Draft Environmental Assessment of Proposed 4(d) Protective Regulations for the Utah Prairie Dog

April 2012
Draft NEPA Document

Prepared By:
U.S. Fish and Wildlife Service
Utah Field Office
2369 West Orton Circle, Suite 50
West Valley City, Utah 84119

TABLE OF CONTENTS

1 Purpose of and Need for Action 1–1
1.1 Description of Purpose and Need 1–1
1.2 Background of Regulatory Authorities 1–1
1.3 Description of Proposed Action 1–3
1.4 Action Area 1–6
2 Alternatives 2–1
2.1 Alternative 1 (No Action) 2–1
2.2 Alternative 2 (Preferred Action) 2–1
2.2.1 Permitting Take 2–2
2.2.2 Limiting Where Take is Allowed 2–3
2.2.3 Limiting the Amount and Distribution of Direct Take That Can Be Permitted ... 2–4
2.2.4 Limiting Methods Allowed to Implement Direct Take 2–5
2.2.5 Incidental Take From Normal Agricultural Practices 2–6
2.3 Alternative 3 2–7
2.4 Alternatives Considered but not Analyzed in Detail 2–7
3 Affected Environment 3–1
3.1 Threatened or Endangered Species 3–1
3.1.1 Autumn Buttercup 3–1
3.1.2 California Condor 3–2
3.1.3 Greater Sage-Grouse 3–3
3.1.4 Utah Prairie Dog 3–4
3.2 Other Fish And Wildlife 3–8
3.3 Transportation System 3–9
3.4 Farm Lands 3–10
3.5 Livestock Grazing 3–12
3.6 Socioeconomics 3–14
3.6.1 Iron County 3–14
3.6.2 Beaver County 3–14
3.6.3 Emery County 3–15
3.6.4 Sevier County 3–15
3.6.5 Millard County 3–16
3.6.6 Sanpete County 3–16
3.6.7 Washington County 3–17
3.6.8 Garfield County 3–17
3.6.9 Kane County 3–17
3.6.10 Wayne County 3–18
3.6.11 Piute County 3–18
4 Environmental Consequences 4–1
4.1 Alternative 1 (No Action) 4–1
4.1.1 Threatened or Endangered Species 4–1
4.1.2 Other Fish and Wildlife 4–9
4.1.3 Transportation System 4–10

4.1.4 Farm Lands 4–11
4.1.5 Livestock Grazing 4–11
4.1.6 Socioeconomics 4–11
4.2 Alternative 2 (preferred action) 4–13
4.2.1 Threatened or Endangered Species 4–13
4.2.2 Other Fish and Wildlife 4–20
4.2.3 Transportation System 4–21
4.2.4 Farm Lands 4–21
4.2.5 Livestock Grazing 4–21
4.2.6 Socioeconomics 4–21
4.3 Alternative 3 4–21
4.3.1 Threatened or Endangered Species 4–22
4.3.2 Other Fish and Wildlife 4–23
4.3.3 Transportation System 4–23
4.3.4 Farm Lands 4–23
4.3.5 Livestock Grazing 4–24
4.3.6 Socioeconomics 4–24
5 Cumulative Impacts 5–1
Cumulative 5–1
5.1 Activities 5–1
5.1.1 Urban Expansion 5–1
5.1.2 Agricultural Use and Overgrazing 5–2
5.1.3 Off-Highway Vehicle/Recreational Uses 5–3
5.1.4 Energy Resource Exploration and Development 5–4
5.1.5 Poaching 5–5
5.1.6 Occurrence of Plague 5–5
5.1.7 Utah Prairie Dog Recovery Actions 5–8
5.1.8 Lead in the Environment 5–8
5.2 Summary of Cumulative Effects 5–9
6 Comparison of Alternatives 6–1
7 Literature Cited 7–1
8 List of Agencies Consulted 8-1

TABLES

Table 1. Comparison of Current Special Rule, Current Practice, and Proposed Amendments. 1–4
Table 2. Action Area by County. 1–6
Table 3. Population and Occupancy Data for Each Recovery Unit. 3–6
Table 4. Wildlife Species in Action Area and their Potential to Occur in Utah Prairie Dog Habitats and Feed on Utah Prairie Dog Carcasses. 3–9
Table 5. Land Ownership Acreage (and Percentage) Within Allotments in the Action Area. 3–12
Table 6. Amount of Utah Prairie Dog Take Permitted and Reported Under the ESA 4(d) Rule by UDWR, 1985-2010 (UDWR 2005, 2010, 2011). 4–8
Table 7. Comparison of the Environmental Effects of the Alternative Actions. 6–1

FIGURES

Figure 1. Action Area. 1–7
Figure 2. Current Range of the Utah Prairie Dog. 3–5
Figure 3. Utah Prairie Dog Spring Counts with Rangewide Population Trend LIne (UDWR 2005, 2010, 2011). 3–6
Figure 4. Farm Lands in the Action Area. 3–11
Figure 5. Grazing and Pasture Lands in the Action Area. 3–13

APPENDICES

Appendix A. Components of the Affected Environment Checklist A-1
Appendix B. Federally Listed Endangered, Threatened and Candidate Species and Critical Habitat in the Action Area B-1
Appendix C. Utah Prairie Dog Recovery Unit Boundary Descriptions C-1

ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
CFR	Code of Federal Regulations
EA	Environmental Assessment
ESA	Endangered Species Act of 1973, as amended
FAA	Federal Aviation Administration
FPPA	Farmland Protection Policy Act
MZ	Management Zones
NEPA	National Environmental Policy Act of 1969, as amended
NRCS	Natural Resources Conservation Service
RU	Recovery Unit
SITLA	State of Utah School and Institutional Trust Lands Administration
TNC	The Nature Conservancy
USFWS	U.S. Fish and Wildlife Service
USFS	US Forest Service
UDWR	Utah Division of Wildlife Resources

1 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF PURPOSE AND NEED

The Utah prairie dog is federally listed as a threatened species under the Endangered Species Act of 1973, as amended (ESA). The purpose and need for action is to conserve the Utah prairie dog using the flexibility of the ESA to prohibit take to the extent necessary and advisable to provide for the conservation of the Utah prairie dog.

When the Utah prairie dog was reclassified from endangered to threatened status on May 29, 1984 (49 FR 22330), we developed a special rule under section 4(d) of the ESA, applying the prohibitions for threatened animals (50 CFR 17.31) to the Utah prairie dogs except for allowing regulated take of up to 5,000 animals annually on private lands in Iron County, Utah. On June 14, 1991 (56 FR 27438), we amended the special rule to allow regulated take of up to 6,000 animals annually on private lands throughout the species' range. Both rules were intended to relieve Utah prairie dog population pressures in overcrowded portions of the range—agricultural practices were making the habitat more productive than it was historically, thus allowing the prairie dog population to achieve unnaturally high densities. The resulting overpopulation pressures may have increased the risk of sylvatic plague outbreaks and increased competition for available resources (49 FR 22333-22334, May 29, 1984; 56 FR 27439-27441, June 14, 1991). In addition, these rules were necessary and advisable to address the growing conflicts between landowners and prairie dogs by providing for ecologically based population control that also alleviated some of the impacts to agricultural operations (49 FR 22330, May 29, 1984; 56 FR 22330, pages 27439-27440).

Based on new scientific information and 25 years of available data, we are proposing to amend the existing 4(d) special rule. This amendment would revise the 1984 special rule as amended in 1991 (hereafter referred to as the "existing special rule"), by limiting the specific areas where take is allowed, limiting the amount and distribution of direct take that can be permitted, limiting the methods allowed to implement direct take, and not prohibiting incidental take from normal agricultural practices.

The 1991 special rule (56 FR 27438, June 14, 1991; 50 CFR 17.40(g) authorizes the Utah Division of Wildlife Resources (UDWR) to permit take of up to 6,000 animals on private land within the species' range annually, without restrictions. Our proposed new restrictions on direct take and the proposed new incidental take provision would support the conservation of Utah prairie dogs while still providing relief and conservation incentives to private landowners. On the whole, we believe this proposed rule would help maintain the stable to increasing long-term population trends we have seen over the last 25 years [U.S. Fish and Wildlife Service (USFWS 2012)], and facilitate the recovery of the Utah prairie dog.

1.2 BACKGROUND OF REGULATORY AUTHORITIES

Section 4(a) of the ESA requires the USFWS to list species it determines are threatened or

endangered[1] after conducting a review of the species' status and evaluating efforts being made to protect it.

Section 9(a) of the ESA prohibits the "take"[2] of any fish or wildlife species listed under the ESA as endangered; under Federal regulation, take of fish or wildlife species listed as threatened is also prohibited unless otherwise specifically authorized by regulation. For species listed as threatened, section 4(d) of the ESA is used to prescribe those regulations that are necessary and advisable to conserve a threatened species. These 4(d) protective regulations, or "4(d) rules," may prohibit, with respect to threatened species, some or all of the acts that section 9(a) of the ESA prohibits with respect to endangered species. Both the section 9(a) prohibitions and section 4(d) regulations apply to all individuals, organizations, and agencies subject to United States jurisdiction.

We have elected to extend all prohibitions under section 9 of the Act to threatened species through a "blanket 4(d) rule" unless otherwise specified in a separate 4(d) rule (50 CFR §17.31 (a), (c)). In some instances, we used our ability to create a separate 4(d) rule to tailor regulations to meet the conservation needs of the species. In these cases, the species-specific 4(d) regulation replaces the blanket regulation. Because the blanket rule effectively extends all available prohibitions to threatened species, separate 4(d) rules could be viewed as "exempting," "allowing," or "permitting" acts that would otherwise be prohibited. Instead, it is more accurate to say that a species-specific 4(d) rule supersedes the blanket 4(d) rule for the species at issue, and extends a more tailored set of prohibitions to the species. As a result, there may be some prohibitions that apply to other threatened species that do not apply to the threatened species at issue. In the interest of providing a clear rule and environmental assessment with simple language, we will be using "exempt" and "allow" in order to convey that the 4(d) rule would not prohibit certain actions. It is important to note that this use of language is for clarity only. The 4(d) rule would still function by prescribing the regulations necessary and advisable to conserve the species.

The ESA provides other protections for listed species, regardless of whether a species is listed as endangered or threatened. Section 7 of the ESA outlines the procedures for Federal interagency cooperation to conserve federally listed species and designated critical habitats. Section 7(a)(1) directs all Federal agencies to, in consultation with the Secretary, use their authorities in the furtherance of the purposes of this Act by carrying out programs for the conservation of endangered and threatened species. Section 7(a)(2) directs each Federal agency to, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Section 10 of the ESA provides a clear regulatory mechanism to permit the incidental take of federally listed fish and wildlife species by private interests and non-Federal government agencies during lawful land, water, and ocean use activities. Congress intended this process to reduce conflicts

---

[1] Threatened is defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. An endangered species is any species which is in danger of extinction throughout all or a significant portion of its range.

[2] Take, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

between listed species and economic development activities, and to provide a framework that would encourage "creative partnerships" between the public and private sectors and state, municipal, and Federal agencies in the interests of endangered and threatened species and habitat conservation (H.R. Rep. no. 97-835, 97th Congress, Second Session).

1.3 DESCRIPTION OF PROPOSED ACTION

Because the Utah prairie dog is federally listed as a threatened species and has special management considerations, we are proposing to revise our special regulations for the conservation of the Utah prairie dog. Our existing special rule for the Utah prairie dog did not find it necessary and advisable to apply the take provisions described in section 9 of the ESA to activities occurring on private lands across the range of the species, under a permit system developed by the Utah Division of Wildlife Resources (UDWR) as implemented under Utah State Code R657-19-6, R657-19-7. We are proposing to revise the 1991 rule to specifically limit where take is allowed, limit the amount and distribution of direct take that can be permitted, limit the methods allowed to implement direct take, and authorize incidental take from normal agricultural practices (Table 1).

Table 1. Comparison of Current Special Rule, Utah State Code, and Proposed Amendments.

	Current Rule and Utah State Code	Proposed Amendments
Who Can Allow Take	UDWR	UDWR, or with the Service's written approval, other entities can perform the permitting and reporting tasks for control activities on agricultural lands or properties adjacent to conservation lands. No permits are required for take in areas where prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites.
Where Direct Take Is Allowed	Existing Special Rule—private lands Utah Code—agricultural lands.	Direct take is limited to: Agricultural land being physically or economically impacted by Utah prairie dogs when the spring count on the agricultural lands is seven or more individuals; private properties within 0.8 km (0.5 mi) of Utah prairie dog conservation land; and areas where human safety hazards or the sanctity of significant human cultural or human burial sites are a serious concern, but only after all practicable measures to resolve the conflict are implemented.
Amount of Rangewide Direct Take Allowed	6,000 animals annually.	The total annual upper permitted take limit may not exceed 10 percent of the estimated rangewide population (adults and juveniles) annually for agricultural lands and properties adjacent to conservation lands; and, on agricultural lands, may not exceed 7 percent of the estimated annual rangewide population annually. There is no limit for the amount of take in areas where prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites, and take in these circumstances does not contribute to the upper permitted take limits described above.
Site-Specific Limits on Amount of Direct Take	No restrictions specified.	On agricultural lands, within-colony take is limited to one-half of a colony's estimated annual production (approximately 36 percent of estimated total population). On properties neighboring conservation lands, take is restricted to animals in excess of the baseline population. The baseline population is the highest estimated total (summer) population size on that property during the 5 years prior to establishment of the conservation property. No numeric take limits are established where take is incidental to otherwise legal activities associated with standard agricultural practices, in areas of serious human safety hazards, or where prairie dogs disturb the sanctity of significant human cultural or human burial sites.
Timing of Allowed Direct Take	June 1 to December 31.	The timing of permitted take on agricultural lands and properties adjacent to conservation lands is limited to June 15 through December 31. There is no timing restriction where prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites, except that translocations must be completed prior to conducting any lethal take.

Methods Allowed to Implement Direct Take	Existing Special Rule—no restrictions specified Utah Code—limited to firearms and trapping, and chemical toxicants specifically prohibited.	On agricultural lands and properties adjacent to conservation lands, direct take is limited to activities associated with translocation efforts by trained and permitted individuals complying with current USFWS-approved guidance, trapping intended to lethally remove prairie dogs, and shooting. Actions intended to drown or poison prairie dogs, and the use of gas cartridges, anticoagulants, and explosive devices are prohibited in these areas. There are no restrictions on methods to implement take in areas where prairie dogs create serious human safety areas or disturb the sanctity of significant human cultural or human burial sites, except that translocations must be conducted before lethal measures of control are allowed.
Ability to Further Restrict Direct Take	The USFWS may immediately prohibit or restrict such taking as appropriate for the conservation of the species.	Unchanged.
Incidental Take	Not authorized.	Utah prairie dogs may be taken when take is incidental to otherwise legal activities associated with standard agricultural practices (see rule for specifics).

Because the Secretary has discretion in specifying regulations deemed necessary and advisable to provide for the conservation of threatened species, the promulgation of 4(d) protective regulations is subject to the requirements of the National Environmental Policy Act of 1969, as amended (NEPA). For this EA, the conditions presently existing under the 4(d) rule established May 29, 1984 (49 FR 22330) that was amended on June 14, 1991 (56 FR 27438) are represented by the No Action alternative.

1.4 ACTION AREA

The action area includes the Utah prairie dog recovery units (see Figure 2 in section 3.1.4, below), and areas within 10 miles of known colonies to provide a buffer should prairie dogs expand beyond known occupied/mapped habitats (Table 2, Figure 1). The action area thus includes the entirety of Beaver, Iron, Piute, and Sevier counties, and portions of Emery, Garfield, Kane, Millard, Sanpete, Washington, and Wayne counties (Table 2).

Table 2. Action Area by County.

County	Total Acres per County	Acres Within UPD 4d Rule Action Area	Percent County within 4d Rule Action Area
Beaver	1,654,465	1,654,465	**100**
Emery	2,853,125	57,473	**2**
Garfield	3,331,067	1,393,075	**42**
Iron	2,113,393	2,113,393	**100**
Kane	2,627,474	238,052	**9**
Millard	4,375,780	1,619,149	**37**
Piute	489,673	489,673	**100**
Sanpete	1,024,887	234,844	**23**
Sevier	1,227,082	1,227,082	**100**
Washington	1,556,233	115,745	**7**
Wayne	1,577,473	539,530	**34**
Grand Total	**54,323,771**	**9,682,482**	**18**

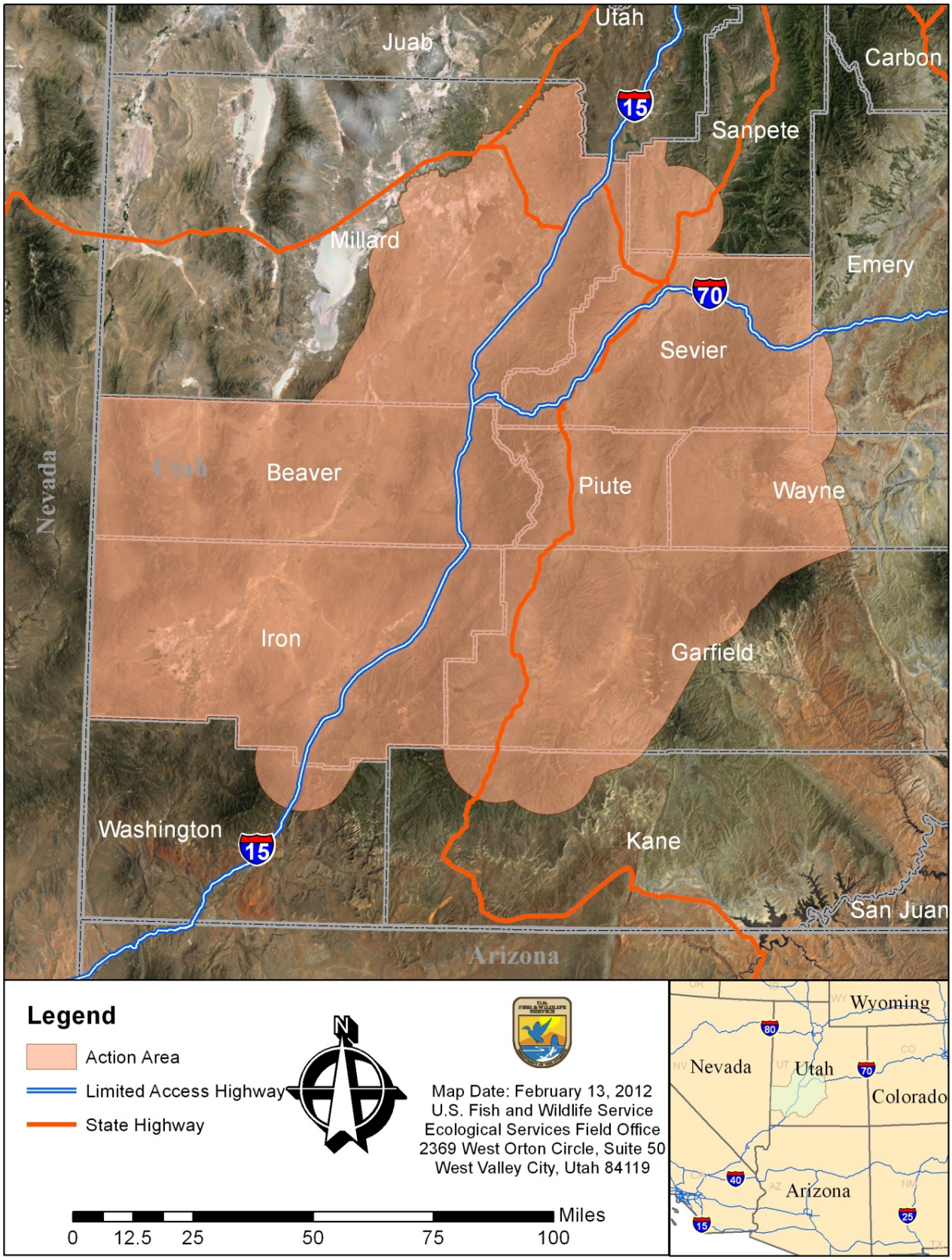

Figure 1. Action Area.

2 ALTERNATIVES

This EA describes and evaluates alternatives for addressing ESA 4(d) protective regulations for the Utah prairie dog. The environmental impacts of the alternative actions are assessed relative to baseline conditions established by existing laws and regulations. This EA was prepared in accordance with the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508; July 1, 1986) and the Department of the Interior's (Departmental) regulations for implementing NEPA (43 CFR §46; October 15, 2008)..

2.1 ALTERNATIVE 1 (NO ACTION)

Under Alternative 1 (No Action), we would not change the existing special rule, as amended in 1991. Up to 6,000 animals per year could continue to be authorized for lethal take on all private lands throughout the species' range, in the months of June 1 to December 31 (56 FR 27438; 50 CFR § 17.40). The UDWR would still be required to maintain records on permitted take and make them available to us upon request (50 CFR 17.40(g)). Under this alternative, we would continue to retain the ability to immediately prohibit or restrict take as appropriate for the conservation of the species if we receive substantive evidence that the permitted take was having an effect that is inconsistent with the conservation of the species (50 CFR 17.40(g)). There are no other specific limitations established by the existing special rule.

The UDWR sets some limits to the use of the 4(d) rule through a permitting system that has been in place since the 1984 rule (Utah Code R657-19-6, R657-19-7). The UDWR restricts the issuance of lethal take permits to 6,000 animals annually on agricultural areas where Utah prairie dogs are causing damage (Utah Code R657-19-6, part 1(b)(i); R657-19-7, part 6(b)). The taking of Utah prairie dogs is limited to the months of June 1 through December 31 (Utah Code R657-19-7, part 5). The UDWR permits taking only by shooting or trapping on agricultural lands where prairie dogs are causing damage, and the use of chemical toxicants are not allowed (Utah Code R657-19-6, parts 2(a),(b)). Overall, the Utah State Code is more restrictive than the existing special rule which authorizes take on all private lands across the species' range.

This action alternative evaluates the existing special rule as limited by Utah State Code. The existing regulatory environment has been in place since 1984. We recognize that Utah State Code could change in the future, and we note this where applicable throughout our analysis of Alternative 1.

2.2 ALTERNATIVE 2 (PREFERRED ACTION)

Under Alternative 2 (Preferred Action), we would amend the existing special rule and extend the prohibitions in section 9(a)(1) of the ESA to Utah prairie dogs on all lands across the species' range, where not specifically exempted (see Table 1, above). We propose to clarify those areas specifically exempted from the prohibitions (i.e. where lethal take is not prohibited) to include agricultural lands where prairie dogs are causing damage, private property neighboring conservation lands, and properties where Utah prairie dogs are causing

serious human safety hazards or disturbing the sanctity of significant human cultural or human burial sites and the amount of prairie dogs that can be taken in these areas. We also propose to limit the methods of take that can be permitted on agricultural lands and properties near (within 0.8 km (0.5 mi)) conservation lands to translocations, trapping intended to lethally remove prairie dogs, and shooting, and to modify the season in which take can occur on these lands to June 15 through December 31. There would be no limits on the amount, methods, or timing on take in areas where prairie dogs cause serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites. In addition, we propose to authorize incidental take from normal agricultural practices. Overall, our proposed amendments result in a revised special rule that is similar to Utah State Code in some instances (e.g., Limiting Where Take is Allowed, Limiting the Methods Allowed to Implement Take), and more restrictive in other instances (e.g., Limiting the Amount of Take, modifying the season of take to begin June 15 instead of June 1), but mostly consistent with UDWR-permitting past practices.

2.2.1 Permitting Take

AGRICULTURAL LANDS AND PROPERTIES NEAR CONSERVATION LANDS

The existing special rule allows take of Utah prairie dogs when permitted by UDWR. Under the existing special rule, UDWR biologists are required to count Utah prairie dogs, determine extent of damage, determine level of take, and issue permits to applicants who requested the ability to control prairie dogs on their lands. At the time the existing special rule was published, UDWR biologists were likely the only persons with the expertise to perform these permitting tasks. However, we now have a larger partnership effort, in the form of the Utah Prairie Dog Recovery Implementation Program, in which members of other state, federal, tribal, local entities and the public are working together on various programs to facilitate the species' recovery. Because of this partnership, we can reasonably assume that other entities may hire biologists or individuals with expertise in Utah prairie dogs, and that these individuals may be available to conduct many of the permitting responsibilities previously undertaken by the UDWR. Approved permitting entities would at a minimum be required to employ a sufficient number of professional wildlife biologists to conduct all permitting responsibilities; request and complete permitting training from the UDWR for staff assigned to permitting; complete the USFWS's annual Utah prairie dog survey training; maintain a complete reporting and tracking system for take, including annual reports on the number and location of permits issued, spring population counts and boundaries of permitted colonies, number of animals allowed to be taken, number of animals actually taken, method of take, and method of disposal of all Utah prairie dogs taken. Thus, this Alternative would allow, with written approval of the USFWS, other entities to perform the UDWR-permitting and reporting tasks for control activities. For simplicity, this draft EA refers throughout to UDWR-permitted take, but by inference would also apply to other permitting entities should those entities assume specific responsibilities under this special rule.

