations Manual. 89 pp.

Vosburgh, T. 1996. Impacts of recreational shooting on prairie dog colonies. M.S. Thesis. Montana State University, Bozeman. 50 pp.

Witmer, G.W., N.P. Snow, and R.S. Moulton. 2016. Retention time of chlorophacinone in black-tailed prairie dogs informs secondary hazards from a prairie dog rodenticide bait. Pest Management Science 72:725-730.

Wyoming Game and Fish Department and Wyoming Black-footed Ferret Working Group. 2018. Wyoming Black-footed Ferret Management Plan. 26 pp.

APPENDIX I

Black-footed Ferret Reintroduction Site Prioritization Matrix

(Adapted from the Wyoming Black-footed Ferret Management Plan and including sections pertinent to black-tailed prairie dogs only.)

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Purpose:

The Working Group has developed a prioritization matrix that facilitates agency personnel, interested working group landowners and interested working group non-government organization personnel in evaluating different criteria in order to prioritize new areas for reintroduction. Only sites that meet the minimum criteria, e.g., R1-6, and have the potential for ferret reintroduction will be run through the matrix. When multiple sites are being considered in a given year, sites with the highest overall score will be priorities for ferret reintroductions. Because specific details and the relative importance of each of these criteria may change as management efforts proceed, the use of this matrix over time will be an iterative process to ensure additions, deletions or edits to the criteria reflect current conditions and the interests of involved parties. In order to ensure the matrix is kept current and relevant, the Working Group will meet annually to discuss and re-evaluate the matrix, make updates as necessary, and evaluate and prioritize any potential reintroduction areas and new and existing management needs.

Important Definitions:

Active Acres – Acres of land within a prairie dog complex that are currently occupied by black-tailed prairie dogs (BTPD) and suitable for ferrets. This is the number that will be used by MFWP and USFWS to evaluate and quantify ferret habitat. By this definition, active acres do NOT include:

- Area between colonies that are not occupied by prairie dogs (i.e., interstitial spaces)
- Area within a prairie dog colony that contains burrows not currently occupied by prairie dogs (e.g., declines due to disease, habitat changes, etc.)
- Area within a prairie dog colony where control measures are planned or ongoing that are likely to result in a significant reduction of prairie dogs (e.g., boundary control or large-scale poisoning or shooting)

Prairie Dog Colony – Area of land composed of a group of associated prairie dog burrows that are no more than 200 m from the nearest burrow. This is typically mapped by circumscribing the outer boundary of burrows (or the 'clip line' of BTPD colonies). Colonies may be classified as 'active', 'inactive', or a combination of both, although only active colonies or sections of colonies count as active acres (see above).

Prairie Dog Complex – Group of prairie dog colonies that are no more than 7 km (~4.5 miles) from the nearest colony (i.e., the dispersal distance of a ferret). Although complexes (and colonies) may extend beyond the reintroduction site boundary (see definition below), only the portion within the reintroduction site will be counted toward acreage requirements and, thus, be part of the site-specific management plan and included in management and monitoring activities.

Reintroduction Site – Lands included within site-specific management plans. Reintroduction site boundaries are determined in collaboration with landowners within the site. This does NOT include land not included in site-specific management plans and where monitoring and management activities do not apply (i.e., adjacent landowners). The reintroduction site includes both prairie dog colonies and interstitial spaces between colonies within a complex, although only colonies or active acres within colonies count toward management and monitoring activities or acreage requirements, respectively.

BTPD – Black-tailed prairie dog

Requirements: The following conditions MUST be satisfied in order for a site to be considered for ferret reintroduction.

R1: Minimum Prairie Dog Acreage	
The minimum requirement for a site to be considered for reintroduction of ferrets is 1,500 active acres of black-tailed prairie dog colonies within a single complex in a designated reintroduction site. Colonies must occur in a landscape setting where they have the potential to expand to approximately 4,500 acres.	
Scoring: Condition must be satisfied.	
R2: Capacity to Fulfill Allocation of Ferrets	
Ferrets must be available to be reintroduced at the proposed reintroduction site. For the foreseeable future, the availability of ferrets will rely on captive breeding centers. The ability to fulfill requests in a given year will depend on the breeding success of ferrets and priority among all ferret allocation requests received nationally. However, the hope is that translocations of wild ferrets from other reintroduction sites will eventually be possible.	
Scoring: Condition must be satisfied.	
R3: Support of Landowners Within Reintroduction Site	
All stakeholders listed below who have a vested interest in lands <u>within</u> a proposed reintroduction site must formally approve of the reintroduction and management activities to occur at the reintroduction site. Stakeholders are those owning or utilizing land or holding conservation easements within the reintroduction site and include: □ Private landowners and current permittees or leasees with grazing leases, □ State and federal agencies (e.g., Bureau of Land Management, Office of State Lands and Investments, US Forest Service, etc.), □ NGOs holding conservation easements relevant to ferret reintroduction (e.g., The Nature Conservancy). Montana Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service will work with these stakeholders to develop a mutually agreed upon site-specific management plan that includes management and monitoring activities for both ferrets and prairie dogs.	
Scoring: Condition must be satisfied.	
R4: Resources in place to conduct boundary control efforts (if needed)	
In the event that stakeholders within or adjacent to the proposed reintroduction site require that boundary control efforts be established for prairie dogs, resources must be in place prior to reintroduction to conduct such efforts over a distance that is mutually agreed upon between the stakeholders, Montana Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service. Resources should be available for a minimum of 3 (preferably 5) years of boundary control.	
Scoring: Condition must be satisfied.	

