

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW for
BLACK-FOOTED FERRET
(*Mustela nigripes*)

Species Reviewed: Black-footed ferret (*Mustela nigripes*)

Federal Register Notice of Listing Determination:

- March 11, 1967. Endangered Species Preservation Act of 1966; Endangered Status for the Black-footed ferret (32 FR 4001).
- June 2, 1970. Endangered Species Conservation Act of 1969; Revised Listing of the Black-footed ferret as Endangered (35 FR 8491).
- January 4, 1974. Endangered Species Act of 1973; Listing as Endangered (39 FR 1171).

Federal Register Notice Announcing Initiation of this Review: August 10, 2018. Endangered and Threatened Wildlife and Plants; 5-Year Status Reviews of 11 Species in the Mountain-Prairie Region (83 FR 39771).

Lead Region: Department of Interior Region 7, Black-footed Ferret Recovery Program, Pete Gober, Recovery Coordinator, (720) 626-5260.

Classification: Endangered

Methodology used to complete the review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a 5-year review is to assess each threatened species and endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The U.S. Fish and Wildlife Service (Service) recently evaluated the biological status of the black-footed ferret as part of a Species Status Assessment (SSA) to inform this 5-year review and recovery planning and implementation for the species. Our SSA report (Service 2019) for the black-footed ferret included input from tribes, state wildlife agencies, Federal land management agencies, and non-governmental organizations (NGOs) engaged in black-footed ferret conservation efforts throughout its range, and was independently reviewed by peer reviewers and partners. The SSA report represents our evaluation of the best available scientific information, including the resource needs and the current and future condition of the species. We developed five future scenarios with respect to land and species management conditions, which we analyzed under two future climate predictions, to portray a range of possible future conditions for the species. The SSA report is the scientific basis for this 5-year review decision-making process.

Additionally, we solicited data for this review from interested parties through an August 10, 2018, Federal Register Notice announcing this review (83 FR 39771). Information we received from this data call included summaries of recent conservation actions by non-governmental organizations (NGOs).

REVIEW ANALYSIS

Updated Information and Current Species Status

Biology and Habitat:

Our SSA report (Service 2019) provides a detailed summary of the biology, habitats, and current and future condition for the black-footed ferret, which we summarize below. The black-footed ferret is the only ferret species native to North America, and its historic distribution overlapped with the distributions of three prairie dog species: the black-tailed prairie dog (*Cynomys ludovicianus*), Gunnison's prairie dog (*C. gunnisonii*), and the white-tailed prairie dog (*C. leucurus*). It is an obligate associate of these three prairie dog species, and depends almost exclusively on prairie dogs for food and on prairie dog burrows for shelter (Hillman 1968, Biggins et al. 2006a). The species was common historically; however, its secretive habits (nocturnal and often underground) probably made it difficult to observe (Forrest et al. 1985, Anderson et al. 1986, Clark 1989). Anderson et al. (1986) stated that prairie dog habitat 100 years ago may have supported 500,000-1,000,000 black-footed ferrets given a conservative estimate of 41,000,000 hectares (ha) of prairie dog colonies and one ferret per 40-60 ha (Forrest et al. 1985). At present, the species has been reintroduced to a small portion of its historic range, with 29 discrete reintroduction sites being established since recovery efforts began in 1991. As of December 9, 2019, 13 of 29 reintroduction sites are active, with an estimated wild population of approximately 325 individuals. The captive population is divided between six captive breeding facilities, and numbers 301 individuals.

To assess the current status, future status, and overall viability of the black-footed ferret, we used the conservation biology principles of resiliency, redundancy, and representation. Specifically, we considered the ecological requirements of the black-footed ferret at the individual, population, and species levels, and described the stressors influencing the viability of the species.

At the individual level, the primary requirement for all black-footed ferret life stages is prairie dogs. At the population level, black-footed ferret populations need at least 30 breeding adults, which requires at least 1,200-1,800 ha of black-tailed prairie dog habitat or 2,500-4,000 ha of Gunnison's or white-tailed prairie dog habitat, depending on prairie dog density (Service 2013). Populations also need some level of connectivity, a sufficient rate of juvenile survival, and larger, contiguous prairie dog colonies to maintain resiliency to stochastic events. At the species level, the black-footed ferret needs multiple (≥ 20), resilient populations that display a breadth of ecological and genetic diversity across its historic range, including black-tailed, Gunnison's, and white-tailed prairie dog habitats. A captive breeding population is also needed to provide individuals for release at reintroduction sites, thereby increasing resiliency of those populations, and to provide additional redundancy in the case of catastrophic events that could affect reintroduction sites, as well as to maintain the theoretical genetic diversity that is needed for the species to adapt to changing conditions.

