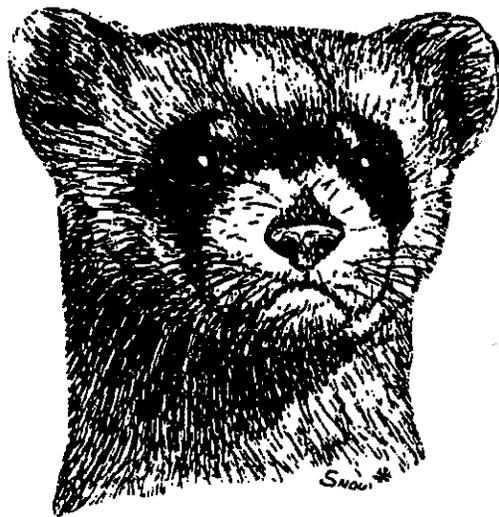


**EVALUATION OF A POTENTIAL
BLACK-FOOTED FERRET
REINTRODUCTION SITE IN AUBREY VALLEY
COCONINO COUNTY, ARIZONA**

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Evaluation of a Potential
Black-footed Ferret
Reintroduction Site in Aubrey Valley
Coconino County, Arizona

INTRODUCTION

Since 1985, the Arizona Game and Fish Department (AGFD) has been evaluating potential habitat for black-footed ferrets (*Mustela nigripes*) statewide, as AGFD reported at the 1988-1993, annual meetings of the U.S. Fish and Wildlife Service (USFWS) Interstate Coordinating Committee. The most thorough site evaluation completed in Arizona prior to this work focused on Bureau of Land Management lands in Navajo and Apache counties (Yarchin et al. 1988). The potential of prairie dog towns in the Aubrey Valley Complex (AVC) as black-footed ferret habitat was first recognized by AGFD Habitat Specialists in 1985, but funding and staffing for thorough evaluation were not available until 1990.

METHODS

Field work included detailed description and mapping of Gunnison's prairie dog (*Cynomys gunnisoni*) towns throughout Coconino County, Arizona. The techniques proposed by Biggins et al. (1989 and undated) to estimate prairie dog activity and density have been applied to a large complex of Gunnison's prairie dog towns in Aubrey Valley, an area included in the species' range in Arizona as reported in Hoffmeister (1986) (Figure 1). Night surveys for ferrets in accordance with the procedures of Clark et al. (1984) have also been conducted. Interviews of knowledgeable people, such as ranch employees and AGFD personnel, helped to determine the history of prairie dog poisoning and other pertinent management history.

RESULTS

Habitat

The Aubrey Valley is characterized by Brown (1982) as a Plains Grassland community, with annual precipitation averaging 25 to 30 cm. The valley floor includes approximately 220 km² and ranges from 1600 to 1900 m in elevation. It is bounded on both sides by pinyon-juniper ridges along a 41 km northwest-southeast axis. Near mile marker #124, along old Highway Route 66, the valley is 12 km wide.

Nearly 7000 ha (36%) of the valley floor is inhabited by Gunnison's prairie dogs. Land ownership throughout Aubrey Valley is a state-private checkerboard pattern, with 38 percent of the prairie dog acreage state-owned and the remainder private (Table 1). An additional 5454 ha of Gunnison's prairie dog towns have been located outside of AVC, with the nearest prairie dog town eight km east.

