Gunnisonn's prairie dog range is characterized by fewer, smaller, and more isolated colonies with minimal to no metapopulation structure. These factors make the prairie dogs in this habitat highly susceptible to plague-related declines.

4.1.5 Gunnison Sage Grouse (Candidate)

Gunnison sage-grouse are smaller than the greater sage-grouse and have distinctive plumage, genetic and behavioral differences. Sage grouse populations are closely associated with sage brush habitats in western North America. They currently occur on 924,000 acres of Federal and non-federal lands in 7 widely scattered and isolated populations in Colorado and Utah. Currently they 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 (CDWP, 2005).

In September of 2010, the USFWS found that the Gunnison sage grouse was warranted for listing under the ESA but precluded by other higher listing priorities. The present and threatened destruction, fragmentation or curtailment of habitat due to changes in land uses and the expansion of invasive plant species is a primary threat to this species. While livestock grazing and conversion of habitat for agricultural purposes can contribute to this threat, these activities themselves are not a significant threat (USFWS 2010c).

4.1.6 Lesser Prairie Chicken (Candidate)

The lesser prairie chicken (*Tympanuchus pallidicinctus*) is a distinct species of North American prairie grouse that inhabits rangelands dominated primarily by shinnery oak (*Quercus havardii*)-bluestem and sand sagebrush (*Artemesia filifolia*)-bluestem vegetation types (Sharpe 1968). Major factors affecting the status of the lesser prairie chicken are conversion, degradation, and fragmentation of habitat. The conversion of native sand sagebrush and shinnery oak rangeland to improved pastures and cropland have been documented as important factors in the decline of the lesser prairie chicken. 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 (Texas Parks and Wildlife Dept, 2006).

In October of 2011, the USFWS published a Candidate Notice of Review that confirmed that the lesser prairie chicken is warranted for listing under the Endangered Species Act but precluded by higher listing priorities.

4.1.7 Sprague's Pipit (Candidate)

The Sprague's pipit (*Anthus spragueii*) is a small passerine of the family Motacillidae that is endemic to the Northern Great Plains (Robbins and Dale 1999, p.1). The Sprague's pipit has buff and blackish streaking on the crown, nape, and underparts, a short bill with a blackish upper mandible and a buffy face with a large eye ring. Males and females are similar, as are juveniles, which are slightly smaller (Robbins and Dale 1999). The Sprague's pipit both breeds and winters on the North American prairie. The breeding range in the United States includes parts of Montana, North Dakota, South Dakota and Minnesota. The species' wintering range includes parts of Arizona, Texas, southern Oklahoma, southern Arkansas, northwest Mississippi, southern Louisiana, and northern Mexico. Breeding bird surveys suggest that the species is in steep decline (Peterjohn and Sauer 1999) with an 80 percent decrease from 1966 through 2007 in U.S and Canadian breeding range (Sauer et al. 2008)

In September of 2010, the USFWS found that the Sprague's pipit was warranted for listing under the ESA but precluded by other listing priorities. While improper grazing and mowing can have impacts on Sprague's pipit, overall habitat fragmentation from conversion of native prairie to other uses is likely having greater impacts on the species (USFWS, 2010b).

4.2 WILDLIFE

Many wildlife species occur within the action area on non-federal grazing lands and could occur on occupied prairie dog habitat. Wildlife presence on any lands to be enrolled in the programmatic Agreement would vary greatly depending on location, proximity to urban development, vegetation community, annual precipitation, and proximity to wildlife dispersal corridors. We identify here and analyze in Chapter 5 Environmental Consequences the wildlife guilds by state and the species of greatest conservation concern that may occur within the action area and may be affected by the proposed action (Table 3).

Table 3. Wildlife that could occur within the action area and may be affected by the Alternatives described in Chapter 3.0.

Wildlife Guilds	Wildlife Families
Invertebrates	Butterflies, Beetles
Reptiles	Snakes, Lizards
Amphibians	Frogs, Toads, Salamanders
Birds	Owls, Raptors, Songbirds, Upland Game Birds
Small Mammals	Rabbits, Rodents and Bats
Ungulates	Bison, Antelope, Deer and Elk
Predators	Coyote, Foxes, Badgers, Bobcats, Mt. Lions, Wolves and Bears

State Wildlife Action Plans

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Fish and wildlife agencies in all 50 states have developed Wildlife Action Plans that examine the health and status of each state's wildlife and habitats, identify potential threats, and outline the actions that are needed to conserve wildlife and their habitats over the long term. Further information on the wildlife guilds in Table 3 can be found in the Wildlife Action Plans (WAP) for each of the 12 states within the action area.