Requirements (continued)

R5: Community Support	
Prior to moving forward with any new reintroduction sites, Montana Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service will reach out to the local community. At a minimum, we will discuss ferret reintroduction and management plans with the following groups and organizations: ❑ Local Weed and Pest Districts ❑ County Conservation Districts ❑ County Commissions ❑ Adjacent landowners (also covered in ranking criteria below) ❑ Permittees / leasees (also covered in ranking criteria below) Unanimous support from community groups and organizations is unlikely. Opposition by any of these parties will be carefully considered and addressed in a manner that attempts to reduce concerns or opposition. Specific management actions to reduce those concerns should be explored, e.g., more colony boundary control than originally proposed, additional funding for control, more community outreach, etc.	
Scoring: Condition must be satisfied.	

R6: Compatible Land Management Practices	
Within the proposed reintroduction site, land management practices occurring and predicted to occur should be compatible with the maintenance and sustainability of adequate active acres of prairie dog colonies and the establishment and persistence of ferrets. In evaluating this requirement the Working Group will consider at least the following: ❑ Land use plans ❑ Multiple use objectives ❑ Infrastructure development ❑ Impending land-ownership changes ❑ Existing land uses (e.g., grazing leases) The above list represents examples of practices to be considered and is not meant to be comprehensive. Additionally, not all examples listed above are necessarily incompatible with ferret reintroduction, and each must be considered on a case-by-case basis.	
Scoring: Condition must be satisfied and be reasonably expected to be satisfied for 10 years.	

Ranking Criteria: The Working Group will use the following conditions to prioritize sites for the purpose of selecting the highest priority site for new or additional reintroduction activities when multiple sites are being considered.

Section I	Habitat Suitability and Management

Criterion 1: Actual Prairie Dog Acreage
Proposed reintroduction sites with greater acreages of active prairie dog colonies within a complex are more likely to withstand stochastic events and increase the viability of ferret populations. Only colonies and complexes within the borders of a proposed reintroduction site will be counted toward total prairie dog acreage.
Scoring: If complex has enough active acres to support: ● <30 breeding adults (i.e., 1,500-4,499 BTPD acres) (0 points) ● 30-99 breeding adults (i.e., 4,500-14,999 BTPD acres) (5 points) ● ≥100 breeding adults (i.e., ≥15,000 BTPD acres) (10 points)
Criterion 2: Potential to contribute to population connectivity
Connectivity among populations can assist with gene flow and provide a larger population of ferrets overall that is better equipped to withstand population reductions and repopulate vacant areas following declines. As sites are evaluated for their potential to support ferrets, Montana Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service will evaluate the potential for a site to result in connectivity with an already existing site to help establish a metapopulation. Specifically, connected reintroduction sites will be in proximity of another established ferret population with a feasible habitat corridor between populations (i.e., sparsely-developed prairie dog complexes).
Scoring: If reintroduction site: ● Does not have the potential to support connectivity to an existing population (0 points) ● Has the potential to support connectivity to an existing population (10 points)

Section I (continued)

Criterion 3: History of Disease Management Within Reintroduction Site
Proposed reintroduction sites for which some form of disease management specifically for prairie dogs or ferrets has been conducted within the previous 5 years will likely increase the probability the reintroduction efforts will be successful and may reduce the overall cost of management of the site. Disease management may occur in currently occupied prairie dog colonies (i.e., active acres) or in areas not currently active in an effort to promote recolonization or reduce potential for disease outbreaks. Current examples of disease management include dusting and sylvatic plague vaccine application.
Scoring: If disease management within the past 5 years has: ● Not occurred (0 points) ● Occurred on acreage to support <30 breeding adults (i.e., <4,500 acres of BTPD) (4 points) ● Occurred on acreage to support 30-99 breeding adults (i.e., 4,500-14,999 acres of BTPD) (7 points) ● Occurred on acreage to support ≥100 breeding adults (i.e., ≥15,000 acres of BTPD) (10 points)

