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FISH AND WILDLIFE SERVICE

Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

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Memorandum

To: Assistant Regional Director, Region 6 / Ecological Services; Lakewood, Colorado
Attention: Amelia Orton-Palmer (Mail Stop 60120)

From: Scott Larson, Field Supervisor, South Dakota Ecological Services Field Office
Pierre, South Dakota Scott Larson

Subject: Biological and Conference Opinion on the Black-footed Ferret Programmatic Safe Harbor Agreement

This document transmits the U.S. Fish and Wildlife Service's Biological and Conference Opinion for the proposed issuance of an incidental take permit pursuant to Section 10(a) of the Endangered Species Act (ESA), as amended (16 U.S.C. 1531-1544). The requested permit would authorize the incidental take of the endangered black-footed ferret (*Mustela nigripes*) during the implementation of a Programmatic Safe Harbor Agreement (SHA) designed to enhance the recovery of the species on non-Federal lands within its historic range for a time period up to 50 years.

In carrying out these recovery activities for the black-footed ferret (ferret), there is a possibility that some ferrets will be adversely affected. In addition to ferrets, we also evaluated impacts to 111 other endangered, threatened, proposed, and candidate species and found that 7 of those species could also be adversely affected to a small degree over the 50-year timeframe of the permit. These seven species include Gunnison's prairie dog (*Cynomys gunnisoni*), California condor (*Gymnogyps californianus*), greater sage-grouse (*Centrocercus urophasianus*), Gunnison sage-grouse (*Centrocercus minimus*), lesser prairie-chicken (*Tympanuchus pallidicinctus*), northern aplomado falcon (*Falco femoralis septenrionalis*), and Sprague's pipit (*Anthus spragueii*) as well as proposed critical habitat of the Gunnison sage-grouse. We determined that none of the actions proposed under the permit are likely to jeopardize the continued existence of the species evaluated or adversely modified any proposed or designated critical habitat.

Final Biological and Conference Opinion on the Issuance of a Section 10(a)(1)(A) Enhancement of Survival Permit to the U.S. Fish and Wildlife Service, Black-Footed Ferret Recovery Coordinator, for the Black-Footed Ferret Programmatic Safe Harbor Agreement

Prepared By:

U.S. Fish and Wildlife Service
Ecological Services Region 6
October 18, 2013

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ACRONYMS AND ABBREVIATIONS

ac	Acres
Act	Endangered Species Act
BA	Biological Assessment
BO	Biological Opinion
BTPD	Black-tailed prairie dog
CFR	Code of Federal Regulations
Cooperators	Eligible Landowners
DPS	Distinct Population Segment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
et al.	and others
ft	Feet
g	gram
GIS	Geographic Information System
GPS	Global Positioning System
ha	hectares
i.e.	in explanation
in	Inches
ITS	Incidental Take Statement
lbs	Pounds
m	Meters
MBTA	Migratory Bird Treaty Act
NEP	Nonessential Experimental Population
PCE	Primary Constituent Element
Permit	Section 10(a)(1)(A) Safe Harbor Enhancement of Survival Permit
Permittee	Black-footed Ferret Recovery Program Coordinator
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
Service	U.S. Fish and Wildlife Service
SHA	Safe Harbor Agreement
spp.	species
USDOI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Services

INTRODUCTION

This document constitutes the U.S. Fish and Wildlife Service's (Service) biological and conference opinions based on the review of the application from the Service's Black-Footed Ferret Recovery Implementation Coordinator for an Endangered Species Act (ESA) Section 10(a)(1)(A) Safe Harbor Enhancement of Survival Permit (Permit). This proposed Permit would cover reintroduction, plague (*Yersinia pestis*), and prairie dog (*Cynomys spp.*) management on non-Federal lands for the endangered black-footed ferret (*Mustela nigripes*) in the following states: Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming. Suitable habitat within these states for the black-tailed prairie dog (*C. ludovicianus*), white-tailed prairie dog (*C. leucurus*), and Gunnison's prairie dog (*C. gunnisoni*) is considered to be the action area for the proposed action (Figure 1).

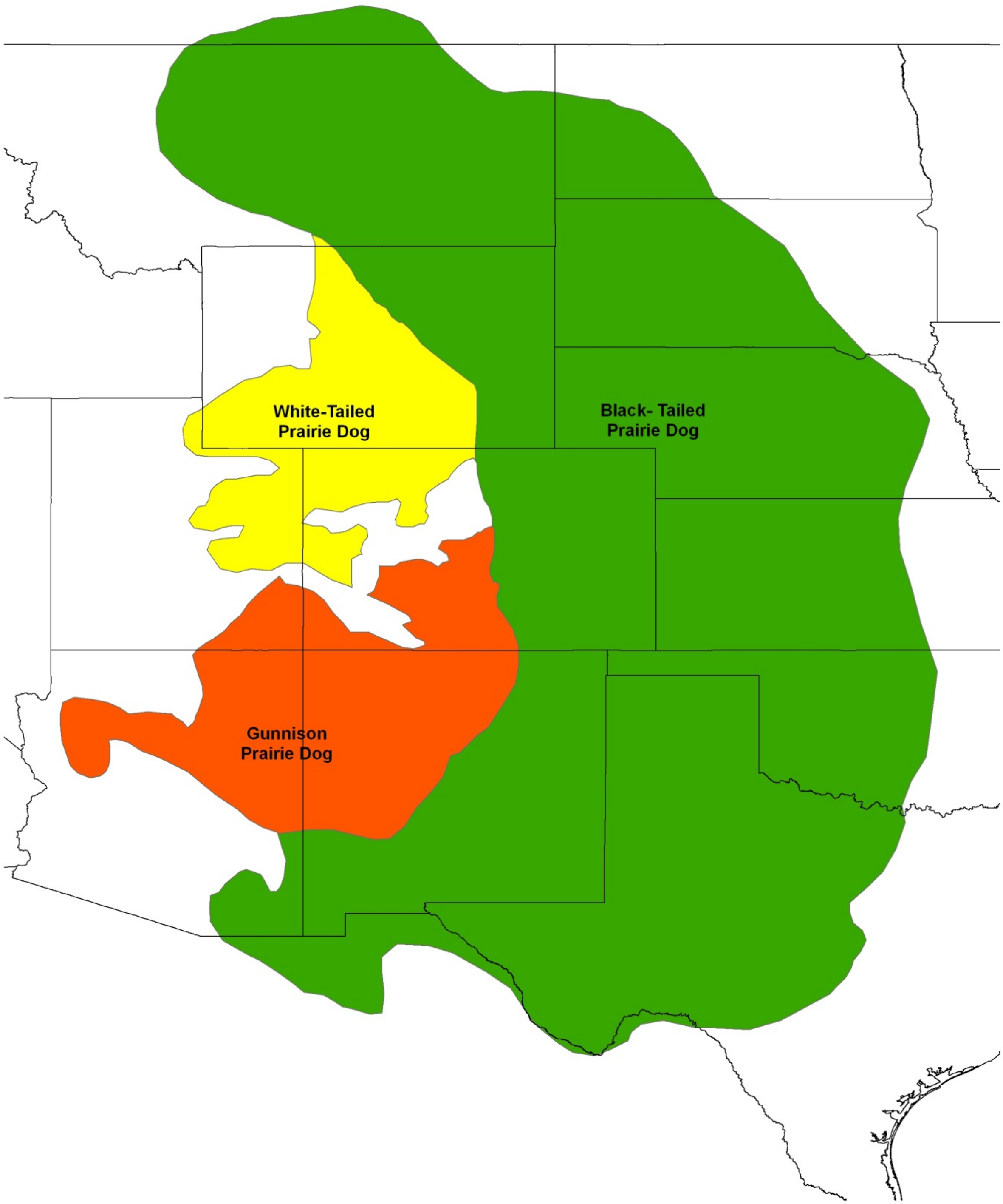
A list of other listed, candidate, and proposed species that may occur in the project area, including a determination of the effect of the action, is found in Appendix A. Species for which a "no effect" determination has been made are not discussed in this Biological Opinion (BO), and no take of these species is authorized. Species in addition to the black-footed ferret that may be affected by the proposed action include the Gunnison's prairie dog, California condor (*Gymnogyps californianus*), greater sage-grouse (*Centrocercus urophasianus*), Gunnison sage-grouse (*Centrocercus minimus*), Lesser prairie-chicken (*Tympanuchus pallidicinctus*), northern aplomado falcon (*Falco femoralis septenrionalis*), and Sprague's pipit (*Anthus spragueii*). Potential impacts and recommended conservation measures for these species are addressed further in the body of this BO.

This biological and conference opinion is based on information provided in the November 29, 2012 "Application from the Black-Footed Ferret Recovery Implementation Coordinator for an Enhancement of Survival Permit under the Endangered Species Act of 1974, as amended (ESA)," draft Environmental Assessment (EA), draft Black-Footed Ferret Programmatic Safe Harbor Agreement (Agreement), and other sources of information. A complete administrative record of this consultation is on file at the Service's Black-Footed Ferret Recovery Program Office in Carr, Colorado.

CONSULTATION HISTORY

On November 29, 2012, the Service's Black-Footed Ferret Recovery Coordinator submitted an application for an Enhancement of Survival Permit under Section 10(a)(1)(A) of the ESA. The availability of this application, along with the draft Agreement and draft EA, was published in the Federal Register on December 19, 2012. The 30-day public comment period closed on January 18, 2013, and a 30-day extension to the comment period was granted on January 23, 2013. The Service received 302 written comments on the application during the public comment period. These comments are available, along with the Service's findings, in the Administrative Record at the Black-Footed Ferret Recovery Program Office.

Figure 1. Black-footed Ferret Programmatic Safe Harbor Agreement Action Area



BIOLOGICAL OPINION

I. Description of the Proposed Action

The proposed action is the issuance of an Enhancement of Survival Permit under Section 10(a)(1)(A) of the ESA to the Black-Footed Ferret Recovery Program Coordinator (Permittee). This Permit will be used to promote the reintroduction of black-footed ferrets on non-Federal lands in Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming through voluntary participation in the Safe Harbor Agreement (SHA). Below is a synopsis of the Agreement, and a complete copy is found in Appendix B.

The Service will issue a Section 10(a)(1)(A) Enhancement of Survival permit to the Permittee, who will in turn enroll eligible landowners (Cooperator) that volunteer their properties for black-footed ferret reintroduction and/or implementation of conservation activities identified in the Agreement. Each Cooperator will be enrolled through a Certificate of Inclusion, which will convey incidental take authorization and assurances that the Service will not impose restrictions on or commitments of land, water, or financial resources beyond those in the Agreement. The proposed duration of the Agreement and Permit is 50 years.

Lands eligible for enrollment in this Agreement include non-Federal lands within the aforementioned states that have suitable acres of occupied prairie dog habitat to support a population of at least 30 breeding adult black-footed ferrets. The acreage necessary to support 30 breeding adults can vary depending on the species of prairie dogs present. Typically, this will be a minimum of approximately 1,500 acres of black-tailed prairie dog habitat or a minimum of approximately 3,000 acres of white-tailed or Gunnison's prairie dog habitat, but these amounts may vary depending on site conditions. The Permittee will evaluate eligibility of potentially suitable lands on a site-specific basis, based on available site information and site visits. Properties owned by more than one adjacent landowner can be combined to meet these eligibility criteria. Adjacent landowners can collectively enroll lands together under the Agreement such that sufficient acreage to support 30 breeding adult black-footed ferrets is enrolled.

Each Cooperator will work with the Permittee to develop a Reintroduction Plan for the enrolled lands. The Reintroduction Plan will identify the number and location of enrolled acres and delineate a Conservation Zone and/or a Management Zone. The Reintroduction Plan will also describe the conservation activities to be implemented on the enrolled land. The conservation activities for the enrolled lands may include the reintroduction of black-footed ferrets, plague management, and prairie dog management.

Each Conservation Zone will contain at least 1,500 acres of occupied black-tailed prairie dog habitat or at least 3,000 acres of white-tailed or Gunnison's prairie dog habitat to provide adequate habitat to support a population of at least 30 adult black-footed ferrets. Conservation activities conducted within the Conservation Zone will include black-footed ferret reintroduction and plague management. Legal activities including, but not limited to, routine livestock grazing and ranching activities will continue within the Conservation Zone, with the exception of activities that substantially alter black-footed ferret habitat suitability through the reduction of prairie dogs. Inappropriate activities within the Conservation Zone will include major landscape alterations such as plowing and lethal control of prairie dogs, except in unusual circumstances approved by both the Permittee and Cooperator.

The Management Zone may or may not have occupied prairie dog habitat. It will consist of additional lands adjacent or in close proximity to the Conservation Zone and may or may not exceed the number of acres in the Conservation Zone. Conservation activities within the Management Zone may include plague management and/or prairie dog management (including lethal control) as defined in the Reintroduction Plan. Legal activities including, but not limited to, routine livestock grazing and ranching activities will continue in the Management Zone.

Plague management may occur within the Conservation Zone and/or the Management Zone. Cooperators enrolled in this Agreement will allow for the treatment of plague as appropriate and necessary on their enrolled lands for the protection of black-footed ferrets and prairie dogs. Plague management activities will be coordinated by the Permittee or designee.

Currently there is an effective vaccine that will protect black-footed ferrets from plague. All animals maintained at the captive breeding facilities are vaccinated for plague and other diseases as necessary, including those designated for reintroduction. However, if reintroductions are successful and reproduction occurs, it may be necessary to live trap and vaccinate any black-footed ferret kits that are produced on a reintroduction site. This will occur in conjunction with other activities discussed herein and in coordination with the Cooperator to minimize disruptions to the Cooperator’s use of the land.

Fleas, the main vector of plague transmission, can be controlled with deltamethrin, the active ingredient in the insecticide DeltaDust. DeltaDust is an unrestricted use pesticide classified by the U.S. Environmental Protection Agency (EPA). It may be applied according to label requirements once per year, generally between March and August, and involves the placement of approximately 5 grams of DeltaDust directly into each prairie dog burrow (dusting). Application of DeltaDust for plague management will be coordinated by the Permittee or designee.

An alternative to DeltaDust for plague management is currently under development that involves an oral bait sylvatic plague vaccine for prairie dogs. The vaccine is a genetically modified viral vaccine using attenuated raccoon pox virus as a vector for orally delivering plague antigens to target animals through the use of baits (U.S. Geological Survey 2012). If effective, this vaccine may be used on lands enrolled under this Agreement. The oral vaccine is placed in baits distributed from ATVs or possibly aerially onto a prairie dog colony once per year or possibly less often, depending upon research results. Prairie dogs consume the bait and become vaccinated, thereby limiting plague outbreaks within the treated lands. Administration of oral plague vaccine is expected to occur no more than once per year after emergence of the young prairie dogs and might occur from late May through October. This plague abatement technique is expected to be less labor intensive than dusting. However, it may require limiting access of livestock to treated areas for a few days after application to avoid livestock consumption of the bait. The bait will not harm livestock, but consumption by livestock potentially reduces the amount available to prairie dogs, thereby reducing its effectiveness.

Each Reintroduction Plan will outline any necessary prairie dog management that may be carried out on enrolled lands to address landowner concerns of unwanted expansion of prairie dogs onto non-participating or neighboring lands. Only non-lethal prairie dog management will be appropriate in Conservation Zones, except in unusual circumstances approved by both the Permittee and Cooperator. Non-lethal prairie dog management may be carried out by the Cooperator or other partners as agreed to and identified in each Reintroduction Plan. Non-lethal methods may include live trapping and relocation to other appropriate locations where local and State ordinances and laws permit such activities. Non-lethal methods can also include the use of structural or vegetative barriers to discourage prairie dog movement. Non-lethal or lethal methods can be conducted in Management Zones. Implementation of lethal prairie dog management may be carried out by USDA/APHIS-Wildlife Services and/or other local entities such as weed and pest boards. Lethal activities include shooting, the application of zinc phosphide by licensed applicators, and other approved activities as directed by the Permittee. Anticoagulant pesticides such as chlorophacinone (Rozol®) and diphacinone (Kaput®) will not be used on enrolled properties due to the risks of secondary poisoning to other non-target wildlife species that consume prairie dogs, including black-footed ferrets.

As indicated in the Agreement, each Reintroduction Plan will describe the monitoring to occur on enrolled lands. Monitoring will inform the Service of the status of implementation of the conservation activities, track any incidental take of black-footed ferrets, and determine success of black-footed ferret reintroductions on the enrolled properties. Annual reports will be provided by the Permittee to the Service's Region 2 and Region 6 Offices. Reports will include the number of acres treated for plague management and prairie dog management as well as number of black-footed ferrets released, number of black-footed ferrets observed, and any incidental take that may have occurred. Additionally, Cooperators will provide pertinent information to the Permittee on an annual basis.

The term of each Reintroduction Plan will be a minimum of 10 years and will not exceed 40 years. Each Certificate of Inclusion, which provides incidental take coverage and assurances to the Cooperator, will extend for as long as the terms of the Agreement and Reintroduction Plan are met. However, the Cooperator may choose to terminate the Reintroduction Plan prior to expiration. In the event of early termination, incidental take coverage will be retained by the Cooperator as a non-participating landowner via this BO, provided that the Cooperator notifies the Permittee and allows the Service access to recapture black-footed ferrets during the following fall, prior to the Cooperator carrying out any otherwise lawful activity that may result in take of black-footed ferrets on enrolled lands, including a return to baseline. If a Cooperator fails to notify the Permittee regarding possible take or fails to provide access, coverage for incidental take would not be granted.

A non-participating landowner is defined as any landowner interest within the vicinity of enrolled lands upon which black-footed ferrets may disperse to and/or occupy as a result of black-footed ferret reintroductions. These interests include split estate interests, e.g., severed mineral interests who are not Cooperators. Non-participating neighboring landowners whose land use activities may incidentally take black-footed ferrets dispersing or expanding onto their lands will receive authorization for such take through this BO.

II. Status of the Species/Environmental Baseline

Three federally listed endangered species, one species proposed for listing as endangered, one species proposed for listing as threatened, and three candidate species that occur in the action area may be affected by the implementation of the proposed action: the black-footed ferret (Endangered and nonessential experimental), Gunnison's prairie dog (Candidate), California condor (Endangered and nonessential experimental), greater sage-grouse (Candidate), Gunnison sage-grouse (Proposed Endangered), Lesser prairie-chicken (Proposed Threatened), northern aplomado falcon (Endangered and nonessential experimental), and Sprague's pipit (Candidate). In addition, proposed critical habitat for the Gunnison sage-grouse may be affected by the proposed action. Descriptions of the status and environmental baseline for these species and proposed critical habitat follow.

A. Black-footed ferret (*Mustela nigripes*)

The black-footed ferret is a medium-sized member of the Mustelidae family typically weighing 1.4–2.5 pounds (lbs) and measuring 19–24 inches (in) in total length. Upper body parts are yellowish buff, occasionally whitish; feet and tail tip are black; and a black "mask" occurs across the eyes. It is the only ferret species native to the Americas. There are no recognized subspecies. Other ferret species in the genus include the Siberian polecat (*M. eversmanni*) and the European ferret (*M. putorius*) (Hillman and Clark 1980; Anderson et al. 1986). The black-footed ferret was first formally described in 1851 by J.J. Audubon and J. Bachman (Clark et al. 1986). The species entered North America from Siberia approximately 1–2 million years ago, spread across Beringia, and advanced southward through ice-free corridors to the Great Plains approximately 800,000 years ago (Wisely 2006). Contrary to early characterizations that addressed natural history, it was probably common historically, although its secretive habits (nocturnal and often underground) made it difficult to observe (Forrest et al. 1985; Anderson et al. 1986; Clark 1989).

Black-footed ferrets prey primarily on prairie dogs and use their burrows for shelter and denning (Henderson et al. 1969; Hillman and Linder 1973; Forrest et al. 1985). Since black-footed ferrets depend almost exclusively on prairie dogs for food and shelter, and the species' range overlaps that of certain prairie dog species (Anderson et al. 1986). With no documentation of black-footed ferret breeding outside of prairie dog colonies, the Service believes that black-footed ferrets were historically endemic to the range of three prairie dog species. There are records of black-footed ferrets from the ranges of the black-tailed prairie dog, white-tailed prairie dog, and Gunnison's prairie dog (Anderson et al. 1986) which collectively occupied approximately 100 million acres (ac) of intermontane and prairie grasslands (Biggins et al. 1997; Clark et al. 1986; Ernst et al. 2006). The historical range of the species includes 12 States (Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming) and the Canadian provinces of Alberta and Saskatchewan (Anderson et al. 1986); this range is also the action area for the proposed action. Ernst (2008 pers. comm.) estimates that in the United States, this occupied habitat existed within an estimated 562 million ac of potential habitat. Ernst (2008 pers. comm.) used a geographic information system (GIS) database to predict the distribution of prairie dog habitat across the United States and concluded that historically 85 percent of all black-footed ferrets probably occurred in black-tailed prairie dog habitat, 8 percent in Gunnison's prairie dog habitat, and 7 percent in white-tailed prairie dog habitat. The Service concludes that most black-footed ferrets likely occurred in black-tailed prairie dog habitat.

The black-footed ferret breeds at approximately one year of age, from mid-March through early April, and gestation is about 42-45 days. Litter sizes average about 3.5 (Wilson and Ruff 1999). Juveniles disperse in late summer/early fall. The black-footed ferret leads a solitary existence except for mating and the period when mother and young are together (Forrest et al. 1985). It is a "searcher" predator that is generally nocturnal, appearing above ground at irregular intervals and for irregular durations (Clark et al. 1986).

The black-footed ferret's close association with prairie dogs was an important factor in its decline. From the late 1800's to approximately 1960, both prairie dog habitat and numbers were dramatically reduced by the combined effects of habitat loss from conversion of native prairie to cropland, poisoning of prairie dogs, and disease, particularly sylvatic plague (U.S. Fish and Wildlife Service 2008a). Sylvatic plague, caused by a non-native bacterium, can be devastating to both prairie dogs and black-footed ferrets. By 2005, plague had been detected in prairie dogs in all 12 states throughout the historical range of the black-footed ferret (Abbott and Rocke 2012).

The black-footed ferret was considered extinct or nearly extinct when a small population was located in Mellette County, South Dakota, in 1964 (Henderson et al. 1969). The species was listed as endangered under early endangered species legislation by the Service in 1967 and was "grandfathered" into the ESA in 1973 (U.S. Fish and Wildlife Service 2008a). No critical habitat has been proposed or designated for this species. The last wild blck-footed ferret observed at the Mellette County site was in 1974 (Clark 1989). Attempts at captive breeding of a few captured animals from the Mellette County population failed, and when the last captive animal died at Patuxent Wildlife Research Center in Laurel, Maryland, in 1979, the species was again presumed extinct (U.S. Fish and Wildlife Service 1988).

In 1981, a second remnant population was discovered in Meeteetse, Wyoming (Clark et al. 1986; Lockhart et al. 2006). Following disease outbreaks at Meeteetse, all surviving wild black-footed ferrets (totaling 18 individuals) were removed from the wild between 1985 and 1987 to initiate a captive breeding program (U.S. Fish and Wildlife Service 1988). Seven of the blck-footed ferrets captured at Meeteetse successfully reared young, leading to a lineage of continuing captive reproduction that provides black-footed ferrets to reintroduction sites today (Hutchins et al. 1996; Garelle et al. 2006). Reintroductions began in 1991 (Table 1), and all extant populations, both captive and reintroduced, descend from these seven "founder" animals (Garelle et al. 2006).