AREAS WHERE PRAIRIE DOGS CREATE SERIOUS HUMAN SAFETY HAZARDS OR DISTURB THE SANCTITY OF SIGNIFICANT HUMAN CULTURAL OR HUMAN BURIAL SITES

Take would be allowed in these areas when Utah prairie dogs are determined, with the written approval of the Service to be presenting a serious human safety hazard (e.g., airport safety areas, recreational sports fields, nursing homes, schools), or disturbing the sanctity of a significant human cultural or human burial site sites (e.g., public cemetery, sacred tribal sites) if these lands are determined not necessary for the conservation of the species. No permit would be required in these instances.

2.2.2 Limiting Where Take is Allowed

The first situation where take would be allowed is on lands that meet the Utah Farmland Assessment Act of 1969 definition of agricultural lands (Utah Code Annotated Sections 59–2–501 through 59–2–515). Specifically, to be considered agricultural, lands must:

(1) meet the general classification of irrigated, dryland, grazing land, orchard or meadow;
(2) be capable of producing crops or forage;
(3) be at least 2 contiguous hectares (ha) (5 contiguous acres (ac)) (smaller parcels may qualify where devoted to agriculture use in conjunction with other eligible acreage under identical legal ownership);
(4) be managed in such a way that there is a reasonable expectation of profit;
(5) have been devoted to agricultural use for at least 2 successive years immediately preceding the year in which application is made; and
(6) meet State average annual (per-acre) production requirements.

Additionally, agricultural operators must demonstrate that their land is being physically or economically impacted by Utah prairie dogs. The UDWR would conduct a visual census of the applicant's property to verify that the land is being physically or economically impacted by Utah prairie dogs. During the visual census, UDWR personnel would count prairie dogs on the applicant's property and determine a population estimate for the colony. Permits would only be authorized on agricultural lands that have a minimum spring count of seven animals (Day pers. comm. 2011).

The second situation where take would be allowed is on private property adjacent to and within 0.8 kilometers (km) (0.5 mile (mi)) of Utah prairie dog conservation lands. Conservation lands are areas set aside for the preservation of Utah prairie dogs and are managed specifically or primarily toward that purpose. Conservation lands may include, but are not limited to, non-federal properties set aside as conservation banks, fee title purchased properties, properties under conservation easements, or properties subject to a safe harbor agreement. In order to be recognized as Utah prairie dog conservation land, the parcel must be accompanied by documentation that clearly defines the conservation benefits to the Utah prairie dog. In addition, documentation

must be available describing the location of all neighboring private properties within 0.8 km (0.5 mi) of the conservation land parcel; the baseline populations of prairie dogs on the neighboring private properties (the highest estimated population size of the last 5 years prior to the establishment of the conservation property); and the methods of Utah prairie dog control that would be allowed on the neighboring private properties.

The third situation where take would be allowed is in areas where Utah prairie dogs are determined, with our approval, to be presenting a serious human safety hazard (e.g., airport safety areas), or disturbing the sanctity of significant human cultural (e.g., tribal sites) or human burial sites (e.g., cemetery) if these lands are determined not necessary for the conservation of the species. This change would only apply to areas where a credible, serious public safety hazard could be demonstrated. No UDWR permit is necessary for take in these locations. Areas of serious human safety hazards do not include public rangelands; or properties being developed for residential or commercial uses. In addition, we would not intend for this rule to be used to eliminate prairie dogs because of concerns regarding plague transmission to humans, unless this disease becomes a proven human safety issue in the future, and directly linked to the presence of Utah prairie dogs. Lethal take in these situations is considered a last resort, and would only be allowable after all practicable measures to resolve the conflict are implemented. All practicable measures means, with respect to these situations, the (1) construction and maintenance of a prairie-dog proof fence, above and below grade to specifications approved by us, around the area in which there is concern, and (2) translocation of Utah prairie dogs out of the area in which there is a concern. Lethal take would be allowed only to remove prairie dogs that remain in these areas after the measures to fence and translocate are successfully carried out. Despite our best engineering efforts, prairie dog-proof fences may still be breached by prairie dogs. The local communities or private entities would be required to maintain the fence, fix any breaches, or modify the fences as necessary to limit access of prairie dogs in order for the lethal take authorization to be sustained long-term.

2.2.3 Limiting the Amount and Distribution of Direct Take That Can Be Permitted

The existing special rule allows UDWR to permit take for a maximum of 6,000 animals annually between June 1 and December 31, without additional restrictions as long as such take is not having an effect that is inconsistent with Utah prairie dog conservation.

AGRICULTURAL LANDS AND PROPERTIES NEAR CONSERVATION LANDS

Under this Alternative, we would limit the allowable permitted take to no more than 10 percent of the estimated annual rangewide population (adults and juveniles). Take associated with agricultural lands would never exceed 7 percent of the estimated annual rangewide population. The remaining allowable take would be reserved for properties neighboring conservation lands. In addition, UDWR would spatially distribute the 7 percent across the three Recovery Units, based on the distribution of

the total annual population estimate within each RU. This spatial distribution would help ensure that the take is not clustered in one area, and is instead more uniform based on comparative annual population numbers.

Furthermore, we are limiting within-colony take on agricultural lands to not exceed one-half of a colony's estimated annual productivity. Annual productivity = [(2 × spring adult count) × 0.67 (proportion of adult females) × 0.97 (proportion of breeding females) × 3.88 (average number of young per breeding female)], or approximately 36 percent of the total estimated population of the colony.

AREAS WHERE PRAIRIE DOGS CREATE SERIOUS HUMAN SAFETY HAZARDS OR DISTURB THE SANCTITY OF SIGNIFICANT HUMAN CULTURAL OR HUMAN BURIAL SITES

We would not limit the amount of lethal take allowed on lands where Utah prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites. In these situations, we would allow lethal take of all Utah prairie dogs remaining in the site once prairie-dog fences have been installed and as many Utah prairie dogs as is feasible have been relocated out of the site. This activity would only occur on lands that the USFWS has determined are not necessary for the conservation of the species.

2.2.4 Limiting Methods Allowed to Implement Direct Take

The existing special rule did not restrict the method or type of take UDWR can permit. In practice, UDWR has permitted the control of Utah prairie dogs through translocation efforts, trapping intended to lethally remove prairie dogs, and shooting. Under this Alternative, we would limit the methods of take that would be allowed to be consistent with this past practice.

AGRICULTURAL LANDS AND PROPERTIES NEAR CONSERVATION LANDS

Translocation would be one of the approved methods of taking Utah prairie dogs. Currently, only UDWR performs Utah prairie dog translocations. This proposal would allow all properly trained and permitted individuals to translocate prairie dogs to new colony sites in support of recovery actions, provided these parties comply with current USFWS-approved translocation guidance. Translocated prairie dogs would count toward the take limits established under this Alternative. Translocation activities would comply with current Service approved guidelines (at present, the approved guidelines are the 2006 Recommended Translocation Procedures (see Appendix D *in* USFWS 2012)) in order for the provisions of this proposed rule to apply.

While translocation is and shall continue to be the preferred take option, largely due to its contribution to recovery, finite staff resources and a limited availability of suitable translocation sites require that other tools also be available. Thus, we are limiting the methods of intentional lethal take to forms with a proven success record as demonstrated by past UDWR permitting, including lethal removal through

trapping and shooting. Controlled take could be carried out by the landowner or the U.S. Department of Agriculture, Wildlife Services with the landowner's permission. Use of these same proposed methods has occurred over the past 25 years, while the total population of Utah prairie dogs rangewide and within individual colonies subject to take has remained stable to increasing (Day, pers. comm. 2010).

Under this Alternative, we would specifically prohibit drowning, poisoning, and the use of gas cartridges, anticoagulants, and explosive devices as methods of permissible lethal control on agricultural lands and properties adjacent to conservation lands. These types of methods are typically applied across large areas and usually kill large numbers of prairie dogs (Collier 1975, p. 55). These techniques are not employed by UDWR under the existing special rule and are explicitly prohibited by this rule on agricultural lands and properties adjacent to conservation lands because they do not allow control agents to target a specific number of prairie dogs or track actual take.

The existing special rule limits control of prairie dogs to a June 1 to December 31 time period. Under this Alternative we would allow Utah prairie dog control on agricultural lands and properties neighboring conservation lands from June 15 to December 31.

AREAS WHERE PRAIRIE DOGS CREATE SERIOUS HUMAN SAFETY HAZARDS OR DISTURB THE SANCTITY OF SIGNIFICANT HUMAN CULTURAL OR HUMAN BURIAL SITES

There would be no limits on the methods of take in areas where prairie dogs create significant human safety hazards or disturb the sanctity of significant human cultural or human burial sites.

We would not restrict shooting to a specified time frame in areas where prairie dogs present a serious human safety hazard or disturb the sanctity of significant human cultural or human burial sites because the specific intent of control in these areas is to remove the remaining prairie dogs following implementation of all practicable measures including fencing and translocations.

2.2.5 Incidental Take From Normal Agricultural Practices

Normal agricultural practices can result in incidental take (harm, harass, or death) of Utah prairie dogs. For example, agricultural equipment can accidentally crush burrows or individual animals. Burrows can be flooded by normal irrigation practices and thus made uninhabitable for Utah prairie dogs, or result in incidental mortality.

Under this Alternative, we would exempt incidental take resulting from agricultural practices on legitimately operating agricultural lands. Exempted practices include plowing to depths not exceeding 46 centimeters (cm) (18 in.), discing, harrowing, irrigating crops, mowing, harvesting, and bailing, as long as the activities are not intended to eradicate Utah prairie dogs. These are traditional practices on this landscape.

The above activities would be exempted from incidental take prohibitions on agricultural lands, only in accordance with the previously described Utah Farmland Assessment Act of 1969 (Utah Code Annotated Sections 59–2–501 through 59–2–515). To be considered agricultural land under this proposed rule, lands must meet the following requirements: They must meet the general classification of irrigated, dryland, grazing land, orchard, or meadow; must be capable of producing crops or forage; must be at least 2 contiguous ha (5 contiguous ac) (smaller parcels may qualify where devoted to agriculture use in conjunction with other eligible acreage under identical legal ownership); must be managed in such a way that there is a reasonable expectation of profit; must have been devoted to agricultural use for at least 2 successive years immediately preceding the year in which application is made; and must meet State average annual (per acre) production requirements.

2.3 ALTERNATIVE 3

Under this alternative, we would promulgate the blanket 4(d) rule that applies all ESA section 9(a)(1) take prohibitions to the Utah prairie dog. Under this alternative, direct lethal take would not be allowed unless permitted pursuant to section 10(a)(1)(A) of the Act.

2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

We considered one other alternative which would allow take on all lands regardless of land ownership across the range of the species. However, we concluded that this Alternative would not benefit the conservation of the Utah prairie dogs because it would authorize take on federal, non-agricultural lands. Federal non-agricultural lands do not support unnaturally high densities of Utah prairie dogs, so control would not benefit these populations. In addition, there are no significant impacts to local communities or agricultural uses from the presence of Utah prairie dog on federal lands. No other possible alternatives were identified within the reasonable range of alternatives for the scope of this action.

3 AFFECTED ENVIRONMENT

All resources considered in this EA are found in the Components of the Affected Environment Checklist (Appendix A). Rationale for why components may or may not be impacted by the Proposed Action is also provided in this appendix. Components that may be affected by the Proposed Action are analyzed in detail in this chapter and in Chapter 4. We have determined the potential impacts would likely be limited to the following components:

- threatened or endangered species,
- other fish and wildlife,
- transportation system,
- farm lands,
- livestock grazing, and
- socioeconomics.

No other resources are expected to be impacted by the proposed action, so they were not included in the Affected Environment discussion, or in Chapter 4, Environmental Consequences.

3.1 THREATENED OR ENDANGERED SPECIES

We reviewed all threatened, endangered, and candidate species in the Action Area to determine if they may be impacted by our Alternatives (Appendix B). Within the Action Area, the following threatened, endangered, and candidate species occur and may be potentially impacted by the Proposed Action: Autumn buttercup, California condor, greater sage-grouse, and Utah prairie dog.

3.1.1 Autumn Buttercup

The Autumn buttercup (*Ranunculus acriformis* var. *aestivalis*) is a herbaceous perennial plant in the buttercup or crowfoot family. The Autumn buttercup grows to a height of 0.3 to 0.6 meters (1 to 2 feet) tall. Most of the leaves are centered at the base and both stems and leaves are covered in fine hairs. The flowers are 1.3 centimeters (1 inch) in diameter and are yellow. Flowering occurs from late July to early October.

We listed the Autumn buttercup on July 21, 1989, as an endangered species (54 FR 30550). At that time, we believed the greatest threats to the species were destruction, modification, or curtailment of its habitat, predominantly from livestock grazing; predation from livestock and small mammals; lack of adequate regulatory mechanisms (the plant occurs only on private lands and receives no protection from any Federal, State, or local law or regulation); and small population size and limited distribution. The Autumn buttercup is a narrow endemic occurring only in the Sevier River Valley in Garfield County, Utah.

Autumn buttercups occur in two populations, both on private lands. One population on private lands is heavily grazed; however, it appears to be healthy (Roth 2011). This population occurs within a wet meadow community and individual plants occur

on islands of drier hummocks. The second population is on land owned by The Nature Conservancy (TNC) specifically for the conservation of the autumn buttercup. The population on TNC lands is in dire condition. The plants on TNC land occur on drier sites, but are extremely limited in number. In 2011, only 15 plants were found (Roth 2011). We are working with partners to determine the cause of the decline in the population on TNC land.

Utah prairie dog burrows occur on the TNC property upslope from the autumn buttercup population; however the burrows are historical and not currently occupied by prairie dogs. Prairie dog burrows also occur across highway 89 from the TNC property. Prairie dogs eat forbs; however, it is unknown if they would eat Autumn buttercup or if they could have a negative impact on the population. However, prairie dogs and Autumn buttercups have occurred together on this site in the past as evidenced by the historical prairie dog mounds.

3.1.2 California Condor

The California condor (*Gymnogyps californianus*) 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 10 kilograms (22 pounds) with wing spans up to 2.9 meters (9.5 feet) (USFWS 1996; 61 FR 54043). Condors reach sexual maturity by 5 to 6 years of age and breeding occurs between 6 and 8 years of age. Breeding California condors normally lay a single egg between late January and early April, every other year (USFWS 1996). The condor provides an extensive amount of parental care and the average incubation period for a condor egg is about 56 days (USFWS 1996). Fledging occurs at six months of age; however, juvenile condors may be dependent on their parents for more than a year. The California condor life span is unknown, but may possibly extend up to 60 years (San Diego Zoo 2005). Condors are strict scavengers. Unlike turkey vultures, condors do not have an exceptional sense of smell (National Park Service 2005). They locate their food visually, often by investigating the activity of ravens, coyotes, eagles, and other scavengers. Condors may eat the carcasses of cattle, domestic sheep, California ground squirrels, mule deer, and horses; however, they prefer deer (61 FR 54045). Without the guidance of their parents, young, inexperienced juvenile condors may also investigate the activity of humans. As young condors learn and mature, this human directed curiosity diminishes (National Park Service 2005).

The California condor was listed as endangered in 1967 (March 11, 1967, 32 FR 4001). Critical habitat was designated 9 years later within the state of California. Despite intensive conservation efforts, the wild California condor population declined steadily until 1987, when the last free-flying individual was captured. During the 1980s, captive 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 increasingly successful captive breeding, condors were first released back to the wild in California in early 1992. On October 6, 1996, the USFWS announced its intention to reintroduce California condors into northern Arizona and southern Utah, and designated the

released birds as a nonessential, experimental population under Section 10(j) of the ESA (61 FR 54043). On October 29, 1996, six California condors were released at the Vermilion Cliffs in Coconino County of northern Arizona. The current nesting sites occur within Grand Canyon National Park and Vermillion Cliffs, Arizona. Condors are not known to nest within Utah; however, they are frequently observed foraging and roosting in and around Zion National Park. The latest estimate for the number of California condors within Arizona and southern Utah is 73 birds (California Condor Recovery Program 2011).

Most California condor deaths are directly or indirectly related to human activity. Shootings, poisoning, lead poisoning, and collisions with power lines are the condors' major threats, and all of these activities occur within the action area. The principal source of lead contamination in condors is from hunter-killed deer (Parish *et al.* 2009). Condors that have high levels of exposure to lead are susceptible to mortality. However, condors may be exposed to lead at low levels which may impact fertility and reproduction, neural development of young, and other processes (Mautino 1997 and Gangoso *et al.* 2009 *in* Parish *et al.* 2009). The condor's slow rate of reproduction and high number of years spent reaching breeding maturity make the birds more vulnerable to these threats.

3.1.3 Greater Sage-Grouse

Greater sage-grouse (*Centrocercus urophasianus*) are the largest grouse in North America. Males often weigh in excess of 2 to 3 kilograms (4-7 pounds) and hens weigh 1 to 2 kilograms (2-4 pounds) (USFWS 2011). Greater sage-grouse require large, interconnected expanses of sagebrush with healthy, native understories (Patterson 1952; Knick *et al.* 2003; Connelly *et al.* 2004; Connelly *et al.* 2011; Pyke 2011; 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 sage-grouse and their habitats within these areas are likely to respond similarly to environmental factors and management actions. The action area is completely within MZ III, the Southern Great Basin Management Zone. The minimum male population estimate for this MZ, which includes portions of California, Nevada, and Utah, is 6,854 birds (75 FR 13915).

A detailed description of seasonal habitats, sage-grouse natural history and population trend analyses can be found in our March 2010 status review (75 FR 13915).

Threats within MZ III include land conversion to agriculture, urban, or industrial uses; fire; invasive plants, particularly nonnative annual grasses; pinyon-juniper encroachment; nonrenewable energy and mineral exploration and development; renewable energy sources such as wind and geothermal; and drought.

3.1.4 Utah Prairie Dog

The Utah prairie dog (*Cynomys parvidens*) is the smallest species of prairie dog. Individuals are typically 305 to 360 millimeters (12 to 14 inches) long (Hollister 1916) and weigh 640 to 1410 grams (1.4 to 3.1 pounds) (Wright-Smith 1978). Utah prairie dogs range in color from cinnamon to clay.

The Utah prairie dog was listed as an endangered species on June 4, 1973 (38 FR 14678), pursuant to the Endangered Species Conservation Act of 1969. At the time of listing, the species was threatened with extinction due to habitat destruction; modification or severe curtailment of habitat; over exploitation; disease; and predation. The species was reclassified as threatened on May 29, 1984 (49 FR 22330), with a special rule to allow take of prairie dogs on agricultural lands. Critical habitat has not been designated for this species.

Utah prairie dogs forage primarily on grasses and forbs, preferring plants with higher moisture content (Crocker-Bedford 1976). They often select colony sites in swales where the vegetation can remain moist even in drought conditions (Collier 1975; Crocker-Bedford and Spillet 1981). Vegetation must be of short stature to allow the prairie dogs to see approaching predators as well as have visual contact with other prairie dogs in the colony (Collier 1975; Crocker-Bedford and Spillet 1981). Prairie dogs will avoid areas where brushy species dominate, and will eventually decline or disappear in areas invaded by brush (Collier 1975; Player and Urness 1982). Well-drained soils are a habitat requirement for Utah prairie dogs to excavate burrow sites. Burrows must be deep enough to protect the prairie dogs from predators and environmental and temperature extremes.

The Utah prairie dog occurs in three geographically identifiable areas, or recovery units, within southwestern Utah: (1) the Awapa Plateau; (2) the Paunsaugunt, and (3) the West Desert (Figure 2 and Appendix C). The Awapa Plateau recovery unit encompasses portions of Piute, Garfield, Wayne, and Sevier Counties. The Paunsaugunt Plateau recovery unit is primarily in western Garfield County, with small areas in Iron and Kane Counties. The West Desert recovery unit is primarily in Iron County, but extends into southern Beaver County and northern Washington County. Table 3 provides information on each recovery unit, including average percentage of the rangewide population and average percentage of prairie dogs occurring on non-Federal land (UDWR 2009, 2010). Additional information on prairie dog life history and status can be found in our 2012 Revised Recovery Plan (USFWS 2012).

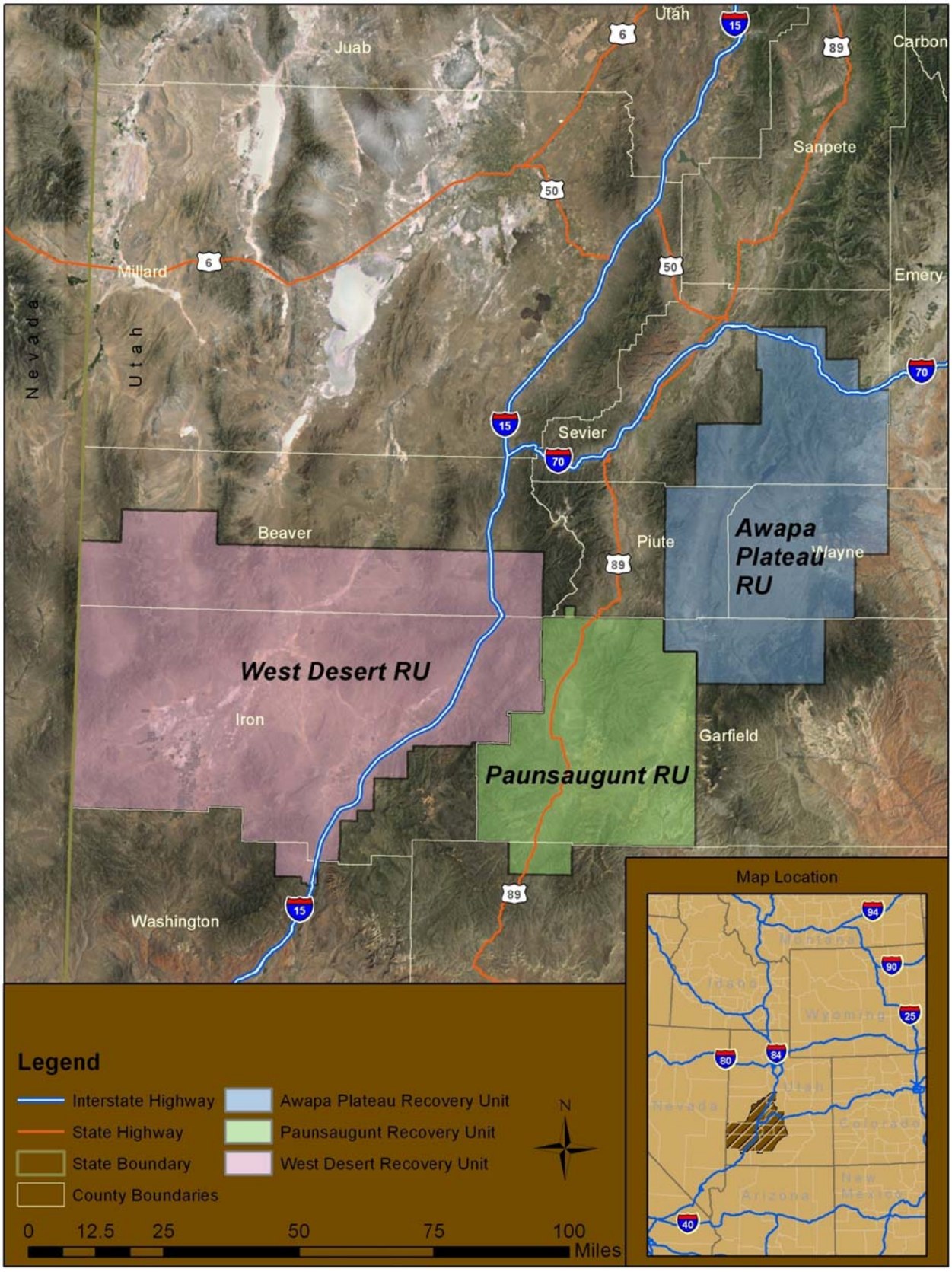

Figure 2. Current Range of the Utah Prairie Dog

Table 3. Population and Occupancy Data for Each Recovery Unit.

Recovery Unit	Average Percentage of Rangewide Population	Average Percentage of Prairie Dogs Occurring on Non-Federal Land
Awapa Plateau	8.9	47.6
Paunsaugunt	16.9	71.0
West Desert	74.2	85.1
Note: Averages calculated from 2000 to 2009. Source: UDWR 2009, 2010.		

Approximately 30 percent of Utah prairie dogs range-wide occur on federal or otherwise protected lands (e.g., conservation easements, conservation banks). The remaining 70 percent of Utah prairie dogs occur on non-federal lands where they may be more vulnerable to threats associated with habitat loss (USFWS 2012). Of the three recovery units, the Awapa Plateau recovery unit has the highest percentage of prairie dogs (up to 70 percent) occurring on federal lands and the West Desert recovery unit has the highest percentage of prairie dogs (up to 90 percent) occurring on private lands.

Utah prairie dog population estimates provide population trend information. Utah prairie dog spring counts from the past 30 years show considerable annual fluctuations, but a stable to increasing long-term trend (USFWS 2012; Figure 3).