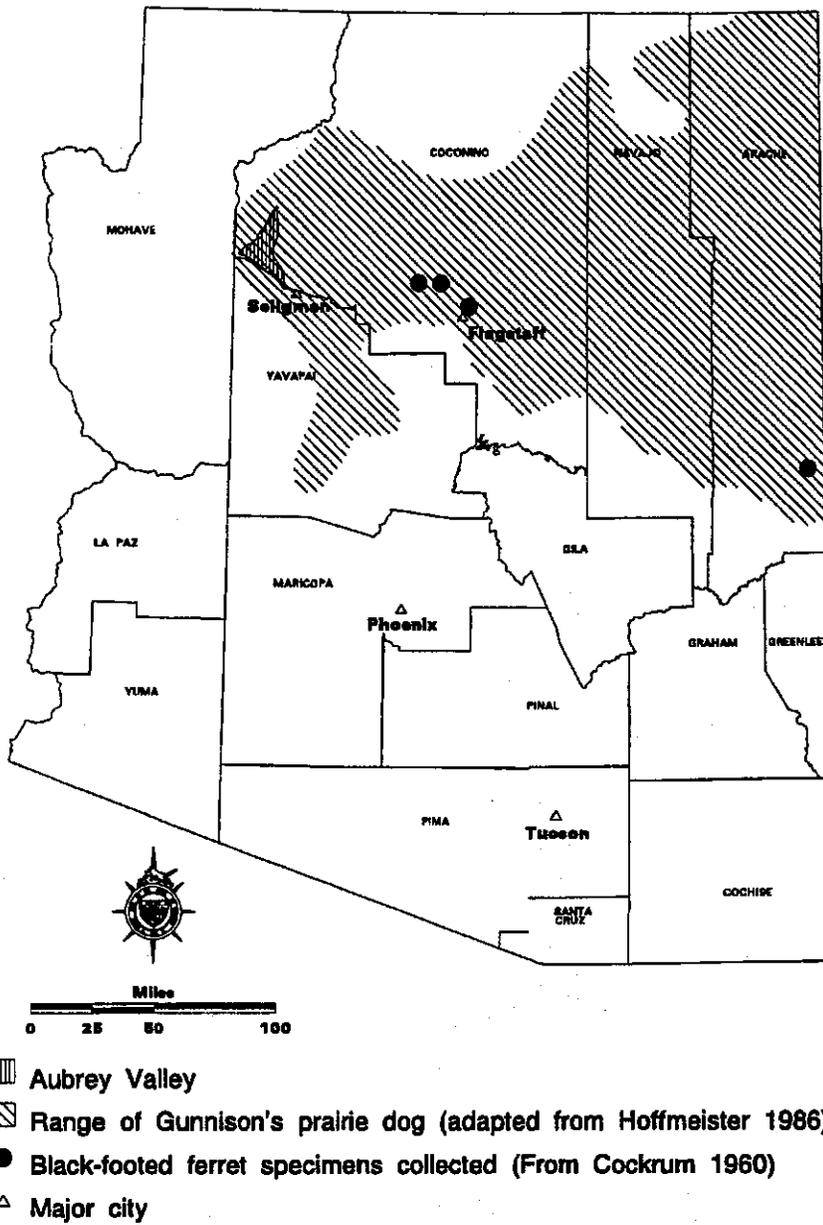


Figure 1. Shaded area indicates the range of Gunnison's prairie dog in Arizona.

Table 1. Gunnison's prairie dog towns in the Aubrey Valley Complex, Coconino County, Arizona, 1993-94.

PRAIRIE DOG TOWN	TOWN SIZE IN HECTARES	PERCENT STATE LAND
South Caterpillar	84	30
North Caterpillar	35	10
Tin Shack	13	0
Audley	4536	35
Cliff	11	100
Roundup	6	0
Borrow Pit	19	50
Pica Station	11	0
Mission	86	87
Hyde Park	17	100
Last Chance	22	33
Pica Camp	1935	40
Reservation	45	0
Grand Canyon Caverns	67	33
Longhorn	208	66
Crossroads	106	28
Buffalo	34	12
Lonetree	22	10
Topeka	11	0
Santa Fe	11	100
Valley	106	53
TOTAL	7385	38

Table 3. Prairie dog burrow counts along transects (each 3 x 1000 m = 1/3 ha) in Audley town, Aubrey Valley, Coconino County, Arizona, in 1993.

LOCATION	# OF TRANSECTS	ACTIVE	ACTIVE/HA

other species of prairie dogs and considers Gunnison's prairie dog to be a member of the subgenus *Leucocrossuromys* or white-tailed prairie dogs. However, according to Pizzimenti (1975) *C. gunnisoni* have a looser form of organization than *C. leucurus*, the species on which Biggins et al. (undated) based their calculations.

Biggins et al. (undated) found burrow densities in Meeteetse to vary from 39 to 108 burrows/ha and prairie dog densities ranging from 5.7 to 16.0 prairie dogs/ha. AVC studies show similar ranges for the Gunnison's prairie dog. Therefore, Gunnison's prairie dog is assumed to compare closely to the white-tailed prairie dog.