No wild populations of black-footed ferrets have been found since the capture of the last Meeteetse black-footed ferrets, despite extensive and intensive range-wide searches. It is unlikely that any undiscovered wild populations remain (Lockhart et al. 2006). No known extant wild populations of black-footed ferrets exist, except those at reintroduction sites.

Approximately 280 animals currently make up the current black-footed ferret captive population at six facilities which provide surplus animals for release. Today, in addition to those in the 6 captive breeding facilities, approximately 274–448 black-footed ferrets exist at 20 reintroduction sites across their historical range (Table 1; U.S. Fish and Wildlife Service 2013a). Captive breeding and the release of surplus black-footed ferrets continue in efforts to establish more populations throughout their range.

Table 1. Black-footed ferret reintroduction sites, year initiated, and prairie dog species.

SITE (YEAR INITIATED)	PRAIRIE DOG SPECIES
Shirley Basin, Wyoming (1991)	White-tailed
UL Bend National Wildlife Refuge, Montana (1994)	Black-tailed
Badlands National Park, South Dakota (1994)	Black-tailed
Aubrey Valley, Arizona (1996)	Gunnison's
Conata Basin, South Dakota (1996)	Black-tailed
Fort Belknap Indian Reservation, Montana (1997)	Black-tailed
Coyote Basin, Colorado and Utah (1999)	White-tailed
Cheyenne River Indian Reservation, South Dakota (2000)	Black-tailed
Bureau of Land Management 40-Complex, Montana (2001)	Black-tailed
Wolf Creek, Colorado (2001)	White-tailed
Janos, Mexico (2001)	Black-tailed
Rosebud Indian Reservation, South Dakota (2004)	Black-tailed
Lower Brule Indian Reservation, South Dakota (2006)	Black-tailed
Wind Cave National Park, South Dakota (2007)	Black-tailed
Espee Ranch, Arizona (2007)	Gunnison's
Logan County, Kansas (2007)	Black-tailed
Northern Cheyenne Indian Reservation, Montana (2008)	Black-tailed
Vermejo Park Ranch, New Mexico (2008)	Black-tailed

Grasslands National Park, Saskatchewan (2009)	Black-tailed
Vermejo Park Ranch, New Mexico (2012)	Gunnison's

Section 10(j) of the ESA allows reintroduced populations to be designated Nonessential Experimental Populations (NEP) to ease concerns about reintroductions of threatened and endangered species and to facilitate species recovery efforts. To date, 11 black-footed ferret reintroductions have occurred through use of Section 10(j) designated NEP areas in the United States (U.S. Fish and Wildlife Service 2008a). There have also been seven reintroductions in the United States that used Section 10(a)(1)(A) recovery permits. Additionally, there have been reintroductions in Chihuahua, Mexico, and in Saskatchewan, Canada, in compliance with those countries' statutes, for a total of 20 reintroduction attempts (U.S. Fish and Wildlife Service 2008a; Fargey 2010). See Table 1 for the location and date of initiation of each of the black-footed ferret reintroduction sites.

At the present time, black-footed ferret populations at active reintroduction sites persist only through the purposeful management of prairie dogs to protect both black-footed ferrets and prairie dogs from sylvatic plague. Without such management, it is likely that any extant black-footed ferret populations would be reduced to zero due to this recurring non-native disease. Therefore, baseline for the black-footed ferret under the proposed action is considered to be zero for both existing and new reintroduction sites because none will occur on any property until reintroduction of the species. Further, we do not expect that black-footed ferrets will persist long-term on most properties that may have black-footed ferrets now without purposeful management of prairie dogs to protect both black-footed ferrets and prairie dogs from sylvatic plague.

B. Gunnison's prairie dog (*Cynomys gunnisoni*)

The Gunnison's prairie dog is a member of the Sciuridae family which includes squirrels, chipmunks, marmots, and prairie dogs. Adult Gunnison's prairie dogs vary in length from 12–15 in and weigh 23–42 ounces, with males averaging slightly larger than females. They are yellowish-buff in color with blackish hairs intermixed. The tops of the heads, sides of cheeks, and eyebrows are noticeably darker. The species differs from black-tailed prairie dogs in having a much shorter and lighter colored tail and from other white-tailed species in having grayish-white hairs in the tip of the tail rather than pure white. The Gunnison's prairie dog occurs in Arizona, Colorado, New Mexico, and Utah, and its range is contained within the action area.

The Gunnison's prairie dog has sometimes been divided into two subspecies: *C. g. gunnisoni* and *C. g. zuniensis* (Hollister 1916). The Service currently regards the Gunnison's prairie dog as a single species because the most recent published analyses (Goodwin 1995; Pizzimenti 1975) do not support subspecies designation. Unpublished research (Hafner 2004; Hafner et al. 2005) indicates that the distribution of mitochondrial DNA (deoxyribonucleic acid) haplotype lineages supports past geographic isolation, followed by limited mixing in regions coincident with the recognized borders of the two purported subspecies. Although this analysis will likely be substantiated through additional research, it is still preliminary and needs to be verified before we can use it as evidence for subspecies designation.

The onset of reproduction in Gunnison's prairie dogs is somewhat variable depending upon latitude, elevation, and seasonal variation but most typically is April and May (Hoogland 2001). Individuals hibernate for as long as seven months (Fitzgerald and Lechleitner 1974). Females will breed as yearlings when resources are abundant (Goodwin 1995; Hoogland 1998; Hoogland 2001; Pizzimenti and Hoffman 1973). A maximum of one litter is produced per year with a mean litter size of 3.77 (Hoogland 2001). Individuals live in family groups called clans, and adjacent clans constitute a colony (Fitzgerald and Lechleitner 1974). Clan members defend a home territory of approximately 2.5 ac, but commonly forage outside of home territory in the weakly defended peripheral sections of territories belonging to other clans (Hoogland 1999).

Gunnison's prairie dog potential habitat includes level to gently sloping grasslands and semi-desert and montane shrublands, at elevations from 6,000–12,000 feet (Bailey 1932; Fitzgerald et al. 1994; Pizzimenti and Hoffman 1973; Wagner and Drickamer 2002). Grasses are the most important food item with forbs, sedges, and shrubs also occasionally utilized (Pizzimenti and Hoffman 1973; Shalaway and Slobodchikoff 1988).

The best available information indicates that population densities of Gunnison's prairie dog colonies are variable, depending on environmental influences (including habitat, season, disease, and precipitation) as well as anthropogenic influences (such as chemical control and recreational shooting). Densities typically range from 2–23 individuals per ac (Fitzgerald et al. 1994) and are similar to densities in black-tailed prairie dog colonies (Cully 1993) which typically range from 2–18 individuals per ac (Fagerstone and Ramey 1996; Hoogland 1995; King 1955; Koford 1958). Knowles (2002) notes historic densities for Gunnison's prairie dogs as high as 63 individuals per ac but concludes that overall they generally occur at lower densities than black-tailed prairie dogs. In the available literature, Gunnison's prairie dog population abundance is most often discussed in terms of acres or hectares of occupied habitat rather than in numbers of individuals because of the wide range of observed population densities for the species, wide natural population fluctuations (due to drought and other factors), and the limited number of studies that have determined actual numbers of individuals in a population due to the significant additional cost and effort associated with doing so.

The current distribution of the species is generally centered on the ''Four Corners'' region of northern Arizona, southwestern Colorado, northwestern New Mexico, and southeastern Utah (Anderson et al. 1986; Bailey 1932; Knowles 2002; Pizzimenti and Hoffman 1973). There is some very limited overlap between ranges for Gunnison's prairie dogs and black-tailed prairie dogs in New Mexico (Goodwin 1995; Sager 1996) and between Gunnison's prairie dog and white-tailed prairie dog in Colorado (Knowles 2002), but there is no evidence that interbreeding is occurring. Using GIS datasets and known habitat requirements, Seglund et al. (2005) estimate that 27 percent of potential Gunnison's prairie dog habitat occurs in Arizona, 25 percent in Colorado, 45 percent in New Mexico, and 3 percent in Utah. Rangewide, approximately 73 percent of potential habitat occurs on tribal and private lands (Seglund et al. 2005). Significant portions of potential habitat occur on tribal lands, especially in Arizona and New Mexico.

In 2008, the Service found that the Gunnison's prairie dog populations in the montane portion of the range meet the definition of threatened and are considered significant because they would contribute meaningfully to the ability to conserve the species. The species within the montane portion of its range was designated as a candidate for listing as threatened under the ESA on February 5, 2008 (U.S. Fish and Wildlife Service 2008b). No critical habitat has been proposed or designated for this species. The montane habitat found in the northeastern portion of the range (central and south-central Colorado and north-central New Mexico) consists primarily of higher elevation, cooler and moister plateaus, benches, and intermountain valleys. This habitat comprises 35–40 percent of the species' total current range. Gunnison's prairie dogs occupy grass-shrub vegetation types in low valleys and mountain meadows within this habitat. At present, the occupied range of the Gunnison's prairie dog in the montane portion of its range is approximately 722,000 ac (U.S. Fish and Wildlife Service 2008b).

While the Gunnison's prairie dog is affected by loss of habitat from urbanization and agriculture, it is not considered a significant threat as these activities are only affecting a small percentage of the species' habitat (U.S. Fish and Wildlife Service 2008b). Shooting continues to be a threat to Gunnison's prairie dogs when combined with the impacts of disease. However, seasonal shooting closures in Arizona and Colorado are anticipated to limit this impact (U.S. Fish and Wildlife Service 2008b). Of all the factors affecting Gunnison's prairie dog populations, sylvatic plague is the most significant. While both white-tailed and black-tailed prairie dog populations have been reported to recover following reductions due to plague, little to no recovery to previous levels has been noted in montane Gunnison's prairie dog colony die-offs, even after long periods of time. The landscape in the montane portion of the Gunnison's prairie dog range is characterized by fewer, smaller, and more isolated colonies with minimal to no metapopulation structure. These factors make the Gunnison's prairie dogs in this habitat highly susceptible to plague-related declines.

C. California condor (*Gymnogyps californianus*)

The California condor is a member of the family Cathartidae, the New World vultures. They are among the largest flying birds in the world with adults weighing approximately 22 lbs and wing spans up to 9.5 feet (U.S. Fish and Wildlife Service 1996a). California condors reach sexual maturity by five to six years of age, and breeding begins between six and eight years of age. California condors are strict scavengers. Unlike turkey vultures (*Cathartes aura*), California condors do not have an exceptional sense of smell and locate their food visually, often by investigating the activity of ravens (*Corvus corax*), coyotes (*Canis latrans*), eagles (*Halieeatus leucocephalus*), and other scavengers. California condors may eat the carcasses of cattle (*Bos taurus*), domestic sheep (*Ovis aries*), California ground squirrels (*Otospermophilus beecheyi*), mule deer (*Odocoileus hemonius*), and horses (*Equus ferus caballus*); however, they prefer deer (U.S. Fish and Wildlife Service 1996). California condors overlap a small portion of the action area in northern Arizona and southern Utah.

Most California condor habitat use in northern Arizona occurs in open areas and throughout the forested areas of the rims of Grand Canyon. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass. Roost sites include cliffs and tall trees, including snags. Nesting sites for California condors include various types of rock formations such as caves, crevices, overhung ledges, and potholes. California condors are attracted to human activity; newly released individuals and young inexperienced juveniles are more likely to investigate human activity.

The California condor was listed under early endangered species legislation by the Service in 1967 (U.S. Department of Interior 1967) and was "grandfathered" into the ESA in 1973. Critical habitat was designated in 1976 within the state of California; no critical habitat has been designated for this species within the action area. Despite intensive conservation efforts, the wild California condor population declined steadily until 1987 when the last free-flying individual was captured. During the 1980's, captive California condor flocks were established at the San Diego Wild Animal Park and the Los Angeles Zoo, and the first successful captive breeding was accomplished at the former facility in 1988. Following several years of successful captive breeding, California condors were first released back to the wild in California in early 1992.

On October 6, 1996, the Service announced its intention to reintroduce California condors into northern Arizona and southern Utah and designated the released birds as a NEP under Section 10(j) of the ESA (U.S. Fish and Wildlife Service 1996b). On October 29, 1996, six California condors were released within a designated NEP area in northern Arizona and southern Utah. The area is bounded by Interstate 40 on the south, U.S. Highway 191 on the east, Interstate 70 on the north, and Interstate 15 to U.S. Highway 93 on the west. The NEP status applies to California condors only when they are within the experimental population area. For the purposes of section 7 consultation, when California condors are on lands not within the National Wildlife Refuge System or the National Park System but within the experimental population area, they are treated as if proposed for listing. When California condors are on National Wildlife Refuge or National Park System lands within the designated experimental population area, they are treated as a threatened species. Any California condors outside of the experimental population area are fully protected as endangered.

As part of the program to manage California condors within the NEP area, all California condors released in the area are instrumented and monitored with radio and/or satellite telemetry. Individual California condors are tracked and monitored by personnel from The Peregrine Fund. Sick or injured California condors are rescued, sent to rehabilitation, and re-released when recovered. Dead California condors are recovered by The Peregrine Fund field personnel to determine cause of death.

As of June 30, 2013, a total of 231 California condors existed in the wild; what is known as the Southwest (Arizona) population of California condors contained 71 individuals. Fifty-three California condors have died in northern Arizona since 1996. Most California condor deaths are directly or indirectly related to human activity. Shootings, poisoning with toxicants, lead poisoning, and collisions with power lines are major threats, and all of these activities occur within the action area. The California condor's slow rate of reproduction and high number of years spent reaching breeding maturity make the species more vulnerable to these threats.

D. Greater sage-grouse (*Centrocercus urophasianus*)

The greater sage-grouse is a member of the Phasianidae family and is the largest grouse in North America. Males may weigh in excess of four to seven lbs, and hens weigh approximately two to four lbs (U.S. Fish and Wildlife Service 2010a). Greater sage-grouse require large, interconnected expanses of sagebrush with healthy, native understories (Patterson 1952; Knick et al. 2003; Wisdom et al. 2011). Due to differences in the ecology of sagebrush across the range of the greater sage-grouse, the Western Association of Fish and Wildlife Agencies delineated seven Management Zones (MZs I-VII) based primarily on floristic provinces (Stiver et al. 2006). The boundaries of these MZs were delineated based on their ecological and biological attributes rather than on arbitrary political boundaries (Stiver et al. 2006). Therefore, vegetation found within a MZ is similar, and greater sage-grouse and their habitats within these areas are likely to respond similarly to environmental factors and management actions. The action area contains all of MZ I and MZ II, and a portion of MZ III within the states of Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.

The greater sage-grouse is a lek breeder; up to 400 males may display in an area up to 0.5 miles (mi) long. Clutch size averages around seven to eight but is highly variable; variation may reflect habitat quality and nutritional condition of females (Connelly et al. 2000). Incubation, by the female only, lasts 25-27 days. Young are precocial, downy, tended by the female, and are capable of flight by 7-14 days old. Productivity generally is low; reported nest failure is 36 percent (Montana) to 76 percent (Oregon) (Gregg et al. 1993). Renesting rates after nest loss are variable, from less than 10 percent to more than 40 percent (Connelly et al. 2000). Females are sexually mature in one year, though some or many yearlings may not nest. Most greater sage-grouse live three to six years or less, but individuals up to nine years of age have been recorded in the wild (Connelly et al. 2004).

Greater sage-grouse populations can be defined by their migration habit. Populations are either non migratory or undertake a one-stage migration or two-stage migration. One-stage migrants move between distinct summer and winter ranges, often 10–30 mi apart. Two-stage migrants move between breeding habitat, summer range, and winter range, and their annual movements can exceed 50 to 63 mi (Connelly et al. 1988). Fall movements to winter range can span several months, from late August to December (Connelly et al. 1988). Males and females flock separately; in some areas, populations make local elevational migrations between summer and winter habitats (Schroeder et al. 1999).

Median dispersal distance from natal area to breeding area is approximately 4.4 - 5.6 mi in Colorado; probably over half of all yearling grouse attended their natal-area lek (Dunn and Braun 1985). Over the year, individuals in migratory populations may cover home ranges that exceed 900 mi^2; the size of home ranges vary greatly with migratory habit and season (Connelly et al. 2000). Distances between nest sites and nearest leks average 0.7 - 3.9 mi, but females may move more than 12.5 mi from a lek to nest (Connelly et al. 2000). In Colorado, greater sage-grouse generally stay within 3.8 mi of their lek (Schoenberg 1982). Leks are an important focal habitat feature for greater sage-grouse, and the quality of adjacent nesting and brood-rearing habitat may be the most important factor in lek choice; males apparently form leks opportunistically within potential nesting habitat where female traffic is high (Wakkinen et al. 1992; Schroeder et al. 1999; Connelly et al. 2000). Leks are located on relatively open sites surrounded by sagebrush or in areas where sagebrush density is low, such as exposed ridges, knolls, or grassy swales (Schroeder et al. 1999). Lek sites themselves are highly variable and may include many types of clearings and disturbed sites, including landing strips, old lake beds, roads, prairie dog towns, gravel pits, cropland, and burned areas in addition to natural openings (Connelly et al. 1981; Gates 1985; Schroeder et al. 1999; Connelly et al. 2000).

Greater sage-grouse habitat includes foothills, plains, and mountain slopes where sagebrush is present, often with a mixture of sagebrush, meadows, and aspen in close proximity. The species uses a wide variety of sagebrush mosaic habitats, including (1) tall sagebrush types such as big sagebrush (*Artemisia tridentata*), three-tip sagebrush (*A. tripartita*), and silver sagebrush (*A. cana*); (2) low sagebrush types, such as low sagebrush (*A. arbuscula*) and black sagebrush (*A. nova*); (3) mixes of low and tall sagebrush with abundant forbs; (4) riparian and wet meadows; (5) steppe dominated by native forbs and bunchgrasses; (6) scrub-willow (*Salix* spp.); and (7) sagebrush/woodland mixes with juniper (*Juniperus* spp.), ponderosa pine (*Pinus ponderosa*), or quaking aspen (*Populus tremuloides*) (Schroeder et al. 1999).

Habitats used by pre-laying females are also important for subsequent reproductive success. At this time, hens require areas rich with forbs that are high in calcium, phosphorus, and protein (Barnett and Crawford 1994). Important forbs include desert-parsley (*Lomatium* spp.), hawksbeard (*Crepis* spp.), long-leaf phlox (*Phlox longifolia*), everlasting (*Antennaria* spp.), clover (*Trifolium* spp.), mountain-dandelion (*Agoseris* spp.), Pursh's milk-vetch (*Astragalus purshii*), obscure milk-vetch (*A. obscurus*), and buckwheat (*Eriogonum* spp.) (Barnett and Crawford 1994).

Hens often nest in same specific area in successive years (Fischer et al. 1993). Nests are typically found in thick cover in sagebrush habitat, beneath a sagebrush or another shrub; nests are on the ground in a shallow depression. Hens usually choose areas dominated by sagebrush, in sites with taller sagebrush, greater shrub canopy cover, and more ground litter (Musil et al. 1994) and nest beneath one of the tallest shrubs in the stand with greater amounts of lateral cover (Roberson 1986; Wakkinen 1990). Hens occasionally use areas dominated by grasses or other shrubs (Schroeder et al. 1999). Proximity to water may be more important in some areas than in others (Schroeder et al. 1999).

Important components of greater sage-grouse nesting habitat include both a dense sagebrush overstory and an herbaceous understory of grasses. Sagebrush and grasses are important to provide shade and security, and both new herbaceous growth and residual cover are important in the understory (Connelly 1999). Tall grass cover is critical for concealment and a warmer microclimate (Call and Maser 1985; Gregg et al. 1994). Nests are most often located beneath a sagebrush plant and approximately 20 percent of the time may be beneath other shrub species or grass, but nest success is higher beneath sagebrush than other shrubs (Connelly 1999). Nest success averages 53 percent for females nesting under sagebrush and 22 percent for those using non-sagebrush cover (Connelly et al. 1991). Hens favor nesting in sagebrush 16 - 32 inches in height with 15 - 25 percent canopy cover (sometimes more than 30 percent), grasses 6 - 12 in high (usually more than 7 in, measured in May), and 3 - 30 percent grass cover (15 - 25 percent optimum (Connelly 1999).

Habitat for brood-rearing in early spring is critical to greater sage-grouse brood survival. Hens with broods tend to use sagebrush uplands adjacent to nest sites, but distance of movement varies (Connelly et al. 2000). Sagebrush overstory, herbaceous understory, and the presence of plentiful insects that provide a high-protein diet for broods (especially Hymenoptera and Coleoptera, species typical of sagebrush upland steppe) are the three important factors (Connelly 1999). Stands may be relatively open (approximately 14 percent sagebrush canopy cover (Wallestad 1971) with more than or equal to 5 percent grass and forb cover (Sveum et al. 1998).

As spring habitats dry, greater sage-grouse hens move their broods to wetter sites in June and July (Connelly et al. 2000). Habitats used are highly variable, but food-rich areas with succulent forbs and abundant insects are key. In this season, greater sage-grouse may roost in sagebrush and use seeps, wet meadows, riparian areas, alfalfa fields, potato fields, and other cultivated and irrigated areas. Males and broodless females use a wide variety of habitats, and they may move to uplands and into mountains, using high mountain meadows and grasslands (Connelly 1999). Broodless hens typically move to meadows by early July whereas hens with broods remain in upland habitats (Gregg et al. 1993); hens with broods initially select low sagebrush cover types during early brood-rearing, big sagebrush cover types later in brood-rearing, and ultimately concentrate habitat use in and near lakebeds and meadows (Drut et al. 1994). In Wyoming, broods most often occupy sagebrush-grass and sagebrush-bitterbrush habitats (Klott and Lindzey 1990).

Greater sage-grouse are well-adapted to winter extremes, but access to sagebrush for food and cover in all snow conditions is critical to survival. Individuals are known to move considerable distances to find good habitat, and winter ranges may exceed 90 mi^2 (Robertson 1991). Thus, greater sage-grouse require a landscape mosaic with a diversity of sagebrush canopy cover and heights over hundreds of square miles (Connelly 1999). Winter sites are selected on the basis of topography and availability of sagebrush above snow. Greater sage-grouse tend to feed in low, open sagebrush flats, and once these are covered with snow, they will move into taller sagebrush (Connelly 1999). Favored conditions include stands with high available sagebrush canopy cover (10 - 25 percent and up to 40 percent) and sagebrush heights of 10 - 12 in above the snow level (Braun et al. 1976; Call and Maser 1985; Connelly 1999). The sagebrush subspecies and stands that contain the highest levels of protein may be selected (Remington and Braun 1985). Greater sage-grouse use snow burrows for thermal cover, tunneling into soft drifts on the lee side of shrubs, or burrowing into dry soft snow (when snow depths exceed 10 in) in open, level areas without visible shrub cover above the snow (Remington and Braun 1985).

Sagebrush provides most of the winter diet for greater sage-grouse. At other times of the year, greater sage-grouse feed on sagebrush as well as the leaves, flowers, and buds of associated plants. They also eat insects (e.g., ants, beetles, grasshoppers [Connelly 1999]). Insects are especially important in the diet of newly hatched broods. Over the fall, birds shift from consuming large amounts of forbs to eating mostly sagebrush (Wallestad 1975).