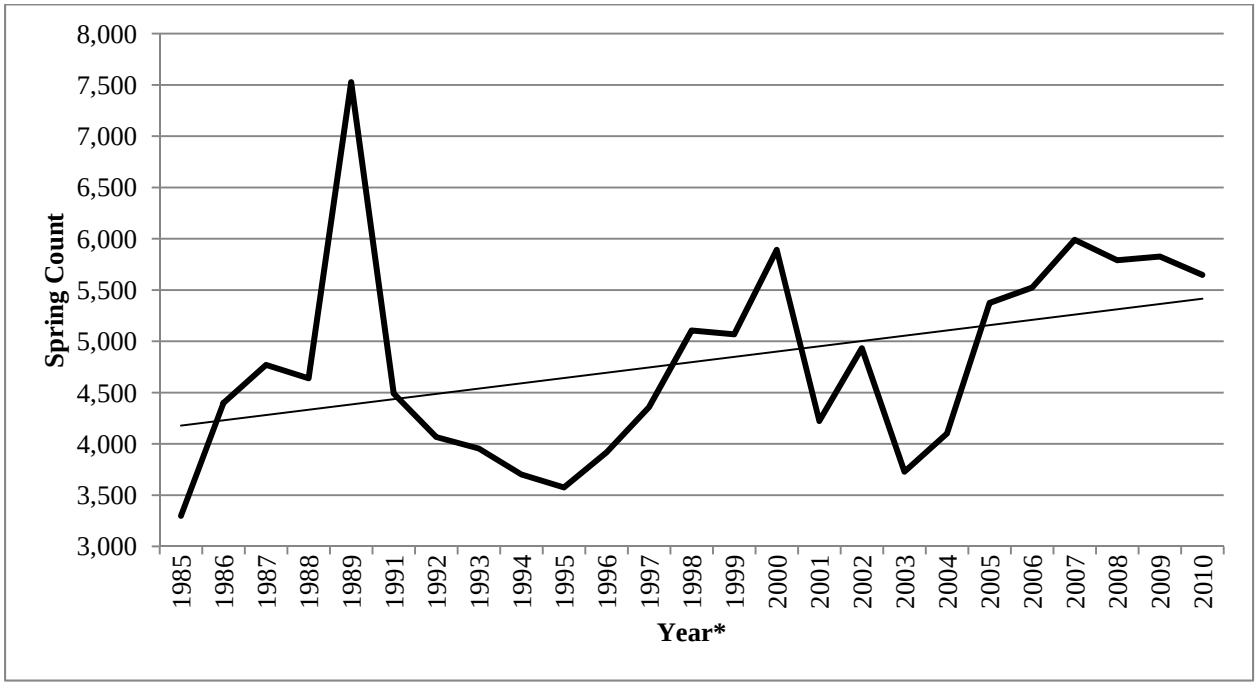

Figure 3. Utah Prairie Dog Spring Counts with Rangewide Population Trend LIne (UDWR 2005, 2010, 2011).

We completed a revised Utah Prairie Dog Recovery Plan in 2012 (USFWS 2012). This recovery plan differs from the 1991 Recovery Plan by emphasizing Utah prairie dog conservation on private or non-federal lands. Our emphasis on non-federal lands is important for achieving recovery of the Utah prairie dog because over 70 percent of the species' population occurs on non-federal lands. Recovery Criteria under the 2012 Recovery Plan are:

1. At least 5,000 acres (2,023 hectares) of occupied habitat are protected in perpetuity in each RU (West Desert, Paunsaugunt, and Awapa Plateau). These occupied habitat criteria will be spatially distributed to provide sufficient connectivity and gene flow within each RU.
2. At least 2,000 adult animals (at least 1,000 counted adults in the spring counts) are present in each RU (West Desert, Paunsaugunt, and Awapa Plateau) within protected habitat for 5 consecutive years.
3. Management strategies are in place to prevent and respond to threats from disease.
4. Education, outreach, and public relations programs and State and/or local regulations are in place and are sufficient to minimize illegal take, manage legal lethal control post-delisting, and foster habitat management practices.
5. Utah prairie dog-specific adaptive management strategies are in place on protected lands to improve suitable habitat in a manner that will facilitate management responses to changing climatic conditions and other threat factors that are difficult to predict.

The recovery actions to implement these criteria are a two tiered approach of conserving habitats on federal and non-federal lands. Important to our proposed 4(d) revision, the recovery actions include specific measures to conserve habitat on non-Federal lands, including efforts to permanently protect Utah prairie dog habitat on non-Federal lands; protect Utah prairie dog habitat through conservation easements and fee acquisition from willing sellers; expand market-based and other financial incentives for private landowners who enter into permanent agreements to manage or restore Utah prairie dog habitat; establish an endowment fund to administer and manage protected Utah prairie dog property; and enroll private lands in temporary voluntary agreements for the benefit of Utah prairie dogs using Federal and State conservation programs (USFWS 2012).

3.2 OTHER FISH AND WILDLIFE

We evaluate other wildlife species in this EA primarily because of the potential for lead ingestion in areas where the special rule is applied, and where landowners choose shooting with lead ammunition as their method of take. Numerous raptor and predator species occur throughout the action area. In general, predators such as coyotes, fox, and badgers as well as many raptor species feed on prairie dogs and prairie dog carcasses (Table 4), through which they could ingest lead. Information in Table 4 was derived from http://www.utahbirds.org/checklists.html; http://dwrcdc.nr.utah.gov/rsgis2/Search/SearchVerts.asp; http://www.birdweb.org; http://bna.birds.cornell.edu unless otherwise cited.

Upland game birds may ingest lead shot by mistaking it for food or grit (Pain et al. 2009). Upland game birds in the action area include mourning doves, common pheasant, and Greater sage-grouse (Greater sage-grouse are further discussed in section 3.1, Threatened and Endangered Species, above).

Table 4. Wildlife Species in Action Area and their Potential to Feed on Utah Prairie Dog Carcasses

Wildlife Species	Primary Habitat Type Overlaps with Utah Prairie Dogs	Known to Scavenge Mammals
Coyote	Yes	Frequent
Badger	Yes	Frequent
Red Fox	Yes	Frequent
Turkey Vulture	Yes	Frequent
Osprey	No	No
Bald Eagle	Yes	Frequent
Northern Harrier	Yes	Occasional
Sharp-shinned Hawk	Yes	Occasional
Cooper's Hawk	Yes	Occasional
Northern Goshawk	Yes	Occasional
Common Black-Hawk	No	No
Swainson's Hawk	Yes	Frequent (Knopper *et al*. 2006)
Zone-tailed Hawk	No	No
Red-tailed Hawk	Yes	Frequent
Ferruginous Hawk	Yes	Frequent (Knopper *et al.* 2006)
Rough-legged Hawk	Yes	Occasional
Golden Eagle	Yes	Frequent
American Kestrel	Yes	No
Merlin	Yes	No
Peregrine Falcon	Yes	No
Prairie Falcon	Yes	Possibly (Anderson and Squires 1997)
Flammulated Owl (*Otus flammeotus*)	No	No
Western Screech Owl	Yes	No
Barn Owl	Yes	Occasional
Great Horned Owl	Yes	Occasional
Northern Pygmy Owl	No	No
Burrowing Owl	Yes	Frequently
Mexican Spotted Owl	No	Occasional
Long-eared Owl	Yes	Occasional
Short-eared Owl	Yes	Occasional
Northern Saw-Whet Owl	No	No
Raven	Yes	Frequent
American Crow	Yes	Frequent
Black-billed Magpie	Yes	Frequent

3.3 TRANSPORTATION SYSTEM

Implementing the proposed action would not impact the county, state, or Federal road networks (see Appendix A). However, implementing the action may benefit airports within the action area. Therefore, the only transportation system that is analyzed in the EA is airports.

Five airports are within the action area: Cedar City Regional, Parowan, Loa-Wayne Wonderland, Panguitch Municipal, and Bryce Canyon. These five airports are near urban areas. The surrounding native sagebrush and mountain prairie habitats have been disturbed and altered. Habitat on the airports includes several grass and forb species. Utah prairie dogs occur on the Cedar City Regional, Parowan, and Loa-Wayne Wonderland airport properties, and there is the potential for prairie dogs to occupy the Panguitch Municipal and Bryce Canyon airports in the future due to the proximity of known prairie dog colonies to these airports. In 2010, we completed a consultation with the Federal Aviation Administration (FAA) regarding their operating and maintenance activities on these airports (FAA 2010; USFWS 2010). For a more detailed description of these airports within the range of the species, please see the Utah Public Airport Operations on the Utah Prairie Dog Biological Assessment (FAA 2010).

3.4 FARM LANDS

The purpose of the Farmland Protection Policy Act (FPPA) is to "… minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses..." (P.L. 97-98, Sec. 1539-1549; 7 U.S.C. 4201, et seq.). The FPPA also stipulates that federal programs be compatible with state, local and private efforts to protect farmland. The Utah Natural Resources Conservation Service (NRCS) maintains a geographic information systems database depicting prime farmland in Utah (NRCS 2008). According to their records, there are 92,800 acres (or 1 percent) of prime farmland within the action area.

The FPPA encourages states to develop criteria for Farmland of Statewide Importance. This is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops (NRCS 2008). In the late 1970s, the Utah Department of Agriculture and Utah State University in cooperation with the NRCS developed criteria for defining Farmland of Statewide Importance (NRCS 2008). According to NRCS's geographic information systems database, there are 117,753 acres (or 1 percent) of Farmland of Statewide Importance within the action area (NRCS 2008). Most of the prime farmlands and farmlands of statewide importance occur along the I-15 corridor, although there are some larger concentrated areas by the towns of Newcastle, Millford, and Panguitch (Figure 4).

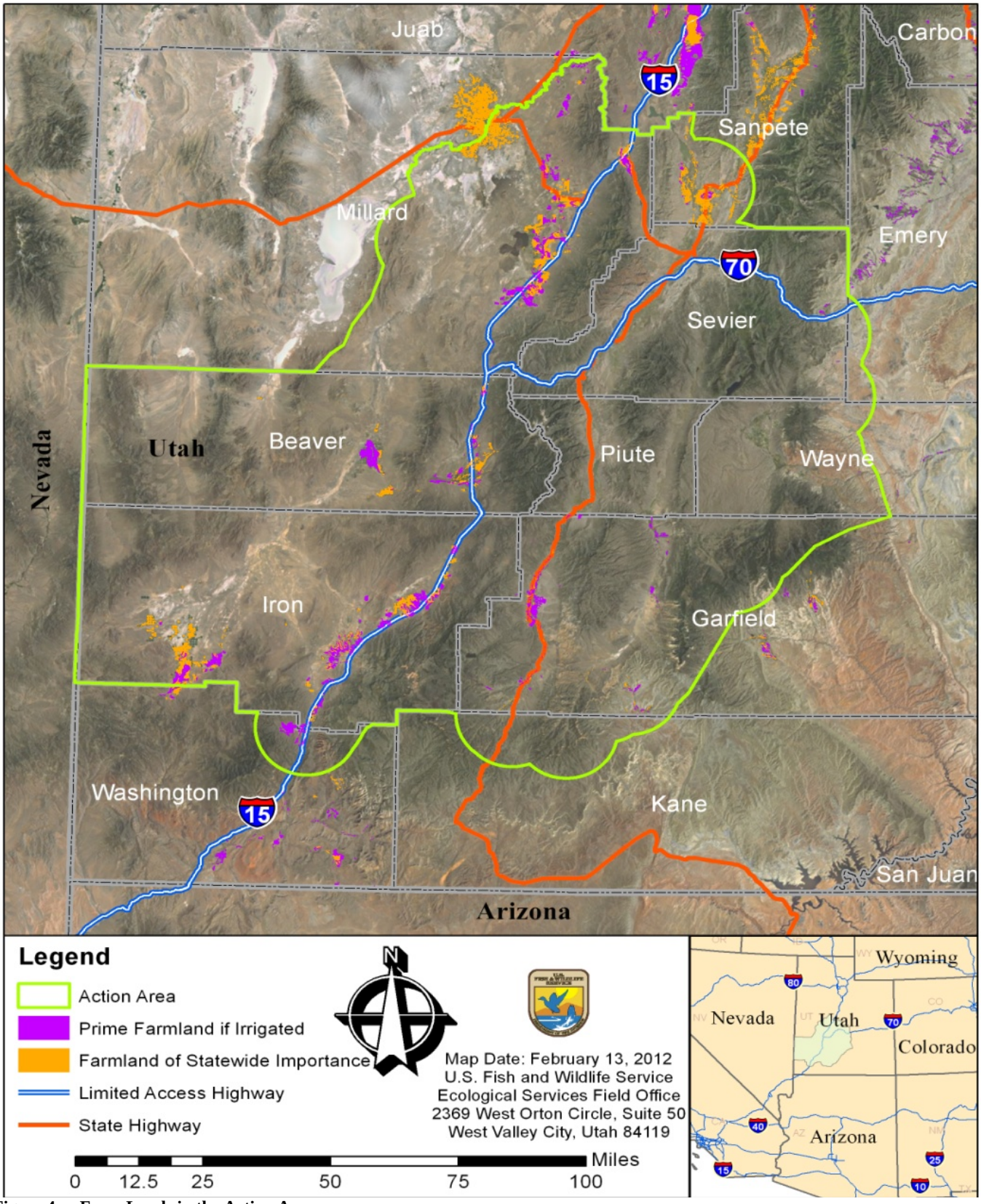

Figure 4. Farm Lands in the Action Area.

3.5 LIVESTOCK GRAZING

The US Forest Service (USFS) and the Bureau of Land Management (BLM) are the Federal land management agencies that maintain active grazing allotments within the Action Area. There is a checkerboard pattern of State of Utah School and Institutional Trust Lands Administration (SITLA) scattered throughout the Action Area as well as other land owners and managers. According to the grazing allotment boundary files and the state's land ownership database, these allotments contain lands owned or managed by the military, National Park Service, private landowners, State Park Recreation Areas, SITLA, State Wildlife Reserves, Tribal lands, and areas that are classified as water (Table 5; Figure 5).

Table 5. Land Ownership Acreage (and Percentage) Within Allotments in the Action Area.

Land Owner	Not in Allotment	BLM	Forest Service	Grand Total
BLM	190,111 (5)	3,624,215 (95)		3,814,326
FOREST SERVICE	125,886 (4)		2,681,133 (96)	2,807,019
MILITARY	647 (94)	44 (6)		692
NATIONAL PARK SERVICE	110,050 (63)	58,938 (34)	6,664 (4)	175,651
PRIVATE	1,377,712 (66)	602,865 (29)	107,221 (5)	2,087,798
STATE PARK REC. AREA	1,789 (73)	666 (27)		2,455
STATE TRUST	191,694 (27)	519,570 (73)	1,851 (0)	713,114
STATE WILDLIFE RESERVES	43,861 (81)	9,971 (18)	398 (1)	54,230
TRIBAL	4,277 (89)		539 (11)	4,816
WATER	11,480 (51)	5,699 (26)	5,120 (23)	22,299
Grand Total	**2,057,505 (21)**	**4,821,968 (50)**	**2,802,927 (29)**	**9,682,400**

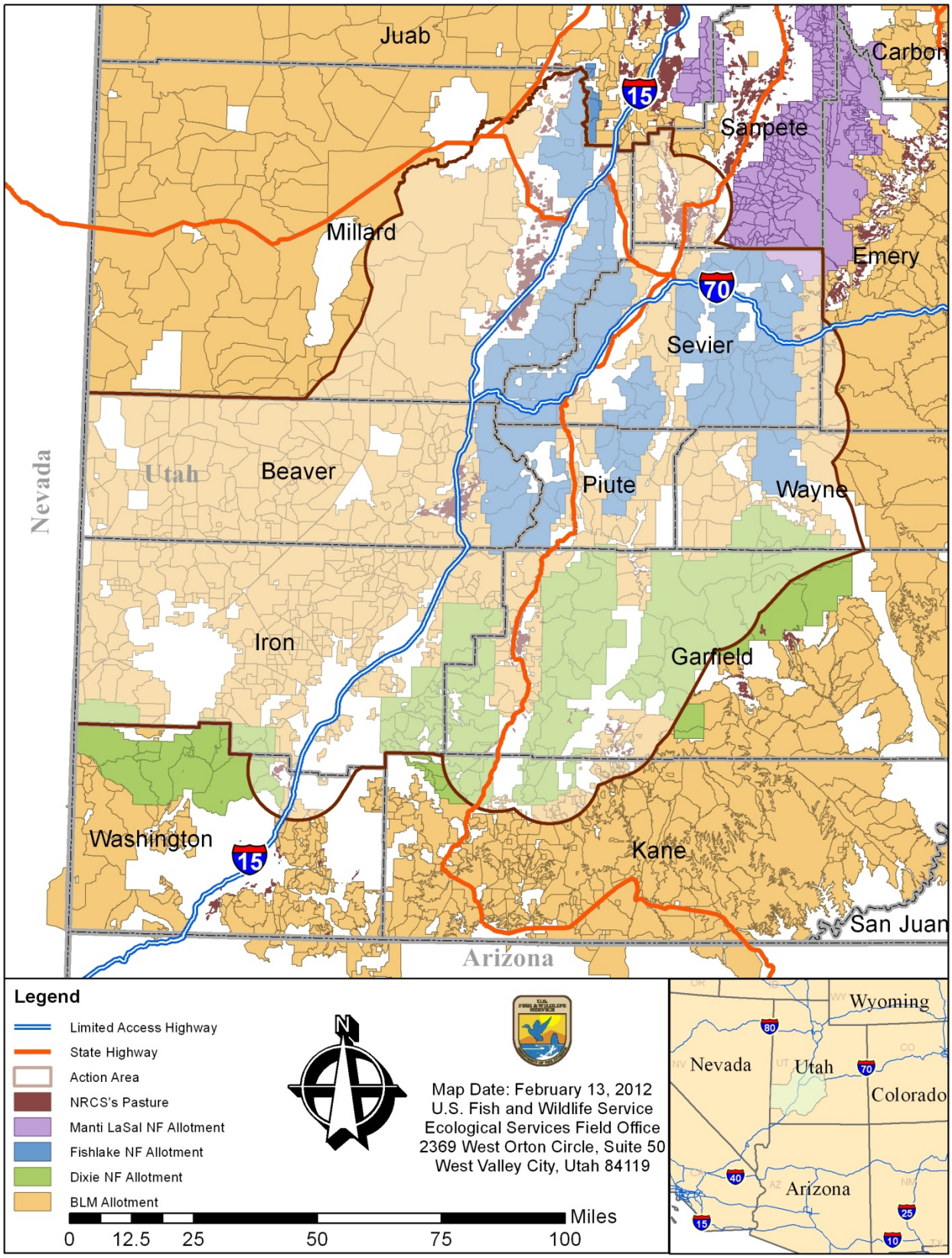

Figure 5. Grazing and Pasture Lands in the Action Area.

3.6 SOCIOECONOMICS

As previously described, the action area for our proposed action includes all of Iron County, and portions of Emery, Millard, Washington, Kane, Beaver, Garfield, Piute, Wayne, Sanpete, and Sevier counties. The information in this section is taken from U.S. Census Bureau 2010 online data (U.S. Census Bureau 2012, entire).

3.6.1 Iron County

Iron County includes 8,538 square kilometers (3,296 square miles), or 4.0 percent of the total land mass of Utah (212,818 sq km / 82,167 sq mi). The population density is 14 persons per sq mi compared to 33.6 persons per sq mi statewide. Iron County had a total estimated population of 46,163 in 2010, which was 1.7 percent of the total estimated population of the State of Utah (2,763,885). Iron County's population increased by 36.7 percent from 2000 to 2010 compared to a 23.8 percent increase for the State of Utah. There are 15,155 households in Iron County. The median value of owner-occupied housing units from 2006-2010 was $204,600, which is 6 percent below the statewide median of $218,100. Median household income is $42,247 in Iron County compared to $55,330 statewide.

Iron County's economy is concentrated in government (Crispin *et al.* 2008, p. 58). In 2005, government employment was the dominant non-agricultural employment sector (26.7 percent), followed by services at 26 percent and trade at 22.7 percent. (Crispin *et al.* 2008, p. 58). Southern Utah University is the largest employer (Iron County 2009, p. 25). Farm employment made up 2.6 percent of total employment in Iron County, which is a significant decrease from 1970 when farm employment was 13 percent of the total (Crispin *et al.* 2008, p. 85; Iron County 2009, p. 25). The average size of farms in Iron County is 1094 ac (443 ha); irrigated harvested cropland accounts for 98.41 percent of the land in farms. The average value of agricultural products sold per farm is $176,718 and the average value of crops sold per acre for harvested cropland is $590 (http://www.city-data.com/county/Iron_County-UT.html).

3.6.2 Beaver County

Beaver County includes 6,708 sq km (2,590 sq mi), or 3.1 percent of the total land mass of Utah. The population density is 2.6 persons per sq mi, well below the 33.6 persons per sq mi statewide density. Beaver County had a total estimated population of 6,629, which was 0.24 percent of the estimated population of the State of Utah. Beaver County's population increased 10.4 percent from 2000 to 2010. There are 2,091 households in Beaver County. The median value of owner-occupied housing units from 2006-2010 was $150,200, or 31 percent below the statewide median. Median household income is $41,514 in Beaver County.

Beaver County's economy is concentrated in agriculture and government (Crispin et al. 2008, p. 41). In 2005, government employment was the dominant non-agricultural employment sector (based on wages) (37.4 percent), followed by trade at 13.4 percent and mining at 2.7 percent. (Crispin et al. 2008, p. 44). Farm employment made up

17.2 percent of total employment in the County, which is a decrease from 1970 when farm employment was 20 percent of the total (Crispin et al. 2008, p. 85). The average size of farms in Beaver County is 544 ac (220 ha); irrigated harvested cropland accounts for 92.13 percent of the land in farms. The average value of agricultural products sold per farm is $630,253 and the average value of crops sold per acre for harvested cropland is $325.62 (http://www.city-data.com/county/Beaver_County-UT.html).

3.6.3 Emery County

Emery County includes 1,806 sq km (4,462 sq mi), or 5.4 percent of the total land mass of Utah. The population density is 2.5 persons per sq mi, well below the 33.6 persons per sq mi statewide density. Emery County had a total estimated population of 10,976 in 2010, which was 0.4 percent of the estimated population of the State of Utah. Emery County's population increased 1.1 percent from 2000 to 2010. There are 3,779 households in Emery County. The median value of owner-occupied housing units from 2006-2010 was $105,500, or 52 percent below the statewide median. Median household income is $49,237 in Emery County.

Emery County's economy is concentrated in mining, quarrying, and oil and gas extraction (21 percent), construction (13 percent), and utilities (9 percent). Agriculture makes up 7 percent of the County's economy. Farmers and farm managers make up 4 percent of all jobs in the County. Irrigated harvested cropland accounts for 94.20 percent of the land in farms. The average value of agricultural products sold per farm is $24,950 and the average value of crops sold per acre for harvested cropland is $86.89 (http://www.city-data.com/county/Emery_County-UT.html).

3.6.4 Sevier County

Sevier County includes 4,948 sq km (1,911 sq mi), or 2.3 percent of the total land mass of Utah. The population density is 10.9 persons per sq mi, well above the 33.6 persons per sq mi statewide density. Sevier County had a total estimated population of 20,802 in 2010, which was 0.75 percent of the estimated population of the State of Utah. Sevier County's population increased 10.4 percent from 2000 to 2010. There are 6,937 households in Sevier County. The median value of owner-occupied housing units from 2006-2010 was $148,300, or 30 percent below the statewide median. Median household income is $45,622 in Sevier County.

Sevier County's economy is concentrated in trade, transportation, and utilities (Six County Economic Development District 2006, p. 216). In 2005, trade, transportation, and utilities (31 percent) was the dominant non-agricultural employment sector, followed by services (27 percent) and government (21 percent). Farm employment made up 1 percent of total employment in Sevier County (Six County Economic Development District 2006, p. 216). The average size of farms in Sevier County is 290 ac (117 ha); irrigated harvested cropland accounts for 96.41 percent of the land in farms. The average value of agricultural products sold per farm is $92,119 and the

average value of crops sold per acre for harvested cropland is $303.33 (www.city-data.com/county/Sevier_County-UT.html).

3.6.5 Millard County

Millard County includes 17,022 sq km (6,572 sq mi), or 8.0 percent of the total land mass of Utah. The population density is 1.9 persons per sq mi, well below the 33.6 persons per sq mi statewide density. Millard County had a total estimated population of 12,503 in 2010, which was 0.45 percent of the estimated population of the State of Utah. Millard County's population increased 0.8 percent from 2000 to 2010. There are 4,046 households in Millard County. The median value of owner-occupied housing units from 2006-2010 was $121,100, or 45 percent below the statewide median. Median household income is $44,594 in Millard County.

Millard County's economy is concentrated in government and trade, transportation, and utilities (Six County Economic Development District 2006, p. 147). In 2005, trade, transportation, and utilities (28 percent) was the dominant non-agricultural employment sector, followed by government (26 percent), and services (24 percent). Farm employment made up 11 percent of total employment in Millard County (Six County Economic Development District 2006). The average size of farms in Millard County is 689 ac (279 ha); irrigated harvested cropland accounts for 94.28 percent of the land in farms. The average value of agricultural products sold per farm is $175,168 and the average value of crops sold per acre for harvested cropland is $329.42 (http://www.city-data.com/county/Millard_County-UT.html).

3.6.6 Sanpete County

Sanpete County includes 4,118 sq km (1,590 sq mi), or 2.0 percent of the total land mass of Utah. The population density is 17.5 persons per sq mi, below the 33.6 persons per sq mi statewide density. Sanpete County had a total estimated population of 27,822 in 2010, which was 1.0 percent of the estimated population of the State of Utah. Sanpete County's population increased 22.2 percent from 2000 to 2010. There are 7,870 households in Sanpete County. The median value of owner-occupied housing units from 2006-2010 was $148,700, or 30 percent below the statewide median. Median household income is $42,395 in Sanpete County.