Section II	Statewide Objectives

Criterion 4: Meets Statewide Numbers Objective
This reintroduction site would help fulfill the objective set forth in the USFWS Recovery Plan to establish 300 breeding adults distributed across 45,000 acres. Existing reintroduction sites that have already met Recovery Plan objectives will be valuable to overall recovery efforts but will not receive points.
Scoring: If the reintroduction site: ● Contributes to an objective that is already met (0 points) ● Contributes to a currently unmet objective (10 points)
Criterion 5: Meets Population Number and Size Objective
This reintroduction site would help fulfill the objective set forth in the USFWS Recovery Plan to establish >1 populations of ferrets with the potential for ≥100 breeding adults and >1 population with the potential for 50-100 breeding adults. Carrying capacity estimates should be based on the best available data, including complex size and prairie dog density within the reintroduction area. Existing reintroduction sites that have already met Recovery Plan objectives will be valuable to overall recovery efforts but will not receive points.
Scoring: If the reintroduction site: ● Contributes to an objective that is already met (0 points) ● Contributes to a currently unmet objective (10 points)

Section III	Stakeholder and Financial Support

Criterion 6: Adjacent Landowner and Permittee / Leasee Support

Landowners adjacent to a reintroduction site who have the potential to be impacted by ferret reintroductions and subsequent management actions should be indifferent to or supportive of reintroduction. In some cases, it may be possible to mitigate adjacent landowner concern by reassessing reintroduction site boundaries, providing boundary control if appropriate, or employing other management options. Although unanimous support may not be achievable, there should not be significant opposition to reintroduction efforts.

Note: Requirement 3 above requires that all stakeholders who have a vested interest in lands within a proposed reintroduction site must formally approve of the reintroduction and management activities to occur at the reintroduction site. Without this approval a proposal would not make it to this scoring stage.

Note: A negative score for this criterion automatically triggers additional discussion by the Working Group. Scoring for this criterion will be based on the number of landowners supportive vs opposed and/or the intensity of that support or opposition.

Scoring: If potentially impacted adjacent landowners and permittees / leasees:

- Are opposed to reintroduction (-10 points)
- Are indifferent to reintroduction (0 points)
- Are supportive of reintroduction (10 points)

Criterion 7: Dedicated Resources for Population Management and Monitoring of Ferrets and Prairie Dogs

Population monitoring efforts for both ferrets and prairie dogs at reintroduction sites can be extremely time-consuming and costly, often requiring support from multiple agencies and organizations to ensure success. Therefore, proposed reintroduction sites will likely require multiple agencies or NGOs to officially commit to contributing significant funding, personnel time, and/or resources to the population management and monitoring needs of the reintroduction site. Having stable and sufficient resources in place to manage and monitor ferret and prairie dog populations will be critical to ensuring success.

Scoring: If stable funding is committed that will cover:

- None of the predicted management and monitoring needs (0 points)
- Predicted management and monitoring needs to support <30 breeding adults (i.e., <4,500 acres of BTPD colonies) (4 points)
- Predicted management and monitoring needs to support 30-99 breeding adults (i.e., 4,500-14,999 acres of BTPD colonies) (7 points)
- Predicted management and monitoring needs to support ≥100 breeding adults (i.e., for ≥15,000 acres of BTPD colonies) (10 points)

Section III (continued)

Criterion 8: Dedicated Resources for Disease Management and Monitoring
Resources should be in place to adequately monitor and manage diseases at a reintroduction site. This includes the capacity to conduct disease management (e.g., dusting, sylvatic plague vaccine application) as needed.
Scoring: If resources to manage and monitor disease are: ● Not secured and unlikely to be secured in the future (0 points) ● Not secured but likely to be secured in the future (4 points) ● Secured for ≤ 2 years (7 points) ● Secured for > 2 years (10 points)
Criterion 9: Prairie Dog Control Adjacent to Reintroduction Site (Boundary Control)
Proposed reintroduction sites that do not require boundary control efforts for prairie dogs on adjacent lands will significantly reduce the costs required to manage the site. Although a landowner may not require boundary control at the initiation of the release, this does not preclude him or her from requesting it at a later date.
Scoring: If landowners adjacent to reintroduction site: ● Desire prairie dog boundary control (0 points) ● Do not desire prairie dog boundary control (10 points)

Matrix Scoring Sheet

Requirements	**Notes**
R1	
R2	
R3	
R4	
R5	
R6	

Ranking Criteria	**Points**	**Notes**
Section I		
Criterion 1		
Criterion 2		
Criterion 3		
Section II		
Criterion 4		
Criterion 5		
Section III		
Criterion 6*		
*Note: a negative score for this criterion automatically triggers additional discussion by the working group members participating in the site evaluation.		
Criterion 7		
Criterion 8		
Criterion 9		
Total Score		