Prior to settlement of western North America by European immigrants in the 19th century, greater sage-grouse occurred in 13 states and 3 Canadian provinces - Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, North Dakota, Nebraska, Arizona, British Columbia, Alberta, and Saskatchewan (Schroeder et al. 1999; Young et al. 2000; Schroeder et al. 2004). Sagebrush habitats that potentially supported greater sage-grouse occurred over approximately 463,509 mi^2 before 1800 (Schroeder et al. 2004). Currently, greater sage-grouse occur in 11 States (Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, and North Dakota), and 2 Canadian provinces (Alberta and Saskatchewan), occupying approximately 56 percent of their historical range (Schroeder et al. 2004). Greater sage-grouse have been extirpated from Nebraska, British Columbia, and possibly Arizona (Schroeder et al. 1999; Young et al. 2000; Schroeder et al. 2004). Current distribution of the greater sage-grouse is estimated at 258,075 mi^2 (Connelly et al. 2004; Schroeder et al. 2004). Changes in distribution are the result of sagebrush alteration and degradation (Schroeder et al. 2004).

Greater sage-grouse distribution is associated with sagebrush (Schroeder et al. 2004), although sagebrush is more widely distributed than the greater sage-grouse itself. However, sagebrush does not always provide suitable habitat due to fragmentation and degradation (Schroeder et al. 2004). Very little of the extant sagebrush is undisturbed, with up to 50 to 60 percent having altered understories or having been lost to direct conversion (Knick et al. 2003). There also are challenges in mapping altered and depleted understories, particularly in semi-arid regions, so maps depicting only sagebrush as a dominant cover type are deceptive in their reflection of habitat quality and, therefore, use by greater sage-grouse (Knick et al. 2003). As such, variations in the quality of sagebrush habitats (from either abiotic or anthropogenic events) are reflected by greater sage-grouse distribution and densities.

Estimates of greater sage-grouse abundance were mostly anecdotal prior to the implementation of systematic surveys in the 1950s (Braun 1998). Early reports suggested the birds were abundant throughout their range, with estimates of historical populations ranging from 1,600,000 to 16,000,000 birds. However, concerns about extinction were raised in early literature due to market hunting and habitat alteration (Hornaday 1916). Following a review of published literature and anecdotal reports, Connelly et al. (2004) concluded that the abundance of greater sage-grouse has declined from presettlement (defined as 1800) numbers. Most of the historical population changes were the result of local extirpations which has been inferred from a 44 percent reduction in greater sage-grouse distribution described by Schroeder et al. (2004).

Population numbers are difficult to estimate due to the large range of the species, physical difficulty in accessing some areas of habitat, the cryptic coloration and behavior of hens (Garton et al. 2011), and survey protocols. Problems with inconsistent sampling protocols for lek surveys (e.g., number of times a lek is counted, number of leks surveyed in a year, observer bias, observer experience, time counted) were identified by Walsh et al. (2004) and Garton et al. (2011), and many of those problems still persist (Stiver et al. 2006). Additionally, estimating population sizes using lek data is difficult as the relationship of those data to actual population size (e.g., ratio of males to females, percent unseen birds) is usually unknown (WAFWA 2008). However, the annual counting of males on leks remains the primary approach to monitor long-term trends of populations (WAFWA 2008), and standardized techniques are beginning to be implemented throughout the species' range (Stiver et al. 2006). The use of harvest data for estimating population numbers also is of limited value since both harvest and the population size on which harvest is based are estimates. Given the limitations of these data, states usually rely on a combination of actual counts of birds on leks and harvest data to estimate population size. Estimates of populations by state, generated from a variety of data sources, are found in Table 2.

Table 2. Greater sage-grouse population estimates based on data from State wildlife agencies.

STATE	DATA YEAR	SOURCE	ESTIMATE
CA/NV	2004	California/Nevada Sage-grouse Conservation Team (2004)	88,000
CO	2008	Colorado Greater Sage-Grouse Steering Committee (2008)	22,646
ID	2007	Calculated based on assumption of 5% of population is harvested (Service, unpublished data)	98,700
MT	2007	Calculated based on assumption of 5% of population is harvested (Service, unpublished data)	62,320
ND	2007	Adjusted 2008 lek counts (ND Game & Fish Department, unpublished data)	308
OR	2003	2003 Oregon Conservation Plan estimate (Hagen 2005)	40,000
SD	2007	SD Game & Fish Department web site (last updated 2007)	1,500
UT	2002	UT Division of Wildlife Resources (2002)	12,999
WA	2003	Washington Division of Fish and Wildlife (Stinson *et al.* 2004)	1,059
WY	2007	Calculated based on assumption of 5% of population is harvested (Service, unpublished data)	207,560

Although population numbers are difficult to estimate, the long-term data collected from counting males on leks provides insight to population trends. Periods of historical decline in sage-grouse abundance occurred from the late 1800's to the early-1900's (Hornaday 1916; Braun 1998; Schroeder et al. 1999). Other noticeable declines in sage-grouse populations occurred in the 1920's and 1930's and then again in the 1960's and 1970's (Connelly and Braun 1997; Braun 1998). Declines in the 1920's and 1930's were attributed to hunting, and declines in the 1960's and 1970's were primarily as a result of loss of habitat quality and quantity (Connelly and Braun 1997). State wildlife agencies were sufficiently concerned with the decline in the 1920's and 1930's that many closed their hunting seasons and others significantly reduced bag limits and season lengths as a precautionary measure (Patterson 1952; Autenrieth 1981).

Using lek counts as an index for abundance, Connelly et al. (2004) reported rangewide declines from 1965–2003. Declines averaged two percent per year from 1965 - 2003. The decline was more dramatic from 1965–1985, with an average annual change of 3.5 percent. The rate of decline rangewide slowed to 0.37 percent annually during 1986–2003, and some populations increased (Connelly et al. 2004). Based on these analyses, Connelly et al. (2004) estimated that greater sage-grouse population numbers in the late 1960's and early 1970's were likely two to three times greater than current numbers (Connelly et al. 2004). Using a statistical population reconstruction approach, Garton et al. (2011) also demonstrated a pattern of higher numbers of greater sage-grouse in the late 1960's and early 1970's which was supported by data from several other sources (Garton et al. 2011). In 2008, the WAFWA conducted new population trend analyses that incorporated an additional four years of data beyond the Connelly et al. (2004) analysis (WAFWA 2008). Although the WAFWA analyses used different statistical techniques, lek counts also were used. The WAFWA results were similar to Connelly et al. (2004) in that a long-term population decline was detected during 1965–2007 (average 3.1 percent annually; WAFWA 2008). The WAFWA attributed the decline to the reduction in number of active leks (WAFWA 2008). Similar to Connelly et al. (2004), the WAFWA analyses determined that the rate of decline lessened during 1985 - 2007 (average annual change of 1.4 percent annually) (WAFWA 2008). Garton et al. (2011) also had similar results. While the average annual rate of decline has lessened since 1985 (3.1 - 1.4 percent), population declines continue and populations are now at much lower levels than in the early 1980's. Therefore, these continuing negative trends at such low relative numbers are concerning regarding long-term population persistence. Similarly, short-term increases or stable trends, while on the surface seem encouraging, do not indicate that populations are recovering but may instead be a function of losing leks and not increases in numbers (WAFWA 2008). Population stability may also be compromised if cycles in greater sage-grouse populations (Schroeder et al. 1999; Connelly et al. 2004) are lost, which current analyses suggest, minimizing the opportunities for population recovery if habitat were available.

In summary, since neither presettlement nor current numbers of greater sage-grouse are accurately known, the actual rate and magnitude of decline since presettlement times is uncertain. However, three groups of researchers using different statistical methods (but the same lek count data) concluded that rangewide greater sage-grouse have experienced long-term population declines in the past 43 years, with that decline lessening in the past 22 years. Many of these declines are the result of loss of leks (WAFWA 2008), indicating either a direct loss of habitat or habitat function (Connelly and Braun 1997).

Although the MZs were not formally adopted by the WAFWA until 2006, the population trend analyses conducted by Connelly et al. (2004) included trend analyses based on the same floristic provinces used to define the zones. While the average annual rate of change was not presented, the results of those analyses indicated long-term declines in greater sage-grouse for MZs I, II, and III (Connelly et al. 2004; Stiver et al. 2006), the MZs that are completely or partially contained within the action area. The WAFWA (2008) and Garton et al. (2011) population trend analyses did consider MZs and reported that MZs I, II, and III had negative population trends from 1965 to 2007.

In addition to calculating annual rates of change by MZ, Garton et al. (2011) also reported the percent change in number of males per lek from 1965 - 2007, the percent change of active leks from 1965 to 2007, and minimum male population estimates in 2007 (Table 3). The percent change in number of males per lek and the percent change in active leks reflect population declines, and possibly habitat loss in all three MZs.

Table 3. Minimum male greater sage-grouse population estimates in 2007, percent change in number of males per lek and percent change in active leks between 1965 and 2007 by MZs contained within the action area (from Garton et al. 2011).

MZ	Minimum Population Estimate in 2007 (# of males)	Percent Change in Number of Males per Lek (1965-2007)	Percent Change in Number of Active Leks (1965-2007)
I	14,814	-17	-22
II	42,429	-30	-7
III	6,851	-24	-16

Factors responsible for declines in greater sage-grouse populations within MZ I, MZ II, and MZ III include land conversion to agriculture, urban, or industrial uses; increased fire frequency and intensity; overutilization of native rangeland by domestic livestock; invasive plants, particularly nonnative annual grasses; herbicidal control of sagebrush; pinyon-juniper encroachment; nonrenewable energy and mineral exploration and development; development of renewable energy sources such as wind and geothermal; infrastructure developments such as roads, powerlines, communication towers, railroad lines, fence construction; and drought. The synergistic effects of these threats prompted the Service to designate the greater sage-grouse as a candidate for listing as a threatened species on March 23, 2010 (U.S. Fish and Wildlife Service 2010a). No critical habitat has been proposed or designated for this species.

E. Gunnison sage-grouse (*Centrocercus minimus*)

Like the greater sage-grouse, the Gunnison sage-grouse is a member of the Phasianidae family. For many years, Sage-grouse were considered a single species. Gunnison sage-grouse were identified as a distinct species based on morphological (Hupp and Braun 1991; Young et al. 2000), genetic (Kahn et al. 1999; Oyler-McCance et al. 1999), and behavioral (Barber 1991; Young 1994; Young et al. 2000) differences and geographical isolation (Young et al. 2000). Based on these differences, in 2000, the American Ornithologist's Union accepted the Gunnison sage-grouse as a distinct species. The current ranges of the two species do not overlap (Schroeder et al. 2004), and the range of the Gunnison sage-grouse is contained within the action area.

Gunnison and greater sage-grouse depend on a variety of shrub-steppe habitats throughout their life cycles and are considered obligate users of several species of sagebrush (Patterson 1952; Braun et al. 1976; Schroeder et al. 1999; Connelly et al. 2000; Connelly et al. 2004). Dietary requirements of the two species are also similar, being composed of nearly 100 percent sagebrush in the winter and forbs and insects as well as sagebrush in the remainder of the year (Wallestad et al. 1975; Schroeder et al. 1999; Young et al. 2000). Gunnison and greater sage-grouse do not possess muscular gizzards and, therefore, lack the ability to grind and digest seeds (Leach and Hensley 1954).

In addition to serving as a primary year-round food source, sagebrush also provides cover for nests (Connelly et al. 2000). Thus, Gunnison sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder et al. 2004). Connelly et al. (2000) segregated habitat requirements into four seasons: (1) breeding. (2) summer - late brood-rearing. (3) fall. and (4) winter. Depending on habitat availability and proximity, some seasonal habitats may be indistinguishable.

Gunnison sage-grouse exhibit strong site fidelity to seasonal habitats, which includes breeding, nesting, brood rearing, and wintering areas, even when the area is no longer of value (Connelly et al. 2004). Adult Gunnison sage-grouse rarely switch among these habitats once they have been selected, limiting their adaptability to changes. Gunnison sage-grouse distribution is associated with sagebrush (Schroeder et al. 2004), although sagebrush is more widely distributed than Gunnison sage-grouse because sagebrush does not always provide suitable habitat due to fragmentation and degradation (Schroeder et al. 2004). Very little of the extant sagebrush in North America is undisturbed, with up to 50 - 60 percent having altered understories (forb and grass vegetative composition under the sagebrush) or having been lost to direct conversion (Knick et al. 2003). Mapping altered and depleted understories is challenging, particularly in semi-arid regions, so maps depicting only sagebrush as a dominant cover type are deceptive in their reflection of habitat quality and, therefore, use by Gunnison sage-grouse (Knick et al. 2003). As such, variations in the quality of sagebrush habitats for Gunnison sage-grouse (from either abiotic or anthropogenic events) are better reflected by Gunnison sage-grouse distribution and densities rather than by broad geographic scale maps of the distribution of sagebrush.

Gunnison sage-grouse exhibit a polygamous mating system where a male mates with several females. Males perform courtship displays and defend their leks (Patterson 1952). Lek displaying occurs from mid-March through late May, depending on elevation (Young et al. 2000). Researchers have observed that a relatively small number of dominant males account for the majority of copulations on each lek (Schroeder et al. 1999). However, an average of 45.9 percent of genetically identified males in a population fathered offspring in a given year (Oyler-McCance et al. 1999). This more recent work suggests that males and females likely engage in off-lek copulations. Males do not incubate eggs or assist in chick rearing.

Lek sites can be located on areas of bare soil, wind-swept ridges, exposed knolls, low sagebrush, meadows, and other relatively open sites with good visibility and low vegetation structure (Connelly et al. 1981; Gates 1985; Klott and Lindzey 1989; Connelly et al. 2004). In addition, leks are usually located on flat to gently sloping areas of less than 15 percent grade (Patterson 1952; Wallestad 1975; Autenrieth 1981). Leks are often surrounded by denser shrub-steppe cover which is used for escape and thermal and feeding cover. Leks can be formed opportunistically at any appropriate site within or adjacent to nesting habitat (Connelly et al. 2000a). Lek habitat availability is not considered to be a limiting factor for Gunnison sage-grouse (Schroeder 1997). However, adult male Gunnison sage-grouse demonstrate strong yearly fidelity to lek sites (Patterson 1952), and some Gunnison sage-grouse leks have been used since the 1950's (Rogers 1964).

Nesting occurs from mid-April to June. Radio-tracked Gunnison sage-grouse nest an average of 2.7 mi from the lek nearest to their capture site, with almost half nesting within 2 mi of their capture site (Young 1994). Nest sites are selected independent of lek locations, but the reverse is not true (Wakkinen et al. 1992). Thus, leks are indicative of nesting habitat. Eighty-seven percent of all Gunnison sage-grouse nests were located less than 4 mi from the lek of capture (Apa 2004). While earlier studies indicated that most greater sage-grouse hens nest within 2 mi of a lek, more recent research indicated that many hens actually move much further from leks to nest based on nesting habitat quality (Connelly et al. 2004). Female greater sage-grouse have been documented to travel more than 13 mi to their nest site after mating (Connelly et al. 2000). Female Gunnison sage-grouse exhibit strong fidelity to nesting locations (Young 1994; Lyon 2000; Connelly et al. 2004). The degree of fidelity to a specific nesting area appears to diminish if the female's first nest attempt in that area was unsuccessful (Young 1994). However, there is no statistical indication that movement to new nesting areas results in increased nesting success (Connelly et al. 2004; Holloran and Anderson 2005).

Gunnison sage-grouse typically select nest sites under sagebrush cover with some forb and grass cover (Young 1994), and successful nests were found in higher shrub density and greater forb and grass cover than unsuccessful nests (Young 1994). The understory of productive sage-grouse nesting areas contains native grasses and forbs, with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage for pre-laying and nesting hens, and cover for the hen while she is incubating (Schroeder et al. 1999; Connelly et al. 2000; Connelly et al. 2004). Shrub canopy and grass cover provide concealment for Gunnison sage-grouse nests and young and are critical for reproductive success (Barnett and Crawford 1994; Gregg et al. 1994; DeLong et al. 1995; Connelly et al. 2004). Few herbaceous plants are growing in April when nesting begins, so residual herbaceous cover from the previous growing season is critical for nest concealment in most areas (Connelly et al. 2000).

Nesting success for Gunnison sage-grouse is highest in areas where forb and grass covers are found below a sagebrush canopy cover of 15 - 30 percent (Young et al. 2000). These numbers are comparable to those reported for the greater sage-grouse (Connelly et al. 2000). Nest success for greater sage-grouse is greatest where grass cover is present (Connelly et al. 2000). Because of the similarities between these two species, we believe that increased nest success in areas of forb and grass cover below the appropriate sagebrush canopy cover is likely the case for Gunnison sage-grouse as well.

Mean clutch size for Gunnison sage-grouse is 6.8 eggs (Young 1994). The mean clutch size for Gunnison sage-grouse in the Gunnison Basin was 6.3, with 94 percent of eggs in successful nests hatching (Childers 2009). Despite average clutch sizes of seven eggs, little evidence exists that populations of Gunnison sage-grouse produce large annual surpluses. The inability of Gunnison sage-grouse to produce large annual surpluses limits their ability to respond under favorable environmental conditions to make up for population declines. Re-nesting rates following the loss of the original nest appear very low in Gunnison sage-grouse, with one study reporting renesting rates of 4.8 percent (Young 1994). Only one instance of renesting was observed over a five-year period during which a total of 91 nesting Gunnison sage-grouse hens were monitored (Childers 2009).

Most Gunnison sage-grouse eggs hatch in June, with a peak between June 10 and June 20 (GSRSC 2005). Chicks are precocial and leave the nest with the hen shortly after hatching. Forbs and insects are essential nutritional components for sage-grouse chicks (Klebenow and Gray 1968; Johnson and Boyce 1991; Connelly et al. 2004). Therefore, early brood-rearing habitat for females with chicks must provide adequate cover adjacent to areas rich in forbs and insects to assure chick survival during this period (Connelly et al. 2000; Connelly et al. 2004). Gunnison sage-grouse chick dietary requirements of insects and forbs also are expected to be similar to greater sage-grouse and other grouse species (GSRSC 2005).

The availability of food and cover are key factors that affect chick and juvenile survival. During the first 3 weeks after hatching, insects are the primary food of chicks (Patterson 1952; Klebenow and Gray 1968; Johnson and Boyce 1991; Pyle and Crawford 1996). Diets of 4- to 8-week-old greater sage-grouse chicks were found to have more plant material as the chicks matured (Peterson 1970). Succulent forbs are predominant in the diet until chicks exceed three months of age, at which time sagebrush becomes a major dietary component (Connelly and Markham 1983; Fischer et al. 1996; Schroeder et al. 1999). Early brood-rearing habitat is found close to nest sites, although individual females with broods may also move large distances (Connelly et al. 2000). Young (1994) found that Gunnison sage-grouse with broods used areas with lower slopes than nesting areas, high grass and forb cover, and relatively low sagebrush cover and density. Broods frequently used the edges of hay meadows, but were often flushed from areas found in interfaces of wet meadows and habitats providing more cover, such as sagebrush or willow-alder (*Salix-Alnus*).

As fall approaches, Gunnison sage-grouse move from riparian to upland areas and start to shift to a winter diet (GSRSC 2005). Movements to winter ranges are slow and meandering (Connelly et al. 1988). The extent of movement varies with severity of winter weather, topography, and vegetation cover. Sage-grouse may travel short distances or many miles between seasonal ranges. In response to severe winters, Gunnison sage-grouse move as far as 17 mi (Connelly et al. 1988). Flock size in winter is variable (15 to 100+), and flocks frequently consist of a single sex (Beck 1977).

From late autumn through early spring, greater and Gunnison sage-grouse diet is almost exclusively sagebrush (Patterson 1952; Wallestad et al. 1975; Young et al. 2000). Many species of sagebrush can be consumed (Remington and Braun 1985; Welch et al. 1988). Characteristics of Gunnison sage-grouse winter habitats are also similar through the range of both species (Connelly et al. 2000). In winter, Gunnison sage-grouse are restricted to areas of 15 - 30 percent sagebrush cover, similar to the greater sage-grouse (Connelly et al. 2000; Young et al. 2000). However, they may also use areas with more deciduous shrubs during the winter (Young et al. 2000).

Sagebrush stand selection in winter is influenced by snow depth (Patterson 1952; Connelly et al. 2000) and, in some areas, topography (Beck 1977; Crawford et al. 2004). Winter areas are typically characterized by canopy cover greater than 25 percent and sagebrush greater than 12 - 16 in tall grass (Shoenberg 1982) associated with drainages, ridges, or southwest aspects with slopes less than 15 percent (Beck 1977). Lower flat areas and shorter sagebrush along ridge tops provide roosting areas. In extreme winter conditions, greater sage-grouse will spend nights and portions of the day burrowed into ‘‘snow burrows’’(Back et al. 1987).

Gunnison sage-grouse typically live between three and six years, but individuals up to nine years of age have been recorded in the wild (Connelly et al. 2004). Adult female Gunnison sage-grouse apparent survival rates from April through September averaged 57 percent, and adult male survival averaged 45 percent (Childers 2009). From October through March, adult female Gunnison sage-grouse apparent survival rates averaged 79 percent, and adult male survival averaged 96 percent (Childers 2009). In one study, Gunnison sage-grouse survival from April 2002 through March 2003 was 48 percent for males and 57 percent for females (Apa 2004). Preliminary results from the Gunnison and San Miguel populations indicate potential important temporal and spatial variation in demographic parameters, with apparent annual adult survival rates ranging from approximately 65 - 80 percent (CDOW 2009a). Gunnison sage-grouse female survival in small isolated populations was 52 percent compared to 71 percent survival in the Gunnison Basin, the only population with greater than 500 individuals (Apa 2004). Higher adult survival has been observed in a lower elevation and warmer area (Dry Creek Basin of the San Miguel population - 90 percent) than in a higher elevation and colder, snowier, area (Miramonte portion of the San Miguel population - 65 percent) (CDOW 2009a). Other factors affecting survival rates include climatic differences between years and age (Zablan 1993).

Apparent chick survival from hatch to the beginning of fall (30 September) averaged seven percent over a five-year period in the western portion of the Gunnison Basin (Childers 2009). Apparent chick survival to 90 days of age has ranged from approximately 15 - 30 percent in the Gunnison Basin, with no juvenile recruitment observed over several years in the San Miguel population (CDOW 2009a). Based on a review of many field studies, juvenile survival rates range from 7 - 60 percent (Connelly et al. 2004). The variation in juvenile survival rates may be associated with sex, weather, harvest rates (no harvesting of Gunnison sage-grouse is currently permitted), age of brood female (broods with adult females have higher survival), and with habitat quality (rates decrease in poor habitats) (Schroeder et al. 1999).

Greater sage-grouse require large, interconnected expanses of sagebrush with healthy, native understories (Patterson 1952; Knick et al. 2003; Connelly et al. 2004). However, little information is available regarding minimum sagebrush patch sizes required to support populations of greater or Gunnison sage-grouse. Gunnison sage-grouse have not been observed to undertake the large seasonal and annual movements observed in greater sage-grouse.

Gunnison sage-grouse typically occupy large expanses of sagebrush-dominated habitats composed of a diversity of sagebrush species and subspecies. Use of other habitats intermixed with sagebrush, such as riparian meadows, agricultural lands, steppe dominated by native grasses and forbs, scrub willow (*Salix spp.*), and sagebrush habitats with some conifer or quaking aspen, is not uncommon (Connelly et al. 2004). Gunnison sage-grouse have been observed using human-altered habitats throughout their range; however, the use of non-sagebrush habitats by Gunnison sage-grouse is dependent on the presence of sagebrush habitats in close proximity (Connelly et al. 2004).