Sanpete County's economy is concentrated in government (Six County Economic Development District 2006). In 2005, government (39 percent) was the dominant non-agricultural employment sector, followed by services (20 percent), and trade, transportation, and utilities (15 percent). Farm employment made up 3 percent of total employment in Sanpete County (Six County Economic Development District 2006). The average size of farms in Sanpete County is 471 ac (191 ha); irrigated harvested cropland accounts for 91.05 percent of the land in farms. The average value of agricultural products sold per farm is $123,412 and the average value of crops sold per acre for harvested cropland is $97.79 (http://www.city-data.com/county/Sanpete_County-UT.html)

3.6.7 Washington County

Washington County includes 6,284 sq km (2,426 sq mi), or 2.9 percent of the total land mass of Utah. The population density is 56.9 persons per sq mi, well above the 33.6 persons per sq mi statewide density. Washington County had a total estimated population of 138,115 in 2010, which was 5 percent of the estimated population of the State of Utah. Washington County's population increased 52.9 percent from 2000 to 2010. There are 45,895 households in Washington County. The median value of owner-occupied housing units from 2006-2010 was $240,900, or 10 percent above the statewide median. Median household income is $50,050 in Washington County.

Washington County's economy is concentrated in trade, services, and construction (Crispin et al. 2008, p. 75). In 2006, services were the dominant non-agricultural employer (36.1 percent), followed by trade, transportation, and utilities (22.9 percent), construction (16.1 percent), and government (11.9 percent) (Crispin et al. 008. 75). Farm employment made up only 0.82 percent of total employment in the County, which is a decrease from 1970 when farm employment was 8.0 percent of the total (Crispin et al. 2008). The average size of farms in Washington County is 451 ac (182 ha); irrigated harvested cropland accounts for 87.9 percent of the land in farms. The average value of agricultural products sold per farm is $15,085 and the average value of crops sold per acre for harvested cropland is $377.13 (http://www.city-data.com/county/Washington_County-UT.html).

3.6.8 Garfield County

Garfield County includes 13,403 sq km (5,175 sq mi), or 6.3 percent of the total land mass of Utah. The population density is 1.0 persons per sq mi, well below the 33.6 persons per sq mi statewide density. Garfield County had a total estimated population of 5,172 in 2010, which was 0.18 percent of the estimated population of the State of Utah. Garfield County's population increased 9.2 percent from 2000 to 2010. There are 2,136 households in Garfield County. The median value of owner-occupied housing units from 2006-2010 was $129,900, or 40 percent below the statewide median. Median household income is $44,745 in Garfield County.

Garfield County's economy is concentrated in tourism and government—combining for more than 60 percent of all non-farm jobs in the county. Tourism employment is largely seasonal, and thus Garfield County has a high overall unemployment rate (U.S. Census Bureau 2012). In 2005, farm employment made up 10.7 percent of total employment in Garfield County, which is a decrease from 1970 when farm employment was 18.1 percent of the total (Crispin et al. 2008). The average size of farms in Garfield County is 355 ac (144 ha); irrigated harvested cropland accounts for 98.22 percent of the land in farms. The average value of agricultural products sold per farm is $26,829 and the average value of crops sold per acre for harvested cropland is $57.37 (www.city-data.com/county/Garfield_County-UT.html).

3.6.9 Kane County

Kane County includes 10,334 sq km (3,990 sq mi), or 4.9 percent of the total land mass of Utah. The population density is 1.8 persons per sq mi, well below the 33.6 persons per sq mi statewide density. Kane County had a total estimated population of 7,125 in 2010, which was 0.26 percent of the estimated population of the State of Utah. Kane County's population increased 17.8 percent from 2000 to 2010. There are 3,065 households in Kane County. The median value of owner-occupied housing units from 2006-2010 was $174,500, or 20 percent below the statewide median. Median household income is $43,540 in Kane County.

Kane County's economy is concentrated in government and services (Crispin et al. 2008, p. 58). In 2006, services (leisure, hospitality, and other) were the dominant non-agricultural employment sector (41.1 percent), followed by government (23.3 percent), trade, transportation, and utilities (14.4 percent), and manufacturing (6 percent) (Crispin et al. 2008). In 2005, farm employment made up 4.1 percent of total employment in Kane County, which is a significant decrease from 1970 when farm employment was 18 percent of the total (Crispin et al. 2008; Iron County 2009). The average size of farms in Kane County is 1190 ac (482 ha); irrigated harvested cropland accounts for 87.83 percent of the land in farms. The average value of agricultural products sold per farm is $25,841 (http://www.city-data.com/county/Kane_County-UT.html).

3.6.10 Wayne County

Wayne County includes 6,373 sq km (2,460 sq mi), or 3.0 percent of the total land mass of Utah. The population density is 1.1 persons per sq mi, well below the 33.6 persons per sq mi statewide density. Wayne County had a total estimated population of 2,778 in 2010, which was 0.10 percent of the estimated population of the State of Utah. Wayne County's population increased 10.7 percent from 2000 to 2010. There are 899 households in Wayne County. The median value of owner-occupied housing units from 2006-2010 was $167,500, or 23 percent below the statewide median. Median household income is $49,414 in Wayne County.

Wayne County's economy is concentrated in government and services (education/health/social and leisure hospitality). In 2005, government and education/health/social services each contributed 27 percent to employment, followed by leisure/hospitality services (18 percent) and trade, transportation, and utilities (12 percent. Agriculture comprised 2 percent of total employment (Six County Economic Development District 2006). The average size of farms in Wayne County is 245 ac (99 ha); irrigated harvested cropland accounts for 97.4 percent of the land in farms. The average value of agricultural products sold per farm is $60,827 and the average value of crops sold per acre for harvested cropland is $52.11 (http://www.city-data.com/county/Wayne_County-UT.html).

3.6.11 Piute County

Piute County includes 1,963 sq km (758 sq mi), or 0.92 percent of the total land mass of Utah. The population density is 2.1 persons per sq mi, well below the 33.6 persons

per sq mi statewide density. Piute County had a total estimated population of 1,556 in 2010, which was 0.06 percent of the estimated population of the State of Utah. Piute County's population increased 8.4 percent from 2000 to 2010. There are 539 households in Piute County. The median value of owner-occupied housing units from 2006-2010 was $163,500, or 25 percent below the statewide median. Median household income is $37,708 in Piute County.

Piute County's economy is concentrated in government and services. In 2005, government contributed 47 percent to employment, followed by trade, transportation, and utilities (20 percent) and services (18 percent). Agriculture comprised 1 percent of total employment (Six County Economic Development District 2006). Irrigated harvested cropland accounts for 90.84 percent of the land in farms in Piute County. The average value of agricultural products sold per farm is $83,588 and the average value of crops sold per acre for harvested cropland is $73.33 (http://www.city-data.com/county/Piute_County-UT.html).

4 ENVIRONMENTAL CONSEQUENCES

This section addresses the likely consequences of each alternative on the resources identified in the Affected Environment section.

4.1 ALTERNATIVE 1 (NO ACTION)

This alternative would reflect a finding by us that no change is needed to the existing 4(d) rule, as amended in 1991. Under the No Action Alternative, the protective regulations currently in place for the conservation of the Utah prairie dog would not change. Throughout the range, up to 6,000 Utah prairie dogs could continue to be lethally controlled on private lands.

4.1.1 Threatened or Endangered Species

4.1.1.1 Autumn Buttercup

Autumn buttercup occurs in two populations, both on private land. One population is on lands actively grazed while the second population is on land owned by TNC for the conservation of the species. Neither population has Utah prairie dogs currently living in close proximity; however, the TNC land has a number of old burrows on it and an historical colony occurs across the highway. Should prairie dogs become established near the two Autumn buttercup populations, individual plants could be eaten by Utah prairie dogs. Under this Alternative, the private land owner that actively grazes his land could apply for a permit for take to lethally remove prairie dogs from his land. This could have a positive impact on the plants and population at this location by reducing prairie dog populations. TNC land does not qualify for a permit under the No Action Alternative because Utah State Code only authorizes take on agricultural lands (Utah Code R657-19-6, part 1(b)(i)). Therefore, negative impacts to Autumn buttercup populations on TNC land may occur under this Alternative; however, the impact is likely negligible given that there are other unknown factors already causing the decimation of this population, prairie dogs do not currently occupy the site, and prairie dogs and Autumn buttercup have existed on this site together in the past.

4.1.1.2 California Condor

California Condors within the action area are susceptible to shooting, poisoning, lead poisoning, and collisions with power lines (see section 3.1.2, above). Of these threats, lead poisoning has some potential of occurring in association with Alternative 1. Condors may eat Utah prairie dog carcasses if they find them, but they prefer to feed on larger animals such as deer (see section 3.1.2, above). Under the No Action alternative, if condors eat prairie dogs that are shot with lead ammunition, they would be susceptible to lead poisoning (see section 4.1.2, Other Fish and Wildlife, below, regarding the effects of lead to wildlife species). However, to date, condors are most frequently seen in southern Utah in the area of Zion National Park. Although

Zion National Park is only 20 ha (50 m) to the south of the action area, less than 1 percent (n=247) of all known locations of condors (n=33,979) recorded by The Peregrine Fund in 2007, 2008, 2009 and 2011 fall inside our Action Area (Day 2012a). This indicates that California condors spend less than 1 percent of their time across the range of Utah prairie dogs (Day 2012a), and likely much less than 1 percent of their time in the vicinity of prairie dog colonies, particularly those colonies where prairie dog take would be permitted. Permits for Utah prairie dog take are only issued on a very small portion of the action area. In 2011, the UDWR issued permits on 29 properties that totaled 1312 ha (3,241 ac) which is likely representative for all years under the existing special rule (Day and Brown 2012), and only represents 0.03 percent of the action area. Additionally, there are no reports of condors occurring in association with Utah prairie dog colonies on which control measures are permitted. Consequently, it is highly unlikely that condors are currently being impacted by 4(d) control measures (Day 2012a).

4.1.1.3 Greater Sage-Grouse

Greater sage-grouse would not be impacted by traps used to take prairie dogs. The UDWR does not use kill traps for Utah prairie dogs. If kill traps were used under this Alternative, the sage-grouse would have to enter a prairie dog burrow to be caught in the trap, which is a highly unlikely scenario. Adult sage grouse would not fit into live traps used to capture prairie dogs. Young grouse may fit into a live trap, but this has never happened in over 30 years of trapping Utah prairie dogs. If a sage-grouse was captured accidently in a live trap, the UDWR checks prairie dog traps hourly, so the chances of an injury to the bird are very low. In addition, almost all trapping under this Alternative happens in close proximity to humans, in areas unlikely to be occupied by sage-grouse (Day 2012b).

Sage-grouse that are in close proximity to Utah prairie dogs that are lethally controlled by shooting may be disturbed by the sound of the gun. Sage-grouse may either seek shelter on the ground by hiding in cover or they may flush. In either case, the impacts are expected to be temporary and negligible with the birds returning to normal behavior.

Greater sage-grouse may also be effected by ingestion of spent lead shot which can result in sublethal and lethal toxicity (see section 4.1.2, Other Fish and Wildlife, below, regarding the effects of lead to wildlife species). However, we conclude that the effects of lead poisoning attributable to this action would be negligible due to the fact that private lands account for only 22 percent of the action area (see Table 5), and only a small proportion of these would be agricultural lands where 4(d) permits are used. For example, in 2011 the UDWR issued permits on 29 properties that totaled 1312 ha (3,241 ac) which is likely representative for all years under the existing special rule (Day and Brown 2012), and only represents 0.03 percent of the action area. In addition, there are seasonal restrictions on shooting prairie dogs under this Alternative.

Therefore, the chances that sage-grouse would encounter spent lead ammunition associated with 4(d) control permits is very small, and negligible.

4.1.1.4 Utah Prairie Dog

This Alternative provides biological and social benefits to the Utah prairie dog, as described below. This Alternative assumes that Utah Code R657-19-7, R657-19-7 remains unchanged. Utah Code provides some limitations to take of Utah prairie dogs as described below. Utah prairie dog populations have remained stable to increasing (see Figure 3) throughout implementation of the current special rule and Utah State Code.

WHERE TAKE IS ALLOWED

Under this Alternative, the existing special rule authorizes take on all private lands across the range of the species. Utah Code (R657-19-6, part 1(b)(i)), however, restricts take to agricultural lands. Allowing permitted take on agricultural lands is critical to facilitating the species' recovery. As previously described, Utah prairie dogs can reach unnaturally high densities and abundance on agricultural lands because of increased forage quantity and quality, and lower predator numbers (see "Habitat Requirements and Food Habits" section above). If prairie dog populations on agricultural lands are left uncontrolled, the consequent crowding may result in diminished forage resources, leading to decreased reproduction and survival or increased emigration (Crocker-Bedford and Spillett 1981, Reeve and Vosburgh 2006). Controlling populations by removing some prairie dogs decreases competition for limited food resources, consequently resulting in increased reproduction and decreased mortality (Cully 1997, Reeve and Vosburgh 2006).

Controlled removal may also help mediate the potential for plague outbreaks on prairie dog colonies in some situations. High animal densities can play a role in facilitating the transmission of the disease between individuals (Cully 1989, Anderson and Williams 1997, Gage and Kosoy 2005). Therefore, allowing control on agricultural lands may enhance the long-term conservation of the Utah prairie dog on these lands by maintaining more sustainable populations (i.e., more natural animal densities are less likely to degrade their forage resources, and less likely to have large scale plague outbreaks). However a variety of factors play a role in the occurrence and extent of enzootic and epizootic plague events; thus, we are not able to conclude that reducing prairie dog population densities will always result in the reduction of plague occurrence or its resulting impacts to prairie dog colonies (USFWS 2012).

Allowing some control of Utah prairie dogs on agricultural lands under this Alternative would also increase the participation of landowners and local communities in the species' conservation and recovery. Until recently, Utah prairie dog recovery efforts focused on habitat enhancements and translocation of the animals to Federal lands (USFWS 1991). Consequently, recovery was

largely dependent on achieving sufficient population numbers on Federal lands, without considering the potential for conservation benefits that could be achieved on private lands. We now believe that recovery will be achieved more rapidly if we increase conservation efforts on private and other non-Federal lands (where the majority of the species' occupied habitat occurs) (USFWS 2012). As recovery becomes more and more successful on non-Federal lands, regulatory relief will become increasingly important if we are to sustain the support of landowners and local communities for Utah prairie dog recovery efforts.

Many agricultural producers claim that Utah prairie dogs impact their operations through loss of forage for their cattle; equipment damage from driving across burrows; livestock injury if animals step in burrows; and decreased crop yields (e.g., prairie dogs eat crop vegetation such as alfalfa) (Elmore and Messmer 2006 a, b). To achieve recovery, we will need to encourage private landowners and local communities to participate in prairie dog habitat improvement and protection measures. We can achieve this only if we demonstrate that the benefits of prairie dog conservation outweigh the costs to the landowner and communities, and if control programs are available when needed (Elmore and Messmer 2006 a, b). Some producers are interested in working with us on habitat and range improvement projects that benefit livestock and Utah prairie dogs simultaneously, or participating in conservation easements that benefit the species (Elmore and Messmer 2006a, b). However, agricultural producers also want the ability to control or translocate prairie dogs to minimize levels of damage (Elmore and Messmer 2006a, b).

Our recent experiences show that if we are mindful of landowner needs, and provide mechanisms to control Utah prairie dogs where they conflict with agricultural uses, which Alternative 1 provides, then we can gain landowner support for species conservation. For example, in a 2005 safe harbor agreement, a landowner agreed to restore habitat and allow the establishment of a new colony of prairie dogs on his property through translocations (USFWS 2005), but conditioned his willingness to accept translocated animals on the fact that his safe harbor agreement allowed him to control animals if they impacted his livestock operations (USFWS 2005). We have completed six similar Utah prairie dog safe harbor agreements, all of which include the ability for a landowner to control some prairie dogs where they may impact their agricultural activities.

Alternative 1 would thus benefit Utah prairie dogs by continuing to allow take on agricultural lands, assuming that Utah State Code remains unchanged. However, if Utah State Code was changed to conform with the existing special rule, then take could occur on all private lands which would likely not benefit conservation of the species. For example, there are numerous private lands that are being developed for residential and commercial uses. The loss of these lands does not benefit the species and requires planning and mitigation through development of Habitat Conservation Plans under section 10 of the ESA.

Therefore, it would not benefit the species to allow the loss of prairie dogs on these properties under a scenario where Utah State Code and this No Action Alternative allowed take on all private lands.

AMOUNT OF TAKE

Under this Alternative, the UDWR could permit the take of 6,000 animals as authorized by the existing special rule and Utah State Code. Since 1991, if UDWR had authorized the maximum amount of allowed take (6,000 animals), and landowners had implemented the full amount of take, it would have represented up to 26 percent of the total estimated annual rangewide population (adults and juveniles). This amount of take would be substantially higher than the annual average amount of take reported under the existing special rule (Table 6)—almost 5 times the average annual permitted take and up to 10 times the average annual reported take. We cannot be certain of the effects of this level of take because actual take over the last 25 years of implementation of the existing special rule has never approached the take of 6,000 animals annually. However, the rule and Utah Code allow the take of 6,000 animals regardless of the total annual estimated rangewide population of Utah prairie dogs—theoretically, this could result in take levels that far exceed the 20-25 percent harvest rates considered to be sustainable (Reeve and Vosburgh 2006, Colorado Division of Wildlife 2007). In addition, this Alternative does not include limits on the take at individual colonies, which could result in the loss of site-specific colonies (see section 4.2.1.4, Utah Prairie Dog, Limiting the Amount and Distribution of Take).

Under this Alternative, take would occur from June 1 through December 31. The available literature indicates that Utah prairie dog pups generally leave their burrows by mid-June, and are no longer dependent on their mother (Hoogland 2003). Therefore, there could be minor effects associated with shooting prairie dogs starting June 1—the loss of adult female prairie dogs prior to pup independence could result in higher mortality of pups. However, many pups, especially in the lower elevations of the West Desert recovery unit, are out of their burrows and independent of their mothers by June 1. Most of the take under the existing special rule occurs in the West Desert recovery unit, and therefore we would anticipate only negligible impacts from timing of take under the No Action Alternative.

METHODS OF TAKE

The existing special rule does not limit the methods of take that can occur. Utah Code (R657-19-6, parts 2(a),(b)) restricts methods of take to use of a firearm or by trapping—the use of chemical toxicants is specifically not allowed, though the Code does not mention other methods. The use of methods such as drowning, poisoning, and the use of gas cartridges, anticoagulants, and explosive devices are typically applied across large areas and usually kill large numbers of prairie dogs (Collier 1975). Because these

methods are applied across large areas and often designed to kill dogs in their burrows they do not allow permittees to target a specific number of prairie dogs or track actual take, and in that respect may result in potentially negative effects to Utah prairie dog colonies or populations. This Alternative does not specifically disallow the use of these methods, although they have not been used to date.

Shooting may increase the potential for lead poisoning in predators and scavengers consuming shot prairie dogs (Reeve and Vosburgh 2006; see section 4.1.2, Other Fish and Wildlife, below). This risk may extend to prairie dogs, which have been observed scavenging other prairie dog carcasses (Hoogland 1995). Expanding bullets leave an average of 228.4 milligrams (mg) (3.426 grains) of lead in a prairie dog carcass, while nonexpanding bullets averaged 19.8 mg (0.297 grains) of lead (Pauli and Buskirk 2007). The amount of lead in a single prairie dog carcass shot with an expanding bullet is potentially sufficient to acutely poison scavengers or predators, and may provide an important portal for lead entering wildlife food chains (Pauli and Buskirk 2007). A wide range of sublethal toxic effects is also possible from smaller quantities of lead (Pauli and Buskirk 2007).

At the present time, we do not have information to indicate that the use of lead ammunition under this Alternative translates into impacts on Utah prairie dogs. UDWR-permitted take is limited to agricultural lands where prairie dogs are causing physical or economic damage, and private lands adjacent to conservation lands. As previously described, in 2011 the UDWR issued permits on 29 properties that totaled 1312 ha (3,241 ac) which is likely representative for all years under the existing special rule (Day and Brown 2012), and only represents 0.03 percent of the action area (see Table 5). Therefore, any potential site-specific impacts are limited in scope and considered to be of minor consequence to the Utah prairie dog. Limitations on the timing of allowed control further limit the scope of potential impacts. Our December 3, 2009, black-tailed prairie dog status review came to a similar conclusion when it found use of expandable lead shot did not pose a substantial risk of lead poisoning to surviving prairie dogs due to scavenging carcasses (74 FR 63343).

SUMMARY

In summary, Utah prairie dog populations have remained stable to increasing throughout implementation of the current special rule and Utah State Code. However, we have never come close to taking the upper limit of 6,000 Utah prairie dogs. We cannot be certain of the effects that this level of take may have to Utah prairie dog populations, if any. The literature supports using fluctuating rather than fixed harvest rate management of prairie dog shooting (Reeve and Vosburgh 2006, Colorado Division of Wildlife 2007), which this Alternative does not incorporate. There may also be site-specific negative effects to prairie dog colonies because neither the existing special rule nor Utah

Code specifies a limit of take at individual colonies nor specifically disallows the use of methods such as drowning, poisoning, and the use of gas cartridges, anticoagulants, and explosive devices.

Table 6. Amount of Utah Prairie Dog Take Permitted and Reported Under the ESA 4(d) Rule by UDWR, 1985-2010 (UDWR 2005, 2010, 2011).

Year[3]	Spring Count	Rangewide Population Estimate	Permitted Take	Permitted Take Percentage of Rangewide Population Estimate	Reported Take	Reported Take Percentage of Rangewide Population Estimate	Reported Take Percentage of Permitted Take
1985	3,299	23,093	845	3.7	426	1.8	50
1986	4,400	30,800	2,040	6.6	1,247	4.0	61
1987	4,771	33,397	975	2.9	370	1.1	38
1988	4,640	32,480	2,415	7.4	528	1.6	22
1989	7,527	52,689	3,050	5.8	838	1.6	27
1991	4,492	31,444	4,200	13.3	1,632	5.2	39
1992	4,067	28,469	3,520	12.4	1,543	5.4	44
1993	3,954	27,678	1,050	3.8	599	2.2	57
1994	3,702	25,914	1,190	4.6	779	3.0	65
1995	3,576	25,032	630	2.5	461	1.8	73
1996	3,917	27,419	520	1.9	436	1.6	84
1997	4,359	30,513	1,065	3.5	589	1.9	55
1998	5,106	35,742	1,220	3.4	717	2.0	59
1999	5,068	35,476	2,496	7.0	1,233	3.5	49
2000	5,892	41,244	3,700	9.0	1,386	3.4	37
2001	4,223	29,561	3,719	12.6	1,626	5.5	43
2002	4,933	34,531	3,781	10.9	1,760	5.1	46
2003	3,729	26,103	2,620	10.0	1,195	4.6	45
2004	4,102	28,714	1,360	4.7	363	1.3	27
2005	5,375	37,625	1,470	3.9	673	1.8	46
2006	5,524	38,668	1,060	2.7	343	0.9	32
2007	5,991	41,937	944	2.2	482	1.1	51
2008	5,791	40,537	1,204	3.0	561	1.4	47
2009	5,827	40,789	1,532	3.7	558	1.4	36
2010	5,648	39,536	2,632	6.7	1,716	4.3	65
AVG	**4,796**	**33,576**	**1,969**	**5.8**	**814**	**2.6**	**41**

[3] In 1990, colonies on private lands were not counted, due to staffing and budget limitations. Thus, these incomplete estimates are excluded from this table. In addition, take from 1985 to 1990 occurred only on non-Federal lands in Cedar and Parowan Valleys, Iron County. Take from 1991 to present was authorized on non-Federal lands rangewide.

4.1.2 Other Fish and Wildlife

The distribution of lead in the environment is continuing through upland hunting activities, which represent the most significant lead exposure pathway in upland birds and birds of prey. Ingestion of spent shot is a common means of exposure to lead in upland birds, which primarily include game species such as mourning doves, common pheasant, and various grouse species, but may also include songbirds (Pain et al. 2009). Upland birds ingest spent lead shot by mistaking it for food or grit. Birds of prey can be exposed to lead by eating carcasses that are embedded with lead shot, bullets, or fragments of lead-based bullets. Lead exposure and toxicity in free-living birds are fairly typical occurrences; however, acute toxicity is not manifested conspicuously and is difficult to detect to an extent that lead toxicity has become known as an "invisible" bird disease and requires forensic investigations to identify its occurrence (USFWS 1989).