Arizona - The Arizona State Wildlife Action Plan identifies over 796 wildlife species across the state with more than 311 identified as Species of Greatest Conservation Need (SGCN) including 67 mammals, 102 birds, 35 fish, 18 amphibians and 59 reptiles. Some of these species include masked bobwhite, lark sparrow and big brown bat (AGFD 2006). For a complete list see: http://www.azgfd.gov/w_c/cwcs_downloads.shtml

Colorado – The Colorado State Wildlife Action Plan identifies 205 Species of Greatest Conservation Need (SGCN) including 26 mammals, 87 birds, 26 fish, 9 amphibians, 48 invertebrates and 14 reptiles. Some of these species include mountain plover, ferruginous hawk and meadow jumping mouse (CDWP 2005). For a complete list see: http://wildlife.state.co.us/WildlifeSpecies/ColoradoWildlifeActionPlan/Pages/ColoradoWildlifeActionPlan.aspx

Kansas - The Kansas State Wildlife Action Plan identifies 315 Species of Greatest Conservation Need (SGCN) including 22 mammals, 100 birds, 67 fish, 17 amphibians, 64 invertebrates and 47 reptiles. Some of these species include grasshopper sparrow, Eastern meadowlark, swift fox and various butterflies (Wasson et al. 2005) For a complete list see: http://www.kdwpt.state.ks.us/news/Services/Kansas-CWCP/Kansas-CWCP

Nebraska – The Nebraska State Wildlife Action Plan identifies 310 Species of Greatest Conservation Need (SGCN) including 31 mammals, 83 birds, 28 fish, 3 amphibians, 144 invertebrates and 21 reptiles. Some of these species include savannah sparrow, black-tailed jackrabbit and prairie king snake (Schneider et al. 2011). For a complete list see: http://outdoornebraska.ne.gov/wildlife/programs/legacy/Natural_legacy_document.asp

New Mexico – The New Mexico State Wildlife Action Plan identifies over 1,166 wildlife species across the State with more than 452 identified as Species of Greatest Conservation Need (SGCN) including 42 mammals, 74 birds, 37 fish, 15 amphibians, 252 invertebrates and 32 reptiles. Some of these species include prairie vole, white-tailed jackrabbit and swift fox (NMDF 2005). For a complete list see: http://www.wildlife.state.nm.us/conservation/comp_wildlife_cons_strategy/index.htm

North Dakota – The New Mexico State Wildlife Action Plan identifies 100 Species of Greatest Conservation Need (SGCN) including 15 mammals, 45 birds, 22 fish, 3 amphibians, 7 invertebrates and 8 reptiles. Some of these species include Le Conte's sparrow, dickcissel,

Northern harrier and swift fox (Hagen et al. 2005). For a complete list see: http://gf.nd.gov/conservation-nongame-wildlife/wildlife-action-plan-0

Montana - The Montana State Wildlife Action Plan identifies over 600 wildlife species across the State with more than 60 identified as Species of Greatest Conservation Need (SGCN) including 15 mammals, 19 birds, 17 fish, 3 amphibians, 1 invertebrate and 5 reptiles. Some of these species include mountain plover, pygmy rabbit and American bison (MFWP 2005). For a complete list see: http://fwpiis.mt.gov/content/getItem.aspx?id=25513

Oklahoma – The Oklahoma State Wildlife Action Plan identifies over 800 wildlife species across the State with more than 228 identified as Species of Greatest Conservation Need (SGCN) including 26 mammals, 74 birds, 52 fish, 16 amphibians, 58 invertebrates and 22 reptiles. Some of these species include black-tailed prairie dogs, burrowing owl, logger-head shrike and swift fox (ODWC 2005). For a complete list see: http://www.wildlifedepartment.com/CWCS.htm

South Dakota – The South Dakota State Wildlife Action Plan identifies 90 Species of Greatest Conservation Need (SGCN) including 10 mammals, 28 birds, 20 fish, 3 amphibians, 20 invertebrates and 9 reptiles. Some of these species include black-tailed prairie dogs, burrowing owl, long-billed curlew and swift fox (SDGFP 2005). For a complete list see: http://gfp.sd.gov/wildlife/management/plans/wildlife-action-plan.aspx

Texas – The Texas State Wildlife Action Plan identifies thousands of wildlife species across the State with more than 1,300 identified as Species of Greatest Conservation Need (SGCN) including 91 mammals, 110 birds, 231 fish, 70 reptiles and amphibians, 449 invertebrates. Some of these species include black-tailed prairie dogs, burrowing owl, pronghorn and American badger (TPWD 2005). For a complete list see: http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_pl_w7000_1187a/

Utah - The Utah State Wildlife Action Plan identifies over 700 wildlife species across the state with more than 188 identified as Species of Greatest Conservation Need (SGCN) including 39 mammals, 44 birds, 29 fish, 10 amphibians and 34 reptiles. Some of these species include (Sutter et al. 2005). For a complete list see: http://wildlife.utah.gov/cwcs/11-03-09_utah_cwcs_strategy.pdf

Wyoming – The Wyoming State Wildlife Action Plan identifies over 800 wildlife species across the state with more than 188 identified as Species of Greatest Conservation Need (SGCN) including 54 mammals, 60 birds, 40 fish, 12 amphibians and 26 reptiles and 88 invertebrates. Some of these species include: black-tailed prairie dog, swift fox and burrowing owl (WFGD 2005). For a complete list see: http://www.wildlifeactionplan.org/pdfs/action_plans/wy_action_plan.pdf

4.3 ENVIRONMENTAL JUSTICE

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Executive Order 12898, February 11, 1994, requires each Federal agency to make environmental justice a part of its mission. Environmental Justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on proposed Federal actions. Furthermore, the principles of environmental justice require that populations are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by, government programs and activities affecting human health or the environment.

Agencies are to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations, low-income populations, and Indian Tribes. Environmental Justice must be applied throughout the United States, its territories and possessions, the District of Columbia, the Commonwealths of Puerto Rico and the Mariana Islands. Environmental justice issues encompass a broad range of impacts covered by NEPA, including impacts on the natural or physical environment and related social, cultural, and economic impacts. The primary means to attain compliance with environmental justice considerations is through the inclusion of low-income, minority, and tribal populations in the planning process and by translating documents into other languages when members of the affected area are not English-speaking.