Based on historical records, museum specimens, and potential habitat distribution, Gunnison sage-grouse historically occurred in southwestern Colorado, northwestern New Mexico, northeastern Arizona, and southeastern Utah (Schroeder et al. 2004). The Gunnison Sage-Grouse Rangewide Steering Committee modified the historic range from Schroeder et al. (2004), based on more complete information on historic and current habitat and the distribution of the species (GSRSC 2005). Based on this information, the maximum Gunnison sage-grouse historical (presettlement) range is estimated to have been 21,370 mi^2 (GSRSC 2005). It is likely that only a portion of the historical range would have been occupied at any one time, while all of the current range is considered occupied.

Much of what was once Gunnison sage-grouse sagebrush habitat was already lost prior to 1958. A qualitative decrease in sagebrush was attributed to overgrazing from the 1870's until about 1934 (Rogers 1964). Additional adverse effects occurred as a result of newer range management techniques implemented to support livestock by the Bureau of Land Management (BLM), Soil Conservation Service, and U.S. Forest Service (USFS) (Rogers 1964). In the 1950's, large areas of sagebrush within the range of Gunnison sage-grouse were eradicated by herbicide spraying or burning (Rogers 1964). About 384,676 ac of sagebrush habitat was lost from 1958 to 1993 within southwestern Colorado (Oyler-McCance et al. 2001). Sagebrush loss was lower in the Gunnison Basin (11 percent) compared to all other areas in southwestern Colorado (28 percent) (Oyler-McCance et al. 2001). Considerable fragmentation of sagebrush vegetation was also quantitatively documented during that same time period (Oyler-McCance et al. 2001). Gunnison sage-grouse habitat in southwestern Colorado (the majority of the range of Gunnison sage-grouse) has been more severely impacted than sagebrush habitat elsewhere in Colorado.
The Colorado River Storage Project (CRSP) resulted in construction of three reservoirs within the Gunnison Basin in the mid-late 1960's (Blue Mesa and Morrow) and mid-1970's (Crystal). Several projects associated with CRSP were constructed in this same general timeframe to provide additional water storage and resulted in the loss of an unquantified, but likely small, amount of sagebrush habitat. These projects provide water storage and, to a certain extent, facilitate agricultural activities that maintain the fragmentation and habitat lost historically throughout the range of Gunnison sage-grouse.

The historic and current geographic ranges of Gunnison and greater sage-grouse were quantitatively analyzed to determine the species' response to habitat loss and detrimental land uses (Wisdom et al. 2011). A broad spectrum of biotic, abiotic, and anthropogenic conditions were found to be significantly different between extirpated and occupied ranges (Wisdom et al. 2011). Sagebrush area is one of the best landscape predictors of Gunnison sage-grouse persistence (Wisdom et al. 2011). Because of the loss and fragmentation of habitat within its range, no expansive, contiguous areas that could be considered strongholds (areas of occupied range where the risk of extirpation appears low) are evident for Gunnison sage-grouse (Wisdom et al. 2011). The minimum amount of sagebrush habitat needed by Gunnison sage-grouse to ensure long-term persistence is unknown; however, based on Wisdom et al. (2011), it appears that landscapes containing large and contiguous sagebrush patches and sagebrush patches in close proximity increase the likelihood of sage-grouse persistence.

Gunnison sage-grouse currently occur in seven widely scattered and isolated populations in Colorado and Utah, occupying 1,511mi^2 (GSRSC 2005). The seven populations are Gunnison

Basin, San Miguel Basin, Monticello–Dove Creek, Pinyon Mesa, Crawford, Cerro Summit–Cimarron–Sims Mesa, and Poncha Pass. Population trends over the last nine years indicate that six of the populations are in decline. The Gunnison Basin population, while showing variation over the years, has been relatively stable through the period. Six of the populations are very small and fragmented (all with less than 100,000 acres of habitat likely used by Gunnison sage-grouse and less than 50 males counted on leks). The San Miguel population, the second largest, comprises six fragmented subpopulations. Gunnison sage-grouse are estimated to occupy only 10 percent of their historical range (Schroeder et al. 2004). Approximately 46 percent of their currently occupied habitat occurs on non-Federal lands in Colorado and Utah (CDOW 2005).

Threats to Gunnison sage-grouse within its occupied range include land conversion to agriculture, urban, or industrial uses; fire; invasive plants, particularly nonnative annual grasses; pinyon-juniper encroachment; water development; nonrenewable energy and mineral exploration and development; development of renewable energy sources such as wind and geothermal; fence construction and maintenance for livestock management; and drought. The magnitude of these threats prompted the Service to develop a proposed rule to list the Gunnison sage-grouse as an endangered species on January 11, 2013 (U.S. Fish and Wildlife Service 2013b). In addition, a proposed rule to designate critical habitat for the species was issued on the same date (U.S. Fish and Wildlife Service 2013c). Critical habitat is proposed for this species across seven units totaling approximately 1,704,227 ac in Chaffee, Delta, Dolores, Gunnison, Hinsdale, Mesa, Montrose, Ouray, Saguache, and San Miguel Counties in Colorado and in Grand and San Juan Counties in Utah.

F. Lesser prairie-chicken (*Tympanuchus pallidicinctus*)

The lesser prairie-chicken is a species of prairie grouse endemic to the southern high plains of the United States, commonly recognized for its feathered feet, stout build, ground-dwelling habit, and lek mating behavior. The lesser prairie-chicken is closely related and generally similar, although not identical in every aspect of behavior and life history, to other species of North American prairie grouse (e.g., greater prairie-chicken (*T. cupido pinnatus*), Attwater's prairie-chicken (*T. cupido attwateri*), sharp-tailed grouse (*T. phasianellus*), greater sage-grouse, and Gunnison sage-grouse). The lesser prairie-chicken is in the Phasianidae family and is recognized as a species separate from the greater prairie-chicken (Jones 1964). The lesser prairie-chicken was first described as a subspecies of the greater prairie-chicken (Ridgway 1873) but was later named a full species in 1885 (Ridgway 1885). The range of the species is contained within the action area.

Lesser prairie-chickens are polygynous and exhibit a lek mating system. The lek is a place where males traditionally gather to conduct a communal, competitive courtship display. Male lesser prairie-chickens gather to display on leks at dawn and dusk beginning as early as late January and continuing through mid-May (Copelin 1963; Crawford and Bolen 1976a), although fewer numbers of birds generally attend leks during the evening (Taylor and Guthery 1980a). Dominant, usually older, males occupy and defend territories near the center of the lek where most of the copulations occur, while younger males occupy the periphery and compete for central access (Sharpe 1968; Wiley 1974). A relatively small number of dominant males account for the majority of copulations at each lek (Sharpe 1968; Locke 1992). Young males are rarely successful in breeding due to the dominance by older males. The spring display period may extend into June (Hoffman 1963); however, Jones (1964) observed some courtship activity even during July in Oklahoma.

Male lesser prairie-chickens exhibit strong site fidelity (philopatry) to their display grounds (Campbell 1972). Such behavior is typical for most species of prairie grouse (e.g., greater prairie-chicken, lesser prairie-chicken, sharp-tailed grouse, greater sage-grouse, and Gunnison's sage-grouse) in North America (Schroeder and Robb 2003). Once a lek site is selected, males persistently return to that lek year after year and may remain faithful to that site for life. They often will continue to use these traditional areas even when the surrounding habitat has declined in value. Female lesser prairie-chickens, due to their tendency to nest within 1.5 mi of a lek (Giesen 1994a) also may display fidelity to nesting areas, but the degree of fidelity is not clearly established (Schroeder and Robb 2003). However, Haukos and Smith (1999) observed that female lesser prairie-chickens are more likely to visit older, traditionally used lek sites than temporary, nontraditional lek sites (those used for no more than two years). Temporary or satellite leks occasionally may be established during the breeding season and appear indicative of population fluctuations (e.g., an expanding population has more satellite leks than a declining population) (Haukos and Smith 1999) or habitat quality (Cannon and Knopf 1979). Lesser prairie-chicken satellite leks have been observed to form later in the breeding season and coincide with decreased attendance at the permanent leks (Haukos and Smith 1999). These satellite leks consisted primarily of birds that were unable to establish territories on the permanent leks (Haukos and Smith 1999). Locations of traditional, permanent lek sites also may change in response to disturbances (Crawford and Bolen 1976b; Cannon and Knopf 1979).

Because of this fidelity to breeding areas, prairie grouse may not immediately demonstrate a population response when faced with environmental change. Considering that landscapes and habitat suitability can change rapidly, strong site fidelity can result in a lag period between when a landscape degradation occurs and when a population response is observed (Gregory et al. 2011). In some birds exhibiting strong philopatry, Wiens et al. (1986) thought that the overall response to a particular habitat alteration might not become evident until after the most site-tenacious individuals had died. Delayed population responses have been observed in birds impacted by wind energy development (Stewart et al. 2007) and in greater sage-grouse impacted by oil and gas development (Doherty et al. 2010). Consequently, routine lek count surveys typically used to monitor prairie grouse may be slow in revealing impacts of environmental change (Gregory et al. 2011).

Leks are normally located on the tops of wind-swept ridges, exposed knolls, sparsely vegetated dunes, and similar features in areas having low vegetation height or bare soil and enhanced visibility of the surrounding area (Copelin 1963; Taylor and Guthery 1980a). The features associated with lek sites also may contribute to the transmission of sounds produced during lekking (Butler et al. 2010), and these sounds may aid females in locating lek sites (Hagen and Giesen 2005). Background noises are known to increase in landscapes altered by human development and may interfere with normal behavioral activities (Francis et al. 2009). Birds may be particularly vulnerable to elevated levels of background noise due to their reliance on acoustic communication, and elevated noise levels may negatively impact breeding in some birds particularly where acoustic cues are used during the reproductive process (Francis et al. 2009).

Areas that have been previously disturbed by humans, such as infrequently used roads, abandoned drilling pads, abandoned farmland, recently cultivated fields, and livestock watering sites also can be used as lek sites (Crawford and Bolen 1976b). However, ongoing human activity, such as presence of humans or noise, may discourage lekking by causing birds to flush and, in some instances, may cause lek sites to be abandoned (Hunt and Best 2004). Leks often are surrounded by taller, denser cover that is used for escape, thermal cover, and feeding cover. New leks can be formed opportunistically at any appropriate site within or adjacent to nesting habitat. Evidence of expanding lesser prairie-chicken populations tends to be demonstrated by increases in the number of active leks rather than by increases in the number of males displaying per lek (Cannon and Knopf 1981).

Females arrive at the lek in early spring after the males begin displaying, with peak hen attendance at leks typically occurring in early to mid-April (Copelin 1963; Hoffman 1963; Davis et al. 1979). Sounds produced by courting males serve to advertise the presence of the lek to females in proximity to the display ground (Robb and Schroeder 2005). Within one to two weeks of successful mating, the hen will select a nest site, normally within 0.6 - 2 mi of a lek (Copelin 1963; Giesen 1994a), construct a nest, and lay a clutch of 8 - 14 eggs (Copelin 1963; Hagen and Giesen 2005; Pitman et al. 2006a). Nesting is generally initiated in mid-April and concludes in late May (Copelin 1963; Merchant 1982). Hens most commonly lay one egg per day and initiate incubation once the clutch is complete (Hagen and Giesen 2005). Incubation lasts 24 to 27 days (Sutton 1968; Pitman et al. 2006a) with hatching generally peaking in late May through mid-June (Copelin 1963; Merchant 1982; Pitman et al. 2006a). Hens typically leave the nest within 24 hours after the first egg hatches (Hagen and Giesen 2005). Renesting may occur when the first attempt is unsuccessful (a successful nest is one in which at least one egg hatches) (Johnsgard 1973; Merchant 1982; Pitman et al. 2006a). Renesting is more likely when nest failure occurs early in the nesting season and becomes less common as the nesting season progresses (Pitman et al. 2006a). Clutches associated with renesting attempts tend to be smaller than clutches at first nesting (Fields 2004; Pitman et al. 2006a).

Nests generally consist of bowl-shaped depressions in the soil (Giesen 1998). Nests are lined with dried grasses, leaves, and feathers, and there is no evidence that nests are reused in subsequent years (Giesen 1998). Adequate herbaceous cover, including residual cover from the previous growing season, is an important factor influencing nest success, primarily by providing concealment of the nest (Riley et al. 1992; Giesen 1998). Young are precocial (mobile upon hatching) and nidifugous (typically leaving the nest within hours of hatching) (Coats 1955). Chicks are usually capable of short flights by 14 days of age (Hagen and Giesen 2005). Broods may remain with females for up to 18 weeks (Giesen 1998; Pitman et al. 2006c), but brood breakup generally occurs by September when the chicks are approximately 70 days of age (Taylor and Guthery 1980a). Males do not incubate the eggs, assist in chick rearing, or provide other forms of parental care (Wiley 1974). Nest success (proportion of nests that hatch at least one egg) varies, but averages about 30 percent (range 0 - 67 percent) (Hagen and Giesen 2005).

Availability of food and cover are key factors that affect chick and juvenile survival. Chick survival averaged only about 25 percent during the first 35 days following hatching (Hagen 2003). Survival for chicks between 35 days of age and the following spring was estimated to be

53.9 percent in southwestern Kansas (Hagen et al. 2009). Jamison (2000) estimated survival of chicks from hatching to early autumn (60 days post-hatching), using late summer brood sizes provided in several early studies, to be 27 percent in Kansas and 43 - 65 percent in Oklahoma. These values were considerably higher than the 19 percent he observed in his study and may reflect an inability in the earlier studies to account for the complete loss of broods and inclusion of mixed broods (combined broods from several females) when estimating brood size (Jamison 2000). Pitman et al. (2006b) estimated survival of chicks from hatching to 60 days post-hatching to be 17.7 percent. Recruitment was characterized as low with survival of juvenile birds from hatching to the start of the first breeding season the following year estimated to be only 12 percent (Pitman et al. 2006b), which may be a significant limiting factor in southwestern Kansas. However, the authors cautioned that these estimates might not be indicative of survival estimates in other areas due to low habitat quality, specifically poor distribution of nesting and brood-rearing habitats within the study area (Pitman et al. 2006b).

Lesser prairie-chicken home ranges vary both by sex and by season and may be influenced by a variety of factors. Males tend to have smaller home ranges than do females, with males generally remaining closer to the leks than females (Giesen 1998). In Colorado, Giesen (1998) observed that spring and summer home ranges for males were 512 ac and for females were 1,473 ac. In the spring, home ranges are fairly small when daily activity focuses on lekking and mating. Home ranges of nesting females in New Mexico varied, on average, from 21 - 227 ac (Merchant 1982; Riley et al. 1994). Jamison (2000) observed that home range size peaked in October as birds began feeding in recently harvested grain fields. Median home range size in October was 566 - 1,400 ac. In Texas, Taylor and Guthery (1980b) found that winter monthly home ranges for males could be as large as 4,806 ac and that subadults tended to have larger home ranges than did adults. More typically, winter ranges are more than 740 ac in size, and the size declines considerably by spring. Based on observations from New Mexico and Oklahoma, lesser prairie-chicken home ranges increase during periods of drought (Giesen 1998; Merchant 1982), possibly because of reduced food availability and cover. Davis (2005) found that the combined home range of all lesser prairie-chickens at a single lek is about 19 square miles (sq mi) or 12,100 ac.

Many grouse species are known to be relatively poor dispersers and normally move less than 25 mi (Braun et al. 1994). Dispersal helps maintain healthy, robust populations by contributing to population expansion, recolonization, and gene flow (Sutherland et al. 2000). In lesser prairie-chickens, most movements within a given season are less than 6.2 mi, but Jamison (2000) thought that movements as large as 27.3 mi might occur in fragmented landscapes. Recent studies of lesser prairie-chickens in Kansas demonstrated some birds may move as much as 31 mi from their point of capture (Hagen et al. 2004). Although recorded dispersal movements indicate that lesser prairie-chickens are obviously physically capable of longer distance dispersal movements, these longer movements appear to be infrequent. Jamison (2000) recorded only 2 of 76 tagged male lesser prairie-chickens left the 14,233 ac primary study area over a 3-year period. He thought that site fidelity rather than habitat was more important in influencing movements of male lesser prairie-chickens (Jamison 2000). Environmental factors also may influence dispersal patterns, particularly in fragmented landscapes where predation rates may be higher and habitat suitability may be reduced in smaller sized parcels. Lesser prairie-chickens appear to be sensitive to the size of habitat fragments and may avoid using parcels below a preferred size regardless of habitat type or quality. As the landscape becomes more fragmented, longer dispersal distances over areas of unsuitable habitats may be required.

Lesser prairie-chickens forage during the day, usually during the early morning and late afternoon, and roost at night (Jones 1964). Diet of the lesser prairie-chicken is very diverse, primarily consisting of insects, seeds, leaves, and buds and varies by age, location, and season (Giesen 1998). They forage on the ground and within the vegetation layer and are known to consume a variety of invertebrate and plant materials. For example, in New Mexico, Smith (1979) documented 30 different kinds of food items consumed by lesser prairie-chickens. In Texas, Crawford and Bolen (1976c) identified 23 different plants in the lesser prairie-chicken diet. Jones (1963a, pp. 765 - 766), in the sand sagebrush *(Artemesia filifolia)* dominated grasslands of Oklahoma, recorded 16 different plant species eaten by lesser prairie-chickens. Because lesser prairie-chicken diets vary considerably by age, season, and habitat type and quality, habitat alteration can influence availability of certain foods. While not as critical for adults, presence of forbs and associated insect populations can be very important for proper growth and development of chicks and poults. Generally, chicks and young juveniles tend to forage almost exclusively on insects, such as grasshoppers and beetles, and other animal matter while adults tend to consume a higher percentage of vegetative material (Giesen 1998). The majority of the published diet studies have been conducted in the southwestern portions of the historical range where the shinnery oak (*Quercus havardii*) dominated grasslands are prevalent. Throughout their range, lesser prairie-chickens will use cultivated grains such as grain sorghum (*Sorghum vulgare*) and corn (*Zea mays*) during the fall and winter months if they are available (Campbell 1972; Crawford and Bolen 1976c). However, lesser prairie chickens tend to predominantly rely on cultivated grains when production of natural foods, such as acorns and grass and forb seeds are deficient (Copelin 1963; Ahlborn 1980).

Prior to the description by Ridgeway in 1885, most observers did not differentiate between the lesser and greater prairie-chicken. Consequently, estimating historical abundance and occupied range is difficult. Historically, the lesser prairie-chicken is known to have occupied native rangeland in portions of southeastern Colorado (Giesen 1994b), southwestern Kansas (Schwilling 1955), western Oklahoma (Duck and Fletcher 1944), the Texas panhandle (Henika 1940), and eastern New Mexico (Ligon 1927). Johnsgard (2002) estimated the maximum historical range of the lesser prairie-chicken to have encompassed some 100,000 - 150,000 mi^2, with about two-thirds of the historical range occurring in Texas. Taylor and Guthery (1980a) estimated that, by the 1880's, the area occupied by lesser prairie-chicken was about 138,225 mi^2, and' by 1969, they estimated the occupied range had declined to roughly 48,263 mi^2 due to widespread conversion of native prairie to cultivated cropland. Taylor and Cuthery (1980a) estimated that, by 1980, the occupied range encompassed only 10,541 mi^2, representing a 90 - 93 percent reduction in occupied range since pre-European settlement and a 92 percent reduction in the occupied range since the 1880s.

In 2007, cooperative mapping efforts by species experts from the Colorado Parks and Wildlife Department, Kansas Department of Wildlife, Parks and Tourism, New Mexico Department of Game and Fish, Oklahoma Department of Wildlife Conservation, and Texas Parks and Wildlife Department, in cooperation with the Playa Lakes Joint Venture, resulted in a revised estimate of the maximum historical and occupied ranges for the lesser prairie chicken. The agencies determined the maximum occupied range, prior to European settlement, to have been approximately 180,309 mi^2 (Playa Lakes Joint Venture 2007). The same mapping effort determined that currently occupied range for the lesser prairie-chicken in the aforementioned states was approximately 27,259 mi^2, a reduction of 84 percent since pre-European settlement.

Major factors influencing the loss of occupied habitat for the lesser prairie-chicken are conversion of native rangeland habitat to cropland or non-native pastures; degradation of native rangeland habitat due to overutilization by domestic livestock, fire suppression, and tree encroachment; fragmentation of habitat due to nonrenewable energy and mineral exploration and development, development of renewable energy sources such as wind and geothermal, and road and powerline construction; collisions caused by anthropomorphic structures such as fences and powerlines; and drought. The conversion of native sand sagebrush and shinnery oak rangelands to improved pastures and cropland has been documented as an important factor in the decline of the lesser prairie-chicken (U.S. Fish and Wildlife Service 2012a). A mixture of heavily, moderately, lightly grazed, and ungrazed native rangelands are all essential components of lesser prairie-chicken habitat and should occur in a mosaic pattern on a landscape scale. However, in most areas, an insufficient amount of lightly grazed or ungrazed habitat is available to support successful lesser prairie-chicken nesting. Overutilization of rangeland by livestock, to a degree that leaves less than adequate residual cover remaining in the spring, is considered detrimental to lesser prairie-chicken populations because grass height is reduced below that necessary for nesting cover and desirable food plants are markedly reduced. Moreover, fragmentation of existing habitat due to a combination of the factors mentioned above serves to exacerbate the effects of improper range management practices. The magnitude and pervasiveness of these threats prompted the Service to develop a proposed rule to list the lesser prairie-chicken as a threatened species on December 11, 2012 (U.S. Fish and Wildlife Service 2012a). No critical habitat has been proposed or designated for this species.

G. Northern aplomado falcon (*Falco femoralis septenrionalis*)

The northern aplomado falcon is one of three subspecies of the aplomado falcon and is the only subspecies recorded in the United States. This subspecies was listed by the Service as an endangered species on February 25, 1986 (U.S. Fish and Wildlife Service 1986). No critical habitat has been proposed or designated for this species. It once extended from Trans-Pecos Texas, southern New Mexico and southeastern Arizona, to Chiapas and the northern Yucatan along the Gulf of Mexico and along the Pacific slope of Central America north of Nicaragua (U.S. Fish and Wildlife Service 1990). Northern aplomado falcons were fairly common in suitable habitat throughout these areas until the 1940s. However, they subsequently declined rapidly and became extirpated from the United States after 1952. The last documented nesting pair of wild northern aplomado falcons in the United States was in Luna County, New Mexico, in 1952.

The decline of the northern aplomado falcon was caused by widespread shrub encroachment resulting from control of range fires and intense overgrazing (U.S. Fish and Wildlife Service 1986, Burnham et al. 2002), and large-scale agricultural development in grassland habitats used by the northern aplomado falcon (Heady 1994, Keddy-Hector 2000). Pesticide exposure was likely a significant cause of the subspecies' extirpation from the United States with the initiation of widespread use of organochlorine pesticides, such as DDT (dichlorodiphenyltrichloroethane) and DDE (dichlorodiphenyldichloroethylene), after World War II, which coincided with the northern aplomado falcon's disappearance (U.S. Fish and Wildlife Service 1986). Northern aplomado falcons in Mexico in the 1950s were heavily contaminated with DDT residue, and these levels caused a 25 percent decrease in eggshell thickness (Kiff *et al.* 1980). Such high residue levels can often result in reproductive failure from egg breakage (U.S. Fish and Wildlife Service 1990). Use of organophosphate insecticides may also threaten northern aplomado falcons because insects and small, insectivorous birds are the species' preferred prey items (Keddy-Hector 2000). Collection of northern aplomado falcons and their eggs may have also been detrimental to the subspecies in some localities. However, populations of birds of prey are generally resilient to localized collection pressure (U.S. Fish and Wildlife Service 1990).