Raptors, vultures, and other birds of prey are susceptible to lead poisoning because they often scavenge on dead prey, which may include feeding on carcasses or gut piles of hunted animals that are not retrieved by hunters and contaminated with fragments of lead-based ammunition (Church et al. 2006; Locke and Friend 1992; Wiemeyer et al. 1998). Shooting may increase the potential for lead poisoning in predators and scavengers consuming shot prairie dogs (Reeve and Vosburgh 2006). Wildlife species most likely to feed on shot Utah prairie dog carcasses include the coyote, north American badger, red fox, turkey vulture, bald eagle, golden eagle, red-tailed hawk, Swainson's hawk, ferruginous hawk, burrowing owl, and raven because these species frequently scavenge on dead prey and their habitats overlap with Utah prairie dogs (Stephens et al. 2005; McDonald et al. 2004; see Table 3). Many hawk species will also scavenge on small mammals opportunistically, particularly or if their normal prey species are in low numbers. For example, prairie species such as the Swainson's and ferruginous hawks are known to scavenge on Richardson's ground squirrel carcasses (Knopper et al. 2006), so it is likely that they would also scavenge on Utah prairie dogs. In a similar example, bald eagles have been reported to ingest lead shot while feeding on black-tailed jackrabbits (Platt 1976). Large owls such as the great horned owl and barn owl sometimes scavenge on dead prey. Other species are less likely to scavenge on shot Utah prairie dogs due to their normal prey preferences or low habitat overlap with Utah prairie dogs. For example, the zone-tailed hawk is not frequently observed in Utah and the species primarily eats reptiles or amphibians. Peregrine falcons feed almost exclusively on birds captured in flight. Some of the owl species such as the flammulated owl, northern pygmy owl, burrowing owl, northern saw-whet owls are small birds that primarily feed on insects or small mammals such as mice; thus, they are unlikely to feed on prairie dogs or their carcasses (see Table 3).

The effects of lead poisoning on wildlife species can be sublethal or acutely toxic. Lead affects several organ systems, but particularly the central and peripheral nervous system, kidneys, and the circulatory system, resulting in a range of sub-lethal physiological, biochemical and behavioural changes which, depending on the dose

and species-sensitivity, may ultimately lead to death (Eisler 1988; Pain et al. 2009; Scheuhammer 1987).

The amount of lead in a single prairie dog carcass shot with an expanding bullet is potentially sufficient to acutely poison scavengers or predators, and may provide an important pathway for lead entering wildlife food chains (Pauli and Buskirk 2007). Expanding bullets leave an average of 228.4 milligrams (mg) (3.426 grains) of lead in a prairie dog carcass, while nonexpanding bullets averaged 19.8 mg (0.297 grains) of lead (Pauli and Buskirk 2007). In experimental studies, bald eagles receiving doses of 2,000 milligrams of lead in the form of ten size #4 shot died anywhere from 1.5 to 19 weeks post-treatment, which demonstrates that ingestion of relatively few shot are required to cause toxicity (Pattee et al. 1981). The same generalization holds true for upland game birds, where a single oral dose of one size #8 pellet, which is equivalent to 72 milligrams of lead, is sufficient to cause mortality in mourning doves and subacute poisoning in other similar species (Buerger et al. 1986).

Fatal lead poisoning does not always occur to species that ingest lead from carrion or other sources. Lead can be digested, eliminated in fecal matter, or regurgitated (Pain et al. 2009). However, lead poisoning may be particularly severe if alternate food resources are unavailable, thus leading species to scavenge more heavily on carrion, or in areas of heavy and consistent shooting (Stephens et al. 2005). Thus, it is possible that the issuance of permits to shoot Utah prairie dogs under a special 4(d) rule would increase the likelihood of lead poisoning to wildlife species in site-specific locations (i.e., individual prairie dog colonies) for the time period of the permitted shooting. However, we do not have any specific information on the scope of potential lead poisoning attributed to the existing special rule.

In general, the use of lead ammunition for hunting and predator control is widespread in upland habitats such as those occupied by Utah prairie dogs. There is no state or federal regulations that restrict the use of lead ammunition for upland wildlife species across the range of the Utah prairie dog. Lead ammunition in the United States is only restricted for waterfowl hunting and within the range of the California condor in California. In addition, we conclude that the effects of lead poisoning attributable to this action would be negligible due to the fact that private lands account for only 22 percent of the action area (see Table 5), and only a small proportion of these are in areas where 4(d) permits are issued. As previously described, in 2011 the UDWR issued permits on 29 properties that totaled 1312 ha (3,241 ac) which is likely representative for all years under the existing special rule (Day and Brown 2012), and only represents 0.03 percent of the action area (see Table 5). Therefore, the chances that wildlife species would encounter spent lead ammunition associated with 4(d) control permits under this Alternative is very small, and negligible.

4.1.3 Transportation System

Under this Alternative, take is not authorized on airport properties because they are not considered agricultural lands, in accordance with Utah Code R657-19-6, part (b)(i). In 2010, we completed a consultation with the Federal Aviation

Administration regarding their operating and maintenance activities on the five airports occurring with the range of the Utah prairie dog (FAA 2010; USFWS 2010). Since 2010, there has been increased concern regarding human safety issues from Utah prairie dogs burrowing near and within the runway safety areas, including burrowing that occurred through the asphalt of the Parowan airport. Burrowing in these areas could result in an aircraft accident if an airplane's wheels hit a burrow, causing the plane to veer in a different direction. The lack of authorized take at these airports under this Alternative results in negative effects to the airports, and the potential for aircraft accidents because of the continued safety hazard.

4.1.4 Farm Lands

This Alternative is compatible with state, local, and private efforts to protect farmland. Prairie dogs can cause conflicts for farmers when their colonies extend into agricultural fields (Elmore and Messmer 2006a, 2006b), they eat crop vegetation such as alfalfa, or their burrows create obstructions for the operation of crop equipment. To minimize these conflicts between agricultural activities and Utah prairie dog conservation, the existing special rule allows regulated take of Utah prairie dogs on private agricultural lands where damage from prairie dogs is observed. Therefore, this Alternative would continue to benefit farm lands by allowing management of Utah prairie dogs. This Alternative would also continue to benefit Utah prairie dogs by gaining increased participation from private landowners for recovery efforts (see section 4.1.6, Socioeconomics, below).

4.1.5 Livestock Grazing

This Alternative is compatible with livestock grazing. Prairie dogs can cause conflicts for ranchers because they impact their operations economically through loss of forage for their cattle; equipment damage from driving across burrows; livestock injury if animals step in burrows (see section 4.1.6, Socioeconomics, below). To minimize these conflicts between agricultural activities and Utah prairie dog conservation, the existing special rule allows regulated take of Utah prairie dogs on private agricultural and pasture lands where damage from prairie dogs is confirmed. Therefore, this Alternative would continue to benefit ranchers by allowing management of Utah prairie dogs. This Alternative would also continue to benefit Utah prairie dogs by gaining increased participation from private landowners for recovery efforts (see section 4.1.6, Socioeconomics, below).

4.1.6 Socioeconomics

Beaver County is the only county within our action area where the economy is concentrated in agriculture. The other counties have economies that are concentrated largely in government, services, and trade, transportation, and utilities. However, all of the counties have private lands that are used for agriculture; thus, the socioeconomic impacts of the no-action alternative are at the individual landowner level.

Utah prairie dogs prefer areas with deep, productive soils. These are the same areas preferred by agricultural producers. Agricultural tilling practices create unusually deep, soft soils optimum for burrowing; irrigation increases vegetation productivity; and plantings of favored moist forb species (such as alfalfa) likely make these areas more productive than they were historically (Collier 1975). Additionally, prairie dogs grow faster and attain larger body weights (Crocker-Bedford and Spillet 1981) and thus have higher overwinter survival in alfalfa crops versus native habitats (Crocker-Bedford and Spillet 1981). Reproduction and weaning of young also may be more successful in agricultural areas that provide abundant forage resources that are otherwise unavailable in drier native habitats (Crocker-Bedford and Spillet 1981). Finally, predator mortality is generally low for Utah prairie dogs in agricultural fields because farmers control badgers and coyotes in these areas (Crocker-Bedford and Spillet 1981). Overall, Utah prairie dog densities are higher at sites associated with agiculture compared to sites not associated with agriculture (Crocker-Bedford 1976). While we believe that the valley bottoms have probably always supported more prairie dogs than surrounding drier sites, it is likely that the high densities and abundances occurring in these areas are unnaturally augmented by today's agricultural practices (Collier 1975; Crocker-Bedford and Spillet 1981).

Many agricultural producers state that Utah prairie dogs impact their operations economically through loss of forage for their cattle; equipment damage from driving across burrows; livestock injury if animals step in burrows; and decreased crop yields (e.g., prairie dogs eat crop vegetation such as alfalfa) (Elmore and Messmer 2006 a, b). The No Action alternative would allow agricultural producers to continue to control prairie dogs where their land is being physically or economically impacted by Utah prairie dogs, thus alleviating some of the impacts to agricultural operations.

To achieve recovery of the Utah prairie dog, we will need to encourage private landowners and local communities to participate in prairie dog habitat improvement and protection measures. We can achieve this only if we demonstrate that the benefits of prairie dog conservation outweigh the costs to the landowner and communities, and if control programs are available when needed (Elmore and Messmer 2006a, b). For example, some producers are interested in working with us on habitat and range improvement projects that benefit livestock and Utah prairie dogs simultaneously, or participating in conservation easements that benefit the species (Elmore and Messmer 2006a, b). However, agricultural producers want the ability to control or translocate prairie dogs to minimize levels of physical and economic damage (Elmore and Messmer 2006a, b).

Our recent experiences show that if we are mindful of landowner needs and provide mechanisms to control Utah prairie dogs where they cause economic losses, we can gain landowner and local community support for species conservation. For example, in a 2005 safe harbor agreement, a landowner agreed to restore habitat and allow the establishment of a new colony of prairie dogs on his property (USFWS 2005), but conditioned his willingness to establish a colony of prairie dogs on the fact that his safe harbor agreement allowed him to control some prairie dogs if they impacted his livestock operations (USFWS 2005). We have since completed six similar Utah

prairie dog safe harbor agreements, all of which include the ability for a landowner to control some prairie dogs where they may economically impact their agricultural activities (see sections 4.1.1.4, Utah Prairie Dog, Limiting Where Take is Allowed, below for additional examples).

In summary, the No Action alternative allows agricultural producers to continue to control prairie dogs on their property in a manner that reduces economic losses for the landowner and consequently gains landowner and community support for prairie dog recovery actions.

4.2 ALTERNATIVE 2 (PREFERRED ACTION)

This alternative would reflect a finding by us that amendments to the existing special rule are necessary and advisable for the conservation of the Utah prairie dog. In some cases these amendments will apply the same limits as found in Utah Code R657-19-6 and R657-19-7, and in some cases our amendments would be more restrictive than Utah Code, but mostly in keeping with past UDWR-permitting practices.

4.2.1 Threatened or Endangered Species

4.2.1.1 Autumn Buttercup

The potential effects to the Autumn buttercup are the same as those described for Alternative 1. This alternative would restrict take to agricultural lands, properties adjacent to conservation lands, and areas where prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites.

4.2.1.2 California condor

The potential effects to the California condor are the same as described for Alternative 1 (see section 4.1.1.2, California condor). This alternative would restrict take to agricultural lands, properties adjacent to conservation lands, and areas where prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites.

4.2.1.3 Greater Sage-Grouse

The potential effects to the greater sage-grouse are the same as described for Alternative 1. This alternative would restrict take to agricultural lands, properties adjacent to conservation lands, and areas where prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites.

4.2.1.4 Utah Prairie Dog

Under this Alternative, we propose to amend the existing special rule by more specifically limiting the areas where take is allowed; limiting the amount and

distribution of direct take that can be permitted; limiting methods allowed to implement direct take; and authorizing incidental take from normal agricultural practices (see section 2.2, Alternative 2 (Preferred Action), above). As compared to Alternative 1, we conclude that these limits and the incidental take authorization provide greater benefits to conservation of the Utah prairie dog, as described below.

LIMITING THE AREAS WHERE TAKE IS ALLOWED

As previously described, Alternative 1 would allow take of Utah prairie dogs only on agricultural lands. As compared to Alternative 1, Alternative 2 would also allow for take of Utah prairie dogs on properties near conservation lands and in areas of serious human safety hazards or where prairie dogs disturb the sanctity of significant human cultural or human burial sites. We conclude that these additional authorizations would benefit the conservation and recovery of the Utah prairie dog.

For example, there may be opportunities to protect Utah prairie dogs and their habitats through fee-title purchase or conservation easements with willing landowners (i.e., conservation lands, see section 2.2.2, Limiting Where Take is Allowed). We are more likely to gain community support for these land protection mechanisms if we can provide regulatory flexibility for neighboring landowners. For example, in 2001, the UDWR and Iron County purchased 73 ha (180 ac) in Parowan Valley, and renamed the area as the Parowan Valley Wildlife Management Area, designating it for the protection of a large Utah prairie dog colony. At the time, there was concern that neighboring landowners would be negatively impacted if prairie dog management activities resulted in the growth and expansion of the existing prairie dog colony. Therefore, to support the purchase and protection of this important colony, we worked with the landowner to allow the control of prairie dogs (above a 2001 baseline number on each property) for properties within 0.8 km (0.5 mi) of the Parowan Valley Wildlife Management Area. Because of the issuance of this permit, the local community supported the purchase and management of the property for conservation of the Utah prairie dog.

Another opportunity to promote the use of conservation easements is the Utah prairie dog habitat credit exchange program (hereafter referred to as the "credit exchange program") or similar conservation banking opportunities. The credit exchange program allows a program administrator (in this case, the Panoramaland Resource Conservation and Development Council, Inc.) to enroll willing landowners in a Utah prairie dog conservation bank that is beneficial to landowners, developers, and prairie dogs. Conservation on private lands can then be used to mitigate development in Utah prairie dog habitat. The credit exchange program, or other conservation banking opportunities, can help us promote mitigation in a way that provides a net benefit to the species by incorporating private lands and protecting prairie

dogs on these lands with perpetual conservation easements (Environmental Defense 2009). Again, we believe that we are more likely to gain community support for these land protection mechanisms if we can provide regulatory flexibility for neighboring landowners, which Alternative 2 provides.

The protection of many conservation lands will occur as mitigation required under section 10(a)(1)(B) incidental take permits and habitat conservation plans (HCPs). The existing Iron County HCP allows the use of mitigation banks to offset the impacts of development to Utah prairie dogs (Iron County 2006). We are working with the counties and local communities to develop a rangewide HCP to replace the Iron County HCP. It is too early to describe specific mitigation scenarios under a new rangewide HCP, other than to summarize our intent that a new HCP contributes to recovery and simultaneously accommodate urban growth. Conservation banking agreements and conservation easements to conserve Utah prairie dog habitats on private or other non-Federal lands are likely tools that we will use under this new HCP. We believe that local support for any conservation lands set aside for the species in association with HCPs, especially in urban or agricultural areas, will be greatly enhanced by our ability to control the expansion of colonies or dispersal of individual prairie dogs onto neighboring lands, which Alternative 2 provides.

Many of the enrolled conservation lands will likely be in or adjacent to agricultural production. The goal in establishing conservation lands is to increase prairie dog populations. As such, we believe there will be site-specific needs to control some animals adjacent to the enrolled conservation lands, on neighboring agricultural and other private properties. Our ability to provide sufficient site-specific control measures that would be provided for by Alternative 2 is essential if we are to gain increased interest on the part of private landowners and local communities in the long-term conservation of the Utah prairie dog.

Local communities are also concerned regarding safety and sacredness issues associated with prairie dogs that occur respectively along airport runways and in local cemeteries (CBD 2011). As described under Alternative 1 (see section 4.1.1.4, Where Take is Allowed), our recent experiences show that if we are mindful of landowner, and in this case community and safety needs, and provide mechanisms to control Utah prairie dogs where they conflict with human land uses (i.e., neighboring properties, see section 2.2.2, Limiting Where Take is Allowed), create serious safety hazards, or disturb the sanctity of significant human cultural or human burial sites, which Alternative 2 provides, then we can gain landowner and local community support for species conservation.

Collectively, the available information indicates that benefits to Utah prairie dog conservation will occur under Alternative 2 because we would allow take on: (1) agricultural lands being physically or economically impacted by Utah

prairie dogs when the spring count on the agricultural lands is five or more individuals; (2) private properties within 0.8 km (0.5 mi) of Utah prairie dog conservation lands; and (3) locations where Utah prairie dogs present a serious human safety hazard or disturb the sanctity of significant human cultural or human burial sites—e.g., airport safety areas, recreational sports fields, cemeteries, tribal cultural sites. It is in these areas that prairie dogs achieve population densities and abundances that are higher than their counterparts in native semiarid grassland communities. In addition, allowing take on private property near conservation lands and areas such as airports, cemeteries, and cultural sites would promote landowner and community support for Utah prairie dogs that is necessary to achieve recovery on non-Federal lands. The ability to allow some control of prairie dogs is prudent from a biological and social context, and has and would continue to enhance our ability to recover the species. In addition, imposing section 9(a) take prohibitions in these areas is not necessary and advisable because it would not enhance the conservation of the Utah prairie dog. Utah prairie dog populations have remained stable to increasing throughout implementation of the current special rule and past practices, as implemented under the UDWR permit system. We believe that the preferred alternative would further facilitate recovery so that future populations of Utah prairie dogs would increase.

LIMITING THE AMOUNT AND DISTRIBUTION OF DIRECT TAKE

Agricultural Lands and Properties Near Conservation Lands

According to the literature, a fluctuating annual harvest rate based on a percentage of the known population can help ensure maintenance of a sustainable population, with no risk of extinction (Reeve and Vosburgh 2006). Available models indicate that harvest rates of 20 to 25 percent of a prairie dog population are sustainable (Reeve and Vosburgh 2006; Colorado Division of Wildlife 2007); however these models were not specific to Utah prairie dogs.

This Alternative would limit the allowable permitted take on agricultural lands and properties near conservation lands to a fluctuating harvest rate of no more than 10 percent of the estimated annual rangewide population (adults and juveniles), which is conservative given the above available science. Take associated with agricultural lands would never exceed 7 percent of the estimated annual rangewide population. The remaining allowable take would be reserved for properties neighboring conservation lands.

Under the 1984 special rule, as amended in 1991, permitted take has averaged 5.8 percent of the Utah prairie dog total rangewide population estimate (range equals 1.9 to 13.3 percent), with actual take averaging 2.5 percent of the total rangewide population (range equals 0.9 to 5.5 percent). With these levels of permitted and reported take, rangewide Utah prairie dog populations have

remained stable to increasing (see Figure 3). While our proposed limit on allowable take is above the average actual take, UDWR-permitted take associated with agricultural lands has met or exceeded the standard for agricultural lands (7 percent) eight times since 1985, without negatively affecting the species' long-term table to increasing population trend. In addition, actual take (i.e., harvest) is always less than permitted take (see Table 6), and we expect this trend to continue under this revised special rule. Thus, this rule is more restrictive than past practice in some years and less restrictive than past practice in other years. On the whole, we believe this limit on take, under this Alternative, would ensure that this rule does not negatively impact the stable-to-increasing Utah prairie dog population trends of the last 25 years. Continuing to allow sufficient permitted take limits would also help ensure that private landowners and local communities are willing to work with us on prairie dog conservation efforts (see Limiting Where Take is Allowed, above).

Furthermore, this Alternative limits within-colony take on agricultural lands to not exceed one-half of a colony's estimated annual productivity. Annual productivity = [(2 × spring adult count) × 0.67 (proportion of adult females) × 0.97 (proportion of breeding females) × 3.88 (average number of young per breeding female)], or approximately 36 percent of the total estimated population of the colony. Colony size would be taken into consideration by the permitting biologist when evaluating the permittee's property and determining appropriate take levels, because the impacts of take may be greater on smaller colonies (Colorado Division of Wildlife 2007). The UDWR personnel would count prairie dogs on the applicant's property and determine a total population estimate (adults and juveniles) for each colony. UDWR would identify each permitted colony by name or number. A minimum spring count of seven animals (total population estimate = 50 animals) would be required and would ensure that permits are authorized only where resident prairie dogs have become established on agricultural lands (Day 2011), and that shooting would not result in the elimination of the colony (Colorado Division of Wildlife 2007).

The proposed limits equate to permitted take of up to 36 percent of the total estimated colony population (adults and juveniles). Available prairie dog modeling shows that populations of 50 animals maintain high population growth rates and populations as small as 25 animals have only a very small risk of extinction (Colorado Division of Wildlife 2007). Reducing a colony 50 animals (spring count = 7) by 36 percent results in a remaining population of 32 animals, which is higher that the smallest population of 25 animals evaluated by modeling (Colorado Division of Wildlife 2007).

These limits are also largely consistent with UDWR's past practice (though not previously codified in State or Federal law), which has successfully controlled prairie dogs in site-specific locations without negatively impacting recovery of the species (Day, 2010; Brown 2012). In fact, this rule increases

the minimum colony size for permitting from a spring count of five (past practice under the existing special rule) to a spring count of seven animals [total estimated population size (adults and juveniles) = 50 animals] because modeling information shows that populations of this size will have positive population growth.

In our view, the Utah prairie dog situation differs from the ones modeled. One major difference is that prairie dog productivity and survivorship, key assumptions for these models, are substantially higher in colonies occurring on irrigated agricultural land than they are on native semiarid grasslands (Collier 1975, Crocker-Bedford and Spillet 1981). These differences suggest that existing models for black-tailed and Gunnison prairie dogs are poor predictors of likely impacts to Utah prairie dogs—the existing models were not specific to agricultural lands as in the case of this special rule. Thus, the suggested sustainable harvest rates recommended by these models are not directly applicable to agricultural lands occupied by Utah prairie dogs.

Instead, we believe a more reliable indicator of likely future impacts is the 25 years of data from UDWR that indicate that this standard would provide for the conservation of the species (UDWR 2010), and continuing stable to increasing populations as described under Alternative 1. Utah prairie dog populations have remained stable to increasing throughout implementation of the current special rule and past practices, as implemented under the UDWR permit system. In fact, since 1985 we have never verified the loss of a prairie dog colony because of take permitted by UDWR (Day 2010). Furthermore, according to UDWR personnel, prairie dog counts have remained stable to increasing on sites where permits are repeatedly requested, indicating a self-sustaining population and, sometimes, the expansion of these colonies despite long-term control efforts (Day 2010). Our available data shows that reported take in one year has not resulted in significant population declines of the colony the following year (Brown 2012). Thus, limiting within-colony take on agricultural lands to not exceed one-half of a colony's estimated annual productivity (approximately 36 percent of the total estimated colony population) is consistent with UDWR's past practice. Consequently, we conclude that these measures would be sufficient to address prairie dog control issues and benefit Utah prairie dog recovery simultaneously.

Lastly, we would limit take by season on agricultural lands and properties near conservation lands under this Alternative. Take would be allowed between June 15 and December 31. This is a moderate change from the dates authorized by the 1984 special rule, as amended in 1991 (June 1 through December 31), but is based on our most current knowledge of the species biology—pups emerge from their burrows by mid-June at which time they are foraging independently (Hoogland 2003). Therefore, the loss of female adult prairie dogs to shooting would not negatively affect the survivability of the remaining young.

Areas Where Prairie Dogs Create Serious Human Safety Hazards or Disturb The Sanctity of Significant Human Cultural or Human Burial Sites

Under this Alternative, we would not limit the amount or timing of lethal take on lands where Utah prairie dogs create serious human safety hazards or disturb the sanctity of significant human cultural or human burial sites, except that translocations would need to be completed prior to the occurrence of lethal take. These sites are relatively small areas, must be fenced, and prairie dogs removed by translocation prior to lethal take being allowed. These areas do not contribute to conservation of the species because they are generally within otherwise developed areas with substantial human activity and habitat fragmentation. Overall, individual Utah prairie dogs to be killed and may result in the loss of colonies in site-specific locations, but there would be no effect to the species' overall viability because these areas do not contribute to the species' conservation.

LIMITING METHODS ALLOWED TO IMPLEMENT DIRECT TAKE

The potential effects of lead shot to Utah prairie dogs is described above for Alternative 1 (see section 4.1.1.4, Utah Prairie Dogs). The potential effects described for Alternative 1 would be the same under this Alternative.

Agricultural Lands of Properties near Conservation Lands

Under this Alternative, we would specifically prohibit drowning, poisoning, and the use of gas cartridges, anticoagulants, and explosive devices as methods of permissible lethal control. These types of methods are typically applied across large areas and usually kill large numbers of prairie dogs (Collier 1975). This limit is more restrictive than Alternative 1 which does not specifically prohibit drowning, poisoning, and the use of gas cartridges, anticoagulants, and explosive devices, but it provides assurances that we are able to control the numbers of prairie dogs taken under the rule, and that we are able to track actual take. Thus this Alternative would have less impacts to Utah prairie dogs.

Areas Where Prairie Dogs Create Serious Human Safety Hazards or Disturb the Sanctity of Significant Human Cultural or Human Burial Sites

The effects of this Alternative are similar, but less than, Alternative 1 because the areas in which any lethal methods may be used to control prairie dogs are very site-specific and small. In addition, translocations must be used prior to any lethal control which reduces the amount of lethal control that would be required at any one site.

AUTHORIZING INCIDENTAL TAKE FROM NORMAL AGRICULTURAL PRACTICES

Under this Alternative, we would exempt incidental take resulting from agricultural practices on legitimately operating agricultural lands. Exempted

practices include plowing to depths not exceeding 46 centimeters (cm) (18 in.), discing, harrowing, irrigating crops, mowing, harvesting, and bailing, as long as the activities are not intended to eradicate Utah prairie dogs. These are traditional practices on this landscape.