There are 103 tribes that are located within the action area (Appendix D). However, only a subset of those tribes is likely to have adequate occupied prairie dog habitat to be eligible for enrollment in the Agreement. The following tribes have occupied prairie dog habitat and have participated in ferret recovery efforts through ESA section 10(j) experimental populations and section 10(a)(1)(A) research and recovery permits: Fort Belknap and Northern Cheyenne Indian Reservations in MT, Rosebud and Lower Brule Indian Reservations in SD. These tribes have had ferrets reintroduced onto their lands and continued to utilize their lands for as they see fit.

4.4 FARM AND RANCH LANDS

The Farmland Protection Act requires that Federal agencies minimize the extent to which their programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses and to assure that their programs are administered in a manner that, to the extent practical, will be compatible with State and local governments and private programs and policies to protect farmland.

Land areas in the U.S. are divided by NRCS into Major Land Resource Areas (MLRAs) on the basis of physiography, geology, climate, water, soils, biological resources, and land use (http://soils.usda.gov/survey/geography/mlra/mlra_definitions.html). There are a total of 104 different MLRAs within the action area. These MLRAs range in type from river plains and lowlands, to upland plains, rolling hills, mountain foothills, and high mountain areas. Only non-federal lands that have occupied prairie dog habitat within the action area may be affected by the implementation of the proposed alternative. Typically, these lands are used for grazing livestock. Overall, approximately 62 percent of private farmland within the MLRAs that occur

within the action area is classified as grazing land. Approximately 531,516,937 acres (830,495 square miles) of privately owned grazing lands fall within the action area. Resource conditions and levels of potential agriculture are relatively uniform within a single MLRA. From the 104 original MLRAs in the action area, 44 were identified as representing the majority of land types identified above, within the historical prairie dog habitat boundaries. We completed a more detailed analysis using these 44 MLRAs. Data for our analysis were obtained on the basis of MLRA or county boundaries. There are 563 separate counties within the action area. To conduct a more efficient analysis, we selected between 1 and 3 counties to represent each of the 44 primary MLRAs. We chose counties on an informal random basis with the condition that each be entirely or mostly included within one of the 44 MLRAs. Within the 87 counties selected for detailed evaluation, the percentage of private farmland in grazing land ranges from 8 percent to over 98 percent with an average of 70 percent. In 59 of the 87 representative counties, more than 50 percent of private farm land is classified as grazing land. Croplands were not considered in this analysis as they are not preferred habitat for prairie dogs or ferrets.

4.5 SOCIOECONOMICS

The social and economic conditions within the action area are varied and diverse. We discuss the social and economic aspects of only the agricultural community because agriculture is the primary land use within prairie dog habitat on non-federal or Tribal lands. According to USDA agricultural statistics, agricultural operations within the action area states are mostly crop-based or livestock-based. While in North Dakota livestock sales make up only 17 percent of total agricultural sales, in the other states within the action area, livestock-based sales range between 41 and 82 percent of all agricultural sales. In some counties within the action area, as much as 98 percent of all agricultural revenue comes from livestock-based operations. Counties with high economic dependence on livestock sales that are, in turn, dependent on grazing lands, have the greatest potential to be affected by the actions analyzed in this document. The value of livestock sales in the states within the action area ranges from just under $1 billion per year in Wyoming to over $14 billion per year in Texas. The total annual value of livestock-based sales in states falling within the action area is more than $52 billion.

The average age of principal operators in states within the action area ranges from 55.7 years up to 59.6 years, with an overall average of 57.5 years. Another characteristic in which producers vary is whether or not farming is their principal occupation. Within the 12 action area states, the percentage of producers for whom farming is their principal occupation ranges from a low of 38 percent in Utah, to a high of 61 percent in Arizona. Where a producer is completely dependent on farm income, he or she will have more at stake in protecting his or her ability to continue farming without disruption.

The racial characteristics of farm operators in the states within the project area range from very minimally diverse to very diverse. For example, in Arizona, approximately 43 percent of farm operators are reported as being white, while in Nebraska, in contrast, white operators make up more than 99 percent of all farm operators (Table 4).

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Table 4. Ethnicity Percentages by Farms in States within the Action Area.

STATE	ETHNICITY					
	American Indian	Asian	Pacific Islander/ Hawian	Black/ African American	Spanish/ Hispanic/ Latino	White
ARIZONA	33	<1	<1	<1	6	73
COLORADO	2	<1	<1	<1	7	98
KANSAS	1	<1	<1	<1	1	99
MONTANA	6	<1	<1	<1	1	96
NEBRASKA	<1	<1	<1	<1	<1	99
NEW MEXICO	23	<1	<1	<1	33	78
NORTH DAKOTA	<1	<1	<1	<1	<1	99
OKLAHOMA	13	<1	1	1	1	93
SOUTH DAKOTA	3	<1	<1	<1	<1	97
TEXAS	2	<1	<1	2	9	97
UTAH	4	<1	<1	<1	2	96
WYOMING	3	<1	<1	<1	2	98

Operators reporting selected race alone or in combination with other races.

5.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the likely environmental consequences of each alternative. The environmental consequences of each alternative will be discussed by the resource components identified in Chapter 4.0.