Little is known about the migratory behavior or seasonal movements of northern aplomado falcons (U.S. Fish and Wildlife Service 1990). Nesting chronology is somewhat variable with egg-laying recorded from January to September, although eggs are usually laid during the months of March to May. Northern aplomado falcons do not build their own nests, but use nest sites constructed by corvids such as Chihuahuan ravens (*Corvus cryptoleucus*) or by large raptors. Thus, northern aplomado falcons are dependent on nesting activities of other stick nest-building birds and their habitat requirements. Nest sites are found in structures such as multi-stemmed yuccas (*Yucca torreyi* and *Yucca elata*) and large mesquite trees (*Prosopis* spp.) as well as other trees.

Northern aplomado falcons feed on a variety of prey, including birds, insects, rodents, small snakes, and lizards. Ligon (1961) suggested that the food habits of northern aplomado falcons "consisted almost wholly of small reptiles, lizards, mice, other rodents, grasshoppers, and various other kinds of insects, rarely small birds except in winter when other food is lacking." Therefore, in winter, factors affecting habitat suitability for migratory bird species may also affect the suitability of the habitat for northern aplomado falcons which in turn can affect the potential for survival of northern aplomado falcons (U.S. Fish and Wildlife Service 2002). In eastern Mexico, small birds accounted for 97 percent of total prey biomass, but insects represented 65 percent of prey individuals (Hector 1985). In one study, 82 bird species were found in prey remains; of these, the most common were meadowlarks (*Sturnella* spp.), common nighthawks (*Chordeiles minor*), northern mockingbirds (*Mimus polyglottos*), western kingbirds (*Tyrannus verticalis*), brownheadedcowbirds (*Molothrus ater*), Scott's oriole (*Icterus parisorum*), mourning doves (*Zenaida macroura*), cactus wrens (*Campylorhynchus brunneicapillus*), and pyrrhuloxia (*Cardinalis sinuatus*), suggesting a preference for medium-sized songbirds (U.S. Fish and Wildlife Service 2002). Documented invertebrate prey includes grasshoppers, beetles, dragonflies, cicadas, crickets, butterflies, moths, wasps, and bees (U.S. Fish and Wildlife Service 1990). Differences in prey abundance and nest site availability can cause differences in home range size. Based on several studies, the Service estimates the northern aplomado falcon home range size to be approximately 8,400 acres (U.S. Fish and Wildlife Service 1990, 2002). For management purposes, this area can be described by a circle with a radius of 2 miles around a particular habitat feature (e.g., a nest site).

Northern aplomado falcon habitat is variable throughout its range and includes palm and oak savannahs, various desert grassland associations, and open pine woodlands. Within these variations, the essential habitat elements appear to be open terrain with scattered trees, relatively low ground cover, an abundance of insects and small to medium-sized birds, and a supply of nest sites (U.S. Fish and Wildlife Service 1990). In Mexico, reported habitat includes palm and oak savannas, open tropical deciduous woodlands, wooded fringes of extensive marshes, various desert grassland associations, and upland pine parklands (U.S. Fish and Wildlife Service 1990). The historical range of the northern aplomado falcon in Texas, New Mexico and Arizona occurs within the Chihuahuan Desert, which is comprised of three basic community types: desert scrub, desert grasslands, and woodlands. The species' historical range also occurs in the coastal prairies of southern Texas.

Northern aplomado falcons are primarily associated with open grasslands that include scattered mesquite and/or yuccas, although small patches of scrub and woodlands may be used (U.S. Fish and Wildlife Service 2006a). Existing data suggest that the ecological status of Chihuahuan Desert grasslands currently occupied by northern aplomado falcons is high seral to potential natural community or climax with significant basal cover of grass species. Montoya et al. (1997) reported the occupied nesting habitat as having basal ground cover ranging from 29–70 percent with a mean of 46 percent. Woody plant density ranged from 5–56 plants per acre with a mean of 31 plants per acre. Dominant woody plant species, comprising 74 percent of this community, were Mormon tea (*Ephedra viridis*), soaptree yucca (*Yucca elata*), sacahuista (*Nolina microcarpa*), mesquite, senecio (*Senecio* spp.), creosotebush (*Larrea tridentata*), and baccharis (*Baccharis* spp.). Site-specific habitat assessments should be conducted to further define whether the site of a given project or activity occurs within suitable habitat for this species.

In recent times, the intense overgrazing that resulted in shrub encroachment into grasslands has moderated, and improved range management techniques have been developed, including decreased stocking rates, stock rotation, prescribed burning, and other brush control methods (Archer 1994, Heady 1994, Burnham et al. 2002). Furthermore, the use of DDT was banned in the United States in 1972 and in Mexico in 2000. Present threats to the northern aplomado falcon including long-term drought and continued replacement of grassland communities with shrubs in Chihuahuan Desert grasslands. Additionally, large-scale conversion of grasslands to agriculture and the increased presence of the great horned owl (*Bubo virginianus*), which preys upon the northern aplomado falcon, may be limiting recovery of this subspecies (Macías-Duarte et al. 2004, U.S. Fish and Wildlife Service 2006b). In contrast to these current threats, northern aplomado falcons appear to be relatively tolerant of human presence. They have been observed to tolerate approach to within 100 m (328 ft) of their nests by researchers, have nested within 100 m (328 ft) of highways in eastern Mexico (Keddy-Hector 2000), and are frequently found nesting in association with well-managed livestock grazing operations in Mexico and Texas (Burnham et al. 2002). Burnham et al. (2002) concluded that northern aplomado falcons would be able to coexist with most current land-use practices in the United States on the broad scale. A recovery plan for the northern aplomado falcon was finalized by the Service in 1990 (U.S. Fish and Wildlife Service 1990). The objective of the Aplomado Falcon Recovery Plan is to ensure that the northern aplomado falcon is no longer threatened by habitat loss, pesticide contamination, or human persecution. Implementation of the steps outlined in the Aplomado Falcon Recovery Plan could lead to downlisting the northern aplomado falcon from endangered to threatened by 2030.

To address reestablishment of northern aplomado falcons in the United States, reintroduction of nestling northern aplomado falcons was identified by the Aplomado Falcon Recovery Plan as a recommended methodology. To further aid reestablishment, reintroduction sites are carefully selected to optimize habitat suitability. Northern aplomado falcon reintroductions have been ongoing in southern Texas since 1985 on National Wildlife Refuges and private land under Safe Harbor Agreements. Consequently, by 2005, reintroductions had resulted in at least 44 pairs of northern aplomado falcons in southern Texas and adjacent Tamaulipas, Mexico, where no pairs had been recorded since 1942 (Jenny et al. 2004). The first nesting pair of northern aplomado falcons in south Texas subsequent to releases did not occur until 1995; however, by 2005, the Texas pairs had successfully fledged more than 244 young (Juergens and Heinrich 2005). In 2008, The Peregrine Fund found that 31 out of 38 territories surveyed in southern Texas were occupied (The Peregrine Fund 2009). There are likely more breeding pairs present in this area than what has been documented, considering areas of habitat that are inaccessible for surveys. Reintroduction of captive-bred northern aplomado falcons began in west Texas in 2002. The Peregrine Fund reported up to 10 breeding pairs were found in west Texas in 2009, including pairs that successfully reproduced (Heinrich 2010).

Reintroduction of captive-bred northern aplomado falcons began in New Mexico with the release of 11 birds in 2006 on the privately-owned Armendaris Ranch near Truth or Consequences. In 2007, a pair of northern aplomado falcons from the first year of reintroductions produced two fledglings on the ranch. In 2007, a total of 41 birds were released in New Mexico on private, state, Bureau of Land Management, and Department of Defense lands. Releases are planned to continue through 2015 with up to 150 northern aplomado falcons released in New Mexico each year.

To date, 686 young falcons have been released in west Texas and 305 falcons in southern New Mexico in unfragmented native grasslands on private, State, and federally-managed areas. Northern aplomado falcons in New Mexico and Arizona are included in a NEP designation under Section 10(j) of the ESA (U.S. Fish and Wildlife Service 2006a). When NEPs are located outside a National Wildlife Refuge or unit of National Parks, they are treated as proposed for listing and only two provisions of Section 7 apply: Section 7(a)(1) and Section 7(a)(4). Section 7(a)(4) requires Federal agencies to confer, rather than consult, with the Service on actions that are likely to jeopardize the continued existence of a proposed species. The results of a conference are advisory in nature and do not restrict agencies from carrying out, funding, or authorizing activities. Northern aplomado falcons have been reintroduced in Texas on private lands using Safe Harbor Agreements, and their regulatory status under the ESA is endangered. Therefore, Section 7(o)(2) consultation by Federal agencies applies to aplomado falcons in Texas.

Currently, there are approximately 36 aplomado falcon pairs in the United States, which constitute less than two-thirds of the minimum number of 60 self-sustaining breeding pairs in suitable parts of the southwestern United States recommended by the 1990 Recovery Plan for reclassification of the subspecies to threatened status. The great majority of these breeding pairs currently occur outside the action area of this project in south Texas due to higher prey availability in the coastal region. Over the course of this 15-year project, the Service expects more breeding pairs to establish in New Mexico and west Texas.

Formal surveys and reliable sightings submitted to the Service show that a small number of northern aplomado falcons have been sighted in the United States during every decade since the 1960s (U.S. Fish and Wildlife Service 2006a). In addition, a resident pair of northern aplomado falcons in Luna County, New Mexico, bred successfully in 2002, fledging three young. These were the first known northern aplomado falcons produced in either New Mexico or Arizona since the subspecies' extirpation as a breeding species in the 1950s. Another pair was reported near this site in 2002, but no nest was located and only one of the pair was present 2 days later (Meyer and Williams 2005). The 2002 nest represented the first successful reproduction by naturally occurring northern aplomado falcons in the United States in 50 years. Meyer and Williams (2005) reported at least eight individual northern aplomado falcons in Luna County between 2000 and 2004. The species occurred historically in Hidalgo County, and there have been five reports of northern aplomado falcons in or near the Animas Valley from the 1990s through the early 2000s (Meyer and Williams 2005).

The action area for this consultation includes the historic range of the black-tailed prairie dog in the United States. The northern aplomado falcon is currently found in Texas and New Mexico. Therefore, the portion of the action area of concern for the northern aplomado falcon includes only New Mexico and Texas where the range of this species coincides with the historic range of the black-tailed prairie dog in the United States.

Northern aplomado falcons in New Mexico were designated a 10(j) NEP to encourage landowners to support the reintroduction of northern aplomado falcons in the state. Several landowners have supported reintroduction and manage the introduction areas to promote northern aplomado falcons. Under the 10(j) rule, northern aplomado falcons do not have incidental take restrictions on private lands. In Texas, private landowners that have allowed releases of northern aplomado falcons on their property are party to a Safe Harbor Agreement (U.S. Fish and Wildlife Service 1996 and 2000a) that covers the entire area within 30 miles of each release site. Under the Safe Harbor Agreement program, participating landowners are permitted to take northern aplomado falcons incidental to future lawful land-use actions (such as prairie dog control), provided that the landowner maintains any established baseline responsibilities (U.S. Fish and Wildlife Service 2000b). All northern aplomado falcon release sites and all recorded nests and northern aplomado falcon pairs within the action area in Texas occur on lands covered by the Safe Harbor Agreement (Montoya 2011, personal communication).

The loss of or physical degradation of conditions in occupied habitat or in potential reintroduction sites would compromise the reintroduction program and recovery of the northern aplomado falcon. While the NEP in New Mexico and Arizona is not necessary for the continued survival of the species, it provides the benefit of an additional population in the event of a catastrophic loss of populations in Texas. Sources of loss and degradation of nesting and roosting sites may include land use and human activities. The activities described below are common sources of stressors that affect the conservation of the northern aplomado falcon.

1. Land Use

Land use activities affect the distribution, density, and species composition of the native vegetation communities on the landscape. Land clearing (including for facilities, roads, trails and utility corridors) eliminates the vegetation, livestock grazing reduces the biomass of desired species and promotes others (that may have differing densities on the ground as well), ground or surface water depletion eliminates riparian and marsh vegetation communities, and erosion can eliminate plants along the paths of gullies.

2. Livestock Grazing

There has been considerable literature produced on the effects of livestock grazing on natural vegetation communities in the desert Southwest. Desert shrublands, grasslands, and woodlands in arid areas face certain threats from any land use that affects the surface and vegetation community.

Currently, the intense overgrazing that resulted in shrub encroachment in the Chihuahuan Desert grasslands in New Mexico and Arizona has moderated, and improved range management techniques have been developed and implemented, including decreased stocking rates and stock rotation. Techniques to increase the incidence of beneficial fire, to restore and increase vegetative productivity, to control erosion, and to suppress brush encroachment have been widely implemented in this planning unit. Among these are managed fire (including prescribed burns), various types of erosion control structures, and various types of brush control measures (Archer 1994, Heady 1994, Burnham et al. 2002). In addition, livestock management on Federal lands must now also consider other public resources. Within this planning unit, many private landowners and public land managers maintain well-managed livestock grazing programs that are compatible with northern aplomado falcon nesting and roosting and maintenance of reintroduction habitat suitability.

3. Road Construction, Maintenance, and Use

Construction and maintenance of access roads has a significant effect on the landscape. Roads and trails provide for foot or vehicle access to the landscape for a variety of purposes that often have other effects on soils, water features, vegetation communities, and wildlife.

4. Communications Towers and Power Lines

Although the effect of communication towers and power lines on the northern aplomado falcon is not well documented, these structures can have an adverse effect on bird species in general, and raptors in particular, due to collision or electrocution. Although birds can collide with any part of a communication tower, causing injury or death, they are most likely to collide with unmarked guy wires, which can be difficult to see. Northern aplomado falcons may also collide with power lines, especially if the power lines are unmarked. Power lines that are uninsulated may electrocute northern aplomado falcons if they try to use them to perch on or collide with them. Northern aplomado falcons may be particularly vulnerable to collision with such objects as they tend to "engage in high-speed, low-level, reckless pursuits of swift avian prey" (Keddy-Hector 2000).

5. Organochlorine and Organophosphate Pesticide Contamination

In the past, organochlorine compounds (DDE/DDT) were heavily used in pesticide applications in the agricultural areas surrounding northern aplomado falcon habitat in south Texas. It is unclear to what degree residual chemicals may still be present in the species' prey base, although some evidence indicates that this may be a lingering threat (Mora et al. 1997, Keddy-Hector 2000). In addition, organophosphate insecticides may threaten the species through adverse effects on its primary prey base of insects and small insectivorous birds, particularly in agricultural areas of south Texas.

H. Sprague's pipit (*Anthus spragueii*)

Sprague's pipits are grassland specialists endemic to the mixed-grass prairie in the northern Great Plains of North America (Robbins and Dale 1999). With the exception of breeding habitat in Alberta, Saskatchewan, and Manitoba and wintering habitat in Louisiana, southern Texas, and Mexico, the range of the species is contained within the action area.

The Sprague's pipit is a passerine about 5.5 inches (in) in length (range 4–7 in). The wings and tail are dark brown with two pale indistinct wing-bars and mostly white outer retrices, the crown, nape and upperparts are buffy with blackish streaking and the face is buffy with a pale eye-ring creating a large-eyed appearance. The underparts are whitish, the breast has fine blackish streaks, and the breast and flanks are often faintly washed with buff. The bill is relatively slender, short, and straight, with a blackish upper mandible and a pale lower mandible with a blackish tip. The tarsi are yellow to pale pinkish brown and are relatively long with an elongated hind claw (Pyle 1997a, 1997b).

Sprague's pipit breeding territories are used for both nesting and feeding. These territories are presumably established and maintained through the aerial display. Occasionally, territorial males interrupt aerial displays and give chase to other presumed males that pass through the territory (Robbins and Dale 1999). Mapping of territory boundaries in 2007 indicated pipit territories rarely crossed trails (Dale et al. 2009); territories were reported as 6.2 ac (Davis and Fisher 2009). In North Dakota, males were not uniformly distributed; all territories were located in elevated areas with short grass and relatively low sedge and forb densities (Robbins 1998).

Sprague's pipits typically forage alone throughout the day in all seasons. They walk or run while gleaning food from the ground surface or grasses, typically in grass that is several inches tall (Robbins and Dale 1999). The diet of Sprague's pipits during the breeding season is almost entirely comprised of arthropods with a small amount of vegetable matter (Robbins and Dale 1999). Sprague's pipits feed primarily on arthropods during migration and on wintering grounds, with the addition of seeds during the late winter (Emlen 1972, Robbins and Dale 1999).

Sprague's pipits are closely associated with native grassland throughout their range (Madden et al. 2000, Grant et al. 2004) and are less abundant (or absent) in areas of introduced grasses than in areas of native prairie (Kantrud 1981, Johnson and Schwartz 1993, Dale et al. 1997, Madden et al. 2000, Grant et al. 2004). Generally, pipits prefer to breed in well-drained native grasslands with high plant species richness and diversity. They prefer higher grass and sedge cover, less bare ground, and an intermediate average grass height when compared to the surrounding landscape, < 5–20 percent shrub and brush cover, no trees at the territory scale, and litter cover < 5 in (Sutter 1996, Madden et al. 2000, Dechant et al. 2003, Dieni and Jones 2003, Grant et al. 2004). The amount of residual vegetation remaining from the previous years' growth also appears to be a strong positive predictor of Sprague's pipit occurrence (Sutter 1996, Sutter and Brigham 1998) and where they place their nests (Dieni and Jones 2003, Davis 2005).

Sprague's pipits prefer breeding sites in grasslands with a range of vegetative structure, which may vary geographically. In native pastureland in Saskatchewan, Sprague's Pipits occurred more frequently in areas with < 10 percent bare soil and < 10 percent clubmoss (*Selaginella densa*; Davis et al. 1999). In Montana, nest abundance was positively associated in sites with ≤ 22% clubmoss cover and dominated by native grass (*Stipa, Bouteloua*, *Koeleria*, and *Schizachyrium* spp.); abundance was negatively associated with prickly pear cactus (*Opuntia* spp.) cover, and density of low-growing shrubs (Dieni and Jones 2003). In North Dakota, Sprague's pipits were negatively impacted by increasing tall shrub (> 40 in) and brush (< 40 in) cover and increasing litter depth > 5 in (Grant et al. 2004). They had a negative reaction to tall shrub cover in the landscape and, with other grassland endemics, preferred areas with < 20 percent shrubs; however, they were not woodland-sensitive at the landscape scale but were negatively associated with trees at the territory scale (Grant et al. 2004).

Sprague's pipits rarely occur in cultivated lands, and are uncommon on non-native planted pasturelands (Owens and Myres 1973, Sutter 1996, Davis et al. 1999, McMaster and Davis 2001). They have not been documented to nest in cropland (Owens and Myres 1973, Koper et al. 2009), in land in the Conservation Reserve Program (Higgins et al. 2002) or in dense nesting cover planted for waterfowl habitat (Prescott 1997). However, territorial displays have been recorded in non-native grasslands where the structure of the vegetation was similar to that of native vegetation (Dale et al. 1997, Sutter and Brigham 1998, Davis et al. 1999, Higgins et al. 2002). In Saskatchewan, Sprague's pipits have been documented nesting in non-native hayfields at Last Mountain Lake National Wildlife Area (Dale 1983); conversely, they were not associated with hayfields in the Missouri Coteau (Dechant et al. 2003).

In Montana, Sprague's pipit nest sites were in grasslands primarily with native grasses of intermediate height and density, with little bare ground or clubmoss and few shrubs, and in nest patches with greater litter cover and depth, while avoiding areas with prickly pear cactus cover (Dieni and Jones 2003). They tended to nest in patches that had little or no clubmoss cover, nor was clubmoss ever used as a nesting substrate (Dieni and Jones 2003). These nest site data were consistent with findings reported from Saskatchewan (Sutter 1997), except there was no evidence of selection against forb cover (Dieni and Jones 2003). Selection for vertical habitat characteristics by this species appears to be occurring at the scale of the nest site rather than the nest (Dieni and Jones 2003, Grant et al. 2004). In Saskatchewan, nest sites were most abundant in areas with intermediate cover values, higher grass and sedge cover, higher maximum height, lower forb and shrub cover, lower bare ground cover, and lower forb density than random sites (Davis et al. 1999).

Migration habitats are poorly known. Where pipits have been seen during migration, the habitats used are similar to those documented on the breeding and wintering grounds, including pastures, prairie-dog (*Cynomys* spp.) towns, fallow cropland, and short-, mixed- and heavily grazed tall-grass prairies (Thompson and Ely 1992).

Winter habitats are similar to breeding habitats; i.e., large grasslands areas that may or may not primarily consist of native grass (Dieni et al. 2003, Desmond et al. 2005). In southern Texas, Sprague's
Pipits were located almost exclusively in grass-forb prairie, and rarely in shrub grassland (Emlen 1972). In Arizona and New Mexico they are found in extensive areas of well-developed desert grasslands (Merola-Zwartjes 2005). In Texas, Sprague's Pipits winter in heavily grazed grasslands dominated by little bluestem (*Schizachyrium scoparium*) and *Andropogon* spp, and in large, over-grazed pastures (Grzybowski 1982); they are often found in patches where the grass is very short (Freeman 1999).

Sprague's pipits are likely influenced by the size of grassland patches and the amount of grassland in the landscape (Davis 2004). In southern Saskatchewan, Davis (2004) found that abundance was influenced by the size and configuration of suitable grassland patches and the amount of grassland in the landscape. Pipits also had a 50 percent probability of occurring on patches ≥ 358 ac; pipits were absent from grassland patches < 72 ac (Davis 2004). A smaller edge:area ratio had higher pipit abundances, and was an important predictor of their occurrence (Davis 2004). No consistent effect of patch size was found on nest success (Winter et al. 2006).

Breeding Bird Survey (BBS) data show Sprague's pipit populations experiencing a statistically significant rangewide decline of 3.9 percent per year (1967–2007; Sauer et al. 2008). The most dramatic population decreases occurred in Canada—6.0 percent per year between 1966 and 1996 (Sauer et al. 2008). On a continental scale, most areas show declining populations over the past 30 years, with non-significant increases occurring only in the southwestern portion of the breeding range (Sauer et al. 2008). Population monitoring for the species is complicated by their nomadic behavior in response to annual weather conditions (Jones et al. 2007).

Using Breeding Bird Survey (BBS) data, a global population estimate of 870,000 Sprague's pipits was derived (Sauer et al. 2003); however, this was calculated using a standard set of assumptions and calculations (Rosenberg 2004) that are unverified with the existing data and is a rough estimate with unknown, but potentially large, error. Similarly, populations have been estimated for the sub-regions of the U.S. states and Canadian provinces (Blancher et al. 2007). These estimates range from 400,000 (47.9 percent of the global population) in Alberta to 3000 (0.3 percent of the global population) in South Dakota (Blancher et al. 2007).