REINTRODUCTION SITE	HECTARES OF PRAIRIE DOGS	ESTIMATED BFF FAMILIES
Meeteetse, Wyoming	2700	33.4
Shirley Basin, Wyoming	16,298	98.5
Aubrey Valley, Arizona	7385	44.7

Few areas within AVC with habitat suitable for prairie dogs are not occupied now. In 1990, approximately 600 ha of old prairie dog mounds without burrow openings were located on the southeastern edge of Pica Camp town. However, since then prairie dogs have recolonized this area. The unoccupied area within Audley town (Figure 2) is overlain with deep sandy soil which is probably unsuitable for burrow construction. Other unoccupied areas in and adjacent to AVC are within small basins that flood periodically or are within highway or railroad rights-of-way.

The dominant land use in AVC is livestock grazing. The current ranch operators lease their grazing rights from an absentee owner. A foreman and several wranglers reside at Pica Camp, in Aubrey Valley, and a manager resides in nearby Seligman.

Predatory Animal and Rodent Control agents of the U.S. Biological Survey treated prairie dog towns in Aubrey Valley with poisoned grain in the mid-1950s, but the effort was apparently ineffective and not thorough. Control efforts have not been attempted since then (Rex Williams pers. com. 1990).

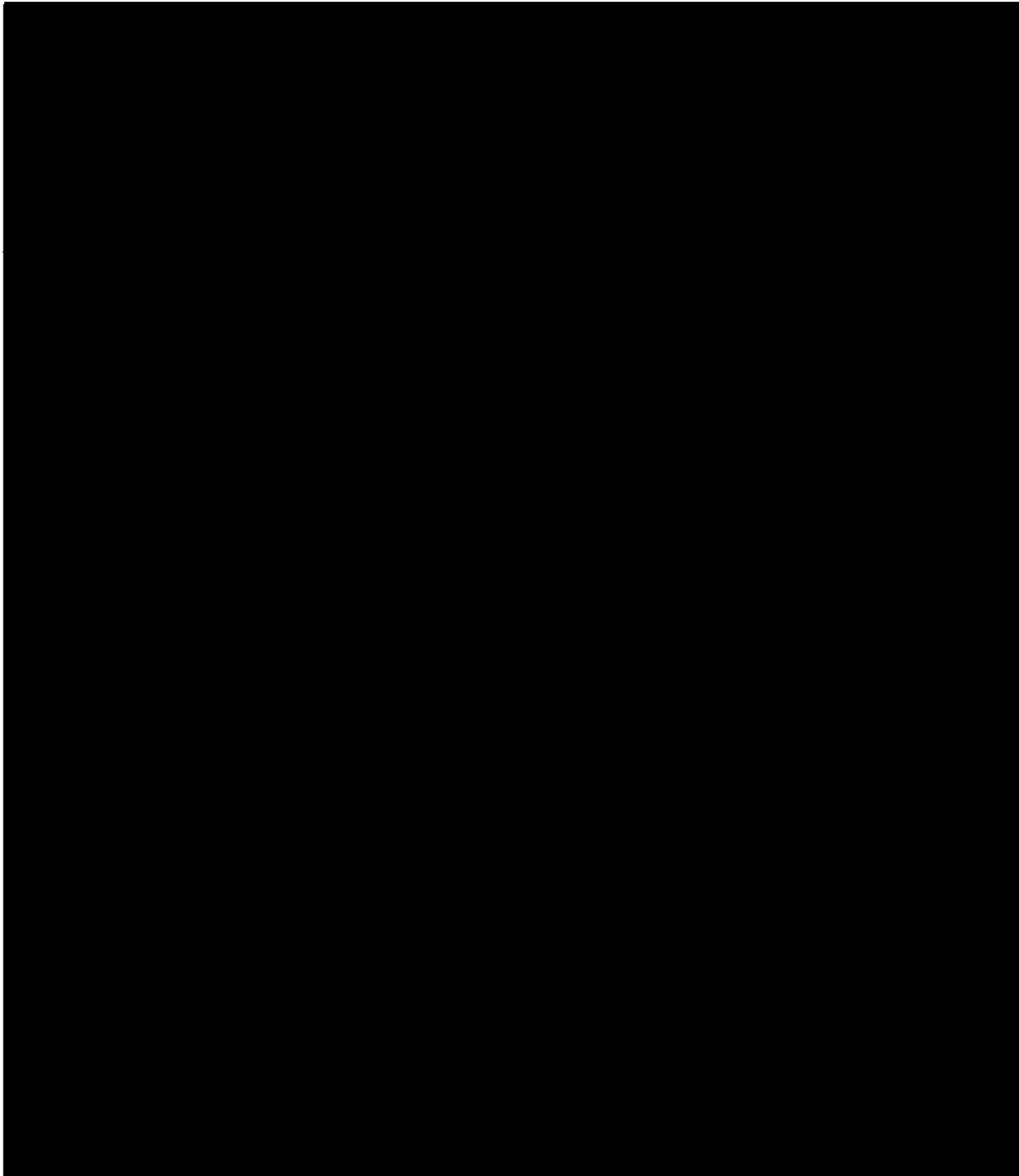
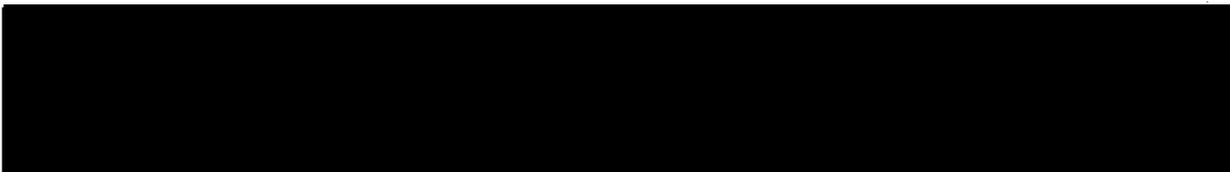