5.1 ALTERNATIVE A – NO ACTION

Under Alternative A, the Black-footed Ferret Programmatic Safe Harbor Agreement would not be approved and the Enhancement of Survival Permit would not be issued. In the absence of a programmatic Safe Harbor Agreement, the current conditions as related to all of the environmental components identified in Chapter 4.0 would likely remain unchanged.

5.1.1 Threatened, Endangered and Candidate Species

The no-action alternative would not result in adverse or beneficial effects to threatened, endangered and candidate species that would be additional to the status quo. However, under this alternative, achieving recovery of the ferret would likely be prolonged, compared to the proposed alternative, because a single, efficient, coordinated program for providing incentives to landowners to allow ferret reintroductions would not exist in the absence of a programmatic Safe Harbor Agreement. Instead ferret recovery would rely on designating additional 10(j) experimental populations, which provide flexible management options and fewer regulatory requirements on private landowners than

areas without 10(j) designation, but take approximately 2 years and several hundred thousand dollars to complete.

In addition to 10(j) experimental populations, additional reintroduction sites may be established through 10(a)(1)(A) recovery permits. However, unlike a safe harbor agreement, this approach does not provide assurances to the landowner that no further restrictions or commitments would be imposed. Furthermore, these permit terms are limited to five years and must be renewed for extended coverage. Without assurances, many landowners are not likely to volunteer for re- introduction of an endangered species onto their lands due to associated regulatory uncertainty. Therefore, few non-federal landowners are likely to participate in ferret reintroduction and conservation under this alternative.

5.1.2 Wildlife

Under the no-action alternative no additional effects to other wildlife species are expected. However, improvements to wildlife habitat and populations are not likely to occur at the same scale as under the proposed alternative due to the lack of landowner incentives under a coordinated program as in the proposed alternative.

5.1.3 Environmental Justice

Under the no-action alternative environmental justice issues would remain unchanged. Minority populations, low-income populations, and Native American Tribes could continue to participate with ferret recovery actions on a voluntary basis through 10(j) nonessential experimental populations and 10(a)(1)(A) recovery permits, which lessen restrictions on take prohibitions. Therefore, it is unlikely that the current occurrence of ferrets or any future reintroductions would limit land uses and affect cultural uses under the no action alternative. However, participation would be limited by the ability of the USFWS to develop and approve alternative mechanisms.

5.1.4 Farm and Ranchland

Under the no-action alternative, farm and ranch lands would likely continue to be utilized for livestock production and for activities to facilitate that use such as moving livestock, installing and maintaining fences to manage livestock, providing water for livestock, controlling weeds, and other routine grazing and ranching activities. No changes to the use of these lands are expected as a result of this alternative.

5.1.5 Socioeconomic

Under the no-action alternative the socioeconomic conditions within the action area are not expected to be affected. The economic foundation of these states would likely remain in agriculture. Black-footed ferrets in the wild currently exist only where special regulatory provisions are in place, which do not interfere with existing land uses. Recognizing the importance of maintaining local support for the recovery of this species,

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the USFWS does not intend to reintroduce ferrets without cooperation from non-federal landowners. Therefore, it is unlikely that the current occurrence of ferrets or any future reintroductions would limit land uses and affect socioeconomic conditions under the no-action alternative.

5.2 ALTERNATIVE B - PROPOSED ACTION

Under the proposed action alternative, the USFWS would issue an ESA section 10(a)(1)(A) Enhancement of Survival Permit to the Black-footed Ferret Recovery Coordinator in accordance with an approved Black-footed Ferret Programmatic Safe Harbor Agreement . The Recovery Coordinator may enroll those eligible landowners who volunteer se to participate and agree to implement the conservation activities described in the Agreement. The proposed conservation activities include ferret reintroduction, plague management, prairie dog management and livestock grazing. Implementation of the proposed Agreement is expected to result in overall beneficial effects to the ferret and prairie dogs. However, some short-term adverse impacts to some environmental factors may occur. The environmental consequences for each environmental component identified in Chapter 4.0 are discussed below.

5.2.1 Threatened, Endangered and Candidate Species

Table 5 indicates whether potential effects to each threatened, endangered or candidate species from each conservation activity are positive, negative, both or neutral. Positive effects include the protection and management of enrolled lands for a minimum term of 10 years which will provide habitat not only for ferrets but other threatened, endangered and candidate species. Enrollment of non-Federal lands under the Agreement may also lead to less conversion of these lands to uses that are incompatible with wildlife habitat, particularly habitat that supports threatened, endangered and candidate species.

Table 5. Conservation Activities to Be Implemented under the Proposed Action and the Potential Impacts to Threatened, Endangered and Candidate Species.

Species	Ferret Reintroduction	Disease Management	Prairie Dog Management	Livestock Grazing
Black-footed Ferret	+	+	-+	=
California Condor	=	=	-	=
Greater Sage Grouse	+	=	-+	-+
Gunnison Prairie Dog	=	+	-	=
Gunnison Sage Grouse	=	=	-+	-+
Lesser Prairie Chicken	=	=	=	-+
Sprague's Pipit	=	=	=	=

+ The Conservation Activity identified is expected to have positive impacts to this species
- The Conservation Activity identified is expected to have negative impacts to this species.
= The Conservation Activity identified is expected to have neutral impacts to the species.