Christmas Bird Count (CBC) data show that the highest wintering densities of Sprague's Pipits are recorded in northcentral Texas (Sauer et al. 2008). Grzybowski (1982) described the highest numbers in the central coastal prairie region of Texas and the highest numbers reported on a CBC route was 196 individuals at Corpus Christi in the winter of 1966–1967. The small numbers of individual pipits on the CBC in southern Oklahoma and northern Texas may be due in part to the sometimes slow migration these birds exhibit during the dates of the CBC period. The largest wintering populations in the United States were in coastal shortgrass prairie in southern Texas; however, since abundance data is largely lacking from Mexico, it is unknown how much of the population generally winters in Mexico.

The range for Sprague's pipits in the United States has contracted notably on its periphery. Changes and declines in abundance have contracted the range west and north in North Dakota and Minnesota and to the north in Montana. Data on South Dakota are inconclusive. As he traveled near present-day Lostwood National Wildlife Refuge (NWR) in northwestern North Dakota in 1873, Elliot Coues remarked on the "...trio of the commonest birds…" encountered: Baird's sparrow (*Ammodramus bairdii*), Sprague's pipits, and Chestnut-collared longspur (*Calcarius ornatus*), stating "…Sprague's pipits were sometimes so numerous that the air seemed full of them..." (Coues 1878, Madden et al. 1999). After fewer than 100 years of settlement and agricultural development, Sprague's pipits in North Dakota have declined to the point that they are no longer among the 15 most common birds and are currently absent in the easternmost counties (Stewart 1975). In Montana, there have been no breeding records in the southern and south-central counties since 1991 or earlier (Lenard et al. 2003). In South Dakota, pipits are absent in the eastern portion of the state and considered a rare and local summer resident (Tallman et al. 2002). The only breeding records are a nest found in 1907 and fledglings in 1996 (Tallman et al. 2002). Sprague's pipits may always have been local and uncommon breeders in South Dakota, but historical data is lacking.

Anecdotal accounts from early naturalists suggest that Sprague's pipits were one of the most common grassland songbirds in the northern Great Plains. Since its discovery, the Sprague's pipit has suffered greatly throughout its breeding range from conversion of short- and mid-grass prairie to agriculture by Euro-Americans. There have been dramatic declines in pipits as prairie has disappeared through cultivation, overgrazing, and invasion by exotic plants (Prescott and Davis 1998). Habitat loss, degradation, and fragmentation, inappropriate management, nest predation and parasitism, energy development, climate change, and drought are threats that currently or potentially effect Sprague's pipit populations throughout their range (Jones 2010). The magnitude of these threats prompted the Service to designate the Sprague's pipit as a candidate for listing as a threatened species on September 14, 2010 (U.S. Fish and Wildlife Service 2010b). No critical habitat has been proposed or designated for this species.

III. Effects of the Action

A. Black-footed Ferret Reintroduction

Under the proposed action, black-footed ferret reintroductions would be carried out on the enrolled lands as described in Section I above and in the Agreement (Appendix B). During ferret reintroductions and monitoring, some mortality may result from transporting and handling of ferrets. While occasional ferret deaths due to handling have occurred at some ferret release sites, the use of the handling protocol outlined in Roelle et al. (2006) would minimize losses. To date, less than 0.5 percent of the more than 2,700 ferrets reintroduced have perished from transporting and handling (Gober pers. comm., 2012). Incidental take of reintroduced black-footed ferrets could occur through vehicle or equipment collisions. While such rare incidents have been documented, the likelihood of vehicle collisions is low due to the nocturnal habits of the ferrets.

Black-footed ferret survival rates 30 days after release range from 10.1 percent, for early reintroduction efforts, to 45.5 percent, for more recent reintroduction efforts that pre-conditioned ferrets prior to their release (Biggins et al. 2004). Relatively low survival rates among reintroduced ferrets are principally due to predation and other natural causes. Captive-raised ferrets have not been exposed to the same environmental factors and therefore have not developed the same resiliency as wild ferrets. Furthermore, captive-raised ferrets may not have had sufficient experience in hunting for prey or avoiding predators. According to studies at Meeteetse, Wyoming, in the 1980s, natural mortality of ferrets in the wild is high. Data presented by Forrest et al. (1988) was used for computer simulation modeling that indicated juvenile mortality rate of a stable wild population up to approximately 78.5 percent. Juvenile mortality of captive-raised ferrets is likely to be higher for the reasons stated above. However, despite the low survival rates for reintroduced ferrets, it only takes a few ferrets to establish a wild population as documented at successful ferret reintroduction sites.

Additional occurrences or expansions of black-footed ferret populations from the proposed reintroductions under this alternative are not expected to have adverse impacts on California condors, greater sage-grouse, Gunnison sage-grouse, lesser prairie chicken, or Sprague's pipit because ferrets do not prey on or compete with these species for prey. While some dietary overlap between ferrets and northern aplomado falcons is possible, it is quite unlikely; the diet of the ferret typically consists of ≥ 90% prairie dogs (Campbell et al. 1987, Sheets et al. 1972), and northern aplomado falcons predominantly prey on medium-sized birds and insects (U.S. Fish and Wildlife Service 1990). Additionally, with the exception of lek sites for greater sage-grouse, Gunnison sage-grouse, and lesser prairie-chicken that may occur on prairie dog colonies, in many instances there is minimal overlap in the ferret's range with these species. Additional occurrences or expansions of ferret populations are also not expected to affect any proposed critical habitat for the Gunnison sage-grouse, as the primary constituent elements of these areas will not be changed as a result of ferret colonization.

Although ferrets rely primarily on prairie dogs for food, the proposed action would not significantly impact the Gunnison's prairie dog within the montane areas, where it is a candidate for listing, because few lands in these areas are likely to meet the Agreement's requirement of 3,000 acres of occupied habitat for enrollment. Additionally, predators seldom extirpate their own prey before either emigrating to another area or succumbing to starvation.

B. Plague Management

1. Insecticide Use

The use of deltamethrin to kill fleas that may transmit sylvatic plague to prairie dogs is not expected to have any adverse impacts on Gunnison's prairie dog, California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, or Sprague's pipit. Deltamethrin, the active ingredient of DeltaDust, is an insecticide that provides broad spectrum and residual control of crawling arthropods. DeltaDust is an unrestricted-use pesticide and considered safe for many applications including use in and around homes. The use of deltamethrin has been shown to be effective at controlling fleas for 6–10 months (Biggins et al. 2010). Deltamethrin toxicity to birds is very low (LD50 range of 5,000–10,000 mg/kg) and is practically nontoxic to mammals (LD50 range 6,500–22,000 mg/kg (http://www.bvsde.paho.org/bvsapud/i/fulltext/deltameth/deltameth.htm). Because the treatment and application is specifically directed at controlling flea populations in prairie dog burrows under the proposed action, the proposed application rate is about 150 times lower than recommended rates for customary home and agricultural use. There is no information suggesting that deltamethrin has any tendency to bioaccumulate in animal tissues and the chemical has been determined to be noncarcinogenic and have no deleterious effects (http://www.bvsde.paho.org/bvsapud/i/fulltext/deltameth/deltameth.htm).

Product transport, mixing, application, storage, cleanup, and use of protective gear would be consistent with the label specifications. Because the product would be placed down individual prairie dog burrows, and not applied above ground, it would be unavailable to any federally listed, proposed, and candidate species in the area (Appendix A), because, with the exception of Gunnison's prairie-dog, none of these species use prairie dog burrows. Because few montane areas where the candidate Gunnison's prairie dog occurs are likely to support populations eligible for ferret reintroductions under the Agreement, DeltaDust is not likely to be applied there as a result of the proposed action. However, if application should occur, the Gunnison's prairie-dog is not likely to be adversely affected because deltamethrin is practically nontoxic to mammals. In fact, the species would benefit from this activity because it would reduce the likelihood of sylvatic plague outbreaks. Because deltamethrin is not known to bioaccumulate, California condors and northern aplomado falcons are unlikely to be exposed to the insecticide through consumption of animal carcasses.

The label for DeltaDust requires avoidance of applications to water-bodies. Prairie dog colonies and ferrets typically are not within close proximity to water-bodies. Therefore, federally listed and candidate species within the project area are not likely to be exposed to this pesticide when using water.

The use of DeltaDust on enrolled lands is likely to temporarily reduce arthropod populations that inhabit treated prairie dog burrows. Arthropod populations outside the treated burrows and in areas surrounding the enrolled lands would not be exposed to the pesticide. Therefore, adequate populations of arthropods would be available to re-inhabit prairie dog burrows when the effects of insecticide diminish 6–10 months following treatment, if treatment is not repeated. Insects are an important food source for females and chicks of greater sage-grouse, Gunnison sage-grouse, and lesser prairie-chickens during brood rearing. However, brood rearing habitat for these species is not typically found in close association with active prairie dog colonies (Connelly 2004, Gunnison Sage-grouse Steering Committee 2005). Therefore, localized depletions of arthropod populations within prairie dog burrows from deltamethrin treatment are unlikely to adversely impact sage-grouse or lesser prairie chicken populations. Proposed critical habitat for the Gunnison sage-grouse is also unlikely to be adversely modified, as application of deltamethrin will likely only occur on potential lek sites without modifying any of the primary constituent elements of this habitat type.

Localized depletions of arthropod populations within prairie dog colonies could affect the northern aplomado falcon, but the effects are unlikely to be significant due to the large home range size of the species—8,400 ac (U.S. Fish and Wildlife Service 1990, 2002) and the types of arthropods consumed by the species. Deltamethrin primarily impacts ground-dwelling arthropods that inhabit prairie dog burrows, and northern aplomado falcons typically capture flying insects by aerial pursuit. Depleted arthropod populations could also affect the Sprague's pipit, as the species has been documented using prairie dog colonies during migration (Thompson and Ely 1992); however, Sprague's pipits typically forage for insects in areas where grass height is relatively tall (Robbins and Dale 1999), so foraging in prairie dog colonies with characteristically short vegetation heights is uncommon.

Sylvatic plague has been identified as a significant threat to the montane populations of Gunnison's prairie dog and a stressor to all other prairie dog species within the action area (U.S. Fish and Wildlife Service 2008b). It is also considered a medium magnitude, imminent threat to black-footed ferrets (U.S. Fish and Wildlife Service 2013a). The positive consequence of the use of deltamethrin is reduction or elimination of mortality from sylvatic plague in both ferret and prairie dog populations. Sylvatic plague control can also stabilize prairie dog populations, an important characteristic of suitable ferret habitat.

2. Sylvatic Plague Vaccine (SPV) Application

Should the SPV be approved by the U.S. Department of Agriculture, its application under the proposed action is unlikely to affect the black-footed ferret, Gunnison's prairie dog, California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie chicken, northern aplomado falcon, or Sprague's pipit. SPV is a genetically modified viral vaccine, using attenuated raccoon pox virus as a vector for orally delivering critical plague antigens to target animals through the use of baits (U.S. Geological Survey 2012). Raccoon pox virus has been shown to be highly safe in numerous animals including ferrets, prairie dogs, dogs, cats, sheep, and mice (Mencher et al. 2004, Rocke et al. 2004, 2006, 2008a, 2008b). While there is no published information on the impacts of the vaccine on birds, it has been successfully used throughout the southeast with no reported effects to birds.

The U.S. Geological Survey is currently refining how to apply bait, which must be ingested by prairie dogs to be exposed to the vaccine. The bait has been developed to be attractive to prairie dogs and other rodents, so the probability of exposure to the vaccine by bait ingestion is high for these animals, including Gunnison's prairie dogs. Bait ingestion by Gunnison's prairie dogs will benefit the species, as it would reduce or eliminate sylvatic plague outbreaks in plague-susceptible montane habitats. We do not anticipate any effects to the California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, and Sprague's pipit because attraction of the bait to birds is expected to be low (U.S. Geological Survey 2012). Distribution of bait is also unlikely to adversely modify any proposed critical habitat for the Gunnison sage-grouse, as it will be applied only to prairie dog colonies, which are typically used only for lekking activities; bait application will not affect any of the primary constituent elements of this habitat type. Furthermore, the bait is not expected to persist more than several days after application, limiting the potential for exposure to any non-target species (Abbott and Rocke 2012).

3. Vehicle Use

During application of either DeltaDust or the SPV, vehicle and ATV use for plague management will typically not exceed two weeks per year. Vehicle and equipment speed will be limited given the rough terrain associated with most occupied prairie dog habitat. These factors would result in a very low likelihood of collisions with black-footed ferrets, Gunnison's prairie dog, California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, and Sprague's pipit. Furthermore, most, if not all vehicle and ATV use will occur during daylight hours, when ferrets are not active, so risk of collisions would also be very low to none. While the creation of roads or trails can reduce nesting success for ground-nesting birds such as greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, and Sprague's pipit by creating trails for potential nest predators, these species typically nest in taller vegetation than that found on prairie dog colonies. Vehicle use is not expected to exceed the level normally associated with livestock management activities, the predominant land use of the habitats used by these species, and thus is not expected to adversely modify any proposed critical habitat for the Gunnison sage-grouse.

C. Prairie Dog Management

Previous experience with ferret reintroductions has shown wide differences in the need for prairie dog management to address prairie dog encroachment issues between prairie dog species. Ferret reintroductions occurring in black-tailed prairie dog colonies have demonstrated a high need to have measures, including lethal control, to address movement of prairie dogs into areas where adjacent landowners do not want them. Ferret reintroductions into Gunnison's and white-tailed prairie dog colonies have not demonstrated that boundary management is as contentious. However, for the SHA we are keeping the prairie dog management options described below available for use on all three prairie dog species should the need arise even though we do not anticipate much if any need to use lethal control options for prairie dog management when using the ferret SHA agreement in Gunnison's and white-tailed prairie dog species.

1. Live Trapping

Under the proposed action, prairie dogs would be managed as requested by the Cooperator, according to each Reintroduction Plan developed for enrolled lands as described in Section I and Appendix B. Prairie dog management is not expected to have significant effects to the black-footed ferret, Gunnison's prairie dog, California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, or Sprague's pipit. The likelihood of incidentally trapping these non-target species is very low to none. The ferret, California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, and Sprague's pipit are very unlikely to be attracted to the bait used in live traps for prairie dogs. Prairie dog trapping would occur only during the day, greatly limiting the possibility of trapping ferrets, which are nocturnal. Furthermore, the trapping and handling protocol requires that traps be monitored several times during each day. Thus, in the unlikely event that any of the aforementioned species enters a trap, the accidentally trapped animal would be released before it could be harmed. Disturbance to sage-grouse and lesser prairie-chickens during trapping activities would be avoided by conducting all trapping activities outside of sensitive lekking seasons, and such temporary disturbance is not expected to adversely impact any proposed critical habitat for the Gunnison sage-grouse. The candidate populations of the Gunnison's prairie dog currently are likely not large enough to meet enrollment eligibility requirements under the Agreement. Therefore, such populations would not be subject to trapping. Should a property become eligible to enroll in the SHA with a large enough population, trapping would occur at levels to sustain population numbers adequate for supporting ferrets.

2. Shooting

Lethal prairie dog management under the proposed action will be restricted to shooting or the use of approved pesticides by a licensed pesticide applicator. Prairie dog shooting is not expected to increase above what currently occurs under local and state laws by non-federal landowners. Opportunistic shooting might occur when a hunter shoots other species instead of the intended prairie dogs simply because the species occurs there and the opportunity to shoot it arises. Because landowners volunteering to participate in the Agreement would be aware of presence of listed species on their lands and prohibitions of take of such species under the Act, such opportunistic shooting is highly unlikely. Although proposed and candidate species do not have protection under the Act, a participating landowner is also likely to be aware of the sensitivity of these species and would not likely allow shooting in the area. Therefore, adverse impacts to black-footed ferrets, Gunnison's prairie dogs, California condors, greater sage-grouse, Gunnison sage-grouse, proposed Gunnison sage-grouse critical habitat, lesser prairie-chickens, northern aplomado falcons, or Sprague's pipits from opportunistic shooting is unlikely.

Accidental shooting of California condors, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chickens, northern aplomado falcons, or Sprague's pipits is not expected because these birds would likely flush and leave the area in response to gunshot noise. Loss of black-footed ferrets as a result of shooting is unlikely because they are nocturnal and shooting for prairie dog management would occur during the day. It is possible that California condors could be poisoned by ingesting lead bullets by feeding on prairie dogs that have been shot; accordingly, any shooting performed for lethal prairie dog management on properties within the 10(j) NEP area for this species in northern Arizona and southern Utah will utilize non-toxic ammunition. The candidate populations of the Gunnison's prairie dog currently are likely not large enough to meet enrollment eligibility requirements under the Agreement. Therefore, such populations would not be subject to shooting.

3. Zinc Phosphide

Because zinc phosphide is highly toxic to mammals and some birds (Witmer and Fagerstone 2003), it can be applied only by a certified pesticide applicator according to the EPA label, which restricts when and how it is applied. Label restrictions require avoidance of areas occupied or used by non-target species or by threatened and endangered species, which should limit risk of exposure. While zinc phosphide applications have occasionally killed non-target wildlife, most of these incidences involved misuse of the product (Witmer and Fagerstone 2003). Field studies examining the effects of zinc phosphide on non-target wildlife have generally found no significant risk to non-target species when properly applied (Johnson and Fagerstone 1994). Under the proposed action, zinc phosphide for prairie dog management would be applied primarily by Wildlife Services and/or local weed and pest districts. These entities have extensive experience in the application of zinc phosphide for prairie dog management. Therefore, the potential for misapplication and exposure to non-target species such as black-footed ferrets, Gunnison's prairie dogs, California condors, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, and Sprague's pipit is low. Zinc phosphide would only be applied in areas occupied by prairie dogs, and thus is not expected to adversely modify proposed critical habitat for the Gunnison sage-grouse; since this species uses prairie dog towns only for lekking and lek sites are not thought to be a limiting factor, adverse modification of critical habitat is not expected to occur.

Primary effects from toxicants refer to effects from direct consumption of, or exposure to the product. Secondary effects refer to the effects to predators from prey that has consumed the product. However, zinc phosphide does not bio-accumulate in non-target predators or scavengers (Witmer and Fagerstone 2003). Many lab and field secondary toxicity studies conducted on mammalian predators, raptors, and reptiles indicate that zinc phosphide poses little secondary risk to non-target wildlife (Johnson and Fagerstone 1994). Some predators may feed on prairie dogs with undigested grain tainted with zinc phosphide in cheek pouches or gastrointestinal tracts. However, many predators will not consume the gastrointestinal tract of prey items and many animal species exhibit an emetic response to zinc phosphide consumption (Witmer and Fagerstone 2003). Furthermore, many of the targeted animals die underground (as would be the case for prairie dogs), where they do not pose as great a risk of secondary poisoning to most predators or scavengers (Knowles 1986).

Lethal prairie dog control associated with the Agreement, regardless of the method, will be confined to the Management Zone of enrolled lands of some Cooperators, except in unusual circumstances approved by both the Permittee and Cooperator. While it is not known how many acres will be enrolled in the Agreement, the intent of this effort is that, over the life of the Agreement (50 years), up to 500,000 acres of occupied prairie dog habitat will be made available for ferret reintroductions. Furthermore, the overall purpose of the proposed action is to contribute to the recovery of the ferret through reintroductions, which requires healthy, stable prairie dog populations. As such, prairie dog management outside the Conservation Zones would be either necessary as a result of expanding populations or would not differ in intensity from management that occurs at present. Therefore, prairie dog management under the proposed action would not exceed the levels currently observed, and would not have adverse impacts on prairie dog populations. The candidate populations of the Gunnison's prairie dog currently are likely not large enough to meet enrollment eligibility requirements under the Agreement. Therefore, such populations would not be subject to poisoning.

D. Livestock Grazing

Under the proposed action, the Agreement does not require any changes to grazing management on enrolled lands. Therefore, the proposed action would not result in changes to any impacts from ongoing grazing activities to the black-footed ferret, Gunnison's prairie dog, California condor, greater sage-grouse, Gunnison sage-grouse (and its proposed critical habitat), lesser prairie-chicken, northern aplomado falcon, and Sprague's pipit . However, a Cooperator may independently choose to improve the quality of the grazing management on his/her lands.

Improved grazing management is expected to provide overall positive effects to the environment and the aforementioned species.

Livestock grazing and the activities to facilitate that activity will require the use of vehicles and equipment. Vehicle and equipment speed will be limited given the rough terrain associated with most occupied prairie dog habitat. These factors would result in a very low likelihood of collisions with black-footed ferrets, Gunnison's prairie dog, California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, and Sprague's pipit. However, vehicle use and equipment use currently occurs on these lands and the proposed action will not result in an increase of their use or an increase in the threat of collision to the aforementioned species.

IV. Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

A. Black-footed ferret

The Service anticipates that States, Tribes, and private landowners will continue to implement conservation actions that benefit the black-footed ferret on a limited and site-specific basis. These efforts include plague management using deltamethrin, and prairie dog management using both lethal and non-lethal techniques. The Service also anticipates that sylvatic plague will continue to present a significant challenge to black-footed ferret recovery, as the disease is widespread throughout the range of the species. The extent of non-federal activities to manage plague is not well-known, but some efforts on tribal lands in Montana show promise and may serve as a model for future plague management efforts in other areas.

The use of anticoagulant rodenticides such as Rozol® and Kaput® by non-federal entities in the range of the black-footed ferret is likely to increase, although its use may be supplanting some of the previously-used rodenticides such as zinc phosphide. Because Rozol use at ferret reintroduction sites is not allowed by this Agreement and through previous consultations (U.S. Fish and Wildlife Service 2012b), current and future ferret reintroduction sites are not expected to be seriously impacted.

B. Gunnison's prairie dog

The Service anticipates that sylvatic plague will continue to present a significant challenge to the conservation of the Gunnison's prairie dog, as the disease is widespread and pervasive throughout the range of the species. The extent of non-federal activities to manage plague is not well-known, but in 2010 Colorado Parks and Wildlife (CPW) initiated a pre-emptive plague management program by applying deltamethrin to priority Gunnison's prairie dog colonies in Colorado. This effort includes a research component implemented by the CPW Wildlife Health Program that will attempt to determine the effect of dusting on overall flea abundance, flea abundance on prairie dog hosts, flea species composition, and duration of effects. In addition, The University of Missouri and the State of Utah, along with several other project proponents are evaluating a newly developed systemic, oral flea control bait, which when consumed by prairie dogs could reduce flea abundance and have mitigating effects similar to those of topical insecticides on the reduction of fleas, a primary plague vector. Broad-scale application strategies are also being evaluated. The project is being conducted in black-tailed prairie dog colonies on the Rocky Mountain Arsenal in Colorado, and on Utah prairie dog colonies in southwest Utah. Bait application, site preparation, and monitoring began in the spring of 2009. If successful, this project has the potential to provide another management tool that will reduce the risk of plague outbreaks over larger areas at a fraction of the cost of topical insecticides and become a valuable tool in protecting declining prairie dog populations throughout their ranges.

The CPW has developed draft action plans for all six individual Gunnison's prairie dog population areas in Colorado. These action plans were developed from workshops held in 2009 and early 2010. Workshop participants included interested stakeholders who reviewed and ranked issues affecting Gunnison's prairie dogs. Participants then ranked potential conservation strategies taken from Colorado's Gunnison's prairie dog and White-tailed prairie dog Conservation Strategy and selected the top two strategies for implementation. The action plans will be valid for 3–5 years.