While it is possible that some incidental mortality or harassment results from these activities, no available information indicates sizable or noteworthy impacts. Similarly, the available information (namely, annual Utah prairie dog surveys conducted by UDWR rangewide; see Figure 3) does not indicate impacts at the colony or species level. The continued presence of large, persistent colonies on agricultural lands despite ongoing agricultural uses indicates any negative impacts are minor and temporary. Agricultural operations make the land more productive than it would be in its natural state. Provided that careful regulation of direct take continues, this increased productivity appears, based on individual colony persistence and abundance data, to more than offset any temporary negative impacts that are created by the incidental take of individual prairie dogs.

Similar to Alternative 1, we conclude that providing this kind of regulatory relief benefits the Utah prairie dogs by gaining landowner support for species conservation. We conclude that the preferred alternative would further facilitate recovery so that future populations of Utah prairie dog would increase.

SUMMARY

In summary, under this Alternative, individual Utah prairie dogs would be negatively impacted; however, we conclude that these impacts are site specific and negligible to conservation and recovery of the population. Our ability to allow take on agricultural lands would have beneficial effects to the biological viability of prairie dog colonies in these areas because of our ability to manage their unnaturally high densities. Allowing take on agricultural lands, lands within 0.8 km (0.5 mi) of conservation lands, and areas of serious human safety hazards or where prairie dogs disturb the sanctity of significant human cultural or human burial sites would help us achieve species' recovery by gaining landowner and local community support for Utah prairie dog recovery efforts. In addition, as compared to Alternative 1, this Alternative would provide Federal regulations which limit take based on best available scientific information and would help us ensure the continued stable to increasing rangewide trends for the Utah prairie dog.

4.2.2 Other Fish and Wildlife

As previously described, many wildlife species are susceptible to lead poisoning and some species may scavenge on prairie dog carcasses killed with lead ammunition under this Alternative (see section 4.1.2, Other Fish and Wildlife).

The potential effects to Other Fish and Wildlife are the same as described for Alternative 1 (see section 4.1.2, Other Fish and Wildlife). Therefore, we conclude that the effects of this Alternative to Other Fish and Wildlife species are negligible.

4.2.3 Transportation System

As previously described (see section 4.1.2, Transportation System), since 2010 there has been increased concern regarding human safety issues from Utah prairie dogs burrowing near and within the runway safety areas, including burrowing that occurred through the asphalt of the Parowan airport. Burrowing in these areas could result in an aircraft accident if an airplane's wheels hit a burrow, causing the plane to veer in a different direction. This alternative would allow take in areas of serious human safety hazard, including airports, thus helping to reduce the potential for aircraft accidents and human injury. As compared to Alternative 1, allowing take in areas of human safety hazards, such as airports, would promote community support for Utah prairie dogs that is necessary to achieve recovery on non-Federal lands. As previously described, the ability to allow some control of prairie dogs is prudent from a biological and social context, and has and would continue to enhance our ability to recover the species. In addition, imposing section 9(a) take prohibitions in these areas is not necessary and advisable because it would not enhance the conservation of the Utah prairie dog. We believe that the preferred alternative would further facilitate recovery so that future populations of Utah prairie dogs would increase. (see sections 4.1.1.4, 4.2.1.4, Utah Prairie Dog Limiting the Areas Where Take is Allowed, above).

4.2.4 Farm Lands

The effects of this Alternative on farm lands are the same as those described for Alternative 1 (see section 4.1.3, Farm Lands). Alternative 2 similarly allows take on agricultural lands.

4.2.5 Livestock Grazing

The effects of this Alternative on livestock grazing are the same as those described for Alternative 1 (see section 4.1.4, Livestock Grazing). Alternative 2 similarly allows take on agricultural and pasture lands.

4.2.6 Socioeconomics

The effects of this Alternative on socioeconomics are the same as those described for Alternative 1 (see section 4.1.5, Socioeconomics). Alternative 2 similarly allows take on agricultural and pasture lands which would help support agricultural economics across the species' range by providing some relief to the agricultural producers.

4.3 ALTERNATIVE 3

4.3.1 Threatened or Endangered Species

4.3.1.1 Autumn Buttercup

As previously described, the Autumn buttercup occurs on one privately owned property and one property owned by TNC. No prairie dogs occur on these properties; however, there are historical mounds. As compared to Alternatives 1 and 2 that allow take on agricultural lands, under this Alternative, if prairie dogs occupy these sites in the future there would be no mechanism to authorize take if the prairie dogs impacted Autumn buttercup plants on either property. There could be impacts to Autumn buttercup plants on both properties if prairie dogs reoccupy the sites and are left uncontrolled; however, the impacts are likely negligible given that there are other unknown factors already causing the decimation of the TNC population, and prairie dogs and Autumn buttercup have existed on these sites together in the past.

4.3.1.2 California condor

As compared to Alternatives 1 and 2 under which lead ammunition could be used, California condors would not be affected by this Alternative. There would be no shooting of Utah prairie dogs and therefore no potential for exposure of condors to lead ammunition.

4.3.1.3 Greater Sage-Grouse

As compared to Alternatives 1 and 2 under which lead ammunition could be used, Greater sage-grouse would not be affected by this Alternative. There would be no shooting or trapping of Utah prairie dogs and therefore no potential for disturbance from human activity, the sounds of gunshots, or exposure to lead.

4.3.1.4 Utah Prairie Dog

As previously described (see sections 4.1.1.4, 4.2.1.4, Utah Prairie Dog, Limiting Where Take is Allowed), the ability to allow some control of prairie dogs is prudent from a biological and social context, and has and would continue to enhance our ability to recover the species. As compared to Alternatives 1 and 2 which allow limited control of Utah prairie dogs, this Alternative would not authorize lethal control of prairie dogs unless permitted pursuant to section 10(a)(1)(A) of the Act. Imposing all section 9(a)(1) take prohibitions for the Utah prairie dog, as proposed under this Alternative, would not enhance the conservation of the Utah prairie dog (see sections 4.1.1.4, 4.2.1.4, Utah Prairie Dog, Limiting Where Take is Allowed). For example, if we did not allow control or incidental take of prairie dogs on agricultural lands, farmers and ranchers would not be supportive of our efforts to recover the Utah prairie dog because they would have no means to reduce the impacts of unnaturally high populations of prairie dogs on their operations. Similarly, if we did not allow control adjacent to conservation lands, the

public would not support protection of Utah prairie dogs on private lands, particularly in areas supporting other human uses. In addition, if we did not control prairie dogs at the Parowan airport or in other areas of human safety concern, and an accident resulted, or we did not control prairie dogs at public cemeteries, public sentiment against Utah prairie dogs would likely increase and foreclose upon opportunities to work with private landowners to conserve the species. This would undermine recovery, as protection of some private lands is essential for the conservation of the species (USFWS 2012). Utah prairie dog populations have remained stable to increasing throughout implementation of the existing special rule and past practices, as implemented under the UDWR permit system (see Figure 3; section 4.2.1.4, Limiting the Amount and Distribution of Take).

4.3.2 Other Fish and Wildlife

Under this Alternative, lethal take of Utah prairie dogs would not be allowed unless permitted pursuant to section 10(a)(1)(A) of the Act. As compared to Alternatives 1 and 2, there would be no effect of this Alternative on other wildlife species in the action area from the use of lead ammunition or increased noise disturbances.

4.3.3 Transportation System

The effects of this Alternative on the Transportation System are the same as Alternative 1 because take would not be allowed on airport properties. The effects of this Alternative are greater than Alternative 2 because Alternative 2 would authorize take on airport properties. As previously described (see section 4.1.2, Transportation System), since 2010 there has been increased concern regarding human safety issues from Utah prairie dogs burrowing near and within the runway safety areas, including burrowing that occurred through the asphalt of the Parowan airport. Burrowing in these areas could result in an aircraft accident and human injury or death if an airplane's wheels hit a burrow, causing the plane to veer in a different direction. This Alternative would not allow take in areas of serious human safety hazard, including airports, thus the potential for aircraft accidents and human injury or death would remain at the airports.

4.3.4 Farm Lands

As previously described in Alternatives 1 and 2, (see sections 4.1.5, Socioeconomics; 4.1.1.4, 4.2.1.4, Utah Prairie Dog, Limiting Where Take is Allowed), the ability to allow some control of prairie dogs is prudent from a biological and social context, and has and would continue to enhance our ability to recover the species. This Alternative would not be as compatible as Alternatives 1 and 2 with state, local, and private efforts to protect farmland. Prairie dogs can cause conflicts for farmers because their colonies extend into agricultural fields, they eat crop vegetation such as alfalfa, and their burrows

can create obstructions for the operation of crop equipment (Elmore and Messmer 2006a, b). To minimize these conflicts between agricultural activities and Utah prairie dog conservation, the existing special rule, as amended, allows regulated take of Utah prairie dogs on private agricultural lands where damage from prairie dogs is observed.

In summary, as compared to Alternatives 1 and 2, this Alternative would allow no regulated take of Utah prairie dogs unless permitted pursuant to section 10(a)(1)(A) of the Act and thus prairie dog impacts to farm operations could increase in many locations.

4.3.5 Livestock Grazing

The effects of this Alternative to livestock grazing are similar to those described above for farm lands. Many agricultural producers claim that Utah prairie dogs impact their operations through loss of forage for their cattle; equipment damage from driving across burrows; and livestock injury if animals step in burrows (Elmore and Messmer 2006). To minimize these conflicts between livestock grazing activities and Utah prairie dog conservation, the existing special rule, as amended, allows regulated take of Utah prairie dogs on agricultural lands (including pasture land) where damage from prairie dogs is observed. This alternative, however, would allow no regulated take of Utah prairie dogs, and thus prairie dog impacts to livestock operations would increase in many locations (see section 4.1.6, Socioeconomics).

In summary, as compared to Alternatives 1 and 2, this Alternative would allow no regulated take of Utah prairie dogs unless permitted pursuant to section 10(a)(1)(A) of the Act and thus prairie dog impacts to livestock grazing operations could increase in many locations.

4.3.6 Socioeconomics

The effects of prairie dog control authorization on socioeconomics are the same as those described for Alternative 1. Thus prairie dog impacts to socioeconomics associated with agricultural operations would increase in many locations (see section 4.1.5, Socioeconomics).

5 CUMULATIVE IMPACTS

Cumulative impacts are 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

5.1 CUMULATIVE ACTIVITIES

Cumulative effects for our Proposed Action would be those that 1) result in population or habitat effects to the Utah prairie dog in addition to prairie dogs killed under this special rule or 2) lead in the environment from other hunting activities and its effects to California condors and other wildlife species. There are no known cumulative effects to the transportation system, farm lands, livestock grazing, or socioeconomics. Thus, the primary cumulative effects associated with this proposed action include urban expansion, agricultural use, over-grazing, off-highway vehicle/recreational uses, energy resource exploration and development, poaching, the occurrence of plague (USFWS 2012), and lead in the environment.

5.1.1 Urban Expansion

Urban expansion across the range of the Utah prairie dog was one of the factors that resulted in listing the species under the ESA and continues to be a primary threat to the species. Approximately 70% of all known Utah prairie dogs occur on private lands (UDWR 2010), the same lands that are prioritized for residential and industrial development. The highest degree of Utah prairie dog habitat impacts associated with urban expansion occurs in Iron County, Utah. Iron County comprises over 95% of the West Desert RU and approximately 70% of the current Utah prairie dog population.

From 1998- 2011, a total of 986 Utah prairie dogs were taken (i.e, incidentally killed, harmed, or translocated), of which 229 Utah prairie dogs were translocated from developing private lands to Federal lands under the Iron County HCP. In addition, 774.3 ac (313 ha) of occupied habitat were lost to urban development in Iron County (Kavalunas 2011a, pers. comm.). In addition, 2,906 Utah prairie dogs were translocated from the Cedar City golf course from 1998 2011 under the Golf Course HCP (Kavalunas 2011b, c) (see section 1.9.6, Habitat Conservation Plans for more information).

Growth projections for the next 30 years include the loss of mapped (occupied and unoccupied) Utah prairie dog habitat to development—4,799 ac (1,942 ha) in West Desert Recovery Unit; 1,220 ac (494 ha) in Paunsaugunt Recovery Unit, and 1,051 ac (425 ha) in the Awapa Recovery Unit (Cardno Entrix 2011). The threatened status of the Utah prairie dog results in the need to develop and implement habitat conservation plans (HCPs) to mitigate impacts to the species from urban development on non-Federal lands. Ongoing development and the resulting incidental take of Utah

prairie dogs in Iron County is authorized under an ESA Section 10(a)(1)(B) permit and the Iron County HCP through 2018. There is no current mechanism (i.e., no approved HCP) to authorize incidental take of Utah prairie dogs on non-Federal lands in the Awapa Plateau or Paunsaugunt RUs. However, a range-wide HCP (covering Iron, Garfield and Wayne counties) is in development (Cardno Entrix 2011). Future growth projections include the loss of 1,247 ac (505 ha) of occupied Utah prairie dog habitat in the Awapa Plateau RU (CardnoEntrix 2011) – 30% of the available occupied habitat and 11% of the mapped habitat in this RU. Future growth projections in the Paunsaugunt RU include the loss of 232 ac (94 ha) of Utah prairie dog occupied habitat (CarnoEntrix 2011) – 2.7% of the total occupied habitat and 1.5% of mapped habitat in this RU.

The projected loss of habitat among the three RUs would impact Utah prairie dogs, especially if the loss is not mitigated adequately. However, the threatened status of Utah prairie dogs prohibits take of Utah prairie dogs from urban development activities unless exempted through Section 7 of the act or permitted through Section 10(a)(1)(B).

5.1.2 Agricultural Use and Overgrazing

As described above (see section 3.4, Farmlands; section 3.5, Livestock Grazing; section 3.6 Socioeconomics), agricultural use would continue to be a component of the lifestyle and economy of the communities in the Action Area. Approximately 70% of Utah prairie dog habitat occurs on non-Federal lands. Many of these lands are in agricultural production (Utah State University 2005).

Utah prairie dogs in agricultural fields are subject to negative impacts including unregulated lethal control efforts to protect crops (Knowles 2002); habitat fragmentation from fences and roads; and urban predators (Seglund and Schnurr 2009). Impacts from over-grazing can include decreased habitat quality resulting from increases in invasive plants and decreased vegetation diversity (Collier and Spillett 1973); erosion (Crocker-Bedford 1975); and decreased forage availability (Ritchie 1998, Cheng and Ritchie 2006). These effects may be more likely during times of drought or in areas with low plant diversity (Elmore and Messmer 2006a, b).

However, maintaining agricultural lands across the species' range can be important for the long term conservation of the species. Agricultural crops can benefit prairie dogs by providing highly nutritious forage (Crocker Bedford 1976; Seglund and Schnurr 2009). The private ownership of agricultural lands means that they are at risk of being converted to urban development in the future (see Urban Expansion, above).

Prairie dogs can cause conflicts for farmers and ranchers because their colonies extend into agricultural fields (Elmore and Messmer 2006a, b), they eat crop vegetation such as alfalfa, their burrows can create obstructions for the operation of crop equipment, and livestock injury can occur if animals step in burrows (Hoogland 2003, Elmore and Messmer 2006a, b). However, damages are likely site specific and

can be managed under available ESA programs to reduce human-prairie dog conflicts and promote conservation of the species on private land, including special 4(d) rules and safe harbor agreements (SHA).

As previously described, a special 4(d) rule (56 FR 27438, June 14, 1991) allows regulated take of Utah prairie dogs on private agricultural lands where damage from prairie dogs is observed. 31906, June 2, 2011); and is the subject of our Proposed Action to revise the special rule. In addition, a programmatic SHA and ESA Section 10(a)(1)(A) incidental take permit was issued to the Panoramaland Resource Conservation and Development Council (Panoramaland RC&D) in June 2009 (Panoramaland 2009). The purpose of the programmatic SHA is to provide a mechanism for partnering with private landowners, largely agricultural producers, to promote the conservation of Utah prairie dogs through the voluntary restoration, enhancement, and management of farms and ranchlands across the species' range, while providing regulatory assurances to landowners.

5.1.3 Off-Highway Vehicle/Recreational Uses

OHV recreation is an increasingly common use of public lands. OHV registrations in Utah increased 233% from 1998-2006 (Burr et al. 2008), and new retail sales of OHVs increased 163% between 1995 and 2001, with most of these vehicles being used on public lands (Fischer et al. 2002).

Though not specific to Utah prairie dogs, OHV use affects soils, vegetation, and wildlife species (Ouren et al. 2007). Based on the available information, it is likely that OHV use results in habitat fragmentation and reduced connectivity across the species' range, increasing the likelihood of local extirpations. Direct mortality may occur as a result of collision or burrow collapse. Repeated OHV disturbances may reduce the foraging time of Utah prairie dogs and negatively affect weight gain, resulting in decreased overwinter survival. Loud OHV noises may cause hearing loss in prairie dogs, leading to a higher risk of predation. Physiological effects from disturbance can lead to declines in local population size, survivorship, and productivity of wildlife species in general (Ouren et al. 2007). OHV activities can crush vegetation, decreasing forage quality and availability for prairie dogs. OHV use also allows more human access to prairie dog colonies, which may increase the risk of illegal shooting (USDA 2009a).

On Federal lands, increased planning efforts direct OHV use to designated trails or play areas, and consequently away from Utah prairie dog habitats. The range of the Utah prairie dog overlaps the Dixie and Fishlake National Forests, and the Cedar City, Richfield, and Kanab BLM Field Office areas. The Dixie and Fishlake National Forests prohibit cross-country vehicle travel Forest wide; motorized travel is restricted to designated open routes or areas (USDA 2006, 2009b). In addition, the Dixie Motorized Travel Plan includes conservation measures specific to Utah prairie dog, including surveys, avoidance (i.e., spatial and seasonal), and revegetation prescriptions for the species along roads proposed for closure (USDA 2009c).

Almost the entire Richfield BLM Field Office area is either closed to OHV use or limited to designated routes, and includes conservation measures (i.e., seasonal and spatial buffers) specific to Utah prairie dog (BLM 2008a). The Kanab BLM Resource Management Plan (RMP) includes a conservation measure to preclude cross-country motorized use in occupied or inactive Utah prairie dog colonies (BLM 2008b). The Cedar Beaver Garfield Antimony RMP (BLM 1986) provides management direction for the Cedar BLM Field Office area, and limits vehicle use to existing roads and trails near prairie dog colonies. This restriction is in effect at one Utah prairie dog complex (Three Peaks) and portions of four additional complexes totaling approximately 7% of Utah prairie dog mapped habitat in the West Desert RU (Bonebrake 2010). The BLM Cedar City Field Office has initiated a RMP revision process. In the revised RMP, they would designate all areas under the jurisdiction of the Field Office as either open to cross-country travel, limited to existing routes, or closed to all motorized travel. However, it is too early to determine how the revisions to this RMP would affect Utah prairie dogs.

While OHV use is not restricted on non-Federal lands, OHV activity in these areas is more likely to be utilitarian in nature (i.e., related to getting around private property) and of lower intensity and impact when compared to recreational use more common on Federal lands.

5.1.4 Energy Resource Exploration and Development

Energy resource exploration and development activities within the range of the Utah prairie dog primarily include wind and oil and gas development. Wind development projects include construction of wind towers, roads, and transmission lines. These facilities can result in the loss and fragmentation of Utah prairie dog habitat and increased predation due to added perching locations for raptors. The most likely areas for wind power development in Utah are the Raft River Mountains in western Utah and the Milford area in southwest Utah (DOE 2010a). The Raft River Mountains do not overlap the historical or current range of the Utah prairie dog. Suitable habitat for Utah prairie dogs occurs in the Milford area (in the species' current range) (BLM 2009), but we are not aware of any occupied habitats within 25 mi (40 km) of the wind development area. Therefore, we do not consider wind power to be a threat to the Utah prairie dog.

Oil and gas development includes seismic activities, exploratory wells, and production facilities. Development also includes the construction of roads, wells and pads, and energy corridors (i.e., long distance pipelines or transmission lines). Resulting impacts to prairie dogs from oil and gas development may include direct mortality from vehicles; direct mortality associated with increased access by recreational shooters who use the new roads (Gordon et al. 2003); increased disturbance responses from increased human activity; direct loss and fragmentation of habitat and forage resources during exploration, drilling, and production; and indirect loss of forage resources from invasive nonnative plant species (Seglund and Schnurr 2009). Potential impacts from seismic testing on Utah prairie dogs are negligible (Young and Sawyer 1981; Menkens and Anderson 1991). However, overall, we do

not anticipate high levels of oil and gas development across the species' range (BLM 1986, 2008b, 2008c, 2008d,2008e; USDA 2007)).

The Department of Energy (DOE) and the BLM are working on a Draft Programmatic Environmental Impact Statement (DPEIS; DOE 2010b) to address utility-scale solar energy development in six southwestern States, including Utah. There are three solar energy zones proposed in Iron and Beaver Counties. Environmental considerations for the Utah prairie dog, at this preliminary stage, include consultation with the USFWS and UDWR to identify appropriate survey protocols and avoidance measures. Impacts to the species are expected to be small overall—the DPEIS estimates 0.1% of suitable Utah prairie dog habitat occurs within the solar energy zones across the species range (DOE 2010b).

Energy resource exploration and development is in the lowest-tier of threats for Utah prairie dogs (see Table 7). Although energy development may occur in some locations across the species' range, there has been a low level of exploration and development to date, and projections remain low for the majority of the species' range for the foreseeable future. Some land use planning documents include conservation measures to avoid and minimize impacts to Utah prairie dog habitats.

5.1.5 Poaching

The Utah Prairie Dog 1991 Recovery Plan identified overutilization through extensive government-sponsored poisoning campaigns as the initial cause of the species' decline. Poaching is any unauthorized killing of Utah prairie dogs, including shooting, poisoning, trapping, and other lethal methods. There are no data to quantify these impacts. We have observed shell casings in Utah prairie dog colonies, and it is possible that prairie dogs are the target animals in some of these locations. Since the fall of 2007, three poisoning incidents and one shooting incident occurred in the West Desert RU. These unauthorized killings resulted in impacts to a few colonies, but these impacts did not extend to the population level. These incidents are currently under investigation (Bell 2008).

5.1.6 Occurrence of Plague

Plague occurs across the entire range of the Utah prairie dog, and is considered to be a primary threat to the species' survival and conservation. Plague is caused by a bacterium (Yersinia pestis) not native to North America. Plague likely arrived in North America about 100 years ago via flea-infested rats on ships coming from Asia and Europe (Biggins and Kosoy 2001a, Hoogland et al. 2004).

Fleas are the most common vector for plague (Biggins and Kosoy 2001a). Infected fleas can be brought into the vicinity of a prairie dog colony by a suite of mammals (Biggins and Kosoy 2001a), and fleas may survive for over a year after their hosts have died (Gage and Kosoy 2005).

Much of the plague research available is for white-tailed prairie dogs; however, due to the similarity in life history and habitat use of white-tailed prairie dogs and Utah

prairie dogs, we consider the research to be relevant to the Utah prairie dog. We use this information as well as any information specifically pertinent to Utah prairie dogs in the below discussion. Plague occurs in prairie dog colonies as enzootic and epizootic events. Enzootic plague is an infection that is persistent in the population over time and causes a low rate of mortality. Epizootic plague occurs when the disease spreads from enzootic hosts to more susceptible animals, resulting in a rapidly spreading die-off cycle (Barnes 1993, Biggins and Kosoy 2001b, Cully and Williams 2001, Gage and Kosoy 2005). During epizootic plague events, large numbers of animals can die within a few days (Lechleitner et al. 1962; Cully 1993).

The factors that cause a change from an enzootic to epizootic cycle are still being researched, but may include host density, flea density, and climatic conditions (Cully 1989; Parmenter et al. 1999; Cully and Williams 2001; Enscore et al. 2002; Lomolino et al. 2003; Stapp et al. 2004; Gage and Kosoy 2005; Ray and Collinge 2005; Stenseth et al. 2006; Adjemian et al. 2007; Snäll et al. 2008; Biggins et al. 2010). More specifically, enzootic plague may be influenced by factors including genetics, prairie dog immunity and physiologic state, and interactions with other bacteria (Gage and Kosoy 2005). Occurrence of epizootic plague outbreaks may be dependent on the density of the host population and/or flea vector abundance (Barnes 1993), or flea density (Biggins et al. 2010), which may be affected by climatic factors (Gage and Kosoy 2005). Epizootic plague outbreaks may occur when Utah prairie dog populations increase to high densities causing increased stress among individuals and easier transmission of disease between individuals (Gage and Kosoy 2005). However, plague also could occur when Utah prairie dogs are at lower densities but flea density is high (Biggins et al. 2010).

Epizootic and enzootic plague can have wide-reaching impacts to prairie dog populations. Although the impacts of enzootic plague may be less dramatic and obvious than epizootic outbreaks of plague, enzootics may be a constant threat to prairie dog persistence over moderate time spans (Biggins et al. 2010).

Plague likely persists in prairie dog colonies at enzootic levels even after an epizootic outbreak subsides. In the absence of epizootic events, plague antibodies and plague positive fleas and prairie dogs occur in colonies (Biggins et al. 2010). Other evidence of enzootic plague includes the increased survival of prairie dogs and black-footed ferrets exposed to flea control and experimental vaccines despite the lack of epizootic plague outbreaks (Matchett et al. 2010). Increased survival with these treatments indicates that enzootic plague is frequently present and suppressing prairie dog population levels in the absence of plague prevention measures.