Ferret Reintroduction

Under the proposed action, ferret reintroductions would be carried out on the enrolled lands as described in Chapter 3.2 above and the draft Safe Harbor Agreement (Appendix C). 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, if any (USFWS 2006). To date, less than 0.005 percent of the 3,000 ferrets reintroduced have perished from transporting and handling (pers. comm. Gober, 2012).

Survival rates range from 10.1 percent to 45.5 percent, 30 days after release of ferrets (Biggins et al. 2004). These low survival rates among reintroduced ferrets are mainly due to predation and natural causes. Captive-raised ferrets have not been exposed to the same environmental factors and therefore have not developed the same degree of disease resistance as wild ferrets. Furthermore, captive-raised ferrets have not been taught to hunt for prey or avoid predators. According to studies at Meeteetse, WY, in the 1980s, natural mortality of ferrets in the wild is high. Data presented by Forrest et al. (1988) were used for computer simulation modeling by Harris et al. (1989) and indicated juvenile mortality rate of a stable wild population to approximate 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 in the successful ferret reintroduction sites.

Incidental take of reintroduced 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. Furthermore, ferret reintroduction activities will occur for only one to three days in the fall, limiting the time in which collisions with ferrets or other threatened, endangered or candidate species identified in Table 5 could occur.

Additional occurrences or expansions of ferret populations from the proposed reintroductions under this alternative are not expected to have adverse impacts on California condors, greater sage grouse, Gunnison's sage Grouse, lesser prairie chicken, or Sprague's pipit, as ferrets do not prey on or compete with these species for prey. Although ferrets rely primarily on prairie dogs for food, the proposed action would not impact the Gunnison's prairie dog within the montane areas, where it is a candidate for listing, because lands in these areas are not likely to meet the Agreement's requirement of 3,000 acres of occupied habitat for enrollment.

Plague Management

Insecticide Use

The use of deltamethrin to kill fleas that may carry sylvatic plague in prairie dog burrows is not expected to affect any threatened, endangered or candidate species. Deltamethrin, the active ingredient of DeltaDust® (0.05%), 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 six to ten months (Tripp, et. al., unpublished; 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 this alternative, 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 and candidate species in the area (Table 5), because, with the exception of Gunnison's prairie-dog, none of these species use prairie dog burrows. Because the montane areas where the candidate Gunnison's prairie dog occurs are unlikely to support populations eligible for ferret reintroductions under the Agreement, deltamethrin 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 to be 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 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 waterbodies. 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 after six to ten months following treatment. 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 (Gunnison Sage-Grouse Steering Committee 2005, Connoly 2004). Therefore, localized depletions of arthropod populations within prairie dog burrows from deltamethrin treatment are unlikely to adversely impact sage-grouse or prairie chicken populations.

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 dogs within the action area. (USFWS, 2008, 2009). It is also considered a high magnitude, imminent threat to black-footed ferrets (USFWS, 2008). 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 indicator of suitable ferret habitat.

SPV Vaccine Application

Should the SPV be approved by the FDA, its application under this alternative is unlikely to affect any threatened, endangered or candidates species. 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 (USGS 2012). Raccoon pox virus has been shown to be highly safe in numerous animals (Esposito et al., 1988, 1992; Fekadu et al., 1991; DeMartini et al., 1993; Osorio et al., 2003; Mencher et al., 2004; Roche et al., 2004a, 2006, 2008a,b, unpublished), including black-footed ferrets, prairie dogs, dogs, cats, sheep, mice, etc. While there is no published information on the impacts of the vaccine on birds, the vaccine has been successfully used throughout the southeast with no reported effects to birds.

USGS 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 (Tripp, unpublished data), including Gunnison's prairie dogs. We do not anticipate any effects to the remaining listed and candidate species in the action area, which are all birds (Table5, because attraction of the bait to birds is expected to be low (USGS 2012). Furthermore, the bait is not expected to persist more than several days after application, limiting the potential for exposure to any threatened and endangered species (pers. comm. Roche 2012).

Vehicle Use

During application of either deltamethrin or the SPV, vehicle and ATV use for plague management will typically not exceed two weeks per year, and 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 individuals of the threatened, endangered and candidate species identified in Table 5. Furthermore, most, if not all vehicle and ATV use will occur during daylight hours, when ferrets are not active, so risk of ferret collisions would also be very low to none. The extremely low number of individuals of listed or candidate species, if any, that may be lost due to such collisions is not likely to affect the stability of local populations of these species.

Prairie Dog Management

Live Trapping

Under the proposed alternative, prairie dogs would be managed as requested by the Cooperator, according to each Reintroduction Plan developed for enrolled lands as described in Chapter 3.2 and Appendix C. Prairie dog management is not expected to have significant impacts to threatened, endangered or candidate species. The likelihood of incidentally trapping non-target listed and candidate species identified in Table 5 is very low to none. The listed and candidate birds 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 time during each day. Thus, in the unlikely event that any of the threatened, endangered or candidate species enters a trap, the accidentally trapped animal would be released before it could be harmed. Disturbance to sage grouse during trapping activities would be avoided by conducting all trapping activities outside sensitive reproductive seasons. The candidate populations of the Gunnison's prairie dog currently are not large enough to 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.