C. California condor

The scenic over-flights program at Grand Canyon, which falls within the action area, is conducted by private non-Federal entities, but regulated by the Federal Aviation Administration. At the present time, a new route structure is being developed. Because the route structure will be authorized by Federal agencies, section 7 consultation on the action is anticipated.

California condor use occurs primarily on Federal land within the action area, and therefore few non-federal actions are likely to occur. Ongoing private actions within the action area include various forms of recreation such as sightseeing, hiking, biking, and hunting. Any effects are expected to be minimal, with the possible exception of lead ingestion by California condors as a result of hunter-killed big game. The Arizona Game and Fish Department and Utah Division of Wildlife Resources have implemented a voluntary non-toxic ammunition program for big game hunters, and it is hoped that these programs will reduce the incidence of condor lead poisoning.

D. Greater sage-grouse

Renewable energy project development projects, oil and natural gas development projects, land development projects, and some livestock management activities implemented by non-federal entities continue to constitute a threat to the greater sage-grouse throughout its range. To address these and other threats to the species, in 2006 WAFWA developed the Greater Sage-Grouse Comprehensive Conservation Strategy (Stiver et al. 2006). This plan attempts to develop partnerships needed to design and implement actions to support robust populations of sage-grouse and the landscapes on which they depend. Several state wildlife agencies are participating in this effort in an attempt to recover greater sage-grouse populations.

E. Gunnison sage-grouse

Residential development in parts of the Gunnison sage-grouse range continues to exacerbate landscape fragmentation for the species, and local jurisdictions (counties and municipalities) within the species' range in Colorado and Utah have not addressed this factor in a meaningful way. The Service expects some development to be moderated by the establishment of additional voluntary landowner conservation easements such as those currently facilitated by the CPW and land trust organizations. The CPW has spent more than $30 million to protect approximately 33,145 ac since 2003. Conservation easements, if properly managed, can minimize the overall impacts to Gunnison sage-grouse. Including CPW and nongovernmental organization held properties, approximately 43,160 ac, or 25 percent, of private lands in occupied Gunnison sage-grouse habitat have been placed in conservation easements or are protected because the fee title was acquired to protect the land. Due to the cost of acquisition we do not expect the amount of land potentially placed in future easements will adequately offset the overall effects of human development and subsequent habitat fragmentation.

F. Lesser prairie-chicken

Much of the occupied range of the lesser prairie-chicken occurs on non-federal lands, and these lands are subject to development for oil and gas production, wind energy, conversion to cultivated crops or non-native pasturelands, and residential development. Several conservation initiatives have been developed by state wildlife agencies, oil and gas producer groups, non-governmental conservation groups, and private citizens to create a habitat exchange program where development may be curtailed and lands may be set aside for lesser prairie-chicken habitat. These programs are still under development by various partners, and it remains to be seen if they can address the aforementioned threats in a meaningful way.

G. Northern aplomado falcon

Human activities may affect the northern aplomado falcon and result in direct and indirect mortality, habitat loss, or reduction of habitat suitability. Anthropogenic uses of northern aplomado falcon habitat include ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil and gas), and development (e.g., roads and power lines). These activities can potentially reduce the quality of northern aplomado falcon nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season.

H. Sprague's pipit

The principal causes for the declines in Sprague's pipit populations are habitat conversion to seeded pasture, hayfield, and cropland, as well as overgrazing by livestock. Moreover, management favoring intensive cattle grazing and reduced fire frequency may lead to the degradation of remaining suitable grassland tracts over much of their range. Without proper fire intervals, shrubs and excessive vegetative litter may reduce habitat quality; in addition, grasslands may even eventually convert to shrub land or savannah. Energy development, introduced plant species, nest predation and parasitism, drought, and fragmentation of grasslands are all threats that currently impact Sprague's pipit populations throughout their present range, and since the majority of the occupied habitat for the species occurs on private lands, there are few regulatory mechanisms in place to address these threats. In spite of these challenges, several states and provinces have developed objectives and actions designed to address state-wide conservation of Sprague's pipits; it remains to be seen if state-level efforts can address the conservation needs of the species.

V. Conclusion

After reviewing the current status of the black-footed ferret, Gunnison's prairie dog, California condor, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, northern aplomado falcon, and Sprague's pipit, the environmental baseline for these species within the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the issuance of an of an Enhancement of Survival Permit under Section 10(a)(1)(A) of the ESA to the Black-Footed Ferret Recovery Program Coordinator is not likely to jeopardize the continued existence of these species or adversely modify the proposed critical habitat for the Gunnison sage-grouse. The reasons for this determination are:

- The proposed action is expected to lead to a suite of conservation measures with immediate and direct beneficial effects to the black-footed ferret.
- Adverse impacts associated with the return of any property enrolled in the Agreement to a baseline of zero are expected to be minor and temporary, and should be offset and exceeded by beneficial and long-lasting effects of Cooperators who elect to keep their properties enrolled in the Agreement.
- Ferrets that will be used for SHA reintroductions are not essential to the survival of the species.
- Precautionary measures will be implemented to reduce losses within the reintroduced population.
- If shooting is needed for lethal prairie dog management in the nonessential experimental area of the California condor non toxic ammunition will be used.
- The proposed action will likely constitute a beneficial effect for the Gunnison's prairie dog, as it includes measures to reduce the incidence of sylvatic plague, the primary factor responsible for the decline of this species.
- Since greater sage-grouse, Gunnison sage-grouse, and lesser prairie-chickens utilize prairie dog colonies for lekking sites, the proposed action will likely increase the size and extent of these colonies, constituting a beneficial effect for these species. While toxicant use for prairie dog management could adversely affect these species in limited circumstances, the season of application does not coincide with sage-grouse and prairie-chicken lekking activities, greatly reducing the likelihood of any non-target poisoning. Further, all of the Gunnison sage-grouse range and much of the greater sage-grouse range occurs in prairie dog species (Gunnison's and white-tailed) where we do not anticipate much need to use toxicants for prairie dog management.
- As prairie dog colonies are not known to be highly important habitat for northern aplomado falcons foraging, prairie dog management as proposed in this action will not preclude the recovery of this species even when combined with other potential anthropogenic threats. In addition, cooperative agreements with landowners in reintroduction areas allows for the

monitoring and potential avoidance of take within these areas. Plague management efforts under the SHA are expected to benefit prairie dogs and thus may provide some ancillary benefit to northern aplomado falcons.

- Sprague's pipits utilize prairie dog colonies during migration, but habitat use tends to be limited in duration. Migratory activities are largely concluded prior to the application of toxicants for prairie dog management, lessening the likelihood of any non-target poisoning of the species. Plague management efforts conducted under the SHA are expected to benefit prairie dogs and thus benefit Sprague's pipit migration habitat.

INCIDENTAL TAKE STATEMENT

I. Introduction

Section 9 of the ESA and Federal regulation pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. *Take* means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. *Harm* is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. *Harass* is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. *Incidental take* is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

The Black-Footed Ferret Programmatic Safe Harbor Agreement (Agreement; see Appendix B) clearly identifies the conservation measures that will be implemented to provide a net conservation benefit to and a contribution to the recovery of the black-footed ferret. All conservation measures described in the Agreement and any Section 10(a)(1)(A) permit issued with respect to the Agreement, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within the ITS pursuant to 50 CFR §402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under Section 10(a)(1)(A) and Section 7(o)(2) of the ESA to apply. If the Permittee or the Cooperator(s) fail to adhere to these terms and conditions, the protective coverage of the Section 10(a)(1)(A) permit and Section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the Agreement, associated reporting requirements, and provisions for disposition of dead and injured animals are described in the Agreement and its accompanying Section 10(a)(1)(A) permit.

For California condors in Arizona and Utah and northern aplomado falcons in Arizona and New Mexico, the prohibitions against taking this species found in Section 9 of the ESA have been modified by their respective nonessential experimental designations. The results of this conference opinion for those species' experimental populations are advisory in nature and do not restrict agencies from carrying out, funding, or authorizing activities. Under the Safe Harbor Agreement program, for northern aplomado falcons in Texas participating landowners are permitted to take aplomado falcons incidental to future lawful land-use actions (such as prairie dog control), provided that the landowner maintains any established baseline responsibilities (U.S. Fish and Wildlife Service 2000).

The prohibitions against taking the Gunnison's prairie dog, greater sage-grouse, Gunnison's sage-grouse, lesser prairie-chicken, and Sprague's pipit found in Section 9 of the ESA do not apply until these species are listed. If listing of any of these species occurs, the measures described below pertaining to the newly-listed species, along with their implementing terms and conditions, will be non-discretionary if this conference opinion for those species is converted to a BO.

II. Amount or Extent of Take Anticipated

A. Black-footed ferret

Incidental take of black-footed ferrets could occur through reintroduction and monitoring of ferrets while handling or transporting to the reintroduction site. Ferret deaths have occurred while anesthetizing animals for health care purposes. In addition, release sites have experienced occasional ferret deaths during transportation due to heat stress when air conditioning equipment failed; however, less than one half of one percent of more than 2,700 ferrets reintroduced have perished from handling and transportation (Gober pers. comm. 2012). While equipment failures could occur during ferret reintroductions under this Agreement, the precautions contained in the protocol for handling and monitoring reintroduced ferrets outlined in Roelle et al. (2006) will minimize this possibility.

Incidental take of black-footed ferrets may also occur in carrying out other conservation activities, including implementing plague management, prairie dog management, and routine ownership interest activities including, but not limited to, livestock grazing and ranching activities. The most likely means of incidental take associated with these activities would occur through vehicle or equipment collisions. While such incidental take has been documented, the risk of vehicle collisions is low due to the nocturnal habits of ferrets. Other than potential collisions with vehicles or equipment, plague management is unlikely to result in incidental take of ferrets.

We anticipate most ferrets that leave the reintroduction area will perish from predation or exposure to plague. However, there could be some ferrets that leave the reintroduction site that experience incidental take with the most likely occurrences being vehicle collisions and other routine ranching activities such as prairie dog management. The ITS covers all ferrets that may leave the reintroduction site if mortalities occur from otherwise lawful activities.

Incidental take of black-footed ferrets from non-lethal prairie dog management is not expected in either Conservation or Management Zones. Incidental take from lethal prairie dog management authorized in Management Zones could occur if ferrets are present. Such take may occur through accidental shooting or non-target exposure of ferrets to toxicants meant for prairie dogs, or potential collisions with vehicles or equipment. Such take is not expected in Conservation Zones because shooting and the use of toxicants will not occur within Conservation Zones, except in unusual circumstances agreed to by both the Permittee and Cooperator.

The provisions of the Agreement allow any Cooperator to return the enrolled lands back to baseline of zero black-footed ferrets at any time through any legal means. Such means cannot include deliberate killing of ferrets. A return to baseline may result in incidental take of all ferrets released onto the enrolled lands. Should the Cooperator choose to return to baseline, the most likely means to do so will be through the absence of plague management, through extensive lethal prairie dog control on all enrolled lands including the Conservation Zone to the point where the prairie dog population is no longer adequate to support a ferret population, or through conversion of enrolled lands from grazing lands to other land uses such as cultivated agriculture or intensive energy development. Before carrying out any activities that would result in a return to baseline, Cooperators would be required to notify the Service in sufficient time to allow relocation of the ferrets. September and October are the most suitable months for trapping ferrets. Therefore, the Agreement requires that Cooperators notify the Permittee by July 1 of any given year to allow logistical planning for the recapture of ferrets from the enrolled lands during the following months of September and/or October, or as otherwise mutually determined by the Permittee and Cooperator. If the Permittee is not notified and/or access is not granted, the Cooperator would lose coverage for incidental take.

In the absence of plague management, it is likely that a plague event will occur that decreases prairie dog populations to a level that will no longer support black-footed ferrets. While prairie dogs have the reproductive potential to increase their numbers after such an event, it is unlikely that ferret populations would recover without additional reintroductions. Likewise, extensive lethal prairie dog management across all enrolled lands would likely result in considerable decreases in prairie dog populations such that they would not support ferrets. The reproductive potential of prairie dogs could allow them to return after extensive lethal control, but it is unlikely that ferrets populations would return without additional reintroductions.

While conversion of rangeland to cultivated agriculture in the past resulted in the loss of considerable habitat, much of the most suitable land has already been converted. Therefore, present and future conversion to cropland is less likely (U.S. Fish and Wildlife Service 2009). However, changes in demands for various crops such as corn for ethanol could influence rate and location of conversion to cropland, which is difficult to predict. Unlike conversion to cropland, energy production does not result in a complete loss of habitat. It reduces the total amount of habitat by converting portions of it to an impermeable surface, i.e., roads and well or turbine pads, but it does not preclude burrows and occupation of prairie dogs and hence black-footed ferrets. However, it may increase the potential for incidental take via vehicle collisions during construction and operations and maintenance. Structures associated with energy development may also increase predation by providing additional perches for raptors. The likelihood of the conversion of enrolled lands to energy production is unknown and difficult to predict, but will be influenced by energy prices and energy policy. While suburban and commercial development is also possible, given the rural and relatively remote locations of many of the eligible lands, it is less likely than conversion to cultivated agriculture or energy development.

By whatever means, a change in land use could make the enrolled lands unsuitable for prairie dog habitat or, more likely, impair the quality of prairie dog habitat. Without adequate prairie dogs, sustainable black-footed ferret populations will not be maintained and the enrolled lands will return to their baseline of zero ferrets.

The extent of the incidental take associated with the implementation of conservation activities is difficult to quantify as we do not know how many eligible landowners will enroll but our previous experience with ferret reintroductions helps inform what levels of incidental take may occur if a landowner does participate in the SHA. Previous Biological Opinions for individual ferret reintroduction sites have recognized that up to 12% annually of the initial population may be lost through incidental take associated with the reintroduction effort (USFWS 2008c). However, those levels of incidental take have not been found to actually occur at any site, even though many recently reintroduced ferrets can be lost to predation or other unknown factors. For the SHA, we expect initial ferret reintroduction numbers at the smallest sites would entail releases of 20 - 30 ferrets while larger sites could have considerably more. Applying the 12% figure to the smaller anticipated number of ferrets to be initially released indicates a range of incidental take of 2.4 to 3.6 annually. For the ferret SHA, 2 individual ferret mortalities annually per site is the maximum number of ferrets that can be legally taken through ongoing management actions. Moving live ferrets within the site or between sites with the involvement of the Black-footed Ferret Coordinator will not be considered mortalities and not count against the incidental take level of 2 ferret mortalities. Monitoring, capturing, handling, anesthetizing live ferrets in association with the site reintroduction plan or with input from the Black-footed Ferret Coordinator is covered by this BO and only mortalities from those actions would count against the incidental take level of 2 ferrets annually.

Ferrets that move off the reintroduction site, while often difficult to determine their fate, if taken incidental to otherwise lawful activities are not counted against the incidental take level of 2 ferret mortalities annually per site. Those ferrets that move off site and are taken by otherwise lawful activities are also covered by this ITS. For example, at previous ferret reintroductions, we have occasionally found ferrets that had moved off site and were killed by vehicle collisions. Such ferret mortalities are covered by this ITS and do not count against the level of 2 ferret mortalities annually for the individual site. We believe it is appropriate to cover all incidental take of ferrets that occur offsite through the ITS because we do not expect dispersing ferrets to return to the reintroduction site and are trying to minimize impacts to otherwise lawful activities that may occur outside the reintroduction site. Further, we expect most dispersing ferrets will perish if they move away from the habitat provided at the reintroduction site. We expect offsite ferret mortality will occur primarily from predation or plague, but if some mortality occurs from otherwise lawful activities, that mortality is covered by this ITS.

Incidental take associated with the return to baseline is also difficult to anticipate. However, a qualitative review of the Service’s Safe Harbor Program indicates that most participants remain committed to these programs and very few choose to return to baseline. Given that livestock grazing and ranching is the primary use for these lands, we anticipate that most Cooperators will not return these lands to baseline. However, if a Cooperator does choose to return to baseline, most ferrets are expected to be live trapped and moved to other sites. Remaining ferrets that are not removed would be subject to incidental take that may occur from normal ranching activities such rodenticide use or subject to predation and plague. While the level of incidental take for the black-footed ferret is not explicitly limited by this BO when returning to baseline conditions of the SHA, purposeful take is still prohibited. The Service anticipates that the implementation of the Agreement will result in two or fewer ferret mortalities per year per site over the 50-year term of the permit.

B. Gunnison's prairie dog

Incidental take of the Gunnison's prairie dog within the montane portion of its range is not anticipated as a result of the implementation of this Agreement, as these populations currently are likely not large enough to meet enrollment eligibility requirements under the Agreement. Therefore, such populations would not be subject to lethal prairie dog management activities. Incidental take could occur as a result of plague management activities aimed at recovering Gunnison's prairie dog populations, primarily through vehicle collisions associated with deltamethrin application and/or distribution of SPV baits. The Service anticipates that such instances would be exceedingly rare, resulting in five or fewer mortalities per year per site over the 50-year term of the permit.

If the montane portion of the Gunnison's prairie dog is listed under ESA and there are ferret SHA activities occurring in areas where the species is listed, the incidental take limit is 5 mortalities per year per site. Non-lethal take of Gunnison's prairie dog during live trapping and relocation is unlimited, but any Gunnison's prairie dog mortalities from these activities would count towards the 5 mortalities per year per site.

C. California condor

Incidental take of the California condor is not expected as a result of the implementation of this Agreement, as habitat overlap between this species and properties with suitable amounts of prairie dog habitat for enrollment is limited. It is possible that incidental take could occur as a result of California condors ingesting lead projectiles through scavenged prairie dogs killed in Management Zones by shooting, vehicle collisions, or rodenticide use related to implementation of the SHA. The Service anticipates that such instances would be exceedingly rare, as condors typically scavenge carcasses from larger animals such as deer, domestic cattle and sheep, and horses. In the majority of the area where the ferret range and California condor range overlap, the California condor is a non-essential experimental population via a section 10(j) rule promulgation that also authorized incidental take for lawful activities like hunting/shooting that could disperse lead fragments into animals that are scavenged by condors. However, the SHA has committed to using non toxic ammunition when shooting is used to manage prairie dogs in the nonessential experimental area of the California condor and therefore we do not anticipate California condor mortality associated with the limited shooting of prairie dogs using non toxic ammunition that might occur under the SHA actions. California condors outside the nonessential experimental area but within the ferret range are not expected to encounter prairie dog carcasses resulting from SHA activities at levels that might result in lead poisoning of a condor over the 50-year term of the permit but a vehicle collision, rodenticide use or other activities associated with the SHA could occur. Such instances, while rare, may result in one or fewer mortalities over the entire 50-year term of the permit.

D. Greater sage-grouse

Incidental take of the greater sage-grouse is not expected as a result of the implementation of the Agreement, as the degree of habitat overlap between this species and properties with suitable amounts of prairie dog habitat for enrollment is limited to lekking sites found on prairie dog colonies. Take is most likely to occur if greater sage-grouse ingest zinc phosphide applied for prairie dog management purposes in Management Zones or through vehicle collisions as SHA activities are conducted. The Service anticipates that such instances would be rare, resulting in two or fewer mortalities per year per site over the 50-year term of the permit.

E. Gunnison sage-grouse

Incidental take of the Gunnison sage-grouse is not expected as a result of the implementation of the Agreement, as the degree of habitat overlap between this species and properties with suitable amounts of prairie dog habitat for enrollment is limited to lekking sites found on prairie dog colonies; moreover, the prairie dog species that overlaps the majority of the Gunnison sage-grouse range is the Gunnison's prairie dog, whose populations currently are insufficient to meet enrollment eligibility requirements under the Agreement. As a result, take is most likely to occur if Gunnison sage-grouse are harassed during the application of SPV baits within Gunnison's prairie dog habitat. The Service anticipates that such instances of the SHA activities causing impacts to Gunnison's sage-grouse would be exceedingly rare, resulting in five or fewer mortalities over the 50-year term of the permit.

F. Lesser prairie-chicken

Incidental take of the lesser prairie-chicken is not expected as a result of the implementation of the Agreement, as the degree of habitat overlap between this species and properties with suitable amounts of prairie dog habitat for enrollment is limited to lekking sites found on prairie dog colonies. Take is most likely to occur if lesser prairie-chickens ingest zinc phosphide applied for prairie dog management purposes in Management Zones. The Service anticipates that such instances would be rare, resulting in two or fewer mortalities per year per site over the 50-year term of the permit.

G. Northern aplomado falcon

Take of the northern aplomado falcon is not expected as a result of the implementation of the Agreement, as prairie dog colonies are not known to be highly important foraging habitat for the species. Take is most likely to occur if northern aplomado falcons ingest rodent prey with zinc phosphide grain bait in their cheek pouches or esophageal tracts before the phosphine gas has dissipated, and succumb to secondary poisoning effects as a result. Such instances are exceedingly rare, because 1. the rapid activation and dissipation of the phosphine gas, 2.many predators will not consume the gastrointestinal tract of prey items, and 3. many animal species exhibit an emetic response to zinc phosphide consumption (Witmer and Fagerstone 2003). Furthermore, many of the targeted animals die underground (as would be the case for prairie dogs), where they do not pose as great a risk of secondary poisoning to most predators or scavengers (Knowles 1986). Approximately half of the northern aplomado falcon range that overlaps with the ferret range in the United States has been designated part of a non-essential experimental population that authorizes incidental take for normal ranching activities. The Service anticipates that such instances will result in two or fewer mortalities over the 50-year term of the permit.

H. Sprague's pipit

Incidental take of the Sprague's pipit is not expected as a result of the implementation of the Agreement, as the degree of habitat overlap between this species and properties with suitable amounts of prairie dog habitat for enrollment is limited to foraging sites found on prairie dog colonies and used during migration. Take is most likely to occur if Sprague's pipits ingest zinc phosphide applied for prairie dog management purposes in Management Zones. The Service anticipates that such instances would be rare, resulting in two or fewer mortalities per year over the 50-year term of the permit.

III. Effect of the Take

A. Black-footed ferret

This biological opinion limits the amount of incidental take for the black-footed ferret to two mortalities per year per site for ongoing ranching or conservation activities at the site. Incidental take of ferrets that may move off the site is expected to be low (less than one per year) but if it occurs it is covered by this Incidental Take Statement. We anticipate most ferrets that may leave the site will be lost to natural predation, plague or their fate will be unknown. Incidental take of ferrets due to the implementation of the conservation activities of the Agreement is not likely to jeopardize the continued existence of the species or materially affect ferret recovery. Because the expected mortalities are likely to be dispersing ferrets that are unlikely to contribute to the success of the reintroduction site, such losses are not anticipated to compromise the survival and recovery of the species. Moreover, any mortalities associated with properties that return to baseline are expected to be offset by other properties that will be enrolled in the Agreement.

B. Gunnison's prairie dog

The Service has determined that five mortalities per year of Gunnison's prairie dogs due to the implementation of plague management activities is not likely to jeopardize the continued existence of the species. Because the expected mortalities are the result of an action that will likely have beneficial effects for the species as a whole, such losses are not anticipated to compromise the survival and recovery of the Gunnison's prairie dog.

C. California condor

The Service has determined that one mortality over the 50-year term of the permit enabling the Agreement due to lead poisoning from scavenged prairie dogs is not likely to jeopardize the continued existence of the species . This is due to the fact that unregulated shooting of lead ammunition is already occurring within the action area, and the core of California condor population is expected to persist at current levels in California, outside of the action area of the Agreement. In addition, reintroduction of captive-bred California condors is expected to continue within the range of the species during several years of the Agreement.