Figure 2. Location of prairie dog towns in Aubrey Valley Complex.



Ferret Searches

Nocturnal searches for black-footed ferrets, totalling 323 person-hours, were conducted July 21-23, 27-29 and August 10-12, 20, 24-25 1993, in accordance with techniques of Clark et al. (1984). No ferrets or sign of their activities were observed.

Plague Management

Gunnison's prairie dogs in Arizona have been affected by plague outbreaks since 1932 (Eskey and Haas 1940). Hoffmeister (1986) reports that prairie dogs in Arizona are recognized as reservoirs of plague. Arizona's Department of Health Services, Division of Disease Prevention, has monitored plague occurrence in humans, wildlife and domestic pets since 1950. In 1991, Dr. John Doll, Division Manager of Vector and Zoonotic Diseases (VZD), provided the following information:

VZD monitors plague activity in Arizona by documenting human cases, testing carnivore blood samples for plague titers, and testing flea pools collected from Gunnison's prairie dog towns (Table 6). The first human case of plague in Arizona was diagnosed in 1950, with subsequent cases as recently as 1994. Blood samples from carnivores collected by USDA Animal Damage Control and AGFD personnel have been analyzed for plague antibodies since 1974.

VZD has monitored plague outbreaks in prairie dog towns since 1974, verifying the outbreaks with analysis of flea samples (Table 7 and Appendix 1). The monitoring includes annual visits to prairie dog towns along a route that parallels Interstate Highway 40 in Apache, Navajo and Coconino counties. One of the monitoring locations is in AVC, where, over the last 19 years, a widespread die-off has never been observed. Furthermore, flea pools from AVC prairie dog burrows have always tested negative for plague (Table 7 and Appendix 1). These observations are supported by Tim Pender (pers. com. 1991), the AGFD Wildlife Manager stationed in Seligman, Arizona. During 1300 person-hours from 1990-1993, AGFD field crews observed no dead or dying prairie dogs in AVC except for those attributable to predation. The present study's 1990, 1991, 1992, and 1993 estimates of 7170 ha, 7025 ha, 6981 ha, and 7385 ha respectively, of habitat occupied by prairie dogs in the AVC also fail to indicate substantial die-offs.

Despite the absence of documented occurrence in AVC, at least some fluctuation in the prairie dog population is likely. Plague is probably epizootic at times in locations adjacent to AVC, as is indicated by carnivore blood titer analysis (Table 6). The carnivores may be exposed to plague as a result of preying on rock squirrels (*Spermophilus variegatus*), which may be the most widespread and consistent carrier of plague in Arizona (John Doll pers. com. 1991) and which are relatively common around AVC. The other aspect of plague and its effects on prairie dogs concerns contingencies for managing epizootic outbreaks.