Shooting

Lethal prairie dog management will be restricted to shooting or the use of zinc phosphide 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 ESA prohibitions of take of such species, such opportunistic shooting is highly unlikely. Although candidate species do not have ESA protection, a participating landowner is also likely to be aware of the sensitivity of candidate species and would not likely deliberately shoot them. Therefore, risks to threatened, endangered and candidate species from opportunistic shooting is unlikely. Accidental shooting of listed or

candidate bird species in Table 5 is not expected because these birds would likely flush and leave the area in response to gunshot noise. Loss of ferrets as a result of shooting is unlikely because they are nocturnal and shooting for prairie dog management would occur during the day.

Zinc Phosphide

Because zinc phosphide is highly toxic to mammals and some birds (Witmer, 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, 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 & Fagerstone, 1994). Under the proposed alternative, zinc phosphide for prairie dog management would be applied primarily by Wildlife Services. This agency has extensive experience in the application of zinc phosphide of prairie dog management. Therefore, misapplication and exposure to non-target species is low.

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, 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 gastro-intestinal 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, 2003). Furthermore, many of the targeted animals die underground (as would be the case for prairie dogs), where they do not pose a secondary risk to most predators or scavengers (Knowles 1986).

The extent of prairie dog management associated with this Agreement, regardless of the method, will be confined to the Management Zone of enrolled lands of each Cooperator. While we cannot predict 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 alternative is to contribute to the recovery of the ferret through reintroductions, which requires healthy, stable prairie dog populations. Because the size of the Management Zone cannot exceed that of the Conservation Zone, a maximum of 500,000 acres of prairie dog management could occur. On the other hand, an equal or greater amount of

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acreage of prairie dog populations would be maintained in the Conservation Zones to support ferret reintroductions. Furthermore, prairie dog management outside the Conservation Zones would be either necessary as a result of expanding populations or would not differ in level from management that would occur under the no action alternative. Therefore, prairie dog management under the proposed alternative would not have adverse impacts on prairie dog populations.

Livestock Grazing

Under the proposed alternative, the Agreement does not require any changes to grazing management on enrolled lands. Therefore, the proposed alternative would not result in changes to any impacts from ongoing grazing activities to threatened, endangered and candidate species listed in Table 5. However, a Cooperator may independently choose to improve the quality of the grazing management on his/her lands. Any changes to grazing management on enrolled lands would be carried out according to a prescribed grazing plan that meets NRCS standards and specifications with a purpose to address environmental resource concerns. Thus, improved grazing management is expected to provide overall positive effects to the environment and the threatened, endangered or candidate species in Table 5.

Livestock grazing and the activities to facilitate that activity will require the use of vehicles and equipment. This could result in collisions with some threatened, endangered and candidate species as identified in table 5. 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 threatened, endangered and candidate species.

Climate Change

Our analyses under NEPA include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). "Climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Warmer temperatures and increasingly dry conditions that may occur in portions of the action area as a result of climate change could reduce availability of forage for some prairie dogs populations which may result in declines or inhibit expansion of those populations. Consequently, such declines may reduce prey availability for ferrets that depend on the affected prairie dog populations. However, part of the purpose of the proposed Agreement is to establish more ferret populations across their range to provide for redundancy against stochastic losses, such as those that could occur as a result of climate change. Therefore, the proposed action alternative would ultimately result in better status of the ferret in the face of climate change than without additional reintroductions.

5.2.2 Wildlife

The effects to wildlife other than threatened, endangered and candidate species is discussed by the conservation activities identified in the Proposed Alternative. While there may be some risk of short term impacts to wildlife species, particularly from prairie dog management, the overall impacts are expected to be beneficial to wildlife.

Ferret Reintroductions The activity of reintroducing ferrets will occur for only one to three days in the fall at each reintroduction site. The only potential impact to wildlife associated with ferret reintroduction activities would may be vehicle or equipment collisions. For the same reasons explained in the previous section on effects to listed and candidate species, we expect the risk of impacts from collisions to other wildlife to be low. Because ferret releases will be very short in duration and occur well outside the breeding season for most wildlife, associated activities would not impact more sensitive life-cycle activities through disturbance or death or injury of breeding adults, eggs, or young. Prairie dogs within the colony where ferrets are released may experience higher predation rates, but long-term population level impacts are not expected because previous ferret release sites have shown continued prairie dog expansion rates after ferret reintroductions similar to rates that occurred prior to ferret reintroductions (Griebel 2009, TESF 2011).

Plague Management

Insecticide Use

Because the product would be placed down individual prairie dog burrows, and not applied above ground, it would remain directly unavailable to essentially all non-burrowing terrestrial wildlife species. Toxicity for birds is very low (LD50 range of 5,000-10,000 mg/kg) (http://www.bvsde.paho.org/bvsapud/i/fulltext/deltameth/deltameth.htm. Therefore toxicity to birds such as burrowing owls is unlikely. Deltamethrin is practically nontoxic to mammals (LD50 range 6,500-22,000 mg/kg) (http://www.bvsde.paho.org/bvsapud/i/fulltext/deltameth/deltameth.htm), therefore, toxicity to kit foxes, badgers, and other ground squirrels that may occasionally utilize

prairie dog burrows is unlikely. Furthermore, 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. The label for DeltaDust® requires avoidance of applications to water bodies. Prairie dog colonies and ferrets typically are not within close proximity to waterbodies. Therefore, aquatic wildlife within the project area are not likely to be exposed to this pesticide. Because the treatment and application is specifically directed at controlling flea populations in prairie dog burrows under this alternative, the proposed application rate is about 150 times lower than recommended rates for customary home and agricultural use. The use of deltamethrin has been shown to be effective at controlling fleas for six to ten (6-10) months (Tripp, et. al., unpublished; Biggins et al., 2010).