The SSA report summarizes the current and projected future conditions of the black-footed ferret to assess the overall viability of the species now and into the future. For the purposes of the SSA, we defined viability as the ability of the black-footed ferret to sustain populations in the wild into the future. Additionally, since the continued persistence of the black-footed ferret depends heavily on the ability to release captive-reared individuals into the wild in order to establish new reintroduction sites and maintain existing reintroduction sites throughout its potential range, we also evaluated the viability of the captive population to provide individuals for these purposes into the future.

For our analyses, we divided the wild (i.e., reintroduced) black-footed ferret population into 29 analysis units that correspond to locations where the species has been purposely reintroduced. The captive population was divided into six analysis units that correspond to the captive breeding facilities currently participating in the black-footed ferret recovery program. For the wild population, we evaluated the resiliency of each analysis unit using the metrics of five-year mean number of breeding adults, the five-year average ferret family rating (an index of habitat suitability encompassing area and prairie dog density; see Biggins et al. 1993 and Biggins et al. 2006b), annual plague management level, annual ferret vaccination level, ferret population persistence, and level of prairie dog population conservation. These metrics either directly or indirectly addressed four primary stressors of concern: sylvatic plague, drought, prairie dog poisoning and shooting, and declining genetic fitness, with declining genetic fitness defined as increased inbreeding and declining genetic diversity. For the captive population, we evaluated the resiliency of each analysis unit using the metrics of percent whelping success, mean number of kits born per litter, and percentage of kits weaned to assess breeding success, animal condition, animal husbandry effectiveness, and declining genetic fitness.

Using the metrics referenced above, we determined that two reintroduction sites were in high condition (high resiliency), eight were in moderate condition (moderate resiliency), four were in low condition (low resiliency), and 15 were extirpated. For the captive population, we determined that one facility was in high condition, four were in moderate condition, and one was in low condition. We note that considerable management inputs (primarily plague management and population augmentation with captive-reared animals for the wild population and managed breeding for the captive population) are required to maintain the of resiliency of each population, and most if not all of the reintroduction sites that are extirpated became so due to the effects of sylvatic plague. Currently, the wild black-footed ferret population is found within all of the ecological settings it occupied historically (black-tailed, Gunnison's, and white-tailed prairie dog habitat), although its representation within Gunnison's prairie dog habitat is limited to only one site. Representation in a genetic context is inherently limited due to the small founder population of seven animals (Hutchins et al. 1996, Wisely 2006), and the current genetic diversity in the captive population is estimated to be 85.66 percent of the founder population (Graves et al. 2018). Although the effects of declining genetic diversity on the reintroduced black-footed ferret population are not known, sperm structural abnormalities in captive black-footed ferret males associated with inbreeding may be responsible for declining reproductive success in the captive black-footed ferret population (Santymire et al. 2019).

We projected the future viability of the black-footed ferret by forecasting the conditions of our metrics for each analysis unit under five potential future scenarios, as described further in the SSA Report (Service 2019). Our future scenarios varied based on four main stressors: sylvatic plague, drought, prairie dog poisoning and shooting, and declining genetic fitness; as well as levels of conservation efforts. We forecasted each scenario to two time periods, approximately 10 and 20 years into the future, and under two climate scenarios that varied with respect to evaporative deficit. The projected future condition of each population varied by scenario, but we predicted that both populations would decline in viability under every scenario except for scenarios where conservation efforts increased relative to current levels. Overall, we project that the effects of sylvatic plague, declining genetic fitness, and the lack of suitable habitat will continue to limit the viability of the black-footed ferret, and management inputs will continue to be required in order to maintain current levels of viability. Moreover, management inputs will need to be expanded and improved in effectiveness in order to increase viability for the species.

Threats Analysis (threats, conservation measures, and regulatory mechanisms):

In our SSA report, we evaluated a number of stressors that may affect the resiliency of black-footed populations, including sylvatic plague, declining genetic fitness, drought, agricultural land conversion, poisoning of prairie dogs, recreational shooting of prairie dogs, range management practices, urbanization, and energy development (Service 2019, pp. 13-42). Based on our evaluation of these stressors, only four (sylvatic plague, declining genetic fitness, drought, and the combined category of recreational shooting of prairie dogs and prairie dog poisoning) were carried forward in our current and future analyses, which included projections under two different greenhouse gas emission scenarios (Service 2019, pp. 56-57). Additional current and potential future rangewide threats to the black-footed ferret identified in the most recent recovery plan (Service 2013) and 5-year review (79 FR 25883) included lack of prairie dog management sufficient for ferrets. A summary of the stressors analyzed in the SSA report and their relationship with the five categories of threats specified in section 4(a)(1) of the Act is found in Table 1.