Table 6. Test results for plague titers in Arizona, 1974-1993. Data from Arizona Department of Health Services.				
	Coconino	Mohave	Yavapai	TOTAL
Coyote	*382/778	28/231	165/523	565/1522
Dog	156/1078	1/75	4/17	161/1170
Fox	5/27	1/21	9/64	15/112
Bear	6/32	-	0/1	6/33
Badger	5/18	-	0/4	5/22
Skunk	0/5	0/1	1/11	1/17
Bobcat	5/15	0/8	2/14	7/37
Cat	1/7	-	0/11	1/18
Ringtail	-	0/2	3/53	3/55
Mountain Lion	0/1	-	0/4	0/5
TOTAL	550/1939	29/325	175/616	764/3755

*number of positives in total blood samples tested. Titers for coyotes ranged from 32 (exposure during the previous year) up to 512 (exposure during recent weeks).

VZD epidemiologist have applied techniques to control plague on prairie dog towns in Arizona, but the effective efforts have always occurred on sites that are very small in comparison to AVC (John Doll pers. com. 1991). The labor-intensive procedure involves using a hand-operated dust applicator that applies one ounce of five percent carbaryl at burrow openings. Aerial application of carbaryl is not appropriate, as the pesticide has to be applied inside every burrow to be effective. Hand application is a manageable task in a prairie dog town of 50 ha, but is essentially impossible in a complex the size of AVC. For example, during 1992, nearly 200 person-hours were required to count two percent of the burrows in AVC (Appendix 3). Counting burrows and dusting them are similar activities, leading to an estimate of 15,000 person-hours required to dust carbaryl in burrows over the entire complex.

Table 7. Plague monitoring in AVC and nearby prairie dog towns, Coconino County, Arizona. Prairie dog status includes: A=active, I=inactive, or not recorded. Data from Arizona Department of Health Services.

LOCATIONS WITHIN AUBREY VALLEY	DATE	PRAIRIE DOG STATUS	FLEA SAMPLE RESULTS	
Grand Canyon Caverns Airport, MM ¹ 114-115	08/04/80	A	Fleas found no test	
	07/18/78, 09/07/78 09/01/81, 05/19/82 10/05/82, 08/30/84 04/16/86, 04/22/87 07/16/87, 04/05/88 04/20/89, 06/21/89 09/14/89, 05/24/90	A	-	
	04/14/81, 04/11/84 06/18/92	A	Negative	
	07/18/78, 11/28/78 04/16/86	I	-	
	10/17/79	I	Negative	
	01/25/84	-	No fleas found	
	04/03/80, 01/18/83	-	Negative	
	Hyde Park, MM 117; Nelson and Yampai turnoffs	04/02/80, 09/01/81 05/19/82, 10/05/82 08/30/84, 07/17/85 04/05/88, 08/31/88 04/20/89, 06/21/89 09/14/89, 05/24/90	A	-
		06/18/92	A	Negative
08/04/80		I	Negative	
04/14/81, 04/11/84 11/16/87		-	Negative	
Pica Camp, MM 120	09/07/78, 04/02/80 04/10/84, 08/30/84 11/01/84, 07/17/85 09/18/85, 04/16/86 04/22/87, 07/16/87 11/16/87, 04/05/88 08/31/88, 04/20/89 06/21/89, 09/14/89 05/24/90	A	-	

¹Mile markers on State Highway 66

Table 7 (continued). Plague monitoring in AVC and nearby prairie dog towns, Coconino County, Arizona. Prairie dog status includes: A=active, I=inactive, or not recorded. Data from Arizona Department of Health Services.

LOCATIONS WITHIN AUBREY VALLEY	DATE	PRAIRIE DOG STATUS	FLEA SAMPLE RESULTS
Pica Camp, MM 120 (cont.)	10/16/79	I	No fleas found
	04/14/81, 04/11/84	I	-
	07/18/78, 07/19/78 04/11/84, 02/20/85 05/25/90	-	Negative
Deer Lodge, MM 119	04/16/86	I	-
Crossroads, 5 mi. NW of Pica Camp	06/22/92	I	Negative
Borrow Pit, MM 124	04/10/84, 04/22/87 07/16/87, 04/05/88 04/20/89, 06/21/89	A	-
	05/24/90	I	-
Audley, MM 125-131	04/10/79, 05/19/82 10/05/82, 01/18/83 04/10/84, 08/30/84 07/17/85, 09/18/85 04/16/86, 04/22/87 07/16/87, 04/05/88 08/31/88, 04/20/89 06/21/89, 09/14/89 05/24/90	A	-
	05/24/90	A	Negative
	10/05/82	I	No fleas found
	08/04/80, 04/23/85	-	Negative
North Caterpillar, MM 132	04/14/81, 04/10/84 08/30/84, 09/18/85 04/22/87, 07/16/87 04/20/89, 06/21/89	A	-
South Caterpillar, MM 133	04/10/79, 10/05/82 04/05/88, 06/21/89 09/14/89	A	-
	10/16/79	I	No fleas found

¹Mile markers on State Highway 66

Furthermore, treatment with five percent carbaryl is effective for no more than a few months, and sometimes requires re-treatment in the same season. Another pesticide, permethrin, has a significantly greater half-life and has been licensed for use in Arizona, but its application method is the same as for carbaryl. Another aspect of this management strategy is that the potential for unforeseen side effects on the prairie dogs, ferrets and other associated species is not known.