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 will have no potential for exposure to the treatment, which will leave adequate populations to re-inhabit prairie dog burrows when the effects of insecticide diminish after six to ten (6-10) months following treatment. Insects are an important food source for many wildlife species including burrowing owls and other small mammals. Reduction of arthropod populations within treated prairie dog burrows could temporarily reduce food sources, indirectly impacting arthropod eating wildlife. However, because the product would be placed down individual prairie dog burrows, and not applied above ground, adequate populations of arthropods should be available in surrounding, non-treated areas.

The positive consequence of the use of deltamethrin is reduction or elimination of mortality from sylvatic plague an identified stressor to all prairie dog populations within the action area (USFWS 2008, 2010). Reduction of plague mortality can stabilize prairie dog populations, providing more resilient prairie dog colonies and food sources for wildlife species that depend on prairie dogs such as predators and raptors.

SPV Vaccine Application

Should the SPV be approved by the FDA, its application under this alternative is unlikely to affect wildlife species other than threatened, endangered or candidate species. 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 (USGS 2012). Raccoon pox virus has been shown to be highly safe in numerous animals (Esposito et al., 1988, 1992; Fekadu et al., 1991; DeMartini et al., 1993; Osorio et al., 2003; Mencher et al., 2004; Roche et al., 2004a, 2006, 2008a,b, unpublished), including

black-footed ferrets, prairie dogs, dogs, cats, sheep, mice, etc. While there is no published information on the impacts of the vaccine on birds, the vaccine has been successfully used throughout the southeast with no reported effects to birds.

USGS 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 (Tripp, unpublished data), including Gunnison's prairie dog. We do not anticipate any effects to other wildlife species in the action area. Furthermore, the bait is not expected to persist more than several days after application, limiting the potential for exposure to any non-target wildlife species (pers. comm. Roche 2012).

Vehicle Use

During application of either deltamethrin or the SPV, vehicle and ATV use for plague management will typically not exceed two weeks per year, and 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 non-target wildlife species. Furthermore, most, if not all vehicle and ATV use will occur during daylight hours, when many species are less active, so risk of collisions would also be very low to none.

Prairie Dog Management

Live Trapping

Under the proposed alternative, prairie dogs would be managed as requested by the Cooperator, according to each Reintroduction Plan developed for enrolled lands as described in Chapter 3.2 and Appendix C. The likelihood of incidentally trapping non-target wildlife species is low. Prairie dog trapping would occur only during the day, greatly limiting the potential to trap non-target wildlife as many are nocturnal. Furthermore, the trapping and handling protocol requires that traps be monitored several time during each day. Thus, in the unlikely event that any of non-target wildlife species enters a trap, the accidentally trapped animal would be released before it could be harmed.

Shooting

Lethal prairie dog management will be restricted to shooting or the use of zinc phosphide 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. However, this is not expected to occur beyond what might occur currently and is not expected to affect any species at a population level.

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Zinc Phosphide

Because zinc phosphide is highly toxic to both mammals and some birds (Witmer, 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, 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 & Fagerstone, 1994).

Zinc phosphide can have both primary and secondary hazards to non-target species. Primary effects refer to effects from direct consumption of, or exposure to the product. Secondary effects refer to the effects of prey that has consumed the product. However, zinc phosphide does not bio-accumulate in non-target predators or scavengers (Witmer, 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). While it is possible that predators could be exposed through undigested grain in rodent cheek pouches or gastro-intestinal tracts, many predators will not consume the gastrointestinal tract of prey items and many animal species exhibit an emetic response to zinc phosphide consumption (Witmer, 2003). Furthermore, many of the targeted species die underground where they do not pose a secondary risk to predators or scavengers (Knowles 1986).

Prairie dog management associated with this Agreement, regardless of the method, will be defined in each Reintroduction Plan of enrolled lands of each Cooperator. While we do not know how many landowners will enroll in the Agreement. It is anticipated that over the life of the Agreement (50 years), that 500,000 acres of occupied prairie dog habitat will be made available for ferret reintroductions. If the Management Zone cannot exceed the Conservation Zone, a maximum of 500,000 acres of prairie dog management could occur over the life of the Agreement. However, annual enrollment will be limited by ferret availability from the captive breeding facilities, thus limiting the acres of prairie dog management that would occur on an annual basis.

Livestock Grazing

There are no changes to grazing management required by the Agreement. Therefore, the proposed action is not expected to result in changes to other wildlife species as a result of this action. However, a Cooperator may choose to improve the quality of the grazing management on his/her lands. Any changes to grazing management on enrolled lands would be carried out according to a prescribed grazing plan that meets NRCS standards and specifications with a purpose to address environmental resource

concerns. Improved grazing management is expected to provide overall positive effects to the environment and any other wildlife species would be inconsequential.

5.2.3 Environmental Justice

Under the Proposed Action, participation in the Safe Harbor Agreement would be voluntary for any landowner who meets the eligibility requirements for habitat suitability identified in Chapter 3.2. Because participation is voluntary, disproportionately high and adverse human health or environmental effects of the Agreement are not expected on minority populations, low-income populations, or Indian Tribes.Many Tribes have indicated a desire to participate in recovery efforts for ferrets and the Agreement would expedite the ability for these tribes to participate and would provide assurances that their participation would not result in additional regulatory burdens associated with the ESA for cultural and historical land uses.