Table 1. Summary of threats affecting the black-footed ferret and the associated listing factors.

Listing Factor	Threat Description
Factor A: The present or threatened destruction, modification, or curtailment of its habitat or range	Analyzed as a threat that occurred in the past in the SSA report, but not identified as a current threat in the SSA report or in previous analyses.
Factor B: Overutilization for commercial, recreational, scientific, or educational purposes	Synergistic effects of recreational shooting and sylvatic plague (see Factor C, below) identified as an imminent threat of low magnitude for black-footed ferret populations located in black-tailed prairie dog habitat.

Factor C: Disease or predation	Sylvatic plague (both direct impact to black-footed ferrets and indirect impact of modification of habitat through the loss of prairie dog habitat) identified as an imminent threat of high magnitude. Effects of sylvatic plague are exacerbated by other sources of prairie dog mortality (see Factors B and E).
Factor D: Inadequacy of existing regulatory mechanisms	Lack of purposeful management of prairie dog populations to provide sufficient habitat for black-footed ferrets identified as an imminent threat of high magnitude (Service 2013); SSA report notes the need for ongoing management of prairie dog populations to maintain and increase black-footed ferret resiliency, redundancy, and representation.
Factor E: Other natural or manmade factors	Poisoning of prairie dogs at black-footed ferret reintroduction sites constitutes a high magnitude, imminent threat, especially in conjunction with sylvatic plague (see Factor C). Climate change constitutes an imminent threat of moderate magnitude by increasing the frequency and severity of droughts, which reduces black-footed ferret habitat suitability. Declining genetic fitness represents an imminent threat of moderate magnitude due to observed effects on captive population performance.

RECOMMENDATION ON SPECIES STATUS

The Act defines an endangered species as any species that is “in danger of extinction throughout all or a significant portion of its range” and a threatened species as any species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” After evaluating threats to the species and assessing the cumulative effects of the threats under the section 4(a)(1) factors, we conclude that the black-footed ferret is in danger of extinction throughout all of its range. The range of this formerly widespread species has been severely reduced, currently existing in the wild at only 13 reintroduction sites, and the species still faces threats, such as sylvatic plague, that are largely unabated and have significant and direct impacts to population resiliency. Currently, significant management inputs (primarily sylvatic plague mitigation and the maintenance of a captive breeding program) are required to maintain black-footed ferret populations in the wild, and cessation of these efforts would likely result in the extinction of the species. Specifically, low population numbers in the reintroduced population, declining reproductive performance in the captive population, continued risk of reintroduction site extirpations due to the impacts of sylvatic plague, and lack of suitable habitat collectively result in low population resiliency for many analysis units, and reduces redundancy and representation for the species as a whole, such that the viability of the species continues to be at risk. These factors support our previous evaluation that the black-footed ferret continues to meet the definition of an endangered species under the Act. Therefore, our review of new information, as documented in our SSA report (Service 2019) and summarized in this 5-year review, does not change our evaluation of species status and the threats affecting the species.

under the factors in section 4(a)(1) of the Act from our last and most recent review of the species (May 6, 2014; 79 FR 25883). Therefore, we recommend no change in status to the species at this time.

**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW
BLACK-FOOTED FERRET (*Mustela nigripes*)**

CURRENT CLASSIFICATION: Endangered

RECOMMENDATION RESULTING FROM THE 5-YEAR REVIEW:


- ☐ Downlist to Threatened
☐ Uplist to Endangered
☐ Delist:
 ☐ Extinction
 ☐ Recovery
 ☐ Original data for classification in error
☒ No change is needed

APPROPRIATE LISTING/RECLASSIFICATION PRIORITY NUMBER, IF APPLICABLE: No change from 2C.

RECOMMENDATIONS FOR FUTURE ACTIONS:

- Update Species Status Assessment report with Population Viability Analysis (PVA), and other new information as needed
- Develop revised Recovery Plan based on Species Status Assessment and Black-footed Ferret Recovery Program review (timeframe to be determined)

FIELD OFFICE APPROVAL:

Approve:  Date: 1/21/20
Pete Gober
U.S. Fish and Wildlife Service
Black-footed Ferret Recovery Coordinator

The lead Field Office must ensure that other offices within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. The lead field office should document this coordination in the agency record.

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