Black-footed Ferret History

Black-footed ferrets have been documented in Coconino County, Arizona (Figure 1), but little is known about their historical abundance or distribution. Hoffmeister (1986) reports two specimens, collected in 1917 and 1929. The capture location of the more recent specimen was 78 km east of AVC. However, Hoffmeister did not include two other Arizona specimens which are curated at the Museum of Vertebrate Zoology (MVZ), University of California at Berkeley. Cockrum (1960) reports that both of these MVZ specimens are from Coconino County, but does not date them. According to an unpublished, undated USFWS report, a personal communication between Richard E. Warner and Dr. Paul Springer verifies the MVZ specimens were collected in 1931. The locations are east of Flagstaff and at Government Prairie, which is 80 km east of AVC. These four specimens are evidently the only black-footed ferrets known from Arizona. In addition, Louis Cox, Animal Damage Control (ADC) trapper, remembered seeing ferret sign west of Seligman while poisoning prairie dogs in 1967 (pers. com. 1993). This location is eight km east of the AVC.

Land Use and Management Strategies

This summary is based on recommendations presented by the USFWS Interstate Coordinating Committee.

Livestock: Grazing is compatible with maintenance of prairie dog towns, which are the ferret's habitat. Black-footed ferrets prey on prairie dogs and potentially could help control prairie dog populations. Management of prairie dog colonies outside of AVC would not be constrained by ferret habitat needs. Other prairie dog complexes in northern Arizona would be subjected to site-specific analyses similar to this one before they could be designated as additional reintroduction sites.

Disease Control: Canine distemper is a viral disease, devastating to ferrets, as observed in the Wyoming colony (Williams et al. 1990). It is similar to plague in that management strategies for wildlife are not known. For example, immunization against the disease is accomplished by inoculation and therefore, is feasible only for the founder generation. However, a prevention protocol for researchers working with ferrets has been effective for captive management and reintroduction activities in Wyoming (Thorne et al. 1985 and Thorne pers. com. 1991).

A study plan similar to a disease survey conducted at a South Dakota reintroduction site (Williams 1991) is being developed by the AGFD Research Branch for the Aubrey Valley and other potential ferret reintroduction sites in Arizona. Regardless of the study results, the potential

of distemper exposure to free-ranging ferrets in AVC will be difficult to estimate. The outbreak in the Meeteetse, Wyoming, ferret population was potentially initiated or, at least, aggravated by ongoing research activities (Williams et al. 1988, and Bergman 1990).

As described in the results section, plague has some potential to affect prairie dogs in AVC. However, the long term monitoring of this site and the detailed study of recent years has failed to discover substantial prairie dog losses. The extensive scale of AVC may buffer the effects of plague or, in any case, it may preclude the application of insecticide as a feasible management strategy.

Trapping and Shooting: Use of leghold traps and snares in ferret management zones could kill ferrets, but fitting stops on snares and tension springs on leghold traps should prevent inadvertent capture of ferrets. Furthermore, telemetry studies of black-footed ferrets have shown that they rarely travel outside the bounds of established prairie dog towns (Biggins et al. 1986) and therefore, would be unlikely to be attracted to traps set in surrounding areas. Based on observations made during burrow sampling in 1990, prairie dog shooters concentrate on the southern third of AVC and take only those prairie dogs within rifle range of established roads. Directing these shooters to alternate sites outside of AVC would reduce the potential for accidental ferret mortality.

Vehicles: State Highway 66 traverses AVC, presenting potential for ferret road kills. However, most East-West traffic across northern Arizona uses Interstate 40, which parallels Route 66. Actually, the situation in AVC is very similar to that of the Shirley Basin, Wyoming, site which is also transected by a major state highway. Some ferrets may cross Highway 66. However, since substantial portions of AVC are located miles from the highway, potentially affected ferrets should comprise only a small portion of the population. The ranch requires recreationists to comply with use restrictions including vehicle traffic only on established roads. ORV use in AVC is not prevalent and could be easily precluded in future management strategies.