Possible reasons for persistence of plague as an enzootic in the environment include survival of the bacterium in the soil, persistence of the bacterium in fleas, and the continued slow transmission of the bacterium within the prairie dog community (Gage and Kosoy 2006 in Biggins et al. 2010). Infected fleas can exist in burrows for up to 13 months following a plague event (Fitzgerald 1993).

Long-term enzootic plague infection may cause local extirpation of colonies, extreme fluctuations in population densities and occupied habitat area, and inbreeding (Seglund et al. 2006). Enzootic plague also may alter population dynamics and dispersal (Biggins et al. 2010).

For example, if plague results in higher mortality of adults than juveniles, the remaining juveniles would be less likely to disperse away from their native colonies, instead replacing the adults and resulting in a younger population (Biggins et al. 2010).

Recovery of colonies after plague outbreaks within localized white-tailed prairie dog populations can occur within as little as 1 to 2 years (Menkens and Anderson 1991; Anderson and Williams 1997) or as long as 10 years (Cully and Williams 2001). Some of reasons for the variability in recovery rates may be due to the continued existence of chronic enzootic plague within colonies, or lack of immigration (due to large distances between colonies) of prairie dogs to reestablish affected colonies (Barnes 1993). Many times, when a colony begins to regain its former population size, it again becomes susceptible to plague epizootics—high population densities provide greater opportunities for the exchange of fleas and thus affect the speed at which plague can move through the population (Barnes 1993).

The long-term consequence of repeated or continued exposure to plague in white-tailed prairie dogs may lead to selection of individuals that are genetically more resistant to the disease and are able to maintain plague in an enzootic form in the environment. However, populations of white tailed prairie dogs thus far have remained highly susceptible to plague even after being subjected to repeated exposure (Biggins and Kosoy 2001b).

Evaluation of plague over longer time periods may provide better insight into the ability of prairie dog populations to cope with this introduced pathogen. Environmental stochastic events and anthropogenic disturbances in combination with plague could ultimately decrease the ability of a population to recover to historical densities and reduce the long-term persistence of prairie dog populations. In addition, a loss of genetic diversity due to periodic population bottlenecks caused by epizootics may occur (Trudeau et al. 2004). Utah prairie dogs exhibit very low genetic variation (Chesser 1984) and little gene flow between colonies (Ritchie and Brown 2005), possibly due to plague and habitat fragmentation (see section 1.7.5, Genetic Diversity).

Plague will likely continue to be a threat throughout the range of western prairie dog species for the foreseeable future. Some tools are available to control plague. Deltamethrin and pyraperm are two insecticides used to successfully control fleas in colonies of many prairie dog species (Seery et al. 2003; Hoogland et al. 2004). Use of these insecticides has increased the number of juvenile Utah prairie dogs weaned (Hoogland et al. 2004) and resulted in higher survival rates for black-tailed (C. ludovicianus), white-tailed, and Utah prairie dogs (Biggins et al. 2010).

Experimental vaccine-laden baits are in development to immunize prairie dogs against plague. Black-tailed prairie dogs exposed to plague in a lab setting and fed vaccine baits experienced a high level of survival (Mencher et al. 2004; Rocke et al. 2008). A systemic flea control bait also is under development (Poché et al. 2008). The flea control bait reduces flea loads on animals, the primary vector in spreading plague in prairie dogs (Jachowski 2009).

Other threats may compound the impacts of plague, at least in the short-term, and should be addressed where possible to lessen the impacts or duration of plague. The effects of plague may be exacerbated and recovery rates slowed when additional stresses such as shooting, poisoning, and habitat loss co-occur. These pressures acting together may increase the isolation of prairie dog populations, and if plague infiltrates isolated areas and localized populations are eradicated, may reduce the number of source animals present to recolonize the area.

5.1.7 Utah Prairie Dog Recovery Actions

As previously described, there are many ongoing and planned recovery actions for the Utah prairie dog (see section 3.1.2, Utah Prairie Dog). Recovery actions include specific measures to manage and restore Utah prairie dog habitats on federal lands; translocate and establish new Utah prairie dog colonies on Federal and non-Federal lands; control and manage plague; conserve habitat on non-Federal lands, including efforts to permanently protect Utah prairie dog habitat on non-Federal lands, protect Utah prairie dog habitat through conservation easements and fee acquisition from willing sellers, expand market-based and other financial incentives for private landowners who enter into permanent agreements to manage or restore Utah prairie dog habitat, establish an endowment fund to administer and manage protected Utah prairie dog property; and enroll private lands in temporary voluntary agreements for the benefit of Utah prairie dogs using Federal and State conservation programs (USFWS 2012). These recovery actions improve the baseline for Utah prairie dogs and in the long-term will mediate the impacts of the other cumulative activities described in this section. For example, the loss of prairie dog habitat to urban development, energy resource exploration and development, and recreational use is offset when we are able to conserve and restore other prairie dog habitats on federal and non-federal lands. In addition, the influence of plague on prairie dogs is mediated by our continued efforts to control plague outbreaks by dusting with pesticides and developing vaccines. Poaching has likely been reduced by our ability to manage prairie dog populations through the existing special rule (Alternative 1), which would be maintained under our proposed action. Overall, our proposed action has positive biological and social positive effects on recovery actions for the Utah prairie dog by allowing us to manage prairie dog populations and gaining landowner and community support for recovery efforts (see sections 4.1.1.4 and 4.2.1.4, Utah Prairie Dog, Limiting Where Take is Allowed).

5.1.8 Lead in the Environment

As previously described (see section 4.1.2, Other Fish and Wildlife), the use of lead ammunition for hunting and predator control is widespread in upland habitats such as those occupied by Utah prairie dogs, California condors, and upland game birds. There is no state or federal regulation that restricts the use of lead ammunition for upland wildlife species across the range of the Utah prairie dog. Lead ammunition in the United States is only restricted for waterfowl hunting and within the range of the California condor in California. In addition, we conclude that the effects of lead poisoning attributable to this action would be negligible due to the fact that private lands account for only 22 percent of the action area (see Table 5), and only a small proportion of these are in areas where 4(d) permits are issued. For example, in 2011 the UDWR issued permits on 29 properties that totaled 1312 ha (3,241 ac) which is likely representative for all years under the existing special rule (Day and Brown 2012), and only represents 0.03 percentof the action area (see Table 5). Therefore, the chances that wildlife species would encounter spent lead ammunition associated with 4(d) control permits, or that 4(d) control permits notably add to the effects of lead in the environment under this Alternative is very small, and negligible.

5.2 SUMMARY OF CUMULATIVE EFFECTS

Throughout implementation of the 1984 and 1991 special rules (49 FR 22330, May 29, 1984; 56 FR 27438, June 14, 1991; 50 CFR 17.40(g)), and in the presence of the aforementioned cumulative effect activities (see section 5.1, above), both the rangewide population estimates and numbers of prairie dogs in individual colonies subject to control remain stable to increasing (Figure 3). Therefore, to date, cumulative effects have not resulted in negative impacts to the rangewide population Utah prairie dogs when combined with the existing special rule.

We anticipate that many of these activities will increase in the future due to population growth. For example, there will be more urban development and more use of federal lands for recreation (e.g., off-highway vehicle recreation use), and these activities will result in the loss and fragmentation of some Utah prairie dog colonies. Despite increasing pressures from human land use activities, the presence of these special rules (and our Proposed Revision) is crucial for the recovery of the Utah prairie dog, especially when considered cumulatively with these ongoing activities across the range of the species. For example, we run the risk of having many of the remaining agricultural lands where prairie dogs occur being converted to residential and commercial development if we are not able to work with landowners and local communities to protect the species' habitat. There are opportunities to protect Utah prairie dogs and their habitats through fee-title purchase or conservation easements with willing landowners. We are more likely to gain community support for these land protection mechanisms if we can provide regulatory flexibility for landowners and their neighbors (see sections 4.1.1.4, 4.2.1.4, Utah Prairie Dog, Limiting Where Take is Allowed). Similarly, public support is needed to effectively implement species' conservation measures that are included in U.S. Forest Service and Bureau of Land Management Resource Plans, as well as increase our efforts to avoid and manage plague outbreaks in prairie dog colonies which will likely result in colony expansion. Lastly, it is likely that illegal poaching of prairie dogs would increase if there was no mechanism to allow control in limited circumstance. Overall, our ability to provide sufficient control measures is essential if we are to gain increased

interest on the part of private landowners and local communities in the long-term conservation of the Utah prairie dog.

Although this action may contribute to lead in the environment, there are no regulations that make it illegal to use lead ammunition in upland environments. In addition, the cumulative effects of any lead ammunition used to control prairie dogs under our proposed action are minimal given the relatively small area in which permits are authorized.

6 COMPARISON OF ALTERNATIVES

Alternative 1 would continue to implement the existing special rule as limited by Utah State Code. This Alternative is not preferred because it maintains a 6,000 animal fixed upper limit to annual take when a harvest rate that fluctuates in proportion to the population size is preferable biologically. In addition, if Utah State Code was changed to conform to the existing special rule, then take could occur on all private lands which would likely not benefit conservation of the Utah prairie dog. The Alternative also does not allow take in areas of human safety hazard or where prairie dogs are disturbing the sanctity of significant human cultural or human burial sites.

Alternative 2, the Preferred Alternative would amend the existing special rule and extend the prohibitions in section 9(a)(1) of the ESA to Utah prairie dogs on all lands across the species' range, where not specifically exempted. Exemptions would be provided for agricultural lands (direct lethal and indirect take), areas of human safety hazard, or where prairie dogs are disturbing the sanctity of significant human cultural human burial sites. This Alternative prescribes limits that are not in the existing special regulation or its corresponding Utah Code R567-19-6, R567-19-7. Overall, this Alternative is preferred because it allows management of Utah prairie dogs in a manner that supports our biological and social objectives for recovery of the species.

Alternative 3 would not allow direct lethal take unless permitted pursuant to section 10(a)(1)(A) of the Act. This is the least preferred option because it does not allow management of Utah prairie dogs in a manner that supports our biological and social objectives for recovery of the species, and negatively impacts Transportation (i.e., airports), Farm Lands, Livestock Grazing, and Socioeconomics.

Table 7 provides a summary of potential impacts from the three analyzed Alternatives.

Table 7. Comparison of the Environmental Effects of the Alternative Actions.

Effects	Alternative 1	Alternative 2 (Proposed Action)	Alternative 3
Threatened & Endangered Species	Beneficial effects for the Utah prairie dog and Autumn buttercup with our ability to manage Utah prairie dogs in site-specific cases, and gain increased participation from private landowners in recovery efforts. Possible negative effects to Utah prairie dogs if the maximum 6,000 Utah prairie dogs is taken annually; take methods other than shooting or trapping are used; and take occurs beginning June 1. Possible site-specific negative effects, if any, to California condors and Utah prairie dogs due to the potential for lead ingestion.	Beneficial effects for the Utah prairie dog and Autumn buttercup due to our ability to manage Utah prairie dogs in site-specific cases, and gain increased participation from private landowners in recovery efforts. Possible negative effects to Utah prairie dogs at site specific locations due to the allowed take, but these effects are significantly reduced (as compared to Alternative 1) and negligible because there are limits set on the amount, location, and type of take that may occur. Possible site-specific negative effects, if any, to California condors due to the potential for lead ingestion.	No effects to California condor, and Greater sage-grouse because these species would not be harmed by shooting or the presence of lead ammunition in the environment. Negligible effects to Autumn buttercup because no prairie dog control would be allowed. Negative effects to Utah prairie dogs due to our inability to manage Utah prairie dogs in site-specific cases (biological) and gain increased participation from private landowners in recovery efforts (social).
Other Fish and Wildlife	Possible site-specific, negligible effects from the presence of lead ammunition. Temporary negligible effects associated with human activity and noise from gunshots.	Possible site-specific, negligible effects from the presence of lead ammunition. Temporary negligible effects associated with human activity and noise from gunshots.	No effects because no wildlife species would be harmed by the presence of lead ammunition in the environment.
Transportation System	Negative effects to safety of airports because no direct lethal take is allowed on airport properties (Utah Code).	Beneficial effects to safety of airports because take is allowed to manage human safety hazards.	Negative effects to safety of airports because no direct lethal take is allowed on airport properties.
Farm Lands	Beneficial effects because we can manage Utah prairie dogs, Negative effects because we do not authorize incidental take.	Beneficial effects because of our ability to manage Utah prairie dogs and provide incidental take authorization.	Negative effects, cannot manage prairie dogs, and no incidental take is authorized.
Livestock Grazing	Beneficial effects because of our ability to manage Utah prairie dogs.	Beneficial effects because of our ability to manage Utah prairie dogs.	Negative effects, cannot manage prairie dogs.
Socioeconomics	Beneficial effects for agriculture.	Beneficial effects for agriculture.	Negative effects for agriculture.

7 LITERATURE CITED

Adjemian, J.Z., P. Foley, K.L. Gage, and J.E. Foley. 2007. Initiation and spread of traveling waves of plague, Yersinia pestis, in the western United States. American Journal of Tropical Medicine and Hygiene 76(2):365-375.

Anderson, S.H. and J.R. Squires. 1997. The Prairie Falcon. University of Texas Press. Austin, Texas. 165pp.

Anderson, S.H., and E.S. Williams. 1997. Plague in a complex of white-tailed prairie dogs and associated small mammals in Wyoming. Journal of Wildlife Disease 33:720-732.

Barnes, A.M. 1993. A review of plague and its relevance to prairie dog populations and the black-footed ferret. Pages 28-37, Biological Report 13. Plague Branch, Centers for Disease Control, Fort Collins, CO.

Biggins, D.E., and M.Y. Kosoy. 2001a. Influences of Introduced Plague on North American Mammals: Implications from Ecology of Plague in Asia. Journal of Mammalogy 82:906 916.

Biggins, D.E., and M.Y. Kosoy. 2001b. Disruptions of Ecosystems in Western North America Due to Invasion by Plague. Journal of the Idaho Academy of Science 37:62-65.

Biggins, D.E., J. L. Godbey, K.L. Gage, L.G. Carter, and J. A. Montenieri. 2010. Vector Control Improves Survival of Three Species of Prairie Dogs (Cynomys) in Areas Considered Enzootic for Plague. Vector-Borne and Zoonotic Diseases 10:71-26.

Brown, N. 2012. Analyses of the Utah prairie dog 4(d) program at the site-specific level. Unpublished Report January 2012. U.S. Fish and Wildlife Service, Utah Ecological Services Field Office, West Valley City, Utah. 7pp.

Buerger TT, RE Mirarchi, and ME Lisano. 1986. Effects of lead shot ingestion on captive mourning dove survivability and reproduction. Journal of Wildlife Management. 50: 1 - 8.

Bureau of Land Management. 2009. Draft Biological Evaluation: Utah Prairie Dog Biological Evaluation for Section 7 Consultation on the Milford Wind Facility - Phase II Project. Prepared by the Bureau of Land Management; Fillmore and Cedar City Field Offices, Utah. December 17, 2009.

_____. 1986. Cedar Beaver Garfield Antimony Record of Decision/Resource Management Plan. U.S. Government Printing Office: 1986 676 066/40.023. Region No. 8. 170 pp.

_____. 2008a. Richfield Field Office Record of Decision and Approved Resource Management Plan. Richfield, UT. 184 pp.

_____. 2008b. Kanab Field Office Record of Decision and Approved Resource Management Plan. Kanab, UT. 157 pp.

_____. 2008c. Kanab Field Office Proposed Resource Management Plan and Final Environmental Impact Statement. Cover Page and Executive Summary. Kanab, UT. 26 pp.

_____. 2008d. Kanab Field Office Proposed Resource Management Plan and Final Environmental Impact Statement. Chapter 3. Kanab, UT. 124 pp.

_____. 2008e. Richfield Field Office Proposed Resource Management Plan and Final Environmental Impact Statement. Kanab, UT. 1590 pp.

_____. 2010. Utsovctr.UTSO.gra_past_poly. Grazing allotment and pasture boundaries mapped at 1:24,000 scale. BLM, Utah State Office. May 5, 2010.

Burr, S.W., J.W. Smith, D. Reiter, P. Jakus, and J. Keith. 2008. Recreational Off-Highway Vehicle Use on Public Lands in Utah. The Institute for Outdoor Recreation and Tourism, Utah State University, Logan, UT.

California Condor Recovery Program. 2011. Population Size and Distribution December 31, 2011.

CardnoEntrix. 2011. Development of a Utah Prairie Dog Regional Habitat Conservation Plan: Overview of the Primary Issue. Resource Agency draft September 12, 2011.

Center for Biological Diversity. 2011. News Release, September 16, 2011: Utah congressional delegation pushing unnecessary legislation weakening protection for Utah prairie dogs. 1pp.

Cheng, E., and M.E. Ritchie. 2006. Impacts of simulated livestock grazing on Utah prairie dogs (Cynomys parvidens) in a low productivity ecosystem. Oecologia 147:546-555.

Chesser, R.K. 1984. Study of genetic variation in the Utah prairie dog. Report prepared for U.S. Fish and Wildlife Service, Contract # 14-16-0006-83-049. Texas Tech University, Lubbock, TX. 6 pp.

Church ME, R Gwiazda, RW Risebrough, K Soreson, CP Chamberlain, S Farry, W Heinrich, B Rideout, and DR Smith. 2006. Ammunition is the principal source of lead accumulated by California Condors Re-Introduced to the Wild. Environmental Science and Technology 40: 6143 – 6150.

Collier, G.D. 1975. The Utah prairie dog: Abundance, distribution, and habitat requirements. PhD Dissertation, Utah State University, Logan, UT. 96 pp

Colorado Department of Wildlife. 2007. Summary of information for use by USFWS in the Gunnison's prairie dog 12-month review. 145 pp.

Connelly, J.W., S.T. Knick, M.A. Schroeder, and S.J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. June 2004.

Connelly, J.W., S.T. Knick, C.E. Braun, W.L. Baker, E.A. Beever, T.Christiansen, K.E. Doherty, E.O. Garton, C.A. Hagen, S.E. Hanser, D.H. Johnson, M. Leu, R.F. Miller, D.E. Naugle, S.J. Oyler-McCance, D.A. Pyke, K.P. Reese, M.A. Schroeder, S.J. Stiver, B. L. Walker, and M.J. Wisdom. 2011. Conservation of Greater sage-grouse: A synthesis of current trends and future managmetn. Habitat. Cooper Ornithological Society scientific series: Studies in Avian Biology 38:549-564.

Crispin, J.E., J.C. Downers, P.S. Perlich, and J.A. Wood. 2008. An Analysis of Long-Term Economic Growth in Southwestern Utah: Past and Future Conditions. Bureau of Economic and Business Research. Prepared for The Southwestern Utah Economic Consortium. June 2008. 228pp.

Crocker-Bedford, D. 1976. Food interactions between Utah prairie dogs and cattle. M.S. Thesis, Utah State University, Logan, UT.

Crocker-Bedford, D.C., and J.J. Spillett. 1981. Habitat relationships of the Utah prairie dog. Publication No. 1981-0-677-202/4. U.S. Department of Agriculture, Forest Service, Intermountain Region, Ogden, UT. 29 pp.

Cully, J.F. 1989. Plague in prairie dog ecosystems: importance for black-footed ferret management. In The Prairie Dog Ecosystem: Managing for Biological Diversity. Montana BLM, Wildlife Technical Bulletin No. 2. Pages 47 55.

Cully, J.F. 1993. Pages 38-49 in J.L. Oldemeyer, D.E. Biggins, B.J. Miller, and R. Crete, editors. Proceeding of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the black-footed ferret. U.S. Fish and Wildlife Service, Biological Report 13.

Cully, J.F., Jr. 1997. Growth and life history changes in Gunnison's prairie dogs after a plague epizootic. Journal of Mammalogy 78(1):146-147.

Cully, J.F., and E.S. Williams. 2001. Interspecific Comparisons of Sylvatic Plague in Prairie Dogs. Journal of Mammalogy 82:894-905.

Day, K. 2012. Utah Division of Wildlife Resources, Southern Regional Office, Cedar City, UT., email dated February 8, 2012.

Eisler R. 1988. Lead hazards to fish, wildlife, and invertebrates: A synoptic review. U.S. Fish and Wildlife Service Biological Report 85: 1 – 133.

Elmore, R.D., and T.A. Messmer. 2006a. Livestock grazing and the Utah prairie dog: implications for managing the Awapa. Berryman Institute Publication No. 24. Utah State University, Logan, UT. 15 pp.

Elmore, R.D., and T.A. Messmer. 2006b. Public perceptions regarding the Utah Prairie Dog and its management: Implications for species recovery. Berryman Institute Publication No. 23. Utah State University, Logan, UT. 16 pp.

Enscore, R.E., B.J. Biggerstaff, T.L. Brown, R.E. Fulgham, P.J. Reynolds, D.M. Engelthaler, C.E. Levy, R.R. Parmenter, J.A. Montenieri, J.E. Cheek, R.K. Grinnell, P.J. Ettestad, and K.L. Gage. 2002. Modeling relationships between climate and the frequency of human plague cases in the southwestern United States, 1960-1997. American Journal of Tropical Medicine and Hygiene 66(2):186-196.

Environmental Defense. 2009. Unpublished report. The Utah prairie dog habitat credits exchange: A report to the Natural Resources Conservation Service to fulfill the requirements of Conservation Innovation Grant # Natural Resources Conservation Service # 69 8D43-7-03, Salt Lake City, UT. 43 pp.

Federal Aviation Administration (FAA). 2010. Utah Public Airport Operations on the Utah Prairie Dog Biological Assessment. Prepared by Jacobs Engineering Group, Inc. Salt Lake City, Utah. 50 pp.

Fischer, A.L., D.J. Blahna, and R. Bahr. 2002. Off Highway Vehicle Uses and Owner Preferences in Utah (Revised). Institute for Outdoor Recreation and Tourism, Department of Forest Resources, Utah State University, Logan, UT. Professional Report IORT PR2001-02. 73 pp.

Fitzgerald, J.P. 1993. The ecology of plague in Gunnison's prairie dogs and suggestions for the recovery of black-footed ferrets. Biological Report 13. Department of Biological Sciences. University of Northern Colorado. Greeley, CO. pp. 50-59

Gage, K.L., and M.Y. Kosoy. 2005. Natural history of plague: perspectives from more than a century of research. Annual Review of Entomology 50:505-528.

Gordon, K.M., K.C. Keffer, and S.H. Anderson. 2003. Impacts of recreational shooting on black-tailed prairie dog behavior, population, and physiology. Wyoming Coop. Fish and Wildl. Res. Unit. Laramie, WY. 24 pp.

Hollister, N. 1916. A systematic account of the prairie dogs. N. American Fauna 40:1-37.

Hoogland, J.L. 1995. The black-tailed prairie dog. University of Chicago Press, Chicago, IL. 557 pp.

Hoogland, J.L. 2003. Black-tailed prairie dog, Cynomys lucovicianus and allies. Pages 232 247 in G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, eds. Wild Mammals of North America, Biology, Management, and Conservation. Second Edition. The Johns Hopkins University Press, Baltimore, MD.

Hoogland, J.L., S. Davis, S. Benson-Amram, D. Labruna, B. Goossens, and M.A. Hoogland. 2004. Pyraperm kills fleas and halts plague among Utah prairie dogs. The Southwestern Naturalist 49:376-383.

Iron County Commission and Utah Division of Wildlife Resources. 2006. Habitat conservation plan for Utah prairie dogs in Iron County, Utah. June 26, 1998, as amended November 9, 2006. 113 pp.

Iron County. 2009. Iron County Resource Management Plan. Final, June 2009. 56pp.

Jachowski, D.S. 2009. Preliminary results from black-tailed and Utah prairie dog systemic flea control evaluations. Powerpoint presentation. U.S. Fish and Wildlife Service. October 2009. 25 pp.

Knick, S.T., D.S. Dobkin, J.T. Rotenberry, M.A. Schroeder, W.M. Vander Haegen, and C. Van Riper III. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. Condor 105:611-634.

Knopper, L.D., P. Mineau, A.M. Scheuhammer, D.E. Bond, and D.T. McKinnon. 2006. Carcasses of shot Richardson't ground squirrels may pose lead hazards to scavenging hawks. Journal of Wildlife Management 70(1):295-299.

Knowles, C. 2002. Status of White-tailed and Gunnison's Prairie Dogs. National Wildlife Federation, Missoula, Montana, and Environmental Defense, Washington, DC. 30 pp.

Lechleitner, R.R., J.V. Tileston, and L. Kartman. 1962. Die-off of a Gunnison's prairie dog colony in central Colorado. I. Ecological observations and descriptions of the epizootic. Zoonoses Research 1:185-199.

Locke LN and M Friend. 1992. Lead poisoning of avian species other than waterfowl. In D.J. Pain, ed., Lead Poisoning in Waterfowl. Special Publication 16. Waterfowl Wetlands Research Bureau, Slimbridge, Gloucester, UK, pp. 19 – 22.

Lomolino, M.V., G.A. Smith, and V. Vidal. 2003. Long-term persistence of prairie dog towns: insights for designing networks of prairie reserves. Biological Conservation 115 (2003):111 120.

Matchett, M.R., D.E. Biggins, V. Carlson, B. Powell, and T. Roche. 2010. Enzootic plague reduces black-footed ferret (Mustela nigripes) survival in Montana. Vector-Borne and Zoonotic Disease, Vol. 10, No. 1, pp. 27-35.

