Utah Prairie Dog
Cynomys parvidens

In the Office of Endangered Species
U.S. Fish and Wildlife Service
United States Department of Interior

Petition to the U.S. Fish and Wildlife Service to Reclassify The Utah Prairie Dog as an Endangered Species Under the Endangered Species Act, 16 U.S.C. § 1531 et Seq. (1973 as amended)

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Photo of Utah prairie dog courtesy of Richard P. Reading

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Introduction

Forest Guardians, Center for Native Ecosystems, Southern Utah Wilderness Alliance, Escalante Wilderness Project, Boulder Regional Group, and Terry Tempest Williams hereby petition for a rule to reclassify the Utah prairie dog (Cynomys parvidens) as Endangered within its historic range in southern Utah under the Endangered Species Act (ESA) as described in U.S.C. § et seq. This petition is filed under 5 U.S.C. § 553(e), 16 U.S.C. § 1533(b)(3)(A) and 50 C.F.R. § 424.19 (1987) which give interested persons the right to petition for issuance of a rule.

The Utah prairie dog is presently listed as a Threatened species. Despite its listed status, rampant habitat destruction and direct take of the species continues. This destruction and take has been permitted by the U.S. Fish and Wildlife Service (FWS) under a special 4(d) rule, habitat conservation planning, and a massive translocation program from private to public lands. In addition, sylvatic plague, habitat degradation on private lands, and illegal shooting and poisoning of the species continue to threaten it with extinction. The Utah prairie dog is a species that faces extinction, and a reclassification to Endangered status is therefore warranted.

Executive summary

Petitioners are requesting FWS reclassify the Utah prairie dog to Endangered status under the ESA. This prairie dog species has been listed since the ESA was passed in 1973. It was originally listed as Endangered, but was downlisted to Threatened in 1984, in response to a delisting petition from the State of Utah.

The Utah prairie dog (UPD) is a full species, and is a member of the prairie dog genus, which comprises five species. All five species are considered keystone, meaning they play inordinately important roles in the ecosystems where they exist. The Utah prairie dog is very geographically restricted, limited to a few counties in southwestern Utah.

Historical acreage of this prairie dog species has been drastically reduced, from 448,000 acres to only 6,977 acres across their range, a decline of 98.4%. Utah prairie dog populations have dwindled from 95,000 UPDs historically to a census count of only 4,217 in 2001. There are three recovery areas delineated for the species: the West Desert, Paunsaugunt, and Awapa Plateau. Declines continue across all three recovery areas.

In the West Desert Recovery Area, only 3,240 UPDs were counted in 2001, down by over 1,200 prairie dogs from the previous year. Between 2000 and 2001, one out of three prairie dogs disappeared from public lands in the West Desert. Some 78% of UPDs in the West Desert are located on private lands, which have also experienced massive declines in recent years: from 3,501 in 2000 to 2,540 in 2001, a decrease of some 27.5%. Since 1989, almost one of out every three prairie dogs on private lands in this recovery area is gone.

On U.S. Bureau of Land Management (BLM) sites classified under a recent conservation strategy, eleven of fifteen sites have been extirpated or are marginal, small, or declining populations. One of the remaining complexes has moved onto private land and the other is the Adams Well Demonstration Site. While the agencies may consider the Adams Well site a successful example of the efficacy of translocation, 1,200 Utah prairie dogs have been translocated to that site, yet only 60 UPDs have been counted there as of Spring 2002. Unclassified sites have not flourished, either. Rather, six are extirpated, marginal, small, or declining. On state lands in the West Desert, nearly one out of every two prairie dogs has disappeared over the past eight years of census data. These site-specific accounts form a bleak story of UPD complex decline and extirpation, which stands in contrast with the supposed stronghold West Desert federal lands represent for the future of the Utah prairie dog.

In the Paunsaugunt Recovery Area, the 2001 census count was 735 prairie dogs on all land ownerships. This is the lowest count across all years of census data except 1979 and 1990 (a year in which no counts were conducted on private land). Over 75% of UPDs in the Paunsaugunt are on private lands, versus 16% on federal lands. This is a substantial decrease from 1991-1992 when 42-46% of UPDs in this recovery area were on federal lands. Of the two UPD sites on BLM land in the Paunsaugunt, both have marginal or small populations. On all eight complexes on USFS land in the Paunsaugunt, UPD populations are extirpated, marginal, have lower populations than in the past, and/or are likely to face recurring plague epizootics in light of past population crashes. Both Utah prairie dog complexes in Bryce Canyon National Park are marginal or declining. There has also been a dramatic decline of prairie dogs on state lands in this recovery area, from 154 prairie dogs counted in 1994 to only 58 prairie dogs recorded in 2001. The 2001 count of 557 UPDs on private land was lower than that recorded for every year after 1984.

The depressed state of Awapa Plateau populations has been acknowledged as dangerously low since at least 1995. The downward spiral has accelerated, as the 2001 spring census indicated only 208 UPDs, down from 353 counted in 1998, and 369 censused in 1996. Out of the seven UPD sites on BLM lands in the Awapa Plateau, all are extirpated, marginal, small, or declining. Out of the five UPD sites on the Dixie National Forest, all have been extirpated or are extremely marginal. All four Utah prairie dog complexes on the Fish Lake National Forest are either extirpated or marginal. The sole UPD complex on National Park Service (NPS) land in the Awapa Plateau has disappeared. Both complexes on state lands in the Awapa Plateau have been marginal since 1991. The one prairie dog site on land owned by the Utah Division of Wildlife Resources (UDWR) has likely been extirpated. In addition, on the

Awapa Plateau, there has been a drastic decrease in prairie dogs on private lands. In 2001, the census count on private lands was 68 UPDs, down from every year from 1985-2000. The 2001 census count was only 23.3% of the count the prior year, and a mere 8.7% of the census two years prior. Only three complexes on the Plateau had steady increases from 1984-2002 or 1991-2002, versus thirteen sites showing declines and 8 sites likely extirpated.

Contrary to a theory in vogue among the agencies involved in UPD recovery planning, the severe imperilment of Utah prairie dogs is not explained away by metapopulation theory, under which UPD complexes comprise a metapopulation, with some complexes disappearing while other complexes appear. This theory would not explain why new colonies and complexes are not flourishing at a rate sufficient to replace established colonies and complexes that disappear, nor can it legitimate the anthropogenic threats which are cumulatively devastating populations of this species.

Census counts remain at levels approximating those found before downlisting. As of Spring 2001, census counts are not much higher, and are in some years lower, than the census counts before the downlisting. In fact, 2001 total population counts were lower than 1983 and 1984 counts in the Paunsaugunt and Awapa Plateau Recovery Areas. Even more alarmingly, 2001 population counts were exceeded by 1976 counts on Paunsaugunt private lands and the total count for that recovery area; and 2001 counts were exceed by 1977 counts on Awapa Plateau private and federal lands and the total count for that recovery area.

In addition, the historic range of UPDs has been greatly reduced, due to the intersection of eradication programs, habitat destruction, and disease. The reductions in range continue to the present. From 1976-1995, UPDs have been mapped on 27,647 acres, a decrease of 93.8% from their historic range. The most recent calculation of occupied acreage – in 1995 – indicated that

UPDs had declined an additional 74.8%. The UPD has been reduced from 448,000 acres to only 6,977 acres across their range, a decline of 98.4%. Of the 6,977 acres reported occupied in 1995, only 31% were publicly owned. Of the 20,670 unoccupied acres, 49% were federal lands, and 26% were state lands.

An explanation for the faltering population status of this long-time veteran under the ESA is that the species continues to be threatened by all five factors considered under the statute:

- Habitat destruction: includes conversion to municipal development; livestock overgrazing (which causes brush encroachment, noxious weed proliferation; fire suppression, soil impacts, destruction of riparian areas, with which UPDs are associated); oil and gas development: and road mortalities, off-highway vehicles (OHVs), and recreation impacts on public lands. Isolation and fragmentation impacts accompany this degradation of habitat, thereby increasing prairie dog susceptibility to inbreeding and disease.

- Overutilization: Both illegal and permitted shooting of the species continues. Not only does the shooting reduce UPD populations, but it may result in behavioral changes – including mass exodus – that exacerbate the direct effects of shooting.

- Disease: Sylvatic plague is a catastrophic threat to Utah prairie dogs. With no natural immunity to the disease, whole complexes of Utah prairie dogs can be eliminated in short order. For instance, plague was documented in a complex in the West Desert and reduced that complex from 95 UPDs in spring 1999 to only 3 UPDs by June of that year. A complex in the Paunsaugunt suspected of having plague was reduced from 190 UPDs in 1994 to only 10 UPDs the following year. It is not even clear if UPDs will recover, given the threat of plague alone. Any additional limitations on UPDs – e.g., the permitted and unpermitted loss and degradation of habitat, shooting, and poisoning – intersect with plague to present a tremendous cumulative set of threats against this already beleaguered and geographically-restricted species.

- Inadequacy of regulatory mechanisms: All indications suggest that the downlisting of the UPD to Threatened in 1984 was premature. Neither census counts prior to UDWR's filing the petition, nor those prior to FWS's downlisting decision, justify diminished protection for the species. Contrary to the ESA, the 1984 downlisting action by FWS appears to be based on political, and not biological considerations.

  The downlisting action made possible a special 4(d) rule that allowed shooting of UPDs. The current 4(d) rule, issued in 1991, allows take of 6,000 UPDs per year throughout the prairie dog's range. From 1985-2000, some 14,002 UPDs have been taken (primarily shot) under this program. Moreover, take of UPDs under the special 4(d) rule should be considered along take occurring under habitat conservation plans (HCPs) and under the massive translocation program.

Habitat conservation plans have resulted in take of 129.1 acres of UPD habitat and 293.9 UPDs under the Iron County HCP from 1998-2000, with additional take from many developers opting to proceed with destruction of UPD habitat without relocating prairie dogs. Iron County growth rate between 1990-2000 was 62.5%. In addition, at least seven small-scale HCPs were developed in the 1990s and provided for the destruction of 103.49 acres of UPD habitat and 362 UPDs in Iron and Garfield Counties.

- <u>Other natural or man-made factors</u>: Translocation, although part of the “recovery” strategy, must be considered a massive form of take. Some 19,193 prairie dogs were translocated from private lands to public sites from 1972-2000. Yet, as of Spring 2002, there were only 25 UPD towns with more than 10 individuals on public lands. Counts of UPDs on public land indicate that, in 1989, there were 2,482 UPDs censused across the three recovery areas, versus 885 counted in 2001. Despite the translocation of 1,200 UPDs to Adams Well, the latest census count indicates only 60 prairie dogs at the site.

Considered across time and cumulatively, permitted take of UPDs has been staggering. Under the Special 4(d) rule, Iron County HCP, small-scale HCPs, and translocation, there has been take of almost 34,000 UPDs. This tally does not include illegal poisoning and shooting or the impacts of plague.

This take is based on a faulty perception among the agencies of UPD reproduction rates. The Recovery Plan, habitat conservation plans, and other planning documents include the perspective that UPDs experience “population explosions” every spring and these documents – even the Recovery Plan itself – refer to UPDs as nuisance animals in need of control. Consequently, permitted take, according to these documents, are economically necessary and will not impact UPD survival.

However, recent scientific findings indicate that UPDs, in fact, experience low reproduction rates. Survivorship in the first year of females and males is less than 50% for the Utah prairie dog. Given that prairie dogs are not sexually active until after their first year, less than half of UPDs live long enough to copulate. Survivorship of adults in subsequent years is even lower. In addition, reproductive females wean, at maximum, only one litter per year. The percentage of males that copulate as yearlings is 49%, and the percentage of yearlings copulating as females is 100%. After copulation, only 67% of reproductive female UPDs wean a litter. The mean litter size for those females that wean offspring is 3.88. Females may lose their young before they are born or weaned to abortion, genetic defects, disease, predation, and infanticide. Infanticide results in the partial or total elimination of approximately 15% of UPD litters.

Planning documents continue to perpetuate the myth that UPDs are prolific and are nuisance animals and erroneously assume that UPDs can recover through massive translocation to poor quality habitat on federal land. UPD recovery planning has therefore resulted in a steady erosion of the protections provided to the Utah prairie dog under the ESA.

Although the vast majority of UPDs are located on private lands, and public lands complexes continue to blink out, the UPD recovery program completely ignores the need to conserve UPDs on private lands. This is likely due to the continued perception among government agencies of prairie dogs as nuisance animals, rather than as a keystone species badly in need of vigorous, aggressive recovery actions. Not welcome on private lands and disappearing on public lands overwrought with ecologically destructive land uses, the Utah prairie dog is stuck between a rock and a hard place, where it’s hard to burrow.

Not only are private lands off-limits for UPD recovery, the prairie dog recovery program has hamstrung the ability of federal lands to serve conservation goals. High quality relocation sites that are “too close” to private lands have been eliminated from the pool of habitat management and UPD restoration site candidates. Further, the U.S. Forest Service and Bureau of Land Management systematically fail to consider the damaging impact of livestock grazing on UPDs and therefore do not ensure that habitat conditions for UPDs are improving.

It is time for a fundamental paradigm shift in the Utah prairie dog recovery program. That shift cannot occur while the UPD is listed as Threatened, with provisions for take via shooting, translocation, and habitat destruction. Further, whatever the causes of the Utah prairie dog's faltering recovery, it is clear that the Utah prairie dog biologically merits reclassification to Endangered status. Under the ESA, listing decisions must be based solely on biological considerations. FWS must therefore expeditiously designate the Utah prairie dog as an Endangered species.

This prairie dog faces extinction, and its protections under the ESA must be substantially upgraded to honor the spirit and purpose of the Act. The continued imperilment of the Utah prairie dog is not the fault of the Endangered Species Act. Rather, it should be attributed to the poor and irresponsible implementation of the ESA by federal and state agencies. An upgrade to Endangered status would better ensure that the ESA's many useful protections could be fully honored and the recovery of this species could be effected. The long period of poor implementation of the ESA in regard to this prairie dog species must come to a close, and the statute should be fully implemented to ensure the survival and recovery of the Utah prairie dog.

Endangered Species Act Implementing Regulations

Section 424 of the regulations implementing the Endangered Species Act (50 C.F.R. § 424) is applicable to this petition. Subsections that concern the reclassification of the Utah Prairie Dog to Endangered status are:

> 424.02(e) "Endangered species" means a species that is in danger of extinction throughout all or a significant portion of its range."…(k) "species" includes any species or subspecies that interbreeds when mature.
>
> "Threatened species" means a species that "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C § 1532(20)).

> 424.11(c) "A species shall be listed…because of any one or a combination of the following factors:
>
> 1. The present or threatened destruction, modification, or curtailment of habitat or range;
>
> 2. Overutilization for commercial, recreational, scientific, or educational purposes;
>
> 3. Disease or predation;
>
> 4. The inadequacy of existing regulatory mechanisms; and
>
> 5. Other natural or manmade factors affecting its continued existence."

All five of the factors set forth in 424.11(c) have resulted in the continued decline of the Utah prairie dog and are causing the species to face extinction.

The Spirit of the Endangered Species Act

Of additional importance is the fact that this petition goes to the heart of the ESA:

> The purposes of this chapter are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species…

See 16 U.S.C.A. § 1531(b). This is set forth as the very purpose of the ESA.

Like other members of the prairie dog genus, Utah prairie dogs are a keystone species (Utah Prairie Dog Recovery Implementation Team 1997, hereinafter ICS 1997).[1] The Utah prairie dog's keystone role entails providing prey and habitat, through their burrow systems and impacts on plants and soils, for a variety of wildlife. The Iron County HCP delineates the following species, which are federally listed, protected under the Migratory Bird Treaty Act, and/or species of special concern, as associated with UPDs: the bald eagle (Haliaeetus leucocephalus), burrowing owl (Athene cunicularia), ferruginous hawk (Buteo regalis), swainson's hawk (Buteo swainsoni), and sage grouse (Centrocercus urophasianus) (Iron County HCP 1998).

Sage grouse have been documented within the Minersville #3 complex (C122) and on and near the Buckskin complex (C110) (BLM 2000: 4, 6; BLM 2002: 4). Burrowing owls have been found on the Steer Hollow complex (C133), and kit foxes have successfully denned at the same site (BLM 2002: 8).

It is now well-established that prairie dogs play a keystone role in the ecosystems where they are found (Kotliar et al. 1999; Kotliar 2000; Miller et al. 2000). While much of this research has focused on other prairie dogs within the genus, Utah prairie dogs share general behavioral traits with other prairie dog species and therefore perform similar roles for associated wildlife and, as indicated above, have been recognized as a keystone species by scientists and government agencies.

Prairie dog colonies provide habitat for a high diversity of vertebrate, invertebrate, and plant species (Miller et al. 1996; Reading et al. 1989; Clark et al. 1982; Campbell and Clark 1981), a level of diversity markedly higher than surrounding grassland (Hansen and Gold 1977). Reading (1993), for instance, found that 170 vertebrate species are associated with prairie dogs. Earlier, Reading et al. (1989) found that 163 vertebrate species are associated with prairie dog towns. A similarly high count was reported for prairie dog associates in South Dakota, where 134 vertebrate species were recorded as associated with colonized areas. This number represents 40% of the vertebrate wildlife species in western South Dakota (Sharps and Uresk 1990). These counts surpass the already high earlier recordings of prairie dog associates, such as the finding of Clark et al. (1982) that 107 vertebrate species were associated with prairie dog colonies. Clark et

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[1]Iron County Commission and Utah Division of Wildlife Resources. 1998. "Habitat conservation plan for Utah prairie dogs in Iron County, Utah." Promulgated June 26, 1998. Hereinafter Iron County HCP.

al. (1982) also references studies that collectively indicate 140 vertebrate associates of prairie dogs.

The most recent review of prairie dog associated species is by Kotliar et al. (1999), who examined 208 species that have been observed on or near prairie dog colonies. These researchers found that nine species can be considered to be dependent on prairie dogs and their colonies (black-footed ferret (Mustela nigripes),[2] burrowing owl, mountain plover (Charadrius montanus), ferruginous hawk, golden eagle (Aquila chrysaetos), swift fox (Vulpes velox), horned lark (Eremophila alpestris), deer mouse (Peromyscus maniculatus),[3] northern grasshopper mouse (Onychomus leucogaster)). In addition, these researchers noted that twenty species benefited from opportunistic use of prairie dog colonies. Moreover, 117 have life history characteristics indicating that they benefit from prairie dogs and their colonies, but there is insufficient data about those species to be conclusive about the degree of their association with prairie dogs.

While not all associated vertebrates are prairie dog obligates, many would benefit from larger prairie dog populations and acreages. Kotliar et al.'s (1999) analysis of vertebrate species associated with the prairie dogs indicates that a number of species flourish in the presence of prairie dogs, or at least prefer to breed, feed, hide, or rest on prairie dog colonies. Given the unique ecological role played by prairie dogs in their ecosystems, they further fit the definition of keystone species (Kotliar 2000).

Moreover, it may be that scientific research will never be able to determine all historic prairie dog associates, as research in this area has largely been post-1960. By 1960, an estimated 98% of prairie dog acreage had already been destroyed (Marsh 1984; Miller et al. 1994). In the face of scarcity of prairie dog acreage, associated wildlife may have altered their behavior in

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[2]Black-footed ferrets are thought to have existed in black-tailed, white-tailed, and Gunnison's prairie dog towns (Miller et al. 1996).

order to survive. Quite possibly, at historic peaks of prairie dog-occupied acreages, even more vertebrate species were associated with prairie dogs and their towns.

Given its status as a keystone species, an upgrade to Endangered status for the UPD would further the ecosystem protection purpose of the ESA and should therefore be a high priority listing action. Indeed, the Utah Prairie Dog Recovery Implementation Team (1997) cites UPD recovery as an example of ecosystem management. By increasing protections for the critically imperiled Utah prairie dog, the Service will further the ecosystem purpose of the ESA.

Petitioners

Forest Guardians is a non-profit environmental organization committed to protecting flora, fauna, natural processes, and native habitats in Colorado, New Mexico, Arizona, and Utah. Forest Guardians has a grasslands protection campaign, with particular focus on short-grass prairie in the southern plains and southwestern desert grasslands. Forest Guardians is interested in the conservation of species that face high levels of imperilment, especially those who play important umbrella and keystone functions within their ranges. The Utah prairie dog is therefore a high priority species for Forest Guardians. In addition, Forest Guardians strives for the restoration and preservation of <u>all</u> naturally occurring components and processes within native ecosystems.

Center for Native Ecosystems is a non-profit advocacy organization dedicated to conserving and recovering native and naturally functioning ecosystems in the Greater Southern Rockies and Plains. We value the clean water, fresh air, healthy communities, sources of food and medicine, and recreational opportunities provided by native biological diversity. We also passionately believe that all species and their natural communities have the right to exist and thrive. Center for Native Ecosystems uses the best available science to forward its mission

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[3] Everett (2002) confirmed the strong relationship between deer mice and black-tailed prairie dog colonies.

through participation in policy, administrative processes, legal action, public outreach and organizing, and education. We strongly endorse the recovery of all five prairie dog species and the ecosystems they support.

The Escalante Wilderness Project is a non-profit grassroots organization dedicated to the protection of native species throughout southern Utah. Toward that end, we advocate for the cessation of domestic livestock grazing on public land, an end to commercial logging in the Dixie National Forest, and a conservation biology approach to water diversions and impoundments on public land. We focus primarily on our eco-region - the Escalante River basin, the Kaiparowits Plateau, and the Aquarius Plateau. We have a special interest in protecting native predators and endangered, threatened and sensitive species, including the Utah Prairie Dog. We work to influence agency decisions through the NEPA process and to educate the public through press releases.

Southern Utah Wilderness Alliance (SUWA) is a Utah non-profit corporation with approximately 15,000 members, dedicated to the sensible management of all public lands within the State of Utah, including the preservation and expansion of wilderness. SUWA promotes local and national recognition of the Colorado Plateau's unique character, including its endemic flora and fauna, through public education and outreach, scientific research, and advocacy efforts. SUWA's members are interested in the wildlife resources that are managed by the Bureau of Land Management, U.S. Forest Service, and other federal and state agencies in Utah. In particular, SUWA members and staff are intensely interested and appreciate species such as the Utah prairie dog and the southwestern Utah landscape that supports its existence.

Boulder Regional Group (BRG) is a non-profit, grassroots organization founded in 1983 and based in the Escalante River Canyons Bioregion of Garfield County, Utah. BRG is composed of concerned individuals working on a voluntary basis to comment on and promote proper resource management of public lands. Working from a Human Ecological approach, we strive to find strategies that conserve local ecosystems and also benefit human beings. We believe that all things in nature are interrelated and connected. Endangered and Threatened Species, Species of Special Concern, and other wildlife issues occurring throughout Utah are important to BRG and our local communities.

Terry Tempest Williams is an author, naturalist, educator, and environmental advocate. Her published writings on the natural world include Refuge: An Unnatural History of Family and Place and Red: Patience and Passion in the Desert.

Endangered Species Listing Criteria Applicable to the Current Status of the Utah Prairie Dog

1. The present or threatened destruction, modification, or curtailment of habitat or range;

2. Overutilization for commercial, recreational, scientific, or educational purposes;

3. Disease or predation;

4. The inadequacy of existing regulatory mechanisms; and

5. Other natural or manmade factors affecting its continued existence.

Classification and Nomenclature

Common Name. The common name for Cynomys parvidens is the Utah prairie dog.

Taxonomy. Five species of prairie dogs (Cynomys spp.) inhabit North America:

1. Black-tailed prairie dog (Cynomys ludovicianus);

2. White-tailed prairie dog (Cynomys leucurus);

3. Gunnison's prairie dog (Cynomys gunnisoni);

4. Utah prairie dog (Cynomys parvidens); and
5. Mexican prairie dog (Cynomys mexicanus).

Prairie dogs are rodents within the squirrel family (Sciuridae), and there are two prairie dog subgenera: the white-tailed (subgenus Leucocrossuromys) and the black-tailed (subgenus Cynomys) groups. The UPD is a member of the white-tailed subgenus, along with the Gunnison's and white-tailed prairie dogs (USFWS 1991; Knowles 2001).

The Mexican and the Utah prairie dog are listed as endangered and threatened species, respectively, under the Endangered Species Act (50 C.F.R. § 17.11). The black-tailed prairie dog is a candidate for listing under the Act (65 Federal Register 5476-5488 (February 4, 2000)). The white-tailed was petitioned for listing by the Center for Native Ecosystems and other groups on July 11, 2002, and a 90-day finding on that petition is now overdue. Gunnison's prairie dogs may also qualify for ESA listing. In this petition, "UPD," "prairie dog," and "Utah prairie dog" are used interchangeably.

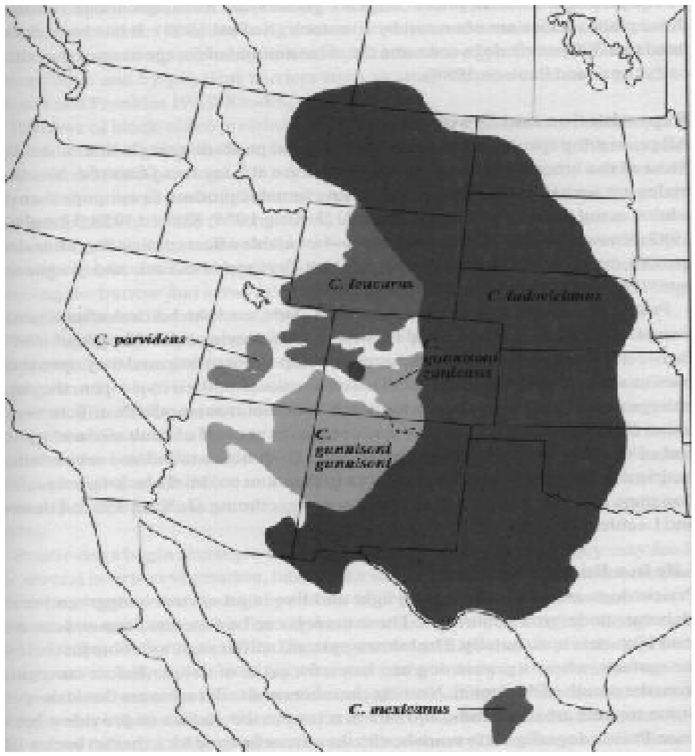
Description

Utah prairie dogs have cinnamon to clay coloring, a relatively short white-tipped tail, a distinct marking of dark brown above and below the eyes, and weigh 300-900 grams in spring to 500-1,500 grams in late summer and early fall. Their individual body hairs are multicolored: from base to tip, they are black, pale buff, cinnamon, and dark brown or pale buff at the tip. Their mouths and chins are whitish and their underparts are cinnamon to pale buff. Total lengths of adult UPDs vary from 305-360mm, tail lengths of 30-60mm, hind feet measuring 55-66mm, and ears that are 12-16mm (USFWS 1991).

While Gunnison's and white-tailed prairie dogs also inhabit Utah, UPDs can be distinguished from these other prairie dog species and fellow members of the subgenus

Leucocrossuromys by their clay colored dorsum and their distinctive eyebrows (USFWS 1991). In addition, the Gunnison's and white-tailed prairie dogs' ranges do not overlap with the UPD's range in southwestern Utah (Figure 1).

Figure 1. Prairie Dog Genus Rangemap. Source: Miller et al. 1996.



Geographic Distribution

<u>Historic</u>

UPDs have historically been limited to the southwestern quarter of Utah and they are the most geographically restricted prairie dog species in the U.S. The UPD's distribution was much broader before poisoning programs began in the late 19th- and early 20th centuries. At one time, their distribution extended almost to Utah's border with Nevada and the species was found as far west as Pine and Buckskin Valleys in Beaver and Iron Counties; southeast to Bryce Canyon National Park; east to Aquarius Plateau's foothills; and south to the northern borders of Kane and

Washington Counties. Historically, the UPD occupied approximately 700 square miles, which equates to 448,000 acres,[4] in ten different areas in southwestern Utah (USFWS 1991).

The Utah prairie dog's distribution was greatly diminished by the 1960s due to plague, drought, poisoning, and habitat loss and degradation. By the early 1970s, UPDs had declined or been extirpated from significant portions of their historic range and trends indicated that it would be extinct by 2000 (USFWS 1991).

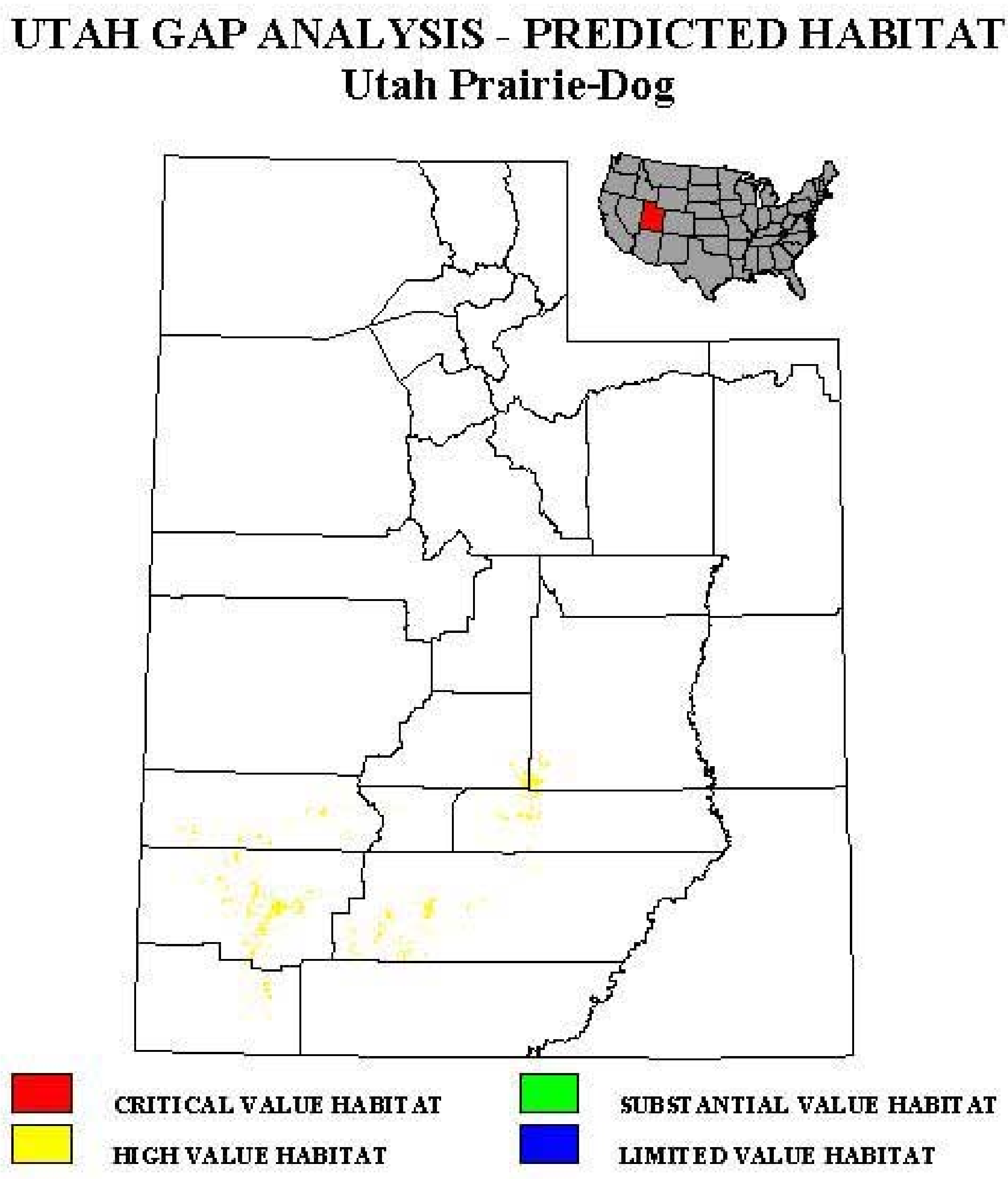
Current

The historic range of UPDs has been greatly reduced, due to the intersection of eradication programs, habitat destruction, and disease. The reductions in range continue to the present. From 1976-1995, UPDs have been mapped on 27,647 acres, a decrease of 93.8% from their historic range. The most recent calculation of occupied acreage – in 1995 – indicated that UPDs had declined an additional 74.8%. The UPD's range has been reduced from 448,000 acres to only 6,977 acres, a decline of 98.4%. Of the 6,977 acres reported occupied in 1995, only 31% were publicly owned. Of the 20,670 unoccupied acres, 49% were federal lands, and 26% were state lands (O'Neill et al. 1999).

GAP analysis indicates the highly restricted range and extreme paucity of high value habitat available as of 1997 (Figure 2).

[4]There are 640 acres in a square mile. (700 * 640 = 448,000).

Figure 2. GAP analysis of Utah Prairie Dog Habitat.



Map Source: Utah Gap Analysis: An Environmental Information System. 1997. USDI National Biological Service and Utah State University. Critical Value Habitat - an area that provides for "sensitive" biological and/or behavioral requisites necessary to sustain the existence and/or perpetuation of a wildlife species. High Value Habitat - an area that provides for "intensive" use by a wildlife species. Substantial Value Habitat - an area that provides for "frequent" use by a wildlife species. Limited Value Habitat - an area that provides for only "occasional" use by a wildlife species.

Within the West Desert Recovery Area, a total of 7,717 acres of prairie dogs were mapped between 1976 and 1995. In 1995, only 3,266 acres – 42.3% – were occupied by UPDs. In the Paunsaugunt Recovery Area, a total of 10,267 acres of prairie dogs were mapped between 1976 and 1995. The 1995 count of occupied acres indicated only 21% (2,121 acres) were occupied. In the Awapa Plateau, a total of 9,663 acres of prairie dogs were mapped from 1976-1995. The 1995 count of occupied acreage indicated only 16% (1,590) were occupied by UPDs (McDonald 1996; O'Neill et al. 1999).

Population Dynamics

Demography and Reproduction

The breeding season for UPDs begins in mid-March and ends in early April (Hoogland 2001). UPD pups are born in April, after a gestation of approximately 30 days. Juvenile UPDs appear above ground at the age of 5-7 weeks in May and June and reach adult size by October (USFWS 1991). Adult females require twice the energy per day during lactation as they do during summer (Crocker-Bedford 1975; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). Approximately two-thirds of the adult UPD population is female due to higher mortality rates of juvenile males.

The most recent analysis of UPD reproduction indicates that the species reproduces slowly (Hoogland 2001). Survivorship in the first year of females and males is less than 50% for the Utah prairie dog. Given that prairie dogs are not sexually active until after their first year, less than half of UPDs live long enough to copulate. Survivorship of adults in subsequent years is even lower. These two dynamics – substantial loss of young UPDs and subsequent losses of adults – “severely limit[s] prairie dog reproduction” (Hoogland 2001: 921). Reproductively active females come into estrus for several hours on only one day during the year,[5] therefore weaning, at maximum, only one litter per year. The percentage of males that copulate as yearlings is 49%, and the percentage of yearlings copulating as females is 100%. After copulation, only 67% of reproductive female UPDs wean a litter.

The mean litter size for those females that wean offspring is 3.88. Litter size varies directly with the body mass of the reproductive female. There are a multitude of factors that cause reproductive females to lose their young before they are born or weaned, including abortion, genetic defects, disease, predation, and infanticide. Infanticide results in the partial or total elimination of approximately 15% of UPD litters. Consequent cannibalism by the infanticidal UPDs (usually adult males) suggests that increased sustenance is a motivation behind killing young prairie dogs (Hoogland 2001).

Hoogland singles out large body mass as a vital factor in reproductive success among UPDs. In turn, the availability of plentiful food and other resources is related to body mass and therefore reproductive success. Hoogland (2001: 923) consequently underscores “the importance of high-quality habitats for the conservation and long-term survival of prairie dogs.”

These most recent findings on UPD reproduction stand in contrast to the descriptions of reproduction in the Recovery Plan and other planning documents, as discussed in the Inadequacy of Regulatory Mechanisms section below. These documents’ description of reproduction is important, as it impacts at what level recovery goals are set and whether take is permitted. In addition, the realization that UPDs experience limited reproduction and that this reproduction

[5]Female UPDs may come into estrus a second time if they fail to conceive during the first estrus (Hoogland 2001).

may be further reduced by the poor quality of existing habitat suggests that the highest quality habitat – even if it occurs on private land – must be safeguarded.

Hibernation

Adult males begin hibernation in August and September. Females start to hibernate several weeks after males. Juvenile UPDs continue surface activity one to two months longer than adults and have been observed above ground well into late December. While few UPDs have been seen above ground from early November to mid-February, some juvenile prairie dogs have been observed in a foot of snow. FWS considers over-winter mortality to be significant (USFWS 1991).

Mortality

While UPDs may reach an age of over five years, most die within their first year. Approximately 30% reach the age of two years, slightly over 20% reach three years, and less than 20% reach the age of four (Hoogland 2001).

After weaning, causes of mortality include predation, poisoning, sylvatic plague, shooting, road mortality, a lack of suitable habitat (resulting in starvation), and land conversion (dislocation, injury, and death from heavy machinery).

Predation

UPD predators include badgers (Taxidea taxus), coyotes (Canis latrans), raptors, and weasels (Mustela spp.) (USFWS 1991). Predation may limit Utah prairie dog numbers in new colonies without established burrow systems (USFWS 1991; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). According to FWS, badgers may cause 80-90% of documented prairie dog mortalities at release cites (Maddux, pers.

comm., March 28, 2002). Further, sagebrush provides cover for predators (BLM 1997 Black Mountain Plan). Where it is dominant, it may aggravate the impacts of predation.

Eradication programs

As is discussed in a subsequent section on the history of UPD management, there was a concerted effort to reduce the prairie dog population and amount of prairie dog-occupied acreage in southcentral and southwestern Utah. This effort was highly effective, with the reduction of an historic population of 95,000 individuals to a census count of only 3,300 individual UPDs by 1972 (USFWS 1991; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). As petitioners show in the Threats section, lethal control of UPDs continues to the present, through a permitted take system and illegal shooting and poisoning activities.

Sylvatic plague

Petitioners discuss the impact of sylvatic plague on UPD populations in the subsection on diseases and predation, under the Threats section. UPDs have no immunity to the sylvatic plague, which was introduced to North America in 1899 (Cully 1993; Fitzgerald 1993). It was first documented within the Utah prairie dog's range, in Beaver and Garfield counties, in 1936 and 1937 (USFWS 1991; Fitzgerald 1993; BLM 1997 EA: 9). Recently, sylvatic plague seems to have played a significant role in the extirpation of colonies in the West Desert. The BLM speculates that high population densities may result in increased stress, which may increase vulnerability to plague epizootics (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans).

Shooting

The permitted take system entails shooting UPDs on private lands. Illegal shooting also occurs, as discussed under the Threats section. While agencies with authority over UPDs may argue that shooting merely reduces the population and does not cause long-term harm (see, e.g., Iron County HCP 1998), this claim is becoming increasingly tenuous given the faltering status of UPDs, and given that shooting intersects with the threats of habitat destruction and loss, sylvatic plague, and illegal poisoning.

Habitat degradation and loss

Much historic UPD habitat has been lost to brush encroachment and conversion to crop agriculture or municipal development (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). Habitat loss and poor quality of remaining habitat contain to be a concern for UPDs (USFWS 1991). On public lands, a lack of suitable habitat is likely the most important factor limiting prairie dog recovery (McDonald 1993; McDonald and Bonebrake 1994; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak plans; Utah Prairie Dog Recovery Implementation Team 1997). The conversion of UPD habitat to municipal or crop use results in the direct mortality and injury of UPDs and dislocates surviving prairie dogs. Petitioners discuss the continued loss and degradation of UPD habitat in the Threats section.

Ecology

<u>Habitat requirements</u>

Utah prairie dogs seem to prefer swale type formations given the availability of moist forage in those areas, even during drought conditions. There is a positive correlation between prairie dog abundance and density and the amount of moisture available in vegetation (USFWS

1991; McDonald 1993; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak plans).[6] In addition, vegetation in prairie dog colony must be low-statured to permit UPDs to scan for predators (USFWS 1991).

UPDs also prefer well-drained loamy soil that allows the species to burrow to deep enough levels where they are protected from predators and intemperate weather (USFWS 1991; Utah Prairie Dog Recovery Implementation Team 1997). While caliche layers have been thought to limit prairie dog burrowing (USFWS 1991), recent observations indicate that UPDs may be able to burrow effectively into these hard soils (Bowns et al. 1998).

Excessive shrub cover limits habitat suitability for UPDs (Utah Prairie Dog Recovery Implementation Team 1997). Shrubs obstruct their view of surrounding habitat, thereby impeding the prairie dogs' ability to detect predators.

The availability of abundant cool season grasses is particularly important for UPDs. According to UDWR, cool season grasses comprise 61-77% of the prairie dog's diet. Further,

> Amounts of available cool season forage were highly correlated to dog town density, and apparently must occur in sufficient quantity in high altitude prairie dog colonies for them to succeed (McDonald 1993: 8).

Cool season forage that is abundant and palatable is especially important given that it is available when prairie dogs emerge from hibernation and breeding, during which time their nutritional needs are highest. Indeed, from 52-68% of annual grazing by UPDs occurs from March to mid-June (McDonald 1993). The Utah Prairie Dog Recovery Implementation Team (1997) also notes the UPD's strong preference for cool season grasses but avers that juveniles may be strongly

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[6]USFS also notes the UPD's preference for moist swales. See USFS Biological Assessment of Utah Prairie Dog Habitat Improvement Projects. Dated 2/27/96.

reliant on warm season grasses during the summer so that they can survive over the winter. An abundance of both cool season and warm season forage is therefore important for UPDs.

UPDs have been found at altitudes ranging from 5,249-9,301 feet (1,600-2,835m) above sea level (USFWS 1991).

Social behavior

Utah prairie dogs are sedentary, gregarious animals that live in colonies, which comprise an aggregate of family groups called clans. A clan is a harem-polygynous group consisting of adults and their young. While females may live out their lives in their natal coteries, yearling males disperse to the edge of a colony or another colony to find females with whom to breed. Infanticide occurs, as does communal nursing, with multiple mothers and their litters sometimes spending the night in the same burrow (Hoogland 2001).

Dispersal

Under natural conditions, UPDs disperse up to 1.2 km (0.72 mi) per migration event, with an average of 0.56 km (0.34 mi) dispersal distance (BLM 1997 Monument Peak Plan). In contrast, UPD dispersal distances were greater than 1.6 km (1 mile) from transplantation sites (McDonald 1997; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans).

Food Habits

Utah prairie dogs are primarily herbivores, with a preference for grasses. They also select for flowers and seeds of forbs (USFWS 1991; BLM 1997 Monument Peak Plan). Forbs may be especially important food items in times of drought (USFWS 1991). UPDs select for higher protein and more digestible energy, preferring flowers and seed parts of plants, young leaves are selected over old leaves, and stems are rarely eaten. Dead vegetation and cattle feces may be consumed by prairie dogs. UPDs also feed on cicada insects (Cicadidae) (USFWS 1991; 1992).