CONCLUSIONS

The biological description of AVC presents convincing justification to proceed with analysis of this area as a potential black-footed ferret reintroduction site. Studies in 1995 will include monitoring of prairie dog populations in northern Arizona, sampling for plague and distemper in Aubrey Valley, and searches for a natural occurring population of black-footed ferrets. AVC's split ownership, between a private landowner and the State Land Department, presents a challenge in finalizing a management plan, but this and other potential conflicts identified above, under Land Use and Management Strategies, should not be difficult to resolve.

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Appendix 1. Plague monitoring results from locations adjacent to Aubrey Valley Complex, Coconino County, Arizona. Prairie dog status includes: A=active, I=inactive or not recorded. Data from Arizona Department of Health Services.

LOCATIONS OUTSIDE AUBREY VALLEY	DATE	PRAIRIE DOG STATUS	FLEA SAMPLE RESULTS
Walnut Creek Rd. [REDACTED]	07/13/76	A	Fleas found no test
	01/19/77, 05/09/78 10/06/82, 08/30/84 04/23/87, 04/05/88 04/20/89, 06/20/89 09/14/89	A	-
	07/19/78, 04/10/79	I	-
	01/19/83	-	No fleas found
	07/20/78	-	Negative
	Bridge Canyon Estates [REDACTED]	07/18/78, 09/07/78 04/10/79, 08/04/80 10/05/82, 08/30/84	A
10/16/79, 04/02/80 07/16/85		I	Fleas found no test
11/28/78		I	-
07/19/79		I	Negative
01/19/83, 01/25/84 11/01/84		-	No fleas found
05/19/82, 05/25/90 06/18/92		-	Negative
Seligman Dam [REDACTED]		11/16/87	A
	09/07/78, 09/01/81 10/05/82, 09/18/85 04/22/87, 07/16/87 04/05/88, 08/31/88 04/20/89, 06/20/89 05/24/90	A	-
	11/01/84	-	-
	04/12/84, 02/20/85 04/22/85, 04/16/86	-	Negative
	Seligman H.S. [REDACTED]	07/19/78	A
01/18/83		I	-
09/07/78		-	No fleas found

Appendix 1 (continued).			
LOCATIONS OUTSIDE AUBREY VALLEY	DATE	PRAIRIE DOG STATUS	FLEA SAMPLE RESULTS
Seligman Landfill [REDACTED]	06/01/77, 07/18/78	A	-
	06/24/92	-	Negative
Seligman KOA [REDACTED]	07/19/78, 07/20/78	-	Negative
Seligman, East I-40 on-ramp [REDACTED]	04/22/85	-	Negative
Seligman Train Depot; between I-40 and RR [REDACTED]	05/24/90	A	-
	07/19/78	-	Positive
Seligman Hill, I-40 [REDACTED]	04/15/81	A	Negative
Chino Wash [REDACTED]	04/14/81, 05/19/82 04/10/84, 08/30/84 11/16/87	A	-
	09/18/85	I	No fleas found
	04/22/85	-	Negative
Nelson, MM ² 113 [REDACTED]	09/01/81, 04/20/89	A	-
Nelson, MM 111 [REDACTED]	05/24/90	A	-
	04/23/85	-	Negative
Anvil Rock Rd. [REDACTED]	06/21/89	I	Negative
	04/16/86	-	Positive
	08/11/86, 07/17/92	-	Negative
Peach Springs MM 107 [REDACTED]	09/01/81	I	-
	06/23/92	-	Negative
Ft. Rock Rd. [REDACTED]	05/09/78, 04/20/89	A	-

²Mile markers on State Highway 66

Appendix 2. Estimated prairie dog burrow status and densities for 1993, in Aubrey Valley.