Mencher, J.S., S.R. Smith, T.D. Powell, D.T. Stinchcomb, J.E. Osorio, and T.E. Rocke. 2004. Protection of black-tailed prairie dogs (Cynomys ludovicianus) against plague after voluntary consumption of baits containing recombinant raccoon poxvirus vaccine. Infection and Immunity 72:5502-5505.

Menkens, G.E., Jr., and S.H. Anderson. 1991. Population dynamics of white-tailed prairie dogs during an epizootic of sylvatic plague. Journal of Mammalogy 72:328–331.

National Park Service. 2005. Three Condors to be Released October 4: California condor (*Gymnogyps californianus*) http://www.nps.gov/grca/media/2003/2-29sep03.htm.

Natural Resources Conservation Service (NRCS). 2008. GIS Database of Utah Important Farmlands. NRCS, Salt Lake City, Utah.

Ouren, D.S., C. Haas, C.P. Melcher, S.C. Stewart, P.D. Ponds, N.R. Sexton, L. Burris, T. Fancher, and Z.H. Bowen. 2007. Environmental Effects of Off-Highway Vehicles on Bureau of Land Management Lands: A Literature Synthesis, Annotated Bibliographies, Extensive Bibliographies, and Internet Resources. U.S. Geological Survey, Open-File Report 2007-1353. 225 pp.

Pain, D. J., I. J. Fisher, and V. G. Thomas. 2009. A global update of lead poisoning in terrestrial birds from ammunition sources. In R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt (Eds.). Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans. The Peregrine Fund, Boise, Idaho, USA. DOI 10.4080/ilsa.2009.0108.

Panoramaland Resource Conservation and Development Council, Inc. and the U.S. Fish and Wildlife Service. 2009. Programmatic Safe Harbor Agreement for Utah prairie dogs. 25 pp.

Parish, C.N., W.G. Hunt, E. Feltes, R. Sieg, and K. Orr. 2009. Lead exposure among a reintroduced population of California condors in Northern Arizona and Southern Utah. *In* R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt (Eds.). Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans. The Peregrine Fund, Boise, Idaho, USA. DOI 10.4080/ilsa.2009.0217.

Parmenter, R.R., E.P. Yadav, C.A. Parmenter, P. Ettestad, and K.L. Gage. 1999. Incidence of Plague Associated with Increased Winter-Spring Precipitation in New Mexico. American Journal of Tropical Medicine and Hygiene 61:814-821.

Pattee, OH, SN Wiemeyer, BM Mulhern, L Sileo, and JW Carpenter. 1981. Experimental lead-shot poisoning in bald eagles. Journal of Wildlife Management. 45:806-810.

Patterson, R.L. 1952. The Sage Grouse in Wyoming. Sage Books, Inc. Denver, Co.

Pauli, J.N. and S.W. Buskirk. 2007. Recreational shooting of prairie dogs: A portal for lead entering wildlife food chains. The Journal of Wildlife Management 71(1):103-108.

Platt JB. 1976. Bald eagles wintering in a Utah desert. American Birds 30: 783 – 788.

Player, R.L., and P.J. Urness. 1982. Habitat manipulation for reestablishment of Utah prairie dogs in Capitol Reef National Park. Great Basin Naturalist 42:517-523.

Pyke, D.A., 2011, Restoring and rehabilitating sagebrush habitats *In* Knick, S.T., Connelly, J.W., eds., Greater Sage-Grouse- Ecology and Conservation of a Landscape Species and Its Habitats, Studies in Avian Biology No. 38: Berkeley, CA, University of California Press, p. 531-548.

Ray, C., and S.K. Collinge. 2005. Chapter 14, Potential effects of a keystone species on the dynamics of sylvatic plague. In Disease Ecology. Pages 202-216.

Reeve, A.F., and T.C. Vosburgh. 2006. Shooting prairie dogs. In Recovery of the Black-footed ferret: progress and continuing challenges. Edited by J.E. Roelle, B.J. Miller, J.L. Godbey, and D.E. Biggins. U.S. Geological Survey. Pages 119-128.

Ritchie, M.E. 1998. Utah prairie dog recovery: impacts of habitat and grazing: 1997 progress report. Department of Fisheries and Wildlife, Utah State University, Logan, UT. 9 pp.

Ritchie, M.E., and N. Brown. 2005. Interim progress report: research toward recovery of the Utah prairie dog. 17 pp.

Rocke, T.E., S.R. Smith, D.T. Stinchcomb, and J.E. Osorio. 2008. Immunization of black-tailed prairie dog against plague through consumption of vaccine-laden baits. Journal of Wildlife Diseases 44:930-937.

Roth, D. 2011. Memorandum to File from Daniela Roth, Botanist, USFWS. Field Report - Autumn buttercup, August 5 & 9, 2011. U.S. Fish and Wildlife Service, Utah Field Office, West Valley City, Utah. 5 pp.

San Diego Zoo. 2005. Birds: California condor. http://www.sandiegozoo.org/animalbytes/tcondor.html.

Scheuhammer AM. 1987. The chronic toxicity of aluminum, cadmium, mercury, and lead in birds: a review. Environmental Pollution 46: 263 – 295.

Seery, D.B., D.E. Biggins, J.A. Montenieri, R.E. Enscore, D.T. Tanda, and K.L. Gage. 2003. Treatment of black-tailed prairie dog burrows with Deltamethrin to control fleas (Insecta: Siphonaptera) and plague. Journal Medical Entomology 40:718-722.

Seglund, A.E., and P.M Schnurr. 2009. Colorado Gunnison's and white-tailed prairie dog conservation strategy. Colorado Division of Wildlife, Denver, CO, USA.

Seglund, A.E., A.E. Ernst, M. Grenier, B. Luce, A. Puchniak, and P. Schnurr. 2006. White-tailed prairie dog conservation assessment. Western Association of Fish and Wildlife Agencies, Laramie, WY. Unpublished Report. 137 pp.

Six County Economic Development District. 2006. Comprehensive Economic Development Strategy comprising: Juab, Millard, Piute, Sanpete, Sevier, and Wayne Counties. The Six County Economic Development District, Richfield, Utah. 256 pp.

Snäll, T., R.B. O'Hara, C. Ray, and S.K. Collinge. 2008. Climate-driven spatial dynamics of plague among prairie dog colonies. The American Naturalist 171(2):238-248.

Stapp, P., M.F. Antolin, and M. Ball. 2004. Patterns of extinction in prairie dog metapopulations: plague outbreaks follow El Niño events. Frontiers in Ecological Environments 2(5):235-240.

Stenseth, N.C., N.I. Samia, H. Viljugrein, K.L. Kausrud, M. Begon, S. Davis, H. Leirs, V.M. Dubyanskiy, J. Esper, V.S. Ageyev, N.L. Klassovskiy, S.B. Pole, and K. Chan. 2006. Plague dynamics are driven by climate variation. Proceedings of the National Academy of Sciences 103 (35):13110-13115.

Stephens, R.M., A.S. Johnson, R. Plumb, K.K. Dickerson, M.C. McKinstry, and S.H. Anderson. 2005. Secondary lead poisoning in golden eagle and ferruginous hawk chicks consuming shot black-tailed prairie dogs, Thunder Basin National Grassland, Wyoming. U.S. Fish and Wildlife Service. Region 6. Environmental Contaminants Program. Contaminants Report No. R6/720/05. 19pp.

Stiver, S. J., A. D. Apa, J. R. Bohne, S. D. Bunnell, P. A. Deibert, S. C. Gardner, M. A. Hilliard, C. W. McCarthy, and M. A. Schroeder. 2006. Greater sage-grouse comprehensive conservation strategy. Unpublished report, Western Association of Fish and Wildlife Agencies, Cheyenne, Wyoming.

Trudeau, K.M., H.B. Britten, and M. Restani. 2004. Sylvatic Plague Reduces Genetic Variability in Black-tailed Prairie Dogs. Journal of Wildlife Diseases 40:205-211.

Utah Division of Wildlife Resources. 2005. Unpublished data from 1976 to 2005. Spring counts of adult Utah prairie dogs.

Utah Division of Wildlife Resources (UDWR). 2009. Unpublished data from 1976 to 2009. Prairie dog count data. Transmitted to the U.S. Fish and Wildlife Service on October 22, 2009.

Utah Division of Wildlife Resources (UDWR). 2010. Unpublished data from 1985 to 2010. 4d summary table. Transmitted to the U.S. Fish and Wildlife Service in November 2009.

U.S. Census Bureau 2012. http://quickfacts.census.gov. website accessed February 2, 2012.

U.S. Department of Agriculture. Forest Service. 2009a Dixie National Forest Motorized Travel Plan. Final Environmental Impact Statement. Garfield, Iron, Kane, Piute, Washington, and Wayne Counties, Utah. 395 pp.

_____. 2009b. Record of Decision for the Dixie National Forest Travel Management Plan. Dixie National Forest, Utah. 44 pp.

_____. 2009c. Powell Ranger District - Paunsaugunt Recovery Area – Utah Prairie Dog Dusting – Summary. Unpublished Report. Transmitted to the U.S. Fish and Wildlife Service on March 22, 2010.

_____. 2006. Record of Decision for the Fishlake National Forest Off-Highway Vehicle Route Designation Project. Fishlake National Forest, Utah. 30 pp.

_____. 2007. Reasonably foreseeable development scenario for oil and gas, Dixie National Forest. Cedar City, UT. 25 pp.

U.S. Department of Energy. 2010a. Energy efficiency and renewable energy: wind and water power program: Utah 50 meter wind resource map. Accessed on March 12, 2010. Downloaded from http://www.windpoweringamerica.gov/maps_template.asp?stateab=ut.

U.S. Department of Energy. 2010b. Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States. Volume 7, Chapter 13: Utah Proposed Solar Energy Zones.

U.S. Fish and Wildlife Service. 1989. Lead poisoning: the invisible disease. In Cross DH and P Vohs, ed., Waterfowl Management Handbook. Fort Collins, CO: U.S. Fish and Wildlife Service., pp. 1 – 5.

U.S. Fish and Wildlife Service and Utah Division of Wildlife Resources. 1991. Utah prairie dog Recovery Plan. Denver, CO. 41 pp.

U.S. Fish and Wildlife Service (USFWS). 1996. California condor recovery plan, third revision. Portland, Oregon. 62 pp.

U.S. Fish and Wildlife Service. 2005. Unpublished Report Safe Harbor Agreement (Allen Henrie). In U.S. Fish and Wildlife Service files on March 3, 2010. 29 pp.

U.S. Fish and Wildlife Service (USFWS). 2010. Final Programmatic Biological Opinion for the Federal Aviation Administration Utah Public Airport Operations and Utah Prairie Dogs. U.S. Fish and Wildlife Service, Utah Field Office, West Valley City, Utah. March 29, 2010. 20 pp.

U.S. Fish and Wildlife Service (USFWS). 2011. U.S. Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form. *Centrocercus urophasianus* (greater sage-grouse). U.S. Fish and Wildlife Service, Region 6 (Mountain-Prairie Region). 139 pp.

U.S. Fish and Wildlife Service (USFWS). 2012. Utah Prairie Dog *(Cynomys parvidens)* Revised Recovery Plan. U.S. Fish and Wildlife Service, Denver, CO. 169 pp

U.S. Fish and Wildlife Service and Utah Division Wildlife Resources. 1991. Utah prairie dog recovery plan. Denver, CO. 41 pp.

Wiemeyer SN, JM Scott, MP Anderson, PH Bloom, and CJ Stafford. 1988. Environmental contaminants in California Condors. Journal of Wildlife Management 52:238–247.

Wisdom, M.J., C.W. Meinke, S.T. Knick, and M.A. Schroeder. 2011. Factors associated with extirpation of sage-grouse. Studies in Avian Biology 38: 451-474.

Wright-Smith, M.A. 1978. The ecology and social organization of Cynomys parvidens (Utah prairie dog) in south central Utah. M.A. Thesis, Indiana University, Bloomington. 44 pp.

PERSONAL COMMUNICATIONS

Bell, B. 2008. USFWS, Utah Law Enforcement. Cedar City, Utah.

Bonebrake, R. 2010. BLM, Cedar City Field Office. Cedar City, Utah, email recvd March 26, 2010.

Day, K. 2010. Utah Division of Wildlife Resources, Southern Regional Office, Cedar City, UT.

Day, K. 2011. Utah Division of Wildlife Resources, Southern Regional Office, Cedar City, UT.

Day, K. 2012a. Utah Division of Wildlife Resources, Southern Regional Office, Cedar City, UT.

Day, K. 2012b. Utah Division of Wildlife Resources, Southern Regional Office, Cedar City, UT.

Day, K. and Brown, N. 2012. Utah Division of Wildlife Resources, Southern Regional Office, Cedar City, UT (Day, K.) and U.S. Fish and Wildlife Service, Utah Ecological Services Field Office (Brown, N.).

Kavalunas, A. 2011a. Utah Division Wildlife Resources, Cedar City, Utah, email recvd August 17, 2011, 8:09am.

Kavalunas, A. 2011b. Utah Division Wildlife Resources, Cedar City, Utah, email recvd August 17, 2011, 9:33am.

Kavalunas, A. 2011c, Utah Division Wildlife Resources, Cedar City, Utah, email recvd September 15, 2011.

8 LIST OF AGENCIES CONSULTED

Utah Division of Wildlife Resources, Southern Regional Office, Cedar City, Utah

Utah Division of Wildlife Resources, Salt Lake City, Utah

Appendix A. COMPONENTS OF THE AFFECTED ENVIRONMENT CHECKLIST

Component	Determination[4]	Rationale for Determination
Threatened or Endangered Species	PI	Refer to Appendix D for a list of species reviewed. Species that may potentially be impacted are discussed in the EA.
Other Fish and Wildlife	PI	Species that occur within or near Utah prairie dog colonies may be temporarily disturbed by implementation of the proposed action (e.g., noise from shooting; human activity from trapping). Prairie dog carcasses can be scavenged by coyotes (Canis latrans), raptors, and other animals, and may be susceptible to lead poisoning if they consume shooter-killed prairie dogs.
Surface Water	NI	Implementation of the Proposed Action will not alter or reduce water quality or quantity.
Ground Water	NI	The Proposed Action will not contribute to a reduction in ground water quality or quantity.
Wetlands / Riparian Zones	NI	Implementation of the Proposed Action will not disturb or alter wetland or riparian flora or the riparian ecosystem.
Air	NI	Implementation of the Proposed Action will not add cumulatively to emissions that lower ambient air quality by elevating levels of ozone, particulates, and other pollutants.
Historic and Archaeological Resources	NI	Implementation of the Proposed Action will have no effect on historic or archaeological resources.
Transportation System	PI	Implementation of the Proposed Action will not impact the county, state, or Federal road network. Implementing the proposed action will benefit airport runways. See the EA for more information.
Farm Lands	PI	The Proposed Action will not contribute to diminished land fertility and productivity. However, implementing the proposed action may improve farm land productivity at site specific locations. See the EA for more information.
Soils	NI	There will be no increase in soil erosion or degradation from implementing the Proposed Action.

[4] NI = No Impact and not carried forth in the analysis in Chapters 3 and 4; PI = Potential Impact and discussed further in Chapters 3 and 4.

Component	Determination[4]	Rationale for Determination
Livestock Grazing	PI	Both positive and negative impacts may be associated with the Proposed Action to livestock grazing. See the EA for more information.
Hazardous Materials or Waste	PI	Implementing the proposed action may include the use of lead shot. Lead shot is allowed for hunting, and it is not regulated. The potential effects of lead shot to threatened and endangered species, and other wildlife species are discussed in the EA under Threatened and Endangered Species (California condor) and Other Fish and Wildlife.
Wild and Scenic Rivers	NI	Implementation of the Proposed Action will not alter wild and scenic rivers.
Environmental Justice	NI	According to EPA's Environmental Justice Viewer (http://epamap14.epa.gov/ejmap/entry.html [accessed November 22, 2011]), <20 percent of the population within the Action Area have been classified as minority population and <20 percent have been classified as below poverty (EPA 2011). No minority or economically disadvantaged communities or populations are present which could be affected by the Proposed Action.
Human Health	NI	The Proposed Action will have no impact on human health. Plague transmission from prairie dogs to humans is a concern among members of the public. However, the Center for Disease Control does not indicate a serious human health risk from plague in the Action Area (http://www.cdc.gov/ncidod/dvbid/plague)
Socioeconomics	PI	Positive impacts to local farming communities that may benefit by the Proposed Action. See the EA for more information.
Wilderness	NI	Implementation of the Proposed Action will not alter wilderness areas.
Mining Operations	NI	The Proposed Action will not affect mining operations.
Forestry	NI	The Proposed Action will not affect woodlands or forestry.

Appendix B. FEDERALLY LISTED ENDANGERED, THREATENED AND CANDIDATE SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

Wednesday, November 23, 2011

Common Name (*Scientific Name*)	Federal Status	Determination[7]	Rationale for Determination
Autumn buttercup (*Ranunculus aestivalis*)	Threatened	PI	Autumn buttercup occupied habitat overlaps Utah prairie dog habitat. See the EA for more information.
Barneby reed-mustard (*Schoenocrambe barnebyi*)	Endangered	NP	Ranges do not overlap.
Bonytail[1,2] (*Gila elegans*)	Endangered	NI	The ranges do not overlap. Implementing the Proposed Action will not result in water depletions.
California condor[3] (*Gymnogyps californianus*)	Endangered	PI	California condors may forage over suitable Utah prairie dog habitat. In implementing the proposed action, lead shot may be used for lethal take of Utah prairie dogs. Lead shot is a primary threat to the California condor. See the EA for more information.
Canada lynx[4] (*Lynx canadensis*)	Threatened	NP	Ranges do not overlap.
Colorado pikeminnow[1,2] (*Ptychocheilus lucius*)	Endangered	NI	The ranges do not overlap. Implementing the Proposed Action will not result in water depletions.
Coral Pink Sand Dunes tiger beetle (*Cicindela albissima*)	Candidate	NP	Ranges do not overlap.
Desert tortoise[1] (*Gopherus agassizii*)	Threatened	NP	Ranges do not overlap.
Dwarf bear-poppy (*Arctomecon humilis*)	Endangered	NP	Ranges do not overlap.
Frisco buckwheat (*Eriogonum soredium*)	Candidate	NP	Ranges do not overlap.
Frisco clover (*Trifolium friscanum*)	Candidate	NI	The Frisco clover is a narrow endemic restricted to soils derived from volcanic gravels, Ordovician limestone, and dolomite outcrops. Soils are shallow with gravels, rocks, and boulders on the surface, which is unsuitable habitat for Utah prairie dogs. Implementing the Proposed Action will not affect the Frisco clover's habitat.
Gierisch mallow (*Sphaeralcea gierischii*)	Candidate	NP	Ranges do not overlap.

Common Name (*Scientific Name*)	Federal Status	Determination[7]	Rationale for Determination
Greater sage-grouse (*Centrocercus urophasianus*)	Candidate	PI	Sage-grouse and Utah prairie dog ranges overlap. In implementing the proposed action, lead shot may be used for lethal take of Utah prairie dogs. The lead shot on the soil may lead to higher plant-available lead concentrations which may, in turn, be eaten by greater sage-grouse. See the EA for more information.
Heliotrope milkvetch[1] (*Astragalus montii*)	Threatened	NP	Ranges do not overlap.
Holmgren milkvetch[1] (*Astragalus holmgreniorum*)	Endangered	NP	Ranges do not overlap.
Humpback chub[1,2] (*Gila cypha*)	Endangered	NI	The ranges do not overlap. Implementing the Proposed Action will not result in water depletions.
Jones cycladenia (*Cycladenia jonesii*)	Threatened	NP	Ranges do not overlap.
Kanab ambersnail[5] (*Oxyloma haydeni kanabensis*)	Endangered	NP	Ranges do not overlap.
Kodachrome bladderpod (*Lesquerella tumulosa*)	Endangered	NP	Ranges do not overlap.
Las Vegas buckwheat (*Eriogonum corymbosum var. nilesii*)	Candidate	NP	Ranges do not overlap.
Last Chance townsendia (*Townsendia aprica*)	Threatened	NP	Ranges do not overlap.
Least chub[6] (*Iotichthys phlegethontis*)	Candidate	NI	The ranges do not overlap. Implementing the Proposed Action will not result in water depletions.
Mexican spotted owl[1] (*Strix occidentalis lucida*)	Threatened	NI	Mexican spotted owls and Utah prairie dogs utilize very different habitats where their ranges overlap. Mexican spotted owls spend a significant amount of time in canyon habitats that are unsuitable for Utah prairie dogs. Mexican spotted owls are not known to feed upon Utah prairie dogs. Finally, the activities associated with the Proposed Action will occur during the daytime hours when owls are not active. Therefore, we do not anticipate any impacts from implementing the Proposed Action.
Ostler's peppergrass (*Lepidium ostleri*)	Candidate	NP	Ranges do not overlap.
Razorback sucker[1,2] (*Xyrauchen texanus*)	Endangered	NI	The ranges do not overlap. Implementing the Proposed Action will not result in water depletions.
San Rafael cactus (*Pediocactus despainii*)	Endangered	NP	Ranges do not overlap.

Common Name (*Scientific Name*)	Federal Status	Determination[7]	Rationale for Determination
Shivwits milkvetch[1] (***Astragalus ampullariodes***)	Endangered	NP	Ranges do not overlap.
Siler pincushion cactus (***Pediocactus sileri***)	Threatened	NP	Ranges do not overlap.
Southwestern willow flycatcher (***Empidonax traillii extimus***)	Endangered	NI	The southwest willow flycatcher utilizes riparian areas, which are unsuitable habitat for Utah prairie dogs. Implementing the Proposed Action will not affect the flycatcher's habitat.
Utah prairie dog (***Cynomys parvidens***)	Threatened	PI	Utah prairie dog will be directly impacted from the Proposed Action. See the EA for more information.
Ute ladies'-tresses (***Spiranthes diluvialis***)	Threatened	NP	Ranges do not overlap.
Virgin River chub[6] (***Gila seminuda***)	Endangered	NI	The ranges do not overlap. Implementing the Proposed Action will not result in water depletions.
Welsh's milkweed[1] (***Asclepias welshii***)	Threatened	NP	Ranges do not overlap.
Western yellow-billed cuckoo (***Coccyzus americanus occidentalis***)	Candidate	NI	The western yellow-billed cuckoo utilizes riparian areas, which are unsuitable habitat for Utah prairie dogs. Implementing the Proposed Action will not affect the cuckoo's habitat.
Winkler cactus (***Pediocactus winkleri***)	Threatened	NP	Ranges do not overlap.
Woundfin[6] (***Plagopterus argentissimus***)	Endangered	NI	The ranges do not overlap. Implementing the Proposed Action will not result in water depletions.
Wright fishhook cactus (***Sclerocactus wrightiae***)	Endangered	NP	Ranges do not overlap.

1 Critical habitat designated in this county. Critical habitat shapefiles are available on http://criticalhabitat.fws.gov

2 Water depletions from any portion of the occupied drainage basin are considered to adversely affect or adversely modify the critical habitat of the endangered fish species, and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.

3 This species is designated a non-essential, experimental population east of I-15 to 191, and south of I-70. Animals occurring outside the designated areas are protected as Endangered.

4 Historical range.

5 Critical habitat proposed in this county.

6 The species occupies habitat in one or more hydrologic unit (8-digit HUC) within this county. Any water depletion from an occupied hydrologic unit may adversely affect the species.

7 NP = Not Present and not carried forth in the analysis in Chapters 3 and 4; NI = No Impact and not carried forth in the analysis in Chapters 3 and 4; PI = Potential Impact and discussed further in Chapters 3 and 4

Appendix C. UTAH PRAIRIE DOG RECOVERY UNIT BOUNDARY DESCRIPTIONS[5]

WEST DESERT

Beaver County –	All lands west of R5W and south of T27S; also including all lands within T27S R16W, T27S R17W and T27S R18W
Iron County –	Beginning at the NE corner of Iron County and proceeding southward; all lands within and west of T31S R6W, T32S R6W, T33S R6W, T34S R7W, T35S R10W, T36S R11W, T37S R12W and T38S R12W; also including Section 6 of T35S R9W and Sections 4 through 9 of T37S R11W.
Washington County –	All lands within: T38S R13W; Section 1 of T39S R13W, Sections 5 and 6 of T39S R12W; and Sections 19, 20 and 29-32 of T38S R12W

PAUNSAUGUNT

Garfield County –	All lands west of R1W, but excluding T31S R2W
Kane County –	T38S R4½ W, T38S R5W and T38S R6W
Piute County –	Sections 25, 26, 35 and 36 of T30S R5W

AWAPA PLATEAU

Garfield County –	All lands north of T33S, east of R2W and west of R4E; also all lands within T31S R2W
Piute County –	All lands east of R3W (R2½W)
Sevier County –	All lands east of R2W and south of T24S; also beginning at the meeting with Emery County and Wayne County and proceeding westward and northward, all lands within: T24S R5E, T23S R4E, T22S R3E, T24S R2E, T23S R2E, T22S R2E, Sections 1 and 12 of T23S R1E; Sections 12, 13, 24, 25 and 26 of T22S R1E
Wayne County –	Beginning at the meeting with Sevier County and Emery County and proceeding southward: all lands within and west of T26S R5E, T27S R5E, T28S R5E, T29S R4E and T30S R4E

[5] All cadastral descriptions are based on the Salt Lake Base and Meridian survey lines.