UPDs gain the most weight and expand their colonies when cool season, palatable forage is available. A UPD colony's food needs are greatest during late spring when their populations peak and are lowest during hibernation (USFWS 1991).

Demography

Approximately 66% of the adult UPD population is female. This is due to higher mortality rates for juvenile males (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). Survival rates at different ages were described above.

Population trends

There is no debate that UPD populations have been significantly reduced since the beginning of the 20th Century. As will be demonstrated in this petition, declines continue, with numerous colonies – on public and private lands – disappearing and others declining in population size. However, since 1995, it has been speculated that UPD complexes periodically go extinct due to interactions among individual UPDs within complexes, food supply, and/or disease and predators. This argument derives from a paper by Ritchie (1995) and has been used to suggest that UPDs represent a metapopulation comprising smaller populations that periodically drive themselves to extinction while other populations arise anew (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans).

In this petition, we demonstrate that, while metapopulation theory may be applicable to the disappearance of some UPD colonies under natural conditions, it is clear that UPD populations are disappearing more quickly than they are being replaced with new ones and that the cause of those losses are often anthropogenic. The severe and extensive loss of prairie dog colonies on public and private lands over the past two decades mandates a shift in UPD management. It is evident that the intensive management of prairie dogs is not resulting in recovery of the species despite its long tenure on the ESA list. Rather, there is continued downward decline, resulting from poor quality habitat on public lands, a massive translocation program, and significant losses in populations and habitat due to permitted and illegal take.

History of Utah Prairie Dog Management

Until their protection under the Endangered Species Act, UPDs were the target of eradication programs and also suffered loss of habitat and populations from a combination of sylvatic plague, habitat destruction, shooting, and drought.

Eradication programs

Livestock ranchers, in conjunction with the federal government, began poisoning prairie dogs in the 1880s. The earliest documented efforts to control UPDs were in 1920. By 1925, poisoning was conducted on Utah prairie dogs in Garfield, Iron, Piute, Sevier, and Wayne counties. In 1921, 4,403 hectares (10,880 acres) were retreated with poison by the federal government on the Fishlake National Forest in Sevier County, and 6,475 additional hectares (16,000 acres) were poisoned. Follow-up poisoning on the Fishlake was conducted in 1924 and 1936. Plague is suspected of depleting UPD populations as early as 1937, thereby limiting the need for poison for control (USFWS 1991).

Habitat destruction

There have been multiple threats to UPD habitat, including land conversion, overgrazing, and fire suppression. As discussed above, there has been a long history of converting UPD habitat to municipal and croplands. This has resulted in the severe lack of high quality habitat available for UPDs today (Figure 2: GAP analysis). In addition, livestock overgrazing and fire suppression have limited the quality of public lands habitat for prairie dogs. Furthermore, the loss in UPD habitat continues to the present. Petitioners discuss all three of these factors – land conversion, overgrazing, and fire suppression – that lead to the degradation and loss of UPD habitat in the Threats section, below.

UPD management

Utah prairie dogs were classified as endangered in 1968 by U.S. Bureau of Sport Fisheries and Wildlife (now FWS). The species was removed from the Endangered list in 1970 under an act prior to the ESA and listed as Endangered on June 4, 1973 under the Endangered Species Conservation Act of 1969 (McDonald 1993). The numerous threats to UPDs went unchecked until its listing under the Endangered Species Act of 1973. In response to the State of Utah's petition to delist the UPD in 1979, FWS downlisted the species to Threatened status and simultaneously issued a Special 4(d) rule in 1984 permitting the take of up to 5,000 UPDs per year in the Cedar and Parowan Valley. That rule was replaced in 1991 with an even more permissive regulation, providing for the take of up to 6,000 prairie dogs per year throughout the species' range. These rules will be discussed in detail in the Inadequacy of Regulatory Mechanisms subsection under Threats, below.

In that subsection, petitioners will also discuss several important management guidance documents for the Utah prairie dog, which we briefly review here. First, a Recovery Plan was promulgated for the species in 1991. The main thrust of the Recovery Plan was that UPDs should be translocated from private lands to public lands, and that habitat management and restoration be conducted on those public lands to ensure long-term viability and eventual recovery.

Second, in 1997, as a response to the perceived shortcomings of the Recovery Plan, an inter-agency effort resulted in the Interim Conservation Strategy (ICS), which was designed to cover the term 1997-2002, at which point the Recovery Plan would presumably be revised. The ICS delineated complexes on public lands that would be targeted, at varying levels of intensity, for prairie dog restoration and recovery.

Third, several Habitat Conservation Plans (HCPs) have been developed and approved, and incidental take permits (ITPs) have consequently been issued, which provide for the destruction of prairie dog colonies and the direct take of individual prairie dogs. Iron County has a county-wide HCP in place, which covers individual developers. In addition, Garfield County is is developing an analogous HCP. Site-specific HCPs have also been approved and ITPs have been issued.

These management documents have, on the whole, resulted in a steady erosion of the protections provided to the Utah prairie dog under the ESA. These diminished protections could be made whole again with an upgrade of the UPD from Threatened to Endangered status. The extensive disappearance of UPD colonies from the landscape, as petitioners describe below, mandates such a change in legal status.

Historic and Current Population Status

Petitioners indicated the drastic reduction in UPD distribution – from 448,000 acres to only 6,977 acres – above. Numbers and sizes of populations are also imperative when considering the level of imperilment a species faces. For the Utah prairie dog, there has been a dramatic decline in both numbers and sizes of populations since the early part of the 20th-century.

As petitioners will demonstrate, census counts show that Utah prairie dog population numbers remain at levels approximating those found before downlisting. As of Spring 2001, census counts are not much higher, and are in some years lower, than the census counts before the downlisting. In fact, 2001 total population counts were lower than 1983 and 1984 counts in the Paunsaugunt and Awapa Plateau Recovery Areas. Even more alarmingly, 2001 population counts were exceeded by 1976 counts on Paunsaugunt private lands and the total count for that recovery area; and 2001 counts were exceed by 1977 counts on Awapa Plateau private and federal lands and the total count for that recovery area.

Historic Population Status

Prior to the onset of eradication programs and sylvatic plague, Utah prairie dogs were estimated to number 95,000 individuals. By 1972, the Utah prairie dog had declined to an estimated 3,300 individuals living in 37 colonies. Intensive poisoning efforts in 1933, 1950, and 1960 were a significant factor in their decline from historic numbers. In addition, sylvatic plague, habitat degradation and loss, and shooting have all contributed to the imperilment of this species (USFWS 1991; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans).

Current Population Status (based on census counts)

The species was provided with ESA protection as Endangered in 1973, but was downlisted to Threatened in 1984 (49 Federal Register 22330-22334 (May 29, 1984)). Following its downlisting, there has been a decline in acreage and population numbers. As the BLM reported in 1997, "Utah prairie dog numbers have since declined, and are presently at their lowest levels since 1980" (BLM 1997 Monument Peak Plan: 2).[7] This statement was made in 1997, when the total census count was 4,357 UPDs. As of Spring 2001, only 4,217 UPDs were observed (See Exhibit 1: Census Data by Recovery Area[8]).

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[7]The BLM makes this same assertion in the other four plans. See BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, and Horse Hollow Plans.
[8]Petitioners' information requests to the Utah Division of Wildlife and FWS yielded census data by recovery area data through 2001, and census data by site through 2002.

State and federal agencies have conducted UPD census counts since 1976.[9] The Recovery Plan divided the UPD's range into three recovery areas: West Desert, Paunsaugunt, and Awapa Plateau. The West Desert Recovery Area includes most of Iron County, and the southern portion of Beaver County. The Paunsaugunt Recovery Area comprises western Garfield, extreme northwestern Kane, and extreme northeastern Iron Counties. The Awapa Plateau includes portions of Sevier, Piute, Wayne, and northwest/northcentral Garfield Counties (USFWS 1991; See Exhibit 2: Map of Present Distribution of Utah Prairie Dog). We review the population status of the UPD across the three recovery areas.

West Desert Recovery Area

According to the Spring 2001 census data, there are 3,240 UPDs in this recovery area. The 2001 census count in the West Desert was dramatically lower than in 2000, when it was 4,492 and is also much lower than in 1988 and 1989, when census counts indicated 4,289 and 4,843 prairie dogs, respectively. Only 635 – or 19.6% – of the prairie dogs within the West Desert Recovery Area are on federal land, which is down from 955 recorded in 2000. In fact, between 2000 and 2001, one out of three prairie dogs has disappeared from public lands in the West Desert. Moreover, this decrease in UPDs on public lands has not been compensated by an increase on private lands. Rather, in the same one year period, prairie dogs have declined from 3,501 in 2000 to 2,540 in 2001 on private lands – a decrease of some 27.5% - or a loss of one in four UPDs from private lands in the West Desert (Exhibit 1: Census Data by Recovery Area).

BLM. The federal lands in the West Desert are primarily BLM lands. As indicated above, as of Spring 2001, there were 635 prairie dogs on BLM lands in this recovery area. This is a decrease from the high count in 1989 of 945 UPDs. Further, when one considers individual BLM colonies, there have been substantial and extensive losses.

[9]Presently, spring counts are conducted prior to June 1 on calm, clear, days when the temperature is above 50ºF.

Many of the complexes on BLM lands in the West Desert have been extirpated or are vulnerable to threats. Of those sites classified as Category 1 under the ICS (n=9), two (C115,[10] C117) have likely been extirpated given census counts of zero or no count from 1997-2002, two (C106, C118) indicate marginal populations (fewer than 10 UPDs), and three sites show declining populations (C119, C120, C123). One complex that has declined (C123) in recent years (2000, 2001) has moved onto private land and is no longer counted by BLM (BLM 2002). Only two complexes (C104, C121) have indicated stability, with increases since the early and mid 1990s (See Exhibit 3: Census Data by Site). The BLM has noted that C117 (Three Peaks) has likely declined due to intense recreational use (BLM Biological Assessment for the Boy Scout Spring Camporee, 3/27/97).

Among those sites designated as Category 2 under the ICS (n=3), UPDs at one site (C110) contracted plague in late June 1999, reducing the population from 95 in spring 1999 to 3 UPDs after the plague epizootic and 7 UPDs in spring 2001 and 2002 (Bonzo and Day 2000; See Exhibit 3: Census Data by Site). This same complex suffered a population crash in 1994, where plague was suspected (BLM 1997 Buckskin Plan). Of the two other sites, one (C114) has a marginal population given the 2000-2002 census ranging from 2-4 UPDs. The population at this site has been less than or equal to 17 UPDs since 1992. Further, this complex has been identified as being invaded by sagebrush and lacking vegetative species diversity, with crested wheatgrass comprising 47.6% total vegetative cover (BLM 1997 Black Mountain Plan; Bowns et al. 1998). For the remaining complex (C113), there has been a significant increase, with 296 UPDs counted in 2002, in contrast with 89 counted in 2001 (See Exhibit 3: Census Data by Site).

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[10]All sites are designated with by "C," which is an abbreviation for complex, and a number, derived from State Reports and Spring Count field reports. "C106" therefore represents Complex 106, which is also called "Road Side." See Exhibit 3: Census Data by Site for a list of each public land complex's number and name.

Of the Category 3 sites (n=3), one complex (C116) may be threatened by recurring extirpation, given lows of zero in 1984 and 1997. Its 2002 count was 26 UPDs. A 1998 vegetation report contracted by the BLM indicated that the site has been largely abandoned, likely due to shrub encroachment (Bowns et al. 1998). A second site (C122), although it has a sizeable population (235 UPDs counted in 2002) has a substantially lower population than its census count one and two years prior, of 332 UPDs in 2001 and 579 in 2000. All recent population counts are down from its 1989 population of 627 prairie dogs (See Exhibit 3: Census Data by Site). Furthermore, the 1998 UDWR Report and the 1997 Black Mountain Plan indicated that sagebrush was overtaking this site and there was a lack of vegetative species diversity (O'Neill et al. 1999; BLM 1997 Black Mountain Plan). BLM suspects that drought "and related impacts to forage resources" (BLM 2002: 8) are the reasons for the decline in population on the site from 2000-2001. The third Category 3 site in the West Desert is Adams Well (C124), which has received some 1,200 UPDs, yet the most recent census count (2002) indicates only 60 UPDs in that complex (See Exhibit 3: Census Data by Site).

There are an additional seven sites with a public land component that were not recognized in the ICS under any of the three categories. Three of the seven sites (C111, C129, C131) are likely extirpated, due to census counts of 0 or no census count in 2001 and 2002. Two other sites (C126, C130) have marginal populations, with spring counts of less than 10 UPDs or no counts conducted from 1999-2002. One site was small or marginal (C127 (SITLA)), with a census count of 8 UPDs in 2002, down from 12 in 2001, and varying between 8-15 for the four years for which census data exist. Only one site (C125 (SITLA)) has demonstrated a positive trend, growing from 3 UPDs in 1996 to 134 UPDs in 2002 (See Exhibit 3: Census Data by Site).

Recently discovered complexes on BLM lands in the West Desert include Water Hollow (C127), discovered in summer 1997; Coyote Pond (C129), found in summer 1998 (BLM 1999 Utah Prairie Dog Management 1998 Report); Minersville Highway (C132), found in 2000; and Steer Hollow (C133), discovered in 2001 (BLM 2002). Shortly after the 2001 spring count, UPD burrows appeared abandoned at the Steer Hollow complex, and prairie dogs have not subsequently been observed at the site (BLM 2002). All of these newly discovered complexes have marginal populations or appear extirpated (See Exhibit 3: Census Data by Site).

Clearly, in the West Desert Recovery Area, new UPD colonies and complexes are not flourishing at a rate sufficient to replace established colonies and complexes that disappear. Table 1 indicates that, since 1984, only ten new complexes have been identified in the West Desert since 1991. Of these, seven had a census count of 0 or a marginal population (less than 10 UPDs) in 2002. Only three new complexes can be described as containing a substantial population of UPDs. Furthermore, among those sixteen complexes that have been recorded since 1984, twelve demonstrated negative population trends between the 1984 and 2002 census counts or between the 1991 and 2002 counts. Only four complexes in the West Desert have demonstrated positive trends during these time periods. Further, the recovery area-level data from 2001 suggests that there have likely been even more substantial declines at the site-specific level than is represented in Table 1 (See Exhibit 1: Census Data by Recovery Area).

Table 1. Colony Disappearance Versus New Colonies: West Desert Recovery Area. Source: Exhibit 3: Census Data by Site.*

Complex Number	Site Name	2002	1991	1984	Trend
102	Duncan Creek-Quichipah	30	342	146	-
104	Rush Lake	107	55	23	+
106	Road Side	0	1	26	-
110	Buckskin	7	165	50	-
111	Rocky Reservoir	0	3	0	-
112	Shurtz Canyon	38	44		-
113	Buckhorn Flat	296	41	NC	+
114	Long Hollow	3	33	6	-
115	Willow Spring	0	0	18	-
116	Horse Hollow	26	36	0	-
117	Three Peaks	0	10	43	-
118	Jockey Springs	7	33	4	-
119	Bear Valley	24	0	23	+
120	Pine Valley	8	64	17	-
121	West Lund	62	85	5	-
122	Minersville #3	235	4	53	+
123	West of Rush Lake	67			
124	Adams Well	60			
125	Wild Pea Hollow	134			
126	Horse Valley	0			X
127	Water Hollow	9			
129	Coyote Pond	8			
130	Domingus-Escalante	9			
131	Tebbs Pond	0			X
132	Minersville Highway	0			X
133	Steer Hollow	0			X

*Key
NC = No Census

Trend Categories
=: stability across all years
-: decline between 1984-2002 or from 1991-2002
+: increase from 1984 and 1991 to 2002
X: extirpated complex (all census counts either blank or 0)

Overwhelmingly, on federal and unclassified sites in the West Desert, there has been massive extirpation, decline, and the threat of recurring plague epizootics. On BLM sites classified under the ICS, eleven of fifteen sites have been extirpated or are marginal, small, or declining populations. One of the remaining complexes has moved onto private land and the other is the Adams Well Demonstration Site. While the UDWR and FWS may consider the Adams Well site a successful example of the efficacy of translocation (Bonzo and Day 2002;

Maddux, pers. comm., March 28, 2002[11]), it is clear that, while 1,200 Utah prairie dogs have been translocated to that site, only 60 UPDs have been counted there as of Spring 2002. Sites not classified under the ICS have not flourished, either. Rather, six are extirpated, marginal, small, or declining. Only one site among those not classified under the ICS has a substantial population. These site-specific accounts form a bleak story of UPD complex decline and extirpation, which stands in contrast with the supposed stronghold West Desert federal lands represent for the future of the Utah prairie dog.

SITLA. The latest census data indicate that 65 UPDs inhabit SITLA land within this recovery area (See Exhibit 1: Census Data by Recovery Area). This represents a mere 2% of UPDs in the West Desert. Moreover, this population number represents only 58% of the population recorded in 1994, at which time UPDs on SITLA land in the West Desert numbered 112 (See Exhibit 1: Census Data by Recovery Area). Therefore, nearly one out of every two prairie dogs on SITLA land in the West Desert Recovery Area have disappeared over the past eight years of census data (Figure 3).

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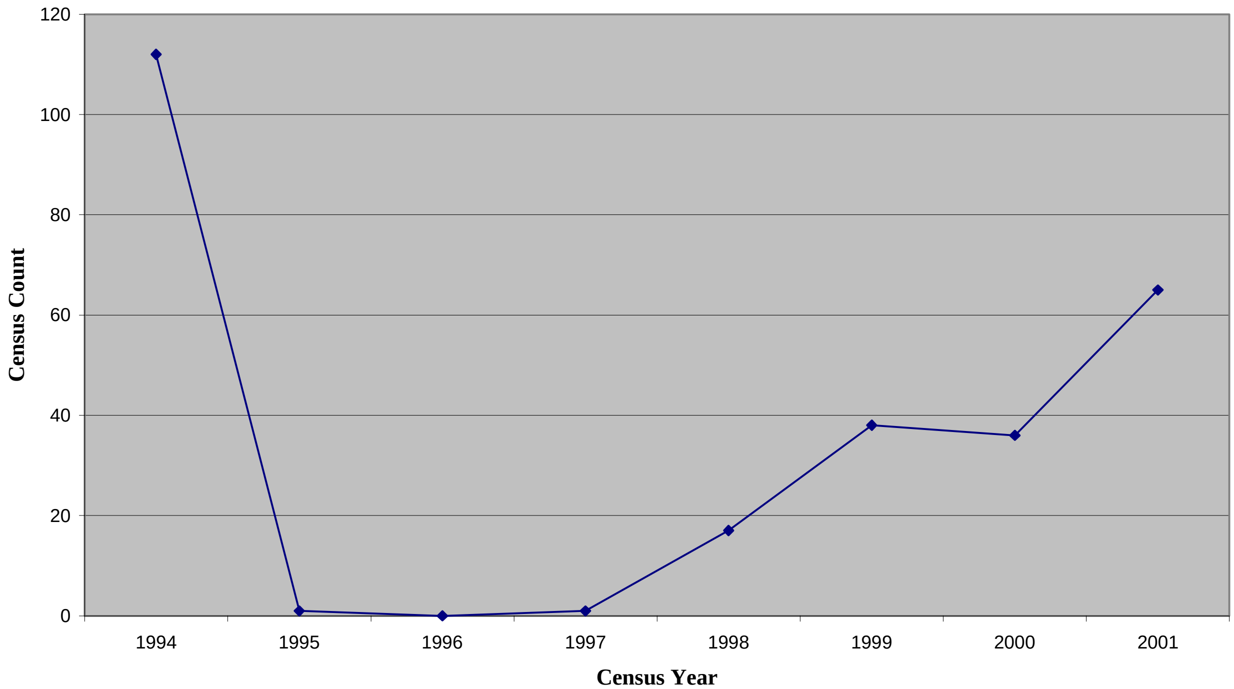
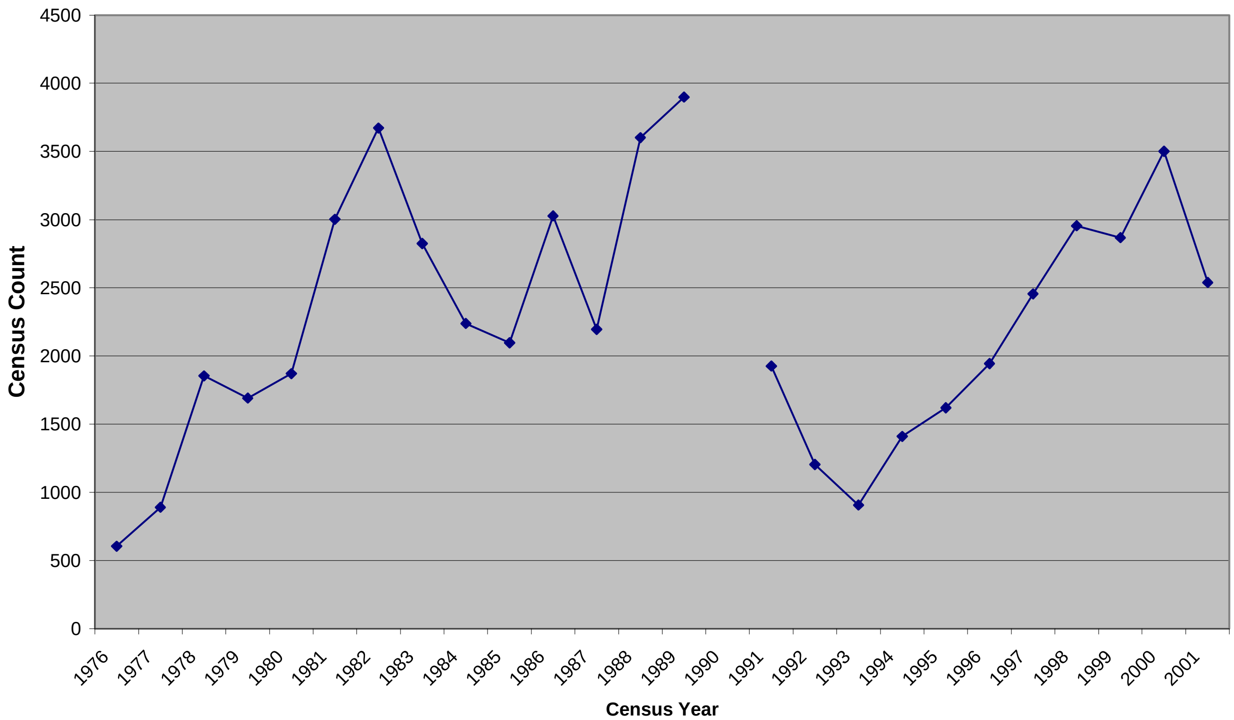
[11]According to Maddux of USFWS: "Incidentally, Adams Well has been immensely successful, with prairie dog[s] spreading far beyond their original translocation area."

Figure 3. Utah Prairie Dog Census Counts on SITLA Lands in the West Desert Recovery Area, 1994-2001 (no census counts were conducted on SITLA land in this recovery area prior to 1994). Source: Exhibit 1: Census Data by Recovery Area.



Private lands. The vast majority of UPDs in the West Desert occupy private lands. As of 2001, there were 2,540 UPDs on these lands. This represents over 78% of the UPD population in the recovery area (See Exhibit 1: Census Data by Recovery Area). The most recent count on private lands in the West Desert indicated a plummeting of the population from the year prior, from 3,501 in 2000 to 2,540 in 2001, a loss of over 27% (See Exhibit 1: Census Data by Recovery Area). In addition, there have been substantial losses in the number of UPDs on private lands since the early 1980s. For example, in the years 1981-1983, 1986, 1988, 1989, and 1998-2000, greater numbers of UPDs were recorded on West Desert private lands than in 2001 (Figure 4). Comparing the latest census data to the high count of 3,898 UPDs in 1989, there has been a nearly 35% loss of UPDs on private lands in the West Desert. In other words, almost one of out every three prairie dogs on private lands in this recovery area is gone.

Figure 4. Utah Prairie Dog Census Counts on Private Lands in the West Desert Recovery Area, 1976-2001 (No private land census counts were conducted in 1990). Source: Exhibit 1: Census Data by Recovery Area.



In sum, prairie dog declines on federal, state, and private land are taking place in the West Desert Recovery Area. Extirpation, marginal, small, and declining populations are the rule on BLM lands in this recovery area, while continued declines are also occurring on SITLA and private lands. Perhaps the most significant – and disconcerting – feature of the faltering status of Utah prairie dogs on the West Desert is that this is the recovery area where the species is doing best, or least worst.

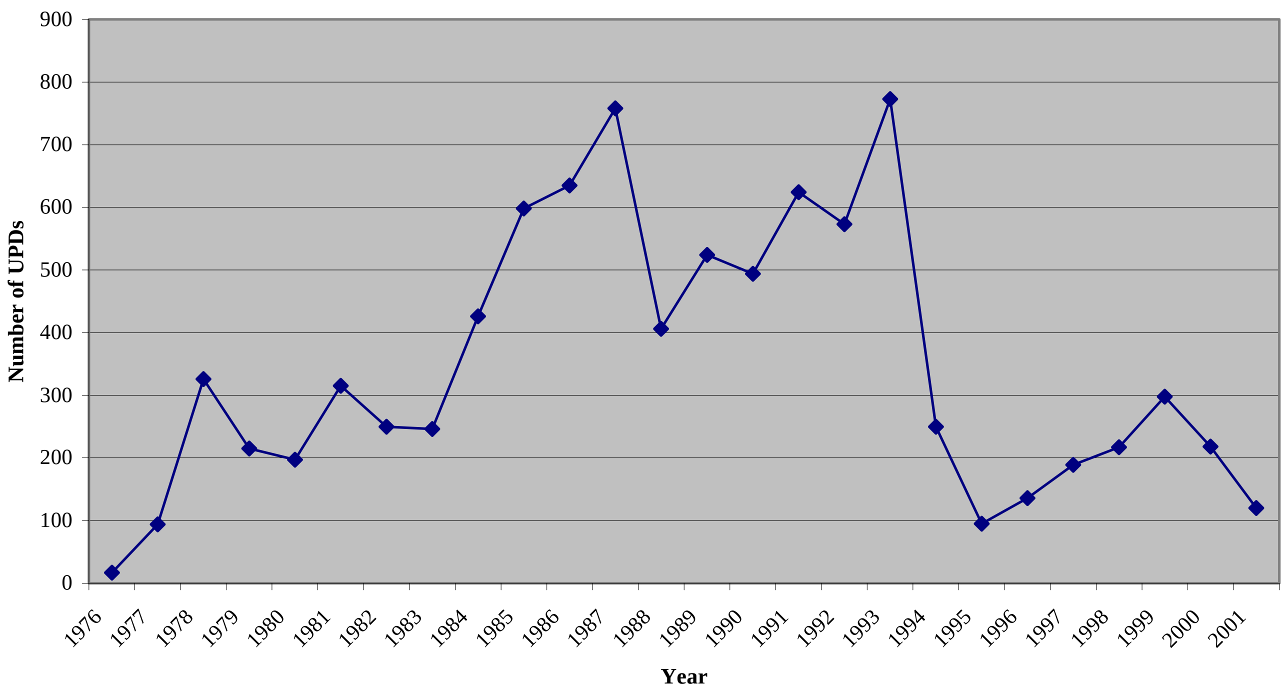
Paunsaugunt Recovery Area

Utah prairie dogs are faring poorly in the Paunsaugunt Recovery Area. There are a mix of federal parcels in this area – BLM, USFS, and NPS lands – along with SITLA and private lands. The 2001 census count was 735 prairie dogs on all land ownerships within the recovery area. The most recent census count is the lowest across all years of census data (1976-2001) except

1979 and 1990 (a year in which no counts were conducted on private land). Moreover, over 75% of UPDs in the Paunsaugunt are on private lands, versus 16% on federal lands. This is a substantial decrease, for example, from 1991-1992 when 42-46% of UPDs in this recovery area were on federal lands (See Exhibit 1: Census Data by Recovery Area).

Populations on federal land sites within this recovery area have declined drastically since 1994 (Figure 5). The most recent census count by recovery area, in 2001, indicated 120 UPDs on federal lands in the Paunsaugunt, a dramatic decline from levels in 1980s and 1990s. As petitioners demonstrate below, this decline has occurred across all federal jurisdictions – BLM, USFS, and NPS lands.

Figure 5. UPD Populations on Paunsaugunt Federal Lands, 1976-2001. Source: Exhibit 1: Census Data by Recovery Area.



BLM. There are two UPD complexes on BLM land in the Paunsaugunt and neither feature flourishing UPD populations. Both are ICS Category 1 sites. The first complex (C201) has had a marginal or small population since 1994. The 2002 census count was thirteen UPDs, while the 1998 count was zero, and the 1999 count was one. This is a decline from a high count in 1991 at 181 Utah prairie dogs (O'Neill et al 1999; Bonzo and Day 2000). The second complex (C205) now has a marginal population, with a 2002 census count of two UPDs. The 1999 count was 26 Utah prairie dogs, down from a count of 37 in 1998, contrasted with high counts in 1986 and 1987 of 302 and 311 prairie dogs, respectively. Consequent fluctuations in population counts, including a low of zero UPDs at this site in 1990 and the low count in the most recent census, suggest that plague may be recurring at this site (O'Neill et al 1999; Bonzo and Day 2000) (See Exhibit 3: Census Data by Site). Of the two UPD sites on BLM land in the Paunsaugunt, both have marginal or small populations.

USFS. There are eight Utah prairie dog complexes on USFS land in this recovery area. All are within the Dixie National Forest. Four of these are ICS Category 1 sites, two are Category 2 sites, and two are Category 3 sites. Of the four Category 1 sites, three have declined significantly over the past several years and may be experiencing recurring plague. At C206, the 2002 count was 48, declining from a count of 90 in 1999. There were counts of zero at this complex in 1994-1995, indicating potential plague. The current count is substantially lower than 1985-1987, when UPD populations were greater than or equal to 100 in each of those years. In C207, the 2002 count was 22, declining from 112 UPDs counted in 1998 and 102 counted in 1999. At this complex, there was a low of 0 in 1990, which suggests vulnerability of the site to recurring plague epizootics. At the third site (C209A), the 2002 count was 64, which indicates a drastic decline from 141 in 1999. Population counts were highest in 1993, at 345 UPDs. Plague was reported from this site in 1995 (McDonald 1996). The fourth site (C209B) had inadequate census information from which to draw conclusions as there were no census counts conducted at this site in 2000-2002. However, the 1999 count was 17, contrasted with 1991-1993 survey counts ranging from 26-39 UPDs. There were no counts in 1995-1998 (See Exhibit 3: Census Data by Site). Plague was also reported at this complex in 1995 (McDonald 1996).

One of the two Category 2 sites on USFS lands has been extirpated. At this site (C202), the 1997-2002 counts were all 0. The population count for this site peaked in 1994, at 14 prairie dogs. At the second site (C218), the 2002 population count was 29, diminishing from 77 counted in 1999. Moreover, these counts are much lower than 1990-1993, when counts ranged from 165-223 (See Exhibit 3: Census Data by Site).

The two Category 3 sites on USFS land are much decreased from the late 1980s and earlier 1990s. At the first site (C210), the 2002 count was 31 UPDs. This count is much lower than the count of 109 in 1997, 144 in 1992, and 104 in 1991. On the second site (C212), the 2001 and 2002 counts were both two UPDs, down from 17 counted in 2000. Population counts were 0 in 1994-1996, perhaps due to a plague epizootic. The most recent census data stand in contrast to the population counts of 53 in 1987 and 51 in 1989 (See Exhibit 3: Census Data by Site). In sum, on all eight complexes on USFS land in the Paunsaugunt, UPD populations are extirpated, marginal, have lower populations than in the past, and/or are likely to face recurring plague epizootics in light of past population crashes.

New colonies have been found on the Dixie National Forest. In 1998, several small colonies were found (Carlton Guillette, USFS, pers. comm., Reed Harris, FWS, dated 26 February 1999). However, across the federal lands in this recovery area, new colonies have formed at a lower rate than established colonies have been lost. As is clear from Table 2, only two new complexes have been found since 1991 and only four complexes have experienced consistently positive trends from 1984-2002. Alternatively, thirteen complexes have endured declines between 1984 and 2002 or 1991 and 2002. In addition, one complex indicates extirpation across the three years. Further, the recovery area-level data from 2001 suggests that there have likely been even more substantial declines at the site-specific level than is represented in Table 2 (See Exhibit 1: Census Data by Recovery Area).

Table 2. Colony Disappearance Versus New Colonies: Paunsaugunt Recovery Area. Source: Exhibit 3: Census Data by Site. *

Complex Number	Site Name	2002	1991	1984	Trend
201	Dog Valley	13	181	0	-
202	Ahlstrum Hollow	0	10	7	-
203	John's Valley North	69	0	0	+
205	John's Valley	2	3	204	-
206	Tom Best Springs	48	0	60	-
207	Panguitch Lake	22	13	13	+
208	Coal Pit Wash	NC	8		-
209A	SR12-Bryce Airport	64	68	21	-
209B	Ruby's Inn	?	31	2	?
210	Johnson Bench/Coyote Hollow	31	104	2	-
212	Berry Springs	2	35	17	-
213	Bryce Canyon NP	1			+
214	Dave's Hollow	0	0	14	-
215	Bryce Canyon Visitors	45			+
216	Blue Springs Valley	0	NC		X
217	Co. Line/Castle Canyon	11	25	10	-
218	East Creek	29	223	46	-
219	Panguitch	342	444	186	-
221	Y Town-and-North	50	12	56	-

*Key
NC = No Census
? = No data

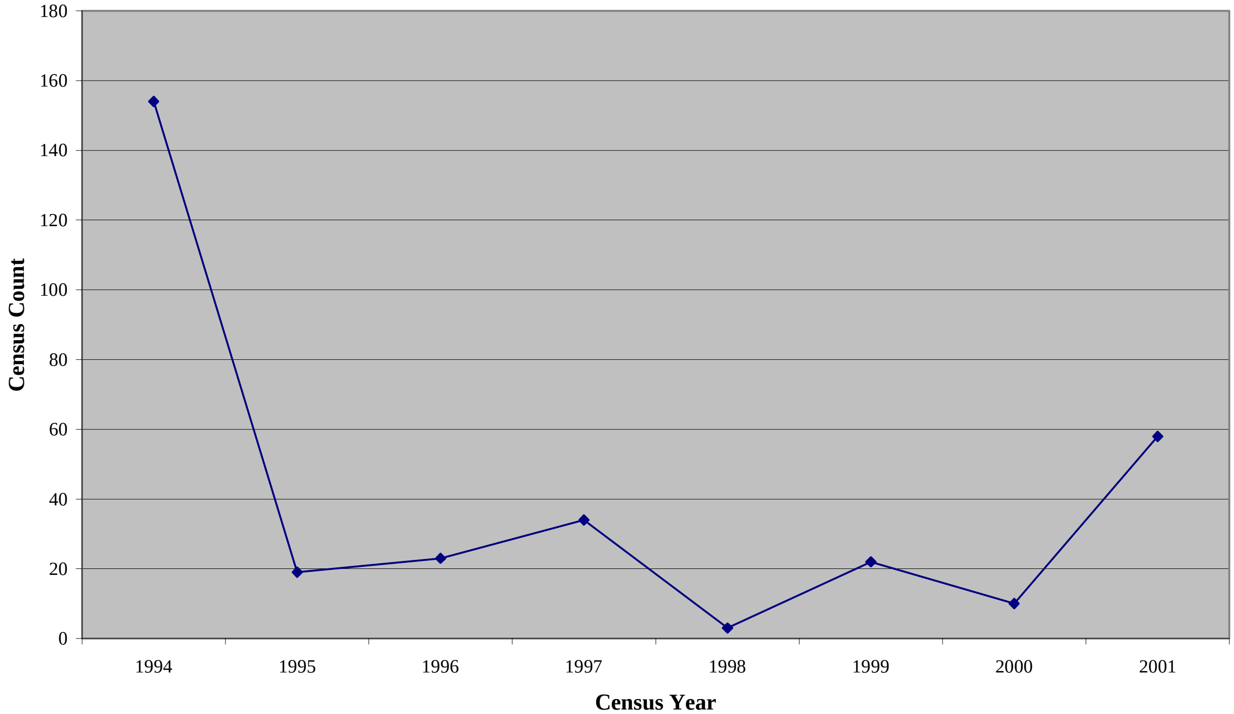
Trend Categories
=: stability across all years
+: increase from 1984 and 1991 to 2002
-: decline between 1984-2002 or from 1991-2002
X: extirpated complex (all census counts either blank or 0)

NPS. There are two UPD sites on NPS land in the Paunsaugunt. Both are classified as ICS Category 2. One of the two sites (C213) has a marginal population. The 2002 census count was of one prairie dog, a mean population from 1993-2002 of 3.4 UPDs, with a range of 0-7 prairie dogs. The census counts in 1993-2002 are the only years for which a count was taken. The second site (C215) had a census count of 45 in 2002. This is a decline from census counts in both 2000 and 2001 (See Exhibit 3: Census Data by Site). Both Utah prairie dog complexes in Bryce Canyon are therefore either marginal or declining.

There are an additional seven sites with a public land component that were not recognized in the ICS under any of the three categories. Three of these sites (C208, C214, C216) have likely been extirpated, with a zero count or no survey conducted for at least the past four years. On a fourth site (C219), although the 2002 count was 342, this represents a decrease from counts in 1987-1989 and 1991-1996. At the fifth site (C217), the 2002 count was 11 UPDs, down from counts in every year from 1991-2001, and down from a population peak in 1998 of 241 UPDs. At a sixth complex (C221), the census count in 2002 was 50 UPDs, down from 186 UPDs in 2000 and 94 UPDs in 2001 (See Exhibit 3: Census Data by Site). On only one complex (C203) was there a population increase. Therefore, of the non-categorized sites on public lands, six are either extirpated or steadily declining. On all of these sites, the lack of management attention is cause for concern.

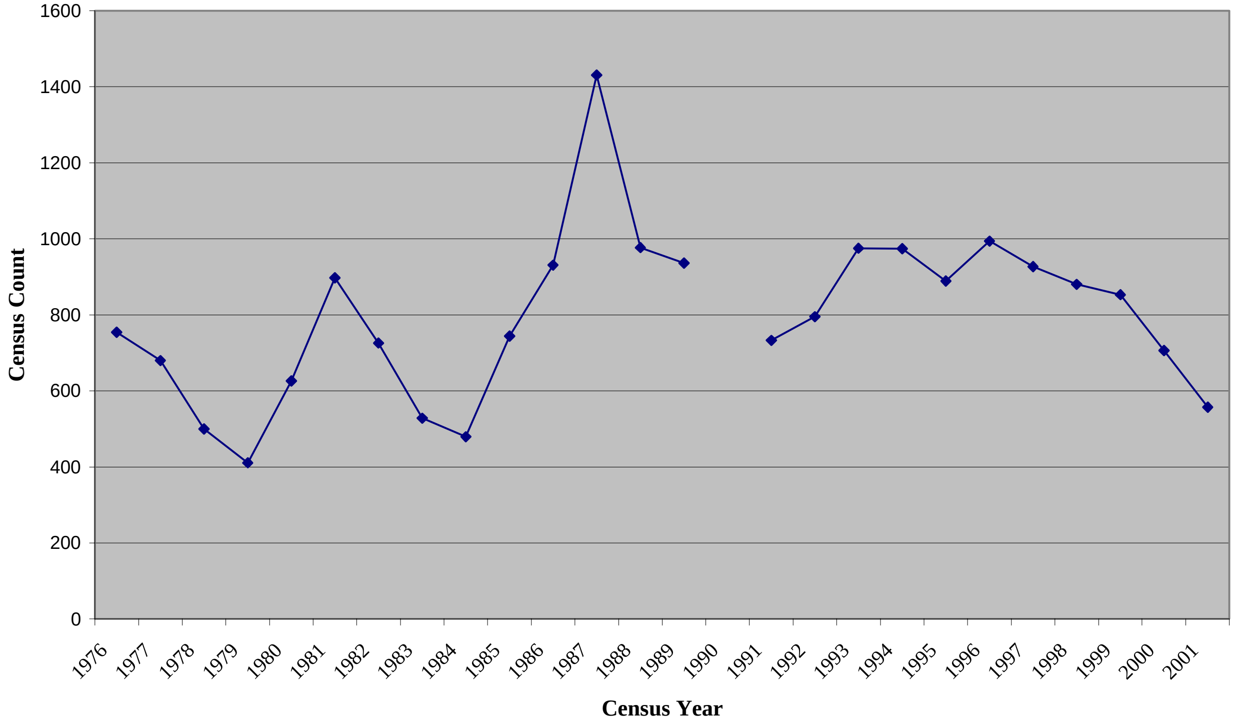
SITLA. There has been a dramatic decline of UPDs on SITLA land in the Paunsaugunt Recovery Area. While the 1994 count (the first census conducted in this recovery area) was 154 UPDs, there were only 58 prairie dogs recorded in 2001 (See Exhibit 1: Census Data by Recovery Area). Since plummeting between 1994-1995, UPDs on SITLA lands in this recovery area have never recovered (Figure 6).

Figure 6. Utah Prairie Dog Census Counts on Federal Lands in the Paunsaugunt Recovery Area, 1994-2001.
Source: Exhibit 1: Census Data by Recovery Area.



Private Lands. The majority of UPDs in the Paunsaugunt are on private lands. A total of 557 UPDs were counted on private property in 2001. This represents 75.8% of the prairie dogs in the recovery area. However, the 2001 count on private land was lower than that recorded for every year after 1984 (Figure 7; See Exhibit 1: Census Data by Recovery Area). Therefore, the public land decreases in UPDs in the Paunsaugunt are not being compensated for by increases on private land. Rather, Utah prairie dogs are experiencing across-the-board declines.

Figure 7. Utah Prairie Dog Census Counts on Private Lands in the Paunsaugunt Recovery Area, 1976-2001 (No private land census counts were conducted in 1990). Source: Exhibit 1: Census Data by Recovery Area.



In sum, in the Paunsaugunt Recovery Area, federal land sites are generally suffering from extirpation, marginal and declining populations, lower population counts than in the past, or are facing potential recurring plague epizootics. These dynamics are taking place across all federal ownerships – including BLM, USFS, and NPS (with the exception of one sizeable NPS complex). Furthermore, SITLA and private land sites are also suffering from continued declines.

Awapa Plateau Recovery Area

UPD populations are faring most poorly in the Awapa Plateau Recovery Area. Prairie dogs are found on BLM, USFS, SITLA, UDWR, and private lands in this area. In its 1996 annual report, UDWR indicated that Utah prairie dog counts in this recovery area had declined 20% from the previous year and “remain dangerously low” (McDonald 1997: 1). Subsequently, in the 1997 and 1998 annual reports, UDWR described counts in this recovery area as "extremely low" and stated that the "prairie dogs in this recovery area are in very small colonies spread out over an extensive area" (O'Neill et al. 1998:12; 1999: 12). The depressed state of Awapa Plateau populations has been acknowledged as dangerously low since at least the 1995 annual report (McDonald 1996). This downward spiral has accelerated, as the 2001 spring census indicated only 208 UPDs, down from 353 counted in 1998, and 369 censused in 1996 (See Exhibit 1: Census Data by Recovery Area).

BLM. There are seven prairie dog complexes within the BLM's Richfield Resource Area. All of these are classified as ICS Category 2 sites. Of the seven sites, three (C313, C314, C318) are likely extirpated, as all had census counts of zero or had no census counts in 2002. Three other sites – C311, C316 and C317 – indicated marginal (10 or less UPDs) or small (20 or less UPDs) populations. Site C311 had a 2002 count of three prairie dogs, and counts for every year between 1989-1999 and 2001-2002 of 0-10 UPDs. Site C316 had a 2002 count of 11, down from counts in 1994-2001. The remaining complex (C312) had a census count of 31 UPDs in 2002, down from 53 in 2000. This site had a population of zero (0) from 1992-1994, in 1985, and in 1981, suggesting the possibility of past plague epizootics and a consequential potential for plague to recur at this site (See Exhibit 3: Census Data by Site). Out of the seven UPD sites on BLM lands in the Awapa Plateau, all are extirpated, marginal, small, or declining.

USFS. There are nine prairie dog complexes on National Forest land within the Awapa Plateau. These sites are located within the Dixie and Fish Lake National Forests. There are four Category 2 sites on the Dixie NF, and one Category 1 site. Of the Category 2 sites, two have been extirpated (C301, C302), with population counts of zero (0) or no survey conducted for at least the last four years. One Category 2 site (C315) has a marginal population, with 4 UPDs counted in 2002, and zero counted or no census count for every year since 1992. The fourth site

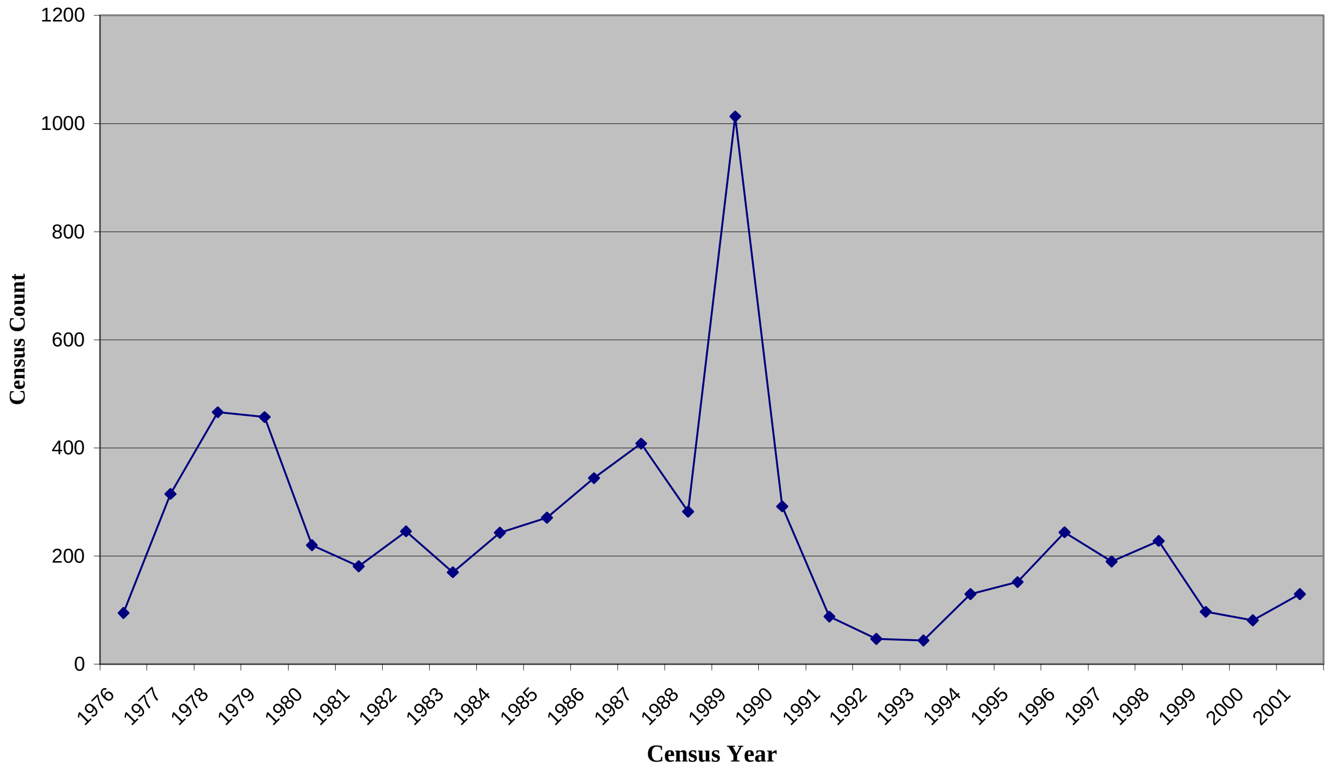
(C300) had a 2002 population count of zero, down from 34 UPDs counted just two years prior. There was also a zero count at this site in 1991, indicating a potential for recurring plague events. The population count in 1979 was the highpoint, with 324 UPDs. The Category 1 site on the Dixie NF (C303) has been extirpated, with population counts of zero (0) or no survey for every year (See Exhibit 3: Census Data by Site). Out of the five UPD sites on the Dixie National Forest, all have been extirpated or are extremely marginal.

On the Fish Lake National Forest, there are two Category 1 sites, one Category 2 site, and one Category 3 site. One of the Category 1 sites (C304) has been extirpated, with population counts of zero (0) or no survey for the period from 1994-2002. The other Category 1 site (C305) also appears extirpated, with zero UPDs counted in 2000-2002. On the Category 2 site (C328), there have been counts of zero (0) UPDs from 1996-2002, and it should therefore be considered extirpated. At the Category 3 complex (C322), there is a marginal population, with counts of 0-7 prairie dogs in every year from 1990-2002. A census count of zero was recorded at the site in 2002 (See Exhibit 3: Census Data by Site). All four Utah prairie dog complexes on the Fish Lake National Forest are either extirpated or marginal.

NPS. There was one historical UPD complex in the Capitol Reef National Park (C326). The last time a population was recorded at Capitol Reef was in 1982, with a count of 28 Utah prairie dogs. Since 1982, there has been a population of zero (0) or no survey conducted (See Exhibit 3: Census Data by Site). The sole UPD complex on NPS land in the Awapa Plateau has disappeared.

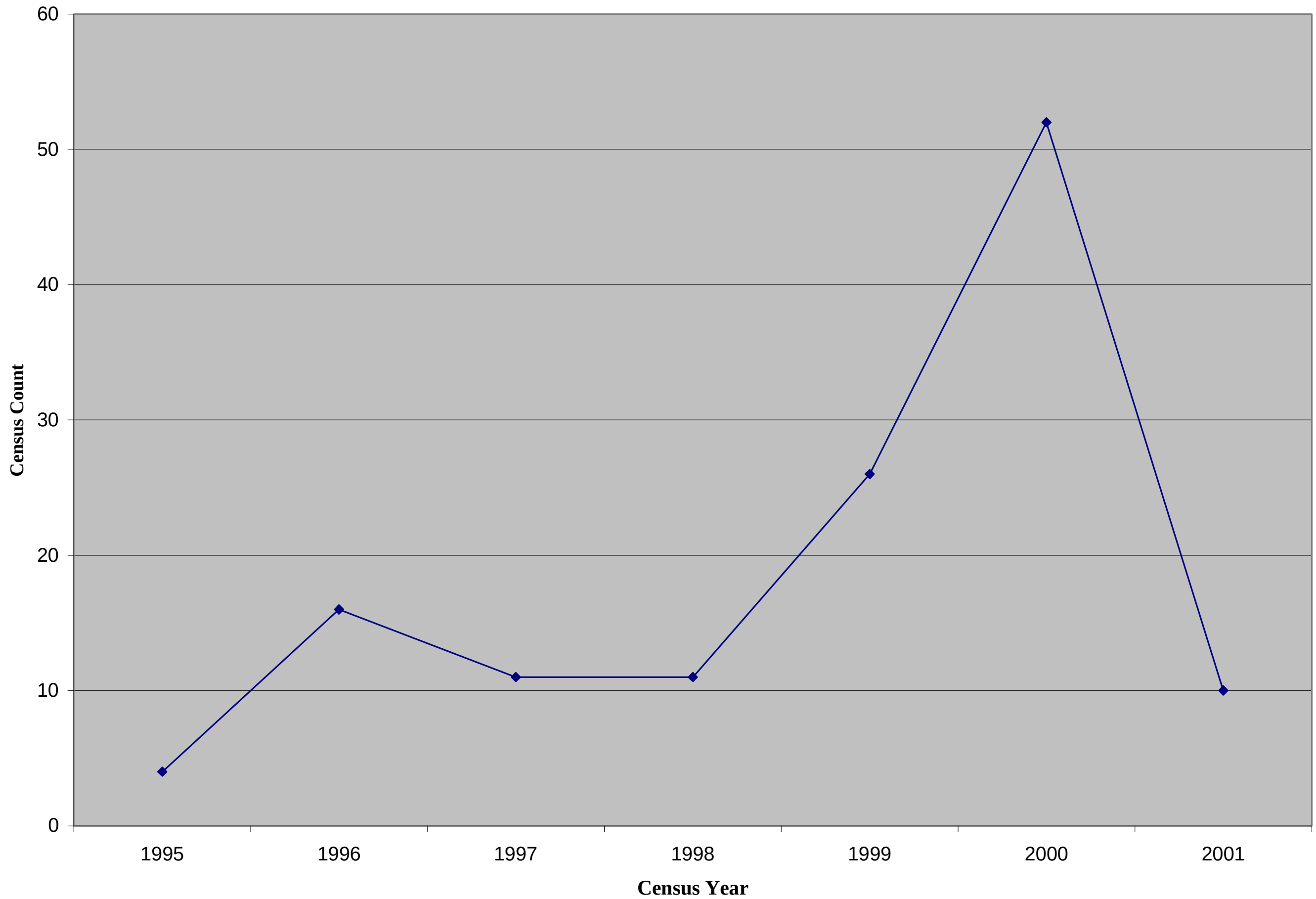
Overall, on federal lands in this recovery area, there has been a significant decrease in thriving UPD complexes. Prairie dog census counts peaked in 1989, and have been depressed subsequently (Figure 8).

Figure 8. Utah Prairie Dog Census Counts on Federal Lands in the Awapa Plateau Recovery Area, 1976-2001. Source: Exhibit 1: Census Data by Recovery Area.



<u>SITLA</u>. There are only two prairie dog sites on SITLA lands that are classified under the ICS. Both are in the Awapa Plateau. One site (C306) has a marginal population, with a census count of two in 2002, after population counts of zero (0) or no survey from 1991-1999 and 2001. The other site (C310) also has a marginal population, with population counts ranging from 0-10 from 1991-2002. Both of these complexes have been marginal since 1991 (See Exhibit 3: Census Data by Site). <u>The total prairie dog population on SITLA lands for 2001 was 10, which amounts to 4.8% of the prairie dogs in this recovery area</u>. As Figure 9 indicates, the decline of UPDs on SITLA lands in 2001 has resulted in the census count being the lowest recorded since the mid-1990s.

Figure 9. Utah Prairie Dog Census Counts on SITLA Lands in the Awapa Plateau Recovery Area, 1995-2001. Source: Exhibit 1: Census Data by Recovery Area.



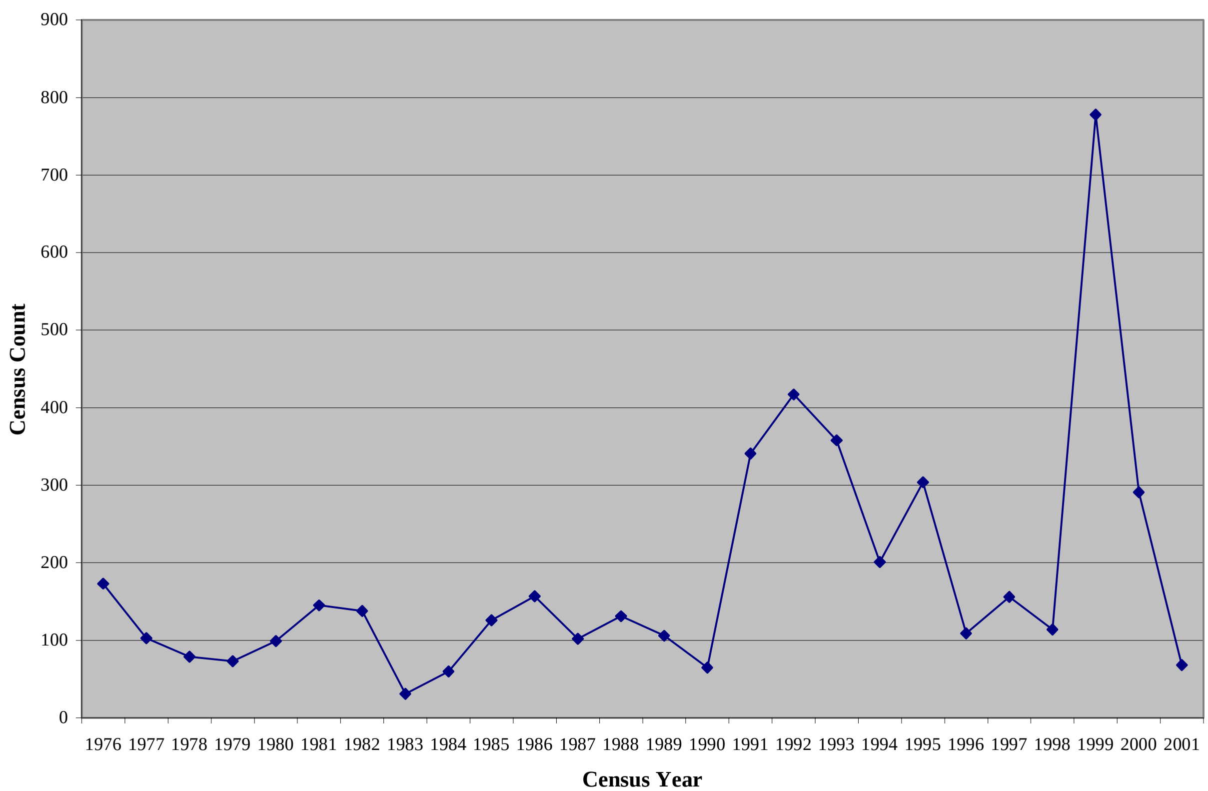
UDWR. There is one UPD site under UDWR ownership (C308). There were no surveys or a zero count from 1996-2002 (See Exhibit 3: Census Data by Site). The one UDWR-owned Utah prairie dog site has likely been extirpated.

In addition, there are four sites that are on public lands, but are not classified in the ICS (in addition to the Capitol Reef NP site, which was unclassified and has been extirpated). One site is likely extirpated (C330) with population counts of zero (0) or no survey for at least the period from 1993-2002. A second site (C329) has a marginal population, verging on extirpation, with census counts ranging from 0-1 from 1995-2000 and of six UPDs in 2002. The third complex (C307) has a marginal population with census counts of ten or fewer UPDs in 2000-

2002, down from a 1996 count of 54. The fourth complex (C309) had a census count of 15 UPDs in 2002, up from zero in previous years (See Exhibit 3: Census Data by Site). Therefore, three of the four unclassified sites on public land in the Awapa Plateau are either extirpated or marginal.

Private Lands. There has been a steady decline of Utah prairie dogs on private lands in the Awapa Plateau. In 2001, the census count was 68 UPDs, down from every year from 1985-2000.[12] The 2001 census count was only 23.3% of the count the prior year, and a mere 8.7% of the census two years prior (See Exhibit 1: Census Data by Recovery Area). In the Awapa Plateau, there has been a drastic decrease in prairie dogs on private lands. Present census counts are among the lowest ever recorded in this Recovery Area (Figure 10).

Figure 10. Utah Prairie Dog Census Counts on Private Lands in the Awapa Plateau Recovery Area, 1976-2001. Source: Exhibit 1: Census Data by Recovery Area.



[12]In 1990, there were no UPD counts conducted on private lands (McDonald 1993).

As in the other two recovery areas, the disappearance of established UPD complexes in the Awapa Plateau has not been accompanied by the creation of new complexes. Across the federal and SITLA lands in this recovery area, new colonies have formed at a lower rate than established colonies have been lost. As is clear, the pattern in this recovery area has overwhelmingly been extirpation or loss, with only three complexes recording increases from 1984-2002 or 1991-2002, versus thirteen sites showing declines and 8 sites likely extirpated (Table 3).

Table 3. Colony disappearance vs. new colonies: Awapa Plateau Recovery Area.
Source: Exhibit 3: Census Data by Site.*

Complex Number	Site Name	2002	1991	1984	Trend
300	Pollywog Top	0	0	29	-
301	Lost Knoll East	0	0	20	-
302	Dry Lake	0	0	0	X
303	Big Lake	0			X
304	Doctor Creek	NC	32	0	-
305	Pelican Point	0	0	0	X
306	Square Reservoir	2	0	4	-
307	Hunt’s Reservoir	10	0	9	+
308	Dog Lake	0	0	4	-
309	Forshea Res.	15	35	33	-
310	Flossie Lake	0	0	11	-
311	Hare Lake	3	0	5	-
312	The Tanks	31	14	9	+
313	Mud Lake	0	0		X
314	Smooth Knoll	NC	0		X
315	Sage Hen Draw	4	5		-
316	Big Hollow-Flat Top	11	2	31	-
317	Terza Flat	5	0	65	-
318	Moroni Peak Reservoir	0	0	6	-
322	Tidwell Slope	0	0	17	-
326	Capitol Reef NP	0	NC	0	X
328	Forsyth Reservoir	0			X
329	Giles Hollow	6			+
330	Deer Peak	0	NC		X

*Key
NC = No Census
? = No data

Trend Categories
=: stability across all years
+: increase from 1984 and 1991 to 2002
-: decline between 1984-2002 or from 1991-2002
X: extirpated complex (all census counts either blank or 0)

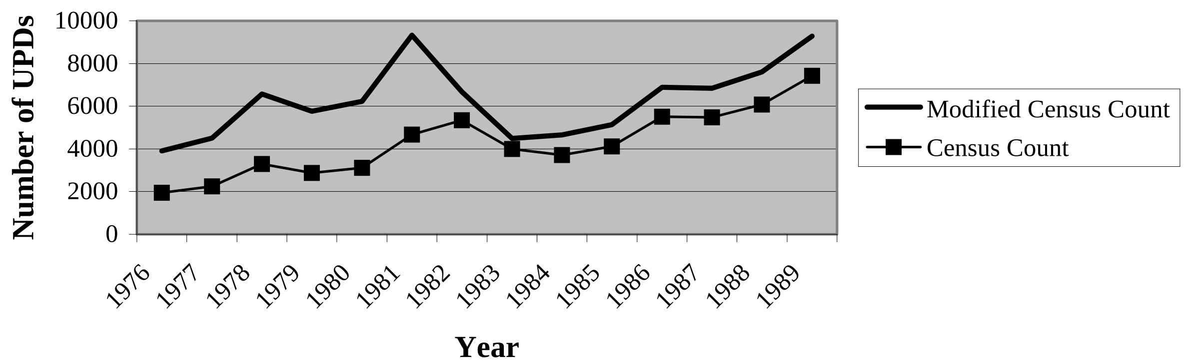
As has been demonstrated, UPD complexes are almost categorically declining across all land ownerships – federal, state, and private – in the Paunsaugunt and Awapa Plateau Recovery Areas. In their one historical stronghold, the West Desert, there has also been a trend of drastic decline and the disappearance and decrease of established complexes has far outpaced the formation of new populations.

Current Population Status (using modified census count)

Census counts do not capture the entire UPD population occupying a complex. Rather, they capture a proportion of the adult population. Census methods have improved since 1976. According to UDWR, from 1976-1981, observations were estimated to constitute 40-60% of the adult population. The canine-tease method, used from 1982-1990, was believed to capture 70-90% of the adult population (McDonald 1993). Petitioners therefore multiplied census data by 50% from 1976-1981 (the mean of 40-60%) and 80% from 1982-1990 (the mean of 70-90%) to obtain estimates of the total adult population. FWS does not appear to know what percentage of the population is being captured with the current census method (Elise Boeke, FWS, pers. comm., Nicole Rosmarino, Forest Guardians, 2002).

A comparison of modified census data to raw data from UDWR reports indicates that there was not as steady an increase in UPD populations from 1976-1989 as was suggested in the raw census data. Rather, there was an increase until 1981, at which time UPD populations began to plummet (Figure 11).

Figure 11. Comparison of Modified Census Count with Census Count. Sources: Exhibit 1: Census Data by Recovery Area, Exhibit 4: Modified Census Data.



Population estimates reached a low in population estimates of 4,492.5 individuals in 1983. In addition, the 1984 modified census count was only 4,650 (See Exhibit 4: Modified Census Counts). These counts were the lowest since the first two years of census data. The 1983 and 1984 censuses were conducted prior to the FWS's publication of the final rule in the Federal Register to downlist the UPD from endangered to threatened (49 Federal Register 22330-22334 (May 29, 1984)).

Petitioners will discuss the downlisting and subsequent increase in the permitted take of UPDs in the Threats section, below. We will demonstrate that one of the most significant threats to this prairie dog species is the continual prioritization of political expedience above the biological needs of the species. Consequently, recovery has certainly not been achieved. In fact, UPD survival is at greater risk currently than when the UPD was listed as endangered.

Identified Threats to the Petitioned Species: Criteria for Listing

Reasons for serious concern about the petitioned species include:

1. Present and threatened destruction, modification, and curtailment of habitat and range;

2. Overutilization of habitat for commercial and recreational purposes;

3. Disease;

4. The inadequacy of existing regulatory mechanisms; and

5. Other natural or manmade factors affecting its continued existence.

1. Present and Threatened Destruction, Modification, or Curtailment of Habitat or Range.

Habitat loss and fragmentation

There has been extensive loss and degradation of the Utah prairie dog's habitat throughout its historic range. Since 1976, UPDs have been mapped on 27,647 acres. As of 1995, they occupied only 6,977 acres. As indicated above, the reduction of UPDs from their historic distribution on 448,000 acres represents a loss of over 98% of UPD acreage. Moreover, of the remaining 6,977 acres, only 31% are on federal lands (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans; O'Neill et al. 1999). Further, in a February 2001 EA, the BLM acknowledged that suitable habitat for UPDs has been declining on public lands (EA # 046-01-010).

The factors responsible for the loss of UPD habitat on public and private lands include land conversion, livestock grazing, off-road vehicle use and recreation, and seismic exploration. Land conversion includes crop agriculture and commercial and residential development. Livestock grazing results in shrub encroachment, riparian destruction, exotic weed invasion, and fire suppression, all of which negatively impact UPDs. Oil and gas and mineral extraction and exploration damages vegetation and disturbs UPDs. In addition, UPDs suffer from road mortalities.

Conversion to cropland and municipal development

Much of the historic, high quality prairie dog habitat was in valleys, which is where crop agriculture and urban expansion have occurred or are occurring (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). As indicated in annual state reports, destruction of UPD habitat continues to the present (McDonald 1996; 1997; O'Neill et al. 1998; 1999; Bonzo and Day 2000; 2002). The most recent UDWR report indicated that,

> Utah prairie dog habitat is jeopardized and further fragmented every year due to rapid growth and development occurring throughout prairie dog range...Although developers are encouraged to plan ahead and incorporate prairie dog removal into their schedules, most prefer not to wait and choose to pay a mitigation fee for the loss of habitat (Bonzo and Day 2002: 22).

In the year 2000, 43 acres of prairie dog habitat were destroyed under the Iron County HCP and 59 UPDs were taken before translocation could occur (Bonzo and Day 2002). The same observations regarding continued habitat destruction and a lack of developer interest in translocation were made in 1999. In that year, under the Iron County HCP, a total of 47 UPDs were taken by development before trapping and removal could occur (Bonzo and Day 2000). In 1998, 50 UPDs were moved from development sites, and 33 UPDs were moved from Iron County School District property (O'Neill et al. 1999). In 1996, UDWR reported the destruction of a 6.5-acre Post Office site, 7.5-acre West Hills site, and 70-acre Cedar City Airport site. In addition, FWS issued Biological Opinions for the destruction of multiple sites: the 63-acre Airport Road site, 28-acre Smead site (Colony No. 0103E), Colony No. 0103DD, Castlegate, Colony No. 0103 BR, 0103 DU, and 0112 C.

Conversion of UPD habitat is of gravest concern in Iron County. This county continues to contain the majority of UPDs and the majority of its UPDs are located on private lands. The Iron

County HCP's take of individual prairie dogs and UPD habitat is discussed below. Land conversion in Iron County is an imminent, high-magnitude threat to UPD survival given the high rate of municipal development. The Iron County HCP states,

> Between the census years of 1980 and 1990, Iron County's population increased 19.8%…Since then, growth has continued, and is increasing at an even greater rate. Human population growth has averaged approximately 5.9% over the past 10 years. In 1993, the human population increased by 6.3%, followed by a 5.8% increase in 1994…and an estimated 6.7% increase in 1995…Based on announced expansion by several manufacturing companies, growth is expected to remain high for several years, up to 10%. By the year 2017, the population level in Iron County will increase approximately 95% to 67,395, based on a conservative growth estimate of 3.24%…Much of the future growth is expected in "the broad expanse of high desert and the ranch lands of Cedar Valley"…where the majority of Utah prairie dogs are located (Iron County HCP: 22).

From 1990-2000, census data for Iron County indicate a staggering population growth rate of 62.5%.[13] Iron County is not alone, however, as much of southwestern Utah is experiencing significant growth and development (Iron County HCP). Garfield County's population increased by 19.0% between 1990-2000, and Beaver County's by 26.0% during the same period.[14]

Some development of UPD colonies has proceeded without permits from the State. According to the UDWR, in 1996, "Several other sites were destroyed due to unpermitted development, including colony Nos. 0103BR, 0103 DU, and 0112 C" (McDonald 1997: 28). In 1995, the agency reported unpermitted development that destroyed four colonies within C103 comprising 5.1 acres, 44 acres, 5.9 acres, and a portion of 3 acres. In addition, construction at the Cedar City airport resulted in the loss of 31 more acres (McDonald 1996). In both years, UDWR commented that, "Numerous other parcels are at risk due to rapid growth and development occurring throughout the range of the Utah prairie dog" (McDonald 1996: 25; 1997: 28).

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[13] See http://quickfacts.census.gov/qfd/states/49/49021.html, visited 7 January 2003.
[14] See http://quickfacts.census.gov/qfd/states/49/49017.html and http://quickfacts.census.gov/qfd/states/49/49001.html, visited 7 January 2003.

In addition, land conversion and development impacts can harm UPDs located on public lands. An example is Johnson Bench, which includes a small UPD complex established through recent translocations on the Powell Ranger District on the Dixie National Forest. In 2001, USFS indicated threats to Johnson Bench from the development of a 9-hole golf course and the selling of cabin sites (Noriega 2001). In addition, on the Cedar City Ranger District on the Dixie, USFS notes:

> During the past 10 years, ATV use has increased dramatically, primarily due to housing development on private lands. Each year, additional 'user-developed' roads increase, primarily due to ATV use.[15]

With the impending issuance of the Garfield County HCP, which will likely be modeled after the Iron County program, the destruction of UPD acreage and populations will increase. In addition, since 1996, numerous site-specific HCPs that provide for the destruction of UPD populations and habitat have been finalized and incidental take permits have been issued. Petitioners will review these in detail below.

Livestock grazing impacts

Livestock grazing can result in the loss or degradation of Utah prairie dog habitat in several ways: by causing shrub encroachment; reducing grass cover and vegetative biomass; degrading riparian areas; facilitating noxious weed proliferation; altering fire ecology; and damaging crytobiotic crusts and degrading soil conditions (See Exhibit 5: Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah).

The potential for livestock to degrade UPD habitat has been acknowledged by the agencies involved in UPD recovery. The Recovery Plan, the 20-year review of the UPD recovery

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[15]See http://www.fs.fed.us/dxnf/d2/ra/ra/ra_chapter4.html#_Toc511709696, visited 25 November 2002.

program, and the BLM's site management plans all indicate this potential (USFWS 1991; McDonald 1993; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans; BLM 1997 Environmental Assessment). Moreover, the quality of habitat, in the form of adequate and appropriate vegetation, is the primary emphasis in the 1997 Interim Conservation Strategy (ICS 1997). Yet, livestock grazing continues to be conducted throughout the UPD's now severely restricted range. Livestock grazing must be recognized as a threat to UPDs and curtailed in a manner that promotes UPD conservation. As petitioners demonstrate below, the primary agencies involved in UPD management have gone to great lengths to avoid restrictions on livestock grazing, irrespective of UPD habitat needs.

Shrub encroachment. Most significantly, livestock grazing has resulted in higher densities of shrub encroaching on UPD habitat (McDonald 1993; BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans; BLM 1997 Environmental Assessment).[16] This impact is related to livestock alteration of fire ecology, discussed below. States UDWR in its 20-year review of the UPD recovery program,

> Long-term heavy grazing by livestock appears to have eliminated much prairie dog habitat by creating a vegetational shift from predominantly grass habitat to poor quality shrub habitat, and may be responsible for much of the present scarcity of necessary early spring forage (McDonald 1993: 16).

Shrub encroachment is counter to the Utah prairie dog's need for open grassland for forage and to detect predators. According to UDWR, Utah prairie dogs avoid brushy areas and "will eventually decline or disappear in areas that are invaded by brush" (McDonald 1993: 6). The conversion of shrub-grassland mosaics to shrublands may have resulted in a permanent loss of UPD habitat. By grazing herbaceous vegetation, livestock provide a competitive advantage to shrubs, which results in brush encroachment of grassy areas (Tisdale and Hironaka 1981; Archer

1989; 1995; Schlesinger et al. 1990; Young 1994; West 1996; Austin and Urness 1998; Cibils et al. 1999; Huber and Goodrich 1999; Paige and Ritter 1999).

Indeed, researchers in other xeric areas in the U.S. have noted the potential irreversibility when perennial grasslands are converted to shrubland (Bahre 1995; Le Houérou 1996; Muldavin et al. 1998; Bock and Bock 2000; Pidgeon et al. 2001). This is due to shrubs being able to conduct water from lower depths than grasses, thus allowing them to achieve dominance over grasses (Burgess 1995; Hutchinson 1996; Gibbens and Lenz 2001).[17] In addition, there is increased infiltration beneath shrubs, with lower temperatures and more soil biota. In contrast, barren areas between shrubs experience greater runoff and erosion, higher temperatures and lowered soil nutrients (Hutchinson 1996). Shrubland therefore perpetuates the dominance of shrubs over grasses and impedes restoration to a grassland state (Heske and Campbell 1991; Whitford et al. 2001). Shrub densities continue to increase in arid regions of the U.S. (Muldavin et al. 1998; Gibbens and Lenz 2001).

Federal land managers involved in UPD recovery efforts acknowledge the loss and degradation of UPD habitat via brush encroachment. They have responded by attempting to control sagebrush. However, mechanical and chemical treatments designed to decrease sagebrush density may actually increase sagebrush cover over the long-term. For instance, Watts and Wambolt (1996) calculated that greater sagebrush canopy cover would result in treated areas than controls for each of the following three treatment methods: spraying with 2,4-D, plowing sagebrush and seeding the area with grasses, and rotocutting sagebrush. In fact, reducing

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[16]See also USFS Biological Assessment of Utah Prairie Dog Habitat Improvement Projects. Dated 2/27/96.

[17]Gibbens and Lenz (2001) provide an exhaustive description of the root systems of desert plants. In creosotebush (Larrea tridentata) dominated areas, creosotebush root systems extended as much as five (5) meters below the soil surface and extend laterally several meters. This can be contrasted with perennial grasses such as tobosa (Pleuraphis mutica) or black grama (Bouteloua eripoda) in the same areas, whose roots extended less than 0.5 meters below the soil surface and laterally less than one (1) meter.

sagebrush cover may actually decrease total vegetative production in an area, as described by Wambolt and Watts (1996: 149-150),

> Mueggler and Blaisdell (1958) compared the sagebrush control techniques of burning, rotobeating, spraying, and railing. They found that regardless of treatment, total vegetal production three years after treatment was still considerably less than on untreated areas. Harniss and Murray (1973) also concluded that sagebrush must utilize resources that are not available to other species because maximum vegetal production results when sagebrush is present.

Consequently, attempts to artificially manipulate sagebrush density may decrease the availability of UPD forage.

Only prescribed burning appears to result in long-term sagebrush canopy reductions. Wambolt et al. (1999) also found that both prescribed burns and wildfires substantially decreased sagebrush canopy cover and density. Yet, the BLM found that prescribed burns were not resulting in the brush reduction desired, and reverted to mechanical control (BLM Decision Notice #UT-044-97-04h, dated 4/29/99). The effectiveness of BLM habitat management for prairie dogs, which is the primary mitigation for continued destruction of privately owned UPD habitat, is therefore questionable.

Forage reduction. Livestock grazing also depletes forage that prairie dogs require for sustenance. Jones (2000)[18] found that livestock grazing results in significant reductions in grass cover and vegetative biomass (See also Exhibit 5: Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah). Several studies indicate these impacts in southern Utah:

- In Capitol Reef National Park, Willey (1994) documented more (and taller) native grasses, more (and taller) shrubs, and more forbs on an ungrazed mesa top compared to a grazed areas within the Park.

[18]Full citation in Petition Exhibit 5.

- In Zion National Park, Madany and West (1983) found twice as much forb cover, three times as much grass cover, and more diverse age structure of trees on a set of ungrazed mesas, compared to a nearby grazed area.
- Kleiner (1983) found that 10 years of rest from grazing in Chesler Park within Canyonlands National Park led to increases in litter cover from 9.8% to 25.7%, and increases in total vegetative cover from 31.6% to 44.5%.
- A study in the Kaiparowits Basin by Jeffires and Klopatek (1987) compared a heavily grazed site, a light/moderate winter grazed site, a site 10 years into recovery from heavy grazing, and a relict, never-before grazed site. The authors found that the relict site had significantly more herbaceous cover (comprised mostly of perennial grasses) than all other sites. There were no significant differences between the heavily grazed site and the recovering site for any of the measured parameters, leading the authors to conclude that recovery from grazing can take a very long time indeed.

As discussed under UPD habitat requirements, cool season grasses are particularly important for prairie dogs. McDonald's 20-year review of the UPD recovery program describes the negative impact of livestock on cool season graminoids and states that, as a result of livestock grazing, "There has been a marked increase in shrubs at the expense of important, palatable, cool season grasses, which are now rare in many of the areas once occupied by Utah prairie dogs" (McDonald 1993: 16). In particular, spring grazing can reduce cool season grasses and can stimulate woody shrub growth at the expense of grasses and forbs important to UPDs (McDonald 1993). Similarly, BLM has noted that, "It is believed that any long term spring grazing on a cool season grass species can be destructive or detrimental to the plants" (BLM 1997 EA: 8).

In the early 1990s, UDWR noted the reduction of UPD forage by livestock on public land UPD complexes and even on sites designated to receive translocated prairie dogs:

> Of particular concern is the effect of spring grazing at transplant sites and other public land complexes. Prairie dogs have their greatest nutritional needs in spring following emergence from hibernation through mid-June. If they are competing with livestock for limited forage at this critical time, they may be unable to acquire sufficient energy to successfully rebuild energetic stores, breed, reproduce, and raise offspring. Livestock have been observed near or in prairie dog complexes on the Awapa Plateau in early spring, even before the snows had

> melted, digging through the snow to get to early growth as it emerged (McDonald 1993: 55).

Consequently, according to the agency, the impact of livestock can be substantial – especially during the spring – if grazing is occurring directly on a prairie dog complex (McDonald 1993). Petitioners will demonstrate in the Inadequacy of Regulatory Mechanisms subsection below the extensive livestock grazing occurring, in spring and other times of the year, on allotments with UPD habitat on BLM and USFS lands.

Riparian area degradation. The negative impact of livestock grazing on riparian areas has been well documented (e.g., Fleischner 1994; Belsky et al. 1999[19]). Impacts include streambank destabilization; channel widening or channel incision, and consequent lowering of the water table and narrowing of the riparian zone; reduction of riparian vegetation; and proliferation of exotic plant species (See Exhibit 5: Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah).

Utah prairie dogs are closely associated with riparian areas, and specifically with moist swales (USFWS 1991; McDonald 1993).[20] In the Recovery Plan for the Utah Prairie Dog, for example, FWS states:

> Historically, prairie dog colonies were located in swale formations. Overgrazing led to erosion of the swales, thus transforming them into gullies. This, in turn, lowered the water table to channel bed level thereby reducing the amount of moisture available for the palatable grasses and forbs that supply summer food for the prairie dogs (USFWS 1991: 11).

Other agencies involved with UPD recovery also note negative impacts of cattle grazing on riparian areas, and, in turn, on prairie dogs. In a review of twenty years of UPD recovery efforts, 1972-1992, McDonald (1993) corroborates the deleterious impact of livestock grazing on UPD habitat in swales and streamside areas. USFS researchers also acknowledge the damage of

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[19]Full citation in Petition Exhibit 5.

livestock grazing on riparian areas, specifically discussing the lowering of the water table and consequent drying of once-succulent vegetation (DeBano et al. 1989).[21] In regard to the UPD, the USFS notes,

> Prairie dog colonies observed within the Paunsaugunt Recovery Area demonstrates that colonies which are located adjacent to riparian zones typically are larger and persist longer than colonies which are not located near riparian zones. This may be coincidental, however, during droughts upland vegetation adjacent to riparian zones is typically healthier and more resilient. This factor may influence prairie dog survival during periods of drought and/or disease outbreaks (USFS 1997 MOU: 5).

It is unclear why the USFS would regard the UPD's predilection for areas of moist vegetation as coincidental, given the recognition within the scientific literature that Utah prairie dogs have a preference for swales with succulent vegetation. What is important is that USFS acknowledges that colonies within the Paunsaugunt recovery area near riparian areas are larger and more stable than upland colonies.

Yet, prairie dog persistence near riparian areas is precarious, due to livestock grazing. A vegetation study indicated that the Buckskin Complex (C110) has experienced increased sagebrush encroachment. In addition, UPDs and cattle are congregating in the same areas. The study states, "It is obvious that activity was abundant at one time but large colonies have been abandoned. Prairie dogs were observed only near the salt lick and pond that are along the dirt road. This is definitely a sacrifice area and cattle were in the area while we were there. This area has been nearly denuded of vegetation, but this is the area of current prairie dog colonization" (Bowns et al. 1998: 8).

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[20]See USFS Biological Assessment of Utah Prairie Dog Habitat Improvement Projects. Dated 2/27/96.
[21]Other research has documented that livestock cause channel incision, which leads to a lowered water table and therefore impairs UPD habitat (See Exhibit 5: Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah).

The question becomes whether UPDs are attracted to these areas because cattle are containing the shrubs through their own preference for congregating in riparian areas, or whether cattle are both restricting UPD colony expansion by causing shrub encroachment in the upland area and competing with UPDs for forage in riparian areas. Bowns et al. 1998 seem to side with the former conclusion, but McDonald (1993) and FWS (1991) underscore the capacity for livestock grazing to degrade the riparian areas preferred by UPDs.

This same issue arises in another area discussed in the 1998 vegetation study, near Dog Valley (C201), where the researchers observed UPDs on private land in 1996, near a pond where livestock loitered. After 1997, no prairie dogs were seen, presumably due to rising pond levels (Bowns et al. 1998). This example may underscore how precarious the persistence is of UPDs who remain only in riparian areas due to increasingly inhospitable uplands. With livestock congregation in riparian areas (Fleischer 1994; Belsky et al. 1999), this leaves Utah prairie dogs with few areas that contain sufficient forage and are not dominated by shrubs.

Noxious weed proliferation.[22] Livestock overgrazing can result in the spread of noxious weeds. Grazing aids the spread and establishment of alien species in three ways: 1) dispersing seeds in fur and dung; 2) opening up habitat for weedy species; and 3) reducing competition from native species by eating them (Fleischner 1994). Studies that have found increased densities, cover or biomass of exotic plant species in grazed versus ungrazed sites include Green and Kaufman (Oregon -1995), Drut (Oregon - 1994) and Harper et al. (Utah - 1996). Kitchen and Hall (1996) found that spring grazing by sheep resulted in higher percent cover of exotic annuals, and favored halogeton and cheatgrass expansion. Grazing can reduce leaf area to the point where native plants cannot complete photosynthesis, or can prevent native plants from reaching reproductive maturity (Knapp 1996). Annual noxious weeds, such as cheatgrass, have a competitive advantage over native plants in overgrazed environments. Livestock also can transport noxious weed seeds on their hides or hooves (Knapp 1996).

In a recent extensive review of the literature on this topic, the authors illustrated how cattle disseminate weed seeds in their fur and hooves; increase the "invisibility" of sites; and maintain weedy communities by continuing to graze preferentially on natives. The ability of cattle to increase a site's susceptibility to invasion has received the most attention from the scientific community. Sites become invasible due to increased bare soils as a result of grazing, which offer greater opportunity for weed establishment, with less competition.[23] Evans and Young (1972) found that increased soil erosion [shown to be caused by grazing] also loosens surface soils and helps bury seeds. Exotic seeds adapted to more erosion-prone environments will benefit from this alteration while native species likely will not. Deposition of nitrogen-rich livestock dung also increases invasion of nitrophilous weeds such as cheatgrass by stimulating germination and enhancing growth over that of native plants (Evans and Young 1975; Smith and Nowak 1990; Trent et al. 1994; Young and Allen 1997). Finally, cattle grazing can further compound the above impacts by creating warmer and drier soil microclimates, through soil compaction, and loss of plant, microbiotic crust and litter cover. The resulting warmer, drier microclimate reduces the competitive vigor of many native grasses (Piemeissal 1951; Archer and Smeins 1991), thus further increasing viability of aggressive exotics.

There has been extensive proliferation of noxious weeds throughout the UPDs historic and current range. According to Ingelfinger (2001: 8), 30% of sagebrush steppe "is heavily grazed and the native understory has been replaced by introduced annuals (West 1983, 1996)."

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[22]Full citations for references in this section are in the bibliography or in Petition Exhibit 5.
[23]See citations in Exhibit 5: Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah.

Once they are established (often assisted by cattle grazing), weeds negatively impact western arid ecosystems in numerous ways. Weed infestations reduce biodiversity (Randall 1996), increase fire frequency (Esque 1999; Brooks et al. 1999), disrupt nutrient cycling (Vitousek 1990), alter soil microclimate (Evans and Young 1984), reduce effectiveness of wildlife habitat (Davidson et al. 1996; Knick and Rotenberry 1997), and can expedite loss of topsoil in xeric environments (Lacy et al. 1989).

The evidence for cattle's implication in spread and establishment of exotic weeds is greater than any evidence to the contrary. Examples of documented cattle harms to native plant communities in southern Utah include:

- Rawlings et al. (1997) found that the part of Canyonlands National Park that had been grazed most intensively prior to 1967 has since been extensively invaded by cheatgrass.
- In a study of 530 different rangeland sites in southern Utah, Gelbard (1999) found that cheatgrass cover was five times greater on sites without cryptobiotic soils (disturbed by either cattle or motorized use) than on sites with undisturbed crusts (and 64% of all sites that were disturbed and lacking crusts were attributed to cattle grazing).
- Bich et al. (1995) found that both density and basal area of Indian ricegrass (Orzopsis hymenoides), a native bunchgrass, increased with decreasing grazing intensity, while density and foliar cover of snakeweed (Gutierrezia spp.) increased with increasing grazing intensity.
- A study in Capitol Reef National Park (Cole et al. 1997) found that pre-settlement middens contained abundant macro-fossils of plant species palatable to livestock, such as winterfat (Ceratoides lanata) and Indian ricegrass. Their packrat midden analysis demonstrated that drastic vegetation changes, unprecedented during the last 5,000 years, occurred in this part of southern Utah between roughly 1800 and the present. Species typical of overgrazed range, such as snakeweed, rabbitbrush (Chrysothamnus nauseosus), and Russian thistle (Salsola iberica) were not recorded in middens prior to the introduction of grazing animals.

In particular, cheatgrass forms monocultures and germinates in the fall when prairie dogs are hibernating, therefore limiting the availability of this exotic grass to prairie dogs before drying up. Consequently, there is a lack of alternative food sources for the rest of the active prairie dog season because of the cheatgrass monoculture. In addition, although prairie dogs can feed on cheatgrass during the spring, when the seeds ripen the awns dry out and can puncture the eyes of livestock and cause infections in their mouths and noses. Prairie dogs may be subject to these hazards as well. As cheatgrass dries out, the amount of digestible protein decreases (Young and Allen 1997), and prairie dog nutritional needs may not be met. As discussed below, cheatgrass also changes fire regimes.

The productivity of cheatgrass is extremely variable – in consecutive years, tenfold differences in cheatgrass production have been observed (Young and Allen 1997). Cheatgrass production is extremely low under drought conditions, and may provide no forage in some years (Young and Allen 1997). Stewart and Young (1939, as cited in Knapp 1996) determined that perennial grasses produced twice as much herbage as cheatgrass in wet years, and 12 times as much herbage as cheatgrass in drought conditions. Cheatgrass often forms dense monocultures. In these areas, forage options are extremely limited, and small variations in weather may lead to large-scale population swings among native grazers.

Cheatgrass is capable of increasing even in areas where livestock have been excluded (Goodrich et al. 1999), and can outcompete native plants because it produces massive numbers of seeds that accumulate in the seedbank (Young and Allen 1997). Cheatgrass can be infected by a smut (Ustilago bromivora) that can spread to other grasses. The cheatgrass seedbank can perpetuate the presence of this smut (Young and Allen 1997). Cheatgrass develops more rapidly than some native plants. For example, Goodwin et al. (1999) found that cheatgrass roots grew 17 times faster than Idaho fescue (Festuca idahoensis) roots.

In addition, livestock have been implicated in the spread of halogeton. Kitchen and Hall (1996) found that spring grazing by sheep resulted in higher percent cover of exotic annuals, and favored halogeton and cheatgrass expansion. Halogeton is a noxious weed that concentrates selenium, and can poison livestock (Phinney, personal communication, 2002). Its effects on prairie dogs are unknown. It is possible that halogeton is not palatable to prairie dogs.

Many areas in the West that were once dominated by perennial plant species are now dominated by introduced annuals such as those mentioned above. Overgrazing is a major cause of this conversion. Rather than addressing the threat of exotic weed proliferation, the BLM claims, “grazing can help prevent the spread of undesirable plant species” and can minimize, or at least have no effect on, the spread of invasive weeds such as cheatgrass (Bromus tectorum) (See Exhibit 5). In both cases the agency cites Sheley (1995), an article that appears in a magazine, not a peer-referred journal. This paper is a two-page set of grazing recommendations, based on no experimental evidence of its own (or any other studies for that matter) that goes into no detail on the “proper grazing management practices” that can supposedly control weeds.

The BLM has also stated that livestock can be used to “control” weed invasions that have already occurred (See Exhibit 5). These claims are based on observations made in systems already so degraded that they might never improve. However, it is irresponsible for the BLM or anyone else to claim that cattle grazing is in some way neutral or beneficial in fighting weed infestations without supporting these claims with adequate studies from the scientific literature. The reason the BLM is not able to cite the literature on this topic is because evidence to support the use of cattle to avoid or control weed infestations in the arid west is scant. Livestock select bunchgrass over weedy species when given a chance.[24]

As is discussed in the Inadequacy of Regulatory Mechanisms subsection below, noxious weeds are a problem throughout the UPD’s current range on BLM lands. Similarly, noxious weeds dominate on USFS lands within the prairie dog’s current range. Smooth brome and

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[24]See citations in Exhibit 5: Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah.

crested wheatgrass are dominant grasses on two key Utah prairie dog sites on the Dixie National Forest – the Johnson Bench and Tom Best areas. As discussed below, cheatgrass is highly flammable and thrives when exposed to frequent fire. Cheatgrass can thus significantly alter fire regimes by increasing fire frequency and intensity (Knapp 1996). Crested wheatgrass, for its part, increased in response to prescribed burns carried out for the UPD (1997 USFS MOU) and has been seeded on BLM lands in the recent past (BLM 1999 Utah Prairie Dog Annual Report for 1998). Hoogland (2001) found that maternal mass was correlated with litter size in other prairie dog species. One would assume that forage quality would affect maternal mass and poor forage quality will therefore decrease prairie dog litter size. Noxious weed proliferation may therefore threaten UPD survival.

Alteration of fire ecology. Livestock grazing alters fire ecology by causing shrub and exotic weed proliferation and by reducing fuel loads. For instance, cheatgrass is extremely susceptible to intense wildfires, and these wildfires actually lead to the spread of cheatgrass across the landscape. Physical disturbances and wildfires both accelerate nitrogen mineralization, and cheatgrass proliferates in areas that have experienced nitrogen enrichment (Young and Allen 1997). Cheatgrass can also survive in areas where mycorrhizal fungi have been drastically reduced (Knapp 1996).

In stands of cheatgrass that lack woody fuel, even intense wildfires do not significantly decrease the number of cheatgrass seeds in the seedbank, which allows for quick reestablishment of this noxious weed (Young and Allen 1997). Hull (1965, as cited in Knapp 1996) estimated that areas dominated by cheatgrass are ten to 500 times more likely to experience wildfire than areas dominated by native bunchgrasses, and he estimated that fire seasons are between one and three months longer in areas dominated by cheatgrass. Fire can then occur so frequently that native shrubs that do not resprout after fire cannot become established by seeds (Knapp 1996). Alternatively, cheatgrass germinates quickly after fire and outcompetes native plants as a colonizer of disturbed areas. In fact, cheatgrass germination success rates can reach 99.5% (Knapp 1996).

In addition, on areas grazed by livestock, there is decreased accumulation of dead grasses and forbs than in areas without livestock. This reduces fire frequency (Cole et al. 1997). The reduction in fuel loads can be dramatic. For instance, Goodrich et al. (1999: 164) found that,

> Litter cover was about two times greater in areas protected from livestock or under moderate intensity grazing than in the area that was heavily grazed in spring each year. Reduction in ground cover included not only smaller basal area of perennial grass plants but also lower ability of plants to produce litter.

Reduced fire frequency consequently facilitates shrub encroachment as shrubs susceptible to fire, such as sagebrush, may form inordinately dense stands with fewer fires on the landscape (Austin and Urness 1998). Other authors correlating noxious weed proliferation with increased fire frequency include Esque (1999) and Brooks et al. (1999).

Soil impacts.[25] Livestock grazing impacts to the soil include destruction of cryptogamic soil crusts, erosion of soil with the loss of these crusts and reduction of vegetative cover, and soil compaction. As soils take 5,000 to 10,000 years to naturally re-form in arid regions such the Colorado Plateau (Webb 1983), accelerated soil loss caused by grazing is an irreversible loss. The steep slopes with little to no vegetal cover underlain by highly erodible rock that are common in the rugged landscape of southern Utah are particularly susceptible to cattle-induced erosion.

First, livestock may trample and destroy cryptogamic or cryptobiotic soil crusts, resulting in the destabilization of soil and vegetation (Kaltenecker et al. 1999). Areas where soil crusts have been disturbed are ripe for noxious weed invasion, are easily eroded, and experience decreased nutrient cycling. Nitrogen fixation may be suppressed long after disturbed soil crusts appear to have recovered (Belnap et al. 1994, as cited in Kaltenecker et al. 1999). Most detrimental is trampling during the summer when conditions are very dry, and during late spring when soils are very wet (Kaltenecker et al. 1999).

Cryptogamic crusts, which were historically widespread in western arid lands, are being rapidly depleted across rangelands today. These crusts increase the stability of otherwise easily erodible soils, increase water infiltration in a region that receives limited precipitation, and increase fertility of xeric soils often limited in essential nutrients such as nitrogen and carbon (Johansen 1993, Belnap et al. 1994). Cattle are highly destructive to these fragile cryptobiotic crusts. Numerous studies that have investigated the impacts of cattle grazing and other disturbances on cryptobiotic soils have been conducted in southern Utah and have found:

- Heavy grazing reduced crusts by 98.5% and light grazing reduced crusts by 52.3% at the Desert Experimental Range in southern Utah (Marble 1990).
- Cryptobiotic crust cover was seven times greater in an ungrazed part of Canyonlands National Park compared to a grazed area (Kleiner and Harper 1972).
- Nitrogenase activity levels in cryptobiotic crusts decreased anywhere from 30% to 100% in disturbed plots relative to undisturbed plots, and that threshold friction velocities (the force required to detach soil particles from the surface) were significantly higher in undisturbed cryptobiotic crusts than in disturbed plots (Moab area - Belnap 1996, Belnap and Gillete 1997).
- A never-grazed site in the Kaiporwits Basin had significantly more cryptobiotic crust cover than both a light-moderately winter grazed site and a site that had not been grazed for 10 years (Jeffries and Klopatek 1987).
- Cryptobiotic crust cover more than doubled over a ten year period of rest from grazing in Canyonlands National Park (Kleiner 1983).
- Jayne Belnap, the respected authority on cryptobiotic soils, reports that cattle grazing has greatly impacted cryptobiotic crust integrity within the new Grand Staircase Escalante National Monument (Belnap 1997).

[25]See full citations in bibliography or Exhibit 5.

The deleterious effects of cattle on cryptobiotic crusts are not easily or rapidly redressed. The recovery time for the lichen component of crusts has been estimated at about 45 years (Belnap 1993). However, the 45 year-old crusts will not have recovered their moss component, which will take an additional 200 years to fully come back (Belnap and Gillette 1997).

There are numerous secondary effects once crusts have been trampled by cattle. Destruction of crusts increases wind and water erosion of surface soils that were previously protected by the crusts (personal communication with Howard Wilshire). This can in turn trigger rapid loss of the underlying topsoil (Webb 1983). The destruction of cryptobiotic soils by cattle can reduce nitrogen fixation by cyanobacteria, and set the nitrogen economy of these nitrogen-limited arid ecosystems back decades.

A severe loss of nitrates to plants is a significant threat in typically nitrogen-poor arid environments, and may even eventually lead to desertification (Belnap 1995). Once crusts are destroyed, ecosystem structure can be furthered altered when bare ground is available for colonization by exotic weeds (see Gelbard, in review, and references within). In addition, the breaking up of physical and microbiotic soil crusts increases surface roughness, which favors cheatgrass germination (Tisdale and Hironaka 1981, Stohlgren in press). The relationship of crust destruction and weeds is further supported by evidence that intact cryptobiotic crusts reduce or prohibit weed establishment by preventing weed seed germination (Eckert et al. 1986, Mack 1989). Even small reductions in crusts can lead to diminished productivity and health of the associated plant community, with cascading effects on plant consumers (Davidson et al. 1996).

Rather than addressing the threat livestock pose to cryptogamic soil crusts, the BLM has stated numerous times that grazing and cryptobiotic crusts are compatible.[26] To justify this position, the BLM cites a study that documented slightly more microphytic cover in a single grazed versus ungrazed comparison (Anderson 1994), and a conclusion by one author (Schofield 1985) that reduction of grass cover by cattle results in greater moss coverage.

Both studies are flawed. In the Anderson study, one of the comparisons was a paired comparison where there was "no measurable difference in...microphyte cover" (Anderson 1994). The other paired comparison revealed that there was 73% percent more microphyte cover in the grazed area than in the exclosure; in other words, about 4% cover versus about 2.5% cover. It is not surprising that Anderson et al. detected such minute effects of grazing; they compared an ungrazed area to a lightly grazed area. In the Schofield study, an increase in mosses does not necessarily mean there is a concomitant increase in cryptobiotic soils. Moss is only one of many components (e.g., algae, lichen, soil particles, cyanobacteria) that comprise crusts. See Exhibit 5 (Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah) for a more detailed refutation of the BLM's defense of grazing in regard to cryptogamic soil crusts, the scientific literature overwhelmingly describes the severe effects that cattle have on cryptobiotic soils. In taking a position in defense of livestock grazing, the BLM has ignored the scientific literature's overwhelming depiction of negative impacts of livestock on cryptogamic soils.

Second, livestock degrade soils by reducing ground cover, which results in increased soil erosion. Goodrich et al. (1999) found that ground cover in areas with heavy spring cattle grazing was only 30%, compared to 55% ground cover in areas where livestock were excluded.

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[26]See, for example, the BLM's 2000 "Environmental Assessment for Term Grazing Permit Renewal, Little Boulder and Peters Point Allotments." EA No. UT-090-00-41. BLM, Monticello Field Office, UT.

Holecheck et al. (1998) reviewed the literature and concluded that the loss of litter contributes to soil erosion. Numerous other studies have observed severe erosion when comparing heavily grazed to ungrazed sites in the arid west (Cooperrider and Hendricks 1937, Croft et al. 1943, Gardner 1950, Kauffman et al. 1983). In a study in Badger Wash, just over the border from Utah in western Colorado, Lusby (1979) found that runoff was reduced by 40%, and sediment yield by 63%, on ungrazed watersheds compared to grazed watersheds. Reviews that describe the correlation between livestock grazing on soil stability and erosion include Gifford and Hawkins (1978), Fleischner (1994), Trimble and Mendel (1995), and Jones (2000).

Erosion causes sites to become more accessible to noxious weeds due to increased bare soils, which offer greater opportunity for weed establishment with less competition from native plants.[27] Evans and Young (1972) found that increased soil erosion [shown to be caused by grazing] also loosens surface soils and helps bury seeds. Exotic seeds adapted to more erosion-prone environments will benefit from this while natives likely will not. Deposition of nitrogen-rich livestock dung also increases invasion of nitrophilous weeds such as cheatgrass by stimulating germination and enhancing growth over that of native plants (Evans and Young 1975, Smith and Nowak 1990, Trent et al. 1994, and Young and Allen 1997).

Third, livestock grazing leads to soil compaction and altered hydrology. Cattle grazing can further compound the above impacts by creating warmer and drier soil microclimates, through soil compaction, and loss of plant, microbiotic crust and litter cover. The resulting warmer, drier microclimate reduces the competitive vigor of many native grasses (Piemeissal 1951, Archer and Smeins 1991), thus further increasing viability of aggressive exotics. Livestock impacts on soil condition also lead to hydrological effects. For example, several authors (Rauzi

[27]See citations in Exhibit 5: Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah.

and Smith 1973; Gifford et al. 1976; Achouri and Gifford 1984; Orodho et al. 1990) have linked soil compaction from livestock trampling to decreased soil infiltration and consequently greater rainwater runoff. Livestock's decrease in plant and litter cover and cryptobiotic soils to absorb rain also leads to greater surface water runoff (Ellison 1990).

Evidence of increased storm-runoff on grazed versus ungrazed watersheds is considerable (Lusby 1979, Meehan and Platts 1978, Stevens et al. 1992). Increased storm runoff indirectly triggered through grazing can in turn cause further soil erosion, and flooding (Ohmart and Anderson 1982). Several reviews describe the impact of livestock grazing on soil compaction, infiltration, and runoff (Gifford and Hawkins 1978, Kauffman and Krueger 1984, Fleischner 1994, Trimble and Mendel 1995, Jones 2000, and Carter 2000).

In summary, livestock cause a variety of impacts – degraded riparian areas, shrub encroachment, reduced forage, proliferated exotic plant species, altered fire ecology, and degraded soil conditions – which deleteriously impact UPDs. As petitioners indicate in the Inadequacy of Regulatory Mechanisms subsection below, federal agencies have failed to address the numerous and significant threats continued livestock grazing pose to the critically imperiled Utah prairie dog.

Disposition of state lands

SITLA is increasingly offering state parcels for sale (Williams 2002). To the extent that those parcels are inhabited by UPDs and are sold to private landowners, the private land share of UPD acreage would increase. As is clear from the recovery plan, those populations would thus be earmarked for translocation to public lands, rather than preserved where they exist. BLM affirms that UPD populations on SITLA land are not safe from development. As stated in the BLM's 1997 Monument Peak Plan, acquisition of a SITLA section near the Adams Well

Allotment "would better protect it from development inconsistent with UPD management" (Monument Peak Plan: 16). This sentiment is echoed in the BLM's 1997 Horse Hollow Plan, where the BLM again advocates acquisition of a SITLA section to protect the Dominguez-Escalante transplant site (Horse Hollow Plan: 16).

Road Mortalities, OHV Use, and Recreation

Roads have a deleterious impact on UPD populations (McDonald 1993). UPDs are killed every year by motor vehicles. With increased road densities on public lands, the threat of road mortality increases. On BLM lands, in the West Desert Recovery Area, the highest densities of rights-of-way and the greatest demand for future rights-of-way are in the Black Mountain and Buckhorn Flat Management Areas (BLM 1997 EA: 43). Within the Minersville #3 complex, one UPD was found dead after BLM graded a roadway (BLM 2000: 4).

The potential for injury or mortality to UPDs from vehicles has also been noted by USFS (Noriega 2001). On the Cedar City Ranger District on the Dixie, in the Duck Creek-Swains Access management area, which comprises 93,099 acres and includes UPD habitat, USFS documented some 617 miles of road and has proposed to decommission 122 miles of unneeded roads. The agency reports numerous impacts of roads on terrestrial wildlife, several of which are relevant to UPDs, including: habitat loss and fragmentation; the creation of corridors for predators which may result in increased predation rates; vehicular collisions; increased hunting; harassment; dispersal disruption; and degradation of riparian areas.[28] In correspondence on the issue, FWS cited road densities as high as seven miles of road per square mile and concurred with the Dixie Forest Plan stipulation of no more than two miles of road per square mile (McGillivary 1999).

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[28]Information obtained from Dixie National Forest website, at: http://www.fs.fed.us/dxnf/d2/ra/ra/ra_chapter4.html#_Toc511709696, visited 25 November 2002.

However, elsewhere on the Dixie, the USFS has pursued road paving and construction projects in and near UPD habitat. In 1995, USFS proposed reconstructing approximately 30-40 miles of roads on the forest to accommodate commercial logging and firewood gathering. The project area included several sites with occupied or potential UPD habitat (Wilson 1995). In 2000, the agency proposed paving the East Fork of the Sevier River Road despite the presence of unoccupied, but potentially suitable, UPD habitat at several locations along the road. The USFS biologist determined that the project was not likely to adversely affect UPDs despite his admission that mortalities from collision with vehicles would increase if prairie dogs occupied this habitat and the road was paved (Noriega 2000).

Also in 2000, USFS proposed a timber sale that would entail the construction of 3.3 miles, reconstruction of 9.8 miles, and reconditioning of 28.6 miles of road despite the fact that UPDs had been sighted northwest of the area within the past two years. Although admitting that road mortality and increased shooting could result from increased roads, USFS determined that the timber sale and road construction was not likely to adversely affect the UPD. This seemed to be based on an analysis of the threat to UPDs from shooting relative to other threats to the species:

> …it is my professional opinion that shooting of prairie dogs since they're [sic] listing in 1973 under the Endangered Species Act (ESA) has not impacted the population nearly as much as the plague (Rodriguez 2000: 9).

However, under ESA consultation requirements, a comparison of threats is not relevant. What is imperative is consideration of the extent to which a proposed project significantly contributes to <u>any</u> threat against a listed species and should therefore be mitigated.

OHV use causes wildlife disturbance and degradation of vegetation and can therefore negatively impact UPDs. Off-road vehicle use can crush, break, trample, and reduce vegetative cover (e.g., Bury et al. 1977; Weaver and Dale 1978; Cole and Bayfield 1993). Vegetation that is stressed by drought conditions may be more susceptible to such impacts. Moreover, vegetative cover decreases, as a result of the combined effects of off-road vehicle use and sustained drought, can increase the likelihood of soil erosion. Soils, especially sensitive soils, are susceptible to rapid erosion when stripped of vegetation (Sheridan 1979).

Recreation more generally has been linked with UPD declines. In 1997, the BLM noted that the Three Peaks prairie dog complex has “probably declined due to the intense increase in recreational use of the Three Peaks area in recent years” (BLM Biological Assessment for the Boy Scout Spring Camporee, 3/27/97, p. 1). Indeed, this complex has likely been extirpated, given census counts of zero for every year from 1997-2000 (See Exhibit 3: Census Data by Site). Due to its extirpation from the site, the BLM determined that “no direct or indirect impacts on the Utah prairie dog” would result from permitting large-scale recreation by boy scouts at Three Peaks (BLM Biological Assessment for the Boy Scout Spring Camporee, 3/27/97, p. 2).

Recreational impacts on UPDs may be on the rise on several Ranger Districts with UPD habitat on the Dixie National Forest. According to the Dixie NF in 1997, on the Powell and Escalante Ranger Districts, “Recreational activities are increasing and include fishing, hunting, disperse camping, OHV use, and trails” (Noriega 1997a: 6). All of these activities bring indirect and or/direct consequences to UPDs via increased human presence and habitat degradation. USFS has noted that recreation “may disturb Utah prairie dogs or result in individual animals which lose their fear of humans” (Noriega 2001: 7).

Specifically, on the Powell Ranger District, in 2000, USFS proposed to develop a site for vehicle parking in precisely the same area within Coyote Hollow where prairie dog habitat improvement projects had previously been conducted (See Exhibit 6: Maps A and B). The recreation pressure on UPD habitat in this area is evident in the USFS's characterization that "this site is becoming a focal point for people to park their vehicles while they enjoy the use of several trails in the general area" (Guillette 2000).

In addition, on the Teasdale Ranger District, the USFS has stated that, on some sites demand for camping, OHV use, and other recreation is increasing and exceeds the capacity of the facilities provided. USFS has responded by proposing improving roads and constructing new OHV trails (Turner 2001). In some areas, these actions will result in habitat degradation and increased human access to UPD habitat.

The Cedar City Ranger District has also experienced increased recreation (Wagner 2000[29]). USFS estimated in 2000 that "[p]opulation growth in southern Utah has caused a 100% increase in local and long distance District use over the last ten years" (Wagner 2000: p. 2). To respond to this increase, the district has pursued new campground developments, new trail construction, and paving roads to campgrounds (Wagner 2000; Maddux 2001; Wilson 2001).

Despite increased recreation on the Dixie National Forest, and the consequent increased management for recreation on the part of the agency, USFS fails to adequately consider the impacts of recreation on UPDs. This was most apparent in a Biological Assessment for the issuance of five-year outfitter and special use permits on the Fishlake and Dixie National Forests in 2001. Some of the roads and trails designated for outfitter-guide use passed through known or potential UPD habitat, and some of the participants would be engaged in hunting. The potential for UPD disturbance and illegal shooting was therefore significant. Yet, in its review of the permits, USFS admitted only "a short-term disruption of prairie dog foraging" but concluded that there would be "no measurable direct or indirect affects [sic] to prairie dog habitat or population viability" with the issuance of the permits (Stenten 2001: 10).

Oil and gas impacts. Oil and gas exploration and extraction results in the degradation and loss of UPD habitat. Seismic exploration activities may crush large swaths of vegetation, destroy biological soil crusts, compact soils, bury vegetation, decrease nitrogen fixation activity, introduce noxious weeds, increase soil erosion by wind and water (Boyle and Connaughton 2002), and cause habitat fragmentation, undermine burrow structures, and increase prairie dog stress levels. An average land-based seismic exploration project requires a crew of 40 people (Evans 1997). Even shot hole exploration requires the use of vehicles such as drilling rigs and recording trucks. The effects of seismic exploration are long lasting, and may persist for 50-300 years after activity ceases (Belnap 2002). Routes used for seismic exploration often turn into established roads (McLellan and Shackleton 1989; Crawford 2001; Zimmermann 2001; Belnap 2002; Conway 2002). These roads contribute to UPD mortality by increasing the likelihood of illegal shooting and by providing opportunities for prairie dogs to become roadkill. In fact, the BLM has acknowledged that tracks from seismic exploration conducted in the 1970's remain visible in 2002 and are often used as roads and trails by motorized vehicles.

There are several noise-related studies that suggest that sound and/or stress associated with seismic exploration could directly impact Utah prairie dogs. Motorized vehicle noise is known to act as a physiological stressor (U.S. Environmental Protection Agency 1971). Nash et al. (1970) found that leopard frogs exposed to loud noises (120 decibels) remained immobilized for much longer periods of time than a similarly handled control group. Similarly, other studies found that motorcycle and dune buggy noise (>100 decibles) decreased acoustical sensitivities of a number of Sonoran Desert lizards (Bondello 1976; Brattstrom and Bondello 1979). Some species suffered severe impacts (e.g., hearing loss) after as little as eight minutes of exposure (Brattstrom and Bondello 1979). Other studies have found that similar impacts occur to small

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[29]See also http://www.fs.fed.us/dxnf/d2/ra/ra/ra_chapter4.html#_Toc511709696, visited 25 November 2002.

mammals. Brattstrom and Bondello (1983) observed severe impacts to kangaroo rats exposed to dune buggy noise. Brattstrom and Bondello (1983) observed significant impacts to other species as well, including severe disruptions to emergence activities (naturally triggered by thunderstorms) of Couch's spadefoot toad. Other studies have found noise impacts to additional mammal species (Ward et al. 1973). Noise from seismic exploration activities may similarly increase prairie dog stress levels, affect prairie dog hearing, and disrupt hibernation.

Prairie dogs are very sensitive to low-frequency sounds. White-tailed prairie dogs responded to frequencies as low as 32 Hz and were sensitive to sounds of as little intensity as 24 dB (at 8 kHz) (Heffner *et a*l. 1994). In seismic exploration involving vibroseis, each truck conducts a frequency sweep, which can range from 5 to 250 Hz at each sampling station. In practice, frequencies below 20 Hz can damage equipment (Evans 1997), so most of the frequencies employed are within the prairie dogs' hearing range. Frequencies of around 100 Hz travel for long distances underground (Nevo 1995). The vibrations from a vibroseis truck are also intense. Evans (1997) cautions that, "vibrators may be used in populated areas (provided windows are well sealed since the vibrator energy may cause glass to vibrate and fracture)" (p. 113). Humans are able to hear explosions from underground charges used in shot hole seismic exploration 2000 m away (McLellan and Shackleton 1989). Seismic sounds transmit even better through the ground than through air. Randall (2001: 1149) reported:

> Randall and Lewis (1997) demonstrated that seismic signals propagated much better than airborne signals in the burrow of banner-tailed kangaroo rats. Peak amplitude of seismic sounds, as measured with a suspended microphone in a sealed burrow chamber, was approximately 40 dB greater than airborne sound transmitted from the same distance–.the best way to transmit signals into the burrow chamber is via low-frequency, seismic vibrations.

Underwater explosions have been shown to damage the hearing of nearby marine mammals (Ketten 1993, as cited in Simmonds and Dolman 1999; Ketten 1995, as cited in Richardson and Würsig 1997; Richardson *et a*l. 1995, as cited in Richardson and Würsig 1997). Richardson and Würsig (1997: 200) state, “some other strong man-made sounds like sonar or seismic pulses might also cause temporary or permanent threshold shifts” in hearing sensitivity. If seismic activities damaged Utah prairie dog hearing, prairie dogs would become more vulnerable to predation. It also possible that seismic sounds could wake hibernating Utah prairie dogs at great energy expense, or that seismic sounds could increase prairie dog stress levels. Simmonds and Dolman (1999) reviewed studies that documented changes in cetacean behavior in conjunction with seismic noise (Bowles *et a*l. 1994; Mate *et a*l. 1994; Stone 1997, 1998; Dolman and Simmonds 1998; McCauley *et a*l. 1998; Swift 1998; Würsig and Evans 1998). To our knowledge, only two studies evaluating the effects of seismic exploration on prairie dogs have been conducted.

Menkens and Anderson (1985) studied the effects of vibroseis on one white-tailed prairie dog colony near Laramie. Their study involved one vibroseis truck making one pass through the colony on one day in May. The colony vegetation was dominated “by graminoids (mostly *Agropyron smithii* and *Bouteloua gracili*s) with two species of subshrubs *(Artemisia frigida* and *Euristia* spp) and a shrub *(Chrysothamnus* spp.) being of lesser importance” (p. 3). The authors concluded, “vibroseis did not have any impact on any aspect of prairie dog ecology or populations [sic] dynamic that we examined” (p. i). However, this conclusion is undermined by their own reported results (discussed below). Moreover, they acknowledged the extremely limited nature of the study. When asked about this research, Anderson himself stated, “we didn’t do much of a study there” (personal communication, 2002) and said that examining the effects of seismic exploration on prairie dogs would make an interesting study today. Nevertheless, changes to prairie dog habitat and population numbers were detected during this study.

Menkens and Anderson (1985) noted changes to vegetation after vibroseis was completed:

> Vegetation structure was affected, but to different degrees, on the stomped sites and the tire tracks. Immediately post-impact the vegetation in both of these areas was flattened and remained so for the rest of the year. In 1985 the vegetation in the impacted areas had recovered to the point where it was difficult to distinguish between stomped and unstomped areas. The vegetation in the tire tracks however had still not recovered its stature. An area that was driven across at approximately the same time in 1983 that the impact occurred in 1984, still showed the effect of this disturbance in 1985, suggesting that the flattening and crushing of the vegetation on the seismic line tire tracks may be long lasting. (p. 10).

Prairie dogs are adapted to using vegetation to hide from predators. After one pass of one vibroseis truck, vegetation remained flattened for one year. There is potential for this impact to lead to increased predation of prairie dogs, and this study did show population declines in both pups and adults of over 50% during the year that vibroseis was conducted. This study was conducted in a graminoid-dominated area rather than a shrub-dominated area, where impacts would be expected to be even greater because woody plants are less flexible than graminoids. Shrub growth is slow, and recovery often takes decades (Harniss and Murray 1973; Pendleton *et a*l. 1995; Belnap 2002). However, even in this area, impacts from tire tracks were considered “long lasting”. Only one truck was used in this study, but multiple vibroseis trucks are often used in seismic exploration (Evans 1997; Tempest Williams 2002). In this study, only one pass of the colony was made, while in reality, seismic exploration lines often must be placed as close as 25 m from one another (Evans 1997). Vibroseis trucks are also accompanied by other vehicles when used in real seismic exploration, including recording trucks and vehicles that lay geophone lines (Evans 1997).

Soil compaction index within the tire tracks was significantly higher than in stomped areas and random points, and remained so at the end of the study 14 months later. Menkens and Anderson (1985) noted, “Unaided compaction relief (i.e., no tilling or plowing) is a slow process (Voorhees *et a*l. 1978), thus the initial differences were maintained throughout the sample periods” (p. 8). The authors qualified this by stating, “Unless the number of tracks or passes is extraordinarily high, and since prairie dogs in the region are known to have burrowed through hard clay horizons (Clark 1971), we doubt that vibroseis will compact the soil to the point where prairie dogs cannot burrow through the compacted region” (p. 9).

Even if prairie dogs are still able to dig burrows, this does not address how soil compaction will affect prairie dog habitat. Soil compaction

> results in a cascade of adverse environmental impacts including increased erosion, increased runoff, increased soil surface strength, reduced plant production, inhibition of seed germination, impairment of root penetration and growth, alteration in plant succession, reduced soil permeability to air and water, reduced soil moisture, reduction in soil depth and organic matter, reduction of groundwater recharge, alteration of hydrological flows, reduced nutrient cycling, increase in heat conductivity and a decrease in heat capacity of soil, and augmentation of colonization by exotic species (Iverson *et a*l. 1981, Wilshire and Nakata 1976, Sheridan 1979, Manning 1979, Wilshire *et a*l. 1977, Mortenson 1989, Peters 1972, Veihmeyer and Hendrickson 1948, Buckman and Brady 1969, Shul’gin 1965, Berry 1980, Griggs and Wash 1981, Stebbins 1974a, Eckert *et a*l. 1979, Liddle and Moore 1974, Liddle 1975, Liddle and Grieg-Smith 1975, Brown *et a*l. 1977, Weaver and Dale 1978, Kuss 1986, Hall and Kuss 1989, Kuss and Hall 1991, Leung and Marion 1996). These impacts are both short and long term (Schubert & Associates 1999, pp. 32-33).

Although Menkens and Anderson did not observe signs indicating that burrows had collapsed after vibroseis, they cautioned (1985: 7):

> These results however may be highly site dependent, and thus generalizations may not be appropriate. Soil characteristics (e.g., texture, water holding capacities) of prairie dog towns are highly variable throughout the Laramie Basin as well as throughout the state (Menkens pers. obs.). These soil characteristics, as well as characteristics of the soil profile (e.g., presence of hardpan) all may influence whether or not a burrow collapses.

The area where seismic exploration was conducted showed population declines of 50% during the year that vibroseis was conducted (Menkens and Anderson 1985). In 1983, before vibroseis operations were conducted, 106 white-tailed prairie dog adults and 84 pups were counted on the study colony. Vibroseis was conducted in May of 1984. Trapping in June and August of that year yielded a total of 52 adults and 55 pups. Trapping the following year yielded 40 adults and 63 pups. The number of adults in the population thus declined by 51% and number of pups declined by 39% in the year that vibroseis was conducted. The number of adults in the population continued to decline by 23% between 1984 and 1985. Litter size and fecundity also declined over the course of the study. In 1983, litter size averaged 3.11 pups. In 1984, this declined to 2.18, and the average was 1.64 in 1985. Fecundity, as measured by the number of female pups per breeding female, declined from 1.49 (1983) to 1.23 (1984) to 1.18 (1985).

Because this study was so limited, the authors were unable to explain the causes of the observed population decline. They stated:

> Brattstrom and Bondello (1983) have observed relatively long-term changes in the behavior of *Dipodomys deserti* after disturbance by off-road vehicles. If behavioral changes *(e.g.*, maternal attentive behavior, lactation behavior) occurred in the prairie dogs on the Nunn town after impact, a decline in population size is possible. These effects are extremely difficult to examine in the field, so we do not know how important this factor may have been in contributing to the decline. (Menkens and Anderson 1985: 12)

However, they went on to dismiss vibroseis activity as the causal factor for the observed decline, even though the data were not sufficient to draw such a conclusion:

> While the above factors may have contributed to the population decline observed in the Nunn town, we feel that their contribution was probably very small, particularly since towns that were not impacted showed an equal amount of fluctuation in total population size–.We conclude from

> our data, that if vibroseis does impact prairie dog populations, this impact is negligible when compared to the degree of population fluctuations exhibited under undisturbed conditions. (Menkens and Anderson 1985: 12-13)

The authors therefore concluded that activities associated with seismic exploration were not connected with observed population declines because their two control colonies also experienced population fluctuation during this time period. It is important to note, however, that the population trends on the two control colonies were similar, and were very different from those observed on the Nunn colony. In the control colonies, adult population size remained stable to increasing throughout the study. In both of these towns, pup population size increased in 1984 and then returned to near-1983 levels in 1985. This pattern is in contrast to that of the Nunn colony, where both adult and pup populations declined between 1983 and 1984. Between 1984 and 1985, the number of adults continued to decline at the Nunn colony, while the number of pups stabilized. Therefore, it seems that the statement in the abstract, "Our results indicate that vibroseis did not have any impact on any aspect of prairie dog ecology or populations [sic] dynamics that we examined. We conclude that the white-tailed prairie dog population studied was not adversely affected by vibroseis" (Menkens and Anderson 1985: i) is not substantiated by the data collected, limited though it was. The colony where seismic exploration was conducted experienced dramatic declines in number of adults, while adult populations remained stable through the study period at the two control colonies. Thus it appears arbitrary to assume that seismic exploration did not contribute to observed declines on the treated colony; rather, the observed and documented declines contradict this conclusion.

Many of these impacts of seismic exploration were observed in an earlier study involving Utah prairie dogs. However, these authors took a much more cautious approach to interpreting the potential effects of seismic exploration on prairie dogs. This study involved three burrows on one Utah prairie dog colony (Young and Sawyer 1981). Again, only one truck was used for tests on prairie dog burrows and vibroseis was only conducted on one day. Results were similar in that no evidence of collapsed burrows was observed, but the authors stated, “We noticed that the vibrators crushed the vegetation, primarily shrubs, and compacted the soil along the seismic line in a swath which was about seven feet wide. Resprouting by shrubs will probably be slow” Young and Sawyer 1981: 2).

Young and Sawyer (1981) expressed concerns that seismic exploration might interrupt Utah prairie dog hibernation. They wrote (1981: 2):

> we do not know what impact there is on the prairie dog. The tests were conducted in mid-September, near the beginning of the prairie dog’s torpor cycle. It is possible that the shaking could disrupt this event. Shaking for one day probably wouldn’t affect the dog, but if seismic operations continue for several days in the same area, there could be a negative impact. Several interruptions during hibernation would cause a large energy demand on the prairie dog (Crocker-Bedford, Personal Communication). Prairie dog habitat on the Parker Mountain is marginal and the nutritional well being of the animals prior to torpor may not be sufficient to sustain survival over winter, if there are frequent interruptions (Crocker-Bedford, Personal Communication).

Utah prairie dogs are already observed to have high winter mortality rates (USFWS 1991). Reynolds *et a*l. (1986) found that denning grizzly bears as far as 1.6 km (1 mi.) from winter seismic exploration activity showed signs of movement within the den on days that seismic shot holes were drilled and on days when seismic shots were detonated.

Young and Sawyer (1981: 2) made the following recommendations regarding seismic exploration in Utah prairie dog habitat:

> 1. Seismic vibrators should not be allowed to operate within 50 feet of active burrows.
> 2. Work around the burrows should be prevented when the young are first above ground, from May 1 to June 15. This is a critical feeding time for the dogs (Crocker-Bedford, Personal Communication). Also, during the summer, work

should be suspended just before evenings when operating near prairie dog colonies.
3. Areas with a high density of burrows should be completely avoided. In areas of low density, work should be completed in one day.
4. Study sites should be set up to monitor vegetation rehabilitation along the seismic line. We recommend establishing photopoints and vegetation trend sites on selected lines.
5. Certain seismic routes should be blocked off to prevent the establishment of a permanent road.

Even if these recommendations are being employed for Utah prairie dogs, they are inadequate. It is likely that 50 feet would be much too narrow of a buffer to protect active UPD colonies from the impacts of seismic exploration.

Obviously these two studies do not provide adequate information to assess the myriad possible impacts of seismic exploration. The effects on prairie dog hearing, hibernation, and reproductive rates are not yet understood, yet seismic exploration is occurring in some portions of the UPD's range.

In addition to the impacts of oil and gas exploration, activities relating to oil extraction, including the roads and other infrastructure needed for oil and gas extraction are additional threats to UPDs, resulting in the loss and degradation of their habitat.

Nor are these esoteric concerns, given the oil and gas leases are being offered within the range of the UPD. In November 2002, the Richfield Field Office of the BLM offered for oil and gas leases an area in Sevier County and a categorical exclusion under NEPA was in preparation as of October 24, 2002 (NEPA #J-O50-03-004CX). In fact, multiple sites in Millard and Sevier Counties are being offered for oil and gas leases.[30] Both counties are within the UPD's range.

Other minerals extraction activity may also be harming UPD potential habitat. In May 2002, the Grand Staircase Escalante National Monument Office of the BLM signed a categorical exclusion for shalestone excavation in Garfield County near Bryce Canyon National Park, well within the UPD's range (NEPA #UT-303-02-016). Also in May 2002, a categorical exclusion was being prepared for the extraction of 210 tons of flagstone on four acres in Beaver County (NEPA #UT-042-02-03). In addition, in January 2002, the Cedar City Field Office of the BLM offered up for geothermal leasing parcels in Beaver County parcels located in Township 30, Range 12 (NEPA #UT-042-02-09), very close to UPD populations in Township 31, Range 10 & 11.

Habitat conditions on public lands

Due to a combination of the above causes, on federal lands, UPD declines continue. This was demonstrated in the Current Population section above. Federal agencies have discussed reasons for these downward trends. For example, in its 1999 Annual Report, the BLM described declines in the west portion of the West Pasture within the Minersville #3 complex (C122) and asserted that this decline "is likely due to habitat conditions" (BLM 2000: 4). In its 2000/2001 Annual Report, the BLM found that the complex had continued to experience an increase in big sagebrush and a decline in UPDs. Although vegetation manipulation was conducted, there are still insufficient warm season grasses on the site and seeded areas experienced little growth in 2000 (BLM 2002: 6). This is cause for concern, given that, as of the 2002 census count, the population within this one complex comprised some 37% of all UPDs on federal lands in the West Desert Recovery Area (See Exhibit 3: Census Data by Site and Exhibit 1: Census Data by Recovery Area). This important complex plummeted from 579 UPDs counted in 2000 to only 235 UPDs reported in 2002 (See Exhibit 3: Census Data by Site).

The Minersville #3 complex's population declines demonstrate the most significant weakness of the UPD recovery program: there are only a handful of UPD complexes of substantial size remaining on federal lands, and even these can experience population crashes. As

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[30]See http://www.ut.blm.gov/ENBBTEMP/Oct18-02/USO Oil & Gas FEB PRELIM 03.rtf, visited 2 February 2003.

is demonstrated below in the Translocation section, poor habitat conditions continued to frustrate the success of translocation efforts to public lands. Without protection for UPDs on private lands, this creates a precarious situation, which thrusts the Utah prairie dog closer to the spectre of extinction.

Impacts of Isolation and Fragmentation

After over a century of loss and degradation of UPD habitat, and the effects of extermination campaigns and plague, remaining prairie dog colonies tend to be isolated and fragmented. The effects of habitat fragmentation and the resulting small, isolated prairie dog populations even among the more widely distributed black-tailed prairie dog, consequently making them more susceptible to local extirpation by factors such as sylvatic plague (Miller et al. 1994; 1996; Mulhern and Knowles 1995; Wuerthner 1997).

This threat was discussed for black-tailed prairie dogs by Miller et al. (1994):

> As a result of the poisoning programs, the few remaining prairie dog colonies are smaller and more isolated. These fragmented colonies are more susceptible to extirpation, particularly by sylvatic plague (Yersinia pestis). Yet some individuals argue that prairie dog populations are safe because prairie dogs can still be found throughout a geographical region between Canada and Mexico. That analysis masks the severity of habitat fragmentation.

With the Utah prairie dog’s much narrower geographic range, fragmentation and isolation of UPD habitat brings even greater risks to Utah prairie dog survival.

There is a substantial body of literature on the risks that small, isolated and fragmented populations face for a wide variety of reasons (Gilpin and Soulé 1986; Lande 1987), including environmental and demographic stochasticity (Caswell 1989; Goodman 1987; Mode and Jacobson 1987; Lande 1993), Allee effects (Allee et al. 1949), extinction due to demographic fluctuation, environmental stochasticity, inbreeding and random drifts in gene frequencies

(Charlesworth and Charlesworth 1987, Soule 1987), and less chance for recolonization after a population is extirpated.

Brussard and Gilpin (1989) and Miller et al. (1996) note the critical role played by stochastic processes in the survival of small populations. There are three types of these processes:

(l) populational or demographic uncertainty,
(2) environmental uncertainty, and
(3) genetic uncertainty (Brussard and Gilpin 1989: 37).

The first type of stochastic process, demographic factors, comprises the following:

- random variation in sex ratios,
- age of first reproduction,
- number of offspring,
- distribution of offspring over the lifetime of an individual, and
- age at death (1989, 37).

Hoogland's (2001) finding that UPDs reproduce slowly, as a result of delayed reproduction, production of only one litter per year, and relatively small average size of litters, indicates that UPD fecundity is naturally relatively low. Populations that are already small may decline further if sex ratios fluctuate and mates are not available. These kinds of small shifts in population dynamics may eventually extirpate small colonies.

The second type of stochastic process, uncertain environmental factors, involves, for prairie dogs, the presence or absence of pandemic diseases, fire, drought, and flooding. The most ominous environmental factor for prairie dogs is the sylvatic plague, to which prairie dogs have almost no natural immunity (Barnes 1993; Cully 1993).

The third type of stochastic process, genetic uncertainty, includes a reduction of variation through genetic drift and inbreeding (Brussard and Gilpin 1989). In an analysis of population reduction and genetic variability in black-tailed prairie dogs, Daley (1992: 219) concluded that:

> In cases of more severe colony isolation, the effects of population control would probably be more noticeable, because genetic variability lost during bottlenecks would be less likely to be replaced through immigration.

Specifying the conditions for such immigration, Daley suggested that successful immigration is probably impacted by dynamics such as the distance between colonies and fluctuations in population density. Isolation would therefore inhibit successful immigration and would consequently have negative ramifications on genetic variability. This finding coincides with observations on habitat fragmentation. Two consequences of fragmentation reported by Wilcox and Murphy (1985) are 1) the loss of sources of immigration; and 2) the obstruction of recolonization and genetic exchange.

In addition, Hoogland (1982) finds that black-tailed prairie dogs avoid extreme inbreeding through several mechanisms: 1) young males leave their natal coterie before breeding, while females remain; 2) adult males leave their breeding coteries before their daughters mature; 3) young females are less likely to come into estrus with their fathers present in the coterie; and 4) estrous females avoid mating with their fathers, sons, or brothers.

These mechanisms, however, can be distilled down to two dynamics: male dispersal and female avoidance. The first of these dynamics underscores the importance of unfettered migration by prairie dogs to ensure genetic variability. With hindered dispersal of males, a sophisticated scheme for avoiding extreme inbreeding may be destroyed. This importance of male migration to prevent inbreeding has been reported elsewhere (Foltz and Hoogland 1983). In terms of the second dynamic, female avoidance, Hoogland states:

> Even when individuals avoid mating with close genetic relatives such as parents, offspring, and siblings, inbreeding coefficients can be high if populations are small and isolated...(1982:1641).

It is therefore clear that small, isolated prairie dog populations are more vulnerable to inbreeding.

The dynamics involved in these stochastic factors indicate that the surest route for maintaining viability of small populations is to encourage these populations to increase in size or increase connectivity so that small populations interact and form a metapopulation. In addition, any UPD complexes with relatively large populations should be protected, whether on private or public land.

In yet another way, prairie dog viability depends on naturally occurring sizes of prairie dog colonies and complexes. Prairie dogs are a colonial species, and one of the benefits of increased colony size is less time devoted to predator detection. Hoogland (1979) traced the relationship between prairie dog alertness and colony size, and found that relationship to be a negative one, with prairie dogs in larger colonies able to spend a smaller portion of their time on predator detection. Spending less time being on the alert for predators leaves more time for activities such as feeding and breeding. Alternatively, the very small sizes of UPD colonies at present impose more constraints on prairie dog activity.

The fragmentation and loss of prairie dog habitat described above also affects those species associated with prairie dog colonies. As discussed above, the Utah prairie dog, like other prairie dogs, is a keystone species. Its continued decline therefore has ecosystemic repercussions. Its upgrade to Endangered status would therefore bring collateral protections to other native species.

It is therefore clear that the impact of isolation and fragmentation, resultant from prairie dog habitat destruction and eradication programs, represents a biological threat to the biological integrity of the prairie dog and the ecosystem this species supports. An adequate manner in which to counteract this threat is to upgrade the UPD’s status to Endangered.

2. Overuse of habitat for commercial, recreational, scientific, or educational purposes.

Prairie dog shooting

There are indications that illegal shooting of UPDs still occurs. There was visible evidence of shooting in East Creek (C218) within the Paunsaugunt Recovery Area in the early 1990s (John Hoogland, pers. comm. February 11, 2002). On the Minersville #3 complex, which is located on BLM land within the West Desert Recovery Area, BLM stated in its Annual Report for 1999, "Illegal shooting continues to occur, but take levels are unknown" (BLM 2000: 4). Within the Dixie National Forest, on the Johnson Bench and Tom Best areas, the USFS acknowledges that there is a potential for forest users to shoot UPDs from roadsides, stating that "Increased road and trail use by forest users increases the potential of prairie dogs being run over and shot by individuals traveling these roads" (USFS 1997 MOU: 6, 8). More recently, USFS stated that illegal shooting continues to occur in the East Creek area (Noriega 2000).

The biological impacts of shooting on several species of prairie dogs have been researched. Shooting harms prairie dogs through population reduction and alteration of behavior. First, shooting reduces prairie dog populations and population densities. In the National Wildlife Federation's petition to list the black-tailed prairie dog under the ESA, that organization provided the following data, obtained from the U.S. Forest Service (National Wildlife Federation 1998), "…the Forest Service reported that in 1998, shooters on a 12,000 acre portion of the Conata Basin in South Dakota shot 162,000 prairie dogs out of an estimated population of 216,000 animals."

FWS also acknowledged the threat of shooting to prairie dogs in a letter to the Forest Supervisor for the Buffalo Gap National Grassland. FWS recognized that shooting was a significant threat to prairie dogs based on the observation that prairie dog shooting significantly reduces black-tailed prairie dog populations and population densities. FWS stated, “We understand that differences in prairie dog density between protected areas and areas open to shooting are significant (approximately 18 versus 8 prairie dogs per acre, respectively)…” (USFWS 7/15/98 correspondence to USDA Forest Service). Similarly, FWS has advocated for the closure to shooting of BLM lands administered in the Malta, MT Field Office, on account of that activity’s reduction of prairie dog populations, and the consequent threat to black-footed ferret restoration projects (USFWS Memo dated 3/11/98 from FWS to BLM Malta, MT Field Office).

Second, shooting alters prairie dog behavior. For instance, Irby and Vosburgh (1994) found that even light shooting has a significant effect on prairie dog behavior, with 42% of prairie dogs retreating to the burrows on a lightly shot colony, contrasted with a 22% retreat rate on unshot colonies, and 55% retreat rate on heavily shot colonies. Further, Irby and Vosburgh (1994) found that prairie dog shooters prefer higher densities of prairie dogs. This causes shooters to spread the pressure of their activity depending on population density. Consequently, shooters may cause uniformity in prairie dog populations across colonies. Biologically, such uniformity is destabilizing to prairie dog populations.

Studies also report that shooting may decrease colony expansion rates (Miller et al. 1993; Reading et al. 1989). One study revealed that a colony in Montana had a 15% annual expansion rate when prairie dogs were not hunted, contrasted with a 3% expansion rate when they were (Miller et al. 1993). This dramatic decrease in rates of expansion represents decreased migration, which constitutes human interference with an integral population dynamic in prairie dogs: prairie dog dispersal.

Even without shooting pressure, there is a low survival rate of dispersing males (Garrett and Franklin 1981). In addition, prairie dog dispersal takes place in late spring (Knowles 1985; Garrett and Franklin 1981), which is one of the most popular times of the year for recreational prairie dog shooting. The negative impacts of shooting on prairie dog migration may therefore be considerable.

In addition, the threat that shooting poses extends to prairie dog associated species. For example, prairie dog shooting causes a reduction in the prey base. This may affect a broad range of avian and mammalian predators that prey on prairie dogs. The danger here is apparent:

> Viable populations of associated species cannot be expected at low prairie dog densities. Based on our observations of other prairie dog complexes in Montana, prairie dog complexes need to be broadly distributed and with relatively high occupancy to assure minimal viable populations of associated species (Knowles and Knowles 1994).

Low population densities result from shooting and will therefore work to the detriment of mammalian and avian prairie dog predators. In addition, there is no evidence to suggest that prairie dog shoots do not result in the harming or killing of non-target species, such as the burrowing owl, ferruginous hawk, and mountain plover. To the contrary, first-hand accounts indicate that these shoots do result in the harming and killing of a variety of wildlife species other than prairie dogs (on file with Forest Guardians).

Shooting impacts may be unpredictable and colony-specific. Knowles and Vosburgh (2001: 7) compared black-tailed prairie dog shooting studies conducted in Montana, and concluded, “Shooting can impact prairie dog populations and …it is just a matter of the number of hours of shooting effort expended on a colony in relation to the size of the colony that determines the level of impact.”

Individual shooters can seriously impact prairie dog colonies. Randall (1976) chronicled the activity of three individual shooters who traveled from Minnesota to shoot white-tailed prairie dogs in Wyoming. In one week they concentrated on seven towns and tallied 1023 kills. This was in 1976, and prairie dog shooters are much better equipped today. Jerry Godbey of the U.S. Geological Survey Biological Resources Discipline reported that when he surveyed white-tailed prairie dog towns in Colorado, Utah, and Wyoming in 1997-1998, he found spent shells or dead prairie dogs at “virtually every site” (Jerry Godbey, USGS, personal communication to Erin Robertson, 3 August 2001). Mr. Godbey said that he met one shooter near Delta, Colorado with three rifles who said that he shot white-tailed prairie dogs at least four times a week. This shooter estimated that he used 10,000 rounds per year, with an estimated 95% kill rate. Those figures translate to take of 9500 prairie dogs annually by a single person. Keffer et al. (2000) found that after they shot 22% of the black-tailed prairie dogs on one colony as part of a controlled shooting study, 69% (212 individuals) of the remaining prairie dogs left the colony.

In addition, there is growing concern about the effects that spent shells may have on prairie dog predators. A preliminary study on the effects of prairie dog shooting on raptors (Wyoming Cooperative Fish and Wildlife Research Unit 2001) showed that black-tailed prairie dog towns on Thunder Basin National Grassland that were shot were visited by raptors an average of 2.42 times per hour, while towns that were not shot were visited an average of 0.5 times per hour. Blood samples taken from burrowing owls on a town where shooting occurred showed elevated lead levels. Knowles and Vosburgh (2001: 15-16) also raise this issue:

> Fragments of lead ingested by raptors when scavenging shot prairie dog carcasses have the potential to kill or severely disable raptors. Burrowing owls are reported to scavenge poisoned prairie dogs (Butts 1973) and would also be expected to feed on prairie dogs killed by recreational shooting. Ferruginous hawks and golden eagles are 2 other raptors known to scavenge on dead prairie dogs. Shooting in some areas has been sufficiently intense during the past decade to

> literally put millions of pieces of lead on the ground. It is unknown if passerine birds are picking up pieces of this toxic heavy metal. Mortalities in morning [sic] doves have been noted with ingestion of only 2 lead pellets. Ingestion of lead is a known significant problem for birds (Lewis and Ledger 1968 and Wiemyer *et al*. 1988).

While the above studies pertain to white-tailed and black-tailed prairie dogs, neither of which is listed under the ESA, illegal UPD shooting still occurs. In addition, as will be discussed in detail below, permitted shooting also occurs. Whether illegal or permitted, shooting UPDs ushers in the various biological impacts – reduced populations and population densities, altered behavior, hindered migration or potential exodus, and lead poisoning – on Utah prairie dogs and associated wildlife.

3. Disease

<u>Sylvatic plague</u>.

What has later come to be known as sylvatic plague (<u>Yersinia pestis</u>) was first recorded from two sailors on a Japanese ship in San Francisco in 1899 (Cully 1993; Fitzgerald 1993). The "plague" was first reported in western states in 1936 (Fitzgerald 1993) and it was recorded in the range of the UPD that same year when a boy contracted plague from a squirrel (NEPA #UT-044-2001-18).

Given their almost total lack of a natural immunity to sylvatic plague, with mortality rates placed at 99-100% (Barnes 1993; Fitzgerald 1993), prairie dogs cannot carry plague, as they typically die within several days after contact with this bacterium. Fleas and other small mammals (including domesticated companion animals) are the usual carriers of the plague.

That plague is a threat to prairie dogs is clear, given their lack of a natural immunity to the bacterium. The danger that sylvatic plague poses is underscored by its cyclical nature. According to researchers, plague does not disappear. Rather, it "remains enzootic until prairie dog numbers are sufficient to support another epizootic" (Cully 1989; Knowles 1995). Recovery from plague is a slow process, as has been witnessed on the Rocky Mountain Arsenal in Colorado. At the Arsenal, black-tailed prairie dog population levels were at only 40% four years after a plague epidemic (See Knowles 1995: 41).

Plague was suspected of eradicating several colonies in the Cedar-Parowan Valley in 1983 and 1990 (USFWS 1991; McDonald 1993) and continues to be cited as a threat to prairie dog colonies throughout the UPD's range (McDonald 1996; Bonzo and Day 2000).

USFS links recent declines in UPDs to plague. According to a Dixie National Forest Biological Assessment, "Annual counts began in 1978 and have indicated a relatively upward trend until the past several years when the recovery areas experienced a heavy die-off which is believed to be related to disease within the populations."[31] In addition, plague was responsible for population declines at Ruby's Inn (C209) and East Creek (C218) (McDonald 1996), both located on the Dixie National Forest.

Plague has been documented on BLM lands in the West Desert and Paunsaugunt Recovery Areas. In 1999, the disease was verified in the Buckskin complex (C110) and reduced the population count from 95 UPDs censused in spring 1999 to 3 counted in June 1999 (Bonzo and Day 2000). Plague had been suspected in an earlier population crash occurring in 1994-1995 (McDonald 1996) and of decimating Minersville #3 in 1991 (McDonald 1993).

Plague has also been documented on National Park Service land. For instance, it struck a UPD population in Bryce Canyon National Park in 1983 (Coffeen and Pederson 1993), and again in 1998 and 2001 (John Hoogland, pers. comm., February 11, 2002).

Federal agencies are beginning to address the threat of plague. The U.S. Geological Survey (USGS) has undertaken a study of plague in UPD habitats on BLM land, the Dixie and

Fishlake National Forests, National Park Service and SITLA lands, scheduled to run from 2001-2007. This study may directly mitigate the impact of plague on UPDs via use of insecticide and may also provide scientific findings that would presumably guide future policy regarding plague and UPDs. The study will involve the treatment of portions of 10 UPD complexes with DeltaDust® two or three times per year, leaving portions of these complexes, and the remaining approximately 52 complexes, untreated with insecticide (See Environmental Assesment for project #UT-044-2001-18).

It is not even clear if UPDs will recover, given the threat of plague alone. Any additional limitations on UPDs – e.g., the permitted and unpermitted loss and degradation of habitat, shooting, and poisoning – intersect with plague to present a tremendous cumulative set of threats against this already beleaguered and geographically-restricted species. Given the difficulty of controlling the impact of plague on UPDs, it is imperative that all other anthropogenic threats against this species be removed. An upgrade to Endangered status would provide more leverage for eliminating anthropogenic threats in the face of plague.

4. Inadequacy of Existing Regulatory Mechanisms.

Although the UPD is currently listed as a Threatened species under the ESA, the species does not enjoy regulatory mechanisms adequate to ensure its survival or recovery. In particular, the special rules promulgated by FWS under Section 4(d) of the ESA in 1984 and 1991, habitat conservation plans, and a faulty recovery plan all imperil the persistence of the UPD.

Downlisting

The Utah prairie dog was listed under the Endangered Species Conservation Act of 1969 on June 4, 1973 (38 Federal Register 14678). The species was a charter member on the Endangered Species Act of 1973's Endangered List (50 C.F.R. § 17.11). In response to a petition

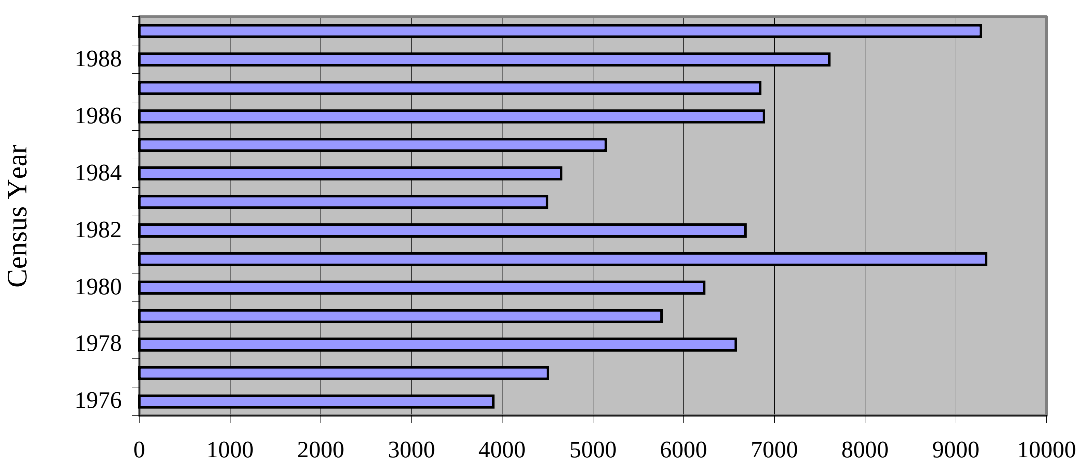
[31]See USFS Biological Assessment of Utah Prairie Dog Habitat Improvement Projects. Dated 2/27/96.

filed by the Utah Division of Wildlife Resources in 1979, requesting delisting of the UPD, FWS downlisted the species to Threatened status in 1984 (49 Federal Register 22330 (May 29, 1984)).

The downlisting action was justified on the basis that population numbers had increased since 1972 and that the area occupied by the UPD in 1984 comprised an estimated 456,000 acres (although FWS acknowledged the area occupied by UPDs was less than this amount). However, a review of census counts indicates that in the years prior to the downlisting, there was evidence of a downward trend.

As mentioned in the Current Population Status section, above, the modified census count for 1983 was the second lowest census count taken since the counts began in 1976. It was lower than the 1977 count, and was only 68.3% of the count taken in 1978, and 78% of the number of UPDs counted in 1979, the year the UDWR filed a petition with FWS to delist the Utah prairie dog (Figure 12).

Figure 12. Modified Census Data, 1976-1989. Source: Exhibit 1: Census Data by Recovery Area; ratio of census counts to population derived from McDonald 1993.



	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Modified Census	3900	4504	6576	5758	6224	9332	6680	4493	4650	5141	6885	6843	7606	9278

Census Count

As is clear from Figure 12, there was little basis for UDWR to ask for the UPD's delisting and little basis for FWS to at least partially grant the UDWR's request by downgrading the UPD's protected status. Before the UDWR filed its petition, there were only four years of census counts (including 1979, as UDWR filed its petition in November and census counts are conducted in the spring). While there were increases from 1976-1778, in 1979, there was a decrease in the total population of some 12.5%. The UDWR should never have filed a petition to downlist a species with an estimated total population of only 5,758 animals as of 1979, and with a mean total population of only 5,184.5 individuals from 1976-1979 (Figure 12).

Moreover, subsequent to UDWR's filing of the delisting petition, the data do not support FWS's decision to downlist the species. While the total population increased from 1979-1981, it subsequently declined from 1981-1983 and remained at a low level by the time FWS published its downlisting rule (Figure 12). If FWS had considered solely biological reasons in making the listing determination, as mandated by the ESA, the abysmally low population estimate for 1983 should have stopped the agency from altering the UPD's Endangered status.

The downlisting decision continues to play a role in the UPD's status. Census counts remain at levels approximating those found before downlisting. As of Spring 2001, census counts are not much higher, and are in some years lower, than the census counts before the downlisting (See Exhibit 1: Census Data by Recovery Area). In its 1997 and 1998 annual reports, UDWR acknowledged this lack of progress, stating that recovery by the year 2000 was unachievable and that,

> Counts remain at levels well below recovery goals and are not much higher than counts in 1984 when they were upgraded from endangered to threatened (O'Neill et al. 1998:22; 1999: 25).

In fact, 2001 total population counts were lower than 1983 and 1984 counts in the Paunsaugunt and Awapa Plateau Recovery Areas (See Exhibit 1: Census Data by Recovery Area). Even more alarmingly, 2001 population counts were exceeded by 1976 counts on Paunsaugunt private lands and the total count for that recovery area; and 2001 counts were exceed by 1977 counts on Awapa Plateau private and federal lands and the total count for that recovery area (See Exhibit 1: Census Data by Recovery Area).

In reality, it appears that FWS originally downlisted the UPD in 1984 for political reasons rather than as a result of the UPD moving closer to recovery. As petitioners have demonstrated, there was inadequate trend data to substantiate the downlisting rule. Moreover, FWS explicitly states in the downlisting final rule that a Threatened listing would provide more "flexibility" for land managers to participate in the translocation program "since threatened species are not as stringently protected as endangered species" (49 Federal Register 22332 (May 29, 1984)). This is a political, not a biological consideration, yet it was considered in the course of a listing decision, in contravention to the ESA's requirement that listing decisions be made "solely on the basis of the best scientific and commercial data available" (16 U.S.C. § 1533(b)(1)(A)).

In addition, the Special 4(d) rule included in the 1984 downlisting rule provided for take of UPDs in the Cedar-Parowan Valleys despite a lack of scientific support to validate this take provision. An even more permissive 4(d) rule, translocation, and habitat conservation plans have subsequently become the primary means of managing UPDs and as a result, actual UPD recovery is faltering, and prairie dog survival is at stake.

Special 4(d) Rules

According to the terms of the ESA, the downlisting of the Utah prairie dog enables regulated take of the species. The Secretary of Interior does not have the discretion to permit take of an Endangered species. Rather, Endangered species automatically receive full protections against take under the statute's Section 9 (16 U.S.C. § 1538(a)(1)). Alternatively, under the ESA's Section 4, the Secretary can permit the take of a Threatened species or can choose to provide such species with full Section 9 protections (16 U.S.C. § 1533(d)).

When the UPD was downlisted to Threatened, a special Section 4(d) rule was promulgated, allowing the take of 5,000 Utah prairie dogs annually between June 1 and December 31 in the Cedar and Parowan Valleys in Utah. This take was to be administered under a permit system developed by the Utah Division of Wildlife Resources (49 Fed. Reg. 22330-22334 (May 29, 1984)). The justification for taking prairie dogs was that UPD populations in the Cedar and Parowan Valleys were exceeding the carrying capacity of available habitat and thus making the populations more vulnerable to plague epizootics. Moreover, population increases were conflicting with agricultural interests, which would potentially lead to illegal take. Take should be permitted, in other words, to avoid take.

Given that the total adult population was estimated at 10,000, FWS assumed that UPDs could tolerate a take of 5,000 individuals per year. This presumption is based on inflated estimates of UPD reproductive rates and the view that human control of UPDs constituted compensatory, not additive, mortality. First, FWS assumed that one-half of the adult population is female and that each female produces an average annual litter of four young. However, as is discussed in the section on the Recovery Plan, there was documentation in the 1970s that litter sizes ranged from 2-4 pups and that FWS was therefore assuming that UPDs always had the maximum size litter.

We currently have an even clearer picture of the low rate of UPD reproduction given Hoogland's (2001) research, as previously described in this petition. While that information was not available to FWS when it developed the UPD's 4(d) rules, this research indicates why, presently, we have substantial information to indicate the 4(d) rules are likely harming UPD survival and recovery, given their inflated estimate of prairie dog reproduction.

FWS also assumes that human shooting and trapping of UPDs constitutes compensatory, rather than additive, mortality. The agency states, "Certainly far more than 5,000 animals die from natural causes in the fall and early winter" (49 Fed. Reg. 22333 (May 29, 1984)). FWS does not consider that human control would add to, rather than replace, these natural mortality factors. Moreover, FWS ascribes a benefit to human control, stating that "The take of 5,000 animals annually (primarily in the spring) should act to reduce natural die off levels in the fall and winter" (49 Fed. Reg. 22333 (May 29, 1984)). This assertion is objectionable for two reasons: 1) FWS provides no support for such a spurious claim; and 2) take was authorized between June 1 and December 31, dates closer to summer, fall, and winter than spring.

In the Special 4(d) final rule, FWS emphasizes the crop damage purportedly caused by UPDs. The agency cites an estimate that prairie dogs cause $1.5 million in crop losses and damage to equipment. The source of this information is Utah State Senator Ivan Matheson. No further evidence or elaboration is provided to substantiate this claim (49 Fed. Reg. 22330 (May 29, 1984)).

The 1984 take regulation was replaced in 1991 with an even more permissive regulation, allowing more take across the species' entire geographic distribution. The 1991 special rule allows for the take of 6,000 Utah prairie dogs annually throughout the species' range. In addition, while the 1984 special rule required quarterly reporting by UDWR to FWS regarding UPD take, the 1991 rule replaced that requirement with annual reports (56 Fed. Reg. 27438-27443 (June 14, 1991)).

Although the 1984 special rule would supposedly prevent illegal take by allowing legal take, the 1991 special rule again asserts that farmers had been provoked into killing UPDs illegally to protect crop agriculture (56 Fed. Reg. 27438, 27440 (June 14, 1991)). It seems that the logic of allowing take to prevent take wasn't working. Nevertheless, FWS raised the allowable take and widened the geographic scope of take to accommodate agricultural interests.

In the 1991 special rule, FWS provides shocking insight into its lack of concern for UPD population trends. The Service describes how there was a decline of 61% in Utah prairie dog numbers on public lands between 1989 and 1990. That means nearly two of three UPDs on public lands disappeared in one year. The agency then claims,

> Though serious, the 1990 decline on public lands should not be considered cause for alarm. The species' high rate of reproduction and its susceptibility to diseases such as plague can cause populations to fluctuate considerably from year to year (56 Fed. Reg. 27439 (June 14, 1991)).

This excerpt is significant for two reasons: 1) the FWS assumes a high rate of reproduction among UPDs; and 2) FWS recognizes the impact of plague on UPD populations, but does not interpret that threat as a reason to limit intentional human control of UPDs and habitat destruction.

First, the Service wildly overestimates UPD reproduction to justify the Special 4(d) rule. FWS calculates that the spring 1989 adult population of 9,200 will balloon to 33,700 UPDs by the summer, which is untenable for a variety of reasons. The Recovery Plan repeats these calculations, and petitioners' analysis and critique of the population estimates is in a subsequent section on the Recovery Plan.

Second, sylvatic plague is an exotic disease to which UPDs are highly vulnerable. The impact of this disease should indeed be "cause for alarm," as it is eliminating Utah prairie dog colonies on private and public lands alike. The potential for other threats - such as translocation, shooting, and habitat destruction - to add to the deleterious impact of plague should be considered cause for eliminating all anthropogenic threats to the species.

FWS, however, fails to consider these issues. This is likely due to the premise within the 1991 Special 4(d) rule that UPDs are economically deleterious. In the 1991 Special 4(d) rule, the Service repeats the still-unsupported claim of the former Utah State Senator Ivan Matheson that first appeared in the 1984 Downlisting final rule, where Matheson maintains that UPDs cause $1.5 million annually in economic damage to cropland. In addition, as in the Recovery Plan, FWS describes a "population explosion" of UPDs as the young-of-the-year emerge and characterizes juvenile UPDs as "nuisance animals" respective to agricultural operations (56 Fed. Reg. 27439 (June 14, 1991)).

The 1991 Special 4(d) rule expands on the notion in the 1984 rule that lethal control of UPDs constitutes compensatory, not additive mortality. FWS states,

> Given the high natural mortality of Utah prairie dogs in the fall and winter, it appeared that allowing controlled take between June 1 and December 31 would address farmers' needs to control nuisance animals without interfering with conservation efforts. In essence, farmers would be allowed to take animals that probably would have perished anyway (56 Fed. Reg. 27439 (June 14, 1991)).

FWS again fails to provide supporting evidence for this claim. The agency cannot show that lethal control of these so-called "nuisance animals" is not exacerbating the impacts of disease, drought, predation, or other natural mortality factors. In other words, FWS cannot show, nor does it attempt to, that the Special 4(d) rule does not constitute additive mortality for this listed species.

In addition, as is discussed in the Illegal Take section, below, unlawful killing of UPDs continues to occur despite highly permissive Special 4(d) rules from the Service. In a biological opinion by FWS on the federal Wildlife Services program (discussed below), the agency stated that, "the damage caused by local concentrations of prairie dogs has provoked farmers in some areas to kill them illegally to protect crops and croplands" (USFWS 1992: 28). This was stated in July 1992, over a year after the most recent, and most permissive, Special 4(d) rule was passed.

Recovery plan

The UPD Recovery Plan itself is contributing to continued declines of the Utah prairie dog. The Plan is flawed in a number of ways – its recovery goal is too low; the emphasis in the Plan is on translocation as a means of recovery; and the Plan neglects conservation of UPDs on private lands, despite the fact that the majority of UPDs are located on private lands. In addition, the Plan's scientific basis is flawed.

First, the recovery plan stipulates that the conditions for delisting will be met when there are 1) three populations on public lands, one in each of the three recovery areas, with minimum spring counts of 813 animals maintained in each population for five consecutive years; and 2) a formal memorandum of understanding between FWS, BLM, NPS, UDWR, and USFS for long-term management of UPD to ensure its protection after delisting (USFWS 1991).

A UDWR report questioned the Recovery Plan's quantitative goal from the perspective that the Plan may be too conservative as many UPD populations are small and isolated from each other. The actual population size needed to maintain a minimum viable population may be substantially larger (five times or more greater) than the effective population size. Seal's (1987) estimate, on which the Recovery Plan's goal is based, that populations of 813 adults were needed to retain 90% of genetic diversity for 200 years appears, appears founded on the assumption that the 813 individuals are connected and therefore interbreeding. UDWR questioned this assumption (McDonald 1993).

Second, translocation, alongside habitat management, is the central component of Utah prairie dog recovery planning. Eight of the ten Priority #1 (the highest priority) tasks delineated in the UPD's Recovery Implementation Schedule pertained to translocation. The only other Priority #1 tasks were census counts and observational monitoring, with no provisions at this level for private land colony protection. In fact, at least seventy times more resources were estimated to be required for capturing and transplanting UPDs as were needed for protecting habitat on private lands.[32]

However, as discussed below, the translocation program has been largely unsuccessful. As petitioners show, degraded habitat and concomitant problems with dispersal, predation, and insufficient forage, is suspected to be the cause of the unsuccessfulness of the translocation program.

Third, the Recovery Plan marginalizes protection of UPDs on private land as a recovery strategy. As indicated above, the thrust of the plan is to translocate UPDs from private land, where they are relatively numerous, to public land, where they are relatively few. As a result, there has been a lengthy and massive translocation program. As petitioners illustrate below, the translocation program has been largely unsuccessful and therefore constitutes a significant threat to the species.

[32]In the Recovery Implementation Schedule, which is Part III, of the UPD's Recovery Plan, the table delineating required tasks specifies that capturing and transplanting UPDs will require 35.0 units of resources, versus 0.5 for protecting habitat on private lands. The table does not specify in what dollar amount (hundreds, thousands, millions) estimates are made.

Fourth, the Plan's scientific basis is flawed. The Plan inflates the estimated reproductive capacity of UPDs. The Plan describes a "population explosion" of Utah prairie dogs when the young of the year appear above ground in the spring. The Plan continues,

> The nuisance prairie dog problem results from the species' high rate of reproduction. Female Utah prairie dogs give birth to an average of 4.8 young in April (Pizzimenti and Collier 1975). Assuming that two-thirds of the adult population is female, and conservatively assuming that each female produces an average litter of 4 young, then the total population would be expected to triple to 33,700 animals in the summer of 1989 throughout its range... (USFWS 1991:14).

While within this excerpt, the Plan assumes that every female bears young, the recovery goal of 813 animals in each of three populations is based on the Captive Breeding Specialist Group's estimation that 90% or more of all females will breed each year and that 70% of adult males breed successfully each year (USFWS 1991: F-5). As is demonstrated below, both are over-estimates when recent scientific findings are considered.

Utilizing the information provided on p. 14 of the Plan, that 1) spring count = 7,377 adults; 2) spring count represents 80% of adult population; 3) females comprise 2/3 of adult population; and 4) assumption of four pup litter size, the math should be as follows:

- Total adult population = 9221.25[33]
- Female adult population = 6147.5[34]
- Total estimated 1989 summer population = 24,590[35]

This resulting estimate of a total of 24,590 UPDs after the young of the year emerge is much lower than the estimate of 33,700 at which FWS inexplicably arrives on p. 14 of the Recovery Plan. Furthermore, the assumptions on which both figures are based are incorrect, given Hoogland's (2001) finding, which was described previously in this petition, of much lower reproductive rates in Utah prairie dogs than previously described in the literature.

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[33](7,377/x = 80/100; x=9221.25).
[34](6,147.5 = 2/3 of 9,221.25).
[35](6,147.5 * 4 = 24,590).

However, even with the state of knowledge when the Recovery Plan was written, FWS clearly overestimated UPD litter sizes. According to the 1987 report from the Captive Breeding Specialist group that was an appendix to the Plan, average litter size of UPDs is 3.5 pups (USFWS 1991). In addition, the Plan cites a 1979 source indicating that litter sizes average 3.4 pups, with litters ranging from 2-4 pups (USFWS 1991: 9). Consequently, the assumption, based on a 1975 publication, that litter sizes average 4 pups is an untenable supposition that prairie dogs are averaging the maximum size litter. It is also an assumption favoring older research above more recent findings at the time the Plan was written.

Adjusting for an average litter size of 3.5 pups, as could have been supported scientifically at the time of the Plan's writing, the estimated total summer population would be 21,516.25.[36] This number is over 36% lower than the Plan's estimated 33,700 total summer population. Furthermore, both estimates are based on the tenuous assumption that every adult female UPD weans a litter. While it is hard to believe FWS could have thought this at the time the Recovery Plan was written, it is now clear that not every adult female UPD weans a litter. In fact, an estimated one-third does not (Hoogland 2001).

In addition, the Recovery Plan places substantial emphasis on the economic damage UPDs supposedly cause and the consequent need for private landowners - and federal agencies - to control prairie dogs. The Plan states,

> In the summer, there is a population explosion of Utah prairie dogs above ground as the young-of-the-year emerge from burrows and disperse, creating serious conflict between the Utah prairie dog and human agricultural interests. The major crop on private land is alfalfa, which is a preferred food of the prairie dog. Crop losses are extensive where large prairie dog colonies and complexes have developed. Prairie dog mounds also damage haying equipment and the burrows drain irrigated fields. It was estimated that the large summer populations of these prairie dogs cost local ranchers $1.5 million annually in crop losses and damage to equipment... (USFWS 1991: 14).

[36](6147.5 * 3.5 = 21,516.25).

The estimate of $1.5 million was echoed from the 1984 Downlisting and Special 4(d) rule. FWS again provides no evidence that this estimate was based on anything more than agriculturally-centric prejudice toward the Utah prairie dog. FWS does not rigorously assess this $1.5 million claim, but rather seems to uncritically accept the view that UPDs are pernicious to agriculture. The Plan states,

> As prairie dog populations continue to expand into previously unoccupied areas, which include agricultural fields, many fields have become so densely populated that they are completed ruined for agricultural use and have been abandoned by farmers (USFWS 1991: 14).

No sources are cited to support this claim. This excerpt shows clearly that the Recovery Plan, which is supposed to guide the recovery of the UPD, itself perpetuates the perception of this species as economically deleterious, a perception that landed the species in the critically imperiled state in which it is now found.

Given this supposedly significant economic impact by UPDs on crop agriculture and the Plan’s exaggerated claims about a yearly prairie dog population explosion, the Plan highlights the need for continued prairie dog control. According to the Plan,

> The control program must be considered a success. It has provided private landowners a means to alleviate localized problems with the Utah prairie dog on their land in a manner that does not undermine conservation efforts. In fact, prairie dog spring counts increased 88 percent in the control area over the period 1985 to 1989. The control program also has improved cooperation between farmers and conservation agencies and reduced the incentive for landowners to kill prairie dogs illegally. The incidence of illegal “take” of Utah prairie dogs has dropped significantly in the control area, based on State law enforcement records... (USFWS 1991: 17)

A self-evident explanation for this decrease in illegal takings is that there exists little need for them, given policies now in place through FWS and the State of Utah providing for substantial lethal control of this critically imperiled prairie dog. This is discussed in a following section on levels of UPD control that have occurred under the permitted take system.

The Recovery Plan itself provides for the limitation of distribution of UPDs and the density of their populations. Guideline 831 of the Plan stipulates: “Colonies should not be allowed to grow uncontrolled causing significant conflict with other land uses” (USFWS 1991: 32). Guideline 832 states that colony densities will be managed primarily by natural means but that “Other means such as trapping and shooting should be used where necessary to control colony density. In the future, control methods may include poisoning, but this would require the approval of a toxicant for use on the Utah prairie dog” (USFWS 1991: 33).

Why limit colony density? According to the Recovery Plan, colony density should be limited to prevent destruction of habitat, increased chance of disease and significant conflict with other interests (USFWS 1991). It is unclear why FWS would believe that UPDs destroy their own habitat if left unchecked given that the species is native and is a keystone species in the ecosystem it creates and sustains. However, it is clear that FWS is interested in controlling UPDs to accommodate economic interests. The Plan echoes the language in support of the Special 4(d) rule that was published in the Federal Register:

> Given the huge increase in prairie dog numbers in the summer and the high natural mortality of animals in the fall and winter, it appeared that allowing controlled ‘take’ of nuisance animals between June 1 and December 31 would address farmers’ needs to control nuisance animals without interfering with conservation efforts. In essence, farmers would be allowed to ‘take’ animals that would probably have perished anyway...(USFWS 1991: 16).

Indeed, the Plan even asserts that controlling UPDs will benefit the species, as it will decrease the chance of disease outbreaks and will prevent populations from exceeding the carrying capacity of the land they occupy (USFWS 1991: 16). The Plan fails to provide any supporting documentation for these claims.

While FWS admits that it would have to restrict take if it were shown to be inconsistent with UPD conservation, the agency fails to consider other threats - such as droughts, livestock grazing, land conversion, and sylvatic plague - when assessing whether there has been a correlation between take levels and census counts (USFWS 1991: 17).

As discussed in the translocation section below, the Recovery Plan seeks to buffer private lands from UPD colonization, thereby hindering recovery on public lands. In the western U.S. and in southern Utah, federal lands are heavily interspersed with private and state lands. This resulting checkerboard in land ownership complicates species conservation on public land. For a species as imperiled as the UPD and with such extreme habitat limitations, recovery must take place across public lands, regardless of their proximity to private lands.

Even on public lands, however, the Plan provides for prairie dog removal. Guideline 52 states, “Prairie dogs also will be removed from sites on public lands to control the colony size and provide animals that can survive on rangelands” (USFWS 1991: 28-29).

In summary, the flaws of the Recovery Plan are its emphasis on translocation from private lands to public lands, failure to provide for protection of private land complexes, support of lethal UPD control, and blind adherence to exaggerated estimates of UPD reproduction levels and deleterious impacts to human economies. These weaknesses have resulted in a recovery program oriented more toward avoiding impacts (both real and perceived) of prairie dogs on economic activities than toward achieving UPD recovery. In fact, it is not even apparent whether the Recovery Plan provides an adequate basis for the survival – much less the recovery – of this critically imperiled prairie dog species.

Interim Conservation Strategy

The Utah Prairie Dog Recovery Implementation Team was formed in late 1994 to address recovery issues. It includes representatives of federal and state agencies and from universities. The Recovery Team found that the Recovery Plan's criteria for delisting were unlikely to be achieved but that the information required to developed new standards for delisting were unavailable (Utah Prairie Dog Recovery Implementation Team 1997). Consequently, an interim conservation strategy was required. In 1997, an interagency team comprising the UDWR, BLM, NPS, FWS, USFS, USDA-Wildlife Services, Brigham Young University, Utah State University, and Southern Utah University, developed the "Utah Prairie Dog Interim Conservation Strategy" (ICS). This document was produced as a response to the faltering UPD recovery effort and was a direct critique of the Recovery Plan (Utah Prairie Dog Recovery Implementation Team 1997).

Content

Perhaps the most significant critique of the recovery plan concerned the Plan's numerical goal of 813 adult UPDs in each of the three recovery areas for five consecutive years. The ICS maintained that this quantitative goal may be based on incorrect assumptions about population dynamics and that UPDs may constitute a metapopulation in which smaller local populations are periodically extirpated as a result of intraspecific competition, food supply dynamics, predators, and disease. These local extirpations are described as the result of "inherent characteristics of Utah Prairie Dog population dynamics" (Utah Prairie Dog Recovery Implementation Team 1997: 4).

However, the inherency or naturalness of these causes of extirpation is contestable, as anthropogenic activities often alter food supply, habitat quality, and consequent predation rates.

The ICS also fails to consider that the disease with the most impact on UPDs – sylvatic plague – is in no way inherent to UPD populations, but in fact is an exotic disease. It may be that the ICS questions the Recovery Plan's numerical goal given the difficulty in meeting that goal, rather than the goal's impropriety. In order to expedite delisting, the recovery goal should therefore be attenuated, according to the ICS. In this way, the ICS appears more oriented toward delisting than effecting UPD recovery. As discussed above, McDonald (1993) earlier questioned the Recovery Plan's goal from the opposite perspective, stating that 813 adult UPDs in each of three recovery areas may be insufficient for maintaining prairie dog viability.

Three central goals in the ICS are: 1) habitat improvement in the area of existing UPD complexes and the sites of new prairie dog translocation on public land; 2) research to monitor translocation success and reevaluate recovery goals; and 3) public involvement to build more cooperation for UPD recovery. The research is to be conducted on population dynamics at existent complexes, the impacts of grazing and range revegetation on translocation success, and the implications of local population extirpations for UPD genetic diversity. Research is supposed to be employed to revise recovery goals (Utah Prairie Dog Recovery Implementation Team 1997).

The ICS developed a categorization system that provides varying protection to UPD complexes. Complexes were ranked Category 1, 2, or 3, with Category 1 providing population monitoring and habitat assessment; Category 2 involving monitoring, assessment, and habitat management/improvement; and Category 3 involving monitoring, assessment, habitat management/improvement, and research (Utah Prairie Dog Recovery Implementation Team 1997).

The lack of translocation success was of particular concern within the ICS and the authors attributed that failure to unsuitable habitat. The document therefore recommends vegetation manipulation at eight new 250+ acre translocation sites, ideally located within three miles of an existing "successful" complex and more than two miles from each other. Prairie dogs are to be translocated to Awapa Plateau, Paunsaugunt, and West Desert Recovery Areas. Up to 200 UPDs will be translocated to each site in each of three consecutive years, and to two new sites each year. With four sites available each year for two consecutive years, 4,800 UPDs would be translocated over a four-year period (Utah Prairie Dog Recovery Implementation Team 1997).

There is an emphasis throughout the ICS on multiple-use of public lands and, specifically, on allowing livestock grazing to continue within the UPD's occupied range. Restoration of UPD sites to grassland, according to the ICS, will also benefit livestock production. Therefore, according to the ICS, "…management of a threatened species may actually augment land use by livestock producers" Utah Prairie Dog Recovery Implementation Team 1997: 6).

Despite the discussion in the Recovery Plan and within UDWR's review of 20 years of UPD recovery efforts on the deleterious impacts of grazing, the ICS takes an agnostic stand on harms caused by livestock. The discussion reads,

> Studies of other prairie dog species…suggest that large grazers, such as bison and cattle, can coexist with prairie dogs. Sheep may also coexist easily with prairie dogs, especially if they graze in fall or winter, because they can feed heavily on shrubs. Thus livestock grazing may benefit Utah Prairie Dogs if grazing enhances primary production and reduces shrub invasion…However, the effects of grazing in any season on Utah Prairie Dogs remain unknown (Utah Prairie Dog Recovery Implementation Team 1997: 9-10).

This analysis is inadequate, for several reasons. First, while heavy ungulates such as bison historically occurred within the UPD's range (Zeveloff 1988), bison and cattle are distinct behaviorally and have divergent ecological impacts. Some of these differences are:

- Bison spend little time in fragile riparian areas, while cattle degrade such areas by defecating and loitering in streams and destroying streambanks, which causes erosion and stream disappearance.
- Cattle dependence on water results in destroyed riparian areas, water developments, and groundwater pumping.
- Bison behavior creates a vegetation mosaic across the landscape. In particular, bison wallows provide a refuge for specialized prairie flora. Cattle do not generally create an analogous mosaic.
- When free-roaming, bison don't return to grazed areas until the vegetation is rejuvenated, while cattle are more stationary.
- Cattle seek refuge from the sun and snow by seeking woody draws and other shelter, while bison are more adapted for inclement weather.
- Cattle overgrazing has been linked with brush encroachment in the West, while bison roaming and grazing patterns are a natural part of Western ecology.
- Making the range safe for cattle has entailed the stringing of barbed wire, which obstructs wildlife migration and causes direct mortality to wild animals.
- Rangeland management for cattle continues to involve the extermination of wildlife seen as a predator of cows or a competitor for forage. (Information on file with Forest Guardians)

Second, sheep do not only feed on shrubs, and they are not only being grazed on UPD habitat in fall and winter, but also in the spring (See Exhibit 7: Livestock grazing on BLM allotments within occupied UPD range), when their potential to impact cool season grasses is highest. Finally, rather than characterizing grazing impacts as "unknown," the ICS should disclose that there are several harmful impacts from livestock grazing, including riparian area destruction, shrub encroachment, noxious weed proliferation, and altered fire ecology, as discussed above.

Likely because of a commitment in the ICS to not limiting livestock grazing, the Utah Prairie Dog Recovery Implementation Team overlooked these impacts. The Team's commitment to not restricting livestock grazing is apparent from the ICS's statement that each translocation site "should demonstrate the effectiveness of habitat manipulation in promoting prairie dog persistence and coexistence with livestock and other wildlife" (Utah Prairie Dog Recovery Implementation Team 1997: 8). Coexistence between UPDs and livestock is assumed a priori, despite the ICS's purported establishment of a research design to discern whether livestock grazing negatively impacts UPDs.

Authority

The ICS was promulgated in August 1997 and was to be implemented over the course of five years (through August 2002). The BLM considers the ICS to be an interim recovery plan "driving recovery efforts for the next 5-10 years (1997-2007)" (BLM 1997 Monument Peak Plan: 4).[37] FWS currently regards the ICS as guiding recovery efforts (Reed Harris, FWS, pers. comm., Nicole J. Rosmarino, dated April 27, 1999). In 1997, BLM authored an EA and five UPD management plans in the Beaver River Resource Area to implement the ICS (BLM 1997 EA).

BLM and USFS policy

As we demonstrate in this section, federal land management policy is itself contributing to the critically imperiled status of the Utah prairie dog. For example, while federal land managers acknowledge the historic impact of livestock overgrazing, they deny that current livestock grazing is negatively impacting UPDs. According to USFS, "Grazing practices have been changed significantly over the past several decades which in combination with this proposal [for burning, mowing, and reseeding] should help prevent the re-establishment of solid brush stands" (See USFS Biological Assessment of Utah Prairie Dog Habitat Improvement Projects, dated 2/27/96). The changes in grazing practices, according to USFS: "Over the past several

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[37]The BLM makes the same claim in the other four management plans. See BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, and Horse Hollow Plans.

decades the numbers of livestock and the season of grazing have been reduced to prevent further degradation…" (See USFS Biological Evaluation for Sensitive Animal Species, dated 3/5/96). Yet, the ICS notes that, "… many existing complexes that were once grassland appear to have been invaded by shrubs during the past 15 years" Utah Prairie Dog Recovery Implementation Team 1997: 5), which clearly indicates that shrub encroachment is not a thing of the past. Rather, livestock grazing continues to convert perennial grasslands to shrub within the UPD's occupied range.

In addition, in the habitat loss and degradation section above, petitioners described impacts on Utah prairie dogs from other land uses permitted on federal lands, including ORV use, recreation, and oil and gas exploration and extraction.

West Desert Recovery Area

Although perceived as a UPD stronghold, prairie dogs on public lands in the West Desert are not faring well. The 2001 Census Count indicated a loss of one-third of the prairie dogs from the previous year (See Exhibit 1: Census Data by Recovery Area). The federal land sites are primarily on BLM lands, and we focus on BLM management of UPD habitat in this section.

BLM. There are five prairie dog management plans in effect for BLM lands in the West Desert: the Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Utah prairie dog site management plans. The plans have some general flaws including inadequately addressing the threat to UPD habitat from continued livestock grazing. In addition, in the plans, less biologically suitable research sites were chosen over more suitable ones on the basis of distance from private lands.

First, the plans fail to adequately address livestock grazing impacts. Two of the plans state that, "It is thought that existing grazing practices are compatible with UPDs" (BLM 1997

Horse Hollow Plan: 13; Monument Peak Plan: 12). Yet, in the Monument Peak Plan, none of the vegetation transects met the requirements for high-quality UPD habitat prescribed in the ICS. The vegetation cover data for the research site selected in the Monument Peak area (Neck site) indicates a lack of cool season grasses (4.5% average versus the ICS recommended guideline of 12-40%) and a predominance of shrubs (12.5% average versus the ICS recommended 0-3%) (BLM 1997 Monument Peak Plan Table 4), which, as discussed in the Livestock Grazing Impacts section, is congruent with livestock overgrazing. For every allotment with Monument Peak, there were inadequate desirable forbs and or/inadequate warm season grasses (BLM 1997 Monument Peak Plan Appendix 4).

Other management areas also failed to meet ICS vegetation guidelines. Every allotment in the Black Mountain and Buckskin management areas was characterized by inadequate desirable forbs and/or inadequate warm season grasses (BLM 1997 Black Mountain and Buckskin Plans Appendix 4). In the Black Mountain, Buckhorn Flat, and Buckskin management areas, "[w]arm season grasses appear to be at unacceptable levels to support long term prairie dog populations" (BLM 1997 Black Mountain, Buckskin, and Buckhorn Flat Plans: 11). For Buckhorn Flat, the BLM found a "near total lack of warm season grasses" (BLM 1997 Buckhorn Flat Plan: 11). There was one portion of one pasture in the Buckhorn Flat area that met the UPD vegetation requirements, but the BLM did not discuss efforts to restore UPDs to that site. No other pastures or allotments in Buckhorn Flat met the vegetation guidelines (BLM 1997 Buckhorn Flat Plan Appendix 4).

According to Appendix 4 of the Horse Hollow management plan, all but two allotments – Perry Well #1 and 2 – either had too few warm season grasses, inadequate cool season grasses, or inadequate forbs for UPD suitable habitat. However, a comparison of the Horse Hollow vegetation data with the ICS vegetation guidelines indicates that even Perry Well #1 and 2 fail to meet the guidelines (Table 4).

Table 4. Failure of Horse Hollow allotments Perry Well #1 and 2 to meet the Utah Prairie Dog Interim Conservation Strategy Vegetation Guidelines. Sources: ICS 1997; BLM 1997 Horse Hollow Plan. (Bolded numbers indicate where shrub percentage of ground cover is in excess of vegetation guidelines).

Vegetation Type	**ICS Vegetation Guidelines (% Ground Cover)**	**Perry Well #1 (% Ground Cover)**	**Perry Well #2 (% Ground Cover)**
Warm season grasses	3-10	3	5
Cool season grasses	12-40	14	16
Forbs	1-10	4.5	3.5
Shrubs	0-3	**9.5**	**10**

Shrub encroachment is an extremely important factor to consider in evaluating UPD habitat, and the BLM itself recognizes the significant role played by invasion of grasslands by woody vegetation in Utah prairie dog imperilment (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). Invasion by woody vegetation is an acknowledged problem for active and potential UPD complexes, yet UPDs are being translocated to shrub-encroached sites. As is discussed in the Translocation section below, the Dominguez-Escalante reintroduction site, located in the Perry Well #1 and 2 grazing allotments, was recognized as encroached by excessive shrub cover, but BLM nonetheless authorized translocations to that site, with disastrous results.

Furthermore, noxious weeds are a significant problem in all five management areas. In the Black Mountain Plan, either crested wheatgrass (Agropyron cristatum) or cheatgrass (Bromus tectorum) was the dominant grass for 13 quadrangles, comprising 11,375 federal acres (BLM 1997 Black Mountain Plan Appendix 3). The same two non-native grasses were also dominant in eight quadrangles in the Buckhorn Flat management area, comprising 4,221 federal acres (BLM 1997 Buckhorn Flat Plan Appendix 3); six quadrangles in the Buckskin management area, covering 5,084 federal acres (BLM 1997 Buckskin Plan Appendix 3); and five quadrangles in the Horse Hollow management area, comprising 1,232 acres. Halogeton (Halogeton glomeratus) was the dominant forb on an additional 323 acres in three quadrangles in Horse Hollow (BLM 1997 Horse Hollow Plan Appendix 3). Appendix 3 of the Monument Peak Plan indicates the noxious weeds crested wheatgrass and halogeton are the dominant grass and forb, respectively, within three quadrangles of the management area, comprising 1,371 acres (BLM 1997 Monument Peak Plan Appendix 3). On the vast majority of quadrangles in the Monument Peak area, however, the BLM did not even determine the dominant forb.[38] More recent observation indicated that North Buckskin has a high amount of crested wheatgrass (BLM 2000: 5; Bonzo and Day 2000).

The land units detailed above, where noxious weeds were identified as the dominant grasses and forbs, total 23,606 acres across the five management areas. Moreover, the BLM characterizes crested wheatgrass as the dominant vegetation throughout the Buckhorn Flat and Buckskin management areas (BLM 1997 Buckhorn Flat and Buckskin Plans).

All three of these noxious weeds – cheatgrass, crested wheatgrass, and halogeton – are associated with livestock grazing or, in the case of crested wheatgrass, rangeland management for livestock. Kitchen and Hall (1996) found that spring grazing by sheep resulted in higher percent cover of exotic annuals, and favored halogeton and cheatgrass expansion. Robertson and Kennedy (1954) also found that cheatgrass and halogeton abundance increased in the presence of grazing. Lacey (1987, as cited in Belsky and Gelbard 2000) found that 500 grams of sheep

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[38]Appendix 3 consists of a table summarizing Monument Peak area vegetation and soil data. In this table, there is a column for dominant forb. There are a series of specific forbs also listed in Appendix 3. However, for the 32 quadrangles in the table, "PPFF" and "AAFF" are provided for 13 of those quadrangles. These codes stand for perennial and annual miscellaneous forbs, respectively. No further information is provided and it is impossible to tell whether the species is exotic and/or aggressive. Out of the remaining 19 quadrangles, "N/A" (data not available) is provided for 15. Only four quadrangles have species codes (BLM 1997 Monument Peak Plan). However, the most egregious problem with Appendix 3 is that the vegetation data is 15 years old.

manure contained 14 viable halogeton seeds. Individual cheatgrass and halogeton plants were found to be larger in areas that were heavily grazed in Utah compared to ungrazed areas (Harper et al. 1996 – see citation in Exhibit 5). Kay and Evans (1965 – see citation in Exhibit 5) found that nitrogen addition combined with livestock grazing favored cheatgrass while reducing native plants. See also Exhibit 5 (Review and Analysis of Cattle Grazing Effects in the Arid West, with Implications for BLM Grazing Management in Southern Utah) and the Noxious Weed section above for an elaboration of the connection between livestock grazing and noxious weed proliferation.

Further, it is impossible to discern from the BLM's prairie dog management plans whether the noxious weed problem has worsened in recent years, as the vegetation data in the plans was gathered in the early 1980s. For the Monument Peak Plan, the data were gathered in 1982 and were therefore obsolete – being over 15 years old – at the time the Plan was promulgated. The data are similarly dated in the Black Mountain (data collected from 1981-82), Buckhorn Flat (data collected from 1980-83), Buckskin (all data from 1981, except one quadrangle, dated from 1983), and Horse Valley Plans (data collected from 1981-82). Scientific research indicates that there has been a steady increase in the spread of noxious weeds across the western U.S. (Belnap 1998). The noxious weed acreage from the early 1980s has therefore likely increased significantly. Noxious weeds invade an estimated 4,600 acres of Western public lands every day (65 Federal Register 54544 (Sept. 8, 2000)). In 1999, the BLM estimated that noxious weeds occupied 17 million acres of public land in the West (Bisson 1999). <u>The extent of noxious weeds, and the role livestock are playing in their spread, are not addressed in the plans</u>.

Indeed, the BLM continues to seed crested wheatgrass on UPD potential habitat, despite the problems this non-native grass can cause. On the Willow Spring Research/Transplant site within the Black Mountain management area, most of 120 acres was aerially seeded with approximately four pounds of crested wheatgrass per acre (BLM 1999 Utah Prairie Dog Annual Report for 1998).

In general, there is a lack of scrutiny on livestock grazing in the plans. This is despite the Recovery Plan's (and the management plans themselves) underscoring that livestock can degrade UPD habitat quality. This omission is explicable, given the obvious efforts by the BLM to keep the area open for livestock use. The plans state:

> The goal of this management plan is to manage public lands within the management area in a manner which is beneficial to Utah prairie dogs, as well as other wildlife and human values. Full implementation of this plan should contribute towards recovery, and eventually, delisting of the Utah prairie dog, without jeopardizing other species or land uses. This plan has been prepared with emphasis on ecosystem management, in which interests of a threatened species, human stakeholders, and other wildlife values are integrated into an entire ecosystem context (emphasis added).[39]

While ecosystem management may be a broadly accepted concept (GAO 1994a; Grumbine 1994), how it is implemented can vary widely (Grumbine 1997). Ecosystem management can be used as a guise for continued unsustainable extractive policies (Stanley 1995; Houck 1997). In the BLM's case, it is being administered to avoid conflicts with public land users, even where those land uses (e.g., livestock grazing) are degrading UPD habitat quality.

Second, potentially higher quality research sites were omitted from consideration by the BLM due to proximity to private lands. In Appendix 7 of the plans, those BLM sites with vegetation meeting the ICS guidelines, or close to meeting those guidelines, which were close to private lands with suitable habitat were dropped from analysis. Alternatively, several of the sites prioritized in Appendix 7 were closed stands of crested wheatgrass (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans Appendix 7), which, according to the Black Mountain and Monument Peak plans, “perform[] poorly as transplant sites” (BLM 1997 Black Mountain plan: 4; Monument Peak plan: 3). For instance, the UPD population at Willow Spring (C115) appears to be extirpated, with census counts of zero from 1999-2002 (See Exhibit 3: Census Data by Site) and the site is dominated by crested wheatgrass (BLM 1997 Black Mountain Plan).

Indeed, the plans are very clear that the BLM followed a “good neighbor” policy in choosing restoration sites: “Transplant sites were selected to minimize dispersal off of public lands.”[40] UDWR also stated in its 1995 annual report that of all the suitable sites on BLM land, “only the Adams Well site was far enough away from private property to be considered for additional transplants” (McDonald 1996: 23). While we understand that such policies may not be extraordinary, where they stunt recovery and accelerate the extinction of a highly imperiled species they contravene the purpose and intent of the Endangered Species Act.

The Environmental Assessment for the five BLM UPD plans makes very clear that the BLM will not limit livestock grazing to benefit UPDs. The Decision Notice states, “Implementing the proposed action [the management plans] will not increase or decrease the total number of animal unit months of specified livestock grazing on any allotment” (BLM 1997 EA Decision Notice dated 10/21/97). The BLM anticipated that livestock grazing would continue on those sites treated to enhance UPD habitat. According to the agency, while there might be some short-term exclosures of livestock, “After the research phase ends, these sites would be turned back to livestock grazing” (BLM 1997 EA: 7). This was stated at a time when livestock grazing impacts on UPDs were just beginning to be scientifically studied, so it is

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[39]See BLM 1997 Black Mountain Plan: 9; Buckhorn Flat Plan: 8-9; Buckskin Plan: 9; Horse Hollow Plan: 9; Monument Peak Plan: 9.

disconcerting that the BLM assumes that those studies will not find significant impacts on UPDs or, alarmingly, that even if those impacts are substantiated, the agency would not alter the livestock grazing regime.

Moreover, the BLM will not even prioritize UPDs over livestock production on its lands. The agency explicitly emphasized the multiple use mandate in response to the question "If prairie dogs are moved into an area with cattle grazing, who has the priority, the cattle or the prairie dogs?" in its 1997 EA. The BLM's reply to the question was,

> Our current management philosophy for public lands is multiple use, and when the range is in good health, more than one creature can benefit from it. We have selected transplant locations, based on current professional knowledge, where livestock grazing and prairie dogs should be compatible. However, if research concludes that certain types of cattle grazing are having a detrimental effect on the prairie dog, BLM has several options. We would look at modifications of the grazing rotation and season-of-use, or <u>other changes developed in coordination with the permittee</u>. Future transplant sites would be selected, if possible, where the grazing system is compatible. It is BLM's intention to manage for both livestock and prairie dogs, as well as other uses, without giving absolute priority to a single use (BLM 1997 EA: 8, emphasis added).

This window into BLM's thinking indicates that this agency is so intent on not disrupting livestock grazing on its lands that it will not even prioritize a severely imperiled species that has historically suffered greatly from brush encroachment, forage reduction, swale-drying, and other impacts of livestock grazing. Even where there are UPD/cattle conflicts, the grazing permittee will still play a large role in determining livestock grazing on BLM lands. This is clear with the coordinating role (i.e., the underlined portion of the excerpt) the BLM has provided permittees.

Permittees have generally not been sympathetic to UPD recovery. For example, in 1995, a BLM grazing permittee successfully blocked the use of Adams Well as a translocation site for prairie dogs on BLM land in the West Desert (McDonald 1996). This resistance to UPD conservation efforts by the rancher came after several years of severely depressed prairie dog

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[40]See, e.g., BLM 1997 Black Mountain Plan: 29.

population levels in the West Desert Recovery Area (See Exhibit 1: Census Data by Recovery Area).

In addition, the EA explicitly states that the BLM's aim is to provide a buffer for private landowners from UPDs:

> The selection criteria for transplant sites used in the site management plans and this environmental assessment give high priority to potential transplant sites that are greater than a mile from private lands while penalizing potential transplant sites that are located near private lands with suitable prairie dog habitat (BLM 1997 EA: 6).

Indeed, the BLM even attempts to buffer SITLA lands from UPD colonization. The agency's 1997 EA states, "…the highest priority for potential public land transplant sites has been given to those sites where BLM feels conditions are favorable for keeping the prairie dogs on public lands and off of private and state lands" (BLM 1997 EA: 6, emphasis added).

Given the obstacles that the BLM itself places on UPD recovery on BLM lands, the agency's goal of establishing 200 adult UPDs in 15 complexes in the West Desert seemed far off when the EA was written in 1997, and it remains far off in light of the 2002 spring census. The BLM projected that with the implementation of the 1997 EA, six more complexes would reach adult populations of 200 UPDs and that two complexes had already. The 2002 census data indicated only two complexes on BLM land in the West Desert containing more than 200 UPDs: Buckhorn Flat (C113) and Minersville #3 (C122). Only 10 complexes on BLM land in the West Desert contained more than 10 UPDs in 2002 (See Exhibit 3: Census Data by Site). Across all three recovery areas, only three complexes on public land (including SITLA) contained more than 200 UPDs in 2002 (Bonzo and Day 2002; See Exhibit 3: Census Data by Site).

In regard to mining claims and the development of mineral resources, BLM again insists on the relative compatibility between these extractive activities and UPDs and their habitat. BLM stated in 1997,

> In most cases, the introduction of a threatened species into an area would, for all intents and purposes, close the area from future mining activity. Mining generally requires surface disturbance which would not be compatible with maintaining wildlife habitat. However, prairie dogs are different. They can tolerate human development in close proximately [sic] to their colonies, they may be moved to new locations, or new habitat may be created elsewhere (BLM 1997 EA: 47).

This perspective clearly underscores the BLM's attitude toward prairie dogs – where economic activity and prairie dogs conflict, move the prairie dogs or assume the prairie dogs can tolerate economic development. This perspective is questionable, given a number of chronic problems hindering prairie dog recovery: low survival rates from translocation, a lack of suitable habitat, unclear evidence that habitat can be recreated and sustained over the long-term, routine disappearance of prairie dog complexes at rates higher than new colonies are forming, and the likelihood that human activities can compound the problems of disease and unsuitable habitat.

BLM's attitude that prairie dogs should accommodate economic activity and, where they conflict, prairie dogs rather than the economic activity, should be dislocated, may be based on BLM's erroneous view of prairie dogs as deleterious to rangeland health. For instance, the agency asserts that UPDs have a negative impact on soils. The BLM 1997 EA (50) states,

> During construction of burrows, prairie dogs would dislodge and move soil material from under the ground surface and deposit that material above the ground surface in the form of a mound and on areas near the mound. This soil would be unprotected since it would not be covered with litter and vegetation. There would be an increased movement and loss of these soils from the site due to wind and water erosion. Most of this movement would be due to wind erosion…While occupying a site, prairie dogs would remove vegetation in a manner which would extend out from the mound according to the needs of the prairie dogs. This would create an area around the mound on which vegetation canopy cover would be

> decreased and exposed soil surface would be increased. This would increase soil movement and loss from the site due to wind and water erosion.

Alternatively, the scientific literature describes how, as part of their keystone role, prairie dogs play crucial roles in benefiting soil structure, water infiltrability of soils, soil aeration and fertility, diversification of soil properties, and other soil-shaping impacts (Hansen and Gold 1977; O'Meilia et al. 1982; Agnew et al. 1986; Sharps and Uresk 1990; Munn 1993). In contrast, livestock compact soils and reduce infiltrability (Bohn and Buckhouse 1985; Orodho et al. 1990). The BLM's questionable description of prairie dog impacts and its lack of acknowledgment of the negative consequences to rangeland from livestock reflect a clear agency bias, one that is mirrored in the inadequate provisions being made for UPDs and their habitat in BLM land management decisions.

Paunsaugunt Recovery Area

As petitioners have demonstrated, UPDs on public lands in the Paunsaugunt Recovery Area have suffered drastic declines. The 2001 Spring Census Count of 120 UPDs is only 28% of the count when the UPD was downlisted in 1984 and only 19% of the count when the second Special 4(d) Rule was passed in 1991 (Exhibit 1: Census Data by Recovery Area). Only 14 complexes on public land in the Paunsaugunt still contain prairie dogs, and three of lose contain marginal populations (Exhibit 3: Census Data by Site). Most UPD complexes in this recovery area are located on USFS lands, and we focus on analysis on land management by the Forest Service.

<u>USFS</u>. The Forest Service supported the taking provision promulgated by the FWS in 1984 (49 Federal Register 22331 (May 29, 1984)). In addition, as discussed above, intensive eradication efforts centered on the Fishlake National Forest and those efforts appear to have been

successful. USFS has demonstrated that it is doing little to prevent the continued downward decline of UPDs on lands it manages.

As in the West Desert Recovery Area, in the Paunsaugunt, even where UPD habitat management has been focused, USFS has placed limits on the extent to which livestock grazing is impacted. For instance, on the Johnson Bench area on the Dixie National Forest, USFS writes:

> Where habitat treatments are implemented rest will be provided when reasonable and/or possible. If resting the entire unit is not possible, rest rotation schedules, livestock patterns, season of use, time of treatment, and habitat conditions will all be considered when planning the treatment to provide as much protection as possible (USFS 1997 MOU: 6).

USFS makes a similar statement in regard to the Tom Best area (USFS 1997 MOU: 7-8). Why would it not be possible to rest an entire unit from livestock in order to benefit UPDs? The only impossibility would be a political barrier, not a biological one. It is no physical impossibility to remove livestock from an allotment.

According to the Biological Assessment written for proposed prescribed burns to enhance UPD habitat in 1996, livestock grazing has been substantially reduced and therefore is not leading to continued degradation on USFS lands (Noriega 1996). In fact, USFS documents indicate UPD habitat destruction by cattle. On the Tom Best area, USFS specifically emphasizes the reduction of "further downcutting and headcuts within riparian areas" (USFS 1997 MOU: 7, emphasis added), intimating that the destruction of riparian areas by livestock continues to occur.

In addition, a review of the conditions on grazing allotments indicates otherwise further affirms that livestock grazing on USFS lands is harming Utah prairie dogs. On the Dixie National Forest, USFS failed to consider adequately the impacts of livestock grazing on UPDs in its issuance of 141 grazing permits on 59 allotments in 1995. This set of permits comprises over half of the grazing permits on this national forest. The permits expire in December 2005. For every ranger district where UPDs occur, USFS provided the following analysis in its BA:

> Direct and Indirect Effects
> Implementation of this alternative would result in shorter vegetation and plant regrowth which would be beneficial to the prairie dog. Provided proper use standards are implemented this alternative would not decrease suitable habitat, but could maintain or enhance habitat through time. Livestock grazing could assist in managing vegetation height, which would assist in the maintenance of suitable habitat.
>
> Cumulative Effects
> This action in combination with future actions would result in overall improved riparian and upland conditions. These improved condition [sic] would consist of healthier, more vigorous landscape of grasses, forbs, and shrubs. These healthy landscapes would be potentially suitable for prairie dogs, provided the vegetation does not exceed a height greater than 16 inches. In the event that the dominant grass, forb, and shrub species exceed this height, these areas would become unsuitable due to the vulnerability of the dogs to predators. Past livestock grazing has resulted in shorter vegetation and plant regrowth which is beneficial to the prairie dog. However, localized overgrazing in areas has been detrimental by decreasing cool season grasses, causing loss of moist swales and small meadows through gullying (Rodriguez 1995: 53, 58-59, 63, 68, 73, 78, 83, 88, 94, 100, 105).

The BA indicates that there can be both positive and negative impacts of livestock grazing on UPDs, but does not attempt to quantify or further analyze how livestock grazing has actually impacted prairie dog populations in specific complexes on this national forest, or across the forest planning unit. In conclusion to this BA, USFS decided that the reissuance of the grazing permit is not likely to adversely affect the UPD (Rodriguez 1995).

Also in 1995, USFS issued a BA for endangered and threatened species after forest plan development. For all three forests within the range of the UPD – Dixie, Fishlake, and Manti LaSal – USFS determined that there would be no “adverse effects to species viability” given adequate standards and guidelines in the forest plans (Thompson, pers. comm., 1995). In its letter of concurrence, FWS agreed with the USFS’s determination that the forest plan standards and guidelines

> …will not allow adverse effects to any endangered or threatened species known or suspected to occur on National Forest System Lands in Utah. Moreover, in our opinion, for species such as the Utah prairie dog the forest plans afford opportunities to conduct activities that would promote the conservation and recovery of the species (Williams, pers. comm., 1995).

This conclusion is reached despite the lack of standards and guidelines in this BA that were specific to Utah prairie dogs (USFS 1995, Biological Assessment for Endangered and Threatened Species Listed After Forest Plan Development in Utah National Forests). In addition, the viability of UPDs is extremely bleak on the Fishlake and Dixie National Forest, as reviewed in the Current Population Status section above (See also Exhibit 3: Census Data by Site). UPDs are not counted on the Manti LaSal NF in annual censuses (See Exhibit 3: Census Data by Site).

The Dixie's re-issuance of grazing permits stipulated proper use criteria to govern grazing management. These include: the limitation of upland forage utilization to no more than 50% of current year's growth, but varying in specific pastures from 40-60%; and, in riparian areas, the maintenance of stubble heights of at least two inches for non-hydric species and four-six inches for hydric species.

Livestock overgrazing and consequent degradation of UPD habitat is rampant on the Dixie and Fishlake National Forests. According to the Dixie National Forest Riparian Inventory conducted in 1994, the following reports were made of livestock overgrazing by the environmental consultants contracted for the inventory:

- *Antinomy Creek, Escalante Ranger District*. "The upper watershed appeared to be at risk from overuse by livestock. The general trend in the grazed complexes is toward general decline in the successional state and an inability of the riparian system to recover from abiotic impacts…Grasses and forbs are being over-grazed. Generally, no graminoid is more than three quarters of an inch high. Unacceptable structural damage is occurring to the stream banks from livestock grazing and trampling." In many riparian areas in Antinomy Creek, the environmental consultants conducted the analysis suggest the reduction or removal of livestock for riparian recovery (EnviroData Systems, Inc. 1994a).

- *East Fork Boulder Creek, Escalante Ranger District*. "Livestock range appears to be the most significant impact on the riparian vegetation in specific locations…Livestock impacts are considerable." In several riparian areas in East Fork Boulder Creek, the environmental consultants again suggest reduction or removal of livestock as a remedy (EnviroData Systems, Inc. 1994b).

- *Center Creek, Escalante Ranger District*. "Grazing pressure has decreased the amount of seral sedges and shrubs. Livestock use is concentrated along the stream, because of the dense adjacent forest" (Long Resource Consultants, Inc. 1995).

- *Crawford Creek, Powell Ranger District*. "The Crawford Creek riparian structure is in a state of general decline from the impacts of grazing…Grasses and forbs are being over grazed. Generally, no graminoid is more than three quarters of an inch high. Structural damage is occurring to the stream banks from livestock grazing and trampling." The environmental consultants again advice reducing grazing in riparian areas (EnviroData Systems, Inc. 1994c).

- *Pole Canyon, Powell Ranger District*. "The wetlands in this location are trampled very badly and the water is spoiled with manure…Livestock range appears to be the most significant resource use on the Sevier Plateau…The large amounts of weeds indicate extensive over grazing in the past. The grasses and forbs are grazed to the ground. Stream banks are trampled and broken. Introduced weeds dominate" (EnviroData Systems, Inc. 1994d).

- *West Fork Hunt Creek, Powell Ranger District*. "Habitat was of poor quality, limited by the stream size and the lack of overhanging vegetation…The general ecological state is very early or early…Livestock range appears to be the most significant use in the Hunt Creek watershed…The West Fork Hunt Creek riparian structure appears to be severely degraded…The grasses and forbs are close grazed and the stream banks are trampled and broken." The consultants recommended cattle removal in this riparian area (EnviroData Systems, Inc. 1994e).

More recent evidence of livestock overgrazing on the Dixie National Forest includes the USFS description in a 2000 biological assessment that several areas were "grazed hard" by livestock, particularly in riparian areas (Summers 2000).[41] More specifically,

- *Bowery Allotment, Cedar City Ranger District*. Eight monitoring reports dating from 2000 and 2001 indicate forage utilization exceeded proper utilization levels. In one report, livestock utilized an average of 85% (142% of the proper utilization level) of available forage and soil compaction was described as heavy. Further, this overgrazing

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[41]These conditions were reported on the Pine Valley Ranger District, which according to USFS does not contain UPD habitat.

occurred during drought conditions (See Exhibit 8: Bowery Allotment Monitoring Reports).

- *Webster Flat Allotment, Cedar City Ranger District*. A range inspection report from August 2000 indicated that, "Very heavy use has occurred near Deep Creek and near the road to the Forest Boundary." The report also indicates extreme drought conditions (See Exhibit 9: Webster Flat Range Inspection).

- *Panguitch Lake Allotment, Cedar City Ranger District*. Four monitoring reports dating from 2000 and 2001 document overgrazing on this allotment. Three of range analyses indicate overgrazing during drought, on the order of 126%-160% of proper utilization levels (See Exhibit 10: Panguitch Lake Allotment Monitoring Reports). There is a UPD complex at Panguitch Lake which has declined every year since 1998 (See Exhibit 3: Census Data by Site).

- *Horse Creek Allotment, Escalante Ranger District*. A monitoring report indicates that, "Horse Creek canyon has been heavily grazed" (See Exhibit 11: Horse Creek Allotment Monitoring Report). This allotment contains occupied or potential UPD habitat (See Exhibit 12: Utah Prairie Dog Habitat on USFS land).

The reports cited above, while documenting overgrazing, do not indicate livestock are trespassing (i.e., entering restricted areas or grazing out of season). However, there are multiple additional reports demonstrating the livestock trespass is also occurring on the Dixie National Forest. Examples include:

- *Jones Corral Allotment, Powell Ranger District*. A monitoring report from May 2001 (a period of extreme drought) indicates that three unauthorized cows were seen in the North Reseed Unit and the grazing permittee was contacted to remove his livestock (See Exhibit 13: Jones Corral Allotment Monitoring Report). In fact, there is habitual trespassing of cattle on this allotment. In a report on the Mount Dutton Grazing Study, researchers indicated that grazing data were confounded in 1996, 1999, and 2000 due to trespassing cattle (See Exhibit 14: Mount Dutton Grazing Study).

- *East Fork Allotment, Powell Ranger District*. A monitoring report indicates livestock trespass (See Exhibit 15: East Fork Allotment Monitoring Report).

- *Suicide Allotment, Powell Ranger District*.[42] The Mount Dutton Grazing Study indicated that cattle trespassed in this area in 1997, 1999, and 2000 (See Exhibit 14: Mount Dutton Grazing Study).

[42]Petitioners are assuming the Suicide study site is in a separate allotment from Jones Corral.

- *Winnemucca Flat, Powell Ranger District*.[43] The Mount Dutton Grazing Study indicated that cattle trespassed in this area in 1996, 1998 and 2000 (See Exhibit 14: Mount Dutton Grazing Study).

The issue of livestock trespass is of special concern to petitioners, as it indicates a lack of Forest Service control of livestock management on the National Forest. Rather, it is evidence that some permittees graze their livestock on the National Forest at will, with little regard for the condition of the rangeland and, we venture to guess, no regard for the biological needs of critically imperiled species such as the Utah prairie dog.

Other uses on the Dixie National Forest may be impairing UPD survival and recovery. An example is gravel extraction. In 2000, USFS proposed using Johnson Bench for a gravel source (Guillette 2000; Maps B and C). In 2001, USFS proposed re-establishing gravel pit operations in the John's Valley area (Schulkoski 2001). Both of these areas contain UPD populations (See Exhibit 3: Census Data by Site).

Another example of disturbance to prairie dog colonies is the burial of fiber optic cable. This was proposed on the Cedar City Ranger District in 1998. The environmental consultants dismissed the threat to a colony of 100-200 UPDs on the basis that the bulldozer would be following a road that is compressed soil and "[p]rairie dogs cannot or do not dig burrows into heavily compressed soil, and this fact minimizes the potential for the destruction of burrows" (Johansson 1998). FWS accepted the consultant's analysis (McGillivary 1998). However, other studies have found that prairie dogs can burrow through caliche (Bowns et al. 1998), suggesting the scientific basis for the fiber optic burial project was flawed.

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[43]Petitioners are assuming the Winnemucca Flat study site is in a separate allotment from Jones Corral.

Awapa Plateau Recovery Area

UPDs have suffered significant decline on the Awapa Plateau in recent years. The 1999 and 2001 census counts comprised two of the three lowest counts for the recovery area since the census began in 1976 and were less than 20% of the census count recorded in 1989 (Exhibit 1: Census Data by Recovery Area). In 1995, UDWR commented,

> The severe population decline in the Awapa Plateau recovery area since 1989 continues to be of critical concern, with the number of remaining prairie dogs at a critically low number. The numbers have declined to the point where prairie dogs remain in only a few isolated pockets on private property, and have essentially become extirpated on public lands on Parker Mountain (McDonald 1996: 28).

The agency further indicated that "Poor range condition is suspected to be the major factor limiting recovery in this large recovery area. The Awapa Plateau consists of 20 public lands complexes, but only half of those were occupied by Utah prairie dogs" (McDonald 1996: 28). As of the 2002 spring census, the number of occupied public lands complex had dropped further – to a mere nine complexes (C306, C307, C309, C311, C312, C315, C316, C317, C329), with only three of those (C309, C312, C316) containing more than 10 UPDs (See Exhibit 3: Census Data by Site).

BLM. Unlike the case of BLM management in the West Desert Recovery Area, petitioners could locate no management plans for UPDs and their habitat on the Awapa Plateau. BLM lands in this recovery area contain a total census of 50 UPDs in four complexes (See Exhibit 3: Census Data by Site). Petitioners worry that the BLM is treating the Awapa Plateau as a sacrifice area when it comes to UPD recovery. Given the lack of a private lands conservation and recovery program for UPDs, this leaves the species' future bleak in this recovery area.

USFS. This recovery area contains UPD sites (or former sites) on both the Fishlake and Dixie National Forests. In a Biological Assessment of a non-grazing project on the Awapa Plateau Recovery Area, a USFS biologist wrote in 2000,

> Past and present grazing activity have [sic] likely caused a reduction in some unknown level of prairie dog habitat by decreasing the availability of palatable grasses and forbs that supply summer food for the prairie dogs (Rodriguez 2000: 9).

However, the biologist also noted that livestock grazing, "when administered properly," could help limit vegetation height, thereby assisting UPDs.[44] The central question is whether livestock grazing is being managed on national forest land in such a way as to permit recovery of UPDs.

USFS has reported that livestock overgrazing is hindering UPD recovery. In 1996, the following was stated in a Biological Assessment issued on a proposed timber sale:

> The Awapa Plateau had a population of over 1000 prior to 1989. In 1989-90 the population crashed and has been critical ever since (Ken McDonald, pers. com.). The crash is thought to have been caused by drought and the lack of recovery is thought to be from overgrazing (Ken McDonald, pers. com.) (Summers 1996).

This observation is corroborated by site-specific documentation of overgrazing. We have discussed the problem of livestock overgrazing and trespass on the Dixie National Forest above. These problems are also in evidence on the Fishlake. For example:

- *Pioneer Allotment, Fillmore Ranger District*. In September 2001, District Ranger Robert Gardner sent a letter to grazing permitees William or Eileen Thompson that 22 pairs of their cattle were trespassing on the allotment and it "seems to be a continual problem" (See Exhibit 16: Robert Gardner Correspondence).

- *Scipio Allotment, Fillmore Ranger District*. In August 2001, District Ranger Robert Gardner sent a letter to grazing permittees Dick and Richard Probert that 20 pairs of cattle and one bull were trespassing on the allotment and "This has been a continuing problem for the last few years…" (See Exhibit 16: Robert Gardner Correspondence).

- *Whiskey Creek Allotment, Fillmore Ranger District*. In September 2001, District Ranger Robert Gardner sent a letter to unnamed grazing permittees that 26 pars of cows and

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[44]In the earliest version of the Biological Assessment, USFS wrote only of the negative impacts of grazing on UPDs. The presumed benefits of grazing were added later (Shafer 1992; Rodriguez 2000).

calves and 2 yearilings were grazing in the allotment but needed to be removed immediately as the area “was grazed beyond proper use standards. The District Ranger indicated that in one part of the allotment, the “areas are grazed way beyond proper use standards” (See Exhibit 16: Robert Gardner Correspondence).

- *Meadow Creek and South Fork Chalk Creek Allotments, Fillmore Ranger District*. In August 2001, District Ranger Robert Gardner sent a letter to permittee Perry Beutler to remove 90 pair of his cattle. In some areas, the range had “been grazed beyond proper use standards” (See Exhibit 16: Robert Gardner Correspondence).

- *North Fork and Leavitts Canyon Allotments, Fillmore Ranger Districts*. In September 2001, District Ranger Robert Gardner sent a letter to permittee Russell Crook instructing him to remove his cattle given “very heavy grazing use” (See Exhibit 16: Robert Gardner Correspondence).

Given the UPD’s marginal status on the Fishlake National Forest and across all USFS lands in the Awapa Plateau, and given the lack of robust sites on BLM lands, it is unclear how the UPD will ever recover within this area. Given the failures in range management cited above, this recovery area may be lost forever if immediate steps are not taken to protect and restore UPD habitat on the Awapa Plateau.

<u>NPS Policy</u>

The National Park Service has not been an active participant in UPD recovery. In the Downlisting and Special 4(d) rule, NPS concurred with downlisting but proposed that immuno-contraception, rather than lethal control, be used to manage Utah prairie dogs. FWS stated that they would consider this alternative (49 Federal Register 22331 (May 29, 1984)), but have not, to date, taken steps toward replacing lethal control with reproductive inhibition. Petitioners believe that NPS’ advocacy of immunocontraception indicates their failure to consider the fact that multiple, cumulative threats to the species - in 1984 and at present - underscore the need to remove anthropogenic impacts on this critically imperiled species. Reproductive inhibition would simply constitute the replacement of one anthropogenic threat with another.

<u>Wildlife Services and Animal Plant Health Inspection Service policies</u>

Wildlife Services (WS) (formerly called Animal Damage Control) is a division within the U.S. Department of Agriculture's Animal Plant Health Inspection Service (APHIS). WS is very active in controlling, through lethal and non-lethal means, wildlife within the UPD's range in southern Utah. According to WS's Environmental Assessment (EA) for its operations in southern Utah, it conducted wildlife damage management on over seven million acres within the region. In the EA, WS states that its personnel do not conduct or recommend prairie dog control within the UPD's range and that pan-tension devices are used for leghold traps in the Utah prairie dog's range to avoid capturing UPDs (USDA 2002). However, this is not accurate, as WS is now conducting UPD lethal control (Baker 2001). In addition, the control of both invertebrates (e.g., grasshoppers and crickets) and vertebrate species (e.g., rodents and predators) may affect Utah prairie dogs. The potential impact of WS programs on Utah prairie dogs has not been sufficiently addressed by FWS.

Invertebrate Species Control. APHIS has conducted and continues to conduct grasshopper and cricket control within the UPD's range. The agency has concluded that its operations have no adverse impact on UPDs because prairie dogs are herbivores (USDA 1987). When assessing the potential impacts of spraying 122,541 acres in Beaver, Iron, and Washington Counties to control grasshoppers and Mormon crickets, the agency stated:

> The prairie dog should not be affected by the treatment program for the following reasons: Its habits should keep it from receiving any direct spray, the chemicals to be used have low mammalian toxicity and it is primarily herbivorous so the reduction of insects should not negatively effect [sic] it, but theoretically, release from competition with grasshoppers should increase the amount of forage available to it (USDA 1987: 7).

However, it is well known that Utah prairie dogs eat cicadas (USFWS 1991; 1992). Cicadas are members of the order Homoptera, which is among the insect targets of carbaryl.[45] Consequently, the agency should have foreseen at least an indirect threat to UPD from cicada reductions.

Moreover, the EA discloses direct threats to UPDs from grasshopper control. The EA disclosed that carbaryl is low to moderately toxic to mammals and malathion poses a low risk to mammals. In its review of potential impacts on threatened and endangered wildlife within the EA, APHIS stated in regard to carbaryl spray that, "few fatalities [are] likely to occur and a low risk of behavioral anomalies" are likely, and that, with the use of malathion, "Some individual animals may be at risk of fatality or behavioral alterations that make them more susceptible to predation… However, most individual animals would not be seriously affected" (USDA 1987b: 14). As for the potential impact of carbaryl bait,

> Some species of granivorous mammals and birds may consume wheat bran bait after it has been applied to grasshopper-infested areas. Carbaryl is moderately toxic to mammals…Because the amount of bait required to be eaten for such effects to occur is relatively low for each species, it is possible that wildlife species, particularly smaller birds and mammals, feeding on the bait would receive toxic doses and some fatalities might occur (USDA 1987b: 14).

Carbaryl and malathion therefore, appear to pose some risk to UPD individuals, in contrast to APHIS's description of no impact to UPDs from the use of these pesticides.

APHIS understates the potential impacts of these pesticides on UPDs. In laboratory tests on rodents (rats), carbaryl caused decreases in weight and body temperature with a single dose of less than 5% of the LD_{50} [46] for this chemical (Wills et al. 1968; Cox 1993). In addition, rats fed carbaryl at 1% of its LD_{50} and then infected with a bacteria suffered mortality rates almost twice that of rats not fed carbaryl (Shabanov et al. 1983; Cox 1993). A multitude of other impacts,

[45] See insect label information for carbaryl at California's Department of Pesticide Regulation database at <http://www.cdpr.ca.gov/cgi-bin/label/label.pl?typ=pir&prodno=35514>, visited 14 November 2002.

including behavioral and neurological ailments, suppressed reproduction, and carcinogenicity, have been documented at low dosage levels of carbaryl in laboratory animals (Cox 1993). Similarly, malathion has been correlated with cancer, genetic defects, suppressed reproduction, lower weights, increased susceptibility to disease, and other negative consequences in laboratory rats and other animals, even at dosages below the LD_{50} for this pesticide (Brenner 1992).

Regardless, APHIS's final decision was to authorize the use of malathion, carbaryl sprays and baits, along with the use of Nosema bait (a naturally occurring protozoan parasite of many grasshopper species). No special mitigations were provided to avoid take of UPDs as a result of the grasshopper control (USDA 1987b Table 1). According to APHIS, because Utah prairie dogs are associated with water and treatments would not occur over rivers and lakes, "toxic affects [sic] in these areas should not occur" (USDA 1987a: 77). However, UPDs do not occupy rivers and lakes. Rather, they occupy moist swales that occur in conjunction with intermittent and perennial riparian areas in rangeland. APHIS's evaluation on the consequences of grasshopper control on UPDs is clearly inadequate.

There have been subsequent grasshopper/Mormon cricket control projects. Prior to 1995, nine biological opinions had been issued to APHIS regarding proposed grasshopper control. The only mitigation made for UPDs is that malathion and acephate will not be used within ¼ mile of Utah prairie dog towns (Terrell 1995). There is little evidence that this mitigation is adequate to avoid take of UPDs and reduction of invertebrate prey, and there is even less evidence that APHIS will be able or willing to fully implement this mitigation.

The most recent proposals for invertebrate control in the range of the UPD occurred in 2002. In January 2002, the Fishlake National Forest decided to implement a control project on 5,000 acres within the Fillmore Ranger District (Erickson 2002). This decision was made

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[46]The LD_{50} of a chemical is the dosage level at which 50% of test subjects will perish.

without analysis in the EA on the potential impacts to UPDs or prairie dog habitat (USFS 2001). Also in 2002, the Cedar City Field Office of the BLM initiated scoping on a proposal for Mormon Cricket control by APHIS on private lands adjacent to BLM lands in Beaver County (NEPA #UT-42-02-11). The Fillmore Field Office of the BLM signed an EA authorizing the control of grasshoppers and crickets in Millard County in January 2002 (NEPA #UT-010-001-036).

Vertebrate Species Control. APHIS/WS also controls vertebrate wildlife – both rodents and carnivores – within the range of the UPD. FWS analyzed the impact on Utah prairie dogs in its 1992 Biological Opinion on the WS (then Animal Damage Control) program. FWS concluded that WS's use of zinc phosphide and aluminum phosphide to control rodents and steel traps to control coyotes and other predators would not jeopardize the UPD. There appear to be multiple bases for FWS's no-jeopardy opinion: 1) EPA label restrictions require that strychnine not be used aboveground for rodent and lagomorph control in counties occupied by the UPD; 2) WS personnel do not conduct or recommend prairie dog control within the UPD's range; and 3) pan-tension devices are used for leghold traps in UPD habitat to preclude take of prairie dogs (USFWS 1992).

Contrary to the biological opinion, WS personnel are indeed conducting prairie dog control within the UPD's range. Moreover, FWS is authorizing this lethal control. In 2001, FWS approved WS control of UPDs through shooting, trapping, or aluminum phosphide on private property adjacent to UDWR land comprising 181.3 acres in Sections 5 and 6 of Township 34 South, Range 9 West.[47] This take was to be allowed under a Special 4(d) rule permit obtained by

[47]Exact location is West Half of the Southwest Quarter of the Northwest Quarter and the Northwest Quarter of the Southwest quarter of Section 5 in T34S, R9W, Salt Lake Base and Meridian; and the Southeast Quarter of the Northeast Quarter, and the Northeast Quarter of the Southeast Quarter, and the Northwest Quarter of the Southeast Quarter of Section 6 in T34S, R9W, Salt Lake Base and Meridian.

the private landowner (Baker 2001). FWS's action is alarming, given the prohibition on registered aluminum phosphide products of the use of these products on Utah prairie dogs (See EPA labeling for product EPA Reg. No. 30574-9). The agency's provision for lethal control of UPDs in 2001 using aluminum phosphide contradicts one of the bases for its 1992 no-jeopardy finding: that UPDs would not be jeopardize by rodent control given label restrictions prohibiting the use of rodenticides on UPDs. Another fumigant, Gas Cartridges, is prohibited from use within the range of the UPD (See EPA labeling for product EPA Reg. No. 56228-2).

In addition, EPA labels for some prairie dog toxicants and fumigants inexplicably omit Beaver County from the UPD's range. These labels therefore do not offer full protection – whether from federal agencies or private pesticide applicators – for Utah prairie dogs from rodenticides (See EPA labeling for product EPA Reg. No. 56228-2 (Gas Cartridge) and No. 56228-6 (Zinc Phosphide Concentrate)). Indeed, FWS stated as much in its review of the final environmental impact statement for the federal Animal Damage Control program. FWS stated that, given the failure of EPA to complete consultations on all pesticides that might adversely affect listed species, "merely following the pesticide label may not ensure that ADC is complying with section 7 of the Endangered Species Act" (Blanchard 1994).

Moreover, the quality of EPA's consultations on pesticides has been seriously called into question. James Salzman (1990: 331) discussed an EPA-funded review of consultations on EPA pesticide registration:

> They studied thirty-six cases where the pesticide use was such that its anticipated effect on listed species should have triggered a consultation. They found twelve [cases] in clear violation of the Act. In six, registration was completed before the consultation; five did not include the steps that the Office of Endangered Species found in consultation to be necessary conditions of registration, nor any other similar precautions; and in one, registration was completed without a consultation being initiated…The general problem is not confined to the EPA. The Service

> does not appear to have range maps, let alone recovery plans, for listed species in many cases, thus making consultation rather difficult.

Given this review, there is little basis for concluding the EPA label restrictions offer the Utah prairie dog adequate protection from pesticide use.

State UPD Management

The State of Utah made its position toward the Utah prairie dog clear when it petitioned for removal of Endangered Species Act protection from the species in 1979. Nevertheless, the State has a cooperative agreement with FWS for management of the UPD under the ESA's Section 6(c) (16 U.S.C. § 1535(c)) and take under the Special 4(d) is administered by the UDWR (49 Federal Register 22331 (May 29, 1984)).

As part of its cooperative agreement with FWS under Section 6(c), the Utah Division of Wildlife Resources publishes annual reports regarding the status of the UPD. The annual reports carry over many of the limitations in federal documents regarding the prairie dog. For instance, the state describes the spring emergence of pups as a "population explosion" with a tripling of the total population every spring; repeats the estimate that UPDs cause $1.5 million in crop damage annually; and maintains that the lethal control program constitutes compensatory mortality (McDonald 1996; 1997; O'Neill et al. 1998; 1999; Bonzo and Day 2000; 2002).

Yet, the state reports consistently indicate that UPD recovery is seriously faltering. First, they indicate that a high percentage of UPDs are on private lands: 76% in 1999, 78% in 1998, 82% in 1997, 78% in 1996, 79% in 1995. Second, the reports acknowledge that census counts in 1995-2000 are not much higher than when UPDs were downlisted. Third, they note that UPD habitat continues to be destroyed due to municipal development and that developers tend not to wait for prairie dog translocation before proceeding with construction (McDonald 1996; 1997;

Bonzo and Day 2000; 2002).

Despite these admissions of serious obstacles to UPD recovery, the obstacles largely go unaddressed. The State continues to repeat in each annual report the same management recommendations without demonstrating that progress is being made towards their implementation. The 1995 report included the following recommendations: 1) need to better understand UPD habitat needs – implement ICS research protocol without delay; 2) all affected agencies should provide resources and personnel to implement recovery plan and ICS tasks; 3) several public land sites becoming dominated by sagebrush – e.g. Buckskin, Minersville #3 – need vegetation management/site-specific management plans; 4) need agreement between all affected agencies on long-term management of prairie dog complexes, as required by recovery plan; 5) need close monitoring on private and public lands "to ensure that dramatic declines do not continue" (31); and 6) need public participation in all aspects of recovery implementation (McDonald 1996).

In the 1996 report, all of these recommendations are repeated verbatim (McDonald 1997). In the 1997 report, all of these recommendations are repeated, and two are added: 1) an HCP for Iron County should be approved without delay; 2) UPDs should be released the same day they're trapped and family groups should be released together; and 3) precise mapping and surveys should occur at Millard and San Pete county colonies (O'Neill et al. 1998). In the 1998 report, all of the recommendations from 1995 are reported, the 1997 recommendations numbered two and three are repeated, and the recommendation that HCPs for Paunsaugunt and Awapa Recovery Areas should be developed promptly is added (O'Neill et al. 1999). In the 1999 report, its only differences from the 1998 report was that HCPs for the Paunsaugunt and Awapa Plateau Recovery Areas were further along and the 1995-1998 recommendation for sagebrush control on some sites was dropped (Bonzo and Day 2000). In the 2000 report, its only differences from the 1999 report was that an HCP for the Paunsaugunt Recovery Area had been prepared and the recommendations for precise mapping in Millard and San Pete Counties was dropped (Bonzo and Day 2002).

Certainly some of these management recommendations are multi-year issues and cannot fairly be expected to be resolved in one year. However, it is interesting to note which recommendations have lingered, unfulfilled, from year to year. First, it is clear that federal land managers do not know what precise habitat requirements are needed for successful translocation sites, yet translocation continues at high rates. The threat this poses to UPD populations is discussed in the Translocation section below. Second, the necessary personnel and resources have not been allocated by affected agencies to implement the Recovery Plan or ICS. Third, an inter-agency agreement for long-term management of UPDs, as required by the Recovery Plan, has still not been developed. Fourth, despite two Special 4(d) rules and habitat conservation plans, human depredation of UPDs is still suspected. This calls into question the extent to which these provisions for legal take to avoid illegal take are actually discouraging the latter. The only clear example of where recommendations are being implemented is in the development of HCPs, which provide for take of individual UPDs and destruction of their habitats.

The lack of UPD recovery efforts on private land

The history of UPD policy has a common strain: emphasis on public lands alone for prairie dog recovery. With such an imperiled species, it is dangerous to neglect UPD protection on private land. In fact, private land habitat is vital for most endangered species. Studies have documented that 75% of listed species find the majority of their habitat on non-federal lands

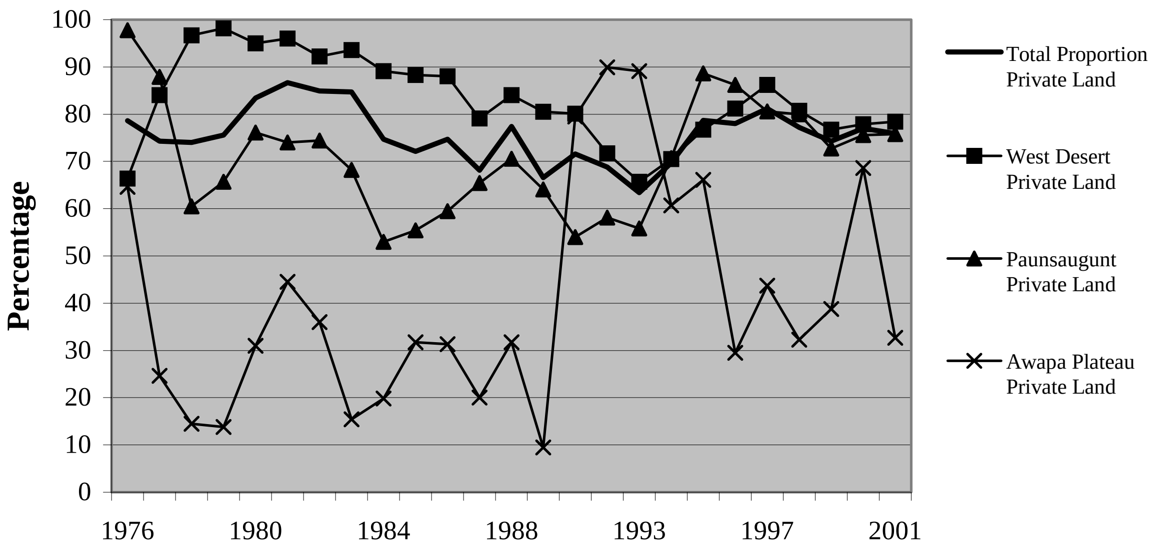
(Natural Heritage Data Center Network 1993), while over 90% of listed species depend on nonfederal lands for a portion of their habitat (GAO 1994b).

The importance of private lands to UPDs

The majority of UPDs in the West Desert and Paunsaugunt Recovery Areas have consistently been on private lands since census counts began in 1976. The majority of the census count overall has been on private lands. The exception is the Awapa Plateau Recovery Area. In this area, there has been extreme variability in the proportion of UPDs located on private lands. That proportion has ranged from 9.5% in 1989 to 89.9% in 1992 (See Exhibit 1: Census Data by Recovery Area).

Figure 13 demonstrates graphically that UPDs have been primarily on private lands throughout the past 25 years, with the exception in some years of prairie dogs within the Awapa Plateau. While total census counts have varied considerably, the recovery goal of moving prairie dogs from private lands to public lands has largely failed as there has been neither a steady increase in total census counts nor has there been an increasing percentage of UPDs on public lands (See Exhibit 1: Census Data by Recovery Area). In short, FWS and UDWR can no longer ignore conservation of UPDs on private lands if this prairie dog species is to survive and recover.

Figure 13. Percentage of UPDs on Private Lands. Source: Bonzo and Day 2002.



Year (1990 data deleted due to lack of private land surveys that year).

On the site-specific level, the West of Rush Lake complex (C123) is, according to the BLM, spreading “considerably to the south on private land” (BLM 2000: 7). This suggests the availability of suitable habitat on private lands. However, because of this complex’s spread onto private land, it no longer even merits Category 1 population monitoring and assessment, as BLM has stopped conducting census counts on the complex (BLM 2002: 8).

FWS recognized in the Recovery Plan that, with the majority of UPDs found on private lands, private and SITLA lands should be acquired or protected via leases and easements in order to effect prairie dog protection (USFWS 1991). BLM acknowledged in its 1997 UPD site management plans the need for acquisition of SITLA parcels to further Utah prairie dog conservation (Horse Hollow Plan BLM 1997; Monument Peak Plan BLM 1997). In addition, in its assessment of 20 years of UPD recovery efforts, UDWR recommended that conservation easements on private lands be pursued (McDonald 1993).

Environmental Defense has discussed the need for UPD conservation and recovery on private lands through the use of landowner incentives (Bonnie et al. 2001). They state,

> As colonies become fewer and more dispersed, the ability of the animals to re-colonize areas in the wake of plague outbreaks, droughts, and other catastrophic declines. Thus a policy that ignores the protection and restoration of prairie dog colonies on private lands could jeopardize the survival of the species (Bonnie et al. 2001: 5).

Petitioners agree that such landowner incentives would be a step forward, but an upgrade of the species to Endangered status would provide an added impetus for landowners to sign onto such programs. Indeed, full ESA protections for the UPD from take or habitat destruction on private and public lands alike is necessary for the species to survive and recover.

Bonnie et al. also point out that the checkerboarded nature of federal landholdings makes private land UPD conservation even more important, as federal land managers will seek to buffer private lands from UPD colonization (Bonnie et al. 2001). As has already been demonstrated in this petition, such an assertion is well substantiated. There is ample evidence that federal land managers and the U.S. Fish and Wildlife Service are limiting UPD conservation in areas close to private lands.

Habitat Conservation Plans

In addition to massive translocation of Utah prairie dogs from private lands to public lands (discussed below), habitat conservation plans have been the recovery program’s response to private land UPD populations. HCPs are being approved by FWS on the basis that vegetation and other habitat manipulation is being conducted on BLM land. However, there is little evidence that these activities are improving UPD recovery on BLM land. Regardless, incidental take of prairie dogs continues. There are several HCPs involving Utah prairie dogs: the Iron County HCP, finalized in 1998; the Garfield County HCP, which was supposed to be finalized in 2002 (Bonzo and Day 2002); and site-specific HCPs and accompanying permits for incidental take.

Iron County HCP. Iron County contains 65% of the total population of Utah prairie dogs, and 86% of UPDs in Iron County are located on private lands (Iron County HCP (1998)). Given the consequent potential for conflict between UPD conservation and economic development within Iron County, a county-wide Habitat Conservation Plan (HCP) was promulgated in June 1998 (Iron County HCP) and an incidental take permit was issued July 1, 1998 (Permit Number MB000142-0). The HCP was "designed to provide coverage for ESA Section 9 for all[48] ground disturbing actions on non-federal lands" (Iron County HCP: 30), which is a disconcerting proposition given the supermajority of UPDs in Iron County being situated on private lands.

The goal of the Iron County HCP is "to allow continued development and economic growth in Iron County, while conserving and recovering the Utah prairie dog on public lands" (Iron County HCP: 1). This fits with the Recovery Plan's and the ICS emphasis on translocation as a recovery strategy and continues to neglect conservation of UPDs on private land.

There are two types of take provided for under this HCP: permanent take, where habitat is permanently destroyed, and non-permanent take, where habitat is not destroyed, but a colony's UPD population is reduced. The level of permanent take allowed under the HCP is tied to the number of UPD complexes existing on public land and the census counts from the previous five years. When the Iron County HCP was promulgated, there were an estimated 11 public land complexes. Consequently, the take of 850 acres per year could be permitted. However, the level

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[48]This includes both ground-disturbing activities requiring a building permit and those not requiring such a permit (Iron County HCP).

of permitted habitat destruction is further qualified by the number of individual UPDs counted in the census. The number of UPDs that could be taken is based on the average of the prior five years of census data. Permitted take is 10% of that average. The example used in the Iron County HCP is based on 1997 statistics. Because the average from the prior five years was 457 UPDs, take of individual UPDs was set at 46 UPDs for 1998. Total allowable take under the HCP for 1998 would be 400 acres or 46 UPDs, whichever was reached first (Iron County HCP). As indicated in the permitted take section below, the Iron County HCP has resulted in take of 293.9 UPDs and 129.1 acres of UPD habitat from 1998-2000.

The primary mitigation for economic development is the translocation of UPDs from private lands slated for development to public lands managed by the BLM. However, as mentioned above, many developers prefer not to delay development with translocation (Bonzo and Day 2000; 2002). Development therefore results in the direct killing of UPDs and the destruction of their native habitat.

The Iron County HCP, like the Recovery Plan and Special 4(d) rules, overestimates UPD reproduction rates. The HCP states that UPD mean litter sizes are 4.1 with 3% of adult females not bringing a litter above ground each year (Iron County HCP). As discussed earlier, the mean litter size is 3.88 and 33% of adult females fail to produce a litter each year (Hoogland 2001). This inaccuracy in the HCP is significant, as overestimation of UPD reproduction provides a flawed biological basis for permitting take.

The Iron County HCP’s incidental take permit was issued by FWS for a period of 20 years (USFWS 1998; Permit Number MB000142-0). Given that drought and sylvatic plague regularly have catastrophic impacts on UPDs throughout their range, locking in private land policies for a term of 20 years in a county hosting the majority of prairie dogs, most of whom are on private lands, is counter to UPD conservation and recovery.

In sum, while it is clear that the Iron County HCP results in the destruction of UPDs and their habitat, it is not clear that mitigations are compensating for this destruction. The Iron County HCP, as implemented, prioritizes economic expedience above the biological needs of the UPD. Given that the majority of UPDs is found in this county, and is found on private lands, makes this HCP a gravely significant threat to UPD survival and recovery.

Garfield County HCP. After Iron County, Garfield County contains the highest number of UPDs and the most UPD-occupied acreage. In addition, it is a rapidly growing county in terms of human growth rates. As mentioned above, Garfield County's population increased by 19.0% between 1990-2000. The Garfield County HCP is modeled after the Iron County program and will result in additional permitted take of UPDs and their habitat. Given the lack of evidence that mitigations will compensate for permitted take, it is apparent that the Garfield County HCP constitutes an additional threat to UPD survival and recovery. The Garfield County HCP has not yet been finalized.

In February 2001, BLM finalized an EA for UPD habitat improvement and translocation in the Panguitch Valley on a parcel where no UPDs exist (EA 046-01-010). This EA provided for the prescribed burning, mechanical treatment, and seeding of 600 acres dominated by sagebrush and pinyon juniper. The project was necessary to implement the draft Garfield County HCP, providing for the translocation of some UPDs from private lands to BLM lands and authorization of incidental take of UPDs and their habitat on private lands (UDWR 2001). According to the BLM, without the 600-acre treatment and translocation project,

> No areas on BLM lands in Garfield County would be available for translocation and impacts to private lands may continue to occur as a result of Utah Prairie Dog

> occupancy. These impacts may include agricultural damage to crop fields from burrowing, crop reduction (actual foraging of crops by prairie dogs), damage to irrigation canals from burrowing (EA 046-01-010: 12).

It is clear that the project was motivated by a desire to alleviate perceived harms by UPDs on private lands in Garfield County. In the BLM's view, the project would consequently lower levels of take, as offending Utah prairie dogs would be moved from private land to public land. This logic would have some merit if vegetation treatments had a record of success. Commenters on the EA even raised this issue, by questioning the BLM on whether the proposal would lead to long term recovery of the species. Rather than respond substantively to this question, the agency responded only that the site and translocation method were proposed by UDWR and to the ICS. In addition, the issue of non-native vegetation on the site was inadequately addressed – while there was no discussion of cheatgrass in the EA's discussion of invasive, non-native species, this noxious weed was noted as a plant species observed during a field survey (EA 046-01-010). The BLM fails to consistently address the problems cheatgrass and other noxious weeds may pose to UPD recovery, even on a site presumably designated for prairie dog recovery.

Site-specific HCPs. Site-specific HCPs have been issued in Iron and Garfield Counties, further undermining UPD conservation on private lands. In the 1990s, there have been at least seven incidental take permits issued for habitat conservation plans developed for site-specific destruction of UPD populations and occupied habitat:

- The Coleman Company, Inc. obtained an incidental take permit on September 18, 1995 for the expansion of an existing warehouse in Cedar City, Iron County, UT. The permit's term was two years and provides for the removal and relocation of up to 116 UPDs and the direct mortality of two UPDs on 1.4 acres (Permit Number PRT-804404).

- West Hills, L.L.C. obtained an incidental take permit on September 18, 1995 for the take of up to 44 UPDs on two acres through capture and relocation and the take of up to one UPD through direct mortality in Cedar City, Iron County, UT. The permit's term was two years (Permit Number PRT-804479).

- Connel Gower Construction obtained an incidental take permit on 13 September 1996 for the relocation of up to 106 UPDs and commercial construction on 63 acres of UPD habitat in Cedar City, Iron County, UT (Sections 3, 4, 9, and 10 in Township 36 South, Range 11 West). The permit's term is 20 years (61 Federal Register 39979-39989 (July 31, 1996); 61 Federal Register 49787 (September 23, 1986); Permit Number PRT-817340).

- Smead Manufacturing Company obtained an incidental take permit on May 29, 1996 for the relocation of up to 50 UPDs and take through direct mortality of 5 UPDs on 29 acres of prairie dog habitat in Cedar City, Iron County, UT (Section 8 in Township 36, Range 11 West). The permit's term was 3.5 years (61 Federal Register 18407-18408 (April 25, 1996); 61 Federal Register 30636 (June 17, 1996); Permit Number PRT-814008).

- Church of Jesus Chris Latter-Day Saints obtained an incidental take permit on 7 March 1997 for the relocation of up to 22 UPDs from private land and the destruction of 6.3 acres of prairie dog habitat to build church in Cedar City, Iron County, UT (T35S, R11W, S35). The permit's term was two years (62 Federal Register 9204-9205 (February 28, 1997); 62 Federal Register 16603 (April 7, 1997); Permit Number PRT-825570).

- Jose Noriega, Sam Zitting, and Phillip Finch obtained an incidental take permit on 16 December 1997 for the destruction of 1.66 acres of UPD habitat and relocation or mortality of up to 12 UPDs south of Panguitch, Garfield County, UT (Section 32 in Township 34 South, Range 5 West). The permit's term is 20 years ((62 Federal Register 55652-55653 (October 27, 1997)); Permit Number PRT-835638).

- South Central Utah Telephone Association obtained an incidental take permit on November 19, 1999 for the take of UPDs resulting from the installation of a 2,500-feet television coaxal cable, impacting 0.133 acres of UPD habitat and the take of four UPDs southeast of Panguitch, Garfield County, UT. The permit's term was one year (64 Federal Register 51333-51334 (September 22, 1999); 64 Federal Register 68112-68113 (December 6, 1999)).

These small-scale HCPs are eroding UPD populations in the areas in which they are occurring. Scientists have described how small-scale HCPs generally do not serve conservation goals (Noss et al. 1997). More specific to the UPD, perhaps the biggest flaw in these HCPs and FWS's issuance of ITPs is that the cumulative impacts of incidental take on prairie dogs in the West Desert has not been considered or addressed by private parties or FWS. In the case of the Coleman Company and West Hills HCPs, the two projects were located in adjacent sections (Sections 9 and 10 of Township 36 South, Range 11 West), the same environmental consulting firm wrote the HCPs and EAs for these two projects and issued them on the same date (June 16, 1995), and FWS issued take permits on the same day (September 18, 1995). Yet, the HCPs and EAs failed to consider the cumulative impact of multiple projects destroying UPD habitat and removing prairie dog individuals (SWCA 1995a; b; c; d). FWS did not question this inadequate analysis.

Other flaws in these HCPs include insufficient discussions of alternative actions and failure to implement mitigations. First, the HCPs and EAs for both the Coleman Company and West Hills provided an alternative action of no action. However, the discussion of this alternative in the Coleman Company case was summarily dismissed on the basis that it would result in economic loss to the landowners. There was no consideration of the fact that UPDs would be better off under the no-action alternative (SWCA 1995a; b). In the West Hills context, the HCP and EA reject the no-action alternative on the basis of economic loss to the private landowner and potential conflict with owners in adjacent areas. Amazingly, the discussion for the West Hills also includes the speculation that, if the project does not go forward and incidental take does not occur, the colony "could become extinct as a result of increasing human encroachment" (SWCA 1995c: 4; 1995d: 15). The HCP and EA for this project fail to recognize that the project itself (residential development) represents human encroachment, and is precisely the reason why UPDs are imperiled in Cedar City and in areas throughout their range.

Second, both the Coleman Company and West Hills projects involved relocations in the summer of 1995 (SWCA 1995a; b; c; d). The 1995 UDWR prairie dog report indicates that only five UPDs were relocated from West Hills to BLM land, which is considerably less than the 44 prairie dogs estimated to have occupied the West Hills development site. In addition, due to a livestock permittee's legal actions, Adams Well was not used as the translocation site, although it had been selected as the priority transplant area. Rather, the UPDs were released on the Buckskin complex and along a gas pipeline (McDonald 1996). It is likely that the remaining UPDs were killed in their burrows when development transpired. For the Coleman Company site, the state report indicated that UPDs were scheduled for removal, but does not specifically discuss the site or its inhabitants' fate in the subsequent year's report (McDonald 1996; 1997).

In the Smead Manufacturing Company HCP and EA, the no-action alternative considers only the adverse economic impact on the company and does not disclose the benefits that preserving UPD habitat provides to prairie dogs (JBR Environmental Consultants 1996a; b). There is no cumulative effects analysis within the HCP. In the EA, the authors state that Cedar Valley is being transformed from primarily agricultural to residential, industrial, and agricultural land uses. The UPD relocation to make way for the Smead Manufacturing Company facility, according to the EA, aligns with long-term management of relocating prairie dogs from private lands where they conflict with human land use to public lands (JBR Environmental Consultants 1996a). The EA does not discuss the benefits to UPDs from protecting their habitat on private lands.

There are similar deficiencies in the HCP and EA prepared for Connel Gower Construction's proposed industrial complex. Both documents fail to discuss the cumulative effects of this project and the no-action analysis is flawed along the same lines as the previous projects (SWCA 1996a; b). However, the Connel Gower project is even more egregious, as the permit provides, after the relocation of eight UPDs per trapping season, for the take of 98 prairie dogs through direct mortality (See USFWS Federal Fish and Wildlife Permit Number PRT-817340). Given this potential for substantial killing of UPDs, it is difficult to accept as accurate the HCP's characterization that the project "will contribute to the attainment of the [U.S. Fish and Wildlife] Service's recovery goals for the Utah prairie dog" (SWCA 1996b: 10).

The HCP and EA prepared for residential building permits for Jose Noriega, Sam Zitting, and Phillip Finch in Panguitch, Utah, also inadequately addressed cumulative impacts and the merits of a no-action alternative. The HCP refuses to address cumulative impacts, stating: "This document does not address potential development or expansion outside the identified project area" (Noriega 1997b: 6), with the project area defined as several acres within Section 32 of Township 34 South, Range 5 West (Noriega 1997b). The no-action alternative is dismissed within the HCP on the basis that this alternative would create significant economic loss to private parties and would limit future development. The only consideration for the UPDs is that, without the project, UPDs would continue to experience conflict with humans and that prairie dogs on private lands do not count toward recovery goals (Noriega 1997b). Although accurate, this does not address the question of whether preserving UPD habitat on private lands biologically benefits prairie dogs. Petitioners maintain that it does.

The EA dismisses the no-action alternative on the basis that it would result in economic loss to the applicants and would prevent future development. It does not discuss how the protection of this private land habitat might benefit UPD survival (USFWS 1997). In addition, the cumulative effects section, in its entirety, is as follows:

> The potential effects related to this proposal are cumulative in nature to the effects resulting from other development and activities in the area. The proposed action and other cumulative effects in the area are not expected to result in significant effects on any resources which may occur in the area (USFWS 1997: 10).

Here, the EA briefly raises the issue that there are cumulative effects from habitat destruction going on elsewhere, but then entirely dismisses the impact of any of these activities on UPDs. This analysis is at best incomplete and, more accurately, it is incoherent and unsupportable.

Moreover, the HCP for this project was prepared by Jose Noriega, one of the individuals seeking to construct a house on UPD habitat and a wildlife biologist for the Dixie National Forest. Noriega's proposal to destroy UPD habitat and relocate 12 prairie dogs under this HCP from the private lands slated for development to the Dixie National Forest (Noriega 1997b), where he works, is of great concern to petitioners. In addition, this same Jose Noriega conducted the UPD survey on the private lands covered under this HCP. Unsurprisingly, he reported that no UPDs occupied his land (Noriega 1997b).

On the Dixie National Forest, Noriega authored multiple BA's concerning the impact of proposed projects on UPDs (Noriega 1996; 1997a; 2000; 2001). Noriega's willingness to destroy UPD habitat to build a house for himself and to facilitate other parties' destruction of prairie dog habitat – i.e., Zitting and Finch – calls into question his ability to objectively assess the deleterious impact of land use activities to UPDs on the Dixie National Forest.

For the South Central Utah Telephone's incidental take of UPDs, FWS found that the project qualified for a categorical exclusion and therefore no EA was prepared (64 Federal Register 51333-51334 (September 22, 1999)). The mitigation consisted of a total fee of only $120.00 and the mere possibility that the UPDs would be relocated prior to habitat destruction (SWCA 1999). In the HCP for this project, as was the case in prior HCPs, the no action alternative and cumulative impact analyses were problematic. In considering the no action alternative, the HCP's authors dismissed it stating that, without the project, the television viewing needs of residents could not be met, and, even if the project didn't proceed, UPDs would continue to experience human/prairie dog conflicts resulting in mortality. This limited analysis indicates that human entertainment has been placed above the survival of a threatened species. In addition, the HCP maintains that, without legal take of the species, illegal take will occur

(SWCA 1999). In the section on Special 4(d) Rules above, petitioners discussed the pitfalls of the "conservation" strategy of taking individual UPDs legally so that illegal take does not occur. Illegal take of UPDs continues to occur – long after the series of highly permissive provisions for legal take of this species have been implemented.

The cumulative impacts analysis for the South Central Utah Telephone project maintained that UPDs would not be permanently affected by the proposed coaxal cable installation or its cumulative effects. This statement is uttered alongside the acknowledgement that, far from a temporary impact, this type of project facilitates commercial and residential development of the area (SWCA 1999). In addition, the analysis fails to consider the cumulative impact of various cable installation projects and the impact of cable installation projects in conjunction with other forms of residential and commercial development that destroys UPD populations and habitat.

Finally, the EA for the Church of Jesus Christ of Latter-Day Saints' proposal to build a church on UPD habitat includes a cumulative effects analysis which discloses that conversion of land to municipal uses is resulting in significant losses of prairie dog habitat. Yet, due to the planned relocation of UPDs, the EA concludes that no cumulative impacts to prairie dogs are anticipated with the project (SWCA 1997). The HCP also concludes that there will not be cumulative effects from the project (SWCA 1996c). Given the lack of success in translocation and the continued role of private lands in sustaining the majority of UPDs, this conclusion is untenable.

Collectively, these small-scale HCPs resulted in considerable take of Utah prairie dogs (See Table 5). In fact, the seven HCPs permitted the take of 103.49 acres of UPD habitat and 362 UPDs.

Table 5. Take of Utah Prairie Dogs Under Small-Scale Habitat Conservation Plans. Source: USFWS Incidental Take Permits.

HCP Applicant	Year of HCP	Acres taken	UPDs taken
Coleman Company	1995	1.4	118
West Hills L.L.C.	1995	2	45
Connel Grower Construction	1996	63	106
Smead Manufacturing Company	1996	29	55
Church of Jesus Christ Latter Day Saints	1997	6.3	22
Jose Noriega et al.	1997	1.66	12
South Central Utah Telephone Assoc.	1999	0.133	4
Total		103.49	362

In sum, the inadequacy of regulatory mechanisms should be considered a severe threat to UPD recovery and survival. There seems to be consensus among state and federal (and certainly county) agencies involved in UPD recovery planning that prairie dogs should not be protected on private land despite the majority of UPDs being located on private holdings. In the meanwhile, UPD complexes continue to languish on public lands and the major federal land management agencies are not taking steps to curtail the destructive land uses that are degrading habitat conditions for UPDs.

5. Other Natural or Man-made Factors Affecting the BTPD's Continued Existence.

Rodent Control Efforts

While the large-scale eradication program at the beginning of the 20th Century has ceased, prairie dogs continue to be controlled via shooting and translocation. Indeed, as discussed in the previous section, FWS has authorized the take of UPDs under a special 4(d) rule and ITPs made possible by the prairie dog's downlisting to Threatened. Illegal poisoning and shooting is also taking place. In addition, the main thrust of the Recovery Plan is to translocate

UPDs from private land to public land. Petitioners review below how the continued take of UPDs via shooting and the massive translocation program constitute threats to Utah prairie dogs.

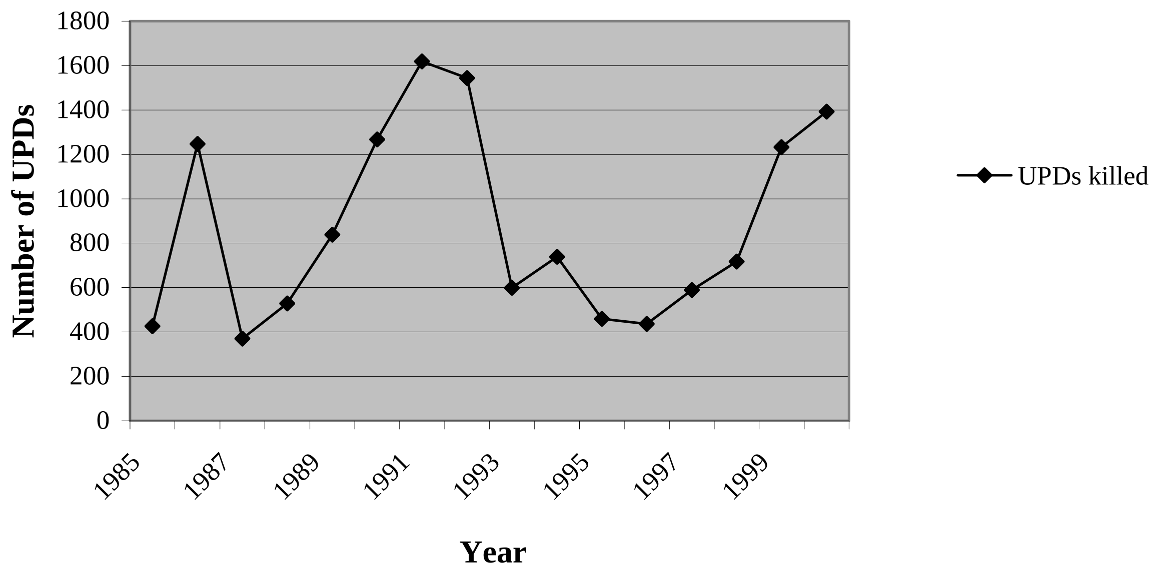
Permitted take

As discussed above, UPDs were historically targeted for eradication by agricultural interests and the federal government. While no toxicants are currently registered for use on Utah prairie dogs, the species continues to be lethally controlled via shooting. Indeed, as indicated in the Inadequacy of Regulatory Mechanisms subsection above, FWS policies - in the form of the Recovery Plan, Special 4(d) rules, and Habitat Conservation Planning - include provisions for continued lethal control of this critically imperiled species.

Legal take of UPDs has been authorized since May 29, 1984. Since then, 14,002 have been killed under this program (See Exhibit 17: UPD Control Data), with an annual average of 875.1 Utah prairie dogs controlled.[49] It is difficult to show that the lethal control program has caused the UPD's increased imperilment, given confounding variables of translocation, habitat destruction, and plague. However, it is clear that lethal control represents an additional threat to UPDs and is therefore, at best, hindering their recovery, and, at worst, pushing UPDs closer to extinction. Figure 14 illustrates the level of take under the lethal control program since the program began in 1985 (Figure 14).

[49] A total of 14,002 UPDs have been controlled under permit over the course of 16 years. (14,002/16 = 875.1).

Figure 14. UPDs controlled from 1985-2000. Source: UDWR UPD State Reports & 1991 Federal Register Rule.



In addition, take levels and population fluctuations from year to year suggest that lethal control may be contributing to population declines. In 2000, 1,392 UPDs were taken under the Special 4(d) rule. Between 2000 and 2001, UPDs plummeted from 5,878 to only 4,217 individuals. In 1991, 1,618 UPDs were taken under the Special 4(d) rule. Between 1991 and 1992, UPDs declined from 4,191 to 3,512 individuals (See Exhibit 1: Census Data by Recovery Area).

In its annual report, UDWR maintains that lethal control of UPDs is not correlated with population growth (Bonzo and Day 2000; 2002). However, the agency does not provide accompanying substantiation for this claim, nor does UDWR consider the cumulative impacts of lethal control on UPD populations alongside habitat degradation and loss, illegal take, and translocation.

In addition to the lethal control program, take is permitted under numerous site-specific and county-wide habitat conservation plans. Under the Iron County HCP, within the West Desert Recovery Area, which applies through the county, destruction of habitat and control of individual prairie dogs is permitted. Under the Iron County HCP, take from 1998-2000 totaled 293.9 UPDs and 129.1 acres of UPD habitat (Table 6). Although discerning the impact of this take is confounded by other threats to the species, in recent years, the census count on private lands in the West Desert has fallen by 415 UPDs, from 2,955 individuals in Spring 1998 to 2,540 individuals in Spring 2001 (See Exhibit 1: Census Data by Recovery Area). In addition, the take of 129.1 acres of UPD habitat represents a loss of 4% from acreage recorded in 1995.[50]

Table 6. Take of UPDs and UPD habitat under Iron County HCP, 1998-2000. Sources: O'Neill et al. 1999; Bonzo and Day 2000; 2002.

Year	**Number of UPDs taken**	**Acres of UPD habitat taken**
1998	191	65.04
1999	46.78[a]	28.825
2000	56.07	35.222
Total	293.85	129.087

[a]Figure represents estimate of number of UPDs taken and is therefore not a whole number.

In addition, as demonstrated in the previous section, site-specific HCPs have been promulgated and have resulted in the additional take of 103.49 acres of UPD habitat and 362 UPDs (Table 5).

Also discussed in the Inadequacy of Regulatory Mechanisms section was the fact that FWS and UDWR have relied on exaggerated estimates of UPD reproduction to legitimate the lethal control program and incidental take under habitat conservation planning. Given the flawed

[50]As discussed earlier in the petition, in 1995 occupied UPD acreage in the West Desert was calculated to be 3,266. 129.087 = 4% of 3,266.

scientific basis for permitting take, FWS and UDWR cannot demonstrate that lethal control is not impeding recovery of UPDs across their range and at the site-specific level. Consequently, the lethal control program should be considered an additional threat to UPDs.

Illegal take

UDWR has continually acknowledged that illegal poisoning of UPD has occurred in the past and may presently take place. As indicated above in the 1991 Special 4(d) rule, farmers – even after the 1984 downlisting – were killing UPDs illegally to protect crop agriculture (56 Fed. Reg. 27438, 27440 (June 14, 1991)). In addition, in the three most recent annual reports (from 1998-2000), UDWR includes the recommendation that populations "suspected to be in decline due to human predation must be monitored closely" (Bonzo and Day 2000: 25; similar language in O'Neill et al. 1999; Bonzo and Day 2002). Moreover, in its 20-year review of the UPD recovery program, the agency writes:

> Poisoning may still be a factor limiting recovery. Although illegal and never confirmed, poisoning is suspected to be the cause of population declines or extirpations in John's Valley in 1979, in Loa in 1982, in Capitol Reef in 1983, and in the Panguitch area in 1984 (McDonald 1993: 14).

The report cites illegal poisoning as the suspected cause in the failure of three UPD transplant sites (McDonald 1993). In 1998, the Iron County HCP also noted that illicit poisoning may be limiting UPD recovery.

Illegal poisoning therefore increases the magnitude of permitted take as a threat to UPD conservation and recovery. The logic that permitting take will preclude illegal take has endured in state and agency recovery planning, but that logic is incorrect. Despite generous provisions for take, private individuals within the UPD's range continue to thwart recovery.

Translocation program

The UDWR began translocating UPDs from private lands to public lands in 1972 (Coffeen and Pederson 1993). According to the UDWR, from 1972-2000, over 18,683 prairie dogs have been translocated under this program (Bonzo and Day 2002). Petitioners' review of UPD translocation from 1972-2000 indicates that a higher number – at least 19,193 UPDs – have been translocated (See Exhibit 18: Translocation Data by Recovery Area). Indeed, both the State of Utah and FWS seem to continually lose track of how many UPDs are being translocated from private lands to public lands. In the 1984 Downlisting and Special 4(d) final rule, FWS stated that 2,437 UPDs had been moved to public lands from 1976-1980 (49 Federal Register 22331 (May 29, 1984)). However, based on data in the Recovery Plan (USFWS 1991: D1-D2), the number of UPDs translocated in that period totaled 4,236.

Whatever the total number of UPDs that have been translocated, there has not been a consequent increase of UPD populations on public lands. Translocation itself, therefore, has resulted in the substantial loss of Utah prairie dog population numbers and acreage. The ICS states that translocation has been largely unsuccessful, as only a small fraction of prairie dogs translocated to the West Desert remained (Utah Prairie Dog Recovery Implementation Team 1997). In the 1984 Downlisting and Special 4(d) final rule, FWS discusses translocation of UPDs and states that "many of these animals apparently did not survive." The agency adds the proviso that translocation has succeeded in increasing the number of active prairie dog towns from 11 in 1976 to 32 in 1982 (49 Federal Register 22331 (May 29, 1984)). As of Spring 2002, only 25 UPD complexes with more than 10 individuals were counted on public lands (See Exhibit 3: Census Data by Site).

According to the BLM, approximately 5% of the total number of UPDs translocated have survived on public lands and over half of the transplant sites have failed (BLM 1997 EA). Most transplant site populations decline within four years after translocation has ended (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans). However, other sites, asserted the BLM, have been “extremely successful” (BLM 1997 EA: 5). The 1997 UPD site management plans developed by the BLM were expected to “maximize success rates” by improving transplant protocol (BLM 1997 EA: 5). Yet, as petitioners indicate below, the most recent translocation effort, in 1999-2000 at Dominguez-Escalante, has been a glaring failure.

In its 20-year review of the UPD recovery program, published in 1993, UDWR described the lack of success in the translocation program. According to the agency, only 17 of the 38 complexes to which UPDs had been translocated still contained prairie dogs in 1991. Of these 17 complexes, 6 had less than 20 UPDs, and only 3 had more than 100 UPDs. The median population in transplant complexes still occupied by UPDs was 29. Based on these small population sizes, UDWR predicted that 35% of occupied transplant complexes would go extinct within 25 years. Like the BLM, UDWR found that transplanted UPDs on public lands constituted less than 5% of the number of prairie dogs that had been translocated. Overall, 55% of the transplant complexes had failed and an additional 24% were occupied by less than 30 adults (McDonald 1993).

As of Spring 2002, there were only 25 UPD towns with more than 10 individuals on public lands. This is despite at least 12,376 UPDs being moved onto public lands since 1982 (See Exhibit 3: Census Data by Site and Exhibit 18: Translocation Data by Recovery Area). Even if one restricts one’s analysis to the period between 1976-1982, FWS appears to be misrepresenting the efficacy of the translocation program. In the West Desert Recovery Area, there were 306 UPDs counted on public lands in 1976 versus 312 in 1982 – a negligible difference. In the Paunsaugunt Recovery Area, there were more UPDs counted on public land in 1978 (326 individuals) than in 1982 (250 individuals). In the Awapa Plateau, there were more UPDs counted in 1977 (315 individuals), 1978 (466 individuals), and 1979 (457 individuals), than there were in 1982 (246 individuals) (See Exhibit 1: Census Data by Recovery Area). By the time the UPD was downlisted in 1984, the translocation program had been steadily hemorrhaging UPDs from quality private land habitat with no concomitant increase of UPDs on public land.

Indeed, in the UPD Recovery Plan, FWS noted that translocated prairie dogs populations were declining some 25-50% within two days after release and continued to decline subsequently. In response to this lack of success, FWS reviewed how the UDWR shifted emphasis in 1983 away from moving large numbers of UPDs toward improving relocation success (USFWS 1991).

However, UDWR continued to move large numbers of UPDs after 1983, in contrast to FWS's assertion. Transplant data from the UPD Recovery Plan indicates that translocation continued at a steady or increased pace, with numbers of UPDs moved in 1986, 1987, and 1989 exceeding those moved in 1983 (Figure 15; Table 7).

Figure 15. UPD Translocation, 1983-1991. Source: USFWS 1991.

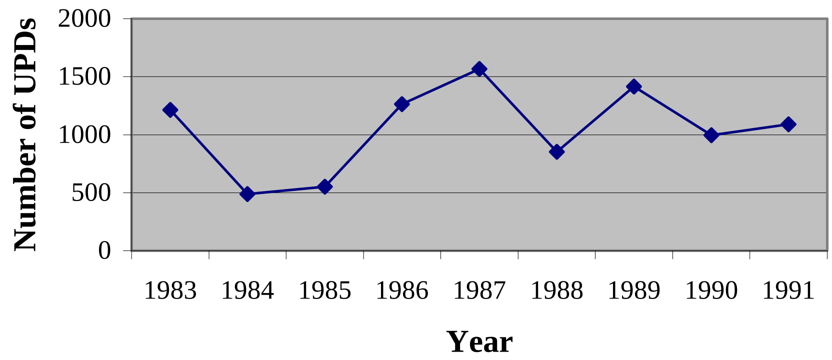


Table 7. UPDs Translocated, 1983-1991. Source: USFWS 1991: D-1-D-2.

Year	Number of UPDs translocated
1983	1,214
1984	488
1985	552
1986	1,263
1987	1,566
1988	852
1989	1,416
1990	995
1991	1,091

Since the Recovery Plan's promulgation, at least 2,888 UPDs have been translocated (See Exhibit 18: Translocation Data by Recovery Area). In 2001, another research study was initiated, in part, to ascertain how to improve translocation success (See BLM 2001 Interim Documentation of Land Use Plan Conformance and NEPA Adequacy for Project #UT-0441-01-19). In other words, UDWR and FWS have been experimenting with translocation for at least 18 years. In the process of this massive experimentation with a critically imperiled species, at least 19,193 UPDs have been expended. Yet, there exists little tangible evidence of the translocation program's success in promoting the conservation of Utah prairie dogs. In fact, despite the extensive translocation efforts, counts of UPDs on public land indicate that, in 1989, there were 2,482 UPDs censused across the three recovery areas, versus 885 counted in 2001. The translocation program therefore represents a massive take of Utah prairie dogs.

Some site-specific examples demonstrate this lack of success. The latest census count for Buckskin Valley (C110) was 7 UPDs, counted in Spring 2002. From 1976-1995, some 1,164 UPDs were translocated to Buckskin Valley (Black Mountain 1997 Plan). The UPD population crashed from the 1999 count of 95 UPDs on account of plague. Therefore, despite extensive translocation to this site, it currently contains only a marginal UPD population. An explanation for the status of this complex is inadequate vegetation for UPDs. The Buckskin complex (C110) fails to meet the warm season grass portion of the ICS vegetation composition guidelines on treated and untreated areas. As of June 2001, transect FN#5 indicated only 1% ground cover comprising warm season grasses, in contrast to the ICS stipulation of 3-10%. The ICS further specifies that if warm season grasses are less than 3%, forbs must be 11-20%. However, forb cover at the Buckskin complex is only 3%. Transect FN#2, the untreated area, indicated 0% warm season grasses and 4.5% forb cover. Transect FN#4, the treated area, was 0% warm season grasses, and 5% forbs Utah Prairie Dog Recovery Implementation Team 1997; BLM 2002: 14). All of these findings are contrary to the ICS vegetation guidelines.

Similarly, Horse Hollow's (C116) latest population count was 26 UPDs, counted in Spring 2002, despite 996 UPDs being translocated to the site from 1983-1992 (See Exhibit 3: Census Data by Site). In addition, according to the UDWR, "Ackers (1992) monitored transplanted prairie dogs and reported that none of the 50 released animals were located within 0.5 km of the release site by the end of the summer" (McDonald 1993: 12-13).

UDWR points to two sites as examples of successful translocation: Minersville #3 and the Adams Well Demonstration Site. First, in 1997, the BLM considered Minersville #3 to be "the most successful transplant site in the West Desert Recovery Area" (BLM 1997 Black Mountain Plan: 13). A 1994 report indicated that Minersville #3 (C122) was perhaps the only successful transplant site. That report found that UPDs had been translocated to nine of ten BLM sites that had been identified for translocation, but only remained at five. Of those five, the Minersville #3 population alone was considered to be faring well. Moreover, none of the ten sites met the vegetation guidelines for transplant sites, as they all contained a high percentage of woody shrubs and lacked one or more of the necessary grass/forb components (McDonald and Bonebrake 1994; McDonald 1996).

Yet, according to the 1998 State Report, even the one successful site – Minersville #3 – is becoming dominated by sagebrush (O'Neill et al. 1999). As of 2001, after vegetative treatment, Minersville #3 complex failed to meet the ICS vegetation guidelines. Transect M3#3 indicated 0% warm season grasses and 7.5% forbs. Transect M3#6 revealed 0% warm season grasses and 5.5% forbs (BLM 2002: 18). According to the BLM's annual report for 1999, in the west portion of the West Pasture, prairie dogs continued to decline (BLM 2000: 4). Although the 2002 census count indicated 235 UPDs at Minersville #3, this is a drastic decline of 579 UPDs in 2000 (See Exhibit 3: Census Data by Site).

On the Minersville #3 complex, grazing permittees have allowed their livestock to graze out of season. According to the BLM, "Livestock grazing did not follow the planned rotation schedule and small numbers of cows were present in the complex from the July 1 removal data [sic] through most of September" (2000: 4). On the Buckskin complex (C110), BLM installed an electric fence in 2000 to protect the 1999 treatment area from grazing, but the fence was ineffective as livestock still grazed the fenced-in area (BLM 2002: 4-5). The assertion that BLM is properly managing livestock numbers to avoid harms to UPD habitat becomes even less tenable with every incident where livestock trespass or ranchers fail to follow removal dates.

Second, UDWR suggests that the Adams Well site (C124) contains a self-sustaining population resulting from translocation (Bonzo and Day 2000). Adams Well has received some 1,200 UPDs. In the summer of 1996, 430 UPDs translocated to Adams Well site.[51] The site was approved for the translocation of only 400 UPDs (McDonald 1997: 7). At least 89 persisted into October; more than 60% of those counted were outside study plots, dispersing to the south. On October 18, 1996, 83 UPDs were counted at the site and the 1997 spring count was 21 prairie dogs. This equates to an overwinter survival rate of 5% (BLM 1997 Monument Peak Plan).

In July – August 1997, 383 UPDs were translocated to Adams Well Site in West Desert. The following spring (1998), only 40 UPDs were counted on the site (See Exhibit 3: Census Data by Site). In July – August 1998, 387 UPDs were translocated to Adams Well. In September and October 1998, 94 UPDs were counted, but more than 65% of those were counted outside of the study plots (O'Neill et al. 1999). The spring count for the following year (1999) was 76 UPDs and by Spring 2002, the census count was only 60 UPDs (See Exhibit 3: Census Data by Site). <u>Therefore, despite the translocation of 1,200 UPDs to Adams Well, the latest census count indicates only 60 prairie dogs at the site</u>.

Indications that individual UPDs translocated to Adams Well have not fared well include weight loss. Recapture data in 1996-1998 substantiate this. In 1996, there were data for 17 UPDs who, on average, had been at Adams Well for 51 days. Of these, six prairie dogs either did not gain or lost weight (50-250gm) between date of release and recapture. One prairie dog lost 200

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[51]The State Report differs from the BLM 1997 Monument Peak Plan in that the latter states that 440 UPDs were released to Adams Well in 1996.

gm between date of relocation on 9/10 and recapture on 9/24. One prairie dog lost 100 gm between date of relocation on 9/11 and recapture on 9/24 (McDonald 1997). In 1997, there were again recapture data for 17 UPDs. These indicated that four individuals had lost weight in the two months subsequent to their release, and one UPD did not gain any weight. The 17 UPDs averaged a weight gain of only 1.05 grams per day (O'Neill et al. 1998). The recapture data from 1998 corroborate the problem of weight loss or insufficient weight gain. Of the nine UPDs retrapped in 1998 from 1997 release, two females had lost weight. Recapture data for fall of 1998 is reported for 30 UPDs. It shows that seven UPDs (both adult and juvenile) translocated to the site in summer 1998 had lost weight between time of translocation and time of recapture one or two months later. One of these UPDs – an adult male – lost 350 grams within two weeks of his release. Four of the five adults for whom recapture data was available had lost weight. In addition, three juveniles translocated in 1998 had gained either 0 or only 25 grams by fall 1998 (O'Neill et al. 1999). The recapture data thus demonstrated that one in three UPDs were either rapidly losing weight or failing to gain sufficient weight consequent to translocation.

The weight loss and insufficient weight gain of UPDs translocated to Adams Well is undoubtedly linked to vegetation inadequacies on the site (as well as the trauma of relocation). Translocation success depends on prairie dog fat reserves, according to the BLM. They state: "Studies by Acker (1992) showed that survival from one breeding season to the next depends largely upon accumulation of fat reserves for the winter" (Black Mountain 1997 Plan: A10.1). There was a drought in 1996 that seriously impacted plant productivity at Adams Well (McDonald 1997). UDWR again points to low forage productivity on the site in its annual report for 1997. The agency states,

> Forage productivity at the Adams Well site in July 1996 averaged 176 lbs/acre, down from 678 lbs/acre in July 1995. This could be an indication why only 5% of

> the prairie dogs translocated in 1996 were found at the site during the 1997 spring count. Utah prairie dogs may not have survived the winter due to minimal forage in the fall, or they may have dispersed because of low food availability. Although forage productivity increased greatly in July 1997 to 559 lbs/acre, weight gain by translocated individuals averaged only 48.5 grams over an average 46 day period (1.05g/day) compared to 88 grams over an average 51 day period (1.73 g/day) in 1996. This low weight gain could affect overwinter survival (O'Neill et al. 1998: 22-23).

Despite the drought in 1996 and the failure of plant productivity in 1997 to rebound to pre-drought levels, the BLM and UDWR continued to translocate more prairie dogs to the site in 1998. Moreover, BLM continued to authorize livestock grazing on the site even while UPD survival at the site appeared to be faltering due to drought (Table 8). The combination of drought and continued livestock grazing on Adams Well explains the plunge in forage quantity and the consequent lack of UPD survival.

Table 8. Livestock grazing on Adams Well Allotment, 1997-1999. Source: BLM 1999, Utah Prairie Dog 1998 Annual Report; BLM 2000, Utah Prairie Dog 1999 Annual Report.

Grazing Season	**Livestock Number and Type**
11/3/97-4/28/98	75 cattle
10/16/97-12/17/97	1000 sheep
12/18/97-1/15/98	1779 sheep
1/16/98-3/19/98	2279 sheep
3/20/98-4/10/98	1500 sheep
11/6/98-4/30/99	77 cattle
12/1/98-12/20/98	1800 sheep
12/21/98-2/19/99	2600 sheep
2/20/99-3/15/99	2300 sheep
3/16/99-4/1/99	1500 sheep

In the West Desert, the BLM has recently shifted emphasis from the Adams Well Demonstration Site as a receiving area for translocated UPDs to the Dominguez-Escalante (D-E) site. From 1999-2000, 383 UPDs were translocated to D-E. However, as of fall 2000, no UPDs were counted at that site (Bonzo and Day 2002). In their annual report for the year 1999, UDWR attributed translocation failure at the site to the lack of burrow establishment, the collapse of burrows, and predation (Bonzo and Day 2000). In Spring 2001, 36 male UPDs were to be released into the D-E site. In Spring 2002, only 9 UPDs were counted at D-E (See Exhibit 3: Census Data by Site). As in Adams Well, the BLM continued to authorize while UPD translocation was underway (Table 9), which may be part of the reason why UPDs are not flourishing at this site.

Table 9. Livestock grazing on Dominguez-Escalante Transplant Site, 1999. Source: BLM 2000, Utah Prairie Dog 1999 Annual Report.

Allotment	Grazing Season	Livestock Number and Type
Perry Well	1/1/99-11/5/99	69-81 cattle
Perry Well	11/6/99-2/28/00	138-150 cattle
South pasture	5/31/99-11/5/99	70-81 cattle
South pasture	11/6/99-12/29/99	149 cattle

Livestock utilization data would help the BLM to discern the impacts of livestock grazing on UPD habitat. However, the agency fails to consistently obtain these data. For instance, at the Adams Well Demonstration site, livestock utilization data were not collected in 1998, despite UPDs being translocated to the site from 1996-1998 (BLM 1999: 3). Similarly, in the Dominguez-Escalante transplant site, livestock utilization data was not collected in 1999, although translocations of UPDs began that year (BLM 2000: 6).

In fact, in the most recent annual report from the BLM, the agency reports that it lacks the funding to conduct intensive monitoring and therefore cannot fulfill the ICS research agenda regarding interactions between habitat, livestock grazing, and UPDs. Further, while FWS is researching translocation and plague, that research does not include the collection of vegetation data (BLM 2002: 5).

During 2001, at least 30 UPDs were slated for translocation to Tebbs Pond and Willow Spring (West Desert Recovery Area) and Berry Springs (Paunsaugunt Recovery Area) (NEPA #UT-044-2001-18). The 1997 Black Mountain plan calls for the translocation of 800 UPDs to four different research sites per year (Coyote Pond, Horse Valley, Tebbs Pond, and Willow Spring Research Sites) within the area, for a maximum of 2,400 UPDs translocated (BLM 1997 Black Mountain Plan).

Coyote Pond complex (C129), Horse Valley complex (C126), and Willow Spring complex (C115) do not meet the warm season grasses component of the ICS vegetation composition guidelines. There was little growth in the seeded areas in 2000 (BLM 2002). In June 2001, at transect M5#5 (the seeded area), the Coyote Pond complex had 0% warm season grasses, which is lower than that specified by the ICS and only 4% forb cover, which, given the lack of warm season grasses, is also deficient. In addition, the shrub cover is 4%, in contrast to the ICS limit of 3% shrub cover, although there has been significant shrub reduction due to vegetation treatment. At transect M5#4 (the unseeded area), warm season grasses comprised 0% ground cover and forbs were only 1.5% ground cover, which are both deficient relative to the ICS vegetation guidelines (BLM 2002: 15). At the Horse Valley complex, the seeded area had only 0.5% warm season grasses and 4.5% forb cover and the unseeded area had 0% and 1%, respectively. Although there are sufficient cool season grasses, cheatgrass comprises 41% of the cool season grasses on the treated plot and 53% on the untreated plot. There has been dramatic reduction in shrub canopy cover at this site due to vegetation treatments (BLM 2002: 17).

The Tebbs Pond complex (C131) has insufficient warm season grasses and excessive shrub cover. However, given that the shrubs present are short shrubs and subshrubs, BLM describes this site as most suited of all the proposed sites. Tebbs Pond is proposed for transplants beginning in 2002 (BLM 2002: 6). As of June 2001, Tebbs Pond complex failed to meet ICS vegetation guidelines. For all transects, including seeded and non-seeded areas, there were deficient warm season grasses and forbs and excessive shrubs (Table 10).

Table 10. Tebbs Pond complex vegetative composition as of June 2001 (in % of Ground Cover). Source: BLM 2002: 19.

Transect Name	Warm Season Grasses	Forbs	Shrubs
LZH#3 (not seeded)	1.5	1.5	5
LZH#4 (not seeded)	0	6	7
LZH#5 (seeded)	2	3	5
LZH#6 (seeded)	1.5	3.5	5

The Willow Spring complex is proposed for transplants in 2002. However, as of June 2001, the Willow Spring complex failed to meet ICS vegetation guidelines. For all transects, including seeded and non-seeded areas, there were deficient warm season grasses and forbs. For one transect on a seeded area, shrubs continued to exceed ICS guidelines (Table 11). Moreover, crested wheatgrass was seeded on both the seeded and unseeded area in 1998 and the two plots showing a substantial increase in cool season grasses reflected a rise in crested wheatgrass (BLM 2002: 20).

Table 11. Willow Spring complex vegetative composition as of June 2001 (in % of Ground Cover). Source: BLM 2002: 20. Bolded numbers represent violations of ICS vegetative guidelines.

Transect Name	Warm Season Grasses	Forbs[a]	Shrubs
JR#7 (not seeded)	**0**	**2.5**	2.5
JR#8 (seeded)	**0**	**7.5**	**3.5**
JR#9 (seeded)	**0**	**2**	3

[a]While the ICS vegetative guidelines stipulate that forbs be 1-10% of ground cover, there is a further stipulation that forbs be 11-20% of ground cover when warm season grasses are less than 3% Utah Prairie Dog Recovery Implementation Team 1997).

Failure to meet ICS vegetation guidelines is not an esoteric concern, as vegetation factors are likely playing a role in the failure of UPDs to create a viable burrow system, and their consequent vulnerability to predators. As of 2001, after two years of serving as a translocation site, vegetation composition at the Dominguez-Escalante transplant site (C130) still failed to meet ICS vegetation guidelines. On transect PW#8, both warm season grasses and shrubs were deficient, at 0% ground cover each. On transect PW#9, warm season grasses were 2.5%, which is lower than that required by the ICS. Forbs, at 1% ground cover, did not make up for the lack of warm season grasses. In addition, there was 5.5% shrub ground cover, which exceeds the 3% limit in the ICS (BLM 2002: 16). The direct relationship between excessive shrub cover and high predation has been recognized by the BLM (BLM 1997 Black Mountain Plan).

The BLM knew about the vegetation problems at D-E before permitting the translocations to begin. The site is located in the Perry Well #1 and 2 grazing allotments, which were recognized as experiencing inordinate invasion by shrubs (Horse Hollow Site Management Plan BLM 1997; Table 4). According to the BLM's Utah prairie dog annual report for 1998, Dominguez-Escalante exceeded recommended shrub cover even after burning was conducted at the site. The BLM assumed that "many of the shrub species present probably do not negatively impact Utah prairie dog habitat due to the short height of the plants" and therefore recommended UPDs be translocated to the site starting in 1999. In November 1998, the Utah Prairie Dog Recovery Implementation Team approved the site for transplants (BLM 1999 Utah Prairie Dog Annual Report for 1998: 3-4). In the 2000/2001 Annual Report, the BLM continues to report that shrub composition exceeds the ICS vegetation guidelines, but excuses this failure on the basis that the shrubs are short (BLM 2002: 7). In its report for 2000, UDWR stated that, despite 383 UPDs being translocated to the site over the past two summers, no prairie dogs were found at the site by September and October 2000 (Bonzo and Day 2002).

According to the BLM, they will continue translocating UPDs to D-E despite the lack of survival there:

> There currently appears to be no survival from the first 2 years of transplants. Doing additional transplants may exceed the total number of Utah prairie dogs authorized for release at the site. However, we have identified no negative

> impacts from this action (See BLM 2001 Interim Documentation of Land Use Plan Conformance and NEPA Adequacy for Project #UT-0441-01-19).

BLM seems to not consider that one negative impact is translocating prairie dogs from quality habitat to habitat which they have demonstrated – through their lack of survival – is inadequate. In effect, this translocation is a form of lethal control of UPDs, as it is resulting in their premature death, whether from predation, starvation, or other causes.

In addition, the complexity of UPD social structure may be hindering translocation success. Ackers (1992) reported that, “transplanted prairie dogs spent less time foraging and more time moving than control prairie dogs, and behaved more like solitary individuals rather than a colonial species” (cited in McDonald 1993: 11). Coloniality is a vital evolutionary trait of the prairie dog genus as a response to the threat of predation (Hoogland 1979). While Ackers’s observation occurred at a time when UDWR was ostensibly overhauling its translocation protocol, the most recent relocation efforts, as demonstrated via failures at D-E, have certainly not been successful. One reason may be the difficulty in translocating UPDs in a way that preserves their social network.

In its 1993 report, UDWR attributed translocation failure to a combination of illegal poisoning, flooding, plague, predation, dispersal, and unsuitable habitat. In addition, the agency noted the ubiquity of grazing, stating,

> Grazing occurred prior to, during, and after translocation of prairie dogs at all transplant sites except Bryce Canyon National Park. Impacts of different grazing regimes are difficult to analyze because of changes that have occurred in allotment management plans over the years, noncompliance with grazing plans, and unavailability of grazing data. Utilization is described as moderate to heavy in the 22/38 (58%) complexes where information is available (McDonald 1993: 46).

The moderate and heavy grazing of UPD transplant sites is of concern, given the numerous impacts of livestock grazing that are deleterious to UPDs. As discussed above, these include:

riparian area destruction, shrub encroachment, decreased forage abundance, noxious weed proliferation, soil degradation, and altered fire ecology. With the exception of poisoning, all of the factors cited by UDWR as reasons for translocation failure are related to unsuitable or degraded habitat. Livestock ranching on public lands contributes to the rangeland degradation that is hindering UPD restoration.

Recently, Truett et al. (2001) reviewed the literature on prairie dog translocation, finding that dispersal, predation, and habitat were the most important factors in determining translocation survival. Indeed, for UPDs, the primary reason for the lack of success is suspected to be unsuitable habitat conditions, inadequate burrow systems, and predation (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans; Bonzo and Day 2000). The ICS also attributed the failure of translocation to habitat quality (Utah Prairie Dog Recovery Implementation Team 1997).

Biological guidelines for successful UPD transplant sites include,

> Moist swale vegetation in the form of grasses, forbs, and shrubs must be available throughout the period that Utah prairie dogs are active above ground. Moist vegetation is particularly essential in drought years and in the dry months of June through August and should be within 180 m of the home burrow area throughout summer (Coffeen and Pederson 1993: 61).

As has been demonstrated in the Inadequacy of Regulatory Mechanisms subsection, USFS and BLM continues to allow livestock overgrazing in allotments suitable or occupied by UPDs. Given the continued authorization of livestock grazing on public lands, it is likely that UPD transplantation will continue to falter.

Ironically, while the recovery plan, the Iron County HCP, and Interim Conservation Strategy call for translocation of hundreds of UPDs per year from private lands to public lands to make way for economic development, the BLM rejected translocation as a method of avoiding harm to up to five UPDs per year from vegetation manipulation of UPD complexes on BLM land. The reasons given were, “the high cost of transplanting, the low success rate, and the availability of suitable habitat on BLM lands at the project sites for affected animals to use” (BLM 1997 EA: 52). The BLM’s own characterization of translocation as not worthwhile due, in part, to low survival rates, calls into question the “recovery” strategy of moving UPDs from private lands to public lands.

The marginalization of private lands for prairie dog recovery is apparent in the recovery plan in the context of UPD translocation. The UPD recovery plan stipulates that, in determining public land transplant sites, prairie dogs should not be placed too close to private lands, “to prevent unwanted colonization on this land” (USFWS 1991: 27). In the event of colonization of private lands, prairie dogs would be removed unless an agreement with the landowner is made (USFWS 1991: 27).

However, placing a buffer between transplant sites and private lands excessively restricts the pool of potential relocation sites. In Iron County, for instance, few sites meet the habitat criteria outlined in the recovery plan, given high shrub cover and crested wheatgrass (Agropyron desertorum) monocultures (BLM 1997 Black Mountain, Buckhorn Flat, Buckskin, Horse Hollow, and Monument Peak Plans).

BLM maintains that crested wheatgrass helps sustain UPDs, but acknowledges its potential long-term harm, as demonstrated in their statement regarding the Buckskin Valley UPD complex:

> It is believed that the current crested wheat grass [sic] seedings have enabled the present prairie dog colonies to survive. It is also believed that this survival is only short-term due to the large population fluctuations that have occurred. A mixture of cool season grasses, warm season grasses, and forbs should provide more suitable habitat for long term survival (BLM 1997 EA: 9).

In addition, BLM comments that, “The tendency of crested wheatgrass seedings, where many colonies are located, to have low vegetative species diversity may also be limiting by contributing to prairie dog population crashes” (BLM 1997 EA: 41). The ICS notes that, “sites reseeded to a monoculture of crested wheatgrass (Agropyron desertorum) performed poorly as translocation sites” (Utah Prairie Dog Recovery Implementation Team 1997: 3).

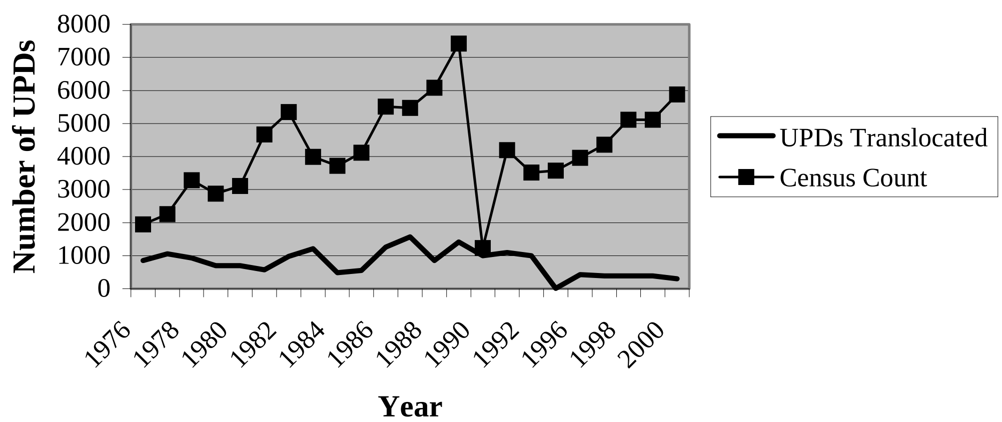
On the Dixie National Forest, translocation sites have not met ICS vegetation guidelines, yet USFS recommended their use for translocation. On the Coyote Hollow Transplant site, proposed for translocation in 1999, cool-season grasses exceeded the guidelines (the site contained 44% CSG versus the ICS’s specified range of 12-40%), and the dominant species were smooth brome and crested wheatgrass. In addition, the percentage of ground covered by shrubs far exceeded the ICS guidelines (12% on the site versus the ICS range of 0-3%), which the USFS excused because the shrub on the site was primarily black sage, which the USFS described as not limiting prairie dog visibility (Carlton Guillette, USFS, pers. comm., Reed Harris, FWS, dated 2/26/99).

At the Johnson Bench Transplant site, to which 304 UPDs were translocated in 1999 and 2000 (Bonzo and Day 2000; 2002), there was again an excess of cool-season grasses (at 60%) of which smooth brome and crested wheatgrass were again dominants. These two exotic grasses had been identified as dominant at Johnson Bench several years prior (See USFS Memorandum of Understanding for the Management of Utah Prairie Dogs in Johnson Bench Tom Best Areas, dated 7/15/97), and it therefore appears that prescribed burning has not significantly reduced smooth brome and crested wheatgrass at the site. Shrub levels were also exceeded (at 4%), but USFS again maintained that the shrubs present would not limit prairie dog visibility. USFS therefore recommended UPDs be transplanted from Panguitch Valley to the Johnson Bench site (Carlton Guillette, USFS, pers. comm., Reed Harris, FWS, dated 2/26/99).

According to the 1997 USFS MOU for the Johnson Bench and Tom Best areas, 1-3 acre openings in sagebrush have been created through prescribed burning. However, even within these openings, smooth brome remains the dominant grass (See USFS Memorandum of Understanding for the Management of Utah Prairie Dogs in Johnson Bench Tom Best Areas, dated 7/15/97). Likely due to inadequate vegetation and noxious weeds, the Spring 2002 census count for Johnson Bench was 31 UPDs, despite the relocation of 304 UPDs to that site (See Exhibit 3: Census Data by Site).

Translocation is not leading to increased UPD populations on public lands (Figure 16). What translocation is taking place should therefore be considered another threat to UPD populations. UPDs are being moved from quality habitat on private land to shrub-encroached and forage-depleted habitat on public land. Weight loss, predation, or dispersal are symptoms of the problem in the translocation program: relegation of UPDs to public land that is, and continues to be, degraded by land use activities.

Figure 16. UPD Translocation and Census Counts. Sources: USFWS 1991; Bonzo and Day 2002. (Years lacking either translocation or census data were omitted).



The goal of UPD translocation has not always been UPD conservation. UDWR reports, for instance, that the emphasis until 1979 was simply removing UPDs from private lands in response to landowner complaints (McDonald 1993). UDWR asserts that there was a consequent shift toward translocation as a means to recover UPDs. Yet, as the 1998 Iron County HCP makes clear, translocation of UPDs is often voiced as a twin goal alongside facilitating economic development.[52]

<u>Drought</u>

Drought also negatively impacts UPDs (USDA 1987; USFWS 1991; McDonald 1993; Iron County HCP).[53] Drought is defined as prolonged dry weather, typically less than 75% of the average annual precipitation (Society for Range Management 1989). While drought is a naturally occurring dynamic in the range of the Utah prairie dog, other anthropogenic factors are likely

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[52]For example, the HCP states on p. 1, "The goal of this plan is to allow continued development and economic growth in Iron County, while conserving and recovering the Utah prairie dog on public lands" (Iron County HCP 1998).

[53]See also USFS Biological Assessment of Utah Prairie Dog Habitat Improvement Projects. Dated 2/27/96; USFS Memorandum of Understanding for the Management of Utah Prairie Dogs in Johnson Bench Tom Best Areas. Dated 7/15/97.

exacerbating the negative impacts of drought on Utah prairie dogs. Drought has caused the elimination of several UPD colonies (USFWS 1991; McDonald 1996). This is due to Utah prairie dogs' need for moist areas with succulent vegetation. According to a UDWR report, "Colonies without moist vegetation are decimated by drought because prairie dogs are unable to obtain sufficient nutrients and water" (McDonald 1993: 15). Because of livestock's deleterious impacts on moist areas with succulent vegetation, discussed above, there is a strong likelihood that livestock grazing exacerbates the effects of drought on UPDs.

Within the West Desert, BLM has reported precipitation data near UPD colonies over the past several years (Table 12). Petitioners are concerned that livestock grazing is continuing during drought and the impacts of drought on UPDs are therefore increased.

Table 12. Precipitation Data for UPD complexes on BLM lands in the West Desert Recovery Area. Drought episodes are shaded. Sources: BLM 2000; 2002. (No data provided by BLM for 1998).

Rain Gauge Location	**Associated UPD Complex**	**% of normal precipitation**					
		1995	**1996**	**1997**	**1999**	**2000**	**2001**
Adams Well	C124	Above Normal[a]	Below Normal	Above Normal	Above Normal	88.27	91.41
Buckhorn Flat	C113	100.00	52.63	142.41	101.14	88.72	115.46
Buckskin Valley	C110	173.95	91.69	166.25	127.59	88.53	133.44
Jockeys	C118	150.12	86.55	125.00	93.32	89.08	82.52
Lizzie's Hill	C125, C122	131.22	85.23	116.71	97.25	89.20	103.68
Perry Well	C116	123.18	73.35	137.17	97.02	74.56	88.17
Pine Valley	C120	113.44	101.40	131.13	96.71	92.77	77.09

[a]The Adams Well gauge was established in 1995 and missed the first quarter's rainfall. BLM does not provide percentages of normal statistics for this gauge until 2000. In 2000 and 2001, BLM estimates normal precipitation at this site to be 7.42 inches in 2000 and 7.33 inches in 2001.

Cumulative impacts on prairie dog viability

All five criteria for listing under the ESA still apply to the Utah prairie dog and these five factors intersect to create a bleak picture for UPD persistence. Habitat destruction and degradation continues on private and public lands. Recovery and habitat conservation planning documents all share the supposition that UPDs should continue to be destroyed and their habitat converted or degraded regardless of the faltering population status of this species. Illegal and legal shooting and poisoning of Utah prairie dogs still occurs. The translocation program must be regarded as a massive take of the Utah prairie dog, given its overwhelming lack of success. And sylvatic plague intersects with all of the preceeding threats, thereby rendering the potential for extinction closer to certainty than speculation.

Considered across time and cumulatively, permitted take of UPDs has been staggering. Table 13 indicates take of almost 34,000 UPDs under four different facets of the UPD "recovery" program. This tally does not include illegal poisoning and shooting or the impacts of plague.

Table 13. Permitted Take of Utah Prairie Dogs Under Multiple Facets of Recovery Program.

Take Authorization	Years of Data	Acres taken	UPDs taken
Section 4(d) Rules	1984-2000		14,002
Iron County HCP	1998-2000	129.1	293.9
Small-scale HCPs	1995-1999	103.49	362
Translocation	1972-2000		19,193
Total		232.59	33,850.9

Despite the UPD's listing under the ESA for over 28 years, not one threat against the species has been eliminated. The lack of success in the prairie dog recovery program must be attributed to the premature downlisting of the Utah prairie dog to Threatened and to faulty implementation of the Endangered Species Act. The Act contains the tools for recovery of UPDs, but federal and state agencies have aligned in support of a misguided recovery program that prioritize economic land use above prairie dog recovery, and places political convenience ahead of the biological necessities of a species facing extinction.

Summary

The Utah prairie dog is facing death by a thousand paper cuts, most of them very painful. Unlike many imperiled species, UPDs are imperiled not by neglect, but by over-management. This management is more often oriented toward limiting impacts on people and less toward redressing "economic growth and development untempered by adequate concern and conservation"[54] – the latter of which is the ESA's very purpose.

UPDs have been protected under the ESA for over 28 years. Yet, declines are apparent across private, federal, and state ownerships in all three recovery areas for this species. There are multiple threats responsible for the UPD's failure to recover and the disappearance of many public land prairie dog complexes. These include sylvatic plague, overgrazing of habitat by livestock, permitted and unpermitted shooting and poisoning, a massive and unsuccessful translocation program, habitat destruction without adequate mitigations under habitat conservation plans, road mortalities, and the intersection of drought with human economic activities.

Perhaps most fundamentally, the UPD suffers from the continued assumptions – especially among the very state and federal agencies imbued with this species's recovery – that prairie dogs are dispensable and that private lands are off-limits for endangered species conservation. Both of these assumptions are inappropriate and are responsible for the prairie dog's downward spiral. Both of these tenets, moreover, fly directly in the face of the ESA's intent and provisions for species recovery. It is time to bring the Utah prairie dog recovery

[54]See ESA Section 2; 16 USC § 1531(a)(1).

program in line with the Endangered Species Act and to leave behind the politically-driven, poor implementation of the ESA that has arrived the program at such a sorry state.

Need for Ecosystem Management

Petitioners believe that classification of the Utah Prairie Dog as an Endangered species will insure that state and federal agencies develop an effective form of ecosystem protection. Biologists working on prairie dog ecosystems recognize the profound need for a multiple-species, habitat-wide, and whole-ecosystem approach to the successful conservation of viable populations of prairie dog-associated species. In particular, these researchers have noted the need to protect the prairie dog in order to safeguard the biotic integrity of native ecosystems (Benedict et al. 1996; Miller et al. 1996; 1994). The efficiency of such management has been noted by several commentators including FWS itself (GAO 1994a; Benedict et al. 1996; Noss et al. 1995).

Moreover, the protection of ecosystems is stated as the very purpose of the ESA. Where single species play keystone roles, the ESA's single-species protection provisions can correlate to ecosystem-wide protection. As a keystone species and a species facing the risk of extinction, the Utah prairie dog's upgrade to Endangered status and subsequent recovery should be FWS's highest priority.

Requested Designation

Forest Guardians, Center for Native Ecosystems, Escalante Wilderness Project, and Southern Utah Wilderness Alliance, Boulder Regional Group, and Terry Tempest Williams hereby petition the U.S. Fish and Wildlife Service under the Department of Interior to list the Utah prairie dog (Cynomys parvidens) as an Endangered species pursuant to the Endangered Species Act. We request that the species be formally uplisted from its current Threatened designation to Endangered designation, which more accurately represents its biological status. The Utah prairie dog is clearly facing extinction and therefore warrants Endangered status.

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