D. Greater sage-grouse

The Service has determined that two mortalities per year of greater sage-grouse due to the ingestion of zinc phosphide bait as a result of prairie dog management activities is not likely to jeopardize the continued existence of the species. Zinc phosphide is a common rodenticide used in parts of the greater sage-grouse range and the limited use under the SHA is not anticipated to compromise the survival and recovery of the greater sage-grouse.

E. Gunnison sage-grouse

The Service has determined that five mortalities over the 50-year term of the permit due to plague management activities for the Gunnison's prairie dog is not likely to jeopardize the continued existence of the species or adversely modify proposed critical habitat. This is due to the fact that harassment associated with vehicle use is already occurring in the action area, and the projected vehicle use associated with plague management activities does not represent a significant increase over existing levels. Thus, such losses are not anticipated to compromise the survival and recovery of the Gunnison sage-grouse.

F. Lesser prairie-chicken

The Service has determined that two mortalities per year of lesser prairie-chickens due to the ingestion of zinc phosphide bait as a result of prairie dog management activities is not likely to jeopardize the continued existence of the species . Because the expected mortalities are the result of an action that is already occurring in the action area, such losses are not anticipated to compromise the survival and recovery of the lesser prairie-chicken.

G. Northern aplomado falcon

The Service has determined that two mortalities over the 50-year term of the permit due to secondary poisoning as a result of ingesting zinc phosphide grain bait intended for prairie dog management activities is not likely to jeopardize the continued existence of the species. This is due to the fact that zinc phosphide application is already occurring within the range of the northern aplomado falcon, and a portion of the species' occupied range in extreme south Texas is not within the action area of the Agreement. In addition, the reintroduction of captive-bred northern aplomado falcons is expected to continue within the range of the species during several years of the Agreement.

H. Sprague's pipit

The Service has determined that two mortalities per year of Sprague's pipits due to the ingestion of zinc phosphide bait as a result of prairie dog management activities is not likely to jeopardize the continued existence of the species. Because the expected mortalities are the result of an action that is already occurring in the action area, such losses are not anticipated to compromise the survival and recovery of the Sprague's pipit.

IV. Reasonable and Prudent Measures

The Service believes that the following Reasonable and Prudent Measures (RPMs) are necessary and appropriate to minimize or avoid the impacts of incidental take of black-footed ferrets, Gunnison's prairie dog, California condors, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chickens, northern aplomado falcons, and Sprague's pipits resulting from the proposed action. The RPMs below apply to all eight species unless otherwise specified within the RPM.

RPM 1:
- The proposed Agreement identifies the conservation activities that will be implemented to benefit the black-footed ferret. All conservation activities described in the Agreement, together with any terms and conditions described in the permit issued for the Agreement, are hereby incorporated by reference as RPMs within the ITS.

RPM 2:
- The Service has a continuing duty to regulate the activity covered by this ITS through implementation of the Agreement. This includes reporting activities conducted under the Section 10(a)(1)(A) permit annually, and the completion of 5-year reviews to determine the effectiveness of the Safe Harbor program.

RPM 3:
- The Permittee will ensure that any shooting used as a tool for lethal prairie dog management pursuant to the Agreement conducted in the nonessential experimental area delineated for the California condor in northern Arizona and southern Utah will be performed using non-toxic ammunition to minimize the possibility of lead poisoning.

V. Terms and Conditions

Compliance with the following terms and conditions must be achieved in order to be exempt from the prohibitions of Section 9 of the ESA. These terms and conditions implement the RPMs described above, and are nondiscretionary.

To Implement RPM 1:
- The Service, through the Permittee, will work with Cooperators to fully implement the conservation activities of the Agreement. This includes the requirements for monitoring and reporting described in the Agreement.

To Implement RPM 2:
- The Service will fulfill their role and responsibilities as described in the Agreement.

To Implement RPM 3:

- The Permittee will stipulate, via inclusion in relevant Reintroduction Plans and Certificates of Inclusion, that prairie dog management conducted by shooting in the nonessential experimental area delineated for the California condor in northern Arizona and southern Utah will be performed using only non-toxic ammunition.

Reporting Requirements

When incidental take is anticipated, provisions for monitoring activities of the action are required to determine actual effects on federally listed species. Monitoring and reporting is essential for the Service to assess the effects of the action, track incidental take levels, and refine the BO, RPMs, and terms and conditions. Thus, the Permittee shall provide a written annual report to the Service each year this BO is in effect. The report shall be submitted to the Service by January 31 of each year. The report shall include:

- A summary and brief description of landowners enrolled under the Agreement during the reporting year, including copies of completed Certificates of Inclusion.
- A summary and brief description of conservation activities in the Agreement action area, including enrolled lands.
- An evaluation of the effectiveness of the conservation activities implemented on enrolled lands during the reporting year.
- Black-footed ferret population surveys conducted on enrolled lands during the reporting year.
- Funds used for the implementation of conservation activities on enrolled lands during the reporting year.

Disposition of Dead or Injured Federally Listed Species

Upon locating dead, injured, or sick federally listed species, the animals shall be left in place, photographed if possible, and immediately reported to a local Service Law Enforcement Agent. The date, time, location, and any other relevant details shall be conveyed. Specimens (collected by authorized individuals) shall be kept cool or frozen to facilitate later examination. Sick or injured animals shall be picked up and transported by authorized individuals to a permitted local wildlife rehabilitation or veterinary facility for treatment. Care must be taken in handling sick or injured animals to ensure effective treatment.

For federally listed species located in the States of Montana, North Dakota, South Dakota, Wyoming, Nebraska, Colorado and Kansas, the local Service Ecological Services Office within the state the animal is detected shall be notified as soon as possible. Office contact information may be found on the internet at www.fws.gov.

The National Black-Footed Ferret Coordinator must also be notified at U.S. Fish and Wildlife Service, P.O. Box 190, Wellington, CO 80549. Phone: 970-897-2730 x 224, Fax: 970-897-2943, Mobile: 720-626-5260.

The Service's Northern Aplomado Falcon Coordinator must also be notified of sick, injured, or dead northern aplomado falcons within 24 hours by calling (505) 346-2525 at the New Mexico

Ecological Services Field Office, 2105 Osuna Road NE, Albuquerque, NM 87113; Fax: (505) 346-2542.

The Service believes that no more than two black-footed ferrets per site per year; five Gunnison's prairie dogs per site per year; one California condor for the 50-year term of the permit; two greater sage-grouse per site per year; five Gunnison sage-grouse for the 50-year term of the permit; two lesser prairie-chickens per site per year; two northern aplomado falcons for the 50-year term of the permit; and two Sprague's pipits per year will be incidentally taken as a result of the proposed action. The Service expects that the RPMs, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the applicable RPM provided. The Permittee must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the RPM.

VI. Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.
To this end, the Service encourages the Permittee to work with other federal agencies, especially the USDA's Natural Resources Conservation Service and APHIS-Wildlife Services to:

- Monitor the effects of existing private lands management assistance programs for the black-footed ferret.
- Modify existing programs or develop new programs to provide incentives for the maintenance of prairie dog colonies on non-federal lands.
- Expand the availability of no-cost prairie dog management and plague management programs to help encourage tolerance of prairie dogs by keeping colonies confined to areas where they are tolerated or encouraged.
- Include plague management activities as cost-shareable practices within existing landowner assistance programs.
- Implement interagency public information programs to help educate the public about regulatory assurances, prairie dog management, and plague management as they pertain to black-footed ferret recovery.

VII. Reinitiation Notice

This concludes formal consultation and conference on the application from the Service's Black-Footed Ferret Recovery Implementation Coordinator for an ESA Section 10(a)(1)(A) Safe Harbor Enhancement of Survival Permit. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if 1) the amount or extent of incidental take is exceeded (or take occurs of species for which the Service currently does not anticipate adverse effects from the proposed action); 2) new information reveals effects of the agency action that may impact listed species or critical habitat in a manner or extent not considered in this BO; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this BO; or 4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any activities causing such take must cease pending reinitiation.

It is recognized that the Black-footed Ferret Recovery Program anticipates using the SHA for multiple decades into the future and therefore it is likely there will be changes and additions to the list of species that were evaluated in this biological/conference opinion. In the course of implementing the SHA, the Ferret Recovery Program, may as appropriate, initiate consultation with a Fish and Wildlife Service Ecological Services Office in a particular State to address possible impacts to species not previously evaluated in this BO.

The Black-footed Ferret Recovery Program may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if the Gunnison' prairie dog, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, or Sprague's pipit are listed, or if critical habitat is designated for the Gunnison sage-grouse. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the action and no further Section 7 consultation will be necessary.

After listing of the Gunnison's prairie dog, greater sage-grouse, lesser prairie-chicken, or Sprague's pipit as threatened, the Gunnison sage-grouse as endangered, or the designation of critical habitat for the Gunnison sage-grouse and any subsequent adoption of this conference opinion, the Permittee shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect the species or critical habitat in a manner or to an extent not considered in this conference opinion; (3) the action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in the conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until any of the aforementioned species are listed or critical habitat is designated, and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the action will be reviewed to determine whether any take of the Gunnison's prairie dog, greater sage-grouse, Gunnison sage-grouse, lesser prairie chicken, Sprague's pipit, or Gunnison sage-grouse critical habitat has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of the Gunnison's prairie dog, greater sage-grouse, Gunnison sage-grouse, lesser prairie-chicken, Sprague's pipit, or Gunnison sage-grouse critical habitat may occur between the listing of any of these species or designation of critical habitat and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation.

Any questions regarding this BO should be directed to Scott Larson of the Service's South Dakota Ecological Services Field Office, 420 South Garfield Avenue, Suite 400, Pierre, South Dakota 57501-5408, Telephone No. (605) 224-8693, Extension 224.

Sincerely,
Scott V. Larson
Field Supervisor
South Dakota Field Office

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Appendix A. List of threatened, endangered, candidate, and proposed species that occur within the action area.

Common Name	Federal Status[1]	Location	Determination of Effect	Rationale for Determination
Amphibians				
Wyoming toad (*Bufo baxteria*)	E	WY	No effect	Habitats do not overlap
Chiricahua leopard frog (*Rana chiricahuensis*)	T	AZ, NM	No effect	Habitats do not overlap
Reptiles				
New Mexico ridgenose rattlesnake (*Crotalus willardi obscures*)	T	NM	No effect	Habitats do not overlap
New Mexican gartersnake (*Thamnophis eues megalops*)	C	AZ, NM	No effect	Habitats do not overlap
sand dune lizard (*Sceloporus arenicolus*)	C	NM, TX	No effect	Habitats do not overlap
Birds				
Black-capped vireo (*Vireo atricapilla*)	E	OK, TX	No effect	Habitats do not overlap
Brown pelican (*Pelecanus occidentalis*)	T	AZ	No effect	Habitats do not overlap
California condor (*Gymnogyps californianus*)	E, NEP	AZ, UT	May affect; likely to adversely affect	See BO for more information
Greater sage-grouse *(Centrocercus urophasianus)*	C	CO, MT, ND, SD, UT, WY	May affect; likely to adversely affect	See BO for more information
Gunnison sage-grouse *(Centrocercus minimus)*	PE	CO, UT	May affect; likely to adversely affect	See BO for more information
Least tern *(Sternula antillarum)*	E	CO, KS, MT, NE, NM, ND, OK, SD, WY	No effect	Habitats do not overlap
Lesser prairie-chicken *(Tympanuchus pallidicinctus)*	PT	CO, KS, NM, OK, TX	May affect; likely to adversely affect	See BO for more information
Mexican spotted owl *(Strix occidentalis lucida)*	T	AZ, CO, NM, UT	No effect	Habitats do not overlap
Northern aplomado falcon (*Falco femoralis septentrionalis*)	E, NEP	NM, TX	May affect; likely to adversely affect	See BO for more information
Piping plover *(Charadrius melodus)*	T	CO, KS, MT, NE, ND, OK, SD, WY	No effect	Habitats do not overlap
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	AZ, CO, NM, UT	No effect	Habitats do not overlap
Sprague's pipit	C	MT, ND, OK, SD	May affect; likely to	See BO for more

(*Anthus spragueii*)			adversely affect	information
Whooping crane (*Grus americana*)	E	CO, KS, MT, NE, ND, OK, SD, WY	No effect	Habitats do not overlap
Yellow-billed cuckoo (*Coccyzus americanus*)	C	CO, NM, UT, WY	No effect	Habitats do not overlap
Fish				
Apache trout *(Oncorhynchus apache)*	T	AZ	No effect	Habitats do not overlap
Arkansas River shiner *(Notropis girardi)*	T	KS, NM, OK	No effect	Habitats do not overlap
Beautiful shiner *(Cyprinella Formosa)*	T	AZ, NM	No effect	Habitats do not overlap
Bonytail chub *(Gila elegans)*	E	AZ, CO, UT, WY	No effect	Habitats do not overlap
Chihuahua chub *(Gila nigrescens)*	T	NM	No effect	Habitats do not overlap
Colorado pikeminnow *(Ptychocheilus lecius)*	E	AZ, CO, NM, UT, WY	No effect	Habitats do not overlap
Gila chub *(Gila intermedia)*	E	AZ, NM	No effect	Habitats do not overlap
Gila topminnow *(Poeciliopsis occidentalis)*	E	NM	No effect	Habitats do not overlap
Greenback cutthroat trout *(Oncorhynchus clarki stomias)*	T	CO, UT	No effect	Habitats do not overlap
Humpback chub *(Gila cypha)*	E	AZ, CO, UT, WY	No effect	Habitats do not overlap
Kendall warm spring dace *(Rhinichthys osculus thermalis)*	E	WY	No effect	Habitats do not overlap
Little Colorado spinedace *(Lepidomeda vittata)*	T	AZ	No effect	Habitats do not overlap
Loach minnow *(Tiaroga cobitis)*	T	AZ, NM	No effect	Habitats do not overlap
Pallid sturgeon *(Scaphrihynchys albus)*	E	CO, MT, NE, ND, SD, WY	No effect	Habitats do not overlap
Pecos bluntnose shiner *(Notropsis simus pecosensis)*	T	NM	No effect	Habitats do not overlap
Pecos gambusia *(Gambusia nobilis)*	E	NM	No effect	Habitats do not overlap
Razorback sucker *(Xyranchen texanus)*	E	AZ, CO, NM, UT, WY	No effect	Habitats do not overlap
Rio Grande cutthroat trout *(Oncorhynchus clarki viginalis)*	C	CO, NM	No effect	Habitats do not overlap

Rio Grande silvery minnow ***(Hyboganthus amarus)***	E	NM	No effect	Habitats do not overlap
Roundtail chub ***(Gila robusta)***	C	AZ	No effect	Habitats do not overlap
Spikedace ***(Meda fulgida)***	T	NM	No effect	Habitats do not overlap
Topeka shiner ***(Notropsis topeka)***	E	KS, NE, SD	No effect	Habitats do not overlap
Zuni bluehead sucker ***(Catostomus discobolus yarrowi)***	C	NM	No effect	Habitats do not overlap
Flowering Plants				
Brady's pincushion cactus ***(Pediocactus bradyi)***	E	AZ	No effect	Habitats do not overlap
Clay-loving wild buckwheat ***(Eriogonum pelinophilum)***	E	CO, NE, WY	No effect	Restricted range; habitats unlikely to overlap
Clay reed-mustard **(*Schoenocrambe agrillacea)***	T	UT	No effect	Habitats do not overlap
Colorado butterfly plant **(*Gaura neomexicana var. coloradensis*)**	T	CO, NE, WY	No effect	Habitats do not overlap
Colorado hookless cactus **(*Sclerocactus glaucus*)**	T	CO	No effect	Habitats do not overlap
Debeque phacelia **(*Phacelia submutica*)**	T	CO	No effect	Habitats do not overlap
Desert yellowhead **(*Yermo xanthocephalus*)**	T	WY	No effect	Habitats do not overlap
Dudley Bluffs bladderpod **(*Lesquerella cogesta*)**	T	CO	No effect	Habitats do not overlap
Dudley Bluffs twinpod **(*Physaria obcordata*)**	T	CO	No effect	Habitats do not overlap
Fickeisen plains cactus **(*Pediocactus peeblesianus fickeiseniae*)**	C	AZ	No effect	Habitats do not overlap
Fremont County rockcress **(*Boechera pussill)***	C	WY	No effect	Habitats do not overlap
Grahm beard tongue	PT	CO, UT	No effect	Habitats do not overlap
Gypsum wild-buckwheat **(*Eriogonum gypsophilum*)**	T	NM	No effect	Habitats do not overlap
Holy Ghost ipomopsis **(*Ipomopsis sancti-spiritus*)**	E	NM	No effect	Habitats do not overlap
Jones cyclandenia **(*Cycladenia jonesii*)**	T	UT	No effect	Habitats do not overlap

Knowlton's cactus (***Pediocactus knowltonii***)	E	CO, NM	No effect	Restricted range; habitats unlikely to overlap
Kuenzler hedgehog cactus (***Echinocereus fendleri var. kuenzleri***)	E	NM	No effect	Habitats unlikely to overlap
Lee pincushion cactus (***Coryphantha sneedii var leei***)	T	NM	No effect	Habitats do not overlap
Mancos milk-vetch (***Astragalus humillimus***)	E	CO, NM	No effect	Habitats do not overlap
Mesa Verde cactus (***Sclerocactus masae-verdae***)	T	NM, UT	No effect	Habitats do not overlap
Navajo sedge (***Carex specuicola***)	T	AZ	No effect	Habitats do not overlap
North Park phacelia (***Pacelia formosula***)	E	CO	No effect	Habitats unlikely to overlap
Osterhout milk-vetch (***Astragalus osterhoutii***)	E	CO	No effect	Habitat unlikely to overlap
Pagosa skyrocket (***Ipomopsis polyantha***)	E	CO	No effect	Habitat unlikely to overlap
Parachute beardtongue (***Penstemon debilis***)	T	CO	No effect	Habitats do not overlap
Pecos sunflower (***Helanthus paradoxus***)	T	NM	No effect	Habitats do not overlap
Peebles Navajo cactus (***Pediocactus peeblesianus peeblesianus***)	E	AZ	No effect	Restricted range; habitats unlikely to overlap
Penland alpine fen mustard (***Eutrema penlandii***)	T	CO	No effect	Habitats do not overlap
Penland beardtongue (***Penstemon penlandii***)	E	CO	No effect	Habitats do not overlap
Sacramento Mountains thistle (Cirsium vinaceum)	T	NM	No effect	Habitats do not overlap
Sacramento prickly poppy (***Argemone pleiacantha ssp. pinnatisecta***)	E	NM	No effect	Habitats do not overlap
San Francisco Peaks groundsel (***Senecio franciscanus***)	T	AZ	No effect	Habitats do not overlap
Schmoll milk-vetch ***(Astragalus schmolliae)***	C	CO	No effect	Habitats do not overlap
Sentry milk-vetch ***(Astragalus cremnophylax var.***	E	AZ	No effect	Habitats do not overlap

cremnophylax)				
Shrubby reed-mustard (*Schoenocrambe suffrutenscens*)	E	UT	No effect	Restricted range; habitats unlikely to overlap
Siler pincushion cactus *(Pediocactus sileri)*	T	AZ	No effect	Habitats do not overlap
Skiff milkvetch (*Astragalus microcymbus*)	C	CO	No effect	Habitats do not overlap
Sleeping Ute milk-vetch (*Astragalus tortipes*)	C	CO	No effect	Habitats do not overlap
Sneed pincushion cactus (*Coryphantha sneedii var. sneedii)*	E	NM	No effect	Habitats do not overlap
Todsen's pennyroyal *(Hedeoma todsenii)*	E	NM	No effect	Habitats do not overlap
Uinta Basin hookless cactus (*Sclerocactus wetlandicus*)	T	UT	No effect	Habitats do not overlap
Ute ladies-tresses (*Spiranthes diluvialis*)	T	CO, NE, UT	No effect	Habitats do not overlap
Western prairie fringed orchid (*Plantanthera praeclara*)	T	CO, NE, SD, WY	No effect	Habitats do not overlap
White River beardtongue (*Penstemon scariosus var. albifluvis)*	C	CO, UT	No effect	Habitats unlikely to overlap
Zuni fleabane *(Erigeron rhizomatus)*	T	NM	No effect	Habitats do not overlap
Invertebrates				
Alamosa springsnail (*Tryonia alamosae)*	E	NM	No effect	Habitats do not overlap
American burying beetle (*Nicrophorus americanus*)	E	NE, SD	No effect	Restricted range; habitats unlikely to overlap
Chupadera springsnail *(Pyrgulopsis chupaderae)*	C	NM	No effect	Habitats do not overlap
Dakota skipper (*Hesperia dacotae*)	C	ND, SD	No effect	Habitats unlikely to overlap
Gila springsnail (*Pyrgulopsis gilae)*	C	NM	No effect	Habitats do not overlap
Kanab ambersnail (*Oxyloma haydeni kanabensis*)	E	AZ	No effect	Habitats do not overlap
Koster's springsnail (*Jutumia kosferi*)	E	NM	No effect	Habitats do not overlap
New Mexico springsnail (*Pyrgulopsis thermalis*)	C	NM	No effect	Habitats do not overlap

Noel's amphipod (*Gammarus desperatus*)	E	NM	No effect	Habitats do not overlap
Pawnee montane skipper (*Hesperia leonardus montana*)	T	CO	No effect	Habitats do not overlap
Pecos assiminea snail (*Assiminea pecos*)	E	NM	No effect	Habitats do not overlap
Roswell springsnail (*Pyrgulopsis roswellensis*)	E	NM	No effect	Habitats do not overlap
Socorro isopod (*Thermosphaeroma thermophilus*)	E	NM	No effect	Habitats do not overlap
Socorro springsnail (*Pyrgulopsis neomexicana*)	E	NM	No effect	Habitats do not overlap
Texas hornshell (*Popenaias popei*)	C	TX	No effect	Habitats do not overlap
Uncompahgre fritillary butterfly (*Boloria acronema*)	E	CO	No effect	Habitats do not overlap
Mammals				
Black-footed ferret (*Mustela nigripes)*	E, NEP	AZ, CO, KS, MT, NE, NM, ND, OK, SD, TX, UT, WY	May affect; likely to adversely affect	See BO for more information
Canada lynx (*Lynx Canadensis*)	T	CO, MT, UT, WY	No effect	Habitats do not overlap
Grizzly bear (*Ursus arctos horribilis*)	T	MT, WY	No effect	Limited habitat overlap
Gunnison's prairie dog (Cynomys gunnisoni)	C	AZ, CO, NM, UT	May affect; likely to adversely affect	See BO for more information
Jaguar (*Panthera onca*)	E	AZ, NM, TX	No effect	Habitats do not overlap
Lesser long-nosed bat (*Leptonycteris cerasoae yerbabuenae*)	E	NM	No effect	Habitats do not overlap
Mexican long-nosed bat (*Leptonycteris nivalis*)	E	NM	No effect	Habitats do not overlap
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	C	AZ, CO, NM	No effect	Habitats do not overlap
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	T	CO, WY	No effect	Habitats do not overlap

[1] T – threatened; E – endangered; C – candidate; PE - proposed endangered; PT - proposed threatened; E, NEP - endangered, non-essential experimental