5.2.4 Farm and Ranch Land

The Farmland Protection Act requires that Federal agencies minimize the extent to which their programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses and to assure that their programs are administered in a manner that, to the extent practical, will be compatible with State and local governments and private programs and policies to protect farmland.

Under the Proposed Action, landowners who choose to participate in the Safe Harbor Agreement would commit to continue to utilize their lands as agreed upon by the landowner and the Recovery Coordinator. In most cases, enrolled landowners are likely to continue livestock grazing, the activities that facilitate grazing (e.g., installing and maintaining fences, installing and maintaining watering facilities and controlling weeds), and other land uses compatible with ferret conservation. Thus, the release of ferrets and associated management activities are not expected to change or disrupt current land uses or contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. In fact, the proposed action may result in prolonged use of enrolled lands for agricultural uses.

Some ranchers are concerned with potential impacts to ranching activities from the presence of prairie dogs, such as the risk of injury to livestock and damage to equipment from prairie dog burrows and competition for livestock forage. However, the Agreement under this alternative allows for prairie dog management in designated management zones to address such concerns. For this reason and because participation in the Agreement is voluntary, conservation activities that might result in expansion of areas inhabited by prairie dogs under this alternative would not occur in areas where not desired by landowners.

5.2.5 Socioeconomic

Under Alternative B, Cooperators would be expected to continue their current use of enrolled lands. The release and management of black-footed ferrets as described in section 3.2 and Appendix C will be coordinated with the grazing activities. The presence of ferrets and the management activities associated with the release of black-footed ferrets, are not expected to change or disrupt current land uses. Furthermore, the assurance provided to the landowner through the Certificate of Inclusion will provide regulatory certainty that the economic benefits derived from these uses should remain unaffected by the proposed Action.

Independent of the Agreement, Cooperators may choose to improve their grazing systems with technical and financial assistance provided by NRCS under the Farm Bill. Improved grazing systems can increase range productivity which can translate to corresponding increases in livestock based revenue. However, landowners that choose to enroll in the Agreement and participate in NRCS Farm Bill programs may be eligible for increased financial assistance. This could result in an improved economic situation for enrolled landowners. Under the proposed action, the social situation is not expected to change.

Carbon emissions caused by the proposed alternative would be associated with vehicular use for reintroduction efforts, prairie dog management, and plague management. Such use would entail a small number of vehicles, occur infrequently and only on enrolled lands. Therefore, the amount of carbon emissions from the proposed alternative would be miniscule compared to that occurring from other sources globally contributing to climate change.

5.3 ALTERNATIVE C - INDIVIDUAL SAFE HARBOR AGREEMENTS

Under Alternative cC landowners who choose to develop an individual safe harbor agreement for their lands would likely commit to conservation activities very similar to those that would be in the reintroduction plans under the proposed alternative. Thus, the type and extent (at the individual participating lands level) of impacts to all of the components of the affected environment – threatened, endangered and candidate species; wildlife; environmental justice; farm and ranchlands; and socioeconomics, would be the same as identified in the proposed alternative. However, the combined level of both beneficial and adverse impacts from all such agreements is likely to be somewhat lower than from the proposed alternative because fewer landowners would be willing to invest the longer time and more resources required to develop and process an individual safe harbor agreement.

6.0 CUMULATIVE EFFECTS

The Council on Environmental Quality defines cumulative impacts as the impact on the environment which results from the incremental impact of the action when added to other

past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7). The time frame for this cumulative effects analysis corresponds with the 50-year permit duration of the Proposed Action. Specific identification or quantification of past, present and reasonably foreseeable future actions outside of the USFWS's purview is not feasible due to the extensive geographic scope and time frame defined for the Proposed Action. However, in general, many past and present human activities, in addition to those of the USFWS, have occurred across the action area over the last several centuries. Collectively these activities have had profound impacts upon the landscape; ranging from agricultural production to urban development, energy development to transportation and infrastructure improvements. Similarly, one could presume that innumerable activities, similar in nature to these things are reasonably foreseeable within the vicinity of the action area based on expected population increases, and associated urbanization, economic development and infrastructure improvements, including transportation and utilities, as well as increased energy development. Examples of such actions that may have some negative impacts on the human environment are included in Table 6.

Table 6. Summary of past, present and reasonably foreseeable future activities in the action area.

Types of Actions	Associated Activities/Facilities
Renewable energy development	Vegetation clearing, construction, access roads, hydropower generating stations, powerlines, operations and maintenance, repowering or decommissioning
Natural gas exploration development and production	Exploratory drilling, construction of well pads, well installation, associated pipelines and utility corridors, access, compressor stations, potential spills/releases, site reclamation.
Coal and other mineral exploration, development and production	Exploratory drilling and trenching along with access development; production within surface or underground mines along with associated access roads, processing plants, transportation, solid waste, tailings, site reclamation
Transmission and distribution systems	Development and improvements to utility corridors, including carrier pipelines, oil and gas pipelines, transmission lines, along with associated infrastructure (substations, access roads, fuel transfer stations) and potential for spills/releases.
Transportation/Infrastructure improvements	Construction and improvements to highways, roads, parkways, railroad construction or

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