PICA CAMP-167 transects ran 6/8,24/93, 7/7-8,13-15/93

1. $89/167=53\%$ (percent of "good" habitat)
2. $(.53)(1935)=1026$ (ha of "good" habitat)
3. $1369/89=15.38/.3=51.27$ (average active burrow/ha on "good" habitat)
4. $(.073)(51.27)=3.74/.495=7.56$ (prairie dog density/ha on "good" habitat)
5. $(7.56)(1026)=7757$ (total number of prairie dogs on "good" habitat)
6. $7757/763=10.17$ BFF Families (a BFF family consist of 1 adult female, 3.3 young, and .5 adult male)

AUDLEY-259 transects ran 5/19-22/93, 6/1,3-4,9-11,22-25/93

1. $201/259=78\%$
2. $(.78)(4536)=3538$
3. $2810/201=13.98/.3=46.60$
4. $(.073)(46.60)=3.40/.495=6.87$
5. $(6.87)(3538)=24306$
6. $24306/763=31.86$ BFF Families

GRAND CANYON CAVERNS-9 transects ran 7/6/93

1. $9/10=90\%$
2. $(.90)(67)=60.30$
3. $152/9=16.89/.3=56.30$
4. $(56.30)(.073)=4.11/.495=8.30$
5. $(8.30)(60.30)=500$
6. $500/763=0.66$ BFF Families

MISSION-5 transects ran 7/9/93

1. $15/18=83\%$
2. $(.83)(86)=71.38$
3. $210/15=14.00/.3=46.67$
4. $(46.67)(.073)=3.41/.495=6.88$
5. $(6.88)(71.38)=491$
6. $491/763=0.64$ BFF Families

BORROW PIT-5 transects ran 6/8/93

1. $5/5=100\%$
2. $(1)(19)=19$
3. $70/5=14.00/.3=46.67$
4. $(46.67)(.073)=3.41/.495=6.88$
5. $(6.88)(19)=131$
6. $131/763=0.17$ BFF Families

Appendix 2 (continued).

VALLEY-8 transects ran 7/15/93

1. $4/8=50\%$
2. $(.50)(106)=53$
3. $42/4=10.50/.3=35.00$
4. $(35.00)(.073)=2.55/.495=5.16$
5. $(5.16)(53)=273$
6. $273/763=0.36$ BFF Families

HYDE PARK-5 transects ran 6/8/93

1. $4/5=80\%$
2. $(.80)(13)=13.60$
3. $50/4=12.50/.3=41.67$
4. $(41.67)(.073)=3.04/.495=6.14$
5. $(6.14)(13.60)=84$
6. $84/763=0.11$ BFF Families

NORTH CATERPILLAR-9 transects ran 5/19/93, 6/2/93

1. $7/9=78\%$
2. $(.78)(35)=27.30$
3. $111/7=15.86/.3=52.87$
4. $(52.87)(.073)=3.86/.495=7.80$
5. $(7.80)(27.30)=213$
6. $213/763=0.28$ BFF Families

SOUTH CATERPILLAR-18 transects ran 5/19/93, 6/1/93

1. $10/18=56\%$
2. $(.56)(84)=47$
3. $122/10=12.20/.3=40.67$
4. $(40.67)(.073)=2.97/.495=6.00$
5. $(6.00)(47)=282$
6. $282/763=0.37$ BFF Families

The AVC will support 44:65 BFF Families. Nine of the 21 towns found in AVC can support BFF families greater than 0.1. However, there were some new towns discovered after transects were run and no data was collected this year. Some of these new towns may be able to support BFFs. Nine of 15 towns in which data was collected can support ferrets. This comprises 6885 of the 7385 hectares mapped as prairie dog towns.

Appendix 3. Percentage of prairie dog towns sampled in AVC in 1993.			
PD TOWN	EST. HA/TOWN	# TRANSECTS COMPLETED	% OF TOWN SAMPLED
AUDLEY	4536	259	1.7
** PICA CAMP	1935	167	2.6
LONGHORN	208	9	1.3
** CROSSROADS	106	12	3.4
MISSION	86	18	6.3
S.CATERPILLAR	84	18	6.4
G.C.CAVERNS	67	10	4.5
RESERVATION	45	0	0
VALLEY	106	8	2.3
N.CATERPILLAR	35	9	7.7
BUFFALO	34	5	4.4
BORROW PIT	19	5	7.9
LONE TREE	22	5	6.8
LAST CHANCE	22	5	6.8
HYDE PARK	17	5	8.8
TIN SHACK	13	9	2.1
ROUNDUP	06	0	0
CLIFF	11	0	0
SANTA FE	11	0	0
TOPEKA	11	0	0
PICA STATION	11	0	0
TOTAL	7385	544	2.2

** Indicates that originally the Crossroads town was considered part of Pica Camp. After running transects in 1992 it was determined that these two towns